
Book:
Berth, C. and Prentice, M.M, eds. (2026) Reworking the computer age: Histories of emotions, work, and gender. History of Science and Technology. Deutsche Nationalbibliothek. ISBN: 9783837675658. ISSN: 2702-9719. EISSN: 2749-2052.

https://doi.org/10.14361/9783839401392

Christiane Berth, Michael M. Prentice (eds.)
Reworking the Computer Age

Editorial

The history of science and technology has long been part of the historiographic toolkit. Despite its long tradition and thanks to its interdisciplinary outlook, this field of research always mustered an impressive degree of innovation and range of approaches. The book series **History of Science and Technology** offers a common platform for discussions and research on the history of science(s) in relation to power and society, on the history of knowledge and of the transfer of knowledge, of scientific progress, as well as on the history of technology and technological innovation.

Christiane Berth is a Professor of Contemporary History at Universität Graz. Her research interests include the global history of communication and technology, food and consumption, trade and migration, as well as the history of Mexico and Central America. She earned her doctorate from Universität Hamburg and has held academic positions at the universities of St. Gallen, Basel, Bern, and Costa Rica.

Michael M. Prentice is a Senior Lecturer in Korean Studies at the University of Sheffield. Trained as a linguistic and cultural anthropologist of Korea, his research broadly focuses on genres and technologies of communication in contemporary South Korea organizations. He earned his PhD at the University of Michigan and previously held a postdoctoral fellowship at Harvard University.

Christiane Berth, Michael M. Prentice (eds.)

Reworking the Computer Age

Histories of Emotions, Work, and Gender

[transcript]

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available online at https://dnb.dnb.de

transcript Verlag | Hermannstraße 26 | D-33602 Bielefeld | live@transcript-verlag.de

Cover design: Maria Arndt
Copy editing: Joan Dale Lace
Printing: Elanders Waiblingen GmbH, Waiblingen
https://doi.org/10.14361/9783839401392
Print-ISBN: 978-3-8376-7565-8 | PDF-ISBN: 978-3-8394-0139-2
ISSN of series: 2702-9719 | eISSN of series: 2749-2052

Printed on permanent acid-free text paper.

Contents

Introduction: Reworking the computer age

Christiane Berth and Michael M. Prentice

In 1996, the UK's Post Office began to pilot a new electronic point-of-sale system known as Horizon, developed by International Computers Limited, part of the Japanese firm Fujitsu. Horizon would fully roll out in 1999 to replace paper-based tills across more than 18,000 post offices and independent post offices (known as sub-post offices). The sub-postmasters and sub-postmistresses who ran the latter could enter transactions electronically through new Horizon terminals installed in their branches which would also allow them to see their balances at the end of each week. Some, however, began to encounter glitches that caused unexplained debts in their weekly accounts. As contractors and not employees, they were responsible for any shortfalls in revenue, which the central Post Office would ask them to repay. It was only in 2009 when a *Computer Weekly* article documented seven cases of individuals who were required to pay funds back, had funds mysteriously removed, or were taken to court (resulting in bankruptcy for some) that a more widespread issue came to light.[1] The article also revealed a cover-up: problems that had been reported by sub-postmasters were dismissed by the Post Office, Fujitsu, and even the Federation of SubPostmasters which represented them. In all, up until 2013, 700 individuals were prosecuted for financial crimes or forced to reach plea deals. The restitution of justice and an investigation into the scandal have been ongoing since.

The roll-out, cover-up, scandal, and subsequent public enquiry into the software provoked strong emotional reactions and prompted reflection on the risks of using computers in the workplace. The accounts of sub-postmasters indicate that many glitches or mistakes leading to fictive losses happened without their knowledge; the subsequent false accusations and lengthy prosecutions caused significant distress and fear. As one impact statement submitted as part of the inquiry noted,

> As [my sub-postmaster brother] fought to make sense of the losses he could not explain, his personality and state of mind started to deteriorate. He had been outgoing and sociable, but during this period he began to change. He became very

1 "Postmasters under Stress," *Computer Weekly* (May 12–18, 2009). Historian Martina Heßler is currently working on a research project about the scandal focusing on technological errors in digital societies.

> depressed and withdrawn and felt he was the only one in this dire situation and so it must be all his fault.[2]

The Horizon IT scandal, as has become known, serves as a vivid reminder that the mass computerization of modern societies has not come without consequences. Moreover, it reminds us that computerization is not a phase that modern societies have entirely completed or come to terms with; rather, computerization is an ongoing process and relationship, in which technological systems are not just developed, improved, and smoothly integrated into a welcoming populace, but one in which the understanding of their vast potential for societal and personal effects is managed, negotiated, and sometimes contested. As the scandal reveals, it often takes considerable inertia for stories about computerization problems to come to the surface, both due to organizational forces that can conceal them, employment dynamics that can silence them, and social forces that may not want to believe them.[3]

Reworking the Computer Age uses critical, historical, and global perspectives to understand where the early reactions and attitudes to computerization emerged, including the first perceptions of the scale and potential of computers on organizational and broader social phenomena, the experience of using them by non-specialists, and the forces that began to gather around them to usher in the computer age of the late twentieth century. The authors in this volume bring attention to the workplace as a specific site where these reactions were not just first experienced but where complex relationships to computers and around computerization were being forged. This includes relationships to devices, interfaces, and spaces; relationships to new social roles and professional aspirations; relationships to others connected by or through computers; relationships to senses of time and development; and relationships to powers and authorities. The chapters make clear that as much as computerization represented a promise for many of technological advancement, personal liberation, or national development, it also – perhaps equally – foreclosed opportunities for others by denying them opportunities or imposing new ideas of work, gender, and the self that often went against the broad promises of the computer age. How these contradictions were experienced and expressed animate the chapters in this book.

---

2 "The Post Office Horizon IT Inquiry: Written statement regarding human impact/cost – Statement 06. No date. Uploaded September 22, 2021. Accessed: https://www.gov.uk/government/groups/the-post-office-horizon-it-inquiry.

3 In the case of the Post Office scandal, it received significantly more public sympathy when Toby Jones, a white male actor portraying Alan Bates, a middle-aged white sub-postmaster who was falsely accused, headed an ITV drama. From a sample of revealed data, 39% of sub-postmasters who were prosecuted were from Asian backgrounds.

Toward the workplace

Historical accounts have tended to center the personal computer as the marker of computerization's success. They have chronicled the process of domestication of the computer from large-scale machines operated by elite specialists to friendlier, mass appliances that could fit comfortably in the home, socializing people at a young age to the presence, ease of use, and potentiality of computers and software as revolutionary or liberating devices.[4] There is a parallel history of computerization to be told in which computers can be seen making their first inroads through workplaces, reshaping secretarial, administrative, managerial, and technical occupations and professional identities as well as bringing many non-Western workforces into the capitalist labor process through computerized work.[5]

Many aspects of computers that emerged in the 1980s were designed around office users or office imagery, such as the idea of the computer interface as a desktop populated by overlapping files which could be organized into folders or email which was patterned on categories from the work of clerks, typists, and secretaries (in-boxes, carbon copies, memos, and so on).[6] At the same time, the computer significantly influenced office architecture, furniture, technical infrastructure, and a wide range of office accessories, reshaping the workplace in both form and function.[7] Computer literacy and skills developed both at homes and in schools prepared individuals for their business and work uses.[8] Such skills were and are still frequently seen as the goal of computer education, which can be linked to future work opportunities or lead to new forms of income and wealth. In this sense, the office is not a side story to the story of the computer, but in some ways both a starting point of the computer age and an endpoint for computerization movements.[9]

Computerization was a wholesale change in the possibilities of workplace life, changing the architecture and design of workplaces, much like the individualized

---

4 Stein, "Domesticity, Gender"; Markussen, "Constructing Easiness"; Baker and Geiringer, "Space, Text and Selfhood."

5 Kling and Iacono describe these in more discrete terms as "computerization movements" which are the social and organizational forces that drive computerization in a given area. See Kling and Iacono, "Mobilization of Support."

6 Campbell-Kelly et al., *Computer*, 261.

7 Kaufmann-Buhler, "Computing the Cubicle."

8 See Mahoney, "Histories of Computing(s)"; Abbate "Code Switch," S154–55.

9 Campbell-Kelly notes that the corporate software industry started already in the 1960s. While individual sales of personal computers and consumer software exploded in the 1980s, the financial scale of corporate software (with some software like Informatics' Mark IV costing $100,000 at the time) made them comparable. Campbell-Kelly, *From Airline Reservations*, 8. On the development of office computing in the United States, see also Haigh and Ceruzzi, *A New History*, 207–42.

cubicle, but extending into all aspects of spatial thinking, layouts, and modes of presenting information in office environments.[10] Computerization entailed new metaphors for how organizations operate, as well as how workers themselves might come to see themselves as information processors.[11] At the same time, computerization was a discourse amplified by different actors, with futuristic visions of technological revolution, optimistic hopes for social transformations, and doomsday predictions for the atomization of professional life and community.[12] In this book, we focus on the computer age as a time in which "technological dramas," to use the anthropologist Brian Pfaffenberger's term, were unfolding in different places around the world. These dramas show how technological objects, processes, or interfaces (or even the idea of them) could be animated for broader purposes, like opening up markets, changing organizations, or altering political landscapes.[13] Such dramas marshalled emotions of the masses in new ways – socializing them to the wonder of computers while also foreclosing or individualizing negative reactions or concerns over them.

The workplace communities where computers (or workstations) were first introduced had often not been socialized on a mass scale to computers.[14] They were (and are still) highly structured, gendered spaces, full of contradictions that were being critiqued at the time around the world, not least by feminist politics. In some instances, computerization re-entrenched gendered divisions of labor. For example, in the 1970s, female typists largely adopted computerized word processors around the world, significantly expanding female labor participation. At the same time, certain activities around the computer also took on social qualities as a masculine technology with its prestige qualities, like programming, evaluating information, or simply even controlling the screen, being delegated to or associated firmly with men.[15] The advent of the computer thus required the new technical and interactive affordances of computers to be worked out in changing social environments, such that women's roles and men's roles might be re-articulated in a new computer order.

At the same time, the hype of computers painted possible futures for work and society. A 1986 report suggested that the computer might finally rid Japan of the feminized labor category of the "office lady," as "women can rise in the hierarchy

10 Richardson, "Coordinating Office Space"; Saval, *Cubed*.

11 Morgan, *Images of Organization*, 76–78.

12 Hakken, "Computing and Social Change"; Pfaffenberger, "Social Meaning."

13 Pfaffenberger, "Technological Dramas," 285–86.

14 Janet Abbate notes that while work and personal devices have largely converged today, in the early 1980s they were two different devices: workstations which ran on UNIX for office settings and personal computers (or microcomputers) which emerged out of hobbyist culture and were first "build-your-own" kits. Abbate, *Inventing the Internet*, 171.

15 Van Oost, "Making the Computer Masculine"; Ensmenger, "Making Programming Masculine"; Hicks, *Programmed Inequality*.

by demonstrating that they are just as adept at using computers as their male colleagues."[16] Nevertheless, a gendered division of office labor would continue to define much of the Japanese economy regardless of the uptake in computers in offices at the time.[17] At the time, computers promised a host of new workplace futures for some which never came to be at the time, like portable computing, voice-input typing, teleconferencing, and telework.[18] They were also creating new divisions, not just around the de-skilled and skilled, but around repetitive "automated" work and higher-value "informated" work, to use Shoshana's Zuboff's terms.[19] Other kinds of professions and work crafts were effectively computerized for the first time, such as French salespeople who transformed from independent workers to those whose performance and schedules were now tied to a key new piece of software – Enterprise Resource Planning (ERP).[20]

The introduction of computers into professional settings goes beyond the sociological (re-)organization and division of work.[21] Looking into the recent past, we can see that computers represented a broad new frontier of social and ecological risk – as workers began to shift from a paper-based and machine-based world of human decision-making and production to software interfaces that mediated the world around them including the flow of money, the control of large machines, and the digitally cataloged lives of others through single terminals, new pieces of software, and keyboards. Historian Mar Hicks notes that in the UK, the threat of strikes by small groups of government computer operators in the 1960s led to fears of widespread failures in government operations, like savings and tax collecting. The newfound power of computer operators themselves could pose a social risk.[22] In this broad sense, the workplace was not only a site where computers gradually developed the forms and functions we know today, or a site where technology simply diffused at greater or lower rates of uptake. We suggest it is better to consider the workplace as a complex zone where the unfolding potentials of computers on all aspects of organizational and broader social life were being introduced and where narratives of what computers represented were being reworked. These zones of course are still

16 "Office automation challenges Japanese tradition," *UPI*, January 5, 1986. https://www.upi.com/Archives/1986/01/05/Office-automation-challenges-Japanese-tradition/8360505285200/

17 Ogasawara, *Office Ladies*.

18 Van Meel, "The Origins"; Haigh, "Remembering the Office of the Future."

19 Zuboff, *Age of the Smart Machine*.

20 Boltanski and Chiapello, *New Spirit of Capitalism*, 248.

21 For a discussion of computerization from a sociological perspective, see Burris, "Computerization of the Workplace."

22 Hicks, *Programmed Inequality*, 198. Hicks notes that the resulting decision to consolidate computer control out of fear of the workers' access to the computer system was double-edged: "[The government] had unwittingly cut the legs out from under the British computer industry and wrought havoc on their own computerization projects," 16.

unfolding today as the promissory notes of computerization are still being issued, so to speak, asking workers to make continual changes or adjustments for the sake of progress and modernization.

Workplace computers and new emotional regimes

The workplace as a site of investigation is also necessary in retelling histories of computers as it is almost inextricably defined by competing qualities of community and control. Arguably, workplaces were the first communities where the impact of computers could be seen and felt in social contexts; they were places where reactions and emotions around computer-based change could be shared and related. At the same time, workplaces are sites of different vectors of control, defined by a mixture of formal contracts, professional hierarchies, social respectability, normative group behavior, economic rationales, and market activity. Workers in office environments and organizational cultural regimes have long been under forms of emotional labor.[23] This was reinforced by firms' efforts to control emotions through interventions of industrial psychologists or trainers from the 1920s onward.[24] Alan Liu has suggested that the rise of office computerization in the 1980s and new ideas of shared corporate culture at the time is no coincidence: the power afforded by new computers also necessitated new regimes of self-control (alongside digital supervision) by which employees would regulate their emotions in daily office interactions.[25]

These factors make the introduction of and reaction to computers anything but personal or individual; instead, they are highly motivated by a number of factors. For some, computers were an object not just of acceptance but of negotiation and contestation. In the 1980s, for instance, trade unions in India negotiated over how many computers could be installed within banks as they realized both their potential and their threat.[26] Within this milieu, workers found themselves with their own pockets of control too, some forcibly collapsed by the computer age (such as the control over graphic design in lieu of a graphics department) and others shifting control to where it had not been (the slow decline in secretarial functions for typing up documents leading to executives acting as their own typists). Some of these controls also extended out into the world, where workers had new powers to add or delete huge files, to control moving objects, to move money, to start and stop heavy machinery, or to track and store large amounts of data. These diverse capacities were increas-

23 Hochschild, *The Managed Heart.*

24 Collin et al., "Bureaucracy and Emotions"; Stearns, "Prescriptive Literature."

25 Liu, *Laws of Cool*, 123–25.

26 Gothoskar, "Computerization and Women's Employment'," 154–55.

ingly being located in the same kind of device – the office computer, an individuated machine with an ever-growing body of software and networked capabilities.

Within the "regime of computation," as the American literary critic N. Katherine Hayles has described the new age filled with computing devices, emotional reactions and personal experiences toward computers have been in a sense pre-packaged.[27] This is particularly true for workplaces where reactions exist within broader labor regimes that not only control and standardize work, but evaluate and reward it as well. The chapters in this volume give a more nuanced perspective to the historical reception of computers in the workplace and ways of approaching emotions and computers historically: first, focusing on global cases, the chapters reveal that different national contexts and national discourses affected some of the reception of computers. For example, *angst* has been much discussed to describe German aversions to disruptive technologies of the future. Likewise, in South Korea, technological development went together with national economic development, which nobody at the time could reasonably oppose as the government, employers, and media all promoted the new winds of office automation. Second, we point to historical cases where the "emotional regime" of computers had not yet formally settled in – that is where the imaginative boundaries around computers had not been narrowed down.[28] In particular, we highlight how many of the early reactions generated new kinds of emotional communities or shared practices of connection – whether through enjoyment, euphoria, and concern. Third, looking from the present, we also highlight the way that the advent of computers has shifted historical memory of both labor and technology from the twentieth century by relegating technologies and their users to the past as well as clouding our impressions of the success of mass computerization.[29]

The workplace computer is not a new phenomenon by twenty-first-century standards, and in some ways it has already taken on some qualities as an "old" technology. Like the automobile, however, it has had remarkable staying power as a central point of individual interaction as well as an organizer of structures, spaces, and habits. That is to say, while our screens today may be faster, thinner, and have more storage than those of the 1980s, many of us still go to work at desks which are almost ritually centered on the computer as the focus of attention, with software built around the individual user experience (or multiple connections of individual users).

---

27 Hayles, *My Mother Was a Computer.*

28 William Reddy provides a transhistorical, transcultural approach to the emotional regime, which he defines as "The set of normative emotions and the official rituals, practices, and emotives that express and inculcate them; a necessary underpinning of any stable political regime." Reddy, *Navigation of Feeling*, 129.

29 On the variety of emotional reactions to technologies, see Heßler, "Technikemotionen," 15.

Computers, too, are still sites for control and surveillance, with the function of business-oriented software and processes. Much like how many of our lives are shaped by highways that accompanied the advent of the automobile, organizations and the workplace experience have been largely built around the computer, even as it has evolved over fifty years and new facets continually threaten to upend many aspects of our relationship to technology. Computers were and are still a central nexus point in which human actors confront digitalization through hardware devices, graphic interfaces, and software programs that connect humans to the powers of code. More than technologies and their object histories, focusing on the earlier histories of this relationship necessarily requires looking at how human actors experienced them, both those pushing them forward and those using them for the first time with fears and concerns about their potentials. At the same time, computers also stimulated fantasies of mobile work in the future that became more feasible once the laptop started substituting personal computers and became the standard device for mobile professionals. Overall, computers and their applications have radically changed size and shape throughout the last decades integrating interactive elements and communications platforms. Computers coexisted with and displaced older technologies, gradually replacing some while coexisting with others for extended periods.[30]

Alongside and accompanying the introduction of computers as objects is the way that many around the world have been socialized to computers, including how they should feel about new computerized, digitized, or networked futures that are always around the corner. This is not just about how people came to use devices or systems, as in technical literacy; rather, it comprises the individual and collective preparation for the advent of computers, including the shaping of emotional responses and attitudes toward computers, new categories of persons in relation to computers ("luddites vs. early adopters"), new promises about what computers could offer, and a reframing of the pre-computer age and non-computerized work. These processes have been so effective at changing attitudes to computers that human reactions toward them today are largely formulaic: if one has an unfavorable reaction toward new technology, that reflects a generational lag, radical lifestyle choice, or simple a sign of being behind the times; likewise, anger at computer interfaces reflects unstable emotional selves not unstable software; software bugs are just things that will be worked out; and computer-related joy is an expected reaction to new devices or software. This coterie of reactions is promoted (and prompted) in advertisements, school and university courses, and popular media. This has all been so effective across computerized environments that managing human reactions to computing has become a technical field itself – affective computing. This field exists (with technologies of its own) to sense emotions of users and help assess what

30 Balbi and Magaudda, *History of Digital Media*, 57–64; Haigh and Ceruzzi, *A New History*, 1–7.

kinds of people are fit for certain kinds of computer activities.[31] The field delegates to computers the job of reading our emotions, albeit within a very narrow window defined in part by the success of computerization as a whole. A return to the recent past allows us to understand just how quickly attitudes have changed and provides a point from which we can rethink narratives around computers in the first place. From this perspective, a new history of computerization can be told that highlights how the social foundations were laid that have made acceptance of computers a success – in some ways more of a success than hardware or software-based achievements on their own. Nevertheless, emotionally charged discussions about computer errors and user-unfriendly software continue.

Our contributions

This volume makes a number of interventions to tell a new story of the computer age. First, we focus on cases of computerization from a close historical perspective, beginning with the widespread adoption of computer coding in the 1960s and transitions to computerized work environments in the 1970s and 1980s. These accounts have often been told from the perspective of technologies themselves or from an assumption that computerization was always in the process of becoming something known, accepted, and ultimately good for society and organizations. Looking at early cases, the chapters in this volume show that many actors at the time had not accepted the new reality of computers and indeed raised many concerns about the potential risks that computers posed. These are more nuanced and complex than common narratives around irrational technological resistance or lack of foresight. Indeed, many of the concerns aired in the 1960s and 1970s foretell some of the consequences that would ultimately befall places like the UK's Post Office. They also provide a glimpse at how different actors came to narrate computerization in collective circumstances in work groups, labor categories, or at international meetings. In contrast to the largely individual and psychologized way we imagine computer usage today, a look at recent history shows that reactions and emotions around computers were experienced collectively and that emotions were not narrowly gathered

31 A 2018 MIT Sloan business school report suggested that managers and employers could soon adopt new technologies to measure emotions at work. "Emotion-sensing technologies" or ESTs can "help people improve their focus, often with relatively minimal technological investment." Such promises of technological control over emotions appear attractive within today's business milieu for those who want to limit the influence of "negative emotions" like panic, greed, or boredom as well as elicit "positive reactions" like happiness, joy, and desire, using the latest scientific devices or sensors. "How Emotion-Sensing Technology Can Reshape the Workplace," *MIT Sloan Management Review*, 2018. Accessed: https://sloanreview.mit.edu/article/how-emotion-sensing-technology-can-reshape-the-workplace/.

around screens, lag-times, and speed – but rather the serious consequences and capabilities that computers purported to control with sometimes careless clicks. It also reveals that in contrast to the teleological image of computers evolving gradually into their current form, there were a number of visions and concerns that predicted alternative futures of human–computer–work configurations. Many of these never came to fruition but they signaled how aspirations and concerns about computerization were more wide-ranging (and futuristic) than we might think today.

Second, we address global cases of computerization, particularly from outside of the United States, including Europe, Asia, and Latin America. These were important sites where computerization (inclusive of the introduction of computers and narratives of what computers would do) were and are taking place. The American and British-centered narrative of computer hardware and software development has been well told.[32] Scholars have begun to trace the developments of internet and networking capacities in different countries. Nevertheless, significant gaps remain regarding, for example, statistical data on early global computer distribution or software production.[33]

However, other contemporaneous dynamics also played a role in both the distribution of computers and the narratives around them, in particular the Cold War, US-led global development, and modernization theory. The US is not the only site where important computers or software were developed, nor is it the only space where ideas about what the future of a computerized world would look like were discussed. But the dominant US framing of computer development, which dovetails with the gradual deregulation of the American economy, rise of financial capitalism, offshoring, and corporate downsizing, reinforces certain American-centric narratives that computerization ultimately led to a decentralization of bureaucratic and organizational forms (particularly embodied by the anti-corporate ethos of Silicon Valley). While this might be true in the context of the US, it ignores the fact that many national economies did not undergo such radical changes and large organizations continued to be sites for widespread employment alongside the introduction of computers into workplace communities. Companies like Germany's SAP (discussed in Schweickert's chapter) were pioneering new forms of software and hardware, and modes of sociological patterns, different categories of work, and different areas of reception which would ultimately shape computerization for many around the world. For those more outside the core, such as Austria (Jahrbacher's chapter) or South Korea (Prentice's chapter), narratives of national development were always laminated on top of (or at least accompanied) discussions of operational efficiency or technological development via computers. Adopting countries were also targets

32 For general overviews see, Campbell-Kelly et al., *Computer*; Cortada, *The Digital Hand*; Harris, *London's Global Office Economy*.

33 Goggin and McLelland, *The Routledge Companion*; Cortada, *The Digital Flood*, 601–13.

for office-centered marketing which promoted computers via new images of workplace relations. Sometimes, this generated counter-movements for domestically developed computers and software in the context of broader visions for technical independence (discussed in Berth's chapter).[34]

Indeed, peeling back the layers of US-centricity on our understanding of computerization reveals that many narratives of computer adoption were shaped by Americans who had long been socialized to technological transformations in the office in attempts to compress space, time, information, and communication.[35] Focusing on other global cases allows us to understand how the computer did not diffuse from one place to another with its narratives in tow, but was shaped by the complex contexts into which it was introduced. These encounters show that there were many places where computers and their associated transformations of both work and domestic life were not familiar or always welcome. These cases should allow us to look for multiple histories of computerization around the world.[36]

Third, the chapters in the volume generally approach case studies through diverse sources, including corporate archives, trade magazines, popular newspapers, early internet portals, oral history interviews, and contemporaneous academic debates. Exploring computerization through these sources is a necessary exercise in uncovering the experiences of workers, managers, and other organizational actors as they began to encounter computers and experience themselves as computerized subjects. Additionally, it is necessary to read against the institutional narratives, success stories, and colorful biographies that accompanied the computer age and its popular retellings. These sources also point to indirect or vicarious ways that the computer age was being documented at the time, particularly about the knock-on effects of computerization on others and the ways that computer-linked behaviors or behavioral types were coming into formation. These vicarious perspectives allow us to understand how narratives of computerization were being shaped in part by images of others using computers – or in the case of Glew's chapter on the lingering meaning of the "typing pool" in the computer era, those *not* adapting to computers. Vicarious images reveal many of the normative concerns that began to accompany the burgeoning computer age.

Lastly, the chapters in this volume take up computerization always with attention on the gendered dynamics of workplaces, building on long lines of scholarship.[37] Computers entered into highly gender-divided workplaces, creating a com-

34 For similar tendencies in India see Homberg, *Digitale Unabhängigkeit*.

35 Campbell-Kelly et al., *Computer*, 21–24.

36 Mahoney, "The Histories of Computing(s)."

37 Haan, *Gender and the Politics of Office Work*; Kwolek-Folland, *Engendering Business*; Gardey, "Mechanizing Writing and Photographing the Word"; Crompton and Jones. *White-Collar Proletariat*; Wagner, "The Politics of Women's Work in Computerized Environments"; Mitter and Rowbotham, *Women Encounter Technology*; Perry and Greber, "Women and Computers: An In-

plex array of new dynamics that provided new opportunities to some, appeared to reinforce existing norms to others, but ultimately changed work for almost every kind of professional activity. Computerization, for instance, offered ways of seeing how gendered the workplaces of the time were: a 1989 pamphlet by the British organization Microsyster (discovered on a library shelf at the University of Sheffield in the process of researching this volume) shows a cross-section of these reactions and experiences. The title of the pamphlet is "Not Over Our Heads," reflecting both a resistance to an image and a prevailing view of secretaries and typists as not capable enough to transition to computerized work. Detailed diagrams and illustrations prepared by the organization explain many of the basics of mainframe computers to prepare them for transition to computer-based work. A comic strip in the pamphlet also depicts a white male boss figure and black female secretarial figure staring at a computer together. The boss leans over and instructs the female employee how to use the computer "it's quite simple … like a typewriter"; the female employee corrects him saying, "why don't I use it like a computer?" reflecting how the on-the-ground practical knowledge had already created imbalances that were nevertheless still concealed by societal norms. Much of the dominant academic literature at the time highlighted some of the major global challenges that particularly affected women, including deskilling, intensification of repetitive tasks, and false promises of future liberation. Through attention to archival and other sources, the chapters here highlight cases in which the gender dynamics are not entirely predictable and reflect more nuanced accounts of how computers (and their new roles, capacities, expectations, and realities) changed both men's and women's work.

Today, we rely on glitches, breakdowns, leaks, failures, and occasionally hacks to remind us that computerization is not all that it promises.[38] This is certainly true for how mass publics take up and critique the creativity (or lack) of generative Artificial Intelligence (AI) or the biases of large language models; a series of failures and an effort to cover them up is also partly how the British public came to learn about and empathize with the victims of the Post Office scandal. While these singular events may generate mass displays of emotion like ridicule or outrage and appear to change public thinking, their ephemerality also reflects a certain acceptance of computerization when things return to normal, as we rely on computers for a variety of services, communication, transportation, and work.

Drawing attention to the workplace, where computers have been both normalized and normativized over many years, the chapters in this volume find it valuable to not focus on scandals or breakdowns as sole moments of clarity. Rather, the

troduction"; Webster, *Shaping Women's Work*; Schafer, "What the History of Women and Computing."

38 El-Ariss, *Leaks, Hacks, and Scandals*; Pow, "A Trans Historiography"; Heßler, *Sisyphos im Maschinenraum*, 176–94.

chapters broadly peel back the processes of computerization from different times and places from around the world. By highlighting different global contexts, from Austria to Indonesia, they collectively highlight how technological modernization discourses accompanying computers have never had a singular transition or convergence point. While much computer hardware and software was shipped around the world by American multinationals, sometimes along with American ideologies, there are equally many stories of localization in which Americanization was rejected and local dynamics were affected in unanticipated and diverse ways. Indeed, computerization's great transformation presented a number of problems on the ground to be resolved – how people were supposed to work, who would take control, how risk would be managed, what was and was not permissible. We highlight how in many cases, actors on the ground immediately saw through these gaps as they came to experience computers in the workplace for the first time – between what was expected and what was possible, what computers were supposed to do and how organizations were then structured – and sought out different connections and possibilities. We also highlight how the effects of computerization would not be narrativized in alternative ways until many years later, oftentimes requiring reading against the grain of both company histories and oral narratives.

This book offers selective glimpses across time and space at different contexts of workplace computerization. The eight contributions here were developed in conjunction with funding from the Elisabeth List fellowship scheme hosted by the University of Graz, beginning in 2022 and culminating in a conference in 2024. Each of the eight contributors sought to make connections between gender, emotions, and the history of computer technology. While there is considerable breadth to the topics and subjects, the authors would be the first to acknowledge that this volume is the tip of the iceberg for histories and analyses of both computerization movements and alternative histories around work. We see this volume as a starting point for future research on contemporary histories of computerization around the world and in different contexts. No doubt there is ample room for more research on computerization's effects, its conflicts at the time, the political and workplace dynamics, and the ways it has shaped both collective and individual memory. Each chapter represents what we hope can be a stepping stone to further research either in a national context or through new empirical sites to tell different kinds of stories about the computer age. As David Edgerton notes, "our future-oriented rhetoric has underestimated the past and overestimated the power of the present."[39] Many alternative accounts of the computer age, particularly outside of the US, have begun to escape historicization.

Collectively, we make no pretense about the "uniqueness" of the computer age (or, as it was amplified at the time, the information age) vis-à-vis other technolog-

39 Edgerton, *Shock of the Old*, 206.

ical ages. As many histories of technology would note, claiming epochal status for certain technologies is a recipe for being easily disproved. Indeed, if pressed, we might be reluctant to stick to such periodization – even noting when the computer age starts and begins is difficult to say with precision (punched-card processing of the 1950s was arguably the first "computing" machine in use).[40] While none will deny the huge changes in speed, scale, and domains of computers – changing the image of the home and office alike – the chapters here are ambivalent about what computerization actually brought. It is important not to confuse diffusion or use with efficiency or productivity. Thomas Landauer noted in the mid-1990s that computers had not really increased efficiency or productivity as much as was hoped or promised.[41] For the chapters here, computers brought empty promises about future liberation; fear about vast and rapid changes; retrenchment of social hierarchies; and transformations to many craft and specialist professions.

The accounts nevertheless pinpoint a period of contemporary global history which serves as a useful point of reflection against recent talk about the rise of AI. The promises and potentials of AI have been presented to publics, companies, and governments around the world as necessary, vital, and imminent. Our emotional reactions to AI have already largely been shaped by what are still untested promises. As in the early stages of computerization, emotional reactions range from euphoria to fear; there is a debate on "AI anxiety" about the unknown possible futures that AI may bring about, even as governments, organizations, and various institutions seek more AI integration.[42] (This echoes the discourse on "computerphobia" of the 1980s.[43]) While the scale and pace of today may seem much different from the early period of computerization, the studies in this volume provide valuable insights into how previous generations adapted to something that was equally presented as radically transformative for society. They also reveal how quickly the computer age has made us forget our own recent pasts. Nevertheless, understanding different social responses to computerization, from different national contexts as well as across different forms of work, can help make sense of the changes we are seeing today.

---

40 Edgerton, 7.

41 Landauer, *The Trouble with Computers*, 1. Arguably, the "productivity puzzle" still holds true today even as many of the issues identified by Landauer have been solved, such as user-friendliness and literacy.

42 "AI anxiety: The Workers Who Fear Losing Their Jobs to Artificial Intelligence," BBC Series, Work: In Progress, April 18, 2023. Accessed: https://www.bbc.com/worklife/article/20230418-ai-anxiety-artificial-intelligence-replace-jobs

43 "When People Feared Computers," by Adrienne LaFrance, *The Atlantic*, March 15, 2015. Accessed: https://www.theatlantic.com/technology/archive/2015/03/when-people-feared-computers/388919/

Chapter overviews

The first two chapters look at cases of heightened affect in a mid-twentieth century shaped by different dynamics of fear, excitement, and optimism. Chapters by Martina Heßler and Anna Baumann capture workplace emotions in the early stages of both computerization and programming. At this time, computerization brought about new ways to express the emotionality of work, in terms of both fear of losing control and futurist visions for computerization at home. The chapters by Heidi Schweickert and Nina Jahrbacher examine the changing role of corporate attitudes to employees' reactions to computerization, with cases revealing management dismissive of emotional reactions to new technologies. The two chapters reveal the ways that access to the emotions of the time are shrouded in shame, ambivalence, and corporate secrecy. The following chapters, by Helen Glew and Michael Prentice, showcase how narratives of workplace computerization in national media drew from references, tropes, and understandings of the past and what was happening within broader civil society. They highlight the resilience of national tropes across time that shape public understanding of technological change. The final two chapters by Christiane Berth and Monika Arnez describe the role that public and social media have in mediating ideas about workplace technologies, particularly as they expand into new territories. These media are always at a remove from actual workplaces but attempt to move them in different directions.

Martina Heßler's chapter addresses an important period in the history of software: the NATO Scientific Committees of 1968 and 1969. These meetings were the first international venues where male software engineers could openly discuss their fears and concerns about the potentials for software errors and malfunctions in the coming computer age. Analyzing the discussions of the meetings in depth, she shows that the software developers formed an ephemeral emotional community bonded by shared concern in the first meeting, a community which subsequently broke down by competing and conflicting concerns about how to approach the software crisis. The chapter thus sheds light on one of the early periods in changing norms around masculinity, software, and emotional talk about failure.

Anna Baumann's chapter looks at intellectual debates about telework in the 1970s and 1980s. The possibility of decentralized office work by means of the personal computer and telecommunication networks, which we call now "working from home," led to new ideas for changes to work, the environment, and gender and family roles. Transnational debates about what promises and perils telework would bring largely occurred against a background in which actual telework barely existed. Nevertheless, she shows how the intellectual debates, with a particular focus on American and European debates, were still highly productive for spurring intellectual developments in the fields of feminist science and technology studies. Through the methodological lens of gender and *Technikemotionen* (technological

emotions), the analysis reveals how narratives of computerization intertwined with gendered and emotional perceptions of technology.[44]

Heidi Schweickert's chapter looks at the history of the SAP software in the context of the company's evolving attitudes to its clients and users. SAP software would bring about far-reaching changes in work practices around the world, but its early history was shaped by complex emotions such as frustration when working with complex applications, shame among experienced clerks at being thrown back to beginner's level, and euphoria among tech-savvy enthusiasts at unimagined technological possibilities. The chapter highlights how SAP shifted its own attitudes to these emotional reactions, at first blaming users and later utilizing them to improve the user experience.

Nina Jahrbacher's chapter examines the relationship between technological innovation and social change at the Austrian Federal Railways (ÖBB). Focusing on gender dynamics and emotional responses to the introduction of electronic data processing, the chapter explores how the ÖBB's modernization efforts intersected with societal shifts, such as gender equality initiatives, and how these factors influenced the workplace environment. Drawing on oral history interviews, internal documents, and legal texts, her study reveals the challenges and opportunities that arose across decades of digital and social transformations at the company and in Austria more broadly. It highlights how technological advancements led to shifts in administrative workflows, which, while enhancing efficiency, also sparked concerns about job security and the future of work. The chapter further investigates the ÖBB's efforts to address gender disparities through programs like the 1981 Women's Advancement Program, contextualizing these initiatives within broader societal changes. Ultimately, the chapter underscores the importance of considering both technological and social dimensions in organizational transformation, offering insights into the complex interplay between innovation, gender equality, and employee well-being during a period of significant change at the ÖBB.

Helen Glew's chapter explores the cultural reactions to the end of typing pools in Great Britain. The typing pool had been equal parts denigrated as a "dead-end" job for women while being recognized as an essential part of office landscapes worldwide. With the advent of word processors and accompanying workplace change that signaled the typing pool's demise, however, social and cultural commentary revealed both an anxiety about women's position in office spaces and a nostalgia for a less complicated pre-computer past with clear gender hierarchies. The chapter examines these reactions in detail, using an array of newspaper and magazine coverage and examples from British popular culture. The chapter highlights the sense of social and cultural insecurity wrought by the changes to the typing pool and the fact that the advent of the personal desktop computer was seen as a point from which there

44 Heßler, *Technikemotionen*.

was no turning back. More widely, the reactions reveal the sense of unease about women's position in office hierarchies and the extent to which women's employment was still contingent and precarious as the twentieth century came to a close.

Michael Prentice's chapter looks at office computerization in South Korea from the 1980s to 1990s with a focus on tropes of intimate connection both in and out of the office. While early computerization was defined by narratives of national development via productivity and automation, South Korean office workers were drawn to their own channels and practices to connect with each other. Drawing on the linguistic concept of phatic communion, he shows how many forums served simply to connect with strangers, vent about work, and hear from office workers at different companies in simple and ephemeral ways. As these channels became popular in civil society, domestic corporations also drew on their popularity by developing their own forums that promoted intimacy among employees and managers. The chapter suggests that common computer tropes forged in this era around corporate intimacy on one side and worker-centered channels for refuge on the other, are still prevalent tropes today.

Christiane Berth's chapter discusses the rise of the computerized office in Latin America during the 1980s and 1990s. In that period, most Latin American countries were affected by debt crises and political transition, which influenced emotional reactions toward technological change. While office employees were concerned about dismissals and feared not being able to get along with computers in daily work, political elites developed an emotional rhetoric of national pride connected to contemporary developmental narratives. In their vision, software production could open up economic opportunities for Latin American nations. Alluding to 1980s international debates on unequal access to technology and information, politicians and technical experts criticized monopolies in computer production and demanded appropriate technologies to deal with unstable electricity systems. Nevertheless, US influence remained strong and was clearly visible in Latin American offices. Analyzing advertisements and contemporary office magazines, the chapter demonstrates that visuals reproduced traditional gender roles. At the same time, there was a need to renegotiate gendered work tasks such as typing, which happened through images of humans interacting with computers. Finally, the computer was used for forecasting future trends of office work by relying on emotional repertoires, such as revolutionary transformation of routine tasks or euphoria for the globally connected office.

Monika Arnez's chapter explores computerization in the context of the popularization of drones in contemporary Indonesia. Drones represent an opportunity to think about a new terrain for emotional discourses about technology, gender, and social change. The chapter analyzes emotional responses to the introduction of drones in areas of Indonesian life, comparing men's and women's reactions. She contextualizes the perception of drones against the backdrop of highly corporatized media that have shaped the emotional contours of the technology as well as social

inequalities in Indonesia. Based on a survey with Indonesian respondents and media analysis, the chapter finds that Indonesians perceive drones as a double-edged sword, eliciting varied emotions – from happiness to fear – based on their usage, while also highlighting the ongoing reproduction of power dynamics stemming from the state.

Acknowledgements

This edited volume was made possible through a grant from the Elisabeth List Fellowship Program for Gender Research at the University of Graz, which supported the research project "Global Working Environments in Transition: The History of Technology, Gender, and Emotions since the 1960s." The funding enabled most of our authors to participate as fellows at the University of Graz and to share and discuss their findings at a final symposium.

We are grateful to the Elisabeth List Fellowship Program and the Institutional Open Access Fund from the University of Sheffield for their generous financial support of this publication. Hannah Derler and Laura Pietsch assisted us in compiling the manuscript and revising the footnotes. We would also like to thank Jakob Horstmann and Luisa Bott at transcript for their invaluable assistance during the publication process, as well as Joan Dale Lace for the copyediting.

Bibliography

Abbate, Janet. *Inventing the Internet*. MIT Press, 2000.

Abbate, Janet. "Code Switch: Alternative Visions of Computer Expertise as Empowerment from the 1960s to the 2010s." *Technology and Culture* 59, no. 4S (2018): S134–S159. https://doi.org/10.1353/tech.2018.0152.

Balbi, Gabriele, and Paolo Magaudda. *A History of Digital Media: An Intermedia and Global Perspective.* Routledge, 2018.

Baker, James, and David Geiringer. "Space, Text and Selfhood: Encounters with the Personal Computer in the Mass Observation Project Archive, 1991–2004." *Contemporary British History* 33, no. 3 (2019): 293–312. https://doi.org/10.1080/13619462.2018.1539828.

Boltanski, Luc, and Eve Chiapello. *The New Spirit of Capitalism*. Translated by Gregory Elliott. Verso, 2018.

Burris, Beverly H. "Computerization of the Workplace." *Annual Review of Sociology* 24 (1998): 141–57. http://www.jstor.org/stable/223477.

Campbell-Kelly, Martin. *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry*. MIT Press, 2003.

Campbell-Kelly, Martin, William Aspray, Jeffrey R. Yost, Gerardo Con Díaz, and Honghong Tinn. *Computer: A History of the Information Machine*. 4th ed. Routledge, 2023.

Collin, Peter, Robert Garot, and Timon De Groot. "Bureaucracy and Emotions-Perspectives across Disciplines." *Administory* 3 (2018): 5–19. https://reference-global.com/article/10.2478/ADHI-2018-0029

Cortada, James W. *The Digital Hand: How Computers Changed the Work of American Manufacturing, Transportation, and Retail Industries.* Oxford University Press, 2003.

Cortada, James W. *The Digital Flood: Diffusion of Information Technology across the U.S., Europe, and Asia*. Oxford University Press, 2012.

Crompton, Rosemary, and Gareth Jones. *White-Collar Proletariat: Deskilling and Gender in Clerical Work,* edited by Gareth Jones. Macmillan, 1984.

Edgerton, David. *The Shock of the Old: Technology and Global History since 1900*. Oxford University Press, 2007.

Ensmenger, Nathan. "Making Programming Masculine." In *Gender Codes: Why Women Are Leaving Computing*, edited by Thomas J. Misa. Wiley, 2010.

El-Ariss, Tarek. *Leaks, Hacks, and Scandals: Arab Culture in the Digital Age.* Princeton University Press, 2018.

Gardey, Delphine. "Mechanizing Writing and Photographing the Word: Utopias, Office Work, and Histories of Gender and Technology." *History and Technology* 17, no. 4 (2001): 319–52. https://doi.org/10.1080/07341510108581999.

Goggin, Gerard, and Mark J McLelland, eds. *The Routledge Companion to Global Internet Histories.* Routledge, 2017.

Gothoskar, Sujata. "Computerization and Women's Employment in India's Banking Sector." *Women Encounter Technology: Changing Patterns of Employment in the Third World* 1 (1995): 154–55.

Haan, Francisca de. *Gender and the Politics of Office Work: The Netherlands 1860–1940*. Amsterdam University Press, 1998.

Haigh, Thomas. "Remembering the Office of the Future: The Origins of Word Processing and Office Automation." *IEEE Annals of the History of Computing* 28, no. 4 (2006): 6–31. https://ieeexplore.ieee.org/document/4042483/

Haigh, Thomas, and Paul E. Ceruzzi. *A New History of Modern Computing*. MIT Press, 2021.

Hakken, D. "Computing and Social Change: New Technology and Workplace Transformation, 1980–1990," *Annual Review of Anthropology* 22 (1993): 107–32, https://www.annualreviews.org/content/journals/10.1146/annurev.an.22.100193.000543.

Harris, Rob. *London's Global Office Economy: From Clerical Factory to Digital Hub*. Routledge, 2021.

Hayles, N. Katherine. *My Mother Was a Computer: Digital Subjects and Literary Texts.* University of Chicago Press, 2010.

Heßler, Martina. "Technikemotionen. Einleitende Überlegungen zur historischen Ko-Konstruktion von Technik und Emotionen." In *Technikemotionen*, edited by Martina Heßler. Brill, 2020.

Heßler, Martina, ed. *Technikemotionen*. Brill, 2020.

Heßler, Martina. *Sisyphos im Maschinenraum. Eine Geschichte der Fehlbarkeit von Mensch und Technologie.* C. H. Beck, 2025.

Hicks, Mar. *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing*. MIT Press, 2017.

Hochschild, Arlie Russell. *The Managed Heart: Commercialization of Human Feeling*. University of California Press, 2012 [1983].

Homberg, Michael. *Digitale Unabhängigkeit. Indiens Weg ins Computerzeitalter – eine internationale Geschichte*. Wallstein, 2022.

Kaufmann-Buhler, Jennifer. "Computing the Cubicle: Design for the High-Tech Office, 1970–1990." *IEEE Annals of the History of Computing* 43, no. 3 (2021): 6–21. https://doi.org/10.1109/MAHC.2021.3088751.

Kling, Rob, and Suzanne Iacono. "The Mobilization of Support for Computerization: The Role of Computerization Movements." *Social Problems* 35, no. 3 (1988): 226–43. https://heinonline.org/HOL/P?h=hein.journals/socprob35&i=240

Kwolek-Folland, Angel. *Engendering Business: Men and Women in the Corporate Office, 1870–1930*. Johns Hopkins University Press, 1994.

Landauer, Thomas K. *The Trouble with Computers: Usefulness, Usability, and Productivity*. MIT Press, 1996.

Liu, Alan. *The Laws of Cool: Knowledge Work and the Culture of Information*. University of Chicago Press, 2009.

Mahoney, Michael S. "The Histories of Computing(s)." *Interdisciplinary Science Reviews* 30, no. 2 (2005): 119–35. https://doi.org/10.1179/030801805X25927

Markussen, Randi. "Constructing Easiness – Historical Perspectives on Work, Computerization, and Women." *The Sociological Review* 42, no. 1 (1994): 158–80. https://doi.org/10.1111/j.1467-954X.1994.tb03415.x.

Mitter, Swasti, and Sheila Rowbotham. *Women Encounter Technology: Changing Patterns of Employment in the Third World*. Routledge, 2003.

Morgan, Gareth. *Images of Organization*. Sage, 1997.

Ogasawara, Yuko. *Office Ladies and Salaried Men: Power, Gender, and Work in Japanese Companies*. University of California Press, 1998.

Perry, Ruth, and Lisa Greber, "Women and Computers: An Introduction," *Signs: Journal of Women in Culture and Society* 16, no. 1 (1990): 74–101. http://doi.org/10.1086/494646.

Pfaffenberger, Bryan. "The Social Meaning of the Personal Computer: Or, Why the Personal Computer Revolution Was No Revolution." *Anthropological Quarterly* 61, no. 1 (1988): 39–47. https://doi.org/10.2307/3317870.

Pfaffenberger, Bryan. "Technological Dramas." *Science, Technology, & Human Values* 17, no. 3 (1992): 282–312. https://www.jstor.org/stable/690096.

Pow, Whitney. "A Trans Historiography of Glitches and Errors." *Feminist media histories* 7, no. 1 (2021): 197–230. https://doi.org/10.1525/fmh.2021.7.1.197.

Reddy, William M. *The Navigation of Feeling: A Framework for the History of Emotions*. Cambridge University Press, 2001.

Richardson, Lizzie. "Coordinating Office Space: Digital Technologies and the Platformization of Work." *Environment and Planning D: Society and Space* 39, no. 2 (2021): 347–65. https://doi.org/10.1177/0263775820959677.

Saval, Nikil. *Cubed: A Secret History of the Workplace.* Anchor Books, 2015.

Schafer, Valérie.. "What the History of Women and Computing Teaches Us." *First Monday* 30, no. 1 (2025). https://doi.org/10.5210/fm.v30i1.13892s.

Stearns, Peter N. "Prescriptive Literature." In *Sources for the History of Emotions. A Guide*, edited by Katie Barclay, Sharon Crozier-De Rosa and Peter N. Stearns. Routledge, 2020.

Stein, Jesse Adams. "Domesticity, Gender and the 1977 Apple II Personal Computer." *Design and Culture* 3, no. 2 (2011): 193–216. https://www.tandfonline.com/doi/abs/10.2752/175470811X13002771867842

Van Meel, Juriaan. "The Origins of New Ways of Working: Office Concepts in the 1970s." *Facilities* 29, no. 9/10 (2011): 357–67. https://doi.org/10.1108/02632771111146297.

Van Oost, Ellen. "Making the Computer Masculine." In: Women, Work and Computerization, edited by Ellen Balka and Richard Smith. Springer. https://doi.org/10.1007/978-0-387-35509-2_2.

Wagner, Ina. "The Politics of Women's Work in Computerized Environments." *European Journal of Women's Studies* 2, no. 3 (1995): 295–314. https://doi.org/10.1177/135050689500200302.

Webster, Juliet. *Shaping Women's Work: Gender, Employment and Information Technology.* Routledge, 2014.

Zuboff, Shoshana. *In the Age of the Smart Machine: The Future of Work and Power.* Basic Books, 1988.

Talking about bugs: Male computer scientists and their emotional relationship with errors

Martina Heßler

For some digital technologists today, it is a matter of course to speak euphorically about their failed projects. They are proud of failing because they see it as an expression of their willingness to take risks, ambition, and originality. Failure qualifies them as innovative inventors. As Lisa Nakamura noted in a short essay, "[f]ailure has an exalted status in new and digital media culture."[1] However, this pride in failure is usually accompanied by a success story. As Nakamura also emphasized, it is primarily those who were ultimately successful who present themselves as proud of their failures.[2] In Silicon Valley, embracing failure has become a mantra, with variations such as "fail fast and often," "fail better," and "fail forward." In an article in *Forbes* magazine, Rob Ashgar stated: "embracing failure makes for a trendy mythology, especially for the aspiring heroes of innovation." In reality, however, it is "lip service, while they scramble hysterically to avoid failure at all costs." In fact, there is a fear of "any kind of failure."[3] These brief remarks touch on the emotions tied to failure and mistakes, which range from openly expressed enthusiasm and pride to a hidden fear of failure. Obviously, failure is deeply intertwined with emotions.

This chapter explores the relationship between emotions, gender, and technological errors and failures. However, it does not focus on enthusiastic project developers in Silicon Valley, but rather on a contrasting phenomenon: concerned software developers who were frightened by software errors and malfunctioning products. The chapter highlights a specific historical moment when software developers discussed software fallibility and sought solutions, namely during two NATO conferences: one in Garmisch-Partenkirchen (Germany) in 1968 and the other in Rome in 1969.

In the 1960s, a growing awareness emerged that software development was challenging, error-prone, and costly, yet increasingly vital to many aspects of society's functioning. At the beginning of 1967, the NATO Science Committee established a

1 Nakamura, "Plug and Pray," 87.

2 Nakamura, 87.

3 Ashgar, "'Fail Fast' Mantra."

Study Group on Computer Science, which began organizing the first conference.[4] This Science Committee was part of NATO's civil science program, aimed at promoting nonmilitary cooperation. Established in 1958, its goal was to encourage scientific cooperation within the Alliance.[5] Scientific cooperation and research across nearly all fields of science were supported. Therefore, it was no surprise that computer science became part of those efforts. By spring 1968, the conference program had been designed, and "key figures in academia, in the computer industry, in the emerging software houses had been invited."[6]

This chapter is mainly based on the reports of the two NATO conferences, each of which is approximately 130 pages long. Both reports document the lectures as well as the discussions that ensued.[7] These conferences have already been a focus of historical scholarship, mainly because they popularized the term "software crisis." Donald MacKenzie wrote a key essay on the subject and highlighted: "The historical significance of the Sonnenbichl [the conference hotel in Garmisch] meeting was the way it provided the single most influential early diagnosis of one of the two fundamental problems that are the obverse of hardware's success: the deeply intractable difficulty of achieving dependable software."[8] However, historians have criticized the term "crisis" and questioned its reality. Thomas Haigh pointed out that it exists more in historians' imaginations than in actual programming practice. He remarked critically that it was an "actor category" that historians should not adopt lightly.[9] Janet Abbate summarized the criticism that historians have directed at this term.[10] Most of them argue that talk of a crisis is exaggerated. This criticism is also supported by the fact that one participant in the first NATO conference remarked, "I do not like the use of the word 'crisis'. It is a very emotional word."[11] However, Abbate emphasizes that the term signaled a genuine concern among software producers,[12] since three problems, in particular, were repeatedly discussed in the computing literature of the 1960s and 1970s: "shortage of programmers; production problems that caused projects to be late, over budget, and full of bugs; and a supposedly undisciplined labor force."[13]

Following Abbate's remark that software developers expressed genuine concerns at that time, the categories and concerns of the actors are taken seriously in what fol-

4 Naur and Randell, *Software Engineering*, 8.
5 "NATO Science Committee." *Nature* 181 (1958): 738–40.
6 MacKenzie, "View from Sonnenbichl," 98.
7 Naur and Randell, *Software Engineering*; Buxton and Randell, *Software Engineering Techniques*.
8 MacKenzie, "View from Sonnenbichl," 97n.
9 Haigh, "Crisis, What Crisis?"
10 Abbate, *Recoding Gender*, chap. 3.
11 Naur and Randell, *Software Engineering*, 71.
12 Abbate, *Recoding Gender*, 89.
13 Abbate, 89.

lows. Reading the conference documentation, it is clear that the participants were outwardly emotional, as the participant quoted above rather critically remarked. However, the conference documents have not yet been examined regarding how participants felt when dealing with problems in software development and what that meant for the history of software. These emotions are at the center of this chapter, which aims to combine the history of emotions, gender history, and failure studies.

The first section situates the chapter within these research fields to clarify the potential insights that can be gained from their combination. The second and third sections examine male emotions in relation to the potential for failure, mistakes, and technological unreliability. These sections analyze the feelings during the two conferences, showing how a strong but short-lived emotional community formed during the first conference completely fell apart during the second conference, just one year later. The chapter concludes with a summary of its findings and some considerations about the role of emotions in the digital age.

Emotions, gender, and failure: New research perspectives

As William Reddy pointed out, historians cannot directly reconstruct feelings because they always result from an interaction between internal experience and the expression of feelings.[14] The historiography of emotions has strongly emphasized this point. Reddy introduced the term "emotive" to describe expressions of internal experiences.[15] He claimed that these expressions are used to navigate emotions. In the following, it will be examined which emotions participants in the two conferences expressed using which terms, and thus which emotives they generated. Following Reddy, it will be described how emotives were a way for the attendees of the conference to navigate their feelings. As will be shown, they thus built an emotional community at the first conference. Furthermore, I consider how the participants themselves evaluated their feelings and what significance it had for the history of software development.

To better understand this, I draw on the concept of emotional communities, developed by Barbara Rosenwein.[16] This concept allows for analyzing how software developers commonly expressed fear, concern, and unease, and how these shared feelings became the basis for further action and problem-solving. This concept will be elaborated on further in the second section of this chapter, within the empirical context.

14 Reddy, *Navigation of Feeling*.

15 Reddy.

16 Rosenwein, *Emotional Communities*.

Notably, this emotional community was exclusively male, with no women among the participants. "Over 50 experts from various fields related to software problems attended, including representatives from computer manufacturers, universities, and software companies."[17] However, only men were invited to participate. Not even computer scientist and mathematician Grace Hopper was included, although she was highly respected at the time

The history of computing has repeatedly demonstrated how women faced discrimination and marginalization.[18] To their credit, women's significant presence and influence in the early history of software have been recognized. From a gender perspective, the history of computing has involved the devaluation of women's activities, sexual segregation, and the process of masculinization. The 1968 software conference took place when many women still worked in computing; however, the professionalization and subsequent masculinization had already begun, as Nathan Ensmenger has shown.[19] The fact that only men were invited can be seen as part of this process of masculinization through professionalization. The conference aimed to address problems in software development and ensure the production of reliable software. At that time, no one seemed to believe women could contribute as well. It is worth noting that one member of the organizing committee explained that "the invitation list was carefully contrived."[20] He emphasized that the committee tried "to pick up the leading figures in their countries."[21] Excluding women from the event reflected the belief that only men were "leading figures" and capable of solving key problems in software development. This aligns with the widespread view that qualified and important work was a male domain.[22]

From a gender perspective, it is crucial to analyze male emotional culture and how it became part of a professionalization process that marginalized women. Notably, the historiography of computing and gender has mostly ignored emotions, focusing, if at all, on the feelings of users.[23] In contrast, the emotions of technology developers, especially software developers, remain a missing piece.

This chapter examines male emotions related to failure, malfunction, and errors. Thus, its goal is to contribute to the emerging field of failure studies and

17 Naur and Randell, *Software Engineering*, 8.

18 Abate, *Recoding Gender*; Ensmenger, "Making Programming Masculine,"; Ensmenger, The Computer Boys; Light, "When Computers Were Women,"; Hicks, "Sexism is a Feature,"; Misa, *Gender Codes*.

19 Ensmenger, "Making Programming Masculine".

20 Valdez, "Gift from Pandora's Box," 176.

21 Valdez, 176.

22 See Hicks, "Sexism is a Feature," 135–58.

23 See Berth, "Zwischen Hoffnung, Stolz und Wut," 229–49; Corn, *User Unfriendly*; Geuenich, "...gibt auch mal ein Küsschen," 271–90; Norman, "Computer Rage." Compare also Heidi Schweickert's chapter in this volume.

highlight the potential insights that can be gained from these perspectives. Neta Alexander coined the term "failure studies"[24] in an article and further developed this concept in a book co-authored with Arjun Appadurai.[25] In essence, failure studies incorporate approaches from various fields, including infrastructure studies, media studies, feminist theory, disability studies, and queer studies. According to Alexander, failure studies "include the analysis and mapping of noise, rupture, disconnection, and the limitations of human perception, knowledge, sensorium, and agency."[26] Alexander "seeks to foreground the inherent failures and limitations of digital technologies."[27] Steven Jackson had already argued for a "broken world" thinking in a 2014 article, calling for a shift beyond the focus on innovation and recognizing that technology often malfunctions.[28] He emphasized the importance of repair and maintenance, which are usually invisible yet vital for functionality and society, yet tend to be undervalued. Two aspects will be added to the emerging field of failure studies in this chapter. First, these studies could benefit from a historical perspective, which clarifies how the evaluation of failure and the approach to dealing with failure and technological errors have evolved and why. Second, failure studies focus on the role of users; thus, the technology developers and their handling of malfunctions remain absent. However, we cannot understand technological development without understanding the fundamental role of malfunctioning and dealing with errors in technological developments.

Ultimately, this chapter aims to contribute to the history of emotions in the digital age by examining the emotions of male developers regarding malfunctions and potential failures at a specific point in software history, namely a moment in which errors and failures of software systems became a heated topic within the software community.

Concerns, fears, and new beginnings: Emotional communities as a self-reflective view on software problems at the conference in Garmisch in 1968

Technological errors and malfunctions have become increasingly common since the latter part of the twentieth century. Engineer Henry Petroski noted in 1982 that he lived in a time when technology was running amok, with technological errors

24 Alexander, "Rage against the Machine." 1–24.
25 Appadurai and Alexander, *Failure*.
26 Alexander, "Rage against the Machine," 15.
27 Alexander, 4.
28 Jackson, "Rethinking Repair," 221–39.

happening "left and right."[29] He observed many "horror stories" about technology. Technological errors, of course, are not unique to modern societies. Even in ancient times, every fourth ship was wrecked.[30] Boiler explosions, mining disasters, and industrial accidents were the much-maligned side effects of industrialization. Nevertheless, the types, scales, and consequences of technological errors have undergone significant changes with the development of software. Computer scientist John Licklider stated in 1969:

> The essential facts are that all complex programs contain programming errors, that no complex program is ever wholly debugged, and that no complex program can ever run through all its possible states or conditions to permit its designers to check that what they think ought to happen actually happens.[31]

In 1985, software developer David Parnas warned "that complex software was prone to unreliability for 'fundamental mathematical reasons' that would 'not disappear with improved technology.'"[32] These severe warnings were also echoed in sarcastic jokes. Lisa Nakamura mentions in her essay "Plug and Pray" a joke about Bill Gates and Jack Welch (CEO at GM) from 1998 that highlighted the fallibility of software. Welch claimed that if GM had developed its technology like Microsoft had "for no reason at all, your car would crash twice a day."[33]

At the end of the 1960s, however, the participants in the NATO conferences were not in the mood to laugh. They emphasized that they were facing significant challenges. At that time, as Janet Abbate summarized, "the size, novelty, and complexity of the programs … led to some spectacular failures."[34] From a business perspective, the enormous costs resulting from delayed, erroneous, or failed software projects posed a significant problem. For software developers, however, the potential consequences of unreliable and faulty software were the primary challenge. Software programmers already had extensive experience with failure and malfunction. In her dissertation on the early history of software, María Valdez even concludes that the software developers attending the conference were traumatized. She referred to the IBM 360 and the so-called third-generation computers. The programming of these new computers encountered "enormous problems" and "created an awareness for the first time of the importance of programming."[35] Thus, "the participants brought with them to Garmisch the experience of the third generation, the trauma of the

29 Petroski, *To Engineer is Human*, 3.
30 Wolf, "Schiffsbruch mit Beobachter," 20.
31 Licklider, "Underestimates and Overexpectations," 51.
32 Parnas, "Software Aspects," 1328, quoted in Slayton, *Arguments That Count*, 173.
33 Nakamura, "Plug and Pray," 88.
34 Abbate, *Recoding Gender*, 89.
35 Valdez, "Gift from Pandora's Box," Introduction.

360, the difficulties experienced in implementing large projects, the failure to meet deadlines, the disappointments of the users, the example of disasters or near-disasters, the anxieties of unbundling."[36]

An analysis of the conference documentation reveals the extent to which the software developers were troubled at the time. They shared a common concern, feeling unease and fear. Donald MacKenzie called the conference a "defining moment of self-reflection in the history of software."[37] While the term self-reflection implies a rational effort, the conference documents reveal how emotionally the software issues were discussed. Software developers shared emotions, thereby building a community where self-reflection could occur in the first place.

As mentioned earlier, Barbara Rosenwein coined the term emotional community: "An emotional community is a group in which people have a common stake, interests, values, and goals."[38] These are "groups in which people adhere to the same norms of emotional expression and value."[39] Rosenwein used examples from the Middle Ages to demonstrate that different groups have their particular norms of emotional valuation and expression. The concept has already been widely adopted, used, criticized, and modified in the history of emotions. Therefore, it is essential to define it in each case. In what follows, this term is used to show that the software programmers at the 1968 conference in Garmisch built a community based on shared emotions. However, it was not a stable emotional community of a specific social group in Rosenwein's sense. Instead, it was a temporary emotional community formed during a conference and fell apart at the follow-up conference one year later. Thus, the concept is applied here to demonstrate how shared emotions can be very effective, even if they are short-lived and fragile. The shared emotions united the conference participants in Garmisch, fostering a sense of community. This emotional connection laid the ground for acknowledging and discussing the existence of a fundamental problem with software development. Further, it enabled future efforts to resolve the crisis.

This emotional community in Garmisch in 1968 is historically significant because it allowed participants to express feelings that had previously been largely ignored. Having the opportunity to share negative emotions, such as fear, anxiety, and a sense of losing control in the face of technological errors, turned the software programmers into a community. The ability to openly discuss their concerns and fears distinguished this emotional community. As Dutch computer scientist and mathematician Edsger Dijkstra, also a participant of the conference, remembered a few years later, it had been difficult to talk about problems before the conference: "to talk

36 Valdez, 176.

37 MacKenzie, "View from Sonnenbichl," 99.

38 Rosenwein, *Emotional Communities*, 24.

39 Rosenwein, 2.

about a software crisis was blasphemy."[40] This only became possible in public during and after the conference in Garmisch. Others also remembered this turning point: "This was quite new: before Garmisch, the literature tended to emphasize the 'seductive fascination' of software rather than its failure."[41] The opportunity to discuss problems openly was a hallmark of the emotional community in Garmisch.

The first software conference in Garmisch-Partenkirchen mainly addressed the challenges of software development. Essentially, the software developers acknowledged the demanding and complex nature of software development and the limited capabilities they had in creating reliable software at that time. They discussed a lot of examples, particularly in the field of safety, i.e., aircraft safety, the problem of faulty software in military projects, as well as the "overall health of the industry."[42]

The comments and presentations at the conference had a tone of concern and anxiety. Referring to Reddy, certain emotions repeatedly surfaced, used to express feelings and to help "navigate" them. Comments often began with phrases like "What worries me," "What concerns me," and "What frightens me." The word "problem" appeared in nearly all documented contributions, along with references to "nightmare," "danger," and "disaster."

The software developers felt uneasy as they created something that was increasingly being applied in everyday life, yet they did not fully understand it. They noted "the problems of achieving sufficient reliability in the data system, which are becoming increasingly integrated into the central activities of modern society."[43] High expectations from users increased the pressure on them, but they were unable to meet them, as they emphasized. Reading the many presentations and statements in the discussions, a recurring feeling of losing control emerges. The ever-increasing size of the programs and the ever-growing number of software programmers involved in the projects made the products prone to errors, and the errors were difficult to find. As the report summarized: "Yet this growth rate was viewed with more alarm than pride."[44] There was repeated talk of "great concern." The software programmers emphasized how overwhelmed they were with the current software development, for example: "The basic problem is that certain classes of systems are placing demands on us which are beyond our capabilities and our theories and methods of design and production at this time. It is large systems that are encountering great difficulties."[45]

Even at the beginning of the 1980s, the size and complexity of maintenance and error problems were still being discussed. It became clear how endless the work of

40 Dijkstra, "The Humble Programmer."
41 Randell, "Software Engineering in 1968," 1–10.
42 Valdez, "Gift from Pandora's Box," 178.
43 Naur and Randell, *Software Engineering*, 3.
44 Naur and Randell, 9.
45 Naur and Randell, 9.

debugging was in software development. One software engineer stated that maintenance is the "ultimate black hole."[46] It gradually became clear that programs are like cabbages, as he described the issue: "If you put them on the shelf and forget about them, they go bad." He commented satirically: "The work of the maintenance programmer is formidable: trying to find original bugs, trying to find the last maintenance programmers' bugs, trying to find the bugs he put in last week himself, making improvements for the user if there is any time left over."[47]

However, it was not just the size of the software systems ("the problem of scale"[48]) that unsettled the programmers. A lack of understanding of the programs, which was connected to their size, also prompted critical and concerned comments:

> Today we tend to go on for years, with tremendous investments to find that the system, which was not well understood to start with, does not work as anticipated. We build systems like the Wright brothers built airplanes – build the whole thing, push it off the cliff, let it crash, and start over again.[49]

It was considered irresponsible to allow software to enter society in this manner. After all, it could be a matter of life and death: "Particularly alarming is the seemingly unavoidable fallibility of large software, since a malfunction in an advanced hardware–software system can be a matter of life and death."[50] Edsger Dijkstra stated that the "massive dissemination of error-laden software is frightening."[51] A summary in the conference report mentioned "growing pains."[52] At the same time, another participant expected "an exponential growth of errors,"[53] another spoke of "obvious dangers" in programming[54] or of "serious errors."[55] At the follow-up conference in 1969, the emotional and psychological strain of producing faulty software was summed up in one sentence. One participant stated: "Programmers call their errors 'bugs' to preserve their sanity; that number of 'mistakes' would not be psychologically acceptable."[56]

By acknowledging this uncertainty and the feelings tied to it, the attendees of the conference began to navigate through it. The words often used at the confer-

---

46 Feeney, "Management Information System," quoted in Valdez, "Gift from Pandora's Box," 115.
47 Feeney, quoted in Valdez, 115n.
48 Naur and Randell, *Software Engineering*, 39.
49 Naur and Randell, 10.
50 Naur and Randell, 9.
51 Naur and Randell, 9.
52 Naur and Randell, 10.
53 Naur and Randell, 20.
54 Naur and Randell, 28.
55 Naur and Randell, 30.
56 Buxton and Randell, *Software Engineering Techniques*, 17.

ence, such as fear, worry, pain, serious errors, concern, problem, disaster, danger, alarm, trouble, and frightening, clearly show that the software developers wanted to confront the issue directly. They frequently emphasized that they currently had no solution for what they described as alarming and disturbing.

The presence of emotions also becomes visible in striking imagery. At the beginning of the 1970s, after the two conferences, Dijkstra remembered his feelings:

> The difficulties of programming arise partly from size. An increase in size can make a problem incomparably more difficult: one can close one's eyes and imagine how it feels to be standing in an open place, a prairie or a seashore, while far away a gib, reinless horse is approaching at a gallop, one can see it approaching and passing. To do the same with a phalanx of a thousand of these big beasts is mentally impossible: your heart would miss a number of beats out of sheer panic if you could.[57]

And further: "Underestimation of the difficulties arising from size is one of the major underlying causes of the current software failure."[58] He described the feeling of threat and loss of control vividly.

In the late 1960s, with its dominant images of confident male scientists and engineers, it is remarkable that these men spoke so openly about their worries, and fears, and even admitted a loss of control. A few, however, were not satisfied with the dominant focus on errors. While most participants, in line with Steven Jackson, practiced, so to speak, "broken software thinking" and reflected on the development of software from the perspective of errors and problems, one participant pointed out that many applications worked well.[59] Another complained that an "aura of gloom had fallen over the assembly."[60] And yet another participant asked whether they perhaps were exaggerating.[61] However, these were only a few voices. The prevailing sentiment was one of shared concern, uncertainty, and fear. The conference in Garmisch began with an evening lecture, in which the speaker admonished those present and even questioned their guilt for not having addressed the errors earlier: "so the effect that we were all guilty, essentially of concealing the fact that big pieces of software were increasingly disaster areas and we were all sitting around actually worrying internally about it and doing precisely nothing."[62]

---

57 Dijkstra, "Notes on Structured Programming," 2.

58 Dijkstra, 2; Valdez, "Gift from Pandora's Box," 198.

59 Naur and Randell, *Software Engineering*, 70.

60 Naur and Randell, 70.

61 Naur and Randell, 71.

62 Interview with John Buxton, Professor of Information Technology, King's College London, co-editor of the Rome Conference Report, quoted in Valdez, "Gift from Pandora's Box," 175. Valdez interviewed computer scientists in the context of her dissertation, which she com-

The conference now presented an opportunity to change this in a spirit of great unity, as an emotional community. Although it might seem surprising at first glance that the exclusively male software developers openly discussed their struggles with technological problems, thereby undermining the image of the confident technician or scientist, it is worth noting that two factors put the dominance of negative feelings into perspective: first, emphasizing responsibility, and second, taking action.

First, concerns, anger, fear, and uneasiness were connected to the responsibility that software developers have. The participants strongly emphasized their responsibility, referring to themselves as reliable people who had come together to solve the problem. They did not portray themselves as despondent and hopeless, but as rightly concerned and therefore responsible. This was accompanied by outrage and accusations against the industry, which was perceived, at least implicitly, as a significant part of the problem. Companies were even accused of being "fraud" because they raised false expectations among customers: "You may be right in blaming users for asking for blue-sky equipment, but if the manufacturing community offers this with a serious face, then I can only say that the whole business is based on a big fraud " (laughter and applause).[63] Industry and managers were often accused of overselling the abilities of software designers.[64] Consequently, the economic conditions that caused time pressure and fueled false expectations, putting software developers in a position where they could not meet these expectations, were denounced.

This highlights the intertwining of emotions with morality, norms, and values that defined this emotional community. The emotional debates at the two conferences involved moral and political judgments, such as frustration with economic conditions or marketing practices. Emotions are closely tied to criticism of financial pressure, as well as moral demands, responsibility, and political attitudes. Dijkstra even called for humility and acknowledgement of human limitations, both in later publications and elsewhere. He even spoke of his "small head" that limited him.[65] It becomes clear how strongly emotions were linked to norms, values, and (political) attitudes toward the world.

Second, in this emotional community, which combined concern, unease, and fears with a sense of responsibility, the need for action was highlighted. The conference attendees saw themselves as responsible and, ultimately, as action-oriented and problem-solving. The conference did not stop at simply discussing concerns together. Instead, it succeeded in transforming negative feelings into positively evaluated and promising action. Many regarded the conference as a turning point from

---

pleted in 1988. She conducted semi-structured interviews, from which she quotes. She does not provide any further details about when exactly these interviews were conducted.

63 Naur and Randell, *Software Engineering*, 7.

64 Naur and Randell, 71.

65 Dijkstra, "Notes on Structured Programming," 3.

not addressing problems to taking action and seeking solutions. Thus, a second set of feelings emerged that characterized this emotional community: euphoria and hope, confidence and a call for action. By beginning to formulate the problems together and exchanging ideas, solutions seemed within reach, and the concerned software developers turned into active and responsible problem-solvers. The conference was seen as a new beginning. Dijkstra put it this way: "The meeting in Garmisch Partenkirchen was very exciting. For me, it was the end of the Middle Ages. It was very sunny. The meeting was a success."[66]

Other participants later emphasized similar points in interviews. They described "an enormous atmosphere of enthusiasm; we felt we might actually achieve something and solve some problems [...]; the main thing from the first conference was that we were openly talking about the software crisis and that something needed to be done."[67] At the conference, problems were "attacked," as one participant put it.[68] There was also a sense of humor. One participant asked, quite seriously: "How many errors should we be prepared to accept in a system containing one million instructions?" Another participant replied: "Seven [laughter]."[69] Despite the significant concerns and fears, the mood was therefore positive overall: "And the result then was an immensely enthusiastic week."[70]

Thus, the emotional community of software developers at the first conference in Garmisch was characterized by a specific mixture of concerns and fears, along with an emphasis on personal responsibility. This did not lead to resignation, but rather served as the starting point for hope and the expectation of regaining control. The conference can thus be interpreted as part of a professionalization strategy of software development, which fostered the process of masculinization. Male software developers were frightened, but first and foremost, they interpreted their worries as a sense of reliability and a determination to act. They built a male community of responsible problem solvers. When the conference ended,

> the majority ... left ... with a feeling of relief, some even in a state of great excitement: It had been admitted at last that we did not know how to program well enough. I myself and quite a few others had been waiting eagerly for this moment because now at last something could be done about it.[71]

---

66 Interview with Edsger Dijkstra, Professor of Computer Sciences, University of Texas, formerly Professor of Mathematics at the Technical University of Eindhoven and Burroughs Fellow, quoted in Valdez, "Gift from Pandora's Box," 175.

67 Interview with Douglas Ross, SofTech Inc., formerly of the Servo Mechanisms Laboratory, Massachusetts Institute of Technology, quoted in Valdez, 176.

68 Naur and Randell, *Software Engineering*, 22.

69 Naur and Randell, 41.

70 Interview with John Buxton, quoted in Valdez, "Gift from Pandora's Box," 175.

71 Dijkstra, "On the Interplay," 3–5.

With these expectations, the second NATO conference was scheduled to take place in Rome in 1969. At the start of this follow-up conference, the "sense of urgency in the face of common problems" that had prevailed at the conference in Garmisch was reiterated.[72]

The disintegration of the emotional community one year later: Anger, frustration, hurt feelings

However, as Valdez has already demonstrated in her dissertation, the follow-up conference resulted in great disillusionment.[73] The participants emphasized that even the venue and its atmosphere had been disappointing. "The place where the conference was held was sterile – I mean it was too modern, too – it didn't bring people together with feeling."[74] It is worth noting that the participant considered feelings important for the conference and criticized the venue for not fostering an emotional atmosphere. Actually, the emotional community started to disintegrate.

The unity that formed through a shared, concerned, and anxious understanding of the problem, accompanied by a sense of relief and expectation that solutions would be found, disintegrated at the moment discussions about possible solutions began. The second conference in Rome was marked by negative feelings, culminating in mutual recriminations. It is also interesting to note that the open approach to errors was no longer welcomed so unanimously. When asked whether errors should be discussed, it was pointed out that this might be honorable, but it could be detrimental to one's career. One commentator suggested introducing a "pathology" of software into the curriculum. He compared discussing mistakes in software education to medical students learning about "disease structures." Software programmers should do the same, even if it is "very painful and unfortunately … not glamorous."[75] However, the reactions to the suggestion were muted.

What was more decisive in the disintegration of the emotional community was that it now became clear that the shared talk of software issues, problems, and even crises had different meanings for different groups of software developers. One could assume that this could be explained by the fact that the participants were not exactly the same. However, there was a significant overlap of participants. As one participant complained: "People were saying their own version in less compelling terms of what had been covered the year before."[76] Rome can be seen as typical of

72 Buxton and Randell, *Software Engineering Techniques*, 7.
73 Valdez, "Gift from Pandora's Box."
74 Interview with Douglas Ross, quoted in Valdez, 183n.
75 Buxton and Randell, *Software Engineering Techniques*, 48.
76 Interview with Douglas Ross, quoted in Valdez, "Gift from Pandora's Box," 183n.

the international software community of the time, which was not in harmony about how to program. There was a fundamental disagreement about what constituted an adequate solution for problems, which they even defined differently. Two groups emerged, who engaged in a heated debate: academic computer scientists and the so-called industrialists, i.e., software developers from an industrial background. Heavy conflicts arose over the appropriate solution strategies, and it soon became clear that this conference lacked harmony and shared concerns. The emotional community, which had united software developers a year earlier, no longer existed. Essentially, the debate centered on whether a mathematical-theoretical approach or a more pragmatic, test-based approach was the most suitable path forward. The positive atmosphere and sense of solving problems collectively as a community of software developers who shared a common concern had vanished, replaced by a dispute over the correct way to address the issue. Taking action became disintegrating. As one speaker summarized: "The truth of the matter is that we tend to look with doubt and suspicion at the other side."[77] The industrialists would say: "Well, there's nothing we can get out of computer science: look at all this rubbish they are talking about." The academics, on the other hand, said: "Goodness me; what rotten techniques they use and look: they all fail!"[78] One speaker urged everyone to ask how they could assist each other. The current situation made him "sad." The academics were "disgracefully arrogant in neglecting and denying the existence of large problems."[79]

Positions on the proper way to program were exchanged directly. As one participant recalled, people from industry felt like "monkeys to be looked at by the theorists." On the other hand, the theorists felt isolated, believing "they were not allowed to say anything."[80] The report of the Rome conference shows what can be described as hardened fronts, which were very emotionally charged and often perceived as a devaluation of one's position. The descriptions and assessments of the respective opposing positions contained terms such as "trouble," "problem," "neglecting," and "collapsing." There was an atmosphere of hurt feelings and mutual disparagement. Overall, disappointment and frustration were so overwhelming that some attendees even suggested the conference would have been better off never having taken place. One participant summed up that most of the participants were left with "an enormous sensation of disillusionment."[81]

While an emotional community had formed at the first conference in Garmisch, with the software developers united by shared feelings of responsibility, concern,

77 Buxton and Randell, *Software Engineering Techniques*, 9.

78 Buxton and Randell, 9.

79 Buxton and Randell, 8.

80 Buxton and Randell, 9.

81 Interview with John Buxton, quoted in Valdez, "Gift from Pandora's Box," 184.

and fear, which were ultimately transformed into an enthusiastic spirit of optimism and hope, this emotional community fell apart when it came to concrete problem-solving. Many negative feelings were expressed at the second conference. However, these were no longer unifying but divisive. They no longer led to a shared, euphoric strategy for action. Instead, when the discussion about the right action started, participants expressed feelings of disappointment, frustration, and a lack of recognition for their positions, which now had a separating effect. At this conference, the participants did not form an emotional community. Factions had emerged, and emotions now had a divisive rather than a unifying effect. Thus, emotions were strongly unifying at the first conference and firmly separated the participants at the second conference.

Conclusion

The all-male software developers were very emotional at both conferences. It is remarkable, first, how clearly and openly feelings of fear, worry, and loss of control were expressed at the first conference, seemingly counteracting the image of a confident, male, in-control software developer. What is striking is the relief felt by many participants in finally being able to discuss the problems, their emotions, and concerns they faced. However, this admission of fear, uncertainty, and discomfort was linked to an emphasis on personal responsibility. Expressing concern thus became part of a sense of responsibility that stylized feelings of anxiety as part of a solution. The openness with which male participants spoke about their fears and concerns, which seemed unusual at first glance, was quickly linked to the great responsibility they bear, which obliges them to address the problems and to express their worries, above all, to find solutions. In this way, negative feelings of fear and concern were transformed into positive emotions. By the end of the conference, these men were confident that they could regain control and resolve the issues. It was thus clear that the software developers were not despondent critics of technology, but saw themselves as responsible technicians who were raising serious concerns and seeking solutions.

Second, the debates on how to solve the problems were part of a male-dominated professionalization strategy. The fact that only male participants were invited effectively meant that women were excluded from a conference where the solution to software problems was discussed openly and in depth. This was in line with the contemporary "recoding" of gender, the attribution of "important topics" as male concerns, and the associated marginalization of women in the software development field.[82]

82 Abbate, *Recoding Gender*, chap. 3; Ensmenger, "Making Programming Masculine."

Third, the 1968 NATO conference represents a brief moment in history where a temporary, very short-lived emotional community openly discussed problems, errors, malfunctions, and potential failure and, importantly, reflected on them emotionally. The intertwining of emotions and reflection aligns with key insights of the historiography of emotions, which has criticized the constructed opposition between emotions and rationality. During the first conference, reflection on software issues became possible within a setting where the same emotions were shared. In any case, technology developers were not purely rational actors, confident in their work and decision-making. They shared their concerns, fears, and uncertainties openly. They expressed their worries, highlighted their sense of responsibility, and sought solutions directly. This was especially evident at the second conference, where they seemed offended, frustrated, and disappointed; they felt somewhat belittled and disrespected during debates about the best solution. Thus, at both meetings, the crucial role of emotions in technology development was evident.

Do the fears expressed by technology developers and their emotional debate about the best solution strategy in the early days of software development now hold greater historical importance? Was this a short and temporary phase of openness about errors, potential failure, and uncertainties that over time gave way to a sense that things were more or less under control? It is undoubtedly the case that fear, concern, and uncertainty have diminished due to the various error control strategies in software development. Without doubt, it is still not possible to produce error-free software systems, but it is possible to produce more or less dependable software.

Nevertheless, the early phase of programming clearly shows that the image of euphoric and self-assured technology developers enthusiastically contributing to progress needs a more nuanced view. Today, in the realm of AI, discussions about its limitations, unreliability, and errors are resurfacing. Warnings are also being expressed in the AI context. Some of these warnings come from Silicon Valley heroes themselves, while others are from well-known AI researchers.[83] However, the hype about AI's potential and successes remains dominant. It's essential to consider the concerns and fears that software developers expressed early on, as this helps to differentiate between the perception of an overly optimistic culture in Silicon Valley and the obvious problems and failures surrounding AI. A culture of risk-taking and embracing failure may prevail in Silicon Valley. However, focusing on these media-savvy, loud, and self-congratulatory project leaders obscures essential questions of how to handle fallibility and uncertainties in technology development – topics that are also filled with concern, fear, and caution. Discussing errors and failures in a way that emphasizes failure not only as a means of success but also as a possible danger

83 United Kingdom Government, *The Bletchley Declaration*; Metz, "Godfather of A.I."

paves the way for a more realistic societal debate. After all, errors, malfunctions, failures, and fears are all part of the digital age.

Epilogue: The digital age and anxiety?

Neta Alexander stated that anxiety "is the dominant reactive affect of the 21st century."[84] She references a manifesto-like essay entitled "We Are All Very Anxious," written by a British collective of artists, scholars, critical thinkers, and anti-capitalists called Plan C.[85] The collective explains the shift from the Fordist system to the present day. With full-time jobs, welfare, job security, and mass consumption, the Fordist era was characterized by a sense of boredom. Jobs were simple, repetitive, and dull. This is no longer the case: "In contemporary capitalism, the dominant reactive affect is *anxiety*."[86] Anxiety is the basis of our attitude toward life, as the collective claims.

From a historical perspective, this dichotomous historical caesura is clearly too simplistic and focused on the Global North. Still, it raises a compelling question: What role does anxiety play in digital societies? A German newspaper recently reported that 16% of the German population would like to see digitalization reversed, and 37 % often feel overwhelmed. A study highlighted the numerous issues people face when using technology correctly, updating it, and maintaining its functionality.[87] When dealing with technology, many often feel uncertain, anxious, and frustrated. Determining whether it is appropriate to call it an "age of digital anxiety" requires more research. Understanding the feelings of technology developers is an essential part of exploring what role anxiety plays. Digital anxiety is a significant social issue that does not receive enough attention.

Bibliography

Abbate, Janet. Recoding Gender: Women's Changing Participation in Computing. The MIT Press, 2017. https://doi.org/10.7551/mitpress/9014.001.0001.

Alexander, Neta. "Rage against the Machine: Buffering, Noise, and Perpetual Anxiety in the Age of Connected Viewing." *Cinema Journal* 56, no. 2 (2017): 1–24. https://dx.doi.org/10.1353/cj.2017.0000.

Appadurai, Arjun, and Neta Alexander. *Failure.* Polity, 2019.

84 Alexander, "Rage against the Machine," 22.

85 Weareplanc, "We Are All Very Anxious."

86 Weareplanc.

87 Herbold, "Speicher voll."

Asghar, Rob. "Why Silicon Valley's 'Fail Fast' Mantra Is Just Hype." *Forbes*, July 14, 2014. https://www.forbes.com/sites/robasghar/2014/07/14/why-silicon-valleys-fail-fast-mantra-is-just-hype/.

Berth, Christiane. "Zwischen Hoffnung, Stolz und Wut: Die emotionale Aneignung des Telefons in Mexiko, 1930er bis 1980er Jahre." In *Technikemotionen*, edited by Martina Heßler. Schöningh, 2020. https://doi.org/10.30965/9783657703456_011.

Buxton, John, and Brian Randell, eds. *Software Engineering Techniques: Report on a Conference Sponsored by the NATO Science Committee, Rome, Italy, 27th to 31st October 1969*. NATO Science Committee, 1970.

Corn, Joseph. *User Unfriendly: Consumer Struggles with Personal Technologies, from Clocks and Sewing Machines to Cars and Computers*. Johns Hopkins University Press, 2011.

Dijkstra, E. W. "On the Interplay between Mathematics and Programming." In *Program Construction*, edited by F. L. Bauer and M. Broy. Springer, 1979. https://doi.org/10.1007/BFb0014653.

Dijkstra, E. W. "Notes on Structured Programming." In *Structured Programming*, edited by O. J. Dahl, E. W. Dijkstra, and C. A. R. Hoare. Academic Press, 1972.

Dijkstra, E. W. "The Humble Programmer." Manuscript EWD 340. E. W. Dijkstra Archive, University of Texas at Austin. Reprint of article published in *Communications of the ACM* 15, no. 10 (1972): 859–66. https://www.cs.utexas.edu/ EWD/transcriptions/EWD03xx/EWD340.html.

Ensmenger, Nathan. "Making Programming Masculine." In *Gender Codes: Why Women Are Leaving Computing*, edited by Thomas J. Misa. John Wiley & Sons, 2010. https://doi.org/10.1002/9780470619926.ch6.

Ensmenger, Nathan. *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise*. The MIT Press, 2010. https://doi.org/10.7551/mitpress/9780262050937.001.0001.

Feeney, J. M. "Management Information Systems – The Failure of Technology." In *Business Information Systems*, Infotech State of the Art Report 9, no. 7. Pergamon Infotech, 1981.

Geuenich, Michael. "'… gibt es auch mal ein Küßchen auf das Lenkrad': Anthropomorphisierung von Technik und die fragile Black Box Automobil." In *Technikemotionen*, edited by Martina Heßler. Schöningh, 2020. https://doi.org/10.30965/9783657703456_013.

Haigh, Thomas. "'Crisis, What Crisis?' Reconsidering the Software Crisis of the 1960s and the Origins of Software Engineering." Paper presented at the Second Inventing Europe/Tension of Europe Conference, Sofia, June 17–20, 2010. https://www.tomandmaria.com/Tom/Writing/SoftwareCrisis_SofiaDRAFT.pdf.

Herbold, Astrid. "Speicher voll." *Die ZEIT*, no. 35/2025, August 17, 2025. https://epaper.zeit.de/article/124e6251e0618cf51faabd202fcec177412a73eb23ed0d62c9402a2cf3d9fa6f.

Hicks, Mar. "Sexism is a Feature, not a Bug." In *Your Computer is on Fire*, edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip. MIT Press, 2021. https://doi.org/10.7551/mitpress/10993.003.0011.

Jackson, Steven J. "Rethinking Repair." In *Media Technologies: Essays on Communication, Materiality and Society*, edited by Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot. The MIT Press, 2014. https://doi.org/10.7551/mitpress/9042.003.0015.

Licklider, J. C. R. "Underestimates and Overexpectations." *Computers and Automation* 18, no. 9 (1969): 48–52.

Light, Jennifer S. "When Computers Were Women." *Technology and Culture* 40, no. 3 (1999): 455–83.

MacKenzie, Donald, "A View from Sonnenbichl: On the Historical Sociology of Software and System Dependability." In *History of Computing: Software Issues*, edited by Ulf Hashagen, Reinhard Keil-Slawik, and Arthur L. Norberg. Springer, 2002. https://doi.org/10.1007/978-3-662-04954-9_9.

Metz, Cade. "'The Godfather of A.I.' Leaves Google and Warns of Danger Ahead." *New York Times*, May 5, 2023.

Misa, Thomas J., ed. *Gender Codes: Why Women Are Leaving Computing*. Wiley; IEEE Computer Society, 2010. https://doi.org/10.1002/9780470619926.ch1.

Nakamura, Lisa. "Plug and Pray: Performance of Risk and Failure in Digital Media Presentations." *The Velvet Light Trap* 64 (2009): 87–89.

"NATO Science Committee." *Nature* 181 (1958): 739–40. https://doi.org/10.1038/181739b0.

Naur, Peter, and Brian Randell, eds. *Software Engineering: Report on a Conference Sponsored by the NATO Science Committee, Garmisch, Germany, 7th to 11th October 1968*. Scientific Affairs Division, NATO, 1969.

Norman, Kent L. "Computer Rage: Theory and Practice." Presentation, HCIL-V and the Department of Psychology, October 21, 2004. Archived at Internet Archive (Wayback Machine), November 19, 2015. https://web.archive.org/web/20151119181900/http://129.2.36.150/trons/hcil22oct2004/hcilbbl_10_22_2004.pdf.

Parnas, David. "Software Aspects of Strategic Defense Systems." *Communication of the ACM* 28, no. 12 (1985): 1326–35.

Petroski, Henry. *To Engineer is Human: The Role of Failure in Successful Design*. Vintage, 1992 (First published 1982).

Randell, B. "Software Engineering in 1968." In *Proceedings of the 4th International Conference on Software Engineering (ICSE '79)*. IEEE Press, 1979.

Reddy, William M. *The Navigation of Feeling: A Framework for the History of Emotions*. Cambridge University Press, 2001. https://doi.org/10.1017/CBO9780511512001.

Rosenwein, Barbara H. *Emotional Communities in the Early Middle Ages*. Cornell University Press, 2006.

Slayton, Rebecca. *Arguments that Count: Physics, Computing, and Missile Defense, 1949–2012*. MIT Press, 2013. https://doi.org/10.7551/mitpress/9234.001.0001.

United Kingdom Government. *The Bletchley Declaration by Countries Attending the AI Safety Summit, 1–2 November 2023*. Policy paper, updated February 13, 2025. https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023.

Valdez, María Eloína Peláez. "A Gift from Pandora's Box: The Software Crisis." PhD diss., University of Edinburgh, 1988.

Weareplanc. "We Are All Very Anxious." *Plan C* (blog). April 4, 2014. https://www.weareplanc.org/2014/04/we-are-all-very-anxious/.

Wolf, Burkhardt. "Schiffbruch mit Beobachter. Zur Geschichte des nautischen Gefahrenwissens." In *Die Unordnung der Dinge: Eine Wissens- und Mediengeschichte des Unfalls*, edited by Christian Kassung. transcript, 2009. https://doi.org/10.1515/9783839407219-002.

Telework in intellectual debates in the 1980s: Gendered visions of technology for the future society

Anna Baumann

Introduction

A woman in front of a screen at a small, cluttered table, with her baby on her lap, in a kitchen or bedroom – this was the dominant image of a teleworker in the 1980s in German-language newspapers. The cover image shown in Figure 1, from an Austrian science and culture magazine from 1990, exemplifies this popular gendered imagination of decentralized office work. The title of the article asked: "Never back to the office?" and the text on "Teleheimarbeit" (tele-homeworking) referred to various US and European studies on telework which interpreted the phenomenon in either "skeptical" or "optimistic" ways, especially regarding the work situation of women in the anticipated "information society."[1] The publication shows that the debate on telework was highly influenced by scientists. In this chapter, I examine the early intellectual history of the new work form and ask what influence the involved sciences had on the construction of the highly gendered and emotionally charged imagination of telework throughout the 1980s – and how the sciences themselves were influenced by their involvement with telework.

"Telework" describes the performance of office tasks outside the actual office by means of personal computers and new telecommunications technologies.[2] The term can be found especially during the 1980s and 1990s in transnational debates. There was not one single or clear definition of the work concept "telework"; still, the idea of decentralized office work became a widely debated key concept during the 1980s and had a high presence in academia and the public. However, the term "telework" was not as widespread in English as "Telearbeit" in German. Today, it is more common to talk about "remote work," "home office," or simply "working from home."

1 Mauritz, "Teleheimarbeit."

2 Historian Mirko Winkelmann notes in his both articles on telework how every author was concerned about a definition of the phenomenon: Winkelmann, "Vom Risiko zur Verheißung," 128; Winkelmann, "Wende oder Wandel?," 121.

Figure 1: This cover illustrates the gendered perception of telework as it prevailed in newspaper articles in German-speaking countries as well as in scientific publications on the subject.

Spektrum-Cover, April 15, 1990, in: AK-Wien: sowidok: Heimarbeit Österreich, 1988–1990.

Telework was first envisioned in 1976 by the engineer Jack Nilles in the US, after home and personal computers had been developed. It was a techno-euphoric vision of work in an anticipated new society, which was referred to as "information" or "knowledge" society.[3] After the oil crises in the early 1970s, deindustrialization and computerization came to be widely discussed. This led globally to a perception of living in times of epochal change.[4] In the socio-economic sphere, the phrase "after the boom" marks this disruption.[5] The future of society, and in particular the future of work, was up for debate. In the 1980s, telework gained widespread international academic and public attention. Scientists were particularly interested in the phenomenon. They launched research projects and wrote about it. The importance of the sciences in discussing telework was primarily due to its technological

3 Danyel, "Zeitgeschichte der Informationsgesellschaft."

4 From a global perspective on the history of emotions: Barua et al., "Introduction."

5 See e.g. Bernet and Tanner, "Einleitung"; Raphael et al., *Vorgeschichte der Gegenwart*.

future-oriented notion. Various disciplines such as geography or spatial planning recognized telework as an opportunity to secure the economic and social survival of peripheral and mountainous regions. They wanted to use it for a "telematically induced re-ruralization" (*telematisch induzierte Wiederverländlichung*).[6] Overall, the phenomenon consisted much more of discourse then actual working practice. In 1987, it was estimated that only about 10,000 people were actually teleworking worldwide.[7]

The discrepancy between the intensity of the debate and the actual realization was due to two reasons. First, the contemporary state of technology when computer networks were still connected via telephone wires made digital connections expensive and therefore mostly local. Moreover, home or personal computers had only just been invented, and the hardware was still expensive and therefore not affordable for every household.[8] In Switzerland, for example, there were only about 200,000 personal computers in the corporate sector in the early 1980s.[9] A lot of people had not yet had any real (working) experience with computers back then.[10] Second, there were extreme emotions toward the idea of telework because it stood as an example of the impact of "computerization": there was anxiety but also euphoria regarding the new technologies.[11]

Scientists used telework in the 1980s internationally as a proxy for discussing social impacts of computer technologies for the future society, as I will argue in this chapter. My contribution focuses on the transnational intellectual debates on telework from its beginning in the mid-1970s in the US to its spread to the UK and German-speaking countries in the 1980s. By tracing the dialectic development of scientists' interventions to the topic of telework, it becomes possible to narrate the history of a mostly imagined working practice that would not be realized on a larger scale until the 1990s and 2000s. As part of the debate on telework, the sciences involved (engineering and futurology, labor/union-oriented social sciences, large interdisciplinary research programs/STS) also negotiated their assessment of technology. The debates on telework shaped the public perception of the work form as well as they stimulated theoretical development and reorientation within the sciences, such as feminist theorical approaches to science and technology studies (STS).

---

6 Stadler et al., *Gegen|Wissen*, IV/70.

7 Huber, *Telearbeit*, 59; Mirko Winkelmann describes different phases for the German context and defines the 1980's as phase of "discourse without practice," and the 1990's as phase of "practice without discourse." Winkelmann, "Vom Risiko zur Verheißung," 151; Winkelmann, "Wende oder Wandel?," 142.

8 See e.g. Gugerli, *Wie die Welt*; Albert, "Der vergessene 'Brotkasten.'"

9 Buchberger et al., *Die Arbeit am Bildschirm*.

10 See for the simultaneity of the digital and the analogue: Christiane Berth's chapter in this volume.

11 Winkelmann, "Vom Risiko zur Verheißung"; Bösch, "Euphorie und Ängste."

I examine the most influential publications on telework from the time through a close reading and analyze them with regard to the different cultural contexts, political visions, and scientific developments aligned with telework. After exploring the context of thought of the first imaginations of telework situated in US futurology, I turn to feminist social scientist reactions in Europe. How did futurists and feminists study and politicize telework? I will show that US futurists and European feminists engaged controversially in the debate, and that they operated with gendered and emotional perceptions of technology in order to either promote or criticize telework. As a consequence, they created a shared imagination of the work form in these societies, based on gendered and emotional presumptions. Furthermore, it becomes evident that the interventions of the scientists themselves on telework were situated in their cultural, political, historical, and gender-specific background – what STS thinker Donna Haraway calls "situated knowledges" in her feminist critique at the dominant understanding of objectivity.[12]

As the magazine cover shows, telework was discussed as a gendered phenomenon at the time.[13] In the office, computers especially changed the work situation of women workers. Because office work was highly gendered from the late nineteenth century, some office tasks had become women's jobs.[14] Professions such as secretaries,[15] computer operators,[16] telephonists,[17] and typists[18] were mainly women's work in Europe and North America. And these feminized jobs were especially affected by the implementation of new technologies. Female office workers suffered from a lot of distress when the new technologies were introduced at the workplace: they feared losing their jobs or being unable to adapt to the necessary computing skills, as the British social scientist Ursula Huws discovered in 1982 among female office workers in Leeds.[19] Thus, computerization caused gender relations and hierarchies, as well as the gendered organization of office work, to be up for negotiation.[20]

---

12 Haraway, "Situated Knowledges."

13 The current historical research on telework focuses on questions of gender: Winkelmann, "Vom Risiko zur Verheißung"; Winkelmann, "Wende oder Wandel?"; Homberg et al., "From 'Home Work'"; Homberg and Winkelmann, "Home Is Where"; Kocka, "Telework."

14 Gardey, "Gender-Technology Relations", 157–69; Gardey, *Schreiben, Rechnen, Ablegen*; see also earlier labour historian contributions on the topic: Nienhaus, *Berufsstand weiblich*; Davies, *Woman's Place Is at the Typewriter*; Anderson, *The White-Blouse Revolution*.

15 Berebitsky, *Sex and the Office*.

16 Jennifer Light shows in her study that the term "computers" was first used for the women workers before it was transferred to the devices. Light, "When Computers Were Women."

17 Schüller, "Vom Wohnzimmer in die Telefonzentrale."

18 See Helen Glew's chapter on the typing pool in this volume.

19 Huws, *Your Job in the 80's*.

20 See e.g. Hicks, *Programmed Inequality*.

The gendered debate about computers in the office of the future was accompanied by the highly emotional and ambiguous debate on computerization in general, related to the spread of (personal) computers in various areas of daily life. Topics such as surveillance and rationalization caused a lot of trouble, while at the same time some experts promised that computers would "humanize" labor and lead to more leisure. This caused many ambiguous feelings such as fear, frustration, and anxiety, but also hope and euphoria, both at an individual and a social level.[21]

To grasp this emotional dimension, the methodological concept of *Technikemotionen* (technological emotions), established by historian of technology Martina Hessler, is useful. *Technikemotionen* means the co-construction of technology and emotions.[22] By examining the interaction and interrelationship of technology and emotions, technological-historical narratives become visible, including how they are developed and shaped by different aspects, such as national stereotypes and gender dynamics.[23] Especially the envisioned gendered teleworking situation caused a lot of anger, concern, and fear, as unionist demands for a ban show.[24] The examination of the different (emotional) positions on gender and telework not only reveals the influence of *Technikemotionen* in the interpretation of the phenomenon and the instrumentalization of *Technikemotionen* for the politization of telework.

The focus on *Technikemotionen* furthermore reveals different scientific communities that were concerned with the future society and emotional anticipation of it. In this way, the futurists and social scientists also formed different *emotional communities*. In Barbara Rosenwein's definition of emotional communities, these are related to social groups with a shared textual basis.[25] By following the intellectual network of telework internationally, I show how techno-deterministic narratives were addressed and how they interacted with emotions and gender. Anxiety or euphoria toward computerization interrelated with the position of the scientists and was a gendered phenomenon. This reveals a dialectic development of different scientific networks around telework as gendered emotional communities with utopian or dystopian expectations regarding the future during the beginning of the "digital revolution" in the 1980s.[26]

---

21 Bösch, "Euphorie und Ängste."

22 Heßler, "Technikemotionen," 14–20.

23 Heßler, 25n.

24 That was the case in West Germany where trade unions demanded for a ban on telework in 1983. Swiss trade unions originally wanted to follow this demand. "Stopp der elektronischen Heimarbeit!," *SMUV-Zeitung*, February 29, 1984, 83; see also Winkelmann, "Wende oder Wandel?," 129.

25 Rosenwein, *Emotional Communities*.

26 Ricky Wichum and Daniela Zetti identify the perception of (continuous) change as written into the ideology of the so-called digital revolution. Wichum and Zetti, "Transformation," 1–11; see also: Balbi, *The Digital Revolution*.

The chapter thus contributes to the history of science, gender, and emotions in the beginning of the so-called digital age. Writing a social and gender history of digitization is an ongoing desideratum in contemporary history but currently there is a lot of new research addressing this gap.[27] One important research area points out the masculinization of computer work.[28] In their study, historian Mar Hicks concludes that Britain's decline in computing was due to the exclusion and invisibility of women as computer workers since the 1960s, and emphasizes that: "All History of Computing is Gendered History."[29] The strongly gendered debate to the home office since the rapid reorganization of work during the Covid-19 pandemic emphasized the need to historicize the gendered debate on decentralized office work.[30]

To study the gendered visions of telework, I present the primary tech-optimistic conception of telework by US futurists since the mid-1970s in the first section. Then I turn to feminist reactions on this anticipated change of work in Europe. Feminist social scientists interpretated telework primarily as a matter of women's work because of feminized office jobs and space-related gender-specific division of labor, as I will show in the second section. The third section deals specifically with female unionists in the Federal Republic of Germany (FRG), who represented a kind of tech-deterministic pessimism and argued with so-called female "tech-fear."[31] Then, I examine reactions toward this gendered problematization of work. On the one hand, European scientists of various disciplines tried to refocus the debate onto telework, away from the gendered notion. They promoted telework and tried to set it into practice. They returned to tech-optimistic visions of the early futurists and thus implicitly to the male connotations of telework because they associated the work with highly qualified male professionals. On the other hand, there was the analysis of feminist English-speaking social scientists who critically engaged in science and technology studies (STS). By reflecting the connections of gender, technology, and emotions in patriarchal capitalism, they focused on telework. The feminist social scientists identified the male connotation of technology as the main problem because it led to a de-skilling of women's tasks or the expulsion of women workers. This was also the case with telework. But they argued in favor to overcome every deterministic notion of technology and gender. In this sense, as I will argue, the transnational debate on telework helped lay the foundation for theories about the co-construction of tech-

27 Bösch, "Wege in die digitale Gesellschaft"; Heßler and Weber, "Provokationen der Technikgeschichte."

28 Light, "When Computers Were Women"; Ensmenger, The Computer Boys; Hicks, Programmed Inequality; Schafer, "What the History."

29 Hicks, *Programmed Inequality*, 234.

30 Kocka, "Telework."

31 For the history of "tech-fear" in general: Heßler and Hitzer. "Introduction: Tech-Fear."

nology and gender, which were fundamental for technology-related equality policies in the 1990s.

US futurists and the male notion of technology: The decentralized office as technological fix around 1980

Since the oil crisis had a dramatic impact on the world economy in the early 1970s, traffic and energy costs emerged as critical topics. In areas like Los Angeles, urban development and air pollution were perceived as dangerous. In this context, the US engineer Jack Nilles recognized telecommunications as a tool to decentralize office work. Nilles and an interdisciplinary team started nationally funded research on the topic at the University of Southern California.[32] The aim of their project was to study "potential telecommunications alternatives to transport."[33]

In the study, published in 1976, they advocated for the use of telecommunications to substitute transportation as a "trade-off": they called this "option" *telecommuting*. In their view, telecommuting should serve as a technological fix to traffic and environmental problems. Nilles and his team calculated the potential costs saved by telecommuting. They called for companies to use this option by highlighting economic advantages and that policy making should encourage it to solve the aforementioned ecological and financial problems. Nilles and colleagues wrote:

> Given the capability of modern telecommunications and computer technologies to efficiently produce, transmit, and store information, it appears probable that many information industry workers could "telecommute." That is, they could perform their work, using communications and computer technologies, at locations much closer to their homes than is the case now.[34]

Telecommuting was proposed for the so-called "information industry workers." The "information society" represented the perception of a new age which had been discussed since the 1970s because of the upheavals of deindustrialization and computerization.[35] The oil crisis pushed the economic shift from blue- to white-collar work in Western countries. There was talk of "information industry workers" as a large new part of the workforce. In Switzerland, for example, the proportion of employees in the industrial sector fell from 48% to 35% between the 1970s and 1990s, while the proportion of employees in the service sector rose from 44% to 62% in the same time

32 Nilles et al., *The Telecommunications–Transportation Tradeoff*; Capraro, *Work Different*.

33 Nilles et al., *The Telecommunications–Transportation Tradeoff*, v.

34 Nilles et al., 4.

35 Danyel, "Zeitgeschichte der Informationsgesellschaft."

period.[36] This process was reflected as the coming of the "knowledge society."[37] In this logic, computerization was perceived optimistically as a chance for society. Interestingly, Nilles imagined the telecommuters would work "closer to their homes," not *at* home. Instead, they should work in decentralized offices, which companies should set up as a kind of branch closer to residential areas. The separation of the public and the private sphere was not challenged by this vision for future work organization.[38]

Nilles and his colleagues envisioned telecommuting in the mid-1970s as a way to decentralize white-collar workplaces through telecommunications. As such, they were mainly concerned with traffic, technology costs, and environmental issues. Telecommuting appeared as a form of work organization which promised a better future through technology. The original idea of telework thus represented a tech-optimistic view, in which the scientists wanted to inform the readers "about using and developing technology for the wisest service to mankind,"[39] as they wrote in the preface.

The US author Alvin Toffler argued in a similar technology-driven direction as Nilles and his team. Toffler was a prominent futurist; his book *Futureshock*, published in 1974, had been a worldwide bestseller. In *Futureshock* he developed his key point, that society is facing a fundamental transformation on all levels: "We are creating a new society. Not a changed society. Not an extended, larger-than-life version of our present society. But a new society."[40] He imagined technology as the "engine" and knowledge as "its fuel."[41] In this metaphor, the industrial progress is written in. Toffler transferred industrial economics to the information industry – and transgressed it: "Human work will move out of the factory and mass office into the community and the home."[42] Toffler's idea of technology corresponds with the potential that media historian Elizabeth Patton associates with it because communication technologies would "disrupt[e] ideological spatial divisions between the sites of leisure (formerly code as unproductive by disregarding unpaid labor) and sites of market labor."[43]

---

36 Tanner, *Geschichte der Schweiz*, 484n.

37 Bell, *Coming of Post-Industrial Society*; Stuhr, *Mythos New Economy*.

38 This is remarkable because media historian Elizabeth Patton shows in her study on the "home office" how communication technologies (e.g. the telephone) undermined the separation of the private and public from the very beginning. Patton, *Easy Living*, 3.

39 Nilles et al., *The Telecommunications–Transportation Tradeoff*, vi.

40 Toffler, *Future Shock*, 185.

41 Toffler, 30.

42 Toffler, 402.

43 Patton, *Easy Living*, 3.

Toffler argued that the acceleration of technological change was causing anxiety, so, it was key to anticipate the future to calm people.[44] For this reason, Toffler argues for "futurology" as a scientific approach to the future, which he saw as an urgent task in times of change.[45] It was also an intervention for establishing futurology as a research field. Computer-based decentralization of office work was an important case (study) for the futurists.

In 1980, Toffler then discussed the concept of telecommuting in his popular book *The Third Wave*, which would predict a new period of socio-economic organization based on the "Information Revolution." Whereas in his first book Toffler had written broadly about a reorganization of work, he now looked more concretely at how home computers could change jobs.[46] Therefore, he referred in detail to Nilles' calculations, although his main conclusion was different. For Toffler, telecommuting was primarily a means of working from home, leading to "The Electronic Cottage," a central point in his argumentation for the sake of the new society. "The Electronic Cottage" was *the* tool to rebuild a home-centered society and therefore to reintegrate work and family life.[47] "The Electronic Cottage" should "humanize" working conditions, minimize the divorce rate and strengthen the local community, especially the family.[48] In Toffler's book, computer technologies and decentralized work organization offered the promise of a better future. The argument was essentially techno-euphoric.

This better, computer-based future, however, appealed to notions from the past. "The Electronic Cottage" represented the pre-modern idea of organizing society through the "whole house" as a producer and consumer entity.[49] Toffler imagined men and women both working at home, which would change the gender-specific division of labor; they could even share employment. In this sense, Toffler envisioned a new gender order that would differ from the existing one. The existing binary gender order was established in the nineteenth century with a dichotomous organization of tasks, the male breadwinner ideology and a strict heteronormative hierarchy, as historians such as Karin Hausen showed in their pioneering research in the 1970s.[50] In Toffler's Electronic Cottage, the premodern organization in households is the tool to overcome the modern (and bourgeois) conception of gender-specific work organization, with the woman in the private sphere and the man in the public. Because the heterosexual married couple would perform their work

44 Toffler, *Future Shock*, 1–20.
45 On the history of the future studies in the German context, see Seefried, *Zukünfte*.
46 Toffler, *The Third Wave*, 195–209.
47 Toffler, 210n.
48 Toffler, 219–23.
49 Schmidt-Voges et al., "Das Haus in der Vormoderne."
50 Hausen, "Die Polarisierung der 'Geschlechtscharaktere.'"

together in the private space, there would be room for shared (working) experiences and different forms of work organization in the family. Toffler promised that "The Electronic Cottage" could, "to put it simply, provide a common set of experiences and get marriage partners talking to one another again. It could shift their relationships along the spectrum from 'cool' to 'hot'. It could also redefine love itself and bring with it the concept of Love Plus."[51] Based on a culturally pessimistic diagnosis, Toffler therefore focused on the heteronormative family and its adaption in the new age: the shared (working) experiences should lead to a new understanding between the partners. The aspect of gender was only mentioned in order to guarantee the heterosexual family model and the organization of paid work in it.[52]

Overall, Toffler put Nilles' concept into a new context. In Nilles' telecommuting, the community-oriented aspect was only a side note.[53] For Toffler, bringing work back into the home through computers and telecommunications, rather than commuting to distant offices, was a promising chance for *The Third Wave*. "The Electronic Cottage" would create a "more human civilization" (to which the German subtitle of the book attested).

By the early 1980s, Nilles' and Toffler's visions together had shaped the primary notion of telework and thus influenced future discussions of it. As a first consequence, a two-fold pattern evolved: on the one side, the argument focused on environment and traffic; on the other, on family and work–life-balance.[54] Secondly, telework provided a vision for the future – not only with regard to the organization of work, but rather for society as a whole. And thirdly, technologies, especially telecommunications, were seen as enablers of social change – as a technological fix.[55] These early intellectual considerations on decentralized office work established a tech-optimistic as well as tech-deterministic notion of telework.

The conception of telework was gender biased, however. A gender dimension was indicated only indirectly such as through comments on family life – as we have seen in Toffler.[56] Also the gender blindness of Nilles' argumentation reproduced the male norm of employment. In their techno-utopias, women were not working with computers – in contrast to the office reality where computer work was mainly women's work due to the gender division in office tasks. As a consequence, the scientists Nilles and Toffler also represented a male culture/gesture with their optimistic and at the same time deterministic attitude toward technology. The

51 Toffler, *The Third Wave*, 234.

52 Toffler, 232–34.

53 Nilles et al., *The Telecommunications–Transportation Tradeoff*, 159.

54 The same ambiguity recognizes also Winkelmann, "Wende oder Wandel?," 125.

55 "Because the technologies are often in the role of the hidden or unperceived enablers of social decisions": Nilles et al., The Telecommunications–Transportation Tradeoff, 171; also Winkelmann, "Wende oder Wandel?," 125.

56 Toffler, *The Third Wave*, 220–23; Toffler, *Future Shock*, 37.

general assumption that men represented technological progress and had to be technophiles came into play here.[57] The early concept of telework was therefore the result of male visions regarding personal computers and the future society. By influencing not only the notion but also the visionary character and – implicitly – the male orientation of telework, Nilles and Toffler became seen as pioneers and were repeatedly mentioned in subsequent research.[58]

This genderblind but at the same time implicitly gendered coining of decentralized office work situates telework in the numerous theories of social transformation established since the 1960s. This was the context of thought in which the concepts of telecommuting and "The Electronic Cottage" were developed. Nilles' and Toffler's visions for computer-based decentralization of office work illustrate how science engaged in predicting a future "new society."[59] James Beniger listed more than forty such predictions in his own study of *The Control Revolution*.[60] Some famous examples were, apart from the already discussed information society: Peter F. Drucker's knowledge society (1968), Daniel Bell's post-industrial society (1973), Ulrich Beck's risk society (1986), and later also Manuel Castells' network society (1996).[61]

These sociological theories were highly influential for social self-description while always announcing a new phase for society which was to come.[62] All these predicted "new societies" were based on interpretations of economic and technological change. They all stated a shift from the industrial to the service sector with various implications, such as the growing importance of knowledge, science, and information, the restructuring of labor in general, but also other (mainly meritocratic) forms of political organization. Another commonality was the importance attributed to the technologies and the (positive) impact they were expected to have, especially computers and telecommunications. Ideologically, these theories brought together visions of future and technology to promote a tech-utopia which was leading, in Toffler's words, to a "more human society."

Nilles and Toffler stand in this tradition of finding solutions for the problems of the present by predicting "a new society." They noted the same developments as the

57 Heßler, "Technikemotionen," 25nf.

58 See e.g. Huber, *Telearbeit*; Jaeger et al., *Telearbeit*; Qvortrup, "Telework"; also in recent historical research: Homberg and Winkelmann, "Home Is Where the Office Is."

59 For the history of the futures: Hölscher, *Die Entdeckung der Zukunft*; Esposito, "Zeitenwandel."

60 Beniger, *The Control Revolution*, 4n.

61 Drucker, *Age of Discontinuity*; Bell, *Coming of Post-Industrial Society*; Beck, *Risikogesellschaft*; Castells, *Network Society*; see also Steinbicker, *Zur Theorie der Informationsgesellschaft*.

62 Alban Frei and Hannes Mangold characterize this as a postmodern modus of description with the logic "of a medusa," because "each time the new society got a new name, two even newer names were to follow." Translated by the author. Original: "wann immer die neue Gesellschaft mit einem neuen Namen benannt wurde, [wuchsen ihr] zwei noch neuere Namen nach"; see Frei and Mangold, "Einleitung," 11.

literature on social transformation, such as deindustrialization and computerization. These sociological theories were a common ground of academic thinking. Toffler, for example, based his argument explicitly on Bell's "post-industrial society."[63] In this way, Nilles and Toffler depicted telework as a tool to reorganize work (and through work all other aspects of social life) in the future "new society."

Turning to the question of gender, we see that beyond the general observation of increasing female employment because of the growing service sector,[64] no attention was paid to the gendering of the predicted developments. Specific consequences of these transformations for women or the gender order were not explicitly discussed, as was common at the time. Another implicit notion on gender at this early stage of telework is the male authorship of these visions: All the futurists and theorists of societal transformation were men. They formed a (male) scientific community which was bound together not only by the perception of a problematic present but also by the anticipation of a better future through the positive effects of technology. Due to their gender role and socialization, this male community also shared emotions toward technological and social change.[65] As an emotional community, they were engaged in promoting their visions of technology and culture, especially in the US. This is where telework as a technological fix for problems regarding office work in service of the new society have been developed.

However, these ways of thinking about future new societies were also contested by contemporaries. The entire genre of future studies has been criticized, particularly Toffler's work. Beniger, for example, attested that Toffler could not grasp the longue durée of the societal transformation, and the Austrian sociologist Holger Rust described the entire literature twenty years later as only a superficially visionary form of naïve techno-optimism, and, even worse, as an unscientific business model for selling books.[66] So it was exactly the deterministic (and positively connoted) link between future and technology which was criticized. And it was precisely the gender-specific dimension of this link between technology, technophile visions for society, and the male gesture which was problematized by English and German feminists with regard to telework in the following years.

---

63 Toffler, *The Third Wave*, 25.

64 Bell, *The Coming of Post-Industrial Society*, 146.

65 Sociologist Martin Meuser recognized regarding the construction of masculinity in the "network society" (Castells) some irritation at the hegemonial breadwinner model. Nevertheless, men controlled the networking in the different social spheres through male communities. Meuser, "Nichts als alter Wein," 89.

66 Beniger, *The Control Revolution*, 11; Rust, *Trends*, 7–14.

Telework as a matter of women's work by the mid-1980s: The interpretation of European feminist social scientists

As discussed, the early conceptualization of telework in the late 1970s conveyed specific notions: on the one hand, the two-sided notion of telework ranging from telecommuting to "The Electronic Cottage"; on the other hand, the gender bias regarding the phenomenon. In this section, I will discuss the international diffusion of the concept in the early 1980s, especially in the UK and in West Germany. By then, the notion of telework as women's work had become very popular, especially in the German-language media.[67] I show that feminist social scientists and union women emerged as a different scientific *and* emotional community that played a crucial role in defining telework as women's work.

The New Women's Movement had given new impetus to the politicization of women's work in the 1970s.[68] Through this social movement, women's union groups were founded, or the existing ones gained more importance. Female unionists criticized the trade unions as patriarchal institutions: they politicized the matter of women's work in trade unions from within. The feminists within and outside the trade unions saw economic independence as a precondition for emancipation. But there was also critique of the ongoing female responsibility for housework and care work. The feminists coined the term "double load" to describe this.[69] They emphasized the correlation of class and gender in wage labor: women often worked in low-paid and precarious jobs.[70]

From the mid-twentieth century, a lot of wage-earning women were working in offices and they made up the major part of the office workers. In the UK, for example, women accounted for 78% of all white-collar workers in 1980.[71] From the late 1970s, research was carried out on women's office work.[72] One example of this new research focus is the study from the British labor sociologist Ursula Huws. Huws investigated on behalf of a Leeds trade union the effects of "microelectronics" on women's jobs in West Yorkshire. As a result, she published a unionist guide for women workers on how to respond to the new technologies.[73] She argued that women were not trained

67 This fact becomes remarkably evident by searching the media documentaries on "telework" (or also on "homework") in various archives, e.g., Arbeiterkammer (AK) Wien sowidok 331.794 Heimarbeit; Archiv für Zeitgeschichte, AfZ: IB wf [Gesellschaft zur Förderung der schweizerischen Wirtschaft]-Archiv II 27.9: 10524–26 EDV und Heimarbeit (Telearbeit); Schweizerisches Sozialarchiv SAR QS/ZA 70.3 Heimarbeit, Telearbeit.

68 See e.g. Schulz, "Neue Frauenbewegung in Europa"; Ferree, *Varieties of Feminism*.

69 Isler, "Lohn für Hausarbeit."

70 Balka and Wagner, "A Historical View."

71 Hicks, *Programmed Inequality*, 230.

72 McNally, *Women for Hire*; see also Balka and Wagner, "A Historical View."

73 Huws, *Your Job in the 80's*.

in the handling of new technologies in order to keep them low in the office hierarchy, with correspondingly low wages. In consequence, she demanded education, especially for older women, so they did not fall behind.

By examining the research by female social scientists on "microelectronics" (computer technologies) in the office, it becomes clear that the awareness of women-specific effects of telework rose. Telework thus emerged in the early 1980s as a complex of women's employment, (personal) computers, and the longstanding tradition of homeworking. Huws, for example, made the general observation that:

> One new group of homeworkers, which has expanded considerably in recent years, is computer programmers. Often, these are mothers who had full-time staff programming jobs before their children were born. Government cutbacks in spending on nursery provision and other social services mean that more and more women are finding it impossible to go out to work. This, combined with increasingly sophisticated communications technology which links homes with offices, seems bound to lead to more growth in the "hidden army," as captive homeworkers have been described.[74]

Huws identified a "new group of homeworkers."[75] They were female programmers who were forced into precarious working conditions because of their mother role and due to the gendering of computer work. The perception of telework as women's work arose not only from gendered effects of the computer technology in offices but also from the narrow notion of telework as working "tele" from home, thus rooted in Toffler's idea of "The Electronic Cottage." Feminist union women and social scientists like Huws problematized this new concept of "telework" by pointing out similarities with historical homeworking and its gendered dimension.[76] In German, the term *Teleheimarbeit* (tele-homeworking) emphasizes the connection to the cottage industry even more explicitly.

Because of the perception of the cottage industry as a precarious, premodern, and highly feminized form of work, so-called computer-based or electronic homeworking was met with great skepticism, especially by unionists. Homeworkers were seen as isolated and difficult to organize.[77] With no regulations and low income, the cottage industry appeared to be the antithesis of wage labor in factories and

74 Huws, 35.

75 In the years that followed, Huws became a renowned expert on teleworking: Her 1984 study was titled *The New Homeworkers*, and in the 1990s she was a member of advisory commissions on the regulation of telework in Europe. Huws, *The New Homeworkers*; Huws et al., *Telework*; Huws et al., *Vertiefende Untersuchung zum Weissbuch*; Huws et al., *Teleworking and Gender*.

76 Winkelmann, "Vom Risiko zur Verheißung"; Winkelmann, "Wende oder Wandel?," 126–29.

77 Boris, "From Industrial Evil."

offices.[78] Homeworking was seen as a temporary and unskilled form of labor. All these features were also attributed to female labor. This gendered dimension was intensified by the spatial organization of the work. Because homeworking took place in the household, it was even more firmly classified as women's work. In a Swiss TV show, for example, "Teleheimarbeit" was called a "relapse into the pre-industrial age."[79] Thus, the consideration of time contradicted the one of the US futurists: while the latter regarded telework as a vision of the future, European feminists saw it as a reenactment of the past. They shared Toffler's vision about the restoring effects of "The Electronic Cottage," but they attributed nothing positive to it. The tech-utopia of the futurists became a reactionary dystopia for the (union) women and feminist social scientists. Accordingly, feminist social scientists were skeptical about new technologies. From their perspective, they thought of them as a threat: they could worsen the social and work position of women.[80]

This skeptical interpretation of telework had two backgrounds. First, it was situated in the research of feminist social scientists. They investigated female office workers, often on behalf of unions. In this context, the new technologies were seen as a gender-specific "threat" because they were expected to worsen the working conditions and job security of workers in general and of women office workers in particular.[81] As a result, feminist social scientists emerged as an emotional community concerned about the computerization of office work because of women workers.

The other background for this emotional interpretation of the technological transformation lay in the position of trade unions toward technological change. Unions in the US and (Western) Europe were generally afraid of so-called "automatization" or "rationalization." They feared job losses, de-qualification, and monotony as consequences of the microelectronics in factories and offices.[82] As in the 1920s, the developments were debated as "proletarization" of white-collar workers.[83] The "office of the future" was called "Electronic sweatshop," transformed by computers "into the factory of the past."[84]

This diagnosis was also crucial for the assessment of telework by union women. Because of the underprivileged status of female labor, they expected secretaries or typists to be the first to lose their jobs during rationalization.[85] So they interpreted the new technologies in the same way as the feminist social scientists: namely as a threat for women's office jobs. The already precarious and marginalized position

78 Tanner, "Heimarbeit."
79 Original: "Rückfall ins vorindustrielle Zeitalter," see MTW, "Homeoffice."
80 Bahl-Benker, "Statt Hektik im Büro."
81 Werneke, *Microelectronics and Office Jobs*; Vogelheim, *Frauen am Computer*.
82 Müller, "Von Job-Killern."
83 Kracauer, *Die Angestellten*.
84 Garson, *The Electronic Sweatshop*; see also Christiane Berth's chapter in this volume.
85 Werneke, *Microelectronics and Office Jobs*.

of women in the labor market could be worsened by automatization.[86] Because of their similar interpretation of computerization and its effects on women office workers, union women and social scientists incorporated a similar interpretation of telework. They were part of the same emotional community.

German union women as emotional community and the fear of telework

In West Germany, the trade union position against "rationalization" was particularly pronounced. The historian Frank Biess places it in context of stereotypical German *Angst* (fear). Biess argues that by examining various German "Angstobjekte" (objects of fear), a different history of the FRG would become visible, illuminating the interactions between new technologies, economic changes, and transformations in the history of emotions.[87] The role of emotions in democracies, and in particular the future-orientation of fear, would be condensed in German *Angst*. According to Biess, the term refers to a common (self-)description and an established discourse around Germany but it can also be found directly in contemporary sources.[88] German tech fear operated with a specific politics of remembrance of mass unemployment in the Weimar Republic with its anti-democratic outcomes.[89] One of these German "Angstobjekte" was "automation," with the debate about it starting in the late 1950s. Biess analyzes this debate surrounding German tech-fear as "modern fear," which was characterized by techno-deterministic perceptions and US orientation and thus represented an effect of the Cold War.[90]

The trade unions played an important role in the automation debate.[91] Historian Moritz Müller shows that in the 1980s fears of the effects of "microelectronics" affected different emotional communities in IG Metall – one of the most important and influential German trade unions. While the functionaries politicized fears against computerization, union members' feelings toward the new technologies varied between powerlessness and pride.[92] In the context of this union-established tech-fear, historian Andie Rothenhäuser argues that the narrative of a specifically German "hostility toward technology" (*Technikfeindlichkeit*) was a politically motivated reaction by the employer lobby to delegitimize the union's criticism of "microelectronics," civilian protest against surveillance, and the environmental movement against nuclear power plants. The employers and their lobby claimed

86 See Helen Glew's chapter on the typing pool in this volume.
87 Biess, *Republik der Angst*, 36–40.
88 Biess, 18–24.
89 Biess, 159n.
90 Biess, 161–74.
91 Biess, 185–90.
92 Müller, "Von Job-Killern."

that trade unions were harming economic progress through their negative attitude toward technology.[93] In the FRG, the term "tech-fear" combined the stereotypical German *Angst* with (transnational) trade union worries about working conditions and job security in times of computerization. These remarks make clear that in the German context, the interpretation of technological change was particularly controversial at the time.

In the context of the German (tech-)fear, the early presence of German union women in the debate on telework is not surprising.[94] They problematized the decentralization of office work through computers and telecommunications by highlighting possible effects of "rationalization." Unionist, German, and gender-specific fear of computerization came together in their resentment of telework. Together these dimensions nourished a discourse around something that was called "female tech-fear" (*spezifisch weibliche Technikskepsis*).[95] This had a particular impact on discussions about telework in the German context.

The brochure of the German sociologist and unionist Marliese Dobberthien exemplifies the gendered fears about telework (Figure 2). It was published in 1985 in the name of the German Trade Union Confederation.[96] The cartoon on the cover connects telework and women's work: the husband is presented as the male breadwinner working away from home, while teleworking from home was imagined as a way for wives and mothers to earn some extra money. The cartoon illustrates the double load carried by different types of feminized labor: the woman is occupied with housework, childcare, and typing. On the husband's question about her day,[97] she responded that it was completely "normal": "No, just a normal day, pea soup, swollen tonsils, five hours in the office, just a bit tired!"[98] Regarding the demonstrated gendering of the private and public spheres, it is astonishing that the woman talks about her work as situated in an office: "five hours in the office."[99] Although, she performs decentralized office work at home, she (still) imagines herself being part of the social

93 Rothenhäusler, "Wegweiser Richtung Steinzeit."

94 Bahl-Benker, "Statt Hektik im Büro"; Dobberthien, *Teleheimarbeit*; another example is the demand for a ban in 1983, see Winkelmann, "Wende oder Wandel?," 129.

95 This is exactly what later the feminist STS addresses. E.g. Cynthia Cockburn points out that there is nothing "natural" in this attitude of women toward technology. Cockburn, *Die Herrschaftsmaschine*, 18–23.

96 Dobberthien, *Teleheimarbeit*.

97 Original: "N'Abend Schatz, ist das Essen fertig, hat Fritzchen noch Husten, gibt's was Besonderes?" (Evening darling, is dinner ready, is Fritzchen still coughing, is there anything special?), translation by the author.

98 Original: "Nein, ganz normaler Tag, Erbsensuppe, geschwollene Mandeln, fünf Stunden im Büro, nur ein wenig abgespannt!," translation by the author.

99 Hausen, "Polarisierung der 'Geschlechtscharaktere.'"

space "office" and marks it in this way as paid work. Apparently, the decentralization of office work was also an ambivalent process in terms of space.

Figure 2: The union brochure shows ambiguity toward the new technologies: it asks if "Teleheimarbeit" would be a threat or an opportunity.

Dobberthien, Marliese: Teleheimarbeit. Elektronische Heimarbeit – Gefahr oder Chance? Hg. von DGB/Landesbezirk Baden-Württemberg. Stuttgart 1985.

Rather surprising for a publication on "Teleheimarbeit" is that the cartoon does *not* reflect the contemporary definition of telework. The woman is not working with a personal computer or any electronic connection for data transfer. In this sense, the situation shows the earlier form of commercial homework, as it was performed for years using typewriters, as the job advertisement of the Swiss electricity company Brown Boveri from 1970 illustrates (Figure 3).[100] Women were specifically addressed as flexible workers during periods of workforce shortage.

100 Job-Advertisement, *Brown Boveri Hauszeitung* 28, no. 7/8 (1970): 221. Many thanks to my colleague Leila Girschweiler, who shared this source with me.

Figure 3: The company was looking for wives of employees to do some work at home on flexible hours. The expression "Fleissige Lieschen" (diligent little Lisas) is highly gendered and suffests a trivialization.

Was uns betrifft

«Brown Boveri Girl Power» sucht Fleissige Lieschen

Liebe Leserinnen,

Haben Sie schon einmal etwas von der «Brown-Boveri-Girl-Power» gehört? Nein? Ich auch nicht, aber wir sind gerade dabei, ein solches «Gebilde» aus der Taufe zu heben. Man hat mir die Aufgabe zugeteilt, mich auf die Suche nach «fleissigen Lieschen» zu machen, die gewillt und fähig wären, ihre kostbare Zeit der Firma in kleineren oder grösseren Brocken zur Verfügung zu stellen.

Muss ich nun — dem Rattenfänger von Hameln gleich — süsse Töne und verführerische Reden schwingend, bergauf und bergab meines Amtes walten? Oder darf ich auf Ihre Projektanträge, interne Betriebsvorschriften, Arbeitsvorschriften etc.

Grosser Wert wird auf eine «Dauerbindung» gelegt, d. h. auf eine recht lange Arbeitsfrist, was natürlich nicht heisst, dass Sie sich bis in Ihr hohes Greisenalter verpflichten müssen. Die Minimalzeit pro Woche liegt bei 5 Stunden. Ihrer Generosität und Ihrem Fleiss sind jedoch keine Grenzen gesetzt, wenn Sie es auf 48 Stunden pro Woche bringen möchten.

Ein Brown Boveri-Chauffeur wird bei Ihnen in Baden, Wettingen, Ennetbaden, Turgi, Nussbaumen, Neuenhof oder Birr vorsprechen, die erledigte Schreibarbeit holen und

auch nicht mehr dazu, sich vernachlässigt zu fühlen! Welches Glück für die ganze Familie! Auch seine geschäftlichen Abweseneiten vergehen für Sie wie im Nu. Kaffeeklatsch mit Nachbarinnen können Sie mit einer guten Ausrede absagen, wobei Sie gerade noch überflüssigen Kalorien den Garaus machen.

Sicherlich haben Sie öfters schon einmal über den langweiligen Haushalt gestöhnt und über Ihre brach liegenden Fähigkeiten. Auch etwas eigenes Taschengeld können Sie doch sicherlich gut brauchen, nicht wahr?

Ausser den bis jetzt besungenen «Heimarbeiterinnen» sucht BBC aber auch Damen, die gewillt wären, eine sogenannte Teilzeitarbeit in der Firma selbst zu leisten. Darunter verstehen wir eine feste Verpflichtung von mindestens 2 bis 3 Stunden täglich oder 1 bis 2 Tagen wöchentlich. Dafür würden wir Sie je nach Einsatz (Sprachkenntnisse) und erbrachter Leistung wie unsere ganztags arbeitenden Mitarbeiterinnen bezahlen. Eine Teilzeitarbeit bietet Ihnen die Möglichkeit zu einer modernen Lebensgestaltung für Frauen, deren Kinder z. B. bereits selbständig oder schon ausgeflogen sind. Warum sollen sie einsam und versauernd den ganzen Tag zu Hause sitzen? Der Kontakt mit dem alten Beruf, mit anderen Menschen und die damit verbundene Weiterbildung wird gerade ihnen ein grosser seelischer Gewinn sein.

Job-Advertisement, in: Brown Boveri Hauszeitung 7,8/28 (1970), 221.

So, the cartoon from Dobberthien's brochure set teleworking as continuous with well-known forms of female labor. There was nothing innovative about the new computer technologies: they were only perceived in a tech-pessimistic way, that they could further worsen the working conditions of women in locating wage labor in the private sphere.

However, in the brochure itself, Dobberthien referred critically to euphoric predictions that by 1990 a third of all employees would be teleworking from home or that up to 50% of all jobs could be decentralized. Instead, she discussed the actual diffusion of telework (around 400 teleworkers in FRG) and its technological definition. She noted also that "traditionally" 90% of homeworkers were women.[101] A tech-pessimistic view prevailed: On a macro level, Dobberthien anticipated an erosion of labor protections, wage suppression, and deskilling; on a personal level, she identified "isolation, separation and loneliness,"[102] as well as a permanent overload because of the double burden, as problems of teleworking. This is because the form of

101 Dobberthien, *Teleheimarbeit*, 6–13.

102 Original: "Isolation, Vereinzelung und Vereinsamung," translation by the author. Dobberthien, 25.

work means that paid and unpaid work now take place in same location. She called it a "privatization of work."[103]

In her analysis of the spatial effects of the decentralization of office work, Dobberthien observed a similar transgression as the already mentioned media historian Patton in her recently published study on the longue durée of homebased office work. Patton argues that communication technologies such as the telephone or the typewriter destabilized the dichotomous division of the public and the private, long before the personal computer showed up.[104] In this sense, telework also stands in another continuity: the effect of technology in undermining and blending the gendered spheres of home and office while maintaining the gender division of labor. But Dobberthien had a rather pessimistic attitude toward technology. She considered it cynical to refer to new technologies as "communication technologies": rather, they should be called "anti-communication and anti-information technologies."[105] Overall, Dobberthien was very skeptical towards telework and its scientific promotion, as she feared negative consequences for women. She therefore called for political measures: regulations should be introduced, and trade unions should be involved.[106]

During the 1980s, the perception of telework as feminized work was situated in a specific context of thought. It brought together feminists' and unionists' criticism of the new technologies. Social scientists such as Ursula Huws investigated the effects of microelectronics on women's office jobs. In this context, the new technologies were seen as a gender-specific "threat" because they were expected to worsen the working conditions and job security of workers in general and of women office workers in particular.[107] Union women focused on the negative aspects of homeworking: "double load" and the precarity of women's work. This also stimulated gendered tech fears. In the FRG, these tech fears had a specific background in the German "Angstobjekt" automation, which was a reason why in 1983 German trade unions demanded a ban on teleworking.[108] Together feminist social scientists and union women formed an emotional community regarding the interpretation of telework, which was located in the fear of the effects of computerization on women office workers due to the gendered division of labor.

---

103 Original: "Privatisierung von Arbeit," translation by the author. Dobberthien, 33.

104 Patton, *Easy Living*.

105 Dobberthien, *Teleheimarbeit*, 25n.

106 Dobberthien, 34–38.

107 Werneke, *Microelectronics and Office Jobs*; Vogelheim, *Frauen am Computer*.

108 "Stopp der elektronischen Heimarbeit!," *SMUV-Zeitung*, February 29, 1984, 83; Winkelmann, "Wende oder Wandel?," 129.

De-gendering of the telework debate in interdisciplinary research programs from the mid-1980s onward

What we encounter in the intellectual telework debate up to the mid-1980s is a US technic-euphoric and male-led vision of decentralized office work and in reaction a European skeptical gender-sensitive view of this work through feminist union women and social scientists. This development of the debate led to different reactions. On the one hand, there were attempts to broaden debate and change the gender-specific notion of teleworking. On the other hand, Anglophone feminist scholars engaged in STS made a theoretical contribution to telework by analyzing the interdependencies between gender and technology. Both responses offered a different and more nuanced emotional connotation of telework.

By the 1980s, gender had become a central topic in the public and academic debate on telework. But despite the lively and controversial debate, there were only a few teleworkers and there was not much information about them or their working conditions. The data showed that earlier euphoric predictions about the spread of telework were far from reality: by 1987, the German economist and social scientist Joseph Huber counted only about 100 persons teleworking in the FRG; worldwide approximately 10,000.[109] This observation of less teleworking in practice grew important and motivated the scientific interventions which aim at a positive reinterpretation and possible realization of telework.

From the mid-1980s onwards, in reaction to the small number of teleworkers, there were some efforts to encourage this form of work. Scientists of various disciplines such as geography, engineering, architecture, economy, law, and sociology launched research projects in European countries.[110] They were part of larger state-funded programs which were occupied with so-called "socially responsible technology design" (*sozialverträgliche Technikgestaltung*) or "humanizing" working conditions (*Humanisierung des Arbeitslebens*).[111] The research programs were meant to address fears regarding the social effects of the new technologies. The scientists involved followed the perception of living in times of technological change and that a "new society" like the "information society" or "knowledge society" was coming. The scientists cross-referenced each other (starting with Nilles and Toffler) and thus established a transnational scientific network to actually implement teleworking.

To implement teleworking, the research projects wanted to establish another connotation of the work form. The key argument was that teleworking from home would only represent one form of teleworking, and not the preferred one. Rather,

109 Huber, *Telearbeit*.

110 Aichholzer and Kirschner, *Telearbeit in europäischen Nachbarschaftsbüros*; Rey, *Mobile Arbeit in der Schweiz*.

111 Kleinöder et al., "Humanisierung der Arbeit."

forms such as so-called teleworking centers and satellite offices were presented as the desirable ones.[112] Teleworking in shared offices had been tested in pilot projects in many European countries, such as Nykvarn in Sweden and Benglen in Switzerland.[113] But these projects were all temporary. One result was that there were financial and technical problems which first had to be solved before teleworking could be established. In particular, the high costs for the telephone connection for data transfer and the fact that devices were not widespread were among the reasons why the projects were halted.

In what follows, I illustrate these scientific interventions using a West German example: the study of the aforementioned Joseph Huber included an orientation toward the future in its title, calling telework a "vision" (*Zukunftsbild*) and a "political issue" (*Politikum*).[114] The publication was part of a FRG research program on socially responsible technology design.[115] There were attempts to end the association of teleworking with women's work. Therefore, the work form was placed (again) in a broader social context, but ecological questions were also important. Huber included settlement structure, the environment, transportation, the welfare state, and productivity in his study. The issue of "teleworking and women" was only one of many. Instead, positive arguments were promoted more strongly in order to overshadow critical considerations that could have hindered implementation. I interpret these attempts to promote telework by the research program as a reaction to the gendered politicization of teleworking as women's work from home by (German) union women. For this reason, other considerations came to the center.

A main focus of Huber's inquiry was the renegotiation of the office in terms of space. The research design was embedded in ergonomic issues and theoretical approaches aimed at "humanizing work." The "relationships in the family" also played an important role here, as it did in Toffler's idea of "The Electronic Cottage." The focus was no longer on gendered working conditions and the situation of female (tele)workers, but once again on the family as a social and economic unit. Historian Michael Homberg and others also point out in their recently published study the growing importance of the family-related argumentation in favor of telework in the UK and FRG, especially since the 1990s.[116] Furthermore, spatial planning and economic considerations on the relationship between urban and rural areas were important. In general, teleworking was discussed in terms of decentralization or

112 Huber, *Telearbeit*.

113 Qvortrup, "Telework," 90–93.

114 Huber, *Telearbeit*.

115 These huge research programs on "computerization" and societal change have recently come to the attention of historical research: see e.g. the conference of the Friedrich-Ebert-Stiftung "Perspektiven menschengerechter Arbeit: Gestern, Heute und Morgen," October 9–10, 2024.

116 Homberg et al., "From 'Home Work,'" 89n.

spatial flexibilization.[117] It was a return to Nilles' concept of "telecommuting," by dissolving the spatial notion of Toffler's "Electronic Cottage" while at the same time reactivating its family-oriented promise.

By dissolving the spatial link to the private sphere, the gendered notion of telework faded. The interest in gendered effects was secondary in Huber's study and similar ones. The aim was to refocus the debate and move away from equating teleworking with women's work and working from home (and its negative aspects). However, this did not make gender irrelevant; on the contrary, there was a shift toward men as teleworkers and an implicit ideological shift to telework as men's work.[118] This shift was based on the reconceptualization of telework as skilled labor with a professional identity which is related to the masculinization of computer work in general. Hicks notes for the British context that this process of (re-)gendering of computer technology was complete by the end of 1980s.[119]

Overall, the research projects on telework were similar: teleworking was tested in pilot projects and promoted as the work form of the future. The focus has shifted from homebased office work to so-called satellite offices and teleworking centers: there was an attempt to relocate telework from the private into the public sphere. The aspect of gender was still mentioned, but only as one aspect of teleworking beside others, while there was a shift to male teleworkers. This reconceptualization of telework, which developed from a narrow, gendered view to address a variety of issues, became the basis for implementation attempts in the 1990s by a broad variety of actors such as companies like IBM, commissions for equal opportunities, or public administration.[120] Private and public institutions launched their own teleworking-programs and the first regulatory efforts were made.[121]

Telework and the co-construction of gender and technology: A new theoretical approach by feminist STS-thinkers

Besides this practical approach to implement teleworking, there were also some more theoretical reflections on the new form of work from the mid-1980s. In particular, technoscience was more and more investigated and theorized by feminist social scientists. They shared with union women a consciousness of the gendered effects of the new technologies.[122] But these STS oriented scientists argued differ-

117 Huber, *Telearbeit*; Stadler et al., *Gegen|Wissen*.
118 Winkelmann, "Vom Risiko zur Verheißung."
119 Hicks, *Programmed Inequality*, 231n.
120 Winkelmann, "Wende oder Wandel?," 131–34.
121 Homberg et al., "From 'Home Work,'" 80n.
122 Schöll and Küller, *Micro Sisters*.

ently. Their analysis formed the basis for the field of gender-oriented studies of science and technology. Through their analyses, they not only intervened in the international discussions about teleworking but also formed an intellectual network and scientific community of their own.

In the 1980s, the British social scientist Cynthia Cockburn stated that technology is gendered at all levels. Cockburn was a pioneer in the field of feminist critique of technology and carried out studies on the effects of computerization such as in the printing industry. She investigated the effects of new technologies when they were introduced.[123] She argued that the gendering of technologies and related tasks determine access, exclusions, the status of the employee, and thus the gender segregation of the labor market. She identified especially processes of (de-)skilling as crucial. These processes were gendered and embedded in the patriarchal capitalist system.[124] The first sentence of her book on technological change in the printing industry presents her key argument in a nutshell: "This book began as a study of the human impact of technological change. It has ended as a study in the making and remaking of men. It is also about the uses to which men put work and technology in maintaining their power over women."[125] In the case of transformation in work organization (such as through new technologies), male workers would organize themselves in such a way that these went in their favor.[126]

In the early 1990s, the Australian sociologist Judy Wajcman further developed Cockburn's thesis on the male character of technology culture into the social co-construction of technology and gender identity. In this process, emotions toward technology played a significant role. Wajcman discussed changes in social organization of office work as a result of computerization.[127] She argued that in offices, firstly, a particularly large number of women are employed and thus affected by the "microelectronic revolution" and, secondly, the gender-specific segregation of professions and hierarchies is imminent. Here she is in line with the diagnosis of earlier studies such as the discussed example by Ursula Huws. Wajcman then turned to teleworking, which she had researched in Australia. She noted that this form of work is still primarily a vision of the future and that only a few people were working in this way. The social scientist noted further that teleworking would affect different employment relations and conditions differently and therefore would affect men and women differently. She explained that "[i]t is only for male professionals who possess

123 Cockburn, *Brothers*; Cockburn, *Die Herrschaftsmaschine*.

124 Cockburn, *Brothers*, 5n; Cockburn, *Die Herrschaftsmaschine*, 17.

125 Cockburn, *Brothers*, 3.

126 Cockburn, *Die Herrschaftsmaschine*, 20n. Interestingly, this book is only translated into German. The translation was paid for by the women's group of the social democratic party. This highlights the significance of this gendered debate in the FRG; see Cockburn, *Die Herrschaftsmaschine*, 7–9.

127 Wajcman, *Feminism Confronts Technology*, 27–53.

skills which are in short supply that new technology homework presents an unambiguously attractive choice."[128] As she put it, teleworking was "a stark example of the reproduction of women's traditional position in the new electronic age."[129] Wajcman agreed with the notion of a new societal phase, ushered by the new technologies, but in contrast to the futurists, she mainly focused on the gender-specific effects. With this focus, she questioned the narrative of the new in connection with the "digital revolution" and instead revealed continuities with the past.[130] By pointing out the conservative effects of the new technologies regarding the gendered organization of labor, Wajcman argued the same way as the union women did.

The achievement of feminist technology criticism lies in the non-deterministic view of the gender-specific effects of technologies on social structure. The focus no longer relied only on women but also on men and how they profit from the male shaping of technology. So, this was a double political intervention: On the one hand, feminist social scientists broke with the technology-driven imagination of the futurists. Rather they insisted on gendered effects and capitalist continuities. On the other hand, they distanced themselves from an essentialist view, which in part characterized feminist positions on technology, such as the mentioned "female tech-fear" of the union women.[131] Wajcman summarizes this approach: "The key issue here is whether the problem lies in men's domination of technology, or whether the technology is in some sense inherently patriarchal."[132] As soon as the problem was localized "in men's domination of technology" (and not in the technologies themselves), it was no longer about turning away from it, but rather tapping its potentials. In the wake of this analysis, emotions toward technology appeared as a question of gender and of emancipation. This was the beginning of feminist calls for the female appropriation of technologies; it paved the way for tech-positive feminisms, such as the cyberfeminism that emerged in the 1990s.[133] And this had implications for the politicization of teleworking: While the German unionists demanded a ban on teleworking in the early 1980s, by the 1990s it was promoted by companies, equality officers, and politicians as a useful strategy for gender equality.[134]

The interventions of scholars such as the German economist Huber or the English-speaking feminist social scientists such as Cockburn or Wajcman show that transnational variations of the telework debate emerged at the end of the 1980s. Both interventions related to the prevailing technical-deterministic interpretation

128 Wajcman, 42.
129 Wajcman.
130 Balbi, *The Digital Revolution*.
131 Dommann, "Umbrüche am Ende der Linotype."
132 Wajcman, *Feminism Confronts Technology*, 13.
133 Cockburn speaks out in favor of self-organized computer courses for women, Cockburn, *Die Herrschaftsmaschine*, 23; Baumann, "Gleichstellung dank Internet."
134 Homberg et al., "From 'Home Work,'" 80n.

of teleworking, which imagined the form of work either in a (gender-blind) utopian way or with a complete focus on women's work. The interventions were intended to nuance and vary the debate. These variations differed in their approach: while the interdisciplinary research projects pursued the goal to realize telework as a work practice, the feminist theorization of gender–technology relations emphasized the ability to alter them. The reorientation of the intellectual teleworking debate also totally changed the scientists' feelings regarding teleworking and computer technologies: the strong emotions – euphoria and fear – were replaced with a more pragmatic attitude toward *Technikemotionen* related to computerization. This shaped a gender-neutral concept of teleworking. This was the starting point for various attempts by different actors to apply this form of work in the 1990s.

Conclusion

By the end of 1970s, Nilles and Toffler saw telework as a technology-driven vision for society as a whole, implicitly taking the US as a model for the rest of the world. This early conception was embedded in a specific scientific network concerned with the future, in which technology would serve for the better. Such visions of "a new society" were all devised by men, gender issues were not discussed critically. Nilles' original concept of "telecommuting" offered solutions to traffic problems and the environment. Futurist Toffler then saw "The Electronic Cottage" as a solution to family issues and against alienation. Telework, they felt, would bring about a new and better society through new technologies. So, both represented a rather optimistic view of computerization in the logic of a technological fix for social problems. By influencing not only the notion but also the visionary character of telework, Nilles and Toffler were the beginning of the teleworking debate and as such repeatedly mentioned in subsequent research on the topic.

In the early 1980s, in the course of intensified computerization, the idea of teleworking spread internationally and the debates on telework operated increasingly around gender. In Europe and especially in the FRG because of the national discourse of German *Angst*, union women like Dobberthien feared a further marginalization of women office workers by the impacts of the new technologies. Contrary to its early conceptualization as a non-gendered phenomenon, telework now appeared solely as a form of women's work. This was due to its association with (electronic) homeworking. Telework was no longer conceived as futuristic, but as antiquated. The impacts of the new technologies were viewed with skepticism on behalf of women: it was feared that they would reinforce patriarchal oppression in working (and family) life. As a result, the narrative of a so-called specific female "tech fear" emerged around teleworking. So, the gendering of the work form has changed as well as the gender of those who politized it.

This was the state of the debate by the mid-1980s. There were different reactions to it. One reconceptualization of telework was performed by European scientists from various disciplines. They followed a similar argumentation as the US futurists, highlighting the various benefits of teleworking. In research projects on the "humanization of work," social scientists, geographers, and economists such as Huber focused on telework in so-called satellite offices or teleworking centers, rather than at home. In doing so, they broke with the spatial gendering of teleworking from home. Instead, they promoted telework as a desirable and promising way of solving traffic and environmental problems, as well as family and gender equality issues. They returned to the early vision of teleworking as a means to create a new society by incorporating some sort of gender awareness. They reactivated the utopian idea of teleworking as a technological fix. These visions again were implicitly male. Because of the male dominance in science, most researchers concerned with telework were male, and they imagined mainly male teleworkers in decentralized offices.

English-speaking feminist social scientists like Cockburn and Wajcman also intervened in the debate. They did so in a twofold way by grounding a theoretical approach in relation to gender and technology. On the one hand, they took a stand against the gender blindness of their academic colleagues in STS. They argued that even technologies as such are gendered, that they have different effects on women and men, and that as long technology is (also culturally) dominated by men, technologies serve patriarchy. In this way, they established the feminist critique of technologies as part of their discipline. On the other hand, they opposed the technodeterminism of the women's (labor) movement, according to which technology was detrimental for women. As representatives of feminist technoscience, they advocated for women to adopt new technologies in order to overcome male dominance in technical culture: technological change should be released from patriarchal uses and instead help to create a better and new society. In this way, they reactivated a positive and emancipatory notion of technology. Teleworking, however, they saw in connection with the gender-specific division of labor. As long as this division persisted, telework serve it.

The recap of the controversial transnational debate on teleworking reveals the dominance of scientific (often also political) actors and offers insights into (theoretical) developments in the social sciences. These developments were gendered – its protagonists as well as its imaginations. The close reading of early important publications on teleworking has shown how ideas of the "new societies" served as spaces for negotiation on whether technologies would be enablers, threats, or irrelevant in the course of the expected economic and technical transformations. It becomes clear that these views were shaped by feelings about technologies as well as technological change – and that these emotions themselves were gendered as well. So, technology, emotions, and gender emerge as an intertwined complex with different national and cultural backgrounds. This complex constituted different attitudes

towards telework. Based on these attitudes, different scientific networks and emotional communities were formed that shaped the gendering of telework in different ways.

The close reading also reveals another shift in the gendering of telework from the mid-1980s, toward a genderblind and as such implicitly male notion of the work form. This shift followed the mechanisms described in the feminist critique of technology as the patriarchal complex of work, class, gender, and technologies: the new focus regarding teleworking was on skilled jobs with a high degree of autonomy and technical know-how, which often applied to managers – and these were predominantly men. This change in the gendering of computer-based labor from female to male workers is also described in the social and gender-oriented historiography of computers.[135] The telework debate reflects this development. In that sense, the analysis confirms the importance of the social sciences in the early stages of remote work organization. Teleworking served as proxy for thinking about the relationship between work and the new computer technologies in the anticipated "new society."

Finally, a brief outlook: there was a fundamental change in the 1990s. Teleworking was no longer a mainly scientific project but put into practice by new actors such as companies, public administrations, or equality institutions.[136] The tone of the debate completely changed. It was no longer about imagining the "new society" and teleworking as part of it (or as a means to reach it). It was about shaping workplaces in a way that made teleworking a realistic option. In the course of this, the liberalization of telecommunications in European countries was legitimized in part with reference to the promotion of telework.[137] This was a further step in the lengthy and ambiguous development toward remote work as we know it today. Since the Covid-19 pandemic the gendered effects of decentralized office work have reemerged as a lively topic of discussion – in science and among the public.

Acknowledgements

I thank Christiane Berth and Mike Prentice for their valuable and helpful comments on the text. Many thanks also to all colleagues of the Fellowship project "Globale Arbeitswelten im Wandel: Die Geschichte von Technik, Geschlecht und Emotionen seit den 1960er Jahren" and the participants of our symposium in June 2024 for discussing the initial draft of this text with me.

135 Hicks, *Programmed Inequality*.

136 Lüthy and Rüegger, *Vernetzte Arbeitsplätze*; Winkelmann, "Wende oder Wandel?"; Homberg et al., "From 'Home Work'"; Homberg and Winkelmann, "Home Is Where the Office Is."

137 Winkelmann, "Wende oder Wandel?," 135–38.

Archives

Arbeiterkammer (AK) Wien, sowidok 331.794 Heimarbeit.

Archiv für Zeitgeschichte, AfZ: IB wf [Gesellschaft zur Förderung der schweizerischen Wirtschaft]-Archiv II 27.9: 10524–26 EDV und Heimarbeit (Telearbeit).

Schweizerisches Sozialarchiv, SAR QS/ZA 70.3 Heimarbeit (Telearbeit).

Bibliography

Aichholzer, Georg, and Andrea Kirschner. *Telearbeit in europäischen Nachbarschaftsbüros*. Schriftenreihe "Soziales Europa." Bundesministerium f. Arbeit, Gesundheit u. Soziales, 1999.

Albert, Gleb J. "Der vergessene 'Brotkasten': neue Forschungen zur Sozial- und Kulturgeschichte des Heimcomputers." Archiv für Sozialgeschichte, vol. 59. J. H. W. Dietz Nachf, 2019.

Anderson, Gregory, ed. *The White-Blouse Revolution: Female Office Workers since 1870*. Manchester University Press, 1988.

Bahl-Benker, Angelika. "Statt Hektik im Büro – angenehmes arbeiten daheim?" In *Frauen am Computer: was die neuen Technologien den Frauen bringen; eine Einführung*, edited by Elisabeth Vogelheim. rororo Frauen aktuell 5529. Rowohlt-Taschenbuch-Verlag, 1984.

Balbi, Gabriele. *The Digital Revolution: A Short History of an Ideology*. Oxford University Press, 2023.

Balka, Ellen, and Ina Wagner. "A Historical View of Studies of Women's Work." *Computer Supported Cooperative Work (CSCW)*, 30 (2021): 251–305. https://doi.org/10.1007/s10606-020-09387-9.

Barua, Rukmini, et al. "Introduction: The Global 1970s from a History of Emotions Perspective." *New Global Studies* 17, no. 2 (2023): 125–33. https://doi.org/10.1515/ngs-2023-0020.

Baumann, Anna. "Gleichstellung dank Internet? Die CD-ROM 'ProNet.'" In *Was ist neu an der New Economy?: eine Spurensuche*, 1st ed., edited by Monika Dommann, Anna Baumann, and Anne-Christine Schindler. Æther 04. Intercom Verlag, 2021.

Beck, Ulrich. *Risikogesellschaft: Auf dem Weg in eine andere Moderne*. Suhrkamp, 1986.

Bell, Daniel. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. Basic Books, 1973.

Beniger, James Ralph. *The Control Revolution: Technological and Economic Origins of the Information Society*. 5th printing. Harvard University Press, 1997.

Berebitsky, Julie. *Sex and the Office: A History of Gender, Power, and Desire*. Society and the Sexes in the Modern World. Yale University Press, 2012.

Bernet, Brigitta, and Jakob Tanner. "Einleitung." In *Ausser Betrieb: Metamorphosen der Arbeit in der Schweiz*, edited by Brigitta Bernet, Jakob Tanner, and Céline Angehrn. Limmat, 2015.

Biess, Frank. *Republik der Angst: eine andere Geschichte der Bundesrepublik*, 2nd ed. Rowohlt, 2019.

Boris, Eileen. "From Industrial Evil to Decent Work: The ILO and Changing Perspectives towards Home-Based Labour." In *Home-Based Work and Home-Based Workers (1800–2021)*, 1st ed., edited by Malin Nilsson, Indrani Mazumdar, and Silke Neunsinger, vol. 45. Studies in Global Social History. Brill, 2022.

Bösch, Frank. "Euphorie und Ängste: Westliche Vorstellungen einer computerisierten Welt, 1945–1990." In *Die Zukunft des 20. Jahrhunderts: Dimensionen einer historischen Zukunftsforschung*, edited by Lucian Hölscher. Campus, 2017.

Bösch, Frank. "Wege in die digitale Gesellschaft. Computer als Gegenstand der Zeitgeschichtsforschung." In *Wege in die digitale Gesellschaft: Computernutzung in der Bundesrepublik 1955–1990*, edited by Frank Bösch. Geschichte der Gegenwart, vol. 20. Wallstein, 2018.

Buchberger, Josef, Ulrich Weickhardt, and Walter Lips. *Die Arbeit am Bildschirm*. Sicher arbeiten Merkblatt 11037. Schweizerische Unfallversicherungsanstalt, 1983.

Capraro, Julien, ed. *Work Different*. Documentary, edited by National Film Board of Canada, 2023. https://www.nfb.ca/film/work-different/.

Castells, Manuel. *The Rise of the Network Society*. Blackwell, 1996.

Cockburn, Cynthia. *Brothers: Male Dominance and Technological Change*. New ed. Pluto Press, 1991.

Cockburn, Cynthia. *Die Herrschaftsmaschine: Geschlechterverhältnisse und technisches Know-how*. Argument, 1988.

Danyel, Jürgen. "Zeitgeschichte der Informationsgesellschaft." *Zeithistorische Forschungen – Studies in Contemporary History* 9, no. 2 (2012): 186–211. https://doi.org/10.14765/zzf.dok-1598.

Davies, Margery W. *Woman's Place Is at the Typewriter: Office Work and Office Workers, 1870–1930*. Temple University Press, 1982.

Dobberthien, Marliese. *Teleheimarbeit. Elektronische Heimarbeit – Gefahr oder Chance?* Edited by DGB Landesbezirk Baden-Württemberg. Stuttgart, 1985.

Dommann, Monika. "Umbrüche am Ende der Linotype." In *Wissen, ca. 1980*, edited by Nils Güttler, Margarete Pratschke, and Max Stadler. Nach Feierabend. Zürcher Jahrbuch für Wissensgeschichte, vol. 12. Diaphanes, 2016.

Ensmenger, Nathan. *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise*. History of Computing. MIT Press, 2010.

Drucker, Peter F. *The Age of Discontinuity*. Harper & Row, 1968.

Esposito, Fernando. "Zeitenwandel. Transformationen geschichtlicher Zeitlichkeit nach dem Boom – eine Einführung." In *Zeitenwandel: Transformationen geschicht-*

licher Zeitlichkeit nach dem Boom, edited by Fernando Esposito. Nach dem Boom. Vandenhoeck & Ruprecht, 2017.

Ferree, Myra Marx. *Varieties of Feminism: German Gender Politics in Global Perspective*. Stanford University Press, 2012.

Frei, Alban, and Hannes Mangold, eds. "Einleitung." In *Das Personal der Postmoderne: Inventur einer Epoche*. Histoire, vol. 84. transcript, 2015.

Gardey, Delphine. "Gender-Technology Relations in the Various Ages of Information Societies." In *Connecting Women: Woman, Gender and ICT in Europe in the Nineteenth and Twentieth Centuries*, edited by Valérie Schafer and Benjamin G. Thierry. History of Computing. Springer International Publishing, 2015. https://doi.org/10.1007/978-3-319-20837-4_10.

Gardey, Delphine. *Schreiben, Rechnen, Ablegen: wie eine Revolution des Bürolebens unsere Gesellschaft verändert hat*. Translated by Stefan Lorenzer. Konstanz University Press, 2019.

Garson, Barbara. *The Electronic Sweatshop: How Computers Are Transforming the Office of the Future into the Factory of the Past*. Simon & Schuster 1988.

Gugerli, David. *Wie die Welt in den Computer kam: zur Entstehung digitaler Wirklichkeit*. S. Fischer, 2018.

Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14, no. 3 (1988): 575–99.

Hausen, Karin. "Die Polarisierung der 'Geschlechtscharaktere' – eine Spiegelung der Dissoziation von Erwerbs- und Familienleben." In *Sozialgeschichte der Familie in der Neuzeit Europas*. Stuttgart, 1976.

Heßler, Martina. "Technikemotionen. Einleitende Überlegungen zur historischen Ko-Konstruktion von Technik und Emotionen." In *Technikemotionen*, edited by Martina Heßler. Geschichte der technischen Kultur, vol. 9. Schöningh, 2020.

Heßler, Martina, and Bettina Hitzer. "Introduction: Tech-Fear. Histories of a Multifaceted Relationship/Einleitung: TechnikAngst. Zur Geschichte eines vielgestaltigen Verhältnisses." *Technikgeschichte* 86, no. 3 (2019): 185–200.

Heßler, Martina, and Heike Weber. "Provokationen der Technikgeschichte. Eine Einleitung." In *Provokationen der Technikgeschichte: zum Reflexionszwang historischer Forschung*, edited by Martina Heßler and Heike Weber. Schöningh, 2019.

Hicks, Mar. *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing*. History of Computing. MIT Press, 2017.

Hölscher, Lucian. *Die Entdeckung der Zukunft*. 2nd ed. Wallstein, 2016.

Homberg, Michael, and Mirko Winkelmann. "Home Is Where the Office Is. Zur Geschichte der Telearbeit." *Aus Politik und Zeitgeschichte (APuZ)*, no. 46 (2023): 10–16.

Homberg, Michael, et al., "From 'Home Work' to 'Home Office Work'? Perpetuating Discourses and Use Patterns of Tele(Home)Work since the 1970s: Historical and Comparative Social Perspectives." *Work Organisation, Labour and Globalisation* 17, no. 1 (2023): 74–116. https://doi.org/10.13169/workorgalaboglob.17.1.0074.

Huber, Joseph. *Telearbeit: ein Zukunftsbild als Politikum*. In *Telearbeit ein Zukunftsbild als Politikum*. Sozialverträgliche Technikgestaltung vol. 2. Westdeutscher Verlag, 1987.

Huws, Ursula. *The New Homeworkers: New Technology and the Changing Location of White Collar Work*. London, 1984.

Huws, Ursula. *Your Job in the 80s: A Woman's Guide to New Technology: Ursula Huws for Leeds TUCRIC*. Pluto Press, 1982.

Huws, Ursula, Werner B. Korte, and Simon Robinson. *Telework: Towards the Elusive Office*. John Wiley Information Systems Series. Wiley & Sons, 1990.

Huws, Ursula, Enzo Mingione, Mauro Magatti, Arbeitsbeziehungen und soziale Angelegenheiten Europäische Kommission Generaldirektion Beschäftigung. *Vertiefende Untersuchung zum Weissbuch*. Soziales Europa. Supplementary brochure 1995/3. Amt für amtl. Veröffentlichungen der Europäischen Gemeinschaften, 1995.

Huws, Ursula, et al., eds. *Teleworking and Gender*. IES Report 317. Institute for Employment Studies, 1996.

Isler, Simona. "Lohn für Hausarbeit? Befreiungsperspektiven der Frauenbewegung in den 1970er-Jahren." In *Ausser Betrieb: Metamorphosen der Arbeit in der Schweiz*, edited by Brigitta Bernet, Jakob Tanner, and Céline Angehrn. Limmat-Verlag, 2015.

Jaeger, Carlo, Lisbeth Bieri, and Gregor Dürrenberger. *Telearbeit, von der Fiktion zur Innovation*. Arbeitswelt, vol. 4. Verlag der Fachvereine, 1987.

Kleinöder, Nina, Stefan Müller, and Karsten Uhl. "Humanisierung der Arbeit: Aufbrüche und Konflikte in der rationalisierten Arbeitswelt des 20. Jahrhunderts." In *"Humanisierung der Arbeit": Aufbrüche und Konflikte in der rationalisierten Arbeitswelt des 20. Jahrhunderts*. Histoire, vol. 150. transcript, 2019.

Kocka, Jürgen. "Telework between Market and Family: The COVID-19 Crisis as an Accelerator of Social Change." In *Corona and Work around the Globe*, edited by Andreas Eckert and Felicitas Hentschke. Work in Global and Historical Perspective, vol. 11. De Gruyter Oldenbourg, 2021.

Kracauer, Siegfried. *Die Angestellten*. 14th ed. suhrkamp taschenbuch, vol. 13. Suhrkamp 2016.

Light, Jennifer S. "When Computers Were Women." *Technology and Culture* 40, no. 3 (1999): 455–83.

Lüthy, Heini, and Sandro Rüegger. *Vernetzte Arbeitsplätze: Telearbeit in der Praxis – ein Leitfaden für Arbeitgeber und Arbeitnehmer*. WM Wirtschafts-Medien-AG, Bilanz, 1999.

Mauritz, Ernst. "Teleheimarbeit: Nie mehr ins Büro?" Ibf-Spektrum. *Österreichisches Magazin für Forschung, Bildung und Kultur*, April 1990, 590, 1–4.

McNally, Fiona. *Women for Hire: A Study of the Female Office Worker*. Macmillan Education UK, 1979.

Menschen Technik Wissenschaft. "Homeoffice – die Arbeitsform der Zukunft?" November 11, 1986, SRF-Archiv. https://www.youtube.com/watch?v=AajWXkydUkY.

Meuser, Michael. "Nichts als alter Wein in neuen Schläuchen? Männlichkeitskonstruktionen im Informationszeitalter." In *Arbeit und Vernetzung im Informationszeitalter: wie neue Technologien die Geschlechterverhältnisse verändern*, edited by Heike Kahlert and Claudia Kajatin. Reihe "Politik der Geschlechterverhältnisse" vol. 26. Campus, 2004.

Müller, Moritz. "Von Job-Killern, Roboterkollegen und feuchten Augen. Die Mikroelektronik und die IG Metall als emotional community." In *Technikemotionen*, edited by Martina Heßler. Geschichte der technischen Kultur, vol. 9. Ferdinand Schöningh, 2020.

Nienhaus, Ursula. *Berufsstand weiblich: die ersten weiblichen Angestellten*. Transit, 1982.

Nilles, Jack M., F. Roy Carlson, Paul Gray, and Gerhard J. Hanneman. *The Telecommunications–Transportation Tradeoff: Options for Tomorrow*. Wiley, 1976.

Patton, Elizabeth. *Easy Living: The Rise of the Home Office*. Rutgers University Press, 2020.

Qvortrup, Lars. "Telework: Visions, Definitions, Realities, Barriers." In *Cities and New Technologies*, edited by OECD. OECD, 1992.

Raphael, Lutz, Thomas Schlemmer, and Anselm Doering-Manteuffel, eds. *Vorgeschichte der Gegenwart: Dimensionen des Strukturbruchs nach dem Boom*. V&R Academic. Vandenhoeck & Ruprecht, 2016.

Rey, Lucienne, ed. *Mobile Arbeit in der Schweiz*. Mensch, Technik, Organisation 28. Vdf, Hochschulverlag an der ETH, 2002.

Rosenwein, Barbara H. *Emotional Communities in the Early Middle Ages*. Cornell University Press, 2006.

Rothenhäusler, Andie. "'Wegweiser Richtung Steinzeit'? Die Debatte um 'Technikfeindlichkeit' in den 1980er Jahren in Westdeutschland." In *Wissenschaftskommunikation, Utopien und Technikzukünfte*, edited by Andreas Böhn and Andreas Metzner-Szigeth. Karlsruher Studien Technik und Kultur, vol. 9. KIT Scientific Publishing, 2018.

Rust, Holger. *Trends: Das Geschäft mit der Zukunft*. K&S, 1995.

Schafer, Valerie. "What the History of Women and Computing Teaches Us." *First Monday*, January 2025, 30. https://doi.org/10.5210/fm.v30i1.13892.

Schmidt-Voges, Inken, Joachim Eibach, and Roman Bonderer. "Das Haus in der Vormoderne." In *Das Haus in der Geschichte Europas*. de Gruyter, 2015.

Schöll, Ingrid, and Ina Küller, eds. *Micro Sisters: Digitalisierung des Alltags: Frauen und Computer*. BilderLeseBuch. Elefanten Press, 1988.

Schüller, Larissa. "Vom Wohnzimmer in die Telefonzentrale. Konfigurationen von Körper und Raum bei der Arbeit von Schweizer Telefonistinnen." In *Arbeiten zwi-*

schen Medien und Künsten: feministische Perspektiven auf die erste Hälfte des 20. Jahrhunderts, edited by Friederike Oberkrome and Lotte Schüssler. Neofelis, 2023.

Schulz, Kristina. "Neue Frauenbewegung in Europa: Ein Überblick." *Schweizerische Zeitschrift für Geschichte* 57 (2007): 336–52. https://doi.org/10.5169/SEALS-98968.

Seefried, Elke. *Zukünfte: Aufstieg und Krise der Zukunftsforschung 1945–1980*. Quellen und Darstellungen zur Zeitgeschichte, vol. 106. De Gruyter Oldenbourg, 2015.

Stadler, Max, et al. *Gegen|Wissen*. cache 01. Intercomverlag, 2020.

Steinbicker, Jochen. *Zur Theorie der Informationsgesellschaft. Ein Vergleich der Ansätze von Peter Drucker, Daniel Bell und Manuel Castells*. 2nd ed. VS Verlag, 2011.

Stuhr, Mathias. *Mythos new economy: die Arbeit an der Geschichte der Informationsgesellschaft*. Sozialtheorie. transcript, 2010.

Tanner, Albert. "Heimarbeit." In *Historisches Lexikon der Schweiz HLS Online*. 2015.

Tanner, Jakob. *Geschichte der Schweiz im 20. Jahrhundert*. Europäische Geschichte im 20. Jahrhundert. C. H. Beck, 2015.

Toffler, Alvin. *Future Shock*. 27th ed. Bantam Books, 1974.

Toffler, Alvin. *The Third Wave*. 1st ed. Morrow, 1980.

Vogelheim, Elisabeth, ed. *Frauen am Computer. Was die neuen Technologien den Frauen bringen. Eine Einführung*. rororo Frauen aktuell 5529. Rowohlt, 1984.

Wajcman, Judy. *Feminism Confronts Technology*. Online ed. Polity Press, 1991.

Werneke, Diane. *Microelectronics and Office Jobs: The Impact of the Chip on Women's Employment*. A WEP Study. International Labor Office, 1983.

Wichum, Ricky, and Daniela Zetti. "Transformation. Die Erfahrung der Ankündigung von Wandel und Veränderung." In *Zur Geschichte des digitalen Zeitalters*, edited by Ricky Wichum and Daniela Zetti. Geschichte des digitalen Zeitalters. Springer VS, 2022.

Winkelmann, Mirko. "Vom Risiko zur Verheißung? Zukünfte des Arbeitens von zu Hause seit den 1980er-Jahren." In *Vergangene Zukünfte von Arbeit: Aussichten, Ängste und Aneignungen im 20. Jahrhundert*, edited by Franziska Rehlinghaus and Ulf Teichmann. Reihe Politik- und Gesellschaftsgeschichte, vol. 108. Dietz, 2019.

Winkelmann, Mirko. "Wende oder Wandel? Telearbeit, Homeoffice und die 'Informationsgesellschaft' in der BRD seit den 1980er Jahren." In *Technikwenden | Technological Turns*, edited by Heike Weber. Nomos , 2023. https://doi.org/10.5771/9783748942351-119.

Euphoria, frustration, and shame: Emotional resonance in the digitization of work (1970s to 1990s) using SAP as an example

Heidi Schweickert

Introduction

In the world of work emotions are of great importance for the motivation, the quality, and the success of work. As a basic condition of human existence, work is part of Arendt's "vita activa" and as such fundamentally associated with emotions.[1] In the context of digital technology, work, technology, and emotions form a triad of mutually influential factors of human existence. This chapter shows examples of emotions such as euphoria or frustration that arise when using digital technology at work. It examines the impact of how these emotions influence the development of technology and how they change. The question of emotional relevance is examined using the example of SAP technology in West German and Austrian companies in the phase of its initial use in the early 1970s and in the phase of its widespread use a decade later and beyond, based on sources from company archives, oral history interviews, personal documents, specialized press reports, and two scientific studies on SAP, the AFOS and WSO study.[2]

1 Arendt, *Vita activa*, 187.

2 German quotations were translated by me. The AFOS study refers to the scientific project "Gestaltungsmöglichkeiten integrierter Standardsoftware am Beispiel der Softwareprodukte R/2 und R/3 von SAP" (Design options for integrated standard software using the example of SAP's R/2 and R/3 software products), which was conducted with fifty companies from 1991 to 1995. The results were published in Barthel and Blume, *SAP, Arbeit, Management*. The WSO study was carried out by Wicke-Schwitalla-Organization, a financially independent, interdisciplinary consulting and research institute in Dortmund, Germany under the title "Introduction and Application of SAP in Transport and Utility Companies" (1993 to 1995) with funding from the Hans Böckler Foundation and the ÖTV trade union. The results were published in Wicke, *SAP-Einsatz*.

SAP as a driving force and a force driven[3]

In 1972, in the wake of the so-called software crisis and the unbundling of hardware and software with the commercial revaluation of software, five ambitious former IBM employees founded the software company SAP with the vision of developing standard software for business applications such as financial accounting, human resources, materials management, and controlling. Previously heterogeneous, often individual solutions for data processing were to be standardized, integrated into a uniform system, and processed in real time, which was then a novelty.

The company's founding was followed by continuous and rapid growth on a global scale.[4] SAP was a mass phenomenon and had achieved the status of a de facto standard for large and medium-sized companies by the mid-1990s at the latest.[5] At the end of the period under review, "an estimated 1.5 million employees worldwide used [SAP's software product] R/3" which led the renowned computer historian Martin Campbell-Kelly to compare SAP with major US computer companies, stating that SAP is "as much a part of the fabric of global business today as IBM was in the 1980s."[6] He even underscored SAP's importance by pointing out the degree of dependence of the market:

> If overnight R/3 were to cease to exist (say, it its licenses were made intolerably expensive), the industrial economy of the Western world would come to a halt, and it would take years for substitutes to close the breach in the networked economy. Were Microsoft`s products to vaporize overnight, it would take only days or weeks to find substitutes, and the economic disruption would be modest.[7]

Another computer historian, James Cortada, analyzed SAP's global spread and found path dependency as well as the implementation of standardized business processes as "the SAP way," to be a major reason for the diffusion.[8] In addition to focusing on standardization and early internationalization, other factors contributing to success included a user-oriented development strategy, whereby user requirements and experiences were consistently and recursively integrated into product development. This also allowed for affective features in the design of the software, especially at the end of the 1990s.

---

3 Leimbach, "Treibende Kraft," 190.

4 SAP has around 400,000 companies as customers and 300 million cloud users worldwide: https://www.sap.com/germany/about/company/history.html.

5 Mormann, *Das Projekt SAP*, 78.

6 Campbell-Kelly, *From Airline Reservations*, 166.

7 Campbell-Kell, 197.

8 Cortada, *How Societies Embrace Information*, 57–58.

In its more than 50-year history, SAP has established itself as a global player. Its standard software generations for business applications, R/2, R/3, and cloud-based solutions reflect the most important technological development trends in the history of software, from punched cards to cloud computing. Often described as disruptive and a driving force, it has profoundly transformed the business world, work, and the working practices of millions of end users in offices, companies, and on a global scale.[9] The latter makes SAP particularly interesting for research into questions of the history of technology, as demonstrated for example by the computer historians cited, without the topic being anywhere near exhausted, especially regarding a critical reflection of common success narratives.

One area of research that has not yet been addressed from a historical perspective is the emotional impact on the workforce using the technology and the resulting consequences. Technologies and emotions are a well-researched interdisciplinary topic in the context of digital human–machine interaction, new forms of emotion-sensitive assistance systems, or in the research of robotics and AI. Both are now also being discussed in many socially relevant dimensions such as "emotional machines"[10] under moral-ethical issues or in the investigation of factors influencing the digital transformation on the perception of workers.[11] Historical research started increasingly dealing with emotions and digitalization, as in the form of pandemic-related digital loneliness[12] or, in the context of the "non-human turn," emotions of non-human animals and machines.[13] The relevance of emotions is in any case recognized, but their role for historical technology and user research could use more case studies on specific technologies in the workplace and office, as well as on a greater differentiation of emotions. This chapter aims to add an additional perspective and demonstrate the variance of emotions at the same time.

Emotions as practice

Regardless of numerous inter- and intradisciplinary definitions and concepts of emotions research, the understanding of emotions here is founded on the broad consensus of their sociocultural imprint, emphasizing their historicity and changeability over time.[14] The spectrum of emotions discussed under the term "emotional granularity"[15] implies the problem of their differentiation and at the same time

9 Erker and Leimbach, "Von der Ungleichzeitigkeit," 33.
10 Misselhorn et al., *Emotional Machines*, 9.
11 Guse et al., "Digitale Transformation," 502nn.
12 Brennan, "Digital Loneliness," 229nn.
13 Quinn and Janacek, "Introduction," 4.
14 Verheyen, "Geschichte der Gefühle," 4.
15 Barrett, *Wie Gefühle entstehen*, 25.

enables flexible designations within semantic word fields with blurred boundaries. If, for example, critical questions arise from the workforce about the purpose of data collection after the introduction of a time tracking system with SAP, where does mistrust end and fear or insecurity begin? Historians with a focus on emotions like to emphasize how emotions motivate human action, set people in motion, paralyze, or direct them. According to Ute Frevert, this is precisely what makes emotions historically powerful.[16]

The relation between emotions and actions is also strongly supported by interdisciplinary research, such as by Katharina Scherke with reference to the concept of "energy-generating emotions," according to which emotional energy influences the course of social situations and can continue even after the situation has long since ended.[17] Emotions connect the past, present, and future by linking events and experiences from the past to a certain emotional state in the present situation, on the basis of which actions are taken (or not taken) that influence the future situation. Emotions can therefore be examined in terms of how they connect the past, present, and future.[18] From a historical perspective, the relation between emotions and actions is reflected in Monique Scheer's concept of "emotion-as-practice,"[19] which is based on practice theory and integrates emotional aspects into it. According to Scheer, emotions are constituted by a combination of mental attitudes and physical actions, which means that we do not *have* emotions, but *do* them.[20] Emotional practices "form complexes of mind/body actions."[21] They are "dynamically coupled" to an environment that both influences and is influenced by the unfolding of the emotion.[22] On the one hand, emotions motivate practices, and on the other hand, people perform these practices "in order to have emotions."[23] In short, emotions and practices are highly interdependent and constitute each other in an "emotion/trigger circuit."[24] Her conceptual framework thus takes a holistic and integrative approach that bridges traditional dichotomies such as internal–external or emotional–cognitive in the sense that it is not a question of either/or but of both/and. "*Doing emotion*" means viewing emotions in a performative sense and understanding them as a kind of practice of what is often referred to as "emotional management."[25] According to Scheer, they manifest in categories of mobilizing,

16 Frevert, "Revisiting the History of Emotions," 12.
17 Scherke, *Emotionssoziologie*, 168–69.
18 Scherke, 126.
19 Scheer, "Emotionspraktiken," 23, and Scheer, "Are Emotions a Kind of Practice," 209nn.
20 Scheer, "Emotionspraktiken," 16.
21 Scheer, "Are Emotions a Kind of Practice," 209.
22 Scheer, 198.
23 Scheer, 194.
24 Scheer, 206.
25 Scheer, 209.

naming, communicating, and regulating emotional practices.[26] Based on this theoretical foundation, this chapter illustrates the mobilizing and regulating emotional practices in the context of SAP.

Mobilizing emotional practices motivate people to take action (e.g., participating in a demonstration out of anger), but are also used to experience moods and emotions (e.g., taking drugs to get high). Mobilization includes both the pursuit of a desired feeling and the alteration of an undesired feeling. Scheer highlights the usage of technologies and media as an extremely important emotional practice, as they can modulate feelings to a greater or lesser extent.[27] A cryptic, incomprehensible user interface in SAP can trigger a mobilizing emotional practice by causing users to avoid certain functions and thus reduce the frustration associated with them.

Regulating emotional practices shape emotions within norms and standards of an emotional culture. They demonstrate what is emotionally acceptable and what is not, building a kind of emotional etiquette, as can be seen for example in the deliberate de-emotionalization in the field of science.[28] If a user, who has been invited to a demo session as a reference customer, effusively praises the standardization of business processes with SAP software, this can be seen as a regulating emotional practice in Scheer's sense, as he/she corresponds emotionally to expectations of the peer group of SAP.

In what follows, I consider two groups of users of SAP technology: first users as newcomers to the technology in the 1970s with an "experience of discrepancy"[29] resulting from the contrast between past and present experiences of technology, and the mass of affected end users of the end-1980s to mid-1990s, who used and operated SAP software as part of their daily work as company employees, clerks, and administrators.[30] This chapter argues that different emotional practices developed while encountering the technology, which in turn had a dynamic effect on the technical development as well as on socio-technical and organizational structures. The work looks at two opposing emotional attitudes and aims to illustrate the effects of emotional practices in an exemplary way, without negating other emotional reactions.f

Euphoria and enthusiasm of first users

The introduction of real-time processing in West German companies since the early 1970s led to a far-reaching transformation of work. While "real-time" is taken for

26 Scheer, "Emotion als kulturelle Praxis," 357.
27 Scheer, "Are Emotions a Kind of Practice," 209n.
28 Scheer, 215.
29 Reckwitz, *Verlust*, 239.
30 Hohlmann, *Organisation SAP*, 15.

granted today, it was a novelty in everyday work in the 1970s, especially in comparison to mainframe computers and punch-card processing that were common at the time. For the first users of SAP, two factors provided the emotional framework: the novelty of a still immature technology and their own inexperience. They are the starting point for the analysis, analogous to the "first encounters"[31] in Sherry Turkle's study of the introduction of home computers and computer games, according to which the reactions are most pronounced among the newcomers to a technology.[32] To understand the emotional reactions to the new SAP technology, I conducted interviews with former employees of companies that were the first to implement the technology along with various reports on the introduction of SAP.[33]

Although business processes had already been automated, rationalized, and fundamentally changed in the 1960s from manual to electronic punched-card-based data processing,[34] processing remained time-consuming, paper-based, and an assembly-line-like batch operation[35] with "lengthy tasks."[36] In contrast, real-time processing established a new kind of data processing in dialog mode on the screen: several clerks could each access a data record individually, edit it simultaneously, directly and interactively, and take turns with the system in time-sharing mode. With the first SAP R/1[37] product to be introduced to the West German market, SAP positioned the "real-time working method"[38] as an innovation, thereby also introducing new working and time practices such as reaction and response times. The localization of the new device on a user's desk established the potential to develop an individual and emotional relationship between user and computer because the physical proximity also had an impact on the psychological context, enabling an emotional relationship with it.[39] Turkle proved this as early as the late 1970s in her research on computer use by children and young people. Typing not only triggered a very sensual feeling, but people formed a personal relationship with the computer.[40]

---

31 Turkle, *Alone Together*, 86.

32 Turkle, *Die Wunschmaschine*, 406.

33 Oral history interviews with former employees of three SAP customer companies conducted as part of a dissertation project, 2021–2023: Imperial Chemical Industries ICI (taken over by Akzo Nobel in 2007), a German publishing house, and Nettingsdorfer Papierfabrik, Austria (since 2000 Kappa Smurfit).

34 Fuhrmann, "Veränderung der Arbeitsaufgaben," 330nn.

35 Hellige, *Paradigmenwechsel der Computerbedienung*, 26.

36 Thierry, "Interactivity," 78.

37 "R" for "real-time."

38 Zipf, "Der erste Kunde," 12.

39 Thierry, "Interactivity," 79.

40 Turkle, *Die Wunschmaschine*, 152.

ICI Fibres[41] was the first company to use SAP technology productively from 1971 during SAP's exploration phase and even before it was officially founded. From the founders' perspective, ICI's initial impact was a stroke of luck for the start-up.[42] The changes in work practices are illustrated by a before-and-after comparison of an ordering process at ICI: while the manual ordering process in purchasing had taken several days, passing through many hands, with handwritten notes,[43] the digitized process based on the SAP real-time system was synchronized immediately and with up-to-date data by a single purchaser.[44] In retrospect, the generation and provision of up-to-date, new, non-prestructured information with a stroke on a keyboard seemed to make an impressive difference from the point of view of the first users. Instead of laborious and error-prone manual work, a simple keystroke allowed staff to extract and evaluate data with aggregated information, for example on material bottlenecks, orders, or capacity utilization. For clerks and administrative staff alike, the availability of up-to-date, consistent, and consolidated data meant the end of tedious data collection, searching, sorting, and correcting printed or written lists. A user at the publishing house describes this difference vividly:

> "While, for example, the stock lists used to become obsolete within a very short time, were just rubble and ashes and no longer up to date and were no longer looked at after three days, after the introduction of SAP the data was updated daily via integrated applications and everyone was able to satisfy their information needs. … in view of the previous manual work with lists of, for example, 28,000 article items … we have become much, much better, cleaner and more transparent in terms of data quality. There were no more backlogs.[45]

The ease of the keystroke (and even more the mouse click in the 1980s) in relation to the data and information obtained becomes comparable to the "magical gesture" of pressing a button, which Zimmer addresses in the control of hydropower, showing how pressing a knob became an everyday gesture while retaining a magical quality because it allowed nature to be controlled.[46] Like the gentle pressing of a button, the stroke of a key in the SAP system had a magical effect and even retains this positive charge to this day, when SAP still advertises its ability to generate information "at

41 Imperial Chemical Industries (ICI), Fibres Division was a British pharmaceutical company with a German subsidiary in southwest of Germany and the first company to implement SAP software.

42 Zipf, "Der erste Kunde," 10.

43 Siegele and Zepelin, *Matrix der Welt*, 39–40.

44 Zipf, "Der erste Kunde," 14.

45 OH KS, 4, 3, 10.

46 Zimmer, *Hydroelektrische Projektionen*, 157.

your fingertips."[47] Depending on the role within a company, the magic stroke either led to joy at the time saved in manually searching for, collecting, and sorting paper or to enthusiasm at the generation of business-relevant data. A whiff of David Nye's "technological sublime"[48] resonates in statements when a first report in the *Computerwoche* in 1976 about the use of SAP at ICI states: "Some shake their heads" as an "average response time of 0.7 seconds … is hard for anyone to believe."[49] Following Nye, the hint of sublimity evident in these statements "is, by definition, something one is not accustomed to, something extraordinary" and at the same time an experience that creates a stronger sense of community among those who share it.[50] In interviews, those involved in the implementation speak enthusiastically of a "quantum leap,"[51] or even of a "big bang" that had never been seen before.[52] The immediate provision of operational and business data in real-time and at the stroke of a key was a categorically new dimension of data processing and triggered strong emotions.

The dialog mode using a keyboard and screen with natural language elements for input fields, error messages, and online help was another novelty in interacting with the system and affected working practices.[53] The ICI MIAS operating manual of 1972, one of the earliest documents on dialog processing of business applications with SAP in Germany, explains dialog mode as a sequence of screens that were run through and posted at the end of a business transaction, while simple natural language system messages instructed the user on how to use masks, enter data, or correct errors.[54] Despite extremely limited linguistic means, the system mastered an impressive repertoire of activities when processing transactions: it answered and provided hints, checked for correctness and consistency, reported mistakes via error messages, or offered a sense of achievement when confirming successful postings. Interactive mode fundamentally changed the way people interacted with computers, as one popular science publication hyperbolically commented: "SAP's real-time software made it possible for the first time to communicate directly with the computer."[55] The first users, mostly male, shared similar experiences and emotions in relation to new working practices with SAP. The introduction of the software brought

47 https://news.sap.com/india/2021/06/saps-new-mobile-experience-the-intelligent-enterprise-at-your-fingertips/.

48 Nye, *American Technological Sublime*, 23.

49 https://www.computerwoche.de/a/ici-europa-fibres-gmbh-oestringen,1201954.

50 Nye, *American Technological Sublime*, 23.

51 OH KS, 30.

52 OH WR, 4.

53 MIAS Material-, Informations- und Abrechnungssystem, Betriebsanleitung [Material, information, and billing system, operating manual] V3, chap. 2.2, 10.

54 MIAS Material, chap. 2.3, 3nn.

55 Meissner, *SAP*, 36.

seemingly undeniable advantages for daily workflows, followed by joy and enthusiasm, which the interviewee from the publishing house summarized: "Yes, we were really proud and happy."[56]

The highly consistent tenor of the interviewees requires critical reflection: Memories are subjectively constructed and tend toward a "nostalgia effect,"[57] as the interviewee from the Nettingsdorfer Papierfabrik, one of the first companies in Austria using SAP, self-critically admitted: "in retrospect, everything is always glorified."[58] Statements may be exaggerated in tendentious company publications, when hindsight makes the quantum leap appear even greater or problems, uncertainties, annoyance, and doubts about the introduction of SAP had long been forgotten. When evaluating the statements, "nostalgia as a filter in retrospect" must therefore be considered as a critical component to relativize, for example, euphorically glorified exaggerations.[59] Stories and interpretations usually reflect the current state of knowledge of the interviewees and are overlaid and shaped by the experiences they may have made in the meantime. Thus, a technological innovation such as the introduction of real time is recounted differently in retrospect and in the knowledge of its later successful implementation than it was in the formerly contingent initial situation. Skepticism that was eventually latent at the time may have turned into euphoria as the "real" story only emerges after a certain period and then may take on a completely different form than it appeared to the respective contemporaries.[60]

Despite this critical assessment, the interviews with former employees from different organizations and positions are clearly positive in their emotional expressiveness, are generally not purely fictional or even fictitious, and may be described as "reality narratives."[61] The subjectivity of the interviews includes emotions of the interviewees and allows them to be considered as a kind of subjective reality narrative. Overall, the effects of the switch to the new SAP technology are remembered very positively in this early phase of use and are described in a euphoric manner when, for example, one of the few female interviewee at ICI looks back, mentioning the elimination of tedious corrections: "We were all very excited to be able to work with such a great system."[62] Employee magazines such as the ICI-Faserspiegel support the findings from the company's perspective, for example when a 1971 issue reports that a level has been reached that not only satisfied everyone involved, but also filled them with a little pride.[63]

56 OH KS, 11.
57 Niethammer, "Fragen – Antworten – Frage"," 425.
58 OH PB, 1.
59 Niethammer, "Fragen – Antworten – Fragen," 397.
60 Koselleck, *Vergangene Zukunft*, 311.
61 Althaus and Apel, "Oral History," 1.
62 OH JG, 3.
63 N.N., ICI Faserspiegel, 10/1971.

Emotional community of the "SAP family"

In the 1970s and early 1980s, the main actors on the software provider side included the founders of SAP themselves and an initially small number of developers.[64] On the side of SAP's customer companies that were the first to implement the new technology,[65] the main players at that time included single employees and individuals who often worked closely with the software provider in a managerial role, such as in IT departments in the middle management. These key individuals acted as intermediaries between the software company and their own top management and were essential for the communication and acceptance of the technology in these companies. Comparable to elevator boys, they conveyed a sense of security and were valuable figures who helped people to emotionally trust the new technology.[66] These actors formed an informal, cross-company group of technophile, similarly aged men and enthusiasts with the common goal of developing and implementing an integrated, dialog-based business application software. As pioneers of technology, they formed a male community of interest within the framework of stereotypical gender roles, the size of which can be measured by the formation of two teams for their regular joint football matches. According to one of the ICI interviewees, it was a "sworn community" in which a "we-feeling," the "family," and the "familiar" prevailed: "It was all so familiar and everyone trusted everyone."[67] The group outlined in this way is defined in the sense of the medievalist Rosenwein as an "emotional community"[68] with a common emotional system, according to which emotions are considered a function of community: "People lived – and live – in what I propose to call 'emotional communities'. These are precisely the same as social communities – families, neighborhoods, parliaments, guilds, monasteries, parish church memberships."[69] According to Rosenwein, the members of a social group share goals and interests, forming an "emotional community" that defines and evaluates which emotions in which form of expression are expected or rejected. Referring to Scheer's concept, regulating emotional practices come into effect within an emotional community. In the case of SAP the emotional attachment among early users based on shared enthusiasm regarding the new technology qualified them as a "family" from the point of

64 Meissner, *SAP*, 283n. Number of SAP employees end of 1972: nine employees incl. founders; 1976: 75 employees; 1984: 163 employees.

65 The first ten SAP customer companies in Germany: 1. Imperial Chemical Industries ICI, 2. Knoll Pharma, 3. Thermal, 4. Reemtsma Rothändle, 5. Burda-Verlag, 6. Linde, 7. Grünzweig & Hartmann AG, 8. Schott AG, 9. Boehringer Mannheim, 10. Schulze Pharma (s. *50 years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation, 140nn.).

66 Payer, "Mühelos nach oben," 146.

67 OH RK, 10.

68 Rosenwein, "Worrying about Emotions," 842.

69 Rosenwein.

view of those involved, and as the interviewee from the publishing house succinctly put it: "SAP was like a family back then."[70] The sense of "family" is also used to refer to one of the company founders as "Father Hopp."[71]

Summarizing these findings, the emotional community is introduced as the "SAP family", whose members identified themselves by configuring, sharing and evaluating dominant emotions in relation to the appraisal of propagated technological progress while referring to family-felt emotions. Coming back to Scherke's work on the social function of emotions, she states that they can have unifying functions (and divisive ones also) by supporting cohesion within one's own group. Loyalty and gratitude are examples of the unifying function of emotions.[72] Against this background, the emotional community of the "SAP family" provides a striking example of the socially unifying function of emotions. In Nye's view, shared enthusiasm helped individuals to see themselves as members of a larger community.[73] The common cliché of the so-called ideal family promises a community of equal, caring members, which, in the case of the "SAP family," conveyed noble values of an ideal while at the same time concealing the economic interests of those involved. Using IBM in the 1950s as an example, Schlombs showed comparable discrepancies when family rhetoric, in combination with monetary allowances and benefits for employees, was used to prevent the workforce from showing solidarity with trade unions.[74] The emotional community of the "SAP family" encouraged behavior that affected the technology and its wider distribution. Regular activities established "mobilizing" emotional practices in Scheer's sense. Collaboration, cooperation, and co-innovation thus enhanced positive emotions of the community and in the interest of the software vendor.

Collaboration with the common goal of developing an integrated and standardized software solution manifested itself, such as joint training sessions, live demos, and jointly conducted sales events for prospective SAP customers.[75] Interviewees from SAP customer companies report how they conducted demos and presentations for prospects of the software house with their own employer's consent.[76] The first SAP software versions were developed on computers of companies such as ICI, because the software provider did not have its own equipment at that time.[77] Likewise, premises and infrastructure were provided to SAP free of charge or employees were

70 OH KS, 13.

71 Zipf, "Eine verschworene Gemeinschaft," 182nn.

72 Scherke, *Emotionssoziologie*, 140.

73 Nye, *American Technological Sublime*, 35.

74 Schlombs, "Gender is a Corporate Tool," 161.

75 N.N., "Die einjährige Probezeit bestanden: Knoll-Buchhaltung per Bildschirm," *Knoll Informationen*, 04/1974, 17.

76 OH GO, 3.

77 Rothermel, "Die ICI und die Geburt der SAP," 46–48.

assigned to support development. Employees were "borrowed" and "passed around," as one interviewee from ICI reports: "I was passed around with this product at various congresses and events and then sang the praises of the standard software and argued against in-house development."[78] Interviews report that employees were allegedly sent to help out and were deployed on such a scale that it was often no longer possible to tell who belonged to which company, because, according to one interviewee, "of course they sang the praises of SAP with great enthusiasm."[79] With the "song of praise" that this "passed-around" interviewee sang "with great enthusiasm," he demonstrates a regulating emotional practice, as he expresses emotions in accordance with the expectation that is set as norm in the context of such events. He displays an ironic attitude and thus an effect that Arlie Hochschild discusses in her studies on emotional labor, according to which there is often a discrepancy between the actual feelings of those affected and the emotional representations required of them in their daily work.[80] While the members of the "SAP family" acted as if they belonged to one and the same company, it remains unclear to what extent all those affected authentically shared this mood.

For the further development of the system into an industry standard product, it was crucial that business knowledge was shared and exchanged as freely as possible, as the example of the fiscal year change function shows:[81] Its design and realization resulted from the joint efforts and development of employees of the publishing house and SAP developers, based on the operational experience of the publishing house and the technical expertise of the software provider.[82] As one of the SAP founders explained, "first-hand information" was crucial for the development of the integrated functions, because the knowledge gained from users' live operations would fly back immediately and could be used directly for new concepts and further developments of the products.[83] Close collaboration was a key prerequisite for identifying business process patterns and developing standard software.

Frustration, suspicion, and shame on the part of the end users

With the increasing spread of SAP in the 1980s, more and more people encountered the software as end users in their companies, while the emotional community of the first users began to dissolve or formed other structures, such as official user

78 OH RK, 6.
79 OH RK.
80 Hochschild, "Das gekaufte Herz," 299.
81 Leimbach, "Mehr als die Summe seiner Teile," 93.
82 OH KS, 12n.
83 Hopp, "Beispiele erfolgreicher Unternehmensführung," 144.

groups.[84] With increasing visibility and publicity, SAP met criteria that qualified its software as public technology.[85] At the same time, it became part of the critical discourse on information technology of the time, which led to the software provider engaging with public criticism.[86] New actors stood for a different, controversial perception of the technology, attributing risks and dangers to those who worked with it as "human capital."[87] Trade unions and works councils began to address the need for protection and vulnerability of end users and to regulate the technically induced changes in work resulting from the introduction of SAP from an employee perspective.[88]

The starting point for emotional reactions were, among other things, technical features, which included real-time processing and the integration of previously separate isolated solutions into a central IT system. Integration brought the company's business processes together in a unified, central system that all users could use as a "single source of truth."[89] Integration replaced the individual solutions of the various business units and made the SAP system the "linchpin" of a software landscape,[90] the "backbone of IT,"[91] to which all departments of a company were connected. Although the software provider itself had self-critically admitted that this led to increased complexity,[92] from the end user's perspective, integration has meant a significant change in working practices. One of the key findings of the WSO study is that complexity is a major cause of the problems in dealing with the system:

> SAP is tremendously complex. The immense complexity not only overwhelms SAP and the consultants, but also and especially the operational users. ... The system literally suffocates under its own complexity, even the developers often no longer understand the complexity ... and the users also see themselves confronted with mountains of ballast that they do not need for their respective tasks.[93]

---

84 Foundation of official user groups like DSAG in Germany or ASUG in the US end of 1980s and throughout the 1990s and beyond worldwide.

85 Trischler and Bud, "Öffentliche Technik," 4nn.

86 Tschira, Korrespondenz mit der OETV, 1988.

87 Tschira, "Zurück auf den Boden und vorwärts!," May 1993, 1.

88 The labor-related magazine *Computerinformation für Personal- und Betriebsräte* began reporting on SAP in 1992.

89 Siegele and Zepelin, *Matrix der Welt*, 53.

90 N.N., SAP als bewährte, neue Basis. Einführung fördert Zusammenarbeit der Bereiche. *ARBURG allrounder* 36, 2008, 7.

91 N.N., Für die Zukunft gerüstet. ARBURG: Mit Umstellung auf SAP optimal aufgestellt. *heute* 61/2016, 16 and 24.

92 Tschira, Produktstrategie der SAP, 1988, 5.

93 Wicke, *SAP-Einsatz* (WSO study), 18nn.

Users complained that "SAP software is not self-explanatory … for beginners, the dialog messages and help texts contribute more to confusion than to information."[94] Complexity and user-unfriendliness of the SAP software became a standard narrative of the press.[95] These manifested for end users in the user-unfriendly interface of a monochrome monitor[96] with text-oriented display in strong light–dark contrasts, cryptic field names, and sometimes incorrect assignments of data field names and data to be entered.[97] Complexity was evident in the display of many unrelated and unnecessary fields on a screen or mask, or conversely in the separation of business-relevant data complexes on different masks.[98] By dividing up tasks, the program seemed to promote a Tayloristic way of working and at the same time dictate to people at their screens how to do their work.[99] Online help and documentation were further examples of user-unfriendliness, as they were only available in a rudimentary form, if at all, and hardly did justice to the title "help." According to SAP founder Klaus Tschira, this poor design led the end user to ineptitude when searching for suitable documentation. The end user repeated or read superfluous information, scrolled through irrelevant displays and wandered aimlessly through menus or command formats.[100] Overall, there was no discussion of user-oriented software at the time; end users had to learn to "get along" with it.[101] Complexity created a tension between the "local" simplicity of the individual actions that make up a program and the "global" complexity that arose when working with the program, in Sherry Turkle's framing.[102]

Integration meant a lack of transparency, as the individual user who entered data into one application may not have been aware of the impact that data could have on another integrated application. In addition to their own tasks, end users always performed data entry for other departments, with usage that remained unclear to the individual.[103] The WSO study also cited this deficiency as a result when end users of the complex integrated SAP system often could not even see the consequences of their own work for other areas of responsibility and speak of a "very fundamental problem of SAP from the point of view of error robustness."[104] According to the AFOS study, missing or incorrect data in the integrated system could not

94 Baumann and Haucke, "SAP-Software schulungsbedürftig," 64.
95 Schneider, "Bei Software-Usern."
96 IBM 2260, 12x80 characters, (1974: IBM 3270, 24x80 characters).
97 Barthel and Blume, *SAP, Arbeit, Management* (AFOS study), 160n.
98 Barthel and Blume, 160.
99 Schröter, "Vom Bediener zum Computeruser."
100 Tschira, *Integration, Intelligenz, Komplexität*, 1989, 2.
101 Leimbach, "Treibende Kraft," 193.
102 Turkle, *Die Wunschmaschine*, 337.
103 Barthel and Blume, *SAP, Arbeit, Management* (AFOS study), 17.
104 Wicke, *SAP-Einsatz* (WSO study), 128–29.

only hinder one's own work, but also caused "social pressure from frustrated fellow users."[105] Complexity, the AFOS study continued, placed higher demands on data discipline and at the same time increased the potential for errors. According to the study, entering a purchase order, for example, affected all integrated applications at the same time and required constant concentration and attention due to higher data quality and data discipline requirements.[106] The overall effect of the recorded data remained largely unmanageable and meant a significant change: whereas the work area had previously remained within the department and thus under the control of the clerk, the scope of data maintenance as a whole now knew no bounds.

According to the studies, complexity was a central reason for frustration in dealing with SAP technology, but it also occurred in connection with operational change processes in the context of change management,[107] as was common when SAP was implemented. In the context of technology, frustration at work is a well-known phenomenon in research: for example, the empirical error analysis by Michael Frese and Dieter Zapf on working with computers at the beginning of the 1990s showed already that the time needed to correct errors could cause negative emotions such as anger, frustration, and tension.[108] Joseph Corn discusses frustration as a reaction to the user-unfriendliness of digital functions, such as a heating thermostat with timers and incomprehensible messages.[109] Shoshana Zuboff cites frustration as a reaction to the devaluation of technical or other experiential knowledge[110] and Quinn and Janacek have pointed to possible negative emotional consequences such as frustration, loneliness, or fatigue due to dependence on digital technology during the pandemic.[111]

In the case of SAP, the introduction of the software meant that experienced administrators, employees, and clerks alike were confronted with a new technology and had to deal with the technical inadequacies described. The end users had to cope with poor response times and frequent software-related system failures and shortcomings, which led to frustration and annoyance, as the example of a disgruntled SAP user at the Nettingsdorfer Papierfabrik paper mill in a handwritten letter of complaint in 1989 shows:

> For weeks now, we have been severely hampered in our work because some device (printer, screen, system, etc.) is unavailable. We […] start work at 5:30 in the morning – for nothing. The work piles up until the damage is finally repaired.

105 Barthel and Blume, *SAP, Arbeit, Management* (AFOS study), 21.
106 Barthel and Blume, 17.
107 Schneider, *Frustration*, 39n.
108 Frese, *Fehler bei der Arbeit*, 82.
109 Corn, *User Unfriendliness*, 206.
110 Zuboff, *Age of the Smart Machine*, 132.
111 Quinn and Janacek, "Feeling Beyond the Human," 27.

> The truck drivers stand grumbling in the office waiting for various shipping documents. Since we then have to complete the work in the shortest possible time, there are of course no control checks and errors are inevitable. We have the impression that these problems are not being tackled with the necessary urgency. The disgruntled system users are left hoping for improvement.[112]

The example vividly describes the frustration of end users when their system goes down, which they are only able to compensate by expending extra work and additional energy. They are expected to absorb the impact of outages and technical failures at their own expense and it is only thanks to their commitment that technical deficiencies are compensated "in the shortest possible time." In this case, technically caused errors are blamed on people and thus lead to annoyance and frustration.

For reasons of traceability and error analysis, the integrated SAP software required the complete logging of all activities with user ID and time stamp.[113] As a *conditio sine qua non* of system operation, logging simultaneously implied aspects of verifiability and control and entailed an ambivalent interpretation in terms of promises of progress and risks. Integration made it possible to generate new types of performance and behavioral data at a "deeper level of transparency"[114] by means of flexible evaluations across integrated applications, and an effect that Zuboff described as "informatization" in her analysis of the "smart machine." Due to the obvious recording of user activities at the moment they are carried out, on the one hand, and the seemingly clandestine possibilities for evaluating them with access to new types of performance and behavioral data on the other, a fundamental conflict emerged, which was all the more serious given that data protection in Germany was only just beginning to take legal shape.[115] Anonymization was not yet an established business practice, and the authorization system was also only rudimentarily in place, if at all.

From the critics' point of view, a panoptic scenario[116] unfolded, in which the mere awareness of being eventually observed at any time could exert pressure on behavior. The end user of an information system became transparent in a new way that, according to Zuboff, could evoke negative feelings of vulnerability and powerlessness. The observed person might begin to wonder if he/she is being exposed in a way he/she doesn't want to be by asking what it is that they could see?[117] The SAP system was no different. Even if it was not the software provider's intention to control performance or behavior, the awareness of one's own visibility and controllabil-

112 Letter of complaint from an employee to authorized officer PB of the Nettingsdorfer Papierfabrik, Austria, October 30, 1989 (private archive PB).

113 MIAS operating manual, chap. 2.3, December 1972, 2.

114 Zuboff, *Age of the Smart Machine*, 5.

115 Hessian Data Protection Act in 1970.

116 Zuboff, *Age of the Smart Machine*, 321n.

117 Zuboff, 344.

ity was enough to create a sense of unease and suspicion in the workforce, as the example of the company EKATO[118] shows: according to a report on the introduction of a new SAP-based time-tracking system, its implementation was accompanied by questions from the workforce about the installation of critical monitoring technology, fueling feelings of mistrust, powerlessness, and fear, asking questions such as "What data is being recorded?" and "What do they do with the data about us?"[119] Concerns about data collection became an increasingly important part of the discourse, especially in the late 1980s, and were a central issue in company agreements on SAP, as reflected by numerous guides and, for example, the WSO study.[120] To some extent, these concerns were addressed through the deployment of an increasingly sophisticated authorization system on the technical side, synchronized with regulations on the legislative side, but uncertainties and feelings of vulnerability unfolded along with technical refinement and still persist to this day.

When considering the question of the emergence of emotions associated with the introduction of SAP, shame should be considered as another feeling, because the software confronted inexperienced employees with external and their own expectations that they might not have been able to fulfill. In contrast to frustration, shame is less prominent in research, difficult to identify and localize, because it is more likely to be implied than explicitly expressed or attributed by third parties, as people do not talk about shame. Whether and how shame can be articulated at all is not a purely individual matter, but depends crucially on the narrative scripts, cultural interpretive patterns, and emotional repertoires that society provides.[121]

However, shame is not unknown in the discourse of technology: Turkle for example discusses a "robotic moment," a feeling of shame experienced by users when interacting with computer-controlled robots such as a robot baby or a slimming robot coach when they feel emotions despite knowing that the robot is artificial.[122] Günter Anders conceptualized the idea of a Promethean shame as a facet of the antiquatedness of man, who feels inferior in comparison to the products he has created and is ashamed "of the 'shamefully' high quality of things."[123] According to Anders, shame arises not only from competition with the machine, but also from the latent danger of failure when operating the machine.[124] The latter in particular offers ample scope for shame-inducing constellations in the sense of a Promethean gap when introducing and appropriating SAP.

---

118 Medium-sized company that manufactures stirring and mixing systems, based in southwest Germany.

119 Eisenbeis-Trinkle, "Rechnergestützte Erfassung," 20.

120 Wicke, *SAP-Einsatz* (WS-study), 147nn.

121 Scherke, *Emotionssoziologie*, 118nn.

122 Turkle, *Alone Together*, 21nn.

123 Anders, *Antiquiertheit des Menschen*, 21–97.

124 Anders, 23.

For many long-standing, experienced employees, the implementation of SAP meant having to grapple with new technology and, in many cases, losing the knowledge they had acquired. Affected employees often felt they had been demoted to beginner level, as a report by trainers with immediate access to user experience described: "SAP software seems to challenge the secure expert knowledge of the clerk. The employee's self-confidence suffers and has to be rebuilt with the IT system."[125] Constant updates, upgrades, and release changes, which require lifelong learning, also exacerbated the problems of experienced workers and, in this context, SAP had a great need for training.[126] Years of experience and expertise were useless in the face of the far-reaching changes in practices, and threw users back to the level of beginners; they were supposed to attend dedicated "beginners' training" courses where shame could affect their self-esteem. A report in the trade union newspaper of IG Bau-Steine-Erden[127] stated on the introduction of SAP: "The experience and knowledge of the employees is no longer used. However, business processes work primarily because people with their knowledge and experience are involved. This is not taken into account by the SAP software with its engineering-based view of things … the previous knowledge is devalued."[128] Despite different roles and perspectives, SAP trainers and trade union representatives come to a similar conclusion: the devaluation of expertise, combined with the possibility of failure, is an attack on the self-confidence of experienced administrators and employees alike. Furthermore, when operating the system, end users are continually offered opportunities to fail at the supposedly different degrees of perfection of humans and computers. As already described, the integration of individual applications from departments of a company into a unified system simultaneously creates a form of publicness during data entry with increased visibility of the end user and thus room for shameful situations. Incorrect entries not only have a local impact, but also became public, transparent, and, according to the AFOS study, "striking."[129]

According to Frevert, shame practices include silence, shame defense, and possible avoidance behavior: "Those who are ashamed usually want to make themselves invisible, remain silent and lower their gaze" or "sink into the ground."[130] In the context of implementing SAP, these shame practices can be seen particularly in avoidance behavior, resistance, rejection, non-use, and non-acceptance. Both

125 Baumann and Haucke, "SAP-Software," 64.

126 Baumann and Haucke.

127 IG Bau-Steine-Erden: German Trade Union for Construction Materials.

128 N.N., Softwarehit SAP, *Der Grundstein* (magazine of the Trade Union for Construction Materials),

129 Barthel and Blume, *SAP, Arbeit, Management* (AFOS-study), 17.

130 Barthel and Blume.

ashamed and frustrated end users expressed their emotions by refusing or avoiding certain system functions. Sources confirm the refusal and non-use of system functions when, for example, the newspaper *Computerwoche* attests: "Often it is the case that users do not use certain functions out of ignorance or fear and the advantages of the software no longer come into play."[131] End users returned to their favorite tools, even though the integrated system would have conveniently made the data from the various departments available. In line with this, project managers who introduced the software spoke of the "end user as a disruptive factor," seeing him/her as a "nightmare for many SAP project managers" who, after a great deal of work, "simply uses Excel again in all corners and ends, even though they have just introduced a nice new standard software."[132]

User analyses and sources indicate reluctance, even confirm non-use of many functions, and suggest a latent avoidance behavior when introducing and using SAP in companies. This is also shown by SAP performance statistics on system transaction usage behavior in the mid-1990s, according to which 72% of all system transactions were not used or were used on average less than once a month.[133] In line with the underlying concept of "emotion as practice," it can be argued that frustration, mistrust, or shame occurred in combination with non-use and avoidance of system functions and thereby formed a mobilizing emotional practice to manage undesired feelings. According to this interpretation, which by no means excludes other readings, end users' avoidance behavior can be interpreted as a mobilizing emotional practice in Scheer's sense, with the effect of dampening unwanted feelings such as shame and frustration.[134]

Reframing emotions by shifting responsibility

The often-expressed criticism of the complexity and user-unfriendliness of SAP as a possible cause of negative emotions in combination with a lack of acceptance, rejection, and non-use on the part of the end user led to adjustments to the software, not least on the basis of technological achievements such as the introduction of graphics-capable screens[135] which enabled the introduction of a graphical user interface (GUI) and a new, user-centered design with the R/3 software generation for client servers at the beginning of the 1990s. To reduce complexity and negative

131 Baumann and Haucke, "SAP-Software," 64.

132 Scherer and Schaffner, *SAP-Training: Konzeption*, 27n.

133 Tobias Rasch, Nutzungsverhalten produktiver Kunden. Transaktionsnutzung auf Basis des Releases 2.2. SAP 1996, 4.

134 Rasch, 30.

135 Hellige, *Paradigmenwechsel der Computer-Bedienung*, 11–92.

user feedback, well-known weaknesses were eliminated, technical improvements and ergonomic adjustments were implemented, and the interface was made more user-friendly.[136] This included greater attention to software-ergonomic design approaches, which resulted in the development of quick-entry masks to simplify complicated processes, masks, and data fields,[137] in the introduction of default and dummy values for mandatory fields, and the switching to an interactive documentation system with hypertext structures in a semantic network instead of sequential online help.

With the provision of solutions for technical inadequacies, with the individualization and flexibilization of the interface, faster reaction times, more ergonomics, with better security and authorization concepts, criticism of the software became less acceptable, less tolerable and more clearly fended off by the software provider. While SAP claimed the advantages of integrated data processing as a quality feature of its solutions and marketed them accordingly, it assigned the responsibility for exploiting them to the companies that used the software and to those who worked with them. As a result, inadequacies and defects of the technology were more likely to be declared and dismissed as operating errors and misuse than taken up as justified criticism of the software. This becomes clear, for example, in a lecture by SAP founder Tschira from 1989, in which he identified "increased data quality" as a "decision criterion" for the use of SAP, while the data quality "in real operation is emotionally with the end users." He added firmly that this is an intended effect and that it is only fair if this occurs.[138] Thus, responsibility for data discipline and system quality seems more likely to be assigned to the end users, redirecting possible negative emotional effects of using SAP beyond its area of responsibility. From the end user's point of view, this implies a latent assignment of blame in the case of supposedly poor system use and fundamentally changes the framing of emotions such as frustration and stress. In a similar vein, union-related voices criticized that the implementation and verifiability of the system for possible misuse would be left to the companies and users.[139] With reference to successful implementations and undeniable economic advantages for companies, SAP tended to redirect responsibility for the critical effects of its software during this period. This was also evident in a public debate between SAP and the German trade union for the public services sector (ÖTV), in which SAP interpreted negative consequences as abuse and misconduct on the part of the users.[140] According to this logic, it was not the provider of the technol-

136 Barthel and Blume, SAP, Arbeit, Management (AFOS study), 160n.

137 Barthel and Blume.

138 Tschira, Qualität hat höchste Priorität, 1989.

139 Konrad-Klein and Fickert, "Einführung von SAP-Programmen," 15.

140 Tschira, Korrespondenz mit der OETV, 1988, 5.

ogy that bears responsibility for the consequences of its use, but rather the company that uses the software and the people who work with it.

Conclusion

The aim of the chapter was to demonstrate the emergence and relevance of different emotions when using a digital technology and their bidirectional effect on the technology as well as on the emotions themselves. The example of SAP shows how technology triggered emotions such as euphoria, enthusiasm, and pride in early users due to the discrepancy experienced with the previous punch-card technology, resulting in mobilizing emotional practices in form of intensive cooperation and co-innovation to foster the technical development and dissemination of the technology. In the context of the union-influenced discourse of the late 1980s and early 1990s, a broad swath of end users had a different, more critical perception of the technology, with experiences of frustration and stress, suspicion and fears in sometimes shame-inducing constellations with emotional practices of avoidance and non-use of functionality in order to manage emotions that went along with the new technology. Associated emotions could undergo a reframing, as demonstrated by the example of the negatively connoted frustration. On the one hand, such emotions contributed to continuous improvements, such as in the area of user design or user-friendliness; on the other hand, they were reframed by the software provider assigning responsibility for negative emotional consequences of software use to the users and their companies.

Archives

SAP Archives

MIAS Material-, Informations- und Abrechnungssystem, Betriebsanleitung [Material, information, and billing system, operating manual], edited by Imperial Chemical Industries (Deutsche ICI), V3: chap. 2.3, December 4, 1972; chap. 2.2, January 22, 1973; V3 July 1, 1977.

Oral History Interview (OH) GO (ICI), 2020 (video and transcript).

Oral History Interview (OH) JG (ICI), 2020 (video and transcript).

Oral History Interview (OH) RK (ICI), 2020 (video and transcript).

Oral History Interview (OH) WR (ICI), 2020 (video and transcript).

Oral History Interview (OH) KS (publishing house), 2021 (video and transcript).

Oral History Interview (OH) PB (Nettingsdorfer Papierfabrik), 2023 (notes).

Tschira, Klaus, Korrespondenz mit der OETV [Correspondence with the trade union OETV. Response to a leaflet from the trade union OETV], December 20,

1988.

Qualität hat höchste Priorität: Vortrag auf der Sommerfest [Quality is our top priority: Lecture at the summer party], 1989.

Produktstrategie der SAP: Zukünftige Software Architektur und internationale Produktstrategie [SAP's product strategy: Future software architecture and international product policy], 1988.

Integration, Intelligenz, Komplexität [Integration, intelligence, complexity], 1989.

Zurück auf den Boden und vorwärts! [Back on track and moving forward! Visions for human resource management], May 1993.

Bibliography

Althaus, Andrea, and Linde Apel. Oral History. *Docupedia-Zeitgeschichte*, March 28, 2023. https://doi: 10.14765/zzf.dok-2478.

Anders, Günther. *Antiquiertheit des Menschen*. Beck'sche Reihe 319, C. H. Beck, 1987 (1956).

Arendt, Hannah. *Vita activa oder Vom tätigen Leben*, expanded new ed. American original ed. [The Human Condition]. Piper München, 2021 (1958).

Barrett, Lisa Feldmann. *Wie Gefühle entstehen: Eine neue Sicht auf unsere Emotionen* . Rowohlt, 2023.

Barthel, Thomas, and Andreas Blume. *SAP, Arbeit, Management: Durch systematische Arbeitsgestaltung zum Projekterfolg*. Vieweg, 1996.

Baumann, Burkhard, and Gerd Haucke. "SAP-Software ist in hohem Maße schulungsbedürftig." *Computerwoche* 48 (1991): 64–65.

Brennan, Edward. "Digital Loneliness." In *Digital Roots. Historicizing Media and Communication Concepts of the Digital Age*, edited by Gabriele Balbi, Nelson Ribeiro, Valérie Schafer, and Christian Schwarzenegger. De Gruyter, 2021.

Campbell-Kelly, Martin. *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry*. MIT Press, 2004.

Corn, Josef J. *User Unfriendliness: Consumer Struggles with Personal Technologies, from Clocks and Sewing Machines to Cars and Computers*. Johns Hopkins University Press, 2011.

Cortada, James. *How Societies Embrace Information Technology: Lessons for Management and the Rest of Us*. Wiley, 2009.

Eisenbeis-Trinkle, Petra."Rechnergestützte Erfassung hat die Zeit im Griff: Die aufwendige Auswertung der Stempelkarten entfällt." *VDI Nachrichten*, October 13, 1989.

Erker, Paul, and Timo Leimbach. "Von der Ungleichzeitigkeit disruptiver Veränderungen." In *50 Years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation. abcVerlag, 2022.

Frese, Michael, ed. *Fehler bei der Arbeit mit dem Computer: Ergebnisse von Beobachtungen und Befragungen im Bürobereich*. Schriften zur Arbeitspsychologie 52. Huber-Verlag, 1991.

Frevert, Ute, and Maria Kerstin, "Revisiting the History of Emotions: An Introduction." *Geschichte und Gesellschaft* 49, no. 1 (2023): 7–26.

Fuhrmann, Jochen. "Zur Veränderung der Arbeitsaufgaben von kaufmännischen und technischen Angestellten durch Computer (10 Case Studies)." In *Computer und Angestellte*, edited by Industriegewerkschaft Metall and Günter Friedrichs. Europäische Verlagsanstalt, 1971.

Guse, Richard, Scott Thiebes, Phil Hennel, Christoph Rosenkranz, and Ali Sunyaev. "Wie nehmen Arbeitnehmende die Digitale Transformation und ihre Auswirkungen wahr? Validierung eines Messinstruments auf Basis der Theory of the Smart Machine." In *Digitalisierung der Arbeitswelten. Zur Erfassbarkeit einer systemischen Transformation*, edited by Sabine Pfeiffer, Manuel Nicklich, Michael Henke, Martina Heßler, Martin Krzywdzinski, and Ingo Schulz-Schaeffer. Springer Fachmedien, 2024.

Hellige, Hans Dieter. "Paradigmenwechsel der Computer-Bedienung aus technikhistorischer Perspektive." In *Mensch-Computer-Schnittstelle. Zur Geschichte und Zukunft der Computerbedienung*, edited by Hans Dieter Hellige. transcript, 2008.

Hochschild, Arlie. "Das gekaufte Herz. Zur Kommerzialisierung der Gefühle." In *Soziologie der Arbeit. Ein Reader*, edited by Wolfgang Menz and Martin Seeliger. Suhrkamp, 2024.

Hohlmann, Brita. *Organisation SAP – soziale Auswirkungen technischer Systeme*. Darmstädter Studien zu Arbeit, Technik und Gesellschaft 3. Shaker, 2007.

Hopp, Dietmar. "Beispiele erfolgreicher Unternehmensführung durch Diversifikation, Innovation, Markterschließung." In *Jahrbuch Marketing*, edited by Klaus M. Schöttle. Springer Gabler, 1990.

Konrad-Klein, Jochen, and Jürgen Fickert. *Einführung von SAP-Programmen: Begrifflichkeiten – Strukturen – Regelungsansätze*, edited by TBS (Technologieberatungsstelle beim DBG Landesbezirk NRW), 1994.

Koselleck, Reinhart. *Vergangene Zukunft: Zur Semantik geschichtlicher Zeiten*. Suhrkamp, 2020 (1979).

Leimbach, Timo. "Mehr als die Summe seiner Teile." In *50 Years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation. abcVerlag, 2022.

Leimbach, Timo. "Treibende Kraft oder Getriebene? SAP und die digitale Revolution – Innovation und Unternehmensentwicklung zwischen Wandel und Kontinui-

tät." In *50 Years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation. abc Verlag, 2022.

Meissner, Gerd. *SAP – die heimliche Software-Macht: Wie ein mittelständisches Unternehmen den Weltmarkt erobert*. Hoffmann und Campe, 1997.

Misselhorn, Catrin, Tom Poljanšek, Tobias Störzinger, and Maike Klein, eds. *Emotional Machines: Perspectives from Affective Computing and Emotional Human–Machine Interaction*. Introduction. Springer Fachmedien, 2023.

Mormann, Hannah. *Das Projekt SAP. Zur Organisationssoziologie betriebswirtschaftlicher Standardsoftware.* transcript, 2016.

Niethammer, Lutz. "Fragen – Antworten – Fragen, Methodische Erfahrungen und Erwägungen zur Oral History." In *Wir kriegen jetzt andere Zeiten. Auf der Suche nach der Erfahrung des Volkes in nachfaschistischen Ländern, Lebensgeschichte und Sozialkultur im Ruhrgebiet 1930 bis 1960*, edited by Lutz Niethammer, and Alexander von Plato. Dietz-Verlag 1985.

Nye, David E. *American Technological Sublime*. MIT Press, 1994.

Payer, Peter. "Mühelos nach oben." In *Technikemotionen*, edited by Martina Heßler. Ferdinand Schöningh 2020.

Quinn, Erika, and Holly Janacek. "Introduction: Feeling Beyond the Human." In *Animals, Machines, and AI. On Human and Non-Human Emotions in Modern German Cultural History*, edited by Erika Quinn and Holly Yanacek. Walter de Gruyter, 2022.

Reckwitz, Andreas. *Verlust*. Suhrkamp, 2024.

Rosenwein, Barbara. "Worrying about Emotions in History." *American Historical Review* 107, no. 3 (2002): 821–45.

Rothermel, Walter. "Die ICI und die Geburt der SAP"," 46-–48, In Östringen, Vom Dorf zur Stadt, edited by Jürgen Alberti et. al. verlag regionalkultur, 2018.

Scheer, Monique. "Are Emotions a Kind of Practice (and is That What Makes Them Have a History?): A Bourdieuian Approach to Understanding Emotion." *History and Theory* 51, no. 2 (2012): 193–220.

Scheer, Monique. "Emotionspraktiken: Wie man über das Tun an die Gefühle herankommt." In *Emotional Turn? Europäisch-ethnologische Zugänge zu Gefühlen & Gefühlswelten*, edited by Matthias Beitl and Ingo Schneider. Selbstverlag des Vereins für Volkskunde, Buchreihe der Österreichischen Zeitschrift für Volkskunde, vol. 27, 2016.

Scheer, Monique. "Emotion als kulturelle Praxis." In *Emotionen. Ein interdisziplinäres Handbuch*, edited by Hermann Kappelhoff, Jan-Hendrik Bakels, Hauke Lehmann, and Christina Schmitt. J. B. Metzler, 2019.

Scherer, Eric, and Dorothea Schaffner. *SAP-Training: Konzeption, Planung und Realisierung*. Springer Gabler, 2003.

Scherke, Katharina. *Emotionssoziologie*. transcript, 2024.

Schlombs, Corinna. "Gender is a Corporate Tool." In *Your Computer is on Fire*, edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip. MIT Press, 2021.

Schneider, Philipp. *Frustration, Rache und Vergeltung am Arbeitsplatz*. Tectum Wissenschaftsverlag, 2016.

Schneider, Wolfgang. "Bei Software-Usern sollten Alarmglocken schellen." *Frankfurter Rundschau*, November 21, 1994.

Schröter, Hans Georg. "Vom Bediener zum Computeruser – Was moderne Software möglich macht: Der Arbeitsplatz rückt in den Mittelpunkt." *Frankfurter Rundschau*, October 29, 1994.

Siegele, Ludwig, and Joachim Zepelin. *Matrix der Welt: SAP und der neue globale Kapitalismus*. Campus, 2009.

Thierry, Benjamin. "Interactivity. An In-between State." In *Digital Roots. Historicizing Media and Communication Concepts of the Digital Age*, edited by Gabriele Balbi, Nelson Ribeiro, Valérie Schafer, and Christian Schwarzenegger. De Gruyter, 2021.

Trischler, Helmuth, and Robert Bud. "Öffentliche Technik: Kernenergie in Europa." *Geschichte und Technik* 34, no. 3–4 (2018): 1–27. DOI: 10.1080/07341512.2018.1570674.

Turkle, Sherry. *Die Wunschmaschine: Vom Entstehen der Computerkultur* [The Second Self]. Reinbek, 1984.

Turkle, Sherry. *Alone Together. Why We Expect More from Technology and Less from Each Other*. Basic Books, 2011.

Verheyen, Nina. "Geschichte der Gefühle." Docupedia-Zeitgeschichte, June 18, 2010. http://docupedia.de/zg/verheyen_gefuehle_v1_de_2010.

Wicke, Walter. *SAP-Einsatz ganzheitlich gestalten: Leitfaden zur Gestaltung von Einführungsprozeß, Organisation und Technik*, edited by ÖTV Referat Technologiepolitik, 1996.

Zimmer, Fabian. *Hydroelektrische Projektionen*. Wallstein-Verlag, 2022.

Zipf, Michael. "Der erste Kunde. Ein Glücksfall." In *50 Years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation. abcVerlag, 2022.

Zipf, Michael. "Eine verschworene Gemeinschaft." In *50 Years – Geschichte, Wirkung und Zukunft der SAP*, edited by SAP-Unternehmenskommunikation. abcVerlag, 2022.

Zuboff, Shoshana. *In the Age of the Smart Machine: The Future of Work and Power*. Basic Books, 1988.

Innovation, gender, and emotional responses: The computerization of the Austrian Federal Railways, 1969–1991

Nina Jahrbacher

Introduction

This chapter examines how computerization reshaped the Austrian Federal Railways (ÖBB) between 1969 and 1991, focusing on the General Directorate. It argues that digital transformation at ÖBB was not merely a technical or administrative project but a deeply social and emotional process that reconfigured work practices, organizational identities, power relations, and gender hierarchies. While management publicly framed digitalization as a straightforward enhancement of efficiency and transparency, employee perspectives reveal a more ambivalent experience marked by adaptation, skepticism, and uneven redistribution of authority. Previous research on ÖBB has primarily focused on processes of economic rationalization and legal restructuring – such as the transition from the Federal Railways Service Act to collective bargaining agreements[1] – without analyzing how computerization reshaped administrative cultures and gendered labor structures. This chapter addresses that gap.

The guiding question is: How did the introduction and consolidation of electronic data processing and office automation reconfigure administrative practice, gendered divisions of labor, and employees' emotional repertoires at ÖBB – and through which organizational mechanisms did these changes occur? Three subsidiary concerns structure the analysis: first, how managerial narratives of efficiency interacted with existing routines and governance constraints; second, how digitalization intersected with entrenched gender hierarchies in hiring, promotion, and everyday task allocation; and third, how employees retrospectively narrated loyalty, identification, and resistance in response to technological change.

Methodologically, the chapter triangulates multiple source groups to capture both institutional dynamics and lived experience. Internal ÖBB records –

1 Dornig, "Vom Bundesbahndienstrecht zum Kollektivvertrag."

investment plans, almanacs, and organizational charts[2] – are used primarily to reconstruct timelines, decision paths, and the scaling of infrastructure. Policy and oversight materials – Women's Reports (1975, 1985),[3] Administrative Reform Reports (1980, 1987),[4] and legal frameworks such as the Equal Treatment Act (1979)[5] and Austria's 1982 ratification of the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)[6] – situate ÖBB within national debates on labor, equality, and public administration. Oral history interviews conducted in 2023[7] supply retrospective narratives of everyday work, emotional coping, and professional identity; company communications (e.g., staff magazines, training and information materials[8]) help trace internal messaging and pedagogical strategies around computerization. Each corpus has limitations – managerial documents privilege official perspectives; oral histories are retrospective and skew male; policy texts are programmatic – but in combination they enable a layered account of organizational change.

Analytically, the chapter integrates insights from innovation theory, gender history, and the history of emotions. Joseph Schumpeter's concept of "creative destruction"[9] and Clayton Christensen's account of organizational constraints on disruption[10] frame the tension between structural change and institutional inertia. In this chapter, emotions are understood not as isolated psychological states but as collective, institutionally mediated experiences shaped by workplace norms and wider social change. "Computerization" refers to both electronic data processing (EDP; German: EDV) and workflow automation in administrative domains such as payroll, statistics, planning, and ticketing.

Brief institutional context is necessary: as Austria's largest state-owned employer during the period examined and a key postwar public institution, ÖBB

---

2 Österreichische Bundesbahnen, *Unternehmenskonzept*. For almanacs see, e.g., GD ÖBB, *Almanach der österreichischen Eisenbahnen*; GD ÖBB, *Geschäftsbericht der Österreichischen Bundesbahnen 1972*; GD ÖBB, *Geschäftsbericht der Österreichischen Bundesbahnen 1978*.

3 Bettelheim et al., "Heft 5: Die Frau im Beruf"; Cyba et al., "Heft 3: Beruf"; Feigl, "Heft 8: Zusammenfassung."

4 Österreichisches Bundeskanzleramt, *Bericht der Bundesregierung*, 1980; Österreichisches Bundeskanzleramt, *Bericht der Bundesregierung*, 1987.

5 "108. Bundesgesetz: Gleichbehandlungsgesetz."

6 "443. Konvention zur Beseitigung."

7 To protect participants' confidentiality, interviewees are referred to by pseudonymous first names; these are invented and do not correspond to their legal identities.

8 See, e.g., N.N., "15. An vermeidbare Kosten denken!"; Pucher, "Teamarbeit in der Datenverarbeitung"; Kuntscher, "Die Bedeutung der Österreichischen Bundesbahnen"; N.N., "Fahrdienstleiterausbildung."

9 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung."

10 Christensen et al., "Disruptive Innovation"; Christensen, "The Ongoing Process of Building"; Christensen, *Innovator's Dilemma*.

embodied technocratic governance and a strongly hierarchical, male-dominated civil service culture;[11] the establishment of a dedicated EDP unit in the General Directorate in 1970 inaugurated a systematic effort to digitize workflows that accelerated through the 1970s and 1980s.[12] Nonetheless, examples from the ÖBB history illustrate resistance to change. In 1971, the board requested proposals for administrative simplification, yet the responsible "Zentrale Planungsstelle" dissolved in 1973 without ever receiving a clear mandate. Similarly, a 1972 initiative by the "Arbeitskreis für Organisation" to address staffing issues was halted after their proposals were neither approved nor empowered. Further, a 1975 "Projektgruppe Organisation" was tasked with critically analyzing and improving organizational efficiency but was disbanded in 1976 before it could develop any substantial proposals, following the rejection of its preliminary report due to significant flaws.[13]

Against this backdrop, the chapter proceeds in three steps that build on one another. The next section is the most extensive because it reconstructs the institutional and technological trajectory from 1969 to 1991 – contextualizing ÖBB within postwar modernization and state reform, tracing early pilot programs and their institutionalization in the 1970s and 1980s, and analyzing how digital tools increased transparency, automated clerical work, and reorganized administration. In doing so, it sequences investments, standardization strategies, and governance constraints, and situates ÖBB within broader regulatory and labor contexts. The section "Gender dynamics and institutional change" then mobilizes quantitative and institutional evidence – almanacs, salary grades, and ministerial reports[14] – to show how digitalization intersected with entrenched hierarchies; it is deliberately substantial, though shorter than section two, because it translates that baseline into a focused analysis of distributional effects within the organization. The section on emotional responses is concise and case-driven: drawing on oral histories, it illuminates how employees retrospectively narrated loyalty, identification, and resistance in everyday encounters with computerization. Its relative brevity reflects its interpretive purpose – deepening, rather than duplicating, the institutional mapping developed in the previous two sections.

11 Puwein, "Erfolge der ÖBB-Reform 1992."

12 GD ÖBB, *Almanach 1970*, 14; Pucher, "Elektronische Datenverarbeitung im Großbetrieb," 16.

13 Republik Österreich, *Bericht des Rechnungshofes*, 6–10 (Abs. 20.1, 21.1, 21.2, 23.1.1, 23.1.4, 23.1.5, 23.2.1).

14 See, e.g., GD ÖBB, *Almanach 1970*; Bettelheim et al., "Heft 5"; Österreichisches Bundeskanzleramt, *Bericht der Bundesregierung*, 1980; Österreichisches Bundeskanzleramt, *Elektronische Datenverarbeitung im Bundesbereich*.

Innovation, disruption, and strategic shifts

The implementation of digital systems at ÖBB aligned with global computerization trends, leading to administrative restructuring and increased efficiency.[15] Christensen's theory of disruptive innovation helps explain why established bureaucracies often resist technological change[16] – a challenge ÖBB faced until the late 1970s. The transition to digital workflows required strategic management to overcome institutional inertia and to ensure that employees adapted effectively.[17] Similarly, Joseph Schumpeter placed innovation at the core of economic development: new products, production methods, and markets drive economic progress. His concept of "creative destruction" describes how existing structures are "destroyed" and "replaced" by new ones – fostering progress but also introducing instability and non-linear change as industries adapt and outdated technologies are phased out.[18] This dynamic was evident at ÖBB, where older administrative systems gave way to computer-based workflows.

Consequently, a key shift was the prioritization of computer-based systems in planning and organization. By 1969, ÖBB had begun focusing on electronic systems and cybernetics to enhance efficiency.[19] In official rhetoric, management cast these moves as efficiency- and transparency-enhancing; inside the organization, many employees perceived heightened monitoring and pressure rather than genuine openness or empowerment. This ambivalence is evident in the reflections of employees directly involved in modernization efforts, as illustrated by the following quote:

> Of course, digitalization also led to proper accounting and economic efficiency – without meaning this critically, but very objectively – these costs became much more transparent, and often much more transparent for those responsible. Yes, then there was this office automation. And yes, it then continued relatively quickly, where the computer world – as is well known – essentially overtakes itself.[20]

---

15 Balbi and Magaudda, *A History of Digital Media*.

16 Christensen et al., "Disruptive Innovation"; Christensen, "The Ongoing Process"; Christensen, *Innovator's Dilemma*.

17 Republik Österreich, *Bericht des Rechnungshofes*, 6–10 (Abs. 20.1, 21.1, 21.2, 23.1.1, 23.1.4, 23.1.5, 23.2.1).

18 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung."

19 N.N., "15. An vermeidbare Kosten denken!"

20 Original: "Und so wurde mit der Digitalisierung natürlich auch im Sinne einer ordentlichen Buchhaltung und einer Wirtschaftlichkeit – ohne das jetzt kritisch anzumerken, aber natürlich sehr nüchtern – wurden diese Kosten viel transparenter, und oft für die Verantwortlichen viel transparenter. Ja, dann hats eben diese Büroautomatisation geben. Und ja, jetzt ging das dann aber relativ rasch weiter, wo sich ja die Computerwelt – allseits bekannt – eigentlich

The quoted reflection offers valuable insight into how digitalization was perceived at ÖBB by those directly involved in technological modernization processes. The interviewee – who began as a clerical assistant and later worked on automation projects in the General Directorate – combines personal experience with an organizational view. His tone is not simply neutral or descriptive; rather, he implicitly defends the shift toward digital tools, especially in areas such as accounting and cost control. By emphasizing that these tools enabled "proper accounting" and made costs "much more transparent," he frames digitalization as a rational and necessary development – subtly distancing himself from more critical or nostalgic perspectives on the pre-digital past.

The reference to "office automation" alludes to the transformation of clerical work through systems for word processing, data management, and workflow optimization. His remark that the "computer world […] overtakes itself" expresses both admiration for the speed of technological innovation and an awareness of the institutional strain such rapid changes could impose. Overall, the statement frames computerization as a pragmatic, largely beneficial development – highlighting how transparency, efficiency, and organizational adaptability were valued by those actively shaping ÖBB's technological future.

The broader economic climate of the 1970s and 1980s significantly shaped ÖBB's modernization efforts. As postwar economic expansion gave way to digital capitalism and financial globalization in the 1980s,[21] productivity expectations and business practices evolved: investment in technological infrastructure became a necessity to remain competitive. At the same time, global regulatory and labor contexts mattered: as Robin Williams and David Edge have argued, the separation of software and hardware markets in the United States reshaped the computing industry,[22] while David Noble shows how labor structures influenced programmable machine tools in the United Kingdom and West Germany.[23] Together, these dynamics underline that technological change is institutionally and labor-embedded – also at ÖBB.

Concurrently, societal changes influenced ÖBB's strategic priorities, particularly in addressing gender disparities. Despite initiatives such as the Women's Advancement Program (1981), which aimed to counteract the underrepresentation of women in technical fields,[24] entrenched gender norms continued to shape the

selbst überholt." Jahrbacher, Interview with Emil. A similar observation can be found in an ÖBB employee newsletter. See Pucher, "Elektronische Datenverarbeitung."

21 Doering-Manteuffel and Lutz, "Nach dem Crash."

22 Williams and Edge, "The Social Shaping of Technology," 880–84.

23 Nobel, "Social Choice in Machine Design"; Bergmann et al., *Digitalisierung der Arbeitswelt*, 7. See also Flecker, *Arbeit und Beschäftigung*, 204.

24 N.N., "Frauen am Zug."

composition of the workforce. This persistence was evident even amid progressive legislation, including the Equal Treatment Act of 1979 and Austria's 1982 ratification of the UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), which obligates states to dismantle structural and legal gender inequalities.[25] The policy frameworks provide the backdrop for the closer examination of how digitalization interacted with entrenched gendered hierarchies inside ÖBB.

At ÖBB, women remained concentrated in administrative roles, while technical and leadership positions were predominantly occupied by men.[26] The introduction of computer systems and digital workflows often reinforced rather than disrupted these divisions: automation displaced many clerical jobs traditionally performed by women, while newly emerging technical roles were typically filled by men.[27]

While the adoption of digital technologies at ÖBB aligned with Schumpeter's "creative destruction"[28] in terms of administrative restructuring and workflow modernization, the transformation did not extend equally across all organizational dimensions. Legacy systems were dismantled and efficiency improved, yet deeply embedded hierarchies – particularly the gendered division of labor – remained largely intact. This calls for a more nuanced account of disruption: digitalization at ÖBB disrupted routines while stabilizing – or even reinforcing – preexisting power asymmetries.[29] Technological change produced structural shifts and institutional anxiety, as Schumpeter and Christensen suggest,[30] but also revealed clear limits when confronting entrenched hierarchies, underscoring the need to integrate gender and emotional dimensions into analyses of organizational change.

Moreover, strategic decisions at ÖBB increasingly emphasized employee training and technological adaptation.[31] A key example was the introduction of floor copiers with counters. Previously, clerks or specialized officers relied on designated staff to handle copying tasks. With digitalization, it became common for engineers

25 "BGBl. Nr. 108/1973," 683–87; "443; BGBl. Nr. 443/1982," 2079–101. For more information, see: UN Women Germany, CEDAW – The UN Convention on the Elimination of All Forms of Discrimination Against Women, available at: https://unwomen.de/cedaw/. The full text of the convention is available at: https://unwomen.de/tcl-content/uploads/2022/03/cedaw.pdf.

26 Bettelheim et al., "Heft 5," 10–14, 48; Cyba et al., "Heft 3," 53–57, 92–95; Feigl, "Heft 8," 16–19, 112.

27 Cyba et al., "Heft 3," 153–63.

28 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung."

29 Cyba et al., "Heft 3," 153–63.

30 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung"; Christensen et al., *Disruptive Innovation*; Christensen, *The Ongoing Process*; Christensen, *Innovator's Dilemma*.

31 Pucher, *Elektronische Datenverarbeitung*; Jahrbacher, Interview with Franz and Josef. Teil 1; Jahrbacher, Interview with Franz and Josef. Teil 2.

and administrative staff to send documents digitally to the print shop and retrieve them independently. While this may seem routine today, at the time it marked a significant shift: employees began using office IT tools autonomously, and staff from the former typing department were reassigned to a newly created automation group responsible for maintaining these systems.[32]

This transition reduced repetitive administrative tasks, particularly for technical and managerial staff, who gained greater autonomy. For former support personnel, however, the change often meant reassignment rather than upward mobility. Although official reports framed digitalization in technical and efficiency-oriented terms, these narratives were far from neutral: they portrayed technological innovation as self-evidently positive, emphasizing institutional progress while largely overlooking the human dimension of change.

Building directly on these developments, this transition required substantial investment in both technical infrastructure and employee training, but it led to significant improvements in administrative productivity and overall service quality.[33] Throughout the 1970s and 1980s, ÖBB pursued the standardization of software and hardware systems in order to streamline workflows, reduce repetitive tasks, and minimize manual processing. The period also saw the introduction of West German Nixdorf systems supporting ticketing and administrative data management – briefly noted here and discussed in detail below.[34] A key organizational shift during this period was the move from decentralized, manual procedures to more centralized and automated forms of administration, as another interviewee emphasized:

> There was also a large copying office and a small printing office in the General Directorate. All directives that were issued were produced in this copying office. […] We had, in the late 70s and mid-80s, about 2,200 service locations in the ÖBB network.[35]

32 Jahrbacher, Interview with Emil.

33 Pucher, "Elektronische Datenverarbeitung im Großbetrieb"; Jahrbacher, Interview with Franz and Josef. Teil 1; Jahrbacher, Interview with Franz and Josef. Teil 2.

34 Nixdorf Computer AG, founded by Heinz Nixdorf, was one of West Germany's leading providers of compact business-oriented electronic data processing systems in the 1970s and 1980s, with a focus on banking, retail, and public administration. Jahrbacher, Interview with Ferdinand.

35 Original: "Es gab dann auch in der Generaldirektion eine große Kopierstelle und eine kleine Druckerei. Denn alle Anweisungen, die rausgingen, wurden hier in dieser Kopierstelle, wurden die gefertigt. Das heißt wir hatten in den, in den Ende 70ern und Mitte der 80ern circa 2.200 Dienststellen im ÖBB-Netz." Jahrbacher, Interview with Emil.

Between 1972 and 1978, ÖBB's IT workforce grew from 155 to 233 employees,[36] while revenues[37] increased by approximately 63%.[38] Nonetheless, administrative and organizational structures lagged behind. Structural reforms – including the creation of a board of directors and trustees – were implemented to address these gaps.

Because of the growth in the IT sector and the increasing adoption of computer systems, ÖBB experienced a general decline in overall staffing levels between 1960 and 1974, particularly in operational and administrative departments. This reduction formed part of broader rationalization strategies aimed at increasing efficiency and reducing labor costs, but it also led to unintended consequences such as increased overtime and growing reliance on external service providers.[39] Digital technologies were introduced to automate workflows, standardize procedures, and provide real-time data to support managerial decision-making. By the early 1980s, ÖBB's digital landscape encompassed approximately 1,800 programs, primarily focused on commercial and administrative functions.[40]

To manage these developments, ÖBB considered a variety of strategies, including structural reforms, employee incentive programs, and changes to training approaches. Modern management techniques were introduced, and interdisciplinary pilot projects were launched to encourage cooperation across departments. Training and examination systems were restructured to develop staff according to functional roles – though in practice this often remained vague. While ÖBB officially aimed to align services with market demand and enhance performance through rationalization and revenue growth,[41] internal skepticism persisted. Many employees viewed the initiatives with suspicion, particularly as they were often accompanied by increased workloads, tighter control mechanisms, and limited opportunities for participation in decision-making.[42]

A ten-year computerization program – budgeted at 60 million Austrian Schillings (ATS), or approximately 3.5–4 million USD at 1975 exchange rates –

---

36 Of these, 138 were computer personnel and 17 were other personnel in 1972, and 204 and 29, respectively, in 1978. Österreichisches Bundeskanzleramt, *Elektronische Datenverarbeitung im Bundesbereich*, 343.

37 In this context, "revenues" refers to the total income generated by the Austrian Federal Railways between 1972 and 1978, reflecting a notable improvement in the company's economic performance.

38 See, e.g., GD ÖBB, *Geschäftsbericht der Österreichischen Bundesbahnen für das Jahr 1972*; GD ÖBB, ed., *Geschäftsbericht der Österreichischen Bundesbahnen für das Jahr 1978*. Wien 1979.

39 Österreichische Bundesbahnen, *Unternehmenskonzept*, 31.

40 Österreichische Bundesbahnen, 32–33.

41 Österreichische Bundesbahnen, 76–80.

42 Jahrbacher, Interview with Franz and Josef. Teil 1; Jahrbacher, Interview with Franz and Josef. Teil 2; Jahrbacher, Interview with Emil.

was designed to free up the equivalent of at least 1,100 staff positions and to generate an annual financial benefit of no less than 315 million ATS (roughly 18–20 million USD, or 0.06% of Austria's GDP at the time).[43] Officially, the investment program referred to a "release of work capacity," which implied neither direct layoffs nor forced redundancies, but rather reductions through natural attrition (e.g. retirement) and internal reassignments. Nevertheless, the overarching objective was a significant reduction in staffing levels, framed as part of a broader rationalization strategy.[44]

By 1978, ÖBB's total computerization expenditure had already reached 128.5 million ATS, including 57.5 million ATS for hardware and 46.2 million ATS for personnel.[45] While this exceeded the original projection, it reflects the rapid scaling-up of digital infrastructure. The fact that hardware investments outpaced personnel spending was not unusual by international standards but illustrates a broader institutional shift: ÖBB increasingly prioritized technological systems over human labor – a development that, while framed in terms of efficiency and modernization, also triggered uncertainty and emotional ambivalence among employees.

The role of technology in ÖBB's General Directorate evolved significantly from the 1970s to the 1990s. Initially focused on automating routine tasks, computerization later supported skilled labor and internal information flows.[46] As social scientist Gabriele Winker argues, technology alone does not determine centralization; decision-makers, particularly in central offices, shape how digital tools are integrated.[47] This was evident at ÖBB, where strategic decisions in the 1990s led to the standardization and centralization of digital systems, fundamentally transforming operations and management.[48]

The transformation of ÖBB was shaped not only by internal restructuring efforts but also by broader socio-economic pressures. During the 1970s and 1980s, external shocks such as the oil crises and growing global competition placed increasing

43 Österreichische Bundesbahnen, *Unternehmenskonzept*, 83.

44 This was particularly relevant for civil servants, who were granted tenure of office, making their positions virtually impossible to terminate. Until 1979, this was codified in the "Dienstpragmatik" and, from 1979 onward, in the "Beamtendienstrecht." "Bundesgesetz: Beamten-Dienstrecht 1979," 1559 (§10 Abs. 2–4).

45 Österreichisches Bundeskanzleramt, *Elektronische Datenverarbeitung im Bundesbereich*, 348. Computerization investments required multilayered approval under the Federal Railway Act: authorization by the Transport and Finance ministries within annual federal budget limits. This framework applied to all major expenditures and limited ÖBB's financial and strategic flexibility. Österreichische Bundesbahnen, *Unternehmenskonzept*, 122, 128, 138; Jahrbacher, Interview with Franz and Josef. Teil 1.

46 Pucher, *Elektronische Datenverarbeitung*, 16; Jahrbacher, Interview with Franz and Josef. Teil 1.

47 Winker, *Büro. Computer. Geschlechterhierarchie*, 16, 22, 49.

48 Jahrbacher, Interview with Ferdinand; Jahrbacher, Interview with Franz and Josef. Teil 1.

strain on Austria's economy.[49] Although ÖBB remained a major employer and essential public service provider, state-owned enterprises were under growing pressure to operate more efficiently and to adapt to market-oriented principles. As the era of postwar prosperity gave way to the challenges of computerization, neoliberal economic policies, and financial globalization, expectations shifted: public companies like ÖBB were now expected to demonstrate fiscal discipline, managerial accountability, and international competitiveness.[50]

In response to these developments – and in preparation for Austria's accession to the European Union – the Austrian government introduced wide-ranging structural reforms. In 1992 – just beyond this chapter's timeframe[51] – the Vranitzky III administration enacted the Federal Railways Act, transforming ÖBB from a state-administered economic entity into a legally independent organization. While still fully owned by the Republic of Austria, ÖBB was restructured as a special-purpose legal entity – combining features of a limited liability company and a joint-stock cooperation – operating under private law.[52] This reform pursued two main goals: aligning with EU directives and reducing the state's financial burden by increasing the company's competitiveness. The new organizational structure allowed ÖBB to adopt private-sector management practices focused on cost-efficiency, internal performance metrics, and market responsiveness. At the same time, however, financial constraints also reshaped employment structures through staff reductions, outsourcing, and the redistribution of responsibilities within the organization.[53]

At the level of concrete systems and workflows, these dynamics were especially visible: one illustrative example of such institutional and technological transformation was the implementation of the Nixdorf ticketing and data management systems in the 1980s, whose digital communication capabilities enabled employees to manage data and information more strategically. One interviewee recalled how ÖBB was among the first institutions to adopt this ticketing systems: instead of issuing tickets manually, employees could simply select a route – such as Vienna to Berlin – and the system completed the transaction. However, this phase of technological modernization came to an end when Nixdorf Computer AG – once a leading German manufacturer – faced severe financial difficulties in the late 1980s. The company was unable to recover from sustained losses and was acquired by Siemens in

49 Elster, *Der Arbeitskraftunternehmer und seine Bildung*, 23.

50 Doering-Manteuffel and Raphael, "Nach dem Crash."

51 1992 lies just beyond the 1969–1991 window, which is deliberately chosen to capture the pre-reform phase leading up to the reorganization associated with EU accession preparations.

52 "825. Bundesgesetz zur Neuordnung."

53 "825"; 'Puwein, "Erfolge der ÖBB-Reform 1992."

1990, effectively ending its independent operations and its direct role in railway administration systems.[54]

This example captures the ambition – and the constraints – of ÖBB's top-down modernization. Written sources largely mute the affective dimension, whereas oral histories reveal uneven, often ambivalent responses (see below). The close of the Nixdorf phase thus serves as a hinge to the ensuing discussion of research on labor, gender, and digitization.

Research by Gerlinde Hauer and Michael Mesch demonstrates that technological progress has historically often coincided with rising employment levels and declining working hours, particularly during the twentieth century.[55] Mesch, focusing on the postwar era of Fordist capitalism, highlights how productivity gains were frequently accompanied by job creation, real wage growth, and shorter working hours – developments made possible by strong labor institutions, collective bargaining systems, and redistributive policies. However, he emphasizes that these outcomes were not automatic but relied on favorable macroeconomic conditions and a relatively equitable income distribution. In contrast, more recent phases of automation – particularly under neoliberal policy regimes – have not consistently delivered comparable employment benefits.[56] Hauer similarly identifies a historical pattern in which technological change has supported employment growth, but stresses that this trend is neither automatic nor universally applicable. Instead, the labor effects of innovation depend on how new technologies are implemented, which sectors they affect, and the broader political and institutional context.[57] Both authors caution against assuming a linear or inevitable relationship between technological advancement and net employment gains – particularly under late twentieth- and early twenty-first-century economic conditions shaped by globalization, deregulation, and weakened collective bargaining.

Isabel Morf adds another dimension to this analysis by examining how digital technologies were already beginning to reshape organizational structures by the late 1980s. Writing in 1991, she observed early signs that digitalization could flatten hierarchies and enable new forms of data generation, storage, and distribution. Although her study captured a contemporary view of emerging developments, her insights remain relevant for understanding broader transformations that unfolded throughout the 1980s and into the 1990s. According to Morf, digital technologies increasingly structured work rhythms and environments around machine logic and algorithmic processes rather than human-centered workflows – signaling a deeper

54 Jahrbacher, Interview with Ferdinand.

55 Hauer, "Digitalisierung – Selbstläufer Richtung Gleichstellung?"; Mesch, "Automatisierung und Beschäftigung"; Mesch, "Editorial. Automatisierung und Beschäftigung."

56 Mesch, "Automatisierung und Beschäftigung"; Mesch, "Editorial."

57 Hauer, "Digitalisierung."

shift in the relationship between labor and technology.[58] Therefore, computers did not simply replace human labor; instead, they became embedded in administrative workflows, transforming the nature of work rather than eliminating it. Recent studies on digital work environments in Austria and Eastern Europe – such as the 2019 report by Bergmann et al.– confirm that the effects of digitalization are neither uniform nor technologically determined.[59] Rather, technological change interacts with institutional, political, and social factors that shape how digital tools are implemented and experienced across sectors and regions.

Ultimately, the adoption of digital technologies at ÖBB between 1969 and 1991 reflects broader patterns of digital transformation in public institutions. The gradual but definitive shift from traditional administrative structures to IT-supported workflows enhanced efficiency and data accessibility, but also required continuous organizational adaptation and new workforce competencies. ÖBB's experience demonstrates that modernization is never merely a technical process. It is shaped by economic structures, labor relations, and societal norms – and must therefore be understood as both a technological and institutional transformation.

Gender dynamics and institutional change

The ÖBB workforce in the 1970s and 1980s was overwhelmingly male, reflecting broader societal gender norms in Austria.[60] In 1986, women made up only 6% of the 67,000 ÖBB employees[61] – underscoring the structural barriers to female participation, particularly in technical and administrative roles. This period of digital transformation coincided with legal efforts to promote gender equality, such as the "Equal Treatment Act" of 1979 and Austria's 1982 ratification of CEDAW.[62]

The Austrian Federal Railways were characterized by a highly gendered division of labor. Women predominantly occupied supportive and administrative positions, while technical and managerial roles remained firmly male-dominated. This pattern reflected not only ÖBB's internal structure but also broader dynamics within Austrian public administration. Reports such as the Women's Reports of 1975 and 1985, as well as the Administrative Reform Reports of 1980 and 1987, provide detailed insights into these gendered distributions.[63]

---

58 Morf, "Durchsatz erhöhen, Backlog abbauen!"

59 Bergmann et al., *Digitalisierung der Arbeitswelt*, 6.

60 Cyba et al., "Heft 3."

61 N.N., "Frauen am Zug," 46.

62 BGBl. Nr. 108/1979; BGBl. Nr. 443/1982.

63 Bettelheim et al., "Heft 5"; Cyba et al., "Heft 3"; Feigl, "Heft 8"; Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1980*; Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1987*.

As historian Bernhard Gotto and sociologist Ursula Holtgrewe have shown in their respective studies on postwar West German public administration and 1980s office labor, traditional role patterns were often reinforced through hiring and promotion practices – even in the context of technological modernization.[64] These broader findings resonate with the situation at ÖBB during the same period: The 1975 Women's Report revealed that in 1973, only 736 women were employed as civil servants or contract staff at ÖBB, compared to 55,475 men[65] – a mere 1.3% of the workforce. A breakdown of these roles further illustrates the systemic barriers: 35% of the 736 women worked in lower-level administrative roles, 61% held mid-level administrative positions, and 4% occupied senior or specialist roles. Among female wage employees: 75% worked in supportive roles such as cleaning, station services, and clerical assistance; 25% were employed in lower-level administrative positions.

ÖBB's participation in the 1975 International Women's Year, initiated by the United Nations, resulted in symbolic gestures but failed to produce substantive reform.[66] The 1981 Women's Advancement Program aimed to increase female representation in traditionally male-dominated roles, yet progress was slowed by persistent prejudices and entrenched societal expectations. While digitalization opened up new professional opportunities, it often served to reinforce, rather than dismantle, existing gender hierarchies.[67]

The historical context of gendered office labor helps explain the persistence of structural barriers. From the late nineteenth century onward, office work became increasingly mechanized with the introduction of typewriters, telephones, and shorthand. Women, despite having formal educational qualifications, were typically assigned repetitive and mechanical tasks. Employers benefited from hiring them at lower wages, which limited their career progression and reinforced stereotypes about women's supposed lack of leadership potential. Marriage was frequently invoked as a justification for excluding women from advancement.[68]

A key symbol of this gendered division of labor was the typewriter. Whereas handwriting had once been a valued skill, the rise of typewritten documents diminished its significance and relegated women to clerical roles. Dictation became a male

64 Gotto, "Bürohengste"; Holtgrewe, *Schreib-Dienst.*

65 Bettelheim et al., "Heft 5," 10–14, 48; Cyba et al., "Heft 3," 53–57, 92–95; Feigl, "Heft 3," 16–19, 112.

66 N.N., "8. März 1975 – Tag der Frau."

67 N.N., "Frauen am Zug," 47–48.

68 Therese Jäggi's research on Switzerland, specifically Zurich, highlights these dynamics and provides a detailed examination of the socio-economic factors influencing the employment and advancement of women in office work during this period. Jäggi, "Seit hundert Jahren unten," 71–81.

status symbol, while typing and shorthand – valued primarily for speed – remained associated with female employees.[69]

By the mid-1980s, administrative office work increasingly resembled industrial labor, characterized by rigid hierarchies and standardized workflows.[70] In the context of computerization-driven rationalization, women – often formally well-qualified – were frequently assigned to routine data entry or screen-based writing tasks, while men occupied more prestigious roles in technical development and systems design. As Ursula Holtgrewe's study of office labor in the 1980s shows, the introduction of computer technologies did not challenge gendered hierarchies, but instead often reinforced them – through a gendered division between using and controlling technology.[71]

While the adoption of digital systems at ÖBB aligned with Schumpeter's notion of "creative destruction"[72] in terms of administrative restructuring and workflow modernization, this transformation did not affect all organizational layers equally. Although legacy systems were dismantled and operational efficiency improved, deeply rooted hierarchies – especially gendered divisions of labor – often persisted or were even intensified. The ÖBB case thus illustrates how technological innovation can simultaneously disrupt and stabilize: it enabled new forms of transparency and workflow reorganization, yet reproduced existing inequalities in access, responsibility, and professional recognition.

In ÖBB's case, the interaction between technology and entrenched routines was especially visible: From the 1950s onward – and more intensively from the 1970s – analog data in areas such as payroll and accounting was processed via computers. This redefined work routines, redistributed labor, and altered decision-making processes.[73] Tasks traditionally performed by women – such as clerical data entry and routine administrative documentation – were among the first to be automated during ÖBB's computerization efforts. At the same time, technical and IT-related roles, typically associated with male employees, expanded and gained institutional importance. While the 1980s saw the introduction of selective training programs for women – e.g. in dispatcher training ("Fahrdienstleiterausbildung") and workflow automation – such initiatives remained limited in scope. Structural barriers and gendered occupational segregation persisted: women continued to be overrepresented in low-status clerical roles and underrepresented in technical or decision-making positions. Reports by the Austrian Federal Chancellery repeatedly emphasized this divide, noting that modernization often reinforced, rather than reduced,

69 Jäggi, 76.

70 Morf, "Durchsatz erhöhen," 122.

71 Holtgrewe, *Schreib-Dienst*, 57.

72 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung."

73 Bergmann et al., *Digitalisierung*, 6.

existing inequalities in professional advancement and job security.[74] These dynamics also signaled broader institutional restructuring and the emergence of a hybrid digital workplace.[75]

Swiss historian Gisela Hürlimann's analysis of the Swiss Federal Railways (SBB) highlights the transformative impact of digitalization on administrative structures. Like the Austrian Federal Railways, she finds that the integration of digital systems often reinforced traditional hierarchies: women remained in supportive functions, while men dominated technical and strategic positions.[76] Maria Oppen's research offers further insight into the long-term effects of office work on women's employment opportunities in the 1980s and 1990s. She argues that the initial role of office jobs in integrating women into the labor force declined over time due to workplace policies that perpetuated gendered hierarchies. These policies limited advancement opportunities and sustained wage disparities. Oppen also emphasizes that women bore a disproportionate burden of technological change, making them especially vulnerable to job displacement. In response, she advocates comprehensive reforms – including equal pay measures, structured career paths, and targeted support for women adapting to digital transformation. Without such structural change, long-term job stability and upward mobility remained elusive.[77] Historian Susanne Kreutzer, meanwhile, underscores the institutional barriers women faced within male-dominated labor organizations. Female unionists were often relegated to "women's departments," which restricted their influence over broader policy debates and strategic decisions.[78]

The 1985 Women's Report, published by the Austrian Federal Chancellery, documented the first systematic efforts to improve women's status in Austria's public sector, attributing these initiatives to the 1975 World Action Plan. However, the report also highlighted their limited success, noting that progress remained uneven across government departments.[79] One example was the opening of train dispatcher training to women in 1984 – a symbolic step forward. Yet by the mid-1980s, only eight women had completed the program, compared to more than 3,000 male graduates since 1971.[80] This stark disparity illustrates the gap between formal inclusion and actual participation.

---

74 Bettelheim et al., "Heft 5"; Cyba, "Heft 3"; Feigl, "Heft 8"; Republik Österreich, *Bericht des Rechnungshofes*, 45–48; N.N., "Fahrdienstleiterausbildung," 2; Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1987*.

75 Carstensen, "Ambivalenzen digitaler Kommunikation am Arbeitsplatz," 39; Kaufmann-Buhler, *Open Plan*, 65.

76 Hürlimann, *Die Eisenbahn der Zukunft: Automatisierung*.

77 Oppen, *Zukunft der Büroarbeit*, 1–6; Oppen, "Zukunft von Frauen im Büro."

78 Kreutzer, "Der Aufstieg findet nicht statt," 171–74.

79 Bettelheim et al., "Heft 5."

80 N.N., "Fahrdienstleiterausbildung."

An analysis of ÖBB almanacs reveals a distinct gender hierarchy in the IT workforce of the General Directorate between 1969 and 1975. During this period, men overwhelmingly occupied the upper and middle salary grades – X, IXb, IXa, VIII, and VIIb – with level "I" representing the lowest and "X" the highest pay grade. These positions were linked to technical expertise, strategic responsibility, and seniority – attributes socially and institutionally coded as male at the time. The top salary levels, particularly X and IXb, were held exclusively by men until 1975, reinforcing their dominance in senior IT roles. In the upper-middle ranges (IXa and VIII), men likewise prevailed, occupying positions in technical specialization, operational management, and system development. By contrast, female employees were concentrated in the lower and middle salary categories – specifically VIIa and Vb – which were associated with administrative and support functions such as data entry, clerical work, and routine operations. Women had no access to higher salary grades, underscoring the structural barriers to their career advancement. This sharp division of labor along gender lines reflects a hierarchical system in which technical and strategic roles remained the domain of men, while women were relegated to subordinate, often invisible, tasks.[81]

The structural shift in computerization within the ÖBB General Directorate further illuminates the gendered division of labor. Initially centralized in "Referat 1a" under the General Secretariat in 1969, responsibilities for computer-based systems were gradually distributed across various departments by the mid-1980s. This decentralization aimed to streamline administrative processes and embed technological expertise into daily operations. While these structural changes facilitated the broader integration of IT, they did not disrupt the gendered distribution of roles.[82] At ÖBB, technical knowledge and decision-making authority remained closely aligned with male-dominated career paths.

The administrative reform reports of 1980 and 1987 provide important context for understanding gender distribution within Austria's public administration. Both reports emphasize women's concentration in lower administrative ranks and the slow progress in integrating them into technical and leadership roles.[83] While measures such as equality officers and training programs were introduced, progress re-

81 GD ÖBB, ed., *Almanach der österreichischen Eisenbahnen 1969*; GD ÖBB, XXXIX. Jahrgang, 1970; GD ÖBB, XL. Jahrgang, 1971; GD ÖBB, XLI. Jahrgang, 1972; GD ÖBB, XLII. Jahrgang, 1973; GD ÖBB, XLIII. Jahrgang, 1974; GD ÖBB, XLIV. Jahrgang, 1975. See also Kreutzer, "Der Aufstieg findet nicht statt," 171–74; Pucher, "Teamarbeit," 26–29; Kuntscher, "Die Bedeutung der Österreichischen Bundesbahnen," 17; N.N., "Fahrdienstleiterausbildung," 2.

82 GD ÖBB, *Almanach 1969*, 13–27; GD ÖBB, *Almanach 1983*, 18–34; GD ÖBB, *Almanach 1984*, 18–35; GD ÖBB, *Almanach 1985*, 18–34; GD ÖBB, *Almanach 1986*, 19–35; GD ÖBB, *Almanach 1987*, 19–35.

83 Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1980*; Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1987*.

mained limited – often symbolic – a pattern mirrored at ÖBB:[84] between 1969 and 1975, core IT roles at ÖBB remained male-dominated, while more women entered auxiliary IT-related support functions; this broadened presence without shifting hierarchies.[85]

ÖBB's internal gender dynamics closely mirrored broader labor market patterns: women were significantly underrepresented in technical and leadership positions. Despite legal reforms and initiatives, traditional hierarchies remained largely intact. The spread of computerization reinforced these disparities, as automation reduced clerical jobs.

Taken together, the findings reveal a persistent and clearly structured gendered hierarchy within the IT workforce of the ÖBB General Directorate. While men held leadership and specialist roles with higher pay, women remained concentrated in lower- and middle-income administrative positions – reflecting entrenched gender norms both within the organization and in Austrian society at large. These patterns reproduced traditional divisions of labor and authority, even as public pressure for change intensified. Political initiatives, the second women's movement of the 1970s and 1980s, and legal reforms signaled growing awareness of systemic inequality. However, these discursive shifts were only partially reflected in institutional practice at ÖBB. The expansion of IT systems, rather than disrupting established hierarchies, tended to stabilize them.

Emotional responses to technological and social changes

The introduction of computerization at ÖBB elicited a range of emotional responses. Some employees welcomed technological change, appreciating its potential to streamline workflows and reduce repetitive tasks. Others expressed anxiety about job losses and the obsolescence of traditional skills. Oral history interviews conducted with former ÖBB staff – many active during the 1970s and 1980s – reveal a mix of enthusiasm and concern as they recalled adapting to digital tools and shifting workplace expectations.[86] One interviewee described how an Excel-based

84 Kutzner and Schnier, "Geschlechterverhältnisse in Digitalisierungsprozessen"; Österreichisches Bundeskanzleramt, *Verwaltungsreformbericht 1987*.

85 GD ÖBB, *Almanach 1969*; GD ÖBB, *Almanach 1970*; GD ÖBB; *Almanach 1971*; GD ÖBB, *Almanach 1972*; GD ÖBB, *Almanach 1973*; GD ÖBB, *Almanach 1974*; GD ÖBB, *Almanach 1975*; GD ÖBB, *Almanach 1976*; GD ÖBB, *Almanach 1977*; GD ÖBB, *Almanach 1978*; GD ÖBB, *Almanach 1979*; GD ÖBB, *Almanach 1980*; GD ÖBB, *Almanach 1981*; GD ÖBB, *Almanach 1982*; GD ÖBB, *Almanach 1983*; GD ÖBB, *Almanach 1984*; GD ÖBB, *Almanach 1985*; GD ÖBB, *Almanach 1986*; GD ÖBB, *Almanach 1987*.

86 Jahrbacher, Interview with Ferdinand; Interview with Emil; Interview with Franz and Josef. Teil 1; Interview with Franz and Josef. Teil 2. See also Heßler, "Technikemotionen," 3–8.

program reduced a full-time job to a two-day task, illustrating the efficiency gains of automation – "with the push of a button."[87] Others, however, voiced unease about the increasing complexity of administrative processes and a perceived loss of control over decision-making.[88] It is important to note that these interviews, conducted in 2023, reflect retrospective interpretations rather than real-time emotional reactions. Reported feelings of ambivalence, pragmatism, or uncertainty should be read as meaning-making narratives – shaped by hindsight, selective memory, and contemporary frames of reference.

Employee reactions ranged from "tech enthusiasm" to "tech anxiety."[89] Enthusiasts viewed automation as a chance to improve efficiency and take on more meaningful tasks. Skeptics, in contrast, feared job displacement and the erosion of valued skills. The rapid pace of digitalization added to the uncertainty.[90] However, these patterns should not be understood as fixed typologies. Several interviewees expressed both enthusiasm and concern – sometimes even within the same narrative. Rather than dividing neatly into "enthusiasts" and "skeptics," most accounts reflected a fluid mix of adaptation, pragmatism, and uncertainty, shaped by changing roles, institutional cultures, and personal trajectories.

These emotional responses, as revealed through interviews with former ÖBB employees, were shaped not only by individual perceptions but also by broader societal expectations and organizational cultures surrounding work and technology. Long-standing routines within the company intersected with generational differences in attitudes toward digitalization, producing a complex emotional landscape.[91] Established employees, accustomed to traditional workflows, often expressed skepticism about new technologies, viewing them as disruptive to familiar practices. In contrast, younger staff tended to be more open to innovation and embraced new systems as tools of increasing efficiency and enabling progress. This emotional spectrum significantly influenced how digitalization was received and implemented at ÖBB. Enthusiasm for technology fostered openness to change and empowered early adopters to champion modernization, whereas technology-related anxiety posed barriers to adoption and slowed integration.[92] Concerns

87 Jahrbacher, Interview with Franz and Josef. Teil 2.

88 Jahrbacher, Interview; Jahrbacher, Interview with Franz and Josef. Teil 1. See also Turek, "Planungs- und Realisierungsstand 1975"; Zeiller, "Das Personal-Informations-System der ÖBB"; Zelenka, "EDV-Projekt."

89 Heßler and Hitzer, "Introduction"; Heßler, "Technikemotionen," 2–8.

90 Heßler, "Technikemotionen," 2. See also Jahrbacher, Interview with Emil.

91 Heßler, "Technikemotionen," 25.

92 Heßler; Heßler and Hitzer, "Introduction"; Winker, *Büro. Computer. Geschlechterhierarchie*.

about job security, in particular, contributed to hesitation in fully embracing automation.[93]

Recognizing these challenges, ÖBB introduced training programs to familiarize employees with new systems. The company magazine also communicated the benefits of digitalization in a pragmatic, non-threatening tone.[94] While emotional management was not formally institutionalized, it became embedded in these pedagogical and communicative strategies – aimed at easing the transition and fostering a sense of inclusion in the modernization process.[95]

The following case studies from oral history interviews further illustrate the emotional diversity described above. These first-hand accounts illuminate how ÖBB staff navigated the shift from manual processes to digital systems – revealing their concerns, adaptations, and reflections on job security, satisfaction, and professional development within a changing institutional framework. Rather than sorting into clear-cut categories, some interviewees tended to shift between skepticism and engagement, depending on their institutional role, career stage, or the task at hand.

Emil began his career at ÖBB in 1978 as an "Amtsgehilfe" (administrative assistant) in the "Zentrale Personalstelle" (Central Personnel Office) of the General Directorate. His early tasks were largely manual and routine, including the distribution of internal mail and official documents. Demonstrating dedication and ambition, he took evening courses and passed the "Kanzlistenprüfung" (clerk exam), which allowed him to transition into more complex administrative responsibilities. Over the course of his career, he witnessed and experienced significant technological and structural changes that profoundly shaped his working life and emotional relationship with the organization.[96]

In the late 1980s and 1990s, ÖBB began implementing significant technological changes. Emil was directly affected – particularly by the introduction of computers and the transition from manual to electronic data processing. Although his status as a tenured civil servant formally ensured job security, regular pay increases, and a predictable career path, he nonetheless expressed growing unease. As automation

93 Jahrbacher, Interview with Emil; Interview with Ferdinand; Interview with Franz and Josef. Teil 1; Interview with Franz and Josef. Teil 2.

94 See ÖBB employee publications such as "ÖBB-Journal," "Der Betrieb,"and "Die ÖBB in Wort und Bild," and ÖBB "Verkehrs-Unterrichtsblatt" for contemporary discussions of technological change and internal communication strategies. See, e.g., Turek, "Planungs- und Realisierungsstand"; Zeiller, "Das Personal-Informations-System."

95 See the ÖBB employee newspapers (1970s–1980s) for discussions on workforce concerns about automation and resistance to digitalization. Oral history interviews (Jahrbacher, 2023) highlight employee anxieties regarding job security and skill adaptation.

96 Jahrbacher, Interview with Emil.

advanced, he began to question the long-term relevance of his role and felt increasingly uncertain about how his existing skills would align with emerging expectations. At the same time, Emil expressed a deep-seated loyalty to the ÖBB.[97] This tension between formal security and emotional insecurity emerged as a recurring theme in interviews with long-serving employees. While institutional protections shielded workers like Emil from the immediate economic consequences of restructuring, they offered little defense against the psychological strain of rapid technological change. His case illustrates how digital transformation could unsettle professional identity – even in the relative safety of the public sector.

In contrast, interviewee Josef experienced technological change as a welcome challenge and a chance for professional growth. He actively participated in training programs to learn the new systems – first the Nixdorf computers, later SAP software – and found the process both demanding and intellectually stimulating. As noted earlier, he developed an Excel program that cut a full-time task to two days, demonstrating how digital tools can boost efficiency and morale even as some colleagues perceived such gains as a threat to job security.[98]

Another example of adaptive behavior emerged in technical departments, where engineers and construction specialists increasingly assumed documentation tasks once delegated to clerical staff. As digital systems became more widespread, traditional role boundaries blurred, and employees were expected to acquire new technical competencies. This shift not only redefined workflows but also reshaped everyday work identities.[99]

Conversely, another interviewee offered a more nuanced perspective on job satisfaction and motivation. While job security was not explicitly addressed, the interviewee emphasized the excitement and fulfillment derived from engaging in innovative and challenging projects. Collaboration with national and international partners fostered a sense of pride and purpose, contributing to a generally positive emotional climate within the organization. Although concerns about job security were absent, the overall tone of the interview conveyed a strong sense of motivation rooted in the meaningful nature of work. This underscores the multifaceted character of employee emotions – where enthusiasm and professional fulfillment could, in some cases, outweigh latent insecurities.[100] Given that the interviews are male-skewed, they provide an incomplete picture. Contemporary documentation, including the 1985 Women's Report, indicates that women encountered a dual burden – loss of clerical tasks through automation and pressure to acquire technical

97 Jahrbacher, Interview with Emil.

98 Jahrbacher, Interview with Franz and Josef. Teil 2,

99 Jahrbacher, Interview with Emil.

100 Jahrbacher, Interview with Ferdinand; Jahrbacher, Interview with Emil.

competencies in male-dominated settings – highlighting the risk that digitization reproduced existing inequalities.[101]

One interview conversation about the historical evolution of HR systems at ÖBB offered valuable insight into the emotional dimensions of organizational change. The transition from customized mainframe systems to standardized SAP solutions marked not just a technical upgrade, but a broader cultural shift for the Austrian Federal Railways. While cost-effectiveness and efficiency were the official drivers of this change, employees recalled a range of emotional reactions. Concerns about job security reflected wider anxieties about the future of work in an increasingly digital environment. At the same time, many also expressed enthusiasm for the challenges and learning opportunities that modernization brought.[102] This emotional duality illustrates the complex interplay between technological change and employee sentiment, underscoring the importance of addressing emotional and gender-related concerns alongside operational goals in transformation processes.

By integrating the analysis of oral history interviews, we gain a more nuanced understanding of how technological change was experienced, interpreted, and negotiated within the Austrian Federal Railways. Employees' reflections on job security, shifting responsibilities, and evolving work environments reveal how digitalization reshaped not only workflows but also perceptions of professional identity and institutional belonging – these narratives reflect broader structural transformations and underscore the human dimension of organizational change. Viewed through the lens of innovation studies, the emotional responses observed during ÖBB's digital transition align with Joseph Schumpeter's concept of "creative destruction," which captures the disruptive nature of technological progress as innovation dismantles established routines and social structures, producing resistance and instability[103] – a dynamic evident in the experiences of employees like Emil, who expressed anxiety over the potential obsolescence of their skills. Likewise, Clayton Christensen's theory of the "Innovator's Dilemma" offers further context: established organizations often struggle to adapt to disruptive innovations because deeply rooted structures and mental models resist change;[104] in ÖBB's case, resistance to computerization stemmed in part from a bureaucratic culture built around hierarchical authority and manual processes.[105]

---

101 Cyba et al., "Heft 3," 53–57, 92–95; Feigl, "Heft 8," 16–19, 112.

102 Jahrbacher, Interview with Franz and Josef. Teil 1, Teil 2.

103 Schumpeter, "The Instability of Capitalism"; Schumpeter and Esslinger, "Entwicklung."

104 Christensen et al., "Disruptive Innovation"; Christensen, *The Ongoing Process*; Christensen, *Innovator's Dilemma*.

105 Republik Österreich, *Bericht des Rechnungshofes*, 6–10 (Abs. 20.1, 21.1, 21.2, 23.1.1, 23.1.4, 23.1.5, 23.2.1).

The introduction of computerization at ÖBB exemplifies the emotional complexity of technological transformation. While digital tools brought benefits in terms of efficiency and productivity, they also disrupted long-standing work routines and provoked widespread anxieties about job security. The contrasting experiences of employees like Emil and Josef underscore the subjective nature of these responses, as captured in oral history interviews. Their differing reactions were shaped by individuals' job roles, career paths, and institutional positioning – reflecting broader patterns of adaptation, ambivalence, and resistance within the workforce.

Conclusions

This chapter has examined the multifaceted transformation of the Austrian Federal Railways (ÖBB) between 1969 and 1991, focusing on how computerization – the rollout of EDP (EDV) and office IT systems – reshaped administrative practices, organizational structures, gender relations, and emotional experiences. Far from a purely technical or efficiency-driven process, the introduction of computer-based systems intersected with deeply rooted institutional routines and hierarchies. The case shows how technological change unfolds within historically embedded frameworks of labor, power, and identity.

ÖBB's computerization and the associated organizational digitalization formed part of broader moves toward market-oriented public sector digitalization and modernization, propelled by global economic pressures, European integration, and emerging digital standards. Management framed computerization as a rational strategy to improve transparency, reduce costs, and align with contemporary norms of performance and accountability. In practice, however, digitalization proceeded unevenly and generated tensions: organizational change often outpaced institutional adaptation, producing friction and ambivalence among employees asked to renegotiate roles and expectations.

A closer examination underscores the persistence of gendered labor structures within ÖBB's IT domains over nearly two decades. Technical EDP work remained male-dominated throughout the 1970s and 1980s, as indicated by personnel records and departmental hierarchies; women were concentrated in supportive and clerical roles, meaning computerization reinforced rather than challenged traditional gender allocations; and the expansion of IT systems did not translate into greater female representation at higher levels – indeed, in some cases restructuring linked to digitalization consolidated existing hierarchies, confining women to lower and middle ranks of the evolving organizational framework.

Emotional responses further reveal the affective dimension of organizational change. Oral histories register a wide spectrum – shaped by institutional culture, generational identity, and professional positioning. While younger or technically

engaged employees often welcomed computerization as a pathway to autonomy and strategic engagement, more senior staff – especially those in clerical or administrative roles – expressed uncertainty about future prospects, the value of their skills, and the loss of familiar routines.

These dynamics complicate dominant theories of innovation. Schumpeter's "creative destruction" and Christensen's "Innovator's Dilemma" illuminate why technological change destabilizes established systems, yet the ÖBB case demonstrates the limits of these models in accounting for persistent institutional cultures, social hierarchies, and emotional ambivalence. Computerization introduced disruption – but digitalization also stabilized or reinforced long-standing inequalities. In this context, innovation was as much about continuity as transformation.

Ultimately, computerization (EDP and automation efforts) at ÖBB reflects a characteristic pattern of late-twentieth-century public sector modernization: a drive toward efficiency and digital integration that coexisted with unresolved structural inequalities and the emotional weight of institutional change. Computer-based systems enabled workflow automation and supported the organization's digitalization through standardization and more centralized decision-making, yet they also reinscribed gendered divisions of labor and produced pervasive uncertainty. Modernization thus unfolded not as a clean break with the past, but as a layered and ambivalent process – combining innovation with institutional inertia, empowerment with marginalization, and hope with disorientation.

This analysis underscores the value of integrating social, emotional, and gendered perspectives into the study of technological change. Attending to how employees experienced, interpreted, and navigated computerization and digitalization clarifies not only institutional outcomes but also the human costs and contradictions of modernization. As public institutions continue to pursue digital strategies, the ÖBB case is a reminder that technological progress is never purely technical – it is always social, emotional, and political.

Bibliography

"108. Bundesgesetz: Gleichbehandlungsgesetz. BGBl. Nr. 108/1979." *Bundesgesetzblatt der Republik Österreich* (1979): 683–87.

"443. Konvention zur Beseitigung jeder Form von Diskriminierung der Frau samt Vorbehalten. BGBl. Nr. 443/1982." *Bundesgesetzblatt der Republik Österreich* (1982): 2079–101.

"825. Bundesgesetz zur Neuordnung der Rechtsverhältnisse der Österreichischen Bundesbahnen (Bundesbahngesetz 1992). BGBl. Nr. 825/1992." *Bundesgesetzblatt der Republik Österreich* 282 (1992): 4587–93.

Balbi, Gabriele, and Paolo Magaudda. *A History of Digital Media. An Intermedia and Global Perspective*. Routledge, 2018.

Bergmann, Nadja, et al. *Digitalisierung der Arbeitswelt – Auswirkungen auf ausgewählte Branchen in den Staaten Bulgarien, Rumänien, Serbien und Österreich*. L&R Sozialforschung, 2019.

Bettelheim, Leonore, et al. "Heft 5: Die Frau im Beruf." In *Bericht über die Situation der Frau in Österreich: Frauenbericht 1975*, edited by Österreichisches Bundeskanzleramt, 1975.

"Bundesgesetz: Beamten-Dienstrecht 1979. BDG 1979." *Bundesgesetzblatt für die Republik Österreich* (1979): 1557–628.

Carstensen, Tanja. "Ambivalenzen digitaler Kommunikation am Arbeitsplatz." *Aus Politik und Zeitgeschichte (APuZ)* 66, no. 18–19 (2016): 39–46.

Christensen, Clayton M. *Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press, 1997.

Christensen, Clayton M. "The Ongoing Process of Building a Theory of Disruption." *Journal of Product Innovation Management* 23 (2006): 39–55.

Christensen, Clayton M., et al. "Disruptive Innovation: An Intellectual History and Directions for Future Research." *Journal of Management Studies* 55, no. 7 (2018): 1043–78.

Cyba, Eva, et al. "Heft 3: Beruf." In *Bericht über die Situation der Frau in Österreich: Frauenbericht 1985*, edited by Österreichisches Bundeskanzleramt, 1985.

Doering-Manteuffel, Anselm, and Lutz Raphael. "Nach dem Crash. Vorwort zur 2. Auflage." In *Nach dem Boom: Perspektiven auf die Zeitgeschichte seit 1970*, edited by A. Doering-Manteuffel and L. Raphael. Vandenhoeck & Ruprecht, 2012.

Dornig, Raimund. "Vom Bundesbahndienstrecht zum Kollektivvertrag. Eine vergleichende Analyse der Dienstverhältnisse der ÖBB" (unpublished Diplomarbeit, Universität Linz, 2019).

Elster, Frank. *Der Arbeitskraftunternehmer und seine Bildung. Zur (berufs-)pädagogischen Sicht auf die Paradoxien subjektivierter Arbeit*. Diss., Hamburg University, 2006 (Theorie bilden 11). Bielefeld, 2007.

Feigl, Susanne. "Heft 8: Zusammenfassung." In *Bericht über die Situation der Frau in Österreich: Frauenbericht 1985*, edited by Österreichisches Bundeskanzleramt, 1985.

Flecker, Jörg. *Arbeit und Beschäftigung. Eine soziologische Einführung* (utb-studi-e-book 4860). utb, 2017.

Generaldirektion der Österreichischen Bundesbahnen (GD ÖBB), ed. *Almanach der österreichischen Eisenbahnen 1969. XXXVIII. Jahrgang*. Wien, 1969.

GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1970. XXXIX. Jahrgang*. Wien, 1970.

GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1971. XL. Jahrgang*. Wien, 1971.

GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1972. XLI. Jahrgang*. Wien, 1972.

GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1973. XLII. Jahrgang*. Wien, 1973.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1974. XLIII. Jahrgang*. Wien, 1974.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1975. XLIV. Jahrgang*. Wien, 1975.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1976. XLV. Jahrgang*. Wien, 1976.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1977. XLVI. Jahrgang*. Wien, 1977.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1978. XLVII. Jahrgang*. Wien, 1978.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1979. XLVIII. Jahrgang*. Wien, 1979.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1980. XLIX. Jahrgang*. Wien, 1980.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1981. L. Jahrgang*. Wien, 1981.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1982. LI. Jahrgang*. Wien, 1982.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1983. LII. Jahrgang*. Wien, 1983.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1984. LIII. Jahrgang*. Wien, 1984.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1985. LIV. Jahrgang*. Wien, 1985.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1986. LV. Jahrgang*. Wien, 1986.
GD ÖBB, ed. *Almanach der österreichischen Eisenbahnen 1987. LVI. Jahrgang*. Wien, 1987.
GD ÖBB, ed. *Geschäftsbericht der Österreichischen Bundesbahnen für das Jahr 1972*. Wien, 1972.
GD ÖBB, ed. *Geschäftsbericht der Österreichischen Bundesbahnen für das Jahr 1978*. Wien, 1979.
Gotto, Bernhard. "'Bürohengste,' 'Amtsfräulein,' Bürger? Geschlechterperspektiven auf Verwaltung in der bundesdeutschen Nachkriegsdemokratie." *Vierteljahrshefte für Zeitgeschichte* 69, no. 4 (2021): 733–41.
Hauer, Gerlinde. "Digitalisierung – Selbstläufer Richtung Gleichstellung? Von der Hartnäckigkeit geschlechtstypischer Zuschreibungen, dem Strukturwandel in wichtigen Frauenbranchen und der Chance sozialer Innovation." *WISO* 39, no. 4 (2016): 171–83.
Heßler, Martina. "Technikemotionen. Einleitende Überlegungen zur historischen Ko-Konstruktion von Technik und Emotionen." In *Technikemotionen*, edited by M. Heßler. Brill, 2020.
Heßler, Martina, and Bettina Hitzer. "Introduction: Tech-Fear. Histories of a Multifaceted Relationship/Einleitung: TechnikAngst. Zur Geschichte eines vielgestaltigen Verhältnisses." *Technikgeschichte* 86, no. 3 (2019): 185–200.
Holtgrewe, Ursula. *Schreib-Dienst. Frauenarbeit im Büro*. SP-Verlag, 1989.

Hürlimann, Gisela. *Die Eisenbahn der Zukunft: Automatisierung, Schnellverkehr und Modernisierung bei den SBB 1955–2005*. Chronos, 2007.

Jäggi, Therese. "Seit hundert Jahren unten. Geschichte der Frauen im Büro." In *Leben, lieben, leiden im Büro: Reportagen, Essays, Analysen, Geschichten und Glossen aus der sauberen Arbeitswelt*, edited by M. Fehr et al. Rotpunktverlag, 1991.

Jahrbacher, Nina. Interview with Emil. Wien, October 25, 2023.

Jahrbacher, Nina. Interview with Ferdinand. Wien, August 22, 2023.

Jahrbacher, Nina. Interview with Franz and Josef. Teil 1. Wien, August 7, 2023.

Jahrbacher, Nina. Interview with Franz and Josef. Teil 2. Wien, August 7, 2023.

Kaufmann-Buhler, Jennifer. *Open Plan. A Design History of the American Office* (Cultural Histories of Design). Bloomsbury, 2021.

Kreutzer, Susanne. "'Der Aufstieg findet nicht statt.' Frauen und Führungspositionen in der Gewerkschaft Öffentliche Dienste, Transport und Verkehr (ÖTV) in den 1950er und 1960er Jahren." *Mitteilungsblatt des Instituts für soziale Bewegungen* 35 (2006): 167–77.

Kuntscher, Helmuth, "Die Bedeutung der Österreichischen Bundesbahnen für den Arbeitsmarkt in Wien." *ÖBB-Journal* 1 (1981): 15–17.

Kutzner, Edelgard, and Victoria Schnier. "Geschlechterverhältnisse in Digitalisierungsprozessen von Arbeit. Konzeptionelle Überlegungen und empirische Fragestellungen." *Arbeit* 26, no. 1 (2017): 137–57.

Mesch, Michael. "Automatisierung und Beschäftigung: Ein Rückblick aufs 20. Jahrhundert." A&W blog (2016). https://awblog.at/automatisierung-und-beschaeftigung-ein-rueckblick-aufs-20-jahrhundert/.

Mesch, Michael. "Editorial. Automatisierung und Beschäftigung. Makroökonomische Zusammenhänge und politische Gestaltungsspielräume." *Wirtschaft und Gesellschaft* 42, no. 1 (2016): 3–18.

Morf, Isabel. "Durchsatz erhöhen, Backlog abbauen! Das Katalogisierungsbüro stellt um." In *Leben, lieben, leiden im Büro: Reportagen, Essays, Analysen, Geschichten und Glossen aus der sauberen Arbeitswelt*, edited by M. Fehr et al. Rotpunkt, 1991.

N.N. "8. März 1975 – Tag der Frau." *ÖBB Verkehrs-Unterrichtsblatt* 1 (1975): 6.

N.N. "15. An vermeidbare Kosten denken!" *ÖBB Verkehrs-Unterrichtsblatt* 4 (1969): 29–30.

N.N. "Fahrdienstleiterausbildung." *Der Betrieb (Informationsblatt der Betriebsdirektion)* 2A (1987): 2–3.

N.N. "Frauen am Zug." In *Das Buch der Bahn: Geburtstagsausgabe 1987*, edited by Österreichische Verkehrswerbung GesmbH, 1986.

Nobel, David. "Social Choice in Machine Design: The Case of Automatically Controlled Machine Tools." In *Case Studies on the Labor Process*, edited by A. Zimbalist. Monthly Review Press, 1979.

Oppen, Maria. *Zukunft der Büroarbeit – Frauenarbeit mit Zukunft?* (WZB Discussion Paper FS II 89–204). WZB, 1989.

Oppen, Maria. "Zukunft von Frauen im Büro – zur arbeitspolitischen Gestaltung geschlechtsspezifischer Erwerbschancen." In *Frauen und Ökonomie: Dokumentation zur Ringvorlesung im Wintersemester 91/92 an der Freien Universität Berlin*, edited by C. Färber and D. Schäfer, 1992.

Österreichische Bundesbahnen. *Unternehmenskonzept 1975–1985*. Wien, 1975.

Österreichisches Bundeskanzleramt, ed. *Bericht der Bundesregierung über Maßnahmen zur Verwaltungsreform in den Jahren 1975–1980 (Verwaltungsreformbericht 1980)*. Beilage zu den Sten. Prot. NR XV.GP. Wien, 1980.

Österreichisches Bundeskanzleramt, ed. *Bericht der Bundesregierung über Maßnahmen zur Verwaltungsreform in den Jahren 1981 bis 1986. (Verwaltungsreformbericht 1987)*. Beilage zu den Sten. Prot. NR XVII.GP. Wien, 1987.

Österreichisches Bundeskanzleramt. *Elektronische Datenverarbeitung im Bundesbereich. EDV-Bericht 1978*. Bericht der Bundesregierung an Nationalrat und Bundesrat. Beilage zu den Sten. Prot. NR XIV.GP. Wien, 1978.

Pucher, Josef. "Elektronische Datenverarbeitung im Großbetrieb." *Der Eisenbahner* 5 (1971): 16.

Pucher, Josef. "Teamarbeit in der Datenverarbeitung." *Die ÖBB in Wort und Bild* 9 (1971): 24–31.

Puwein, Wilfried. "Erfolge der ÖBB-Reform 1992." WIFO Monatsberichte 9 (2001): 567–79.

Republik Österreich, ed. *Bericht des Rechnungshofes über die Durchführung besonderer Akte der Gebarungsprüfung betreffend die Organisation der Österreichischen Bundesbahnen. ZI 810-Pr/84*. Beilage zu den Sten. Prot. NR XVI.GP. Wien, 1984.

Schumpeter, Joseph. "The Instability of Capitalism." *The Economic Journal* 38, no. 151 (1928): 361–86.

Schumpeter, Joseph, and Hans U. Esslinger. "Entwicklung" (2002). URL: https://schumpeter.info/schriften/Entwicklung.htm.

Turek, Günther. "Planungs- und Realisierungsstand 1975 des EDV-Projekts 'Informationssystem Güterverkehr.'" *Die ÖBB in Wort und Bild* 12 (1975): 9–17.

Williams, Robin, and David Edge. "The Social Shaping of Technology." *Research Policy* 25, no. 6 (1996): 865–99.

Winker, Gabriele. *Büro. Computer. Geschlechterhierarchie. Frauenförderliche Arbeitsgestaltung im Schreibbereich*. Leske+Budrich, 1995.

Zeiller, Dietfried. "Das Personal-Informations-System der ÖBB." *Die ÖBB in Wort und Bild* 3 (1975): 4–11.

Zelenka, Rudolf. "EDV-Projekt 'Personal-Informationssystem (PERSIS).'" *ÖBB-Journal* 2 (1979): 5–10.

The end of the typing pool: New technologies, old stereotypes, and emotional reactions to workplace change in British print media

Helen Glew

In 1993, the country singer Mary Chapin Carpenter released the song "He Thinks He'll Keep Her." Already well-known for hits such as "Passionate Kisses" and "Down at the Twist and Shout," "He Thinks He'll Keep Her" was the sixth hit from Carpenter's fourth album *Come On, Come On*, which has now sold over 3 million copies.[1] The song is essentially the story of an underappreciated woman, married at a young age, who spends her life being a wife, caring for children, conducting the emotional labor of running a household and bending to her husband's every whim. The song, with the double meaning of "keep" (as in "keep her" financially, and "keep her" as in her continuing to be his wife), charts her eventual liberation from her husband and the stay-at-home life in which she was taken for granted. She begins a job in the typing pool, for which she receives minimum wage, and the song presents this as a positive development: the entry-level nature of the job, and all that the typing pool implies about repetition, is portrayed as preferable to her life of the previous sixteen years.

Carpenter's song gets at the paradox of the typing pool as a site of women's employment. In the relatively limited range of white-collar employment options for women who were not university graduates or who had not had further specialized training in the later decades of the twentieth century, the typing pool – a centralized room or section of typists which provided services across an entire company – was alternately portrayed as the best "non-professional" employment women could get, but also as a "dead-end" from which only an exceptionally lucky few could rise.

Carpenter's song uses the typing pool as a symbol of personal and economic liberation and is one of very few cultural texts to present the typing pool positively. Strikingly, however, by the time the song was released in the early 1990s, typing pools were disappearing. Although a few would endure later into the 1990s, typing pools

1 Mary Chapin Carpenter, "He Thinks He'll Keep Her," from *Come On, Come On*, Columbia Records (1993). Music and Lyrics by Mary Chapin Carpenter and Don Schlitz.

in larger firms had gradually been replaced by the advent of word-processing technology and, later, by the desktop computer. However, such was the strength of the stereotypes and tropes surrounding the typing pool that they persisted in discussions of women's work and white-collar work for the next decade or more, as well as remaining a short-hand for monotonous, repetitive, thankless work and a whole host of other assumptions. The end of the typing pool – denigrated though it was as a space and a structure – was such a visible and tangible sign of the sea change of technological progress that it generated significant comment and became a way for onlookers to grapple with the wider meanings of technological change, labor processes, and gendered work. Such commentary in some cases belatedly recognized typing as a skill, or considered the work in the context of wider businesses processes more seriously than previously. The continued references to the typing pool also suggested a fixity of association between women, typing work, and subordinate positions in the office. In this way, it functioned as a symbol of an imagined static past in a current world which was presented to readers as changing rapidly.

The focus of this chapter is what might be termed the "long moment" of the dismantling of the typing pool in Britain, as the computer gradually reshaped office work and called into question the normalized existence of a female staff dedicated to typing. As we will see, although the popular perception was often that the typing pool vanished very quickly, the process happened at differing speeds in different workplaces. Nevertheless, with the change – and, crucially, often *in anticipation of* the change – there was much commentary in the press and other public arenas about what it would mean and the impact it would have. Discussions focused on what the workplace might look like – sometimes quite literally with the space of the typing pool gone – and how new and more advanced technologies might change particular processes. There was some discussion occasionally of what this could mean for women's white-collar employment in terms of new opportunities and the ability to move to other types of work with greater responsibility and variety, but this remained peripheral to the range of emotions expressed about new technology and change more broadly.[2]

This chapter draws on discussions of the end of the typing pool in newspapers, magazines, and other public fora in order to capture the extent and range of reactions. These discussions in turn drew on commentaries from industry and elsewhere in the media, functioning as part of the "cultural circuit" in creating a loop of commentary, meaning that many representations of the typing pool were reliant on, and built on, pre-existing and long-established embedded ideas of what the typing pool

2 Trade unionists and feminist scholars did comment on these issues and were particularly concerned about the potential for female unemployment. See, for example, Morgall, "New Office Technology"; Tijdens, "Behind the Screens."

was.[3] Of particular interest here are newspapers (both daily national papers and the local, usually weekly, press), general-interest magazines, and women's magazines (with those considered here being monthly in frequency and aimed broadly at middle-class women under the age of around forty-five). The digital versions of these publications were searched in order to more easily identify passing references to "the typing pool" in articles, features, and advertisements where it might not have been obvious from the title or focus that there would be a reference. Such a method allows the finding of an incidental comment or the stray or unlikely metaphor and allows for a richer understanding of how the typing pool was perceived and conceptualized in its twilight years. It also allows us to discover the extent to which the idea of the typing pool persisted long after its demise and obsolescence, and how, as a gendered and somewhat classed occupation, it pervaded discussions about the negatives of the workplace in particular. The chapter also considers the appearance of the typing pool in responses to the UK's Mass Observation Project (MOP), begun in 1981.[4] MOP gathered written answers to questions on a wide variety of social and cultural issues from its panel of volunteer respondents. Although respondents were self-selecting and tended toward the educated and middle-class, and were often left-leaning politically,[5] the responses help to highlight the embedded understandings of the typing pool in the public consciousness and the ways in which these reflected and built on media messages. Digital searching of MOP's archives allows for the discovery of references to the typing pool in responses related directly to women's work but also in responses to questions that would not at first glance appear to have any relevance at all.

This chapter contributes to growing scholarship on work, gender, society, and technology at the very end of the twentieth century. There is, in general, still very little historiography on women's white-collar work post-1945 in the British context, especially when compared to the range of scholarship which exists for the late nineteenth and early twentieth centuries, although the field for post-1945 work is growing, with important interventions in recent years by Laura Paterson, Laura Carter, and Eve Worth, amongst others.[6] Mar Hicks' work importantly highlights the depths

3 For a discussion of the operation of the "cultural circuit", see Summerfield and Peniston-Bird, *Contesting Home Defence*, 13–14.

4 The Mass Observation Project (MOP) is a revival of the Mass Observation social research organization originally begun in Britain in 1937. It was wound down in the early 1950s and then reinstated as the Mass Observation Project in 1981.

5 Hinton, "Seven Late Twentieth Century Lives," 96; Hinton, *Seven Lives from Mass Observation*.

6 On women's white-collar work pre-1945, see Zimmeck, "New Woman in the Machinery of Government"; Zimmeck, "Marry in Haste, Repent at Leisure"; Zimmeck, "Strategies and Stratagems"; Glew, *Gender, Rhetoric and Regulation*. On the post-1945 situation, see Worth and Paterson, "How Is She Going to Manage?"; Carter, "The Hairdresser Blues"; Worth, *Welfare State Generation*.

of gender discrimination in computing and the ways in which women were increasingly excluded as the power of computing became more evident.[7] Writing on the United States, Allison Elias has noted the vast number of women who worked in white-collar employment in this period and it is, she identifies, precisely because of the ubiquity of this work that these occupations for women have remained largely under the radar of historical analysis.[8] In some contexts the fluid relationship between secretaries and typists and the malleability of the boundaries between the two – secretaries typed, of course, but they also did much more – has meant that the discussions of both have become somewhat intermeshed in the historiography; what is true for secretaries is not always true for members of the typing pool and vice versa. As Michelle Murphy has remarked, "[t]he personal secretary's intimate relationship with management; the valuing of middle-class social skills and dress, and her varied tasks stood in stark contrast to the work of the 'girls' operating office machinery in typing pools or at switchboards."[9] Likewise, although there is a significant historical literature on technological change and its impact on society, there is currently less of this for the dawning of the desktop computer age and what it meant for the typing pool. Much of the extant literature on the end of the typing pool and the advent of word processing is by sociologists researching and writing contemporaneously; there is little by historians reappraising this moment from a later vantage point.[10] This chapter, then, offers contributions to the histories of white-collar work, to women's work, to histories of reactions to technological change, to histories of the 1980s and 1990s, and the role of the media as a discursive space for images of gendered work to be reiterated and maintained.

We begin with the history of typing as an occupation for women and the development of the typing pool in Britain. The chapter then examines print media coverage of the development of new technologies and the disappearance of typing pools, analyzing in particular how these developments were conceptualized and the range of emotions expressed. The chapter argues that the strength and persistence of negative emotions about the typing pool is particularly revelatory about attitudes to gender and work but that, within these, there are glimpses of other emotions such as curiosity and excitement, as well as nostalgia for an apparently less-complicated past. There was also some belated acknowledgement of the skill and individuality of the typist herself.

---

7 Hicks, *Programmed Inequality*.

8 Elias, *Rise of Corporate Feminism*, 7–8.

9 Murphy, *Sick Building Syndrome*, 46.

10 On sociological work, see, for example, Golding, "Problems in the Concept of Secretary"; Tijdens, "Behind the Screens"; Wajcman, "From Women and Technology."

Typing as women's work and the emergence of the typing pool in early-to-mid twentieth-century Britain

Whilst typing pools as a specific means of organizing typing work had not existed until the 1930s in Britain, women had been employed as typists since the 1870s and historians have noted how this very quickly became an almost entirely female profession.[11] By the 1980s, there was therefore approximately a century of this work being very specifically women's work, and half a century or so of the typing pool as a physical space and organizing structure to contain these women in workplace hierarchies.

It is not possible to precisely date the creation of typing pools in Britain as the idea seems to have been picked up from the USA and transported into individual firms piecemeal, but a search of the *British Newspaper Archive* database provides a useful proxy. Articles in 1934 point to the existence of typing pools in York and a 1936 article reports discussion of the establishment of a typing pool at Reigate Town Hall in Surrey.[12] In the following two decades, typing pools became ubiquitous in firms and offices of all sizes. Although typing pools varied according to company size, the central idea was that the typing services across a company – or at least across several departments within a company – were "pooled," meaning that whichever typist was next available would undertake a requested typing task. The belief was that this made the production of typed documents faster and avoided the under-use of typing staff time that would occur were they permanently allocated to particular teams or individuals. The typing pool set-up thus tended to create a high-pressure environment. Workers had very little personal space and autonomy over their work and the work itself was often repetitive and unvaried. In the late 1960s, the sound level in a typing pool was measured at 65 decibels. For comparison, a vacuum cleaner was measured at 69 and being inside a small sports car going 50 miles per hour was measured at 75.[13]

---

11 There is a significant literature on women as typists and shorthand typists in this period. See, for example, Keep, "Blinded by the Type"; Thurschwell, "Supple Minds and Automatic Hands"; Zimmeck, "New Woman in the Machinery of Government"; Zimmeck, "Mysteries of the Typewriter."

12 "Manageresses etc Wanted," *Yorkshire Post and Leeds Intelligencer*, April 20, 1934; "Reigate Economy Committee Proposed," *Surrey Mirror*, April 3, 1936.

13 *The Economist*, March 22, 1969, 67. In 1957, an advertisement for Newalls Insulation Co. claimed that typing pools with plaster walls absorbed only 2% of the sound generated. See *The Economist*, May 25, 1957, 660. For other safety concerns, see "Dangers of Typing Pool Life," *Liverpool Echo*, August 4, 1970. See also Murphy, *Sick Building Syndrome.*

Perceptions and realities of the typing pool

Owing to how it functioned, members of the typing pool were often seen as interchangeable rather than as individuals with some kind of control over their work – a perception which had also been typical for telephonists and filing clerks, and for workers in a range of blue-collar jobs.[14] The typing pool was a significant source of female employment and was simultaneously perceived as a respectable occupation for working-class women to aspire to whilst also being seen as unfulfilling work and as an occupation undertaken by those with low aspirations.[15] The latter notion was also complicated by the fact that there were so comparatively few careers truly open in practice to graduate women or women who had stayed in full-time education to the age of eighteen: therefore, the typing pool for many years had been a site of cross-class employment for women.[16] It was also a site of employment that could be embodied with different meanings: whilst the lack of prospect of advancement in the job might have been keenly felt by some women, or the work perceived as "beneath" them by others in their social circle, the differentiation between white-collar and blue-collar employment that the typing pool symbolized could be of paramount importance for other women. It was also a site of employment for women of all ages, but the language of "girls" referred both to the perceived youth of the majority of the workers and was also a tool of infantilization. Race and ethnicity were also important in women's experiences of the typing pool. Typing pools in all anglosphere nations were overwhelmingly white in the middle decades of the twentieth century, though, as scholars point out for the US context, one of the significant gains of the civil rights movement was the right of women of color to enter white-collar workplaces which had been largely previously closed to them.[17] Thus, for them, joining the typing pool could be a moment of progression and economic and employment liberation. Bryan, Dadzie, and Scafe also point to the fact that in Britain, Black and Asian women were granted space in typing pools and office work more widely just at the very moment of technological change in the 1980s, but that work involving the newer

14 Glew, *Gender, Rhetoric and Regulation*, 16–63; Fremlin, *War Factory*.

15 See, for example, "A Choice of Styles for the Office," *Mansfield and Sutton Recorder*, October 21, 1982.

16 The lack of real opportunities for women which were not typing or hairdressing is widely discussed in the historiography on careers from the 1930s onwards. See, for example, Carter, "The Hairdresser Blues"; Spencer, *Gender, Work and Education*. This was also observed by women themselves. For example, a woman born in the 1920s told MOP that "unless you were dedicated to going to university … you were likely to be advised to do secretarial work, which you were led to believe could lead to all kinds of interesting jobs but which in practice landed you in the typing pool." MOP, 1991 Spring Directive, F, born 1920s, South-West England.

17 Elias, *Rise of Corporate Feminism*, 36–37; Murphy, *Sick Building Syndrome*, 55.

technologies remained effectively closed to them.[18] Jessica White's recent work emphasizes that clerical work was often a positive work choice for Black women in Britain, particularly those who were second-generation migrants, but that racism meant it remained difficult for them to enter or to then progress in the sector.[19]

The ability to type – precisely because it was designated as "women's work" and was often done by women as a full-time occupation – was generally vastly underrated as a skill.[20] The denigration of typing work, and more particularly the typing pool as a specifically female site for this work, was the latest installment in a long history of denigrating women's work because it was work done by women.[21] The women-only nature of the work was also seen to justify lower pay and to be less important than work done by men.[22] Furthermore, because it was a process that relied on dexterity of the fingers and accuracy in a repetitive process, it was seen, to a certain extent, as manual labor (although clearly, like much other manual labor, it required significant concentration and attention to detail to avoid mistakes).[23] Indeed, the set-up of the typing pool as a function to deal with the ebbs and flows in the demand for typing work might be seen as a production line for typed documents and was part and parcel of what Juriaan van Meel has identified regarding offices appearing more like factories by the 1970s.[24] Stereotypes persisted that typing pool work was easy, unskilled or – presumably because it involved working with machinery – a mechanical process involving little or no thinking on the part of the worker. One journalist born in the 1950s told the MOP, during an answer to a question about the pace of life, that she did "sometimes think how wonderful it would be to be, say, on a supermarket check-out, doing something quite mindless and without respon-

18 Bryan et al., *Heart of the Race*, 51.

19 White, "Black Women's Work," 519–543.

20 For a discussion of scholarship on the under-valuing of skill in women's work, see Moss, *Women, Workplace Protest*, 5.

21 The literature here is significant. See, for example, Zimmeck, "Jobs for the Girls"; Boston, *Women Workers and the Trade Unions*; Galvan, *Sympathetic Medium*; Mullin, *Working Girls*; Glew, *Gender, Rhetoric and Regulation*; Glew, "Maiden, Whom We Never See."

22 Boston, *Women Workers and the Trade Unions*, 251; Wigham, *From Humble Petition to Militant Action*, 130–32.

23 It is less prevalent in this period but when typing (or typewriting, as it was then called) emerged as mass employment for women, there was significant discussion about whether women were "just" typing without really taking in the material they were reading, or whether they were also cognizant of the material and could think about it and learn from it. Keep, "Blinded by the Type"; Thurschwell, "Supple Minds"; Galvan, *Sympathetic Medium*; Mullin, *Working Girls*.

24 Van Meel, "Origins of New Ways of Working," 362–63. For an example of an organization wanting the typing pool to function even more like a factory, see "Enquiry Urged into Council Administration," *Birmingham Post*, May 3, 1960.

sibility. Or a secretary in a typing pool."[25] Although the typing pool reference is in a new sentence (and is an interesting example of the blurring of roles of secretary and typist), the inference is that this occupation came to her as she was composing her answer and thinking about other jobs where there was, apparently, no responsibility and where the worker could "switch off." Finally, as the typing pool was the site in each office space which was usually almost entirely feminine, it was also perceived as a space in which young, pretty, and impressionable women were located.[26] Typing pools were thus seen, largely by outsiders, as sites of gossip, "bitchiness," and where the male gaze was sanctioned.[27] These perceptions then became cemented and the typing pool became a shorthand for frivolity, inattention to work, and, potentially, malicious conversations in the office.

Despite the various nuances, and differences in identity and the pluralities of experience amongst typists, the typing pool in popular culture was also uniformly positioned as something women must be desperate to escape. The women's liberation movement of the 1960s and 1970s, especially in the USA, pointed to the fact that the typing pool was often not women's choice of employment (a point which also irritated those women for whom it was a positive choice and for whom the work was a source of pride) but it was somewhere they ended up because of the structural discriminations in place for women as workers.[28] However, the notion that the typing pool was somewhere from which to escape had been solidified over decades, no matter that it might be fulfilling work for some of its workers, or that the work being done required significant skills, concentration, and attention to detail.[29] Tropes about the typing pool as a "dead end" and something for women to avoid at all costs were well-established and ever-present by the mid-twentieth century in Britain in both women's magazines and in print culture more widely. In 1964, for example, an advert for the Women's Royal Army Corps (WRAC) suggested that if women were feeling stuck in the typing pool or were "the oldest girl in the typing pool" they could

25 MOP, 1992 Spring Directive, J1549, F, born 1950s.

26 For a discussion of ageism and employers realizing the value of older and more experienced women in the typing pool and secretarial work more widely, see "Sandra Chapman's Column," *Belfast Telegraph*, May 22, 1973.

27 See, for example, Chris Welles, "Male Menopause," *Cosmopolitan*, July 1973, 94–97; Janet Herrtage, "Rubble, Bubble, Toil and Trouble," *She*, January 1976, 19; Joan Burnie, "Whatever Happened to the Mistress?," *Cosmopolitan*, March 1979, 168. See also the cartoon by Bernard Cookson, "With Your Wife, Parker – not Miss Trimbody from the Typing Pool!," *Evening News*, October 1, 1975.

28 Elias, *Rise of Corporate Feminism*, 32–36.

29 Katie Hindmarch-Watson, for an earlier period, notes how personal service work, such as typing and document-production, required specific knowledge and abilities but that this implicitly had to remain hidden. Hindmarch-Watson, *Serving a Wired World*, 7.

join the WRAC instead.[30] In 1970, Hoover, the vacuum cleaner and household appliance company, announced that it had abandoned its typing pool, gleefully titling an advertisement "Who Hates Typing Pools?" and clearly hoping that this would be persuasive enough to attract applicants.[31] *She* magazine in 1972 referred to women being "fed up to the teeth with a dead-end typing pool routine."[32] A *Cosmopolitan* profile of journalist Shirley Lord in 1976 used the language of battle and described her as "having fought her way up from the typing pool," a way of framing a female life story that was very common.[33] It is also telling that women's magazines frequently repeated the tropes of the typing pool as being among the worst places to work, rather than ever thinking about their readers as potential holders of positions in typing pools, which, given the ubiquity of the typing pool and the barriers to entry for other types of administrative or managerial work for women, was likely to be the case for some of their readership.[34]

Although its function remained largely the same over its lifetime, the technology of the typing pool evolved. Changes in technology for copying documents, for example, meant that numbers of staff needed in a typing pool could be reduced from the late 1950s.[35] Electronic typewriters gradually replaced manual ones. In the 1970s, as audio technology improved and Dictaphones became widely available, many typing pools switched gradually to a mix of shorthand or copy-typing (essentially typing up from shorthand notes or longhand drafts) and audio-typing (typing from an audio recording).[36] One MOP respondent noted in 1981 that after a period of time out of the Civil Service to nurse her husband, she had not been able to return to her former

30 *Sunday Mirror*, September 6, 1964.

31 The advert ran in a number of publications. See, for example, *Harrow Observer*, February 13, 1970, 40.

32 Janet Barber, "And a Good Job Too!," *She*, January 1972, 26–27.

33 Catherine Stott, "What it Takes to Get to the Top and Stay There," *Cosmopolitan*, August 1976, 47. There were other stories of successful women, from time to time, presented as having escaped the typing pool. See, for example, the story of the novelist Barbara Taylor Bradford in "I've Always Had a Head for Writes," *Daily Mail*, July 16, 1998, 29.

34 In addition to the examples given above, see also the following *Cosmopolitan* articles in particular. Hazel Evans and Anne Lambton, "How to Trap a Rich Man – and Keep Him for as Long as You Want," *Cosmopolitan*, July 1972, 92–94, 127, 131; Judith Krantz, "How to Cope Realistically with Change," *Cosmopolitan*, January 1976, 56–57, 61, 113; Nancy Foy, "Money: How to Earn More," *Cosmopolitan*, September 1979, 138–39, 141. There was one article across this period that was about how to effect positive change: Dinah Hall, "You Too Could Have Any Office Like This!," *Cosmopolitan*, April 1980.

35 See, for example, "Machinery Halves a Government Typing Pool," *Birmingham Daily Post*, February 24, 1959.

36 "RVH Out-patients' Clinic Will End Waiting," *Belfast Telegraph*, August 13, 1968; "Burgh to Streamline its Departments," *Wishaw Press*, February 7, 1969; "Typing Pool," *Harrow Observer*, May 8, 1970.

typing pool job because the typing pool now solely undertook audio typing and she was, as she put it, "totally deaf."[37]

These changes in typing pool technology took place alongside the emergence of computing possibilities. Indeed, data processing (and its necessary corollary, data entry) became a significant feature of workplace operations, alongside the possibilities for partial automation of document production afforded by word processors and the growing prevalence of both computer hardware and software.[38] The typing pool thus coexisted with technological change elsewhere in office work, and, importantly, women were employed as users of many of these technologies, meaning that their typing skills were being combined with other skills more specific to these new technologies.[39] However, such was the power and embeddedness of a static, timeless image that these more gradual shifts were less clear to outsiders.

The trope of the typing pool and reactions to technological change

What happened, then, to the tropes and engrained cultural ideas about the typing pool as the direction of technological change meant that there was no longer a need for it? Owing to its ubiquity in the workplace and, just as importantly, in cultural understandings of white-collar work, the typing pool as an idea featured in discussions of future technologies and offices, even if that featuring was in the negative and was used as a distancing measure. Many of the print media discussions about the end of the typing pool and the coming of the computer age constituted, and built on, negative perceptions of the typing pool. Notably, too, as the mainstream press covered technological transitions there was some recognition that typing itself was a skill and in fact the base skill for many aspects of word processor and personal computer operation. There was some interesting but very preliminary discussion of how the abandonment of the typing pool might affect women's employment. Strikingly, once typing pools had fundamentally disappeared, there was some nostalgia and even romanticizing in some of the depictions, even if the typist herself was still maligned or caricatured. There were, then, interesting shifts but ultimately the culturally imagined figure of the typist in the typing pool adhered to the long-established negative trope, particularly as she became a historical figure rather than a feature of the contemporary moment.

---

37 Mass Observation Project, 1981 Royal Wedding Directive, C133, Female, South-East England, response to "General" section.

38 Haigh, "Remembering the Office of the Future." For a discussion of this in the West German context, see Schlombs, "Built on the Hands of Women."

39 Hicks, *Programmed Inequality*.

As word processors and then the personal desktop computer emerged, there were all kinds of discussions about efficiency and productivity. There was evidence by 1979 that word processors saved on costs in the typing pool but, at the same time, companies found that savings and efficiency were not as great as they wished if new technology was introduced too quickly and without proper thought.[40] The capability to edit documents on-screen and then to save and replicate them meant that word processors were initially attractive to businesses. However, as some reporters noted, improving the productivity of the typing pool was not actually that important in cost-efficient terms, precisely because typists were the lowest-paid clerical workers. Furthermore, businesses soon realized that much of their outgoing mail, or at least follow-up mail to an initial letter, needed customizing, so the reproducibility of documents via word-processing packages was less important than it initially seemed.[41] Others realized that gathering the data to decide whether to change the typing pool fully over to word processors at this stage would take more time and money at the outset than was wise to spend.[42] There was also discussion about how to manage staff numbers when introducing technology, essentially making sure that staff were either not left with nothing to do or that they were not dismissed or assigned to a new role too quickly. Throughout the very late 1970s and 1980s, too, there was periodic coverage of firms either with too many typists or with too few and struggling to recruit, pointing to the sense of flux and the difficulties with timing in reshaping the workforce.[43] It was a notable feature of this reporting that readers were assured that fears about, or sadness on behalf of, staff potentially being made redundant were emotions that they did not have to feel. Articles were quick to tell readers that staff reductions could be ensured through processes such as "natural wastage," a not particularly palatable business term which referred to staff choosing to leave.[44] The gender of the staff here was paramount, too, in discussions of wastage: although the marriage bar had disappeared from women's employment contracts several decades before, there was still a cultural expectation which aligned womanhood with wifehood and motherhood and which meant some women might leave employment at

40 "Electronic Post," *The Economist*, August 4, 1979, 76–77; Golding, "Problems in the Concept of Secretary," 106.

41 "Word Processors: It Won't sit on Your Knee," *The Economist*, June 4, 1977, 128.

42 "Word Processors," 128; "Last Word for the Word Processor," *The Economist*, July 25, 1981, 83.

43 See, for example, Peter Morris, "Too Many in Typing Pool: Civic Centre 70 per Cent Overstaffed – Report," *Newcastle Evening Chronicle*, May 7, 1980; John Reynolds, "Crisis in the Civic Centre Typing Pool," *Uxbridge and West Drayton Gazette*, September 11, 1986.

44 See, for example, "Meet the New-Look Typing Pool: The Key to Saving Cash and Time," *Coventry Evening Telegraph*, May 12, 1978. For a story on the US making the same point, see Jack Hayes, "Computers Engine of Clerical Change," *Chicago Tribune*, March 18, 1990.

least temporarily when they married or were expecting a child.[45] More widely, the assertion that female unemployment was not a concern should not, of course, be taken at face value. It is currently unclear, and indeed hard to determine, how many typists in typing pools were made redundant versus being redeployed or retrained for other roles. As Natalie Thomlinson has pointed out, too, in amongst the emotional heft of (often working-class) male unemployment in this period, female unemployment was far less visible, and it was often hard for the wider public to recognize women's loss of jobs *as unemployment* in the same way as men's was, something which was reinforced by the UK government narrowing how it categorized women's unemployment in the 1980s.[46]

Press coverage went into some detail about new features of workload and team management with new technologies. In 1979 the *Newcastle Evening Chronicle* featured an advertorial about the "Thought Tank 193" which allowed typists to type up dictated text whilst recording was still ongoing. Strikingly, in relation to notions of productivity and efficiency, readers were told that the "supervisor has a full statistical picture of the work going through the typing centre" allowing the supervisor to understand "how each typist [was] coping."[47] This suggests an acknowledgement of the demands of the work, the process of interaction between technology and operator, and an emotional understanding of pressure. The monitoring of a typist's progress was not new in the sense that typing pool supervisors had always overseen and allocated work, but the framing of it in this manner suggested a more futuristic, technology-enabled understanding of a typist's ability to respond to the workload demands made of her.

Likewise, there were numerous articles which marveled at the document-production speed of word-processor technology in the instances where the bulk of the text was uniform and there needed to be only minor customizations for individual recipients. In May 1978, the *Coventry Evening Telegraph* ran a story headlined "Meet the New-Look Typing Pool: The Key to Saving Cash and Time." It reported on the installation of an IBM System 6:

> A computerised machine which types at 1,100 words a minute has proved a big success for a Coventry firm of solicitors.
> It can do the work of 10 typists and, in the nine months it has been working, has become an indispensable time and money-saver. …
> Although the system is highly sophisticated, it is comparatively simple to use.

45 Glew, "A New Phase of Activism," 545–63. Adequate childcare was also a factor in this decision. See McCarthy, *Double Lives*, 323–83.

46 Thomlinson, "Women and Unemployment."

47 "The Office of the Future: What's Going on in the Typing Pool?," *Newcastle Evening Chronicle*, September 17, 1979. See also "How Unilever Cut the Typing Pool," *West Briton and Cornwall Advertiser*, February 28, 1980.

> Much of the firm's work involves standardised documents and this "hard copy" is stored on discs which are fed into the computer. …
> The operator uses a traditional typewriter keyboard with additional buttons to produce the computerised copy on a small video screen.
> She can then fill in extra details, such as names and addresses, by typing these on to the screen.

"And you don't have to be a typist to use it," the article assured at the end. "A fortnight's tuition is all that is necessary, though a proficient typist can obviously work the keyboard at greater speed."[48] This was one of a number of moments of at least partial recognition that typing required more skill than had previously been acknowledged. In 1986 the *Western Evening Herald* reported on Plymouth Council's switchover to new word processors, the costs involved and how work would be structured. A Social Democratic Party city council member cautioned, "I would rather have a back-up team of people who can still type and who don't need a word processor to write a letter."[49] Typing was seen as the skill here and the advancement in technology as de-skilling and risky. The "team of people who can still type" was essentially a synonym for the typing pool and suggested both a concern about change and a desire to cling to the old set-up. Such acknowledgement of skill was also a feature of advertisements for training (or perhaps retraining). In 1990 the employment agency Brook Street ran a series of print adverts highlighting the "Brook Audition" package which would, amongst other things, help job seekers develop their keyboard skills and "cross-train" them in other software packages. Although the advert did not outright say this, it is very clear that applicants who were already proficient typists would be much more successful and able to complete the training and assessment much more quickly.[50] Again, this was a tacit acknowledgement that typing as a skill now had added value.

There were also interesting discussions about how women workers would interact with new technology. In June 1979 the *Cheshire Observer* ran an article with the headline "Typing Pool Monotony Eased by Chips" and reported on how "Secretary Linda Brady" typed 1,500 invitations to an event after "one easy lesson." The report argued that "a silicon chip at her fingertips showed the typewriter how to do the donkey work, once Linda tapped out the basic letter, and fed in a file of names and addresses." The process description here is interesting: the labor of producing a typed document is largely described as "donkey work," the silicon chip helps the typewriter

48 "Meet the New-Look Typing Pool: The Key to Saving Cash and Time," *Coventry Evening Telegraph*, May 12, 1978.

49 Guy Fleming, "City Officers Refute Cheap Labour Claim," *Western Evening Herald*, August 5, 1986.

50 See *Sandwell Evening Mail*, Thursday March 8, 1990, though the advert featured widely across a range of publications in 1990.

technology, and the operator does the more complicated elements. Mike Jenkinson, the director of the firm featured in the article, reassured readers at the end: "Word processors don't replace typists, they help them sit back and do something more vital while the machine types the repeated section of letters and documents, such as wills and contracts."[51] The phrasing was telling of shifts in thinking about technology: the image of sitting back conveys relaxing – something which women in the typing pool were accused of doing all too often – but it was in this "sitting back" and doing less physical or mechanical work that the worker was doing something more important. Such reporting gestured at a future reconceptualization of work processes that was not yet mapped out.

It is also significant at the same time that the cemented presence of the typing pool as a part of the workstream in businesses meant that it was difficult initially to see how work might be structured to no longer need a typing pool. In the examples mentioned above featuring the word processors with microchip technology, for example, it was still assumed that the typist would be designated to produce the documents; clearly, the shift from the typing pool creating documents to workers in other roles being able to produce their own documents was a conceptual shift that would take time. Similarly, in the early 1990s, there were numerous job advertisements in which typing pool typists or supervisors were being recruited not to work on typewriters but word processors and, later, WordPerfect.[52] The typing pool was clearly part of the office lexicon and work organization, even if the reorganization of work was not far away – or was already underway – with the increasing availability of the desktop computer by the 1990s. The detailed ways in which work was reorganized with the realization that document-production no longer had to end with the typing pool would be a fascinating topic to explore for this period, but it is outside the scope of this chapter.

The typing pool as a female space was also used as a gendered metaphor in discussions of new technology. The UK publication *The Economist* wrote regularly on technological change and its implications for office and business environments. It attached a whole range of thoughts and emotions to the current state of the typing pool and its perceived inefficiencies. In 1985, it began an article by noting that "[t]he word processors of the future will do more than save time in the typing pool," suggesting there were current inefficiencies or time-wasting or simply less powerful technology.[53] In 1986, a report on early voice-to-screen technology declared that "the door" between the spoken and the written word "is guarded by the formidable power of the typing pool," referring to the power sometimes resentfully attributed

51 "Typing Pool Monotony Eased by Chips," *Cheshire Observer*, June 22, 1979.

52 See, for example, *Liverpool Echo*, August 9, 1990 and *Barnoldswick & Earby Times*, November 4, 1994.

53 "And Now for Sentence Processors," *The Economist*, January 12, 1985, 79.

to the typing pool in the inverse of the actual office hierarchy. Notably, the typing pool as a collective was given these characteristics of power, showing that the "pool" was viewed as a group rather than the typists as individual people.[54] The article suggested that for now the voice-recognition element of the software was subpar and that "a good audio typist can beat the pants off any machine yet devised. But bad ones will soon feel the cold breath of mechanical competition."[55] The mix of frivolous, competitive, and gendered metaphor about the individual audio typist versus giving the machine human qualities – the ability to breathe, even if the breath was cold – suggested a paradoxical set of emotions about technology: it could be more like people, but it could also position itself as better than people. Such discussions and descriptions pointed to a sense of futurity, an understanding of the newness and potential of technology, but also the threat it posed to workers – in this case women workers, whom the magazine was explicitly warning. By 1987, an *Economist* columnist argued that because word processors allowed the easy correction of mistakes, typists had "moved out of the servant-girl stage and have their own servants called word processers[sic] that do the job painlessly."[56] The sense here of "growing up" or "evolution" and new hierarchies is telling of the fact that white collar work remained structured by power dynamics but that a new relationship was possible between user and machine.

There were other things that the typing pool clearly symbolized too, and its feminized nature was paramount in this, though in a more positive way. Writing in 1981 on the projected development of specialized computer systems and the development of word processors, *The Economist* predicted that what it referred to as the "personal 'work station'" of the future, to which every office worker would have access would have its origins in the "friendly word processor (which started life in the humble typing pool) rather than the more daunting data processor (which sprang from the boffin's backroom)."[57] The cozy, feminized word processor was clearly preferred over the intimidating, masculinized, scientific data processor – with the implications that the similarity with the machines used for decades by typists meant that these would therefore be accessible to all, in part because they must be easier to understand.

By the 1990s, the typing pool was evoked in various ways as part of either a nostalgic comment on the passage of time or a continued attachment to a fixed but outdated idea.[58] In October 1990, for example, *The Scotsman* noted in passing that "[t]he

54 Notably, *The Economist* was interested in the concept of giving groups agency. A 1976 article suggested intra-firm competitions and the ability for typists to set their own working hours and work rates. See "Intrapreneurial Now," *The Economist*, April 17, 1982, 47–51.

55 "Technology Brief: Its Master's Voice," *The Economist*, November 15, 1986, 103.

56 "Parkinson's New Law: Need the Future Be Boring?," *The Economist*, May 9, 1987, 20.

57 *The Economist*, July 25, 1981, 83.

58 I am grateful to Amy Thomas for helpful discussions in developing my thinking on continued attachment to a fixed idea.

clicking of typewriter keys may have been replaced by the buzz of a word processor."[59] In 1994, the *Newcastle Journal* reported on the frenetic extent of change over the past decade, noting that "it's hard to imagine that the pace of change could speed up at all." The report continued: "Ten years ago, most journalists were still bashing out their stories on old Remington typewriters, and many offices still had a huge typing pool – the direction of lustful gazes from the workshops and the boardrooms."[60]

Even in describing its demise, the stereotypes of the young, attractive and objectified members of the typing pool were reinforced. The use of "still" implied the long-standing but now archaic nature of the typing pool, whilst also harking back to something which had gone. Similarly, a 1991 article in *Scotland on Sunday* ran with the headline "A Woman's Place is no Longer in the Typing Pool." Clearly playing on the old adage "a woman's place is in the home," the headline pointed to the fact that the typing pool had been women's place in the business world, whilst also drawing on the established notions of trying to escape it. The article focused on a network set up to widen opportunities for women and to provide a source of information about training opportunities, and stands as one of the examples of realizing these technological changes might bring positive change for women.[61]

In August 1981, the *Newcastle Evening Chronicle* featured an article with a local businesswoman about word processors and how they were essentially changing the game in office work. Interestingly, the article had been trailed the week before as an examination of the "silicon chip revolution that is sweeping offices," underscored by the key question "But will that mean an end to that typing pool glamour?," suggesting a romanticizing of, or nostalgia toward, this particular stereotype of femininity and feature of women's work – and also that one of the chief attributes of the typing pool was not the skill and work it offered but the physical characteristics and appearance of those who occupied it.[62] The article, when published, took no such line and in fact might be read as an advertorial for the business in question and the associated training courses readers could sign up for. Notably, though, the article did contain its own ingrained sexism, referring to Hazel Moodie, the business owner, as "petite, pretty and far too feminine for anyone to imagine that she knows about machines."[63] The continued gendering of technology and roles in the workplace was very clear here.

Other passing references in press coverage tell us something further about the immovable stereotypes about typists and the typing pool. In the very decade marked

59 "Stepping Stones to Promotion Across the Typing Pool," *The Scotsman*, October 25, 1990.

60 Peter Cunliffe, "It's All Change in the Office: Technology in the Typing Pool," *Newcastle Journal*, April 27, 1994.

61 "A Woman's Place is No Longer in the Typing Pool," *Scotland on Sunday*, May 26, 1991.

62 Newcastle Evening Chronicle, July 31, 1981.

63 "Who's Afraid of the Word Processor?," *Newcastle Evening Chronicle*, August 6, 1981

by the shift from typing pools to word processors to ultimately personal computers, the typing pool stereotype was evoked again and again as a shorthand for women perceived as unserious and untalented. In 1991, the *Daily Mirror*'s preview of TV shows commented "Have you ever wondered what happens to all the hopeful people on *Opportunity Knocks?* You know, the secretaries or hair dressers who dream of the big time but after fifteen minutes of fame end up back in the typing pool or doing old ladies' perms."[64] In 1997, the newspaper *Sunday Life* ran an article about starting work which it illustrated with a still from the film *9 to 5*, one of the archetypal filmic portrayals of female office work (and in the case of this film, female solidarity in the workplace) which still clearly had significant purchase seventeen years on from its release. The section of "Don'ts" at the bottom of the page is headed "Sinking without trace in the typing pool."[65] Although there were typing pools at some firms still at this point, in many more organizations and offices, typing pools were long gone. It is possible that in using this trope journalists were reaching for a shorthand to describe those they saw as broadly lacking in ambition, or to describe jobs that were seen as insufferable, but it is also possible that this stereotype was useable because it was so recognizable and could still be deployed in the face of technological change. Either way, it is notable that the negative sentiments about the typing pool were still uppermost.

Conclusion

The typing pool was a feature of offices in Britain and elsewhere in the mid-to-late twentieth century and the stereotypical depiction of it became a cultural trope and a shorthand for low-paid and low-status women's work. With technological change – principally the ability to create and edit documents at a workstation and, eventually, the widespread availability of word processors and desktop computers – the typing pool became obsolete. This chapter has traced print media discussions of the typing pool from its heyday to the point of its dismantling and just beyond, arguing that so engrained was the cultural understanding of the typing pool that it remained a significant reference point in discussions about the workplace, and the work process, of the future. These discussions conveyed a range of emotions, from excitement and curiosity in some cases to anxiety about the future. In later years, the typing pool was invoked as a means to express nostalgia along with continued disdain for low-status women's work such as typing.

Reactions to the end or the projected end of the typing pool tell us much, then, about society's perceptions of changing technology and changing gender roles. The

64 Discussion of "You've Got to Be Joking," *Daily Mirror*, April 27, 1991.

65 "First Day Blues," *Sunday Life,* August 17, 1997.

end of the typing pool was discussed as a key manifestation of technological change and often in terms of the idea that an annoyance or negative thing was coming to an end. However, the durability of the image, in a period where clerical and administrative work was in a state of flux, signifies an attachment to what were perceived as more fixed and solid ideas of "the office." In turn, these ideas were predicated on the notion of the majority of women in an office workplace being in one, subordinate place, which was disrupted now that the typing pool was gone.

Typing had been so identified with women, but as technology raised questions of how documentation was produced and office processes were constructed, typing's identification with women would have to shift. Although there was some brief recognition that the end of the typing pool would mean that men would now have to learn to type,[66] it is significant how rarely the voice of the typist herself was heard in the coverage of the end of the typing pool. Just as there was little in-depth discussion in the mainstream media of the potential for new work this might bring to women, there was also strikingly little media interest in women typists' own views. This is indicative of both the lesser importance continually attached to women in paid work even at this stage of the late twentieth century and the low status with which this work continued to be associated.

Acknowledgements

I would like to thank my fellow participants in the fellowship program at Graz, and especially Christiane Berth and Nina Jahrbacher for their welcome and support. I received insightful feedback from audiences at the Contemporary British History seminar at the Institute of Historical Research, the Queen Mary University of London Centre for British Studies conference and at the workshops in Graz. My thanks also to Amy Thomas, Patrick Stribley, Claire Langhamer, Christiane Berth and Mike Prentice for reading drafts and to Natalie Thomlinson for helpful conversations on the issues of women's employment in 1980s and 1990s Britain.

Bibliography

Boston, Sarah. *Women Workers and the Trade Unions*. Lawrence and Wishart, 1987.

Bryan, Beverley, Stella Dadzie, and Suzanne Scafe. *The Heart of the Race: Black Women's Lives in Britain*. Verso, 2018. First published 1985.

66 See, for example, "Electronic Post," *The Economist*, August 4, 1979; "Stepping Stones to Promotion Across the Typing Pool," *The Scotsman*, October 25, 1990; "Real Men Don't Type Slowly," *The Times*, July 28, 1999.

Carter, Laura. "The Hairdresser Blues: British Women and the Secondary Modern School, 1946–72." *Twentieth Century British History* 34, no. 4 (2023): 726–53. https://doi.org/10.1093/tcbh/hwad048.

Elias, Allison. *The Rise of Corporate Feminism: Women in the American Office, 1960–1990*. Columbia University Press, 2022. https://doi.org/10.7312/elia18074.

Fremlin, Celia. *War Factory*. Cresset, 1987. First published 1943.

Galvan, Jill. *The Sympathetic Medium: Feminine Channeling, the Occult, and Communication Technologies, 1859–1919*. Cornell University Press, 2010.

Glew, Helen. *Gender, Rhetoric and Regulation: Women's Work in the Civil Service and the London County Council, 1900–55*. Manchester University Press, 2016. https://doi.org/10.7765/9781784996826.

Glew, Helen. "'Maiden, Whom We Never See': Cultural Representations of the 'Lady Telephonist' in Britain ca. 1880–1930 and Institutional Responses." *Information & Culture* 55, no. 1 (2020): 30–50.

Glew, Helen. "A New Phase of Activism: Women's Occupational Organisations and Married Women's Paid Work after the Second World War in Britain." *Women's History Review* 34, no. 4 (2025): 545–63. https://doi.org/10.1080/09612025.2024.2373505.

Golding, Judith. "Some Problems in the Concept of Secretary." *International Studies of Management & Organisation* 16, no. 1 (1986): 94–111.

Haigh, Thomas. "Remembering the Office of the Future: The Origins of Word Processing and Office Automation." *IEEE Annals of the History of Computing* 28, no. 4 (2006): 6–31. https://doi.org/10.1109/MAHC.2006.70.

Hicks, Mar. *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing*. The MIT Press, 2017.

Hindmarch-Watson, Katie. *Serving a Wired World: London's Telecommunications Workers and the Making of an Information Capital*. University of California Press, 2020.

Hinton, James. *Seven Lives from Mass Observation: Britain in the Late Twentieth Century*. Oxford University Press, 2016.

Hinton, James. "Seven Late Twentieth Century Lives: The Mass Observation Project and Life Writing." *European Journal of Life Writing* 10 (2021): 92–101. https://doi.org/10.21827/ejlw.10.37407.

Keep, Christopher. "Blinded by the Type: Gender and Information Technology at the Turn of the Century." *Nineteenth-Century Contexts* 23, no. 1 (2001): 149–73. https://doi.org/10.1080/08905490108583536.

McCarthy, Helen. *Double Lives: A History of Working Motherhood*. Bloomsbury, 2020.

Morgall, Janine. "New Office Technology" [1981]. In *Waged Work: A Reader*, edited by Feminist Review. Virago, 1986.

Moss, Jonathan. *Women, Workplace Protest and Political Identity in England, 1968–1985*. Manchester University Press, 2019.

Mullin, Katherine. *Working Girls: Fiction, Sexuality, and Modernity*. Oxford University Press, 2016.

Murphy, Michelle. *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience and Women Workers*. Duke University Press, 2006. https://doi.org/10.1215/9780822387831.

Schlombs, Corinna. "Built on the Hands of Women: Data, Automation, and Gender in West Germany's Financial Industry." *Technology & Culture* 64, no. 1 (2023): 63–89. https://doi.org/10.1353/tech.2023.0002.

Spencer, Stephanie. *Gender, Work and Education in Britain in the 1950s*. Palgrave Macmillan, 2005.

Summerfield, Penny and Corinna Peniston-Bird. *Contesting Home Defence: Men, Women and the Home Guard in the Second World War.* Manchester University Press, 2007.

Thomlinson, Natalie. "Women and Unemployment in Deindustrialising Britain, 1975–1990." Paper presented at Contemporary British History seminar, Institute of Historical Research, London, June 25, 2025.

Thurschwell, Pamela. "Supple Minds and Automatic Hands: Secretarial Agency in Early Twentieth-Century Literature." *Forum for Modern Language Studies* 37, no. 2 (2001): 155–68. https://doi.org/10.1093/fmls/37.2.155.

Tijdens, Kea G. "Behind the Screens: The Foreseen and Unforeseen Impact of Computerization on Female Office Worker's Jobs." *Gender, Work and Organisation* 6, no. 1 (1999): 47–57. https://doi.org/10.1111/1468-0432.00068.

Van Meel, Juriaan. "The Origins of New Ways of Working: Office Concepts in the 1970s." *Facilities* 29, no. 9–10 (2011): 357–67. https://doi.org/10.1108/02632771111146297.

Wajcman, Judy. "From Women and Technology to Gendered Technoscience." *Information, Communication & Society* 10, no. 3 (2007): 287–98. https://doi.org/10.1080/13691180701409770.

White, Jessica. "Black Women's Work in Late Twentieth-Century Britain: Changes, Continuities, and Social Mobility, c. 1970–2000." *Contemporary British History* 39, no. 3 (2025): 519–43. https://doi.org/10.1080/13619462.2025.2485891.

Wigham, Eric L. *From Humble Petition to Militant Action: A History of the Civil and Public Services Association, 1903–1987*. Civil & Public Services Association, 1980.

Worth, Eve. *The Welfare State Generation: Women, Agency and Class in Britain since 1945*. Bloomsbury, 2021.

Worth, Eve, and Laura Paterson. "'How Is She Going to Manage with the Children?' Organizational Labour, Working and Mothering in Britain, c. 1960–1990." *Past & Present* 246, issue supplement 15 (2020): 318–43. https://doi.org/10.1093/pastj/gtaa043.

Zimmeck, Meta. "Strategies and Stratagems for the Employment of Women in the British Civil Service, 1919–1939." *The Historical Journal* 27, no. 4 (1984): 901–24.

Zimmeck, Meta. "Jobs for the Girls: The Expansion of Clerical Work for Women, 1850–1914." In *Unequal Opportunities: Women's Employment in England, 1800–1918*, edited by Angela V. John. Basil Blackwell, 1986.

Zimmeck, Meta. "The New Woman in the Machinery of Government: A Spanner in the Works?" In *Government and Expertise in Britain, 1815–1919: Specialists, Administrators and Professionals*, edited by R. Macleod. Cambridge University Press, 1988.

Zimmeck, Meta. "Marry in Haste, Repent at Leisure: Women, Bureaucracy and the Post Office, 1870–1920." In *Gender and Bureaucracy*, edited by Mike Savage and Anne Witz. Blackwell Publishers, 1992.

Zimmeck, Meta. "'The Mysteries of the Typewriter': Technology and Gender in the British Civil Service, 1870–1914." In *Women Workers and Technological Change in Europe in the Nineteenth and Twentieth Centuries*, edited by Gertjan de Groot and Marlon Schrover. Taylor and Francis, 1995.

Channeling workplace sentiment: Phatic communion as regime and refuge in South Korea's computer age

Michael M. Prentice

Introduction

Around the globe, the computer era made promises of hyper-connected, effortless, and democratic future societies and workplaces. More often the realities were cold, disconnected, and individualized, often experienced in the form of unreliable technologies, deskilled work, and retrenched organizational hierarchies.[1] Within this dynamic, acts of adaptation and acceptance took different forms, from those who resisted this promise entirely, such as labor unions in Japan in the 1970s which actively opposed government-led computerization, and those who leaned into it, such as American office workers who tried to make the cubicle "cool" in the 1980s.[2] Taking up the case of South Korea, this chapter draws attention to a different side of computerization: its relational aspects. By that, I mean the ways that computers reshaped existing social connections or enabled new ones, often through sentimental ties between individuals or small groups. These social connections, or the possibility of them, were both leveraged by governments and corporations to animate large-scale computerization projects and sought out by office workers when they had access to private or commercial networks outside of the workplace.

1 Michael Homberg writes on computerization in India, for instance: "However, against all utopian dreams linked to the 'computer revolution,' the digital society quickly developed its own hierarchies. Its knowledge system separated computer literates and illiterates and sharply distinguished administrators, developers, and users. It built new digital walls between nations and caused new 'digital divides,' both nationally and globally, while excluding its citizens with regard to race, class, and gender. In India, such digital divides were also emerging on various levels: between rich and poor, between urban and rural regions, and also between the sexes." Homberg, "Digital India," 317. See other global cases in Van Lente, *Prophets of Computing*.

2 In Japan, Tessa Morris-Suzuki notes that Japanese unions strongly resisted the office automation drive that was being promulgated by the government. A 1977 opposition by government workers to computerize public records would last two years. Morris-Suzuki, *Beyond Computopia*, 168. For the American case, see Liu, *Laws of Cool*, 76–77.

There is a clear difference, however, between the organic sociality of actual office workers on private computer networks and communication channels and the fictive sociality promoted by state and corporate depictions of workplace connections. Following historian William Reddy, we can think about this as a distinction between an "emotional regime" which shapes public and organizational dispositions to new developments on one side, and an "emotional refuge" which provides a release from these norms through private, closed, or anonymous sites of communication, on the other.[3] Across both poles, tropes of enhanced social connections mediated by computers played an important part. I highlight the following points about South Korea's computer age: first, that talk between individuals and computers was an important part of how the new computer era was narrated for mass, non-specialist computer users. State, mass media, and corporate actors promoted the euphoria of connecting to far-away others through computer networks using individual stories and graphics, positing the joy of increased speed and efficiency of office technology. Likewise, office workers also sought out intimate connections with others through new "clubs" on bulletin-board networks. Second, I highlight periods of influence and appropriation. Organic social connections in early online bulletin boards emerged in part from the structures set up by government-sponsored corporate networks. As these private networks became both popular and legitimate outside of corporate walls, corporations attempted to replicate or capture their intimacy within new company channels. From the structures of these workplace channels, newer iterations of independent workplace channels would emerge. This chapter thus points to the importance of comparing projections and realities of social connection enabled by the computer age, as well as movements across state, corporate, and civil spheres.

Because it was a key site of capitalist development and Cold War forces in the twentieth century, South Korea is often remarked for its relative success or even speed of development vis-à-vis the "undeveloped" world from the 1960s onward. Throughout the late twentieth century, South Korea's developmental state, and, to various degrees, corporations and the media, were thoroughly embracing of state projects to render the country a *seonjinguk* or "developed country" through technology.[4] These efforts also involved computerization, beginning in different forms from the 1960s, through society-wide campaigns that would make development tangible and realizable.[5] The period of the 1980s and 1990s coincided with mass computerization efforts around office, industry, and home life, not to mention urban spaces and infrastructures. This period also coincided with a changing political and social context, as the country shifted from almost thirty years of near-continuous rule by military dictatorships (1961–1987) to a multi-party democratic system after 1987 with

3 Reddy, *Navigation of Feeling*, 128–30.

4 Kim, "Science, Technology, and the Imaginaries."

5 Jo, "Computopia and Its Discontents."

greater civil and political freedoms. Cutting across this period, particularly through the 1980s and 1990s, the corporate workplace became a site of increasing social and economic mobility as large corporate groups began to provide pipelines for middle-class achievement in line with state development goals. Central to this mobility, however, was a focus on normative family structures with breadwinner husbands/fathers who worked long hours in company cultures that modeled themselves on the military.[6] In this context, women worked in organizationally supportive roles but were largely expected to leave the workforce after marriage and childbirth to focus on the domestic sphere.[7] Likewise, due to the later introduction of office-based work in South Korea compared to the West, there was not a strict binary between male managers and female secretaries or typists; while these roles existed, male office workers were also arrayed in stratified ranks in which low-level typing or reporting work would be done by men and hand-drafting of formal documents would be specialized work.

Thus, office computerization would not follow the same conflicts that mark North American or European contexts which had been structured by gender-divided roles throughout the twentieth century. The introduction of computers would complicate these dynamics, requiring significant shifts in the gendering of both technologies and office roles, as many scholars have noted, along with other chapters in this volume.[8] Nevertheless, because South Korea was intimately connected to the United States during the Cold War, American government and corporate influences would have a strong role in shaping the introduction of computers as well as providing a kind of developmental benchmark for South Korea to compare itself to and to receive recognition from. Thus, computerization projects spanned both military and democratic regimes, as developmental concerns and ideas about "catching up" were paramount at the national level.

In this context, I focus on what could be described as relatively minor technologies of the computer era – communication channels, which I take to include conferencing, bulletin board systems, messengers, and forums that developed during this period. From the point of view of technological history, these do not often garner significant attention; however, they played important roles.[9] In one sense, images of communication channels that spanned geography and operated at faster speeds were important for government, media, and corporate actors to visualize the new

6 Moon, *Militarized Modernity*, 42.

7 As anthropologist Laurel Kendall notes, in 1988, 84 out of 85 women in South Korea in their thirties was married. Kendall, *Getting Married*, 4.

8 See Schirvar, "Machinery for Managers"; Markussen, "Constructing Easiness"; Stein, "Domesticity, Gender"; Van Oost, *Making the Computer Masculine*; Hicks, *Programmed Inequality*. This is not to say computers were not masculinized in South Korea. See Misu Na's analysis of the masculinization of computer advertising in 1990s South Korea. Na, "Cultural Construction."

9 See Kevin Driscoll's account in *The Modem World*.

possibilities of office automation and computer networking in the 1980s. They were also important for showing human users first embracing what were, up to then, highly specialized machines. In another sense, the advent of computer-based channels, first linked through modems and telephone networks, offered means for workers to connect with others and share their private feelings about their work lives. Both of these dimensions were covered in popular Korean news media at the time, which documented the latest changes in government approaches, corporate developments, and emerging forms of social practice.

From the perspective of emotions and its practices, I draw on the notion of "phatic communion," a sociolinguistic concept referring to the ways that people make the most basic of social connections through the exchange of words. Phatic communion can happen through simple greetings such as "How are you?" that foreground the social connection of people beyond the transmission function of communication.[10] It applies well to computer or digital contexts, where people often send simple messages of acknowledgement and recognition, like emojis to signal a human connection through remote interfaces; it can also occur in acts like opening a private chat room or closed channel. Phatic communion can be mobilized for political or capitalist purposes. For example, states might appropriate tropes of human connection for nationalist purposes, like showing off democratic discussion as a sign of modernity.[11] Phatic communion can also be leveraged by corporate actors who aim to allay feelings of disconnection by providing direct messages from a CEO or promoting the workplace as an intimate family.[12]

Revisiting the global computer age from this perspective, phatic communion was central to both new corporate-computer regimes premised on greater corporate connection (and thus efficiency and control) as well as ways for employees to connect. Shoshana Zuboff describes this in her classic account of 1980s American corporate computing, *In the Age of the Smart Machine*. At one of the companies she studied in 1982, a new bulletin board-like system called DIALOG was installed across the company's offices (the name itself being an allusion to the value of spoken dialog in a text-based system). Workers could initiate their own queries with others in specific "conferences" to propose and resolve work problems asynchronously. Alongside work-related channels, employees created one called the "conference coffee break" which became a virtual social hang-out. On it, workers shared "off-color humor and complaints about the problems of daily work life," narrating it

10 See Zuckerman "Phatic Violence," 295–99, for an overview of the history of the phatic concept and discussion of phatic communion, in particular.

11 See Lemon, *Technologies for Intuition*, 26–29, for a discussion of phaticity in US–USSR Cold War settings.

12 See Wilf, "Phaticity as Technical Mystique," 784, 787, for a discussion of phaticity in corporate settings.

as their own form of workplace "counterculture."[13] Workers at the company also began to play with opening and closing channels to others, shaping their visibility and audience. One closed channel was called "Women's Professional Improvement" and allowed women within the company to build, in their view, their own "old boy's network." As managers became concerned when reports of harassment and the possibility of a women's union were raised, the company began to surveil the closed channels, which quelled most activity and turned many users into idle participants. The company ultimately shut down DIALOG and replaced it with a "more" work-centered system called TONI, or Total Office Network Integration, that would in theory focus on work and work alone.[14] Zuboff's account ultimately reveals how early forms of phatic communion emerged within and alongside corporate software, which allowed office workers to "stay in touch with folks" and to know "it's not just me."[15] The tension between emotional regimes and refuges is evident as workers sought to utilize technological affordances of the system to carve out their own spaces within a changing work environment.

This chapter looks at a longer period of transformations between the regime and refuge of corporate channels in South Korea to understand both the diverse uses of phatic communion across different aspects of computerization as well as how the phatic qualities of different channels evolved with computer technology and organizational practices. The South Korean computer age reveals considerable experimentation with the affordances of corporate-technological interfaces, spaces of refuge, and changing language of regimes over time. I demonstrate how the language of refuge, including metaphors of "open talk," become incorporated into corporate regimes over this time. At the same time, spaces of refuge also derive from the corporate systems they served as an escape from. To do so, I draw from South Korean newspapers, recent secondary literature, and retrospective writing to retrace the emergence of channels and forums used by office workers of the 1980s and 1990s, particularly bulletin board systems (BBS or *PC tongsin*) and corporate groupware. I first look at state projects around automation in the early 1980s to show how idealized depictions of either human–computer connections or human–human connections in corporate networks were circulated to promote ideas of office automation. I then address the first developments of civic networks which appropriated government-created email services into private bulletin board services. These services, which then were commercialized and popularized, were ultimately the first major foray into mass forms of phatic communion within which office workers were significant users. In the third section, I look at the rise of commercial groupware in

13 Zuboff, *Age of the Smart Machine*, 377.

14 Zuboff, 384.

15 Zuboff, 367.

the 1990s and new discourses around democratic office chat that became incorporated into company language. In the final section, I draw on some examples from the 2010s and 2020s to demonstrate how dynamics around phatic communion have shifted in the internet and mobile platform eras while drawing on some familiar tropes from this earlier era.

Office computerization under automation

South Korean popular history conventionally marks 1987 as a landmark year: it is the year the country emerged from almost thirty years of military-led, development-driven dictatorships to transform into a multi-party democracy with greater political and civil liberties and a softening of Cold War hardlines. Before 1987, however, within the military presidency of Chun Doo-hwan (1980–1988), important developments were taking place that would affect both computerization and social attitudes toward computerized aspects of everyday life. One can say that both mechanical ideas of automation and new ideas about future society were descending on South Korea via the United States and through the logic of a Cold War race to development.

From the twenty-first-century perspective, it has been commonplace to note metaphors of speed in regard to South Korean capitalist development or its "fast-fast" (*bballi bballi*) culture, yet speed was not a major part of everyday discourse until the 1970s. A growing body of research from South Korean scholars has put the developmental projects of this era into focus to understand how the country was constructed as a fast society.[16] The early 1980s would be marked by discourses promoted by the government around acceleration (*gasokhwa*), automation (*jadonghwa*), and, by the later 1980s, informatization (*jeongbohwa*). Automation pervaded society in the 1980s from broader discourses around time management to everyday technologies and infrastructures like "vending machines, automobiles, elevators, and escalators."[17] Technological advances under terms like "Technopia" and "Computopia" also concretized notions of space-age domestic futures that would be brought about both collectively and through individual efforts. Strong government and corporate attempts to encourage uptake of these technologies as well as shape public affect through awe and wonder were ultimately causally reversed. Public shifts in attitudes toward technological integration could then be seen as

16 See Kim, "Time Technology in Acceleration"; Kim, "Technopia"; Kim, "Science, Technology, and the Imaginaries"; and Jo, "Computopia and Its Discontents."

17 Kim, "Technopia," 236.

the positive (natural) reaction of South Korean society to such (government-led) movements.[18]

Cultural studies theorist Han Sang Kim notes that three types of automation were being promoted by the government starting in 1982: factory automation, home automation, and office automation.[19] Print and television media were marshalled to promote stories about them. There was a travelling trade exhibit showcasing the latest developments in office automation technologies produced by domestic firms. An article in the *Dong-A Ilbo* newspaper from 1983 on "OA," as it was known, described recent developments for office workers and offered its own prognoses for the future:

> Manager Lee of Company K arrives at work at 9:00 AM, takes out a palm-sized electronic pad from his handbag and presses a key. Following this a friendly greeting, "Hello. We have a lot of documents piling up today," appears, along with a list of documents requiring approval with their urgency levels indicated. Manager Lee's work begins with the guidance of this small pad … This is the appearance of office automation that will appear in the near future.
> … Office automation will undoubtedly bring about a major transformation in the way work is done, with machines taking over tasks previously performed by humans, such as thinking, judgment and planning, and humans moving from simple clerical tasks to focusing on creation and decision-making.[20]

These examples were often compared to what was happening internationally, particularly the United States and Japan, in what was often labelled the "third industrial revolution."[21] One article from 1983 described automation simply as "giving work to robots," which would be "loyal servants," especially in factories. Japan was described as the "robot kingdom."[22]

Though a nationwide electronic mail service would launch in 1984, it is highly unlikely that any of the advanced technologies were operable at the level the article attested. The first electronic mail service was itself in English, as Korean-language

---

18 This causal reversal has had the unfortunate consequence of shaping much of the culturalist interpretation of South Korean economic development and adoption of technology, relative to others.

19 Kim, "Technopia," 237.

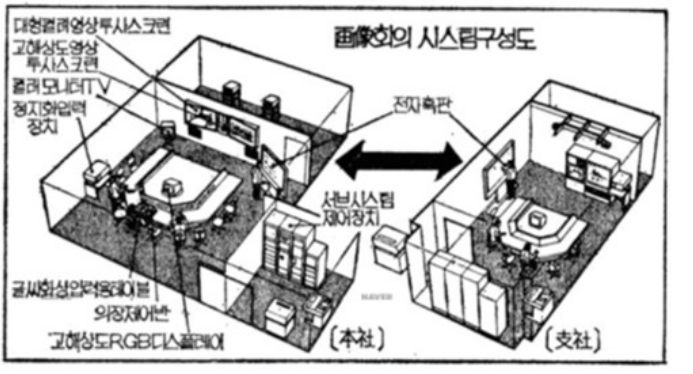
20 "Orders and Inventory Management are Being Handled by Machines and 'Office Automation' is Gaining Attention," *Dong-A Ilbo*, June 4, 1983. All newspapers articles are in Korean unless otherwise noted.

21 "The Flowering 'Third Industrial Revolution'," *Maeil Business Newspaper,* April 10, 1982.

22 "The Beginning of the Automation Wave of the Unmanned Factory Era," *Dong-A Ilbo*, November 5, 1983. Other narratives would come out later that described Japan as highly resistant to computerization, however..

support hadn't been developed yet.[23] Paper-related devices, such as photocopiers, shredders, envelope printing and sorting machines, and fax machines, were becoming more commonly visible. Even the introduction of telephones was described as part of OA.[24] Stories throughout 1984 and 1985 promoted changes in both office layouts and international offices connected through new networks and technologies under development. In Figure 1, a wholesale reinvention of office space for the purposes of virtual meetings was reported, with technologies such as interactive whiteboards and high-definition television panels being promoted. There was no discussion of cost, investment, or productivity but it was likely that the technologies under development were far too expensive to install widely at the time.

Figure 1: A 1984 description of the "Virtual Meeting System Architecture" demonstrating the various technologies that would make virtual meetings possible. These included electronic bulletin boards, color monitors, high-definition video, projector screens, and a virtual text editor.



From *Maeil Business Newspaper*, June 9, 1984. Copyright Maeil Business Newspaper. Used with permission.

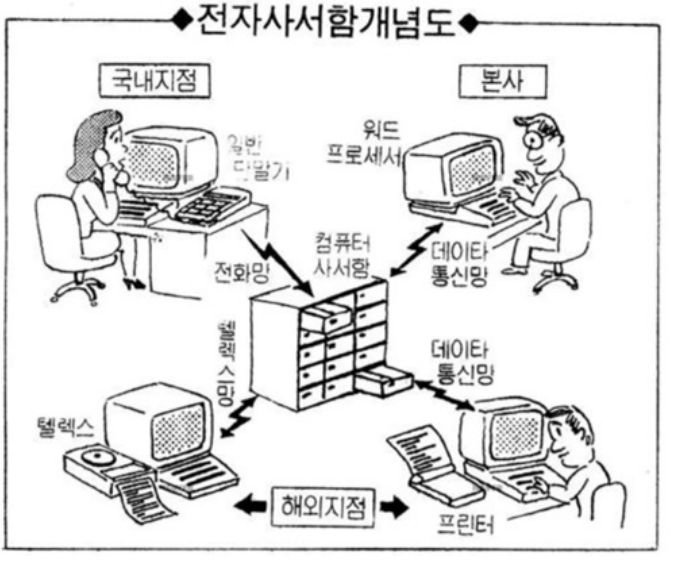
By 1988, a more realistic image (to contemporary eyes) of automation via desks, desktop computers, and email would be apparent in another depiction from the same newspaper (Figure 2). In that graphic, each worker is seated at their own screen, each connected to a "computer post office box" (likely a shared server). Employees are represented individually, each using a computer, but the male workers

23 "The Flower of Office Automation: The Electronic Mailbox," *Maeil Business Newspaper*, November 7, 1984.

24 "In Office Automation, Even the Telephone is Playing a Part," *Maeil Business Newspaper*, June 15, 1985.

are using word processors and printers – producing documents – and communicating from the headquarters or the international branch, while the female work is at the "domestic branch" with a computer and phone that is described as a "regular terminal" (*ilban danmalgi*). A human-less Telex machine also participates in the network. In the same article, the progress of expansion of email services within American companies and services is frequently mentioned (particularly the use of "Value-Added Networks").[25]

Figure 2: "The Electronic Mail Post Office Box Concept." A 1988 depiction of how new electronic mail box will work to connect offices such as the headquarters, domestic branches, and overseas branches via computers, a Telex machine, and telephone networks.



From the *Maeil Business Newspaper*, March 11, 1988. Copyright Maeil Business Newspaper. Used with permission.

Surrounding statements around automation however were somewhat awkward conclusions that automation would not just make South Korea a "developed country" but also help to reduce the working population through efficiency gains. One company was reported to reduce its workforce from 8,100 to 6,100 due to automa-

25 "Electronic Mail Use is Expanding," *Maeil Business Newspaper*, March 11, 1988.

tion developments.[26] By the late 1980s, office and factory automation became common points of dispute for the country's labor unions, as automation came to be seen more as a labor-erasing mechanism than as a step into the future for all workers.[27]

Automation discourses also touched on gender divisions. Descriptions of women's secretarial work at the time describe their work not as being replaced but enhanced by office automation: an article from 1983 describes a secretary (*biseo*) being able to "arrange a meeting among busy executives located across the company, by simply pressing a few buttons and consulting the individual schedules stored in the workstation."[28] The technology for that was reportedly "under development" but imminently arriving. Another describes the secretary and phone both needing to work together to operate successfully.[29] Like other areas of the workforce and other parts of society, such as the domestic sphere, secretarial work was seen to be accelerated or modernized through technology, rather than wholly replaced or removed. One academic study from the 1990s on the impact of automation on secretarial work noted that the role of secretaries would be enhanced under office automation by removing repetitive activities; secretaries would now be "information controllers" in the office.[30] Little attention from news or academic articles at the time addressed fundamentally changing gender roles. Instead, the image of a small team of male workers often supported by one young female secretarial or support worker – still prevalent even which I conducted ethnographic research in the 2010s – would remain as the dominant image of organizations undergoing office automation.

Under early computerization and state-led discourses of automation, phatic communion reflected a certain kind of imaginary at the level of national subjects. That is, while computer devices, industries, telephone networks, and even workers were being "developed" during this time, images of communion helped to draw links with citizens of advanced economies like the United States or European countries which were also developing in the same way, or sometimes with direct links to South Korean projects or companies.[31] It is these abstract national connections that could provide justification for government projects and societal transformations. The idealized landscapes of connection depicted at the individual level, such as men and women experiencing things like email for the first time, were likely showcased

---

26 "Low-Growth and Automation-Induced Unemployment Are Rising," *Maeil Business Newspaper*, July 31, 1989.

27 "Work Types and Wage Structure Are the Epicenter," *Kyunghyang Shinmun*, March 17, 1989.

28 "The Office of the Future – Automated Devices," *Maeil Business Newspaper*, February 8, 1983.

29 "In Office Automation, even the Telephone is Playing a Part," *Maeil Business Newspaper*, June 15, 1985.

30 Chon, "A Study on the Relationship."

31 For example, a newspaper photo caption in 1989 writes "Our Country's Computer Adoption Rate is Falling Behind Other Advanced Countries," *Kyunghyang Shinmun*, April 11, 1989, 19.

by the government's telecom corporation DACOM or individual companies as part of their public relations. These depictions concretized the futurity of computerization at the level of the individual, establishing a kind of phatic communion of the individual office worker with technology itself and the work improvements they promised, rather than sociality with their fellow workers. The depiction of idealized individual exuberance around new technologies would continue: in the 1990s, discourses around "informatization" would see children and families depicted as fascinated with home computers as they became newly targeted subjects for realizing state development and encouraging computer markets.[32] Nevertheless, social forms of communion among office workers would change dramatically by the late 1980s and the rise of private bulletin board systems.

Electronic bulletin boards and civic-consumer refuges

Alongside critiques of government development discourse, another set of recent scholarship has highlighted the role of users, citizens, and hobbyists who adopted, appropriated, and transformed new computer technologies in heterogeneous ways in the pre-internet computer era.[33] This scholarship has also cast doubt on the government's oft-credited role in shaping computer practices and accepting national subjects; they note that early users were active in shaping South Korean digital infrastructure and some of its heterodox legacies, including hacking and file sharing.[34] After 1987 and into the early 1990s, newfound democratic freedoms were experienced on free bulletin boards with other users.[35]

Electronic bulletin boards were first developed in the United States under new ideas about stranger-based remote interaction through networked computers.[36] In the early 1980s, hundreds of hobbyist bulletin board systems had sprung up across the US and were starting to attract more attention from corporations and government organizations. Bulletin Board Systems would be hailed as one of the ways an "ordinary person anywhere in the world could be turned into a 'publisher', an eye-witness reporter, an advocate, an organizer, a student or teacher, and potential participant in worldwide citizen-to-citizen conversation."[37] They were a key part of what Kevin Driscoll has highlighted as an important part of the "modem

32 Yang, "Networking South Korea," 742–44. Yang provides a helpful overview of computerization in the broadband and informatization era (from 1995 on).

33 For the role of early user communities see Jo, "Co-Construction of Active Users"; Jo, "H-Mail"; Park, "History and Role"; Kim and Cho, "Formation and Change."

34 Jo, "Co-Construction of Active Users," 34.

35 Jo, "Citizens Digital Culture," 129.

36 Driscoll, *The Modem World*, 14.

37 Rheingold, *Virtual Community*, 133.

world" in which "millions of people were coming online specifically in search of community."[38]

The arrival of BBS systems in South Korea came via a different path but resulted in similar ideas about an independent citizenry self-organizing. Bulletin boards first emerged from attempts to create the national email service, such as H-Mail (or Hangul mail, referring to the Korean alphabet) which was developed by the Data Communication Corporation of Korea or DACOM. DACOM was a government-led public corporation tasked with developing data and information services for state and corporate automation and communication purposes. The email service, however, quickly became popular with independent subscribers who could afford what were at the time expensive devices and high connection fees. Nevertheless, they discovered for the first time the ability to communicate with each other in mass ways, albeit at small scales. Dongwon Jo reports that the first 100 or so users discovered that H-mail could be "utilized … for horizontal and bidirectional communications among themselves – they were even more interested in such collective communicative features as message boards and chat-like electronic conferencing than in private email exchange."[39]

Bulletin boards were not a separate creation by hobbyists but part of the technological affordances of the email system that they adapted. They developed their own electronic bulletin board systems on services like Empal, or Electronic Mail Pal, which allowed the sharing and posting of content on an open forum. By the late 1980s, there were a number of private BBS services, a defining feature of which would be the proliferation of sub-areas such as "forums, chatting, file archives, and so on, which [allowed] users to organize online communities based on their own interests and needs like computer, game, graphic, music, pet, journalism, and so on."[40] At first, private boards were treated suspiciously by the security-conscious government, thinking users might be involved with North Korea.[41] The tenor of BBS usage changed with the democratization movement in the late 1980s. As anthropologist Hae Joang Cho Han noted in 2007,

> people who criticized structural contradictions and raised their self-consciousness moved online first. In particular, the clear expression of intention and information sharing bulletin board culture learned through the 1980s moved online. What's important is that individual opinions, not collectivist voices, were able to pour out like a flood on cyber bulletin boards.[42]

38 Driscoll, 137.

39 Jo, "H-mail," 308.

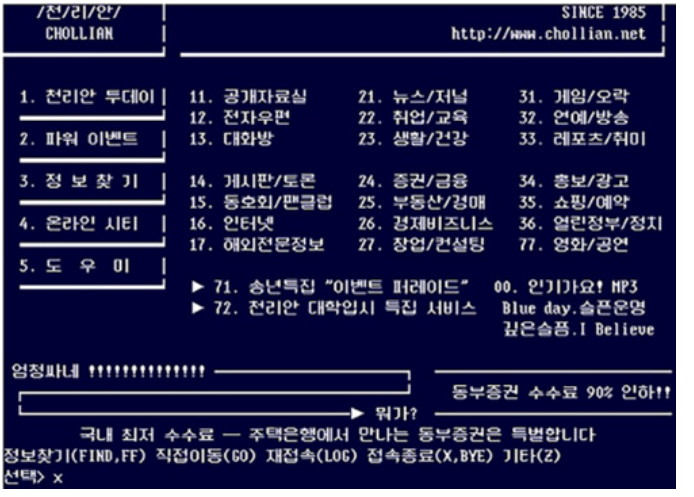
40 Jo, 310.

41 Jo, "Computopia and its Discontents," 417.

42 Cho Han, "Cultural Studies of the Internet Age," 36, quoted in Jo, "Co-Construction," 222.

By the early 1990s, these proto-portal sites had become the main feature by which people used computer terminals or home PCs, with four popular domestic services – Chollian, Hitel, NowNuri, and Unitel – arising during this time. For a brief period of time, the companies operating these services provided the terminals to users to promote the services, following the successful French Minitel model in which millions of terminals were distributed. These were initially free and later changed to monthly fees. By 1989, there was "explosive popularity" for new BBS services, as noted in a report by the *Hankyoreh* newspaper.[43] (One such board was called *Hankyoreh BBS* and scanned articles from the newspaper itself to upload them.) The early 1990s was known as the heyday of "PC communication" (*PC tongsin*) in which users would log on to their favorite bulletin boards via modem, and chat with club members or strangers in simple blue-screen text-based interfaces, as seen in Figure 3 below.

Figure 3: Common interface of Korean electronic bulletin boards of the early 1990s, known simply as the "blue screen." From this page, users could click through to various other parts of the BBS service, such as clubs, open bulletin boards or information pages on topics like real estate, finance, entertainment, job-hunting, and others.



From "The internet turns 20" Samsung Display Newsroom, August 10, 2011. https://news.samsungdisplay.com/7245.

43 "Private BBS Explosive Popularity", *The Hankyoreh*, August 17, 1989.

BBS services were popular with office workers in a variety of ways. Computer-literate, urban, and consumer-oriented office workers were a target market for many of the services which also hosted and created generic worker sections. One group on the Nownuri platform was created so that office workers could have "a space where [they] can support each other," according to the founding member.[44] The club's membership spanned "all walks of life, from the self-employed to office workers, tax accountants, interior designers, legal advisors, and broadcasting station producers … they not only share daily life information but also strengthen their friendships." The Nownuri platform also launched its own worker-centered poral in the same year, called "Now Business Club," offering "sections such as 'Cyber Salaryman,' which includes news, weather, horoscopes, everyday English, and 'Essential Salaryman Information.'"[45]

As one blog of a former office worker noted, even in 1996, his company did not yet have LAN; they used dial-up modems in the office to search for files via BBS. At home after work, he would join a club on one of his own paid services, the Office Worker's Club. Although it had a dull name, the club members were "all poets and writers," who could "express the joys and sorrows of work."[46] This kind of sociality surrounding bulletin boards is still very present on the South Korean internet today, and, as I suggest further in this chapter, plays a part in how corporate technologies are tailored to civil society norms.

One of the appeals of BBS services was meeting strangers – often of the opposite sex. One newspaper account described how in an "Office Workers Club" two people were chatting about work-related matters and then had an "offline meeting" at a pub in Seoul. "Mr. A and Ms. B tied the knot on November 30th of the same year. On their wedding day, the electronic bulletin board was filled with congratulatory messages."[47] The self-forming qualities of BBS at the time also reflect different social categories by which people could identify themselves online. One of the earliest clubs formed in 1989 was for professionals and office workers. The bulletin board had its own sub-areas, such as worker "vents" (*punyeom*).[48] A 1992 report about increasing women's participation on BBS noted that on one Office Workers Club server, a group of women created their own "Old Maid's Corner" (*nangjabang*), where they could share problems with dating and marriage openly with people in

44 "Nownuri's 'Halfway Begins' … A Meeting Room for Office Workers in Their 30s," *Korea Economic Daily*, September 19, 1996.

45 "'Now Business Club' for Office Workers to be Launched in April," *Dong-A Ilbo*, March 31, 1997.

46 "Communication in 2010 vs 1996," *Epiphany of Babjang* blog, September 4, 2010. https://blog.naver.com/jbob70/120114454492.

47 "'Shall we go on a Blind Date?' Much-Remembered Chollian, Comes to an End after 39 Years," Financial News, July 7, 2024. https://www.fnnews.com/news/202407270641118384.

48 "Worker Clubs," *JoongAng Ilbo*, October 15, 1992.

similar situations.[49] Here, early BBS showed examples of a range of different forms of phatic communion among strangers meeting on the basis of their individual status as office workers as well as shared group identities, such as gender, by which they could self-segregate. Small, exclusive clubs in this regard were particularly important for early stranger-based connections in networked spaces, including separate men's and women's themed groups.

The influence on corporate internal culture and management by increasing practices on BBS usage is difficult to assess. One 1996 news report discussed a corporate slander campaign that unfolded across an open bulletin board advertisement within specific clubs.[50] What we might be familiar with today as digital activism at the time was described as "ant legions" that attacked corporations online. These new powers were causing "headaches" to different companies as they exerted continuous pressure across different bulletin boards. The newspaper reported that employees of industry competitors were likely using different boards to slander each other's companies.

BBS is an important touchstone in the history of South Korean digital culture. It was, as Dongwon Jo has pointed out, first formed from government email systems developed by DACOM intended for corporate users; proto communities of hobbyists were then commercialized by media companies which turned them into mass platform services.[51] Office workers were central to their popularity, both as paying users and as emotional contributors who used it for channeling their sentiments about intensive corporate work cultures at the time. From the point of view of phatic communication, I note that BBS forms of communication, which included structures like chat rooms, email, forums, and specific channels, went largely unnarrated by other institutions; it was the users' own efforts to connect with strangers which generated the stranger-based forms of communion and proved popular for channeling sentiments.

Groupware and the corporatization of democratic sociality

While BBS largely defined the burgeoning civic internet in South Korea in the early 1990s, corporate spaces were being transformed by computer networks and new office productivity software in their own ways. The first wave of this occurred using BBS networking and software within companies, through what were known as "closed user groups" that could have been accessed through Telex terminals, such as

49 "Women's Participation on PC Communication is Increasing," *Dong-A Ilbo*, July 7, 1992.

50 "PC Communication Users [Get] Headaches by Slander Campaigns," *Chosun Ilbo*, October 9, 1996.

51 Jo, "Citizen Digital Culture."

in Figure 2 above.[52] News reports at the time discuss the popularity of the closed company groups which operated on national networks and could link many offices, restricting membership to employees or contractors at a relatively low cost.

However, more significant changes came with the advent of what was called groupware. Groupware was originally an American concept associated with new humanist movements and thinkers in the Whole Earth catalogue, developing as a concept throughout the 1980s.[53] A more technology-specific definition and management-centric function would take hold by the late 1980s. Groupware would become defined, essentially, as any suite of software and technology that included functions like electronic meetings, teleconferencing, telework, electronic mail, electronic flipcharts, and electronic decision-making.[54] These technologies were not just part of technological advancement but accompanied the broader organizational changes that were taking place globally, reflecting the "evolving organization of the future that includes flatter hierarchies, network style, and international flavor."[55] Groupware would become packaged in a commercial software with the release of Lotus Notes in 1989. Lotus Notes had many features, including calendar, email, and a shared database function that would allow teams or organizations to replicate a shared database in different geographic locations.

Groupware also began to take off in South Korea in the early 1990s under the borrowed term *geurub-we-eo*, with both foreign and domestic companies creating new lines of software for corporate users. Alongside Lotus Notes in the Korean market were companies Handysoft which produced HandyOffice and Picosoft which produced a product called Master for Workgroups. Similarly, large conglomerates also began to put out their own in-house groupware packages such as Samsung's Single or Ssangyong Motor's CyberOffice. These all were part of discourses at the time that painted their developments using terms like office automation (*samujadonghwa*), electronification (*jeonjahwa*), and paperless offices (*seoryu obneun samusil*).

Many of the first journalistic accounts to cover groupware in the early 1990s highlighted the great strides which were being made to rapidly transform the office of the nation's "lighthouse companies," large companies that set examples for others to follow. By the mid-to-late 1990s, groupware was being hailed as part of a "new office revolution," both in reference to the new functions and abilities for companies as well as the growth of the internal market, which was forecast

52 "CUG Service Use Surges," *Maeil Business Newspaper*, January 19, 1993.

53 See for example Esther Dyson, "Groupware," *Whole Earth Review* (Fall 1989): 105–108.

54 Robert Johansen's *Groupware: Computer Support for Business Teams*, published in 1988, would largely popularize the idea of groupware that many office workers have become used to today. However the origins of groupware as a concept were more open-ended and not focused on business uses per se.

55 Johansen, "Groupware: Future Directions," 221.

to reach around 600,000,000 Korean won (or around $50 million dollars at the time).[56] Conglomerate IT units that had developed custom groupware systems for internal uses started to commercialize these for others, even marketing them overseas. By 1997, the *Maeil Business Newspaper* would report that competition was already fierce among many companies for the groupware market, particularly as small- and medium-sized companies as well as municipal governments across the country sought to computerize.[57] While newspapers covered the developments of groupware in South Korea, their accounts also reflect a positive view of corporate advances as they could stand metonymically for the development and globalization of the country as a whole.

Beyond assumptions about the general uptake of computers and groupware processes in offices, it is difficult to assess how exactly groupware changed the dynamics of office sociality within companies at the time. An article from 1997 titled "The Wind of Groupware" gives some indication. It reported that "groupware is a software that allows all company employees use the computer network, electronic mail, electronic meeting, calendar management, document management, workflow management, etc."[58] One junior worker at a bank was quoted in another report about groupware as saying that "If you attune closely to the electronic bulletin board, you can get a lot more information than overhearing your boss or coworker. The image of starting work with a cup of tea where everyone chats in the lounge [in the morning] is gradually disappearing."[59]

Discourse about democratic office communication increasing was also evident in the early 1990s. A 1992 column entitled "The Employee" in the *Dong-A Ilbo* noted that computer messaging services as part of groupware could solve a problem in large conglomerates where the distance between upper managers and junior staff was increasing.[60] One of the ways this could be overcome was the new communication portals that allow employees and senior executives to chat. The column reported that at one conglomerate, Kumho Group, "the employees of all of their subsidiaries could directly send complaints or suggestions to the chairman or senior managers using a system known as 'Office Vision.'"[61] Using progress in office automation, the group was hoping to create "direct conversations" between employees and the leadership which would protect individual privacy. At Daewoo Securities, it was reported, at the central personal computer in each office, employees could input

56 "Groupware Leads the New Office Revolution," *Maeil Business Newspaper*, April 5, 1996.

57 "Groupware Market Is Getting Hot," *Maeil Business Newspaper*, June 20, 1997.

58 "The Wind of Groupware," *The Hankyoreh*, June 9, 1997.

59 "Groupware is Changing the Image of the Office," *The Hankyoreh*, November 24, 1994.

60 "The Sawon: Small Voice, Listens Loud," *Dong-A Ilbo*, April 26, 1992.

61 OfficeVision is listed as a proprietary service of Kumho Group, but it was also the name of a major IBM office automation program released at the same time in areas including South Korea.

their suggestions or difficulties which would then be sent to the related managers directly through the bulletin board system. The article reported this as the development of an "internal speech-highway" (*sanae-oenro*).

Thinking through these few examples from the perspective of phatic communion, it is evident that advances in communication between different members of a large organization were meant to soften or warm the more mechanical aspects of office automation happening at great pace with the embedding of groupware in everyday work. It is worth observing that groupware would be both the cause and solution to feelings of disconnect in the new digital workplace. That is, software would change the sense of an organization from face-to-face sociality to a large corporate network bound by devices, permissions, usernames, and larger-scale formal hierarchies. So too could it recreate a sense of intimate connection – in the case above, between the junior employees and upper executives who could now share ideas via a special system which would span their physical as well as organizational gaps via the metaphor of face-to-face talk. This kind of emphasis thus combines both communication and technology together to re-animate the intimacy of office relations – albeit in a rather abstract and hypothetical way often in reference simply to "those above" and "those below" (*wuit-saram*, *aret-saram*). Particular mention about the role of young employees is likely indicative of a greater sense that young workers needed these democratic channels, especially after their important role in democratization protests of the late 1980s. One article from 1992 noted that companies were beginning to change their style, moving from authoritarianism to autonomy in a "consciousness revolution," facilitated in part by new corporate systems.[62] Such narrative refrains would be common even in the twenty-first century.

Corporate discourse at this time was partially parasitic of wider democracy fervor. One new feature that was reported in the mid-1990s about corporate groupware was the *sinmungo* or citizen's petition. Normally something proposed in the civic or political sphere, the *sinmungo* provided the ability to submit online petitions directly to their bosses or executives about changes they would like to see in the office. One company, Samsung SDS, set up a "corner" called "What I hope … to the president," where presumably the president of the company was listening to suggestions as well as complaints. ("Corner" was a phrase used on civilian BBS portals.) A 1992 article listed the various types of "proposal systems" being introduced inside companies, including things like "Door for one's heart," "Idea Man," and "Open Door," as reflections of new interest in computer-mediated feedback.[63]

A 1997 report noted that after one company's bulletin board raised concerns about low salaries compared to others, the company president left a message on the

62 "Towards an Open Society," *Dong-A Ilbo*, August 15, 1992.

63 "Companies Expanding Internal Suggestion Systems," *Maeil Business Newspaper*, May 21, 1992.

bulletin board saying, "We will have the highest salaries in our group in five years."[64] Another account from 1997 described how companies were now seeing themselves as "cyber offices" as they started to expand social offerings, like special-interest clubs, to employees. Employees would form small groups within the company, using the groupware as a place to introduce themselves and share discussions.[65] It is worth noting here that rarely if ever are details given of what exactly workers would actually discuss on the platforms or portals, but it seemed sufficient to note that the existence of the portals as means to communicate would be evidence for the broader public that companies had bridged two contradictory but co-occurring concepts at the time: mechanical ideas of connection through computerization and warm human connections animated by democratic interest, both within a single corporate milieu.

Ongoing dynamics between regime and refuge

In the final section, I turn to some post-millennial developments in the ways that sentiment is channeled at work. My focus here is not to directly trace the development of corporate channels to the present, but to suggest that the poles of regime and refuge are still useful to think with, even as the physical sites, technological means, and practices around phatic communion among office workers have shifted.

A 2006 article in the *Dong-A Ilbo* weekly magazine highlighted the rise of salaryman "refuge" (*suimteo*) websites which had become popular with office workers in the internet era.[66] A number of new websites that touted forums exclusively for office workers were available, including www.salaryman.co.kr, www.cool-life.co.kr, and www.kimdaeri.co.kr (all of which are now defunct). These were reported to have been visited by 200,000 to 300,000 office workers a month. One office worker interviewed described how his routine of visiting the site had integrated directly into his regular work schedule:

> When I get to work, I grab a cup of coffee, sit down, and turn on my computer. Then, I head to the online salaryman website. I check the "Attendance sheet Board" to see who's arrived first, and announce that "Sommer (ID) is here." I click through the news briefing to catch up on major news stories. Then, I head to the "Shout to People" section of the story board to briefly vent my frustrations and even briefly check out the heartwarming love stories that have been posted all night … In that way, browsing the office worker site every morning has become my daily commuting ritual.

64 "Corporate 'Online Petitions' Are Spreading," *The Hankyoreh*, February 5, 1997.

65 "Ssangyong Information's Cyberclubs Are Popular," *Maeil Business Newspaper*, July 20, 1999.

66 "Click! Cyber Refuges, 'Come On In,'" *Weekly Dong-A Ilbo*, April 4, 2006.

As much as a refuge is understood as outside of work and in contrast to official work channels, this example shows how closely it became integrated with work practices and the workplace itself. It also reflects the ways that elements of work had started to replicate themselves through sites, creating quasi-fantasy workplaces on the sites, where employees would check themselves in, read news, and even meet up with other site members in ways similar to a regular company. A CEO of one of the sites described the emotional refuge functions of the sites directly: "I created the site with the hope of providing a space where office workers in their twenties and thirties, who often experience the most 'work overload,' can come together … relieving [their] sighs and joys and sorrows." One key aspect of the sites was precisely to allow workers spaces to vent to each other through dedicated sub-channels: there were titles like "Shout to Somebody," "Shout to Society," and "Talkbox." One psychiatrist interviewed for the article noted that the idea of communion with actual co-workers could backfire and that participating on anonymous virtual channels was reflective of a "desire to find a method of relief for confessing one's pent up inside" (*dapdaphan sok*).

Turning to the emotional regime, in the early 2010s, large domestic conglomerates had started to develop anonymous, internal platforms, perhaps in response to the rise of salaryman websites. The conglomerate LG had something called LGIN and SK one called TokTok (which sounds like "talk-talk"). According to a news report in 2013, TokTok served as an "anonymous bulletin accessible without a log-in process [to] provide a venue where employees can post complaints without reservation and freely suggest ideas about corporate culture and management."[67] Samsung had a variety of messaging and board services across their internal groupware throughout the 2000s, including services like ChatOn, MySingle, LiVE, Family Samsung, or Communicator. The anonymous board known as LiVE was developed with knowledge that employees would not participate if they believed the management was overhearing. A company executive was reported in 2013 saying that "capturing or dragging Web pages with the mouse [wasn't] allowed," to indicate that no one could save or circulate what had been written on the anonymous channel.

NHN, the forerunner of what is now called Naver, South Korea's largest search and portal giant, used mostly in South Korea, was another such company. In the 2010s, NHN had developed its own anonymous internal messaging board which employees used to chat with each other at work. According to a former NHN employee I interviewed, one anonymous message that stated how much the employee liked working at the company for its various perks drew rebuke from an executive. The executive thought that that meant the employees had too much time on their hands and ultimately shut down the anonymous board. Two workers at NHN left the company to establish a replica platform called Blind as an independent, anonymous chat

67 "Companies Using Intranets to Review Criticism, Get Ideas," *Dong-A Ilbo*, February 12, 2013.

application with closed workplace channels accessible via mobile phones.[68] Blind was established in Palo Alto, a demonstrable sign of a refuge from the South Korean legal system and as a signal to South Korean users that the United States would offer more protection for free speech (which was helped by a patented hashing algorithm that kept their identities anonymous from even the platform).

Blind launched in 2013, open only to corporate workers, who were verified with their corporate email addresses. They would receive access to both an open channel for all users and closed channels exclusive to their own companies. These company-marked channels replicated internal electronic bulletin boards. The developer's original communications promised that the platform would "open the voice of the worker" and end "retaliation culture," in which workers were afraid to speak out for fear of being punished.[69] Blind's concept quickly took off as a safe refuge outside of management retribution and led in some cases to public scandals involving *gapjil* ("abuses of power") by a high-ranking executive or leader.[70] In the wake of Blind's success as a corporate refuge platform – with more than 8 million users at more than 300,000 registered organizations in South Korea, the United States, and most recently India – companies have started to respond. Human resources managers I have spoken to on the topic since 2021 have largely tried to move their employees away from using it as its very ephemerality is a challenge to the (supposedly) enduring norms of workplace social relations. They have described how the perceived authenticity of anonymous expression of sentiments – something desired in anonymous surveys conducted by management – is dangerous. One suggested that the long-term impact of such platforms becoming regularized, and not just venues for blowing off steam, would be catastrophic, particularly as anonymity had not led to positive notions of communion but to verbally abusive forms, especially amongst employees within and across companies. In that light, he noted to me by email that "if an application grows with hate, detest, and personal attacks as its basis, I am certain it can never be commercially, or socially successful." Despite this, I have heard of many cases in which executives or owners participate passively in Blind to overhear the intimate confessions of their employees to each other. Another interviewee noted that "CEOs with thin ears are often swayed by Blind and can make wrong decisions."

---

68 Interviews with founders on Blind's history (in Korean). https://platum.kr/archives/20043.

69 "Amidst the Popularity of the Office Worker's Anonymous Channel, Blind, Profitability and Stability Remain Hidden Challenges," *The Chosun Economy*, May 6, 2015.

70 For instance, the "nut rage" incident of 2014, in which an airline executive forced a departing flight to return to the boarding gate over poorly plated macadamia nuts, originally broke through Blind by virtue of an employee sharing the details. At the height of the MeToo movement in 2018, an executive at the Kumho Asiana conglomerate was outed on Blind in a significant number of accounts within the company's closed channel.

It is clear, however, that some companies have responded in new ways to mimic the popularity of Blind. In 2018, Samsung SDS, a major IT subsidiary of the Samsung Group, released its anonymous board called TALK with similar features. LG Innotek, another IT service affiliate, did the same with a service called Inno Voice in 2023.[71] A representative at one large conglomerate I spoke to said they tried to minimize Blind's usage by simply becoming more transparent with their management reporting, such as by giving employees the raw data of surveys rather than well-designed PowerPoint reports.

As one newspaper from 2021 notes, companies "tremble" at the thought of Blind, given the threats to their reputations, the circulation of rumors, the leaking of confidential information, and the potential erosion of employee relations.[72] This gives some room to think about the emotional poles constructed by regimes and refuges. If Reddy's classic image of refuge is of a space in which individuals are free to share their emotions outside of societal norms, today's Blind is not just the inheritor of early 1990s BBS groups or even the DIALOG system that was documented by Zuboff in the early 1980s. In some senses, Blind is becoming its own kind of twenty-first-century regime, built up through shifts in media usage, platform expansion, and the propensity for users to attack each other anonymously in mob-like ways (despite its initial intention to move away from such practices). Moreover, Blind has expanded beyond just a work channel: it now hosts hundreds of special-interest channels on consumer and society topics, has its own dating service for corporate users, and has a corporate review section by verified employees, but which companies can also pay to monitor and curate.

While certainly not at the level of a political regime or corporate power, the shift from intimate, protected forms of communion among co-workers to a highly commercialized platform with millions of users is important in two senses: one, as the popularity of Blind grows, its image not just as a site for anonymous talk, but for the possibility of genuine communion, may fade. There are indeed smaller, less well-known channels and platforms that corporate users have started to seek out – as new refuges – to find like-minded anonymous strangers, such as Kakao open rooms and private, closed chatrooms among industry professionals or even friends or alumni groups. Two, it reflects how issues of phatic communion under computerization are dependent not just on the state of technological design but on the broader political economy of technology in which they are embedded. In the 1980s, BBS groups could appropriate private bulletin boards at a time of open-source software, dial-up connections, and the availability of local area networks. In the twenty-first century,

71 "You Upload These Things? Looking at Samsung's Anonymous Board," *Daum Castpic Blog*, September 20, 2024. https://v.daum.net/v/1gEys0e7yM.

72 "Sparks from Blind Fly: Companies Monitor Posts and Block Emails," *Yonhap News*, March 21, 2021.

these dynamics have changed considerably, particularly under platform logics and corporate media control. If phatic communion is arguably a human universal, how it will be experienced, narrated, or appropriated in the future in the realm of digitized work, and how clearly we may distinguish regime from refuge, is an ongoing area of concern not just for analysts but for participants as well.

Conclusion

This chapter has chronicled South Korea's workplace computer age from the perspective of communication channels to understand the importance of relational dynamics in articulating a vision for computerization as well as escapes from it. While minor technologies like bulletin boards or chat rooms are relatively simple innovations in the history of computerization, they nevertheless reveal complex dynamics around the narration and expression of workplace sentiments that are ultimately central to any history of computerization. Emotional control – from new discourses around the fascination with devices to ideas that individuals should adapt themselves to new technologies – is crucial to state or economic projects; however, emotional control can never fully outpace the fact that even simple forms of communion can be created by small gestures of connection (exhibited by the term phatic communion which I have used throughout the chapter). I have shown how phatic communion can be leveraged on both fronts: through the imaginaries created by the state and corporations of new connections afforded by corporate networks and national imaginaries, as well as small-scale forms of spontaneous or ephemeral communion witnessed on private messaging boards or channels that were safe from public scrutiny or managerial evaluation.[73] State, corporate, and media discourses rarely touched on changing gender dynamics witnessed elsewhere around the world, but backgrounded assumptions that the corporate social order would largely stay the same as it was. BBS boards did not necessarily provide a space to radically question these norms, but they did afford spaces for workers to cultivate their own stranger-based connections. Gender separation across sites and channels continues to mark the South Korean internet today.[74]

---

73 There is a parallel story reported by Sunyoung Yang of satirical phatic connection by online users in the 1990s. Some internet users lampooned government informatization campaigns by showcasing their banal or dull home computer settings, labeling themselves as "freaks," on niche internet bulletin board sites. See Yang, "Loser Aesthetics," 861.

74 Sites and channels today can be described as "male-dominant" (*namtang*) or "female-dominant" (*yeotang*). More recently female-dominant channels have more actively sought to push back against patriarchal social norms. See discussion of Megalia movement in Jung, *Flowers of Fire*, 121–27.

This chapter has largely looked at news accounts from the 1980s and 1990s, which have provided windows onto both discourses of nationalist development and new practices in civil and consumer society. This is by no means a complete account of this time period, and there may indeed be many variations on different kinds of channels, particularly at individual companies or individual "virtual clubs" for office workers (*jikjangin dong-ari*). Many BBS services are now completely offline and their records largely unavailable; likewise corporate records of internal messaging boards may be unlikely to see the light of day without careful access or a keen sense of media archeology on how to reanimate them. This is in some ways a reflection of the nature of phatic communion itself, for which brief, fleeting messages of connection are not meant to be preserved or archived. A next step may be to seek out the personal accounts of office workers themselves who crisscrossed corporate groupware and private bulletin board systems in the 1980s and 1990s to understand their experiences of both. Nevertheless, I have suggested that it is not only fruitful but necessary to think about office place computerization in the context of broader changes in civil computer practice, and vice versa, to think about civil computer practice in the context of corporate channels of communication. Similarly, I have found it helpful to attune to minor technologies of the computer era which are often left out of broader histories of machines and networks. Listening to these channels can help us uncover forgotten connections and re-narrate our own histories of computerization.

Acknowledgements

The research for this chapter was supported by a Senior Fellowship at the University of Graz in 2023. This work was also supported by the Core University Program for Korean Studies of the Ministry of Education of the Republic of Korea and the Korean Studies Promotion Service at the Academy of Korean Studies (AKS-2023-OLU-2250003). The original presentation benefited from helpful comments from Katharina Oke. I would also like to thank Dongwon Jo for his insights connecting the corporate context to broader internet and societal context of the 1980s and 1990s, as well as Seri Lee, Wong Kyun Chang, and Christiane Berth for their helpful suggestions on earlier drafts.

Bibliography

Cho Han, Hye Joang. "Cultural Studies of the Internet Age: On Identity, Scenes, and New Society" [Inteonet sidaeui munhwayeongu: juche, hyeonjang, geurigo saeroun sahoe-e daehayeo]. In *Internet and Asian Cultural Studies*, edited by Hye Joang

Cho Han, Heewon Kim Jung, Sangmin Hwang, Geon-ha Park, and Taeji Yoon. Yonsei University Press, 2007. In Korean.

Chon, Soo-jin. "A Study on the Relationship Between Office Automation and Secretary's Role" [Samujadonghwae ttareun biseoui yeokhal byeonhwae gwanhan yeongu]. *Secretary-Office Management Research* 5 (1997): 131–48. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE00960860.

Driscoll, Kevin. *The Modem World: A Prehistory of Social Media*. Yale University Press, 2022.

Hicks, Mar. *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing*. MIT Press, 2017.

Homberg, Michael. "Digital India: Swadeshi-Computing in India since 1947." In *Prophets of Computing: Visions of Society Transformed by Computing*, edited by Dick Van Lente. ACM Books, 2022.

Jo, Dongwon. "Co-Construction of Active User and Information Technology: A Case of BBS Users" [Neungdongjeog Iyongjawa Jeongbogisul-Ui Sanghoguseong: Jeonjagesipan Iyongjaleul Jungsim-Eulo]. *Media and Society* 21, no. 1 (2013): 184–237. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE02114129

Jo, Dongwon. "H-Mail and the Early Configuration of Online User Culture in Korea." In *The Routledge Companion to Global Internet Histories*. Routledge, 2017.

Jo, Dongwon, "Citizen Digital Culture and the Digital Market Logic of Freedom, Openness, Sharing, and Participation in the 1990s" [1990nyeondae simin dijiteol munhwawa jayu: gaebang, gongyu, chamyeoui dijiteol sijang nolli]. *History of Cultural Science* 110 (2022): 107–37. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE11133518

Jo, Dongwon. "Computopia and Its Discontents: Dual Narratives in South Korea." In *Prophets of Computing: Visions of Society Transformed by Computing*, edited by Dick Van Lente. ACM Books, 2022.

Johansen, Robert. *Groupware: Computer Support for Business Teams*. Free Press; Collier Macmillan, 1988.

Johansen, Robert. "Groupware: Future Directions and Wild Cards." *Journal of Organizational Computing and Electronic Commerce* 1, no. 2 (1991): 219–27. https://doi.org/10.1080/10919399109540160.

Jung, Hawon. *Flowers of Fire: The Inside Story of South Korea's Feminist Movement and What It Means for Women's Rights Worldwide.* BenBella Books, 2022.

Kendall, Laurel. *Getting Married in Korea: Of Gender, Morality, and Modernity*. University of California Press, 1996.

Kim, Hak-Sun. "Time Technology in Acceleration Societies: An Examination of 1980s South Korea" [Gasokhwa Sahoe-Ui Sigan Tekeunologi]. *Society and History* 128 (2020): 167–202. In Korean.

Kim, Han Sang. "Technopia: Discourses on Automation and the 1980s New Mobility System" [Tekeunopia: 1980nyeun-Dae Jadong-Hwa Damnon-Gwa Saeroun Idongchegye]. *Critical Review of History* 113 (2015): 234–59. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE06566057

Kim, Min-ok, and Cho, Gwan Yeon, "Formation and Change of the Culture of the Early Online Communities" [Chogi ollain keomyuniti hyeongseonggwa tongsinmunhwaui byeonhwa: gesipangwa donghoin keomyunitireul jungsimeuro]. *Woonkwang Journal of Humanities* 4 (2017): 5–33. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE10705935

Kim, Sang-Hyun. "Science, Technology, and the Imaginaries of Development in South Korea." *Development and Society* 46, no. 2 (2017): 341–71. http://www.jstor.org/stable/90013933.

Lemon, Alaina. *Technologies for Intuition: Cold War Circles and Telepathic Rays*. University of California Press, 2017.

Liu, Alan. *The Laws of Cool: Knowledge Work and the Culture of Information*. University of Chicago Press, 2009.

Markussen, Randi. "Constructing Easiness – Historical Perspectives on Work, Computerization, and Women." *The Sociological Review* 42, no. 1 suppl. (1994): 158–80. https://doi.org/10.1111/j.1467-954X.1994.tb03415.x.

Moon, Seungsook. *Militarized Modernity and Gendered Citizenship in South Korea*. Duke University Press, 2005.

Morris-Suzuki, Tessa. *Beyond Computopia: Information, Automation and Democracy in Japan*. Kegan Paul International, 1988.

Na, Misu. "The Cultural Construction of the Computer as a Masculine Technology: An Analysis of Computer Advertisements in Korea." *Asian Journal of Women's Studies* 7, no. 3 (2001): 93–114. https://doi.org/10.1080/12259276.2001.11665911.

Park, Jinhee. "The History and Role of Civil Society Movements Related to Science and Technology" [Gwahakgisul gwallyeon siminsahoeundongui yeoksawa geu yeok-hal]. *Science and Technology Studies* 4, no. 1 (2004): 111–40. In Korean. https://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE01209365.

Reddy, William M. *The Navigation of Feeling: A Framework for the History of Emotions*. Cambridge University Press, 2001.

Rheingold, Howard. *The Virtual Community: Homesteading on the Electronic Frontier*. Addison Wesley, 1993.

Schirvar, Sam. "Machinery for Managers: Secretaries, Psychologists, and 'Human–Computer Interaction', 1973–1983." *BJHS Themes* 8 (2023): 97–110. https://doi.org/10.1017/bjt.2023.10.

Stein, Jesse Adams. "Domesticity, Gender and the 1977 Apple II Personal Computer." *Design and Culture* 3, no. 2 (2011): 193–216. https://doi.org/10.2752/175470811X13002771867842.

Van Lente, Dick. *Prophets of Computing: Visions of Society Transformed by Computing*. ACM Books, 2022.

Van Oost, Ellen. *Making the Computer Masculine*. Springer, 2000.

Wilf, Eitan. "Phaticity as a Technical Mystique: The Genred, Multi-Sited Mediation of the Innovation Architect's Expertise." *Journal of Cultural Economy* (2021): 782–98. https://www.tandfonline.com/doi/full/10.1080/17530350.2021.1927148.

Yang, Sunyoung. "Networking South Korea: Internet, Nation, and New Subjects." *Media, Culture & Society* 39, no. 5 (2017): 740–49. https://journals.sagepub.com/doi/10.1177/0163443717709443.

Yang, Sunyoung. "'Loser' Aesthetics: Korean Internet Freaks and Gender Politics." *Feminist Media Studies* 19, no. 6 (2019): 858–72. https://doi.org/10.1080/14680777.2018.1503191.

Zuboff, Shoshana. *In the Age of the Smart Machine: The Future of Work and Power*. Basic Books, 1988.

Zuckerman, Charles H. P. "Phatic Violence? Gambling and the Arts of Distraction in Laos." *Journal of Linguistic Anthropology* 26, no. 3 (2016): 294–314. https://anthrosource.onlinelibrary.wiley.com/doi/epdf/10.1111/jola.12137.

The computerized office: Emotions, gender, and technology in Latin America, 1980–2000

Christiane Berth

Introduction

> Ten years ago, screens were objects that raised curiosity. Today they are considered as common as telephones or typewriters. … In public and private administration, banks, insurance companies, telephone exchanges, travel agencies, these electronic devices are used as a work tool. … The enthusiasm of the supporters of cathodic screens is counterbalanced by the protest of female users – it is generally women who operate them – and male users.[1]

This was how a report on the "era of the screens" published in 1984 in the magazine of the Colombian Association of Computer Users (ACUC) started. Screens had become common in Colombia during the computerization of office work and provoked emotions ranging from curiosity and enthusiasm to fear and rage. The author of the report described screen work as an activity mainly realized by female office workers.

In this chapter, I analyze the interplay of emotions, gender roles, and technology during the rise of the computerized office between 1980 and 2000 in Latin America. I argue that the 1980s were a period of transition and uncertainty, regarding technological choices, communication, and gender roles. Firms, as well as specialized magazines for secretaries, office technology and computer science, established an emotional repertoire for computer use. This repertoire included desirable emotions such as curiosity or joy and undesirable emotions such as insecurity or fear.[2] At the same time, different emotional communities formed at the workplace in response to work experiences, information policy of the firms, and prevalent technological visions. However, these communities could not always express their emotions openly, especially when their feelings clashed with official emotional repertoires. This imbalance is reflected in the sources. Historical documents from firm archives and professional magazines primarily cover uplifting emotions and only occasionally pro-

1 Translation from Spanish. "La era de las pantallas," *ACUC noticias*, January–February 1984, 34.

2 On emotions in prescriptive literature see: Stearns, "Prescriptive Literature."

vide insight into the conflicts employees experienced when their feelings contradicted the promoted repertoire. One important medium for transmitting desirable emotions and gender roles were advertisements. In the 1980s, computer firms used efficiency and technical performance as selling points in their advertising.[3] They introduced computers either as powerful technical tools or as talented co-workers with human traits. As for gender, the ads mostly assigned traditional roles to male executives and female secretaries.

In the 1980s and 1990s, the office became an important space of reflection on the future of work and communication. Drawings, photos, caricatures, and workflow diagrams formed a significant element of these predictions and also defined gender roles in office work. Historians Simone Müller and Heidi Tworek have suggested the "imagined use" as an important part of technological development. In periods when office technologies were only used by a small minority, other employees already imagined their use based on their personal observation, advertisements, or cultural representations.[4] These imaginations generated emotional reactions to computers even before their use in the workplace.

The rise of the computerized office was a global process, although temporalities were uneven. Often technological change occurred more slowly than enthusiastic experts had predicted. From the 1980s onward, transnational contact zones emerged where experts, equipment producers, and professional organizations shared knowledge but also struggled over technological choices, power, and future office work.[5] In that sense, the negotiations over office technologies were also sites of emotional encounters.[6] In this article, I focus on professional magazines, advertisements, and multinational enterprise as contact zones.

Magazines for office technologies and informatics promoted computerized devices throughout Latin America. Historians of technology have argued for analyzing the role of mediators in between production and use, such as consumer organizations or business associations. They recommend the concept of "mediation junction" to describe spaces where consumers, producers, and mediators interact.[7] I will utilize magazines about office technology as an important mediation junction since they provide a forum where experts, producers of office equipment, and executives debated the application of new office technologies. In promoting

3 Matt and Fernandez, "Technology and Feeling," 219.

4 Müller and Tworek, "Imagined Use"; Gardey, "Mechanizing Writing and Photographing the Word."

5 Prieto-Nañez, "Postcolonial Histories of Computing"; Philip et al., "Postcolonial Computing."

6 In historical research, the term has been used for cross-cultural negotiations of emotions, but I also consider it useful for interactions between humans and technology. See Gammerl et al., "Introduction."

7 Oldenziel et al., "Europe's Mediation Junction"; de Schot and de la Bruhèze, "The Mediated Design of Products."

computers with enthusiasm but also considering fear, the magazines established an emotional repertoire that influenced office workers' and executives' interactions with computers. Prominent in this repertoire were pride, joy, trust, and fear, while other emotions seldom show up. Nevertheless, rage and frustration were also commonly observed, either as reactions to technological challenges or as a result of dependency on imported equipment.

For multinational enterprises, computerization offered the chance to integrate firms technologically and increase headquarters' control over overseas subsidiaries. Taking the German multinational firm Merck as an example, I demonstrate how technological heterogeneity at the firm's various locations challenged the headquarters' desire for standardization and provoked emotional conflicts in a period of organizational restructuring. The chemical and pharmaceutical company had subsidiaries in Latin America from the 1930s, but it increased investments in Asia due to the 1980s debt crisis in Latin America.[8] Throughout the enterprise, the introduction of digital technologies occurred more slowly than experts had initially predicted. Meanwhile, executives and IT specialists struggled to make technological choices and to define standard software. At some points, the headquarters was hesitant, while individual departments introduced certain programs on their own, which increased technological heterogeneity.[9] Throughout the 1990s, however, the firm expanded and professionalized its IT expertise to ensure global communication with subsidiaries and customers.

In the next section, I discuss how global power structures shaped emotional reactions to computers and software in Latin America. Then, I analyze how firms promoted hardware and software adapted to local needs. Next, I demonstrate that computerization in the 1980s destabilized office work and gender roles. The subsequent section deals with contemporary imaginations of human–computer interactions. Finally, I show how visions of the networked office coincided with disconnections in office communication between the 1980s and the early twenty-first century. In addition to documents from Merck company archives and the firm's staff magazines, this chapter relies on advertisements in Mexican and Colombian newspapers as well as secretaries and computer science magazines from Colombia and Paraguay.

The rise of the computerized office in Latin America

The computerization of office work in Latin America occurred in a period of debt crisis and political transition. It is likely that the speed of the introduction of computers

8 Burhop et al., *Merck*, 263–64, 456–57.

9 "Connect bleibt Rückgrat der Bürokommunikation," *Merck informiert*, July 18, 1996, 4.

varied between large and small countries and large and small firms, but no systematic research has been done so far. From the 1950s to the 1970s, the American giant IBM had dominated the Latin American market for computing.[10] This was met with resistance by elites rallying for more technological independence and student movements opposing the introduction of IBM mainframes at universities in the 1970s. Critics bemoaned the high leasing rates for outdated equipment as well as the missing adaptation to Spanish language or unstable energy supply. The only Latin American country that built up a significant computer industry of its own was Brazil.[11] Other countries, among them Colombia, rather perceived the software business as a chance to compete with foreign companies and take part in a prosperous economic activity. Regional experts argued for stronger Latin American cooperation in informatics. In 1984, an international conference on informatics and sovereignty took place in Cali, Colombia, organized by the Intergovernmental Bureau for Informatics (IBI).[12] Hence, in the context of projects for technological autonomy, the choice of computers and software became a political matter.

Emotional reactions to digital technologies were influenced by global power structures.[13] In Latin American countries, the dominance of large computer firms from the Global North provoked rage and frustration. For example, in Mexico, the National Chamber of Electronic Industries and Electronic Communication (Caniece) denounced the exorbitant prices of foreign multinationals. Mexican consumers paid prices 50% higher than on the US market for computers in 1985. Mexican politicians warned that the country risked losing sovereignty by becoming dependent on the import of spare parts for computers. Therefore, they argued that Mexico needed to enhance its capacities in informatics and promote the development of domestic computer technology.[14] In Colombia, similar concerns existed. In 1984, the local firm Diselec produced a microcomputer with only 30% imported parts to send out a "Yes, we can" message to the national public.[15] Latin American elites used the fear of external dependency to argue for national computer industries

10 Cortada, *IBM*, 294–98; Cortada, "Presence of IBM."

11 Viales-Hurtado et al., "Between Matilde and the Internet"; Langer, "Generations of Scientists and Engineers."

12 "El centro de informática en América Latina," *Oficina y tecnología*, October–November 1985, 11–12.

13 On emotions and global power dynamics see Barua et al., "Introduction." Emotional history in Latin America has mainly focused on the history of dictatorship, violence, and memory but less so on economic and technological issues. Garrido Otoya, "Historia de las emociones"; Macleod and Marinis, "Resisting Violence."

14 "Mantienen dos listas de precios las empresas multinacionales: Caniece," *Excélsior*, May 15, 1985; "Urge salvaguardar la soberanía en informática," *Uno más uno*, August 8, 1985.

15 Diana Balcázar Niño, "Fabricar microcomputadores en Colombia. 'Sí, se puede' Diselec Ltda," *ACUC noticias*, July–August 1984, 30–31.

and for strengthening training capacities in informatics. Political elites cultivated emotive rhetoric centered on national pride to advance their agenda of enhancing their nations' standing in the global economy.[16] This rhetoric was also linked to anti-imperialist sentiments and international debates on the North–South divide. From the 1970s onward, technical experts, international organizations, and politicians discussed issues such as unequal access to information, monopolies in computer production, and the promotion of "appropriate" technologies.[17]

The rise of the computerized office coincided in Latin America with the debt crises of the 1980s and 1990s. Hence, the conditions for launching large technological projects worsened as governments had to cut back budgets and agree with the IMF and the World Bank on debt restructuring. The middle class feared unemployment while informal work in large Latin American cities increased significantly.[18] Hence, it is likely that the crisis strengthened fears of job losses due to computers. The emotional rhetoric of national pride persisted during crises, for example in Mexico and Colombia. Whether the economic crises slowed down the acquisition of personal computers is difficult to answer. The Colombian Association of Computer Users (ACUC) constantly monitored import regulations and invited computer firms to publish their opinions in its magazine.[19] The magazines consulted do not reflect on economic crisis and continued to promote personal computers throughout the 1980s, among them models from large US multinationals, such as IBM or HP.

Political attitudes to US influences shaped the development of computing in Latin America. Regional elites had reacted ambivalently to US influence throughout the twentieth century. In part, they had embraced US support and perceived the superpower in the north as a model for economic development. In part, they had resisted specific US influences and advocated a shift to national development and culture to protect against Americanization. Combinations were also possible, such as when elites rejected North American cultural influences but considered the US as an economic model.[20] All in all, there were distinct regional varieties in elite attitudes depending on the political regime and the economic situation. On the one hand, elites cooperated with US multinationals, development agencies, and universities. The strong presence of US computer firms on the Latin American market became visible in advertising in contemporary newspapers. In addition, many magazines for computing, office equipment, and secretaries translated articles from US

16 On emotional nationalism see Stearns, "Prescriptive Literature."

17 Homberg, *Digitale Unabhängigkeit*, 280–318; Homberg, "Elektronischer Kolonialismus"; Berth, "ITU, the Development Debate."

18 Bulmer-Thomas, "Globalization."

19 "Progreso informático en el país, 1982–1986," *ACUC noticias*, July–August 1986, 7–9; "El centro de informática en América Latina," *Oficina y tecnología*, October/November 1985, 35–37.

20 Gobat, *Confronting the American Dream*; O'Brien, *The Revolutionary Mission*.

authors throughout the second half of the twentieth century.[21] On the other hand, political elites promoted the development of software adapted to Latin American needs as a way out of dependency. In consequence, they established new research centers, degree programs, and public computing hubs.[22] Members of the elites were also responsible for decision-making over technological equipment in government agencies and large firms. Hence, their vision influenced the choice of office equipment in public administration, and state and private enterprise.

In the course of the 1980s, US multinationals occasionally adapted their advertising to the discourse on national development. For example, IBM had founded local branch offices and service bureaus in Latin America from the 1920s onward.[23] One ad from IBM Colombia stands out as it promotes computing by relying on the rhetoric of national pride. Using one iconic export product – Colombian coffee – as a vehicle, the ad argues that IBM provided technical equipment to the Colombian association of coffee producers. Hence, coffee exports were "intimately related" to IBM technology, argues the ad's main slogan. The illustration consists of a cup of coffee with the Colombian flag on the saucer, while technological devices are completely absent. The text below argues that IBM technology ensured the level of efficiency and productivity needed to be successful on the world market. By doing so, IBM contributed to "the good ideas that make our country great". In this ad, IBM Colombia took up the elites' discourse of national pride and presented itself as being identified with Colombian economic development.[24] While historian James Cortada has argued that IBM followed one global sales strategy, it seems that at least in advertising, local branches in Latin America developed their own strategies.[25] More comparative research is needed to figure out if other Latin American IBM offices reframed advertising to counter anti-American sentiments and concerns about technological dependency. As I will show in the next section, other US multinationals also adapted their marketing campaigns for Latin American audiences.

Adaptations: Infrastructure, language, and software

During the rise of the computerized office, technical and cultural adaptations of imported devices became necessary. For hardware, adaptations to local infrastructures were important, while software needed to adapt to administrative environment. To

21 See, for example, the following article translated from an English language guidebook to personal computing: "La vida del futuro en la era de los microcomputadores," *Revista Paraguaya de Informática*, 1983, 30–33.

22 "La evolución del computador," *Nueva Frontera*, March 15, 1982, 30–32.

23 Cortada, "Presence of IBM."

24 "IBM Colombia advertisement," *ACUC noticias*, July–August 1986, 55.

25 Cortada, "Presence of IBM," 53.

increase acceptance of the devices, Spanish-language versions were required. When companies failed to make such adjustments, office workers reacted negatively.

Regarding technical adjustments, computers were often hooked up to unstable energy supplies and supplemented with additional devices to ensure their protection. Electrical voltage fluctuations could damage the devices or render them unusable. To reduce this danger, maintenance firms offered special protectors.[26] A Colombian maintenance firm promoted its service with visuals showing the drastic consequences of electronic service interruptions or voltage fluctuations. Dark columns of smoke indicate that the computers were severely damaged. In one image, the computer produces a last paper flow before its death, with the message to urgently contact the maintenance firm. In another case, the drawing shows different emotional reactions of employees, either with fearful faces or unmoved, continuing the usual coffee break, which might indicate the regularity of such incidents.[27] These examples show that hardware needed to be adapted to local conditions. The same was true for software, either by including Spanish or Portuguese versions or by considering the legal and economic conditions in each country.

Figure 1: Oficina & Tecnología, December 1985–January 1986, 26.

26 "Cositas que debe saber para usar un micro-computador," *Revista Paraguaya de Informática* 1983, 25.

27 "Advertisements Ingenieria Electrónica Diselec," *ACUC noticias*, September–October 1983, 17, 30.

By the mid-1980s, US computer firms had developed special promotion strategies for the Latin American markets. For instance, in 1985–86 HP promoted a personal computer with software in Spanish using the slogan "Hewlett-Packard introduces the ideal language for the office."[28] Figure 1 shows a screen filled with the word Spanish (Español) in large letters followed by a software menu in Spanish, including word processing, email, and office communication. The text argues that Spanish was the only language you needed to learn and promised accelerated office work as well as global communication.[29] This advertisement suggests that US computer firms had begun using Spanish-language marketing as a strategic approach. At the time, they were already facing competition from Japanese and Korean companies promoting their technologies, which likely heightened their focus on Latin America's specific demands. English-language slogans in urban public spaces and advertising had often sparked opposition throughout the twentieth century, being widely perceived as symbols of US imperialism.[30] Hence, English-only technical devices were a sensitive issue. Also, in practical terms, those devices caused problems as not all office staff spoke English or were familiar with the English technical terms. Beyond language, other software features needed adaptation as well.

Latin American experts and maintenance firms considered adapted software as the basis for successful computerization. In their vision, software needed to fit local circumstances, such as the tax system in case of accounting programs. In their advertising, maintenance firms introduced an emotional repertoire ranging from pride to joy. The Colombian firm Carvajal used the English-language expression "to be or not to be" for arguing that the usefulness of computers depended on adapted software. Although admitting that it sold the US standard software packages, Carvajal promoted Colombian software as essential for a successful business operation. In part, these ads allude to national pride, for example in highlighting the prestige of Colombian software producers.[31] Paraguayan experts also related to the joy they felt when working with national software.[32] While computer producers promoted the technical superiority of their devices, maintenance firms portrayed software as key for ensuring smooth office work.

Maintenance firms also promoted their services by promising to avoid negative emotions, such as stress, rage, or confusion. "We help to program your tranquility" was the slogan of another Carvajal advert showing a relaxed businessman with his

28 Translation from Spanish "HP advertisement," *Oficina & Tecnología*, December 1985–January 1986, 26.

29 "HP advertisement," *Oficina & Tecnología*, December 1985–January 1986, 26.

30 Rinke, *Begegnungen mit dem Yankee*; Berth, "Managua – A 'Gringorized' City?"; Gökatalay, "The Cold War."

31 Carvajal is a Colombian multinational enterprise originating from a print shop in Cali. The firm was founded in 1904 and sold, among others, office equipment.

32 "Editorial," *Revista Paraguaya de Informática*, December 1986.

feet up and hands clasped behind his neck. Interestingly, this visual is a computer drawing, which shows that the firms moved from photos and drawings to images produced by graphics software. Another ad shows a confused computer to convince customers to invest in software tailored to their business needs. In the drawing, the computer is anthropomorphized and imagined as an office worker. The face on the screen has an irritated expression while it holds a mug of tea in one of the hands attached to the screen. The text argues that the performance of a computer depends on its software. Beyond that, the focus on tranquility in this advertisement indicates the existence of negative emotions and stress when software problems impede efficient work. However, executives and experts are generally portrayed as calm, which is in line with earlier representations in the late nineteenth century.[33] The choice of both hardware and software also provoked emotional conflicts at Merck in the 1980s and 1990s.

Given the rapidly changing markets, the choice of hardware was a challenge for the Merck IT department. At the headquarters alone, three different iterations of personal computer were in use throughout the 1980s.[34] Looking at the subsidiaries, equipment was even more heterogenous. In the mid-1980s some computers were unavailable in Asian or Latin American countries while others were incompatible with locally available software. Accordingly, the following computers were used in Merck subsidiaries between 1984 and 1989: TeleVideo (Indonesia), Hitachi L-470 (Japan), Apple II (Pakistan), Nixdorf 8870 (South Africa), Hindustan Computer (India), IBM (Argentina, Colombia, Guatemala, and Venezuela).[35]

Despite technological heterogeneity, Merck's IT department decided on standard software in 1984, which led to conflicts across the multinational enterprise. From the headquarters' perspective, standard software was most important for office communication, accounting, and production control, a view that is well-documented in the firm archives, which primarily reflect the headquarters' standpoint. In 1986, Merck management obtained decision-making powers over the matter, but conflicts continued. At stake were not only technical issues but also the fundamental relationship between subsidiaries and the head office. Subsidiaries aimed at making decisions autonomously and sometimes omitted informing the Merck IT department over changes.[36] Generally, documents in the firm archives mainly cover the headquarters' perspective, so it is difficult to know how much they deviated.

---

33 Marvin, *When Old Technologies Were New*, 19–23.

34 These were Sirius I, NC personal computer 6, launched in 1985, and Memorex 7006 introduced in 1989.

35 EDV-Kosten aller größeren und mittleren GMGs, December 1, 1989; Rechnereinsatz in den GMGs, Stand 12/1989, V10/112, Merck Archives.

36 Bericht der OL OD für 1984, February 5, 1985; H. Decker, Tätigkeitsbericht der WDV zum 31.12.1984, January 7, 1985, V10/2; Jahresbericht der Abteilung IVM per 31.12.1986, V10/3, Merck Archives.

From the 1970s onward, Merck's global activities had expanded significantly, which led to organizational change. This process provoked conflicts between different areas of management. In addition, subsidiaries demanded rights to participate in strategic planning in the mid-1980s and organized at the regional level, for example in the Latin American working group for electronic data processing. The regular meetings of IT staff in Latin America and at Merck headquarters forged expert networks and provided an arena for negotiation. However, the conflicts persisted. They originated over practical issues but were influenced by power struggles within the multinational in the background.

As for the practical issues, conflicts broke out after the Merck head office had introduced German software that proved unsuitable for office work in Latin America. For example, Merck introduced German sales software in Colombia that was translated into Spanish. As it was based on German economic conditions, the software did not work well abroad. Similar incidents are documented for accounting software that was unable to include special amortization options in Chile or large sums in countries with high inflation, such as Brazil. In 1985, several subsidiaries opted for different office packages than the IT department in Darmstadt, Merck's home. Several Latin American and European subsidiaries used Lotus instead, while Austro-Merck decided on Framework.[37] In 1989, Merck changed its strategy and provided subsidiaries with more self-determination over IT issues.[38] However, negotiations remained complicated in the 1990s.

Each subsidiary had a different history and culture of IT use, according to Albert Dauscher in an oral history interview conducted in 2017. Dauscher, who had been in charge of negotiating with subsidiaries in the 1990s, also explained that the headquarters perceived Darmstadt as the "center of the world," to which subsidiaries needed to adapt. But in his opinion small subsidiaries could not adapt easily. He concluded: "This is a different world, you can't say 'adapt to Darmstadt,' they have realities which we cannot influence. We have to accept them and provide support so that subsidiaries can generate benefits from these realities." In hindsight, he judged his psychological understanding and tact during the negotiations to be as important as his IT knowledge.[39] This narrative indicates again that the conflict had become emotional and was shaped by power structures within the firm.

At Merck headquarters, the SAP introduction was a controversial issue. The company magazine reported extensively on the matter. In a 1992 article, the magazine reported on the mood in the company:

37 Jahresbericht der Abteilung IVM per 31.12.1985, V10/3, Merck Archives.

38 Interview with Albert Dauscher, March 31, 2017, Minute 79, Y03–449, Merck Archives.

39 Translation from German. Interview with Albert Dauscher, March 31, 2017, Minute 94, Y03–449, Merck Archives.

> Almost everyone at Merck has heard of SAP, but only very few people have a clear idea of what it means. The opinions that you do hear, however, are often very emotionally charged and vary widely: "SAP – a disaster," say some, "without SAP we can no longer cope with the future," say others.[40]

Beyond these extremes, there was a high degree of uncertainty among employees. The changeover to SAP finally took place in May 1994.

Meanwhile, medium-sized subsidiaries relied on the software Business Planning and Control System (BPCS) in the 1990s. The magazine *Así Somos Merck* characterized the beginning of its implementation in the late 1990s as part of the preparations for facing the twenty-first century. Evidence from Merck Central America present a different review: Gerald Blasberg, Director of Administration and Finance, characterized the initial period as "chaos," marked by a lot of errors and resistance. Although in the meantime a certain degree of stabilization was achieved, Blasberg concluded that "a significant group of persons might have the following thought: Bueno para causar stress [Good to cause stress]."[41] Hence, he created a Spanish expression for the abbreviation BPCS that associated the planning software with emotional tension. The protagonists of these conflicts were male executives and IT staff. Their reports only occasionally touch on gender issues. Albert Dauscher, for example, characterized the first personal computer used at Merck headquarters as the "horror of some secretaries."[42] In doing so, he attributed computer fears to women in the lower ranks of office hierarchy.

Destabilization: Emotions, gender, and technological change in office work

In the 1980s, the arrival of personal computers destabilized office work, gender roles, and social hierarchies. The heterogeneous, quickly changing equipment reconfigured established work routines. Scholar Joan Greenbaum, in her book *Windows on the Workplace*, called the 1980s a "decade of contradictory predictions and practices."[43] On the one hand, companies launched their visions of an efficient, connected office and advertised in the press the introduction of computers into everyday business. They promised fast results, precision, reliability, and smooth communication.

---

40 "SAP-Einführung: Die Arbeit wird enger verzahnt," *Merck informiert*, October 10, 1992, 4.

41 "Informática hacia el siglo XXI," *Así somos Merck*, no. 141 (March 1998): 2, Z02 Br-67, Merck Archives; Geraldo Blasberg, "¿BPCS un mito o una realidad?," *Informa ME: Medio de información para los colaboradores de Merck en Centroamérica*, no. 190 (May/June 1996): 3, Z02 BR195, Merck Archives.

42 Interview with Albert Dauscher, March 31, 2017, Minute 30, Y03–449, Merck Archives.

43 Greenbaum, *Windows on the Workplace*, 62.

On the other hand, employees had a different experience in the reality of work: they found a technical ensemble of electronic typewriters, computers, and text machines. Hence, the technological landscape of the 1980s office included digital and analogue devices that employees combined in sometimes unexpected ways.[44] The new devices often had too little space and were connected by seemingly endless cables. In addition, the dot-matrix printers of the time made a tremendous amount of noise, making it difficult to concentrate. Finally, there were frequent data losses, whether due to interruptions in network connections or memory errors on the floppy disks. This frustrated employees, who frequently had to repeat inputs and lost time.

Throughout the 1980s, employees reacted ambivalently to the new office technologies and split into different emotional communities:[45] those who readily embraced the new technology and expressed curiosity, joy, or hope and those who reacted with fear or mistrust and struggled to adapt. Secretaries' professional magazines expressed joy over news of novel devices and the hope that technology might facilitate their professional ascent. Many of the magazines' case studies narrate an emotional sequence from initial fear to the pride of having successfully adapted to technological transition.[46] Fears originated for different reasons: on the one hand, employees feared not getting along with computers in daily work; on the other hand, they were concerned about dismissals as a result of automation.[47]

The computer destabilized gender roles in the office. Whereas the typewriter had been a clearly gendered object, it was different with personal computers. In the contemporary ads, firms presented mainly male, high-ranking users. As programming and computer sciences were gendered as male area, typing on a computer was far more attractive for male employees than using a typewriter. Acquiring a computer in the 1980s was a large investment; therefore, some companies restricted access to male clerical or managerial staff. Secretaries, on the other hand, were expected to use electronic typewriters with memory functions. However, women also appropriated personal computers and ascended within office hierarchies.[48]

Throughout the 1980s, there was a strong uncertainty about equipment choice. Some companies replaced personal computers very frequently, so employees had to keep getting used to new devices and software. In other cases, the new equipment

---

44 Bray, "Flows and Matrices, Landscapes and Cultures."

45 Rosenwein, *Generations of Feeling*.

46 "Profesional – Noticias," *Secretaria moderna*, January 1984, 7. On emotional sequences see Rosenwein, *Generations of Feeling*, 8.

47 "Nuevos roles para secretarias," *Secretaria moderna*, July 1983, 16–17.

48 "Siemens PC auf neuen Wegen," *Com. Siemens-Magazin für Computer & Communications* 3/1985, 12; Webster, "From the Word Processor to the Micro"; Christine Martius-Spitzy, *Frauenarbeit im automatisierten Büro* (Bundesministerium für Arbeit und Soziales, 1987); Bösch, "Wege in die digitale Gesellschaft."

remained unused and turned into "expensive dust catchers," as the Siemens magazine *Com* reported in 1985.[49] In a 1983 ad, a Colombian maintenance firm asked when a computer became obsolete and concluded that computers were outdated once they stopped doing their work as well and as cheaply as the latest models. Maintenance could slow down this process and hence save firms money. The firm illustrated its ad with a personal computer in a garbage can.[50] The ad addressed the concerns of executives over how to keep company equipment up to date. While the maintenance firms sold external advice, the office magazines carried information about new devices. Hence, both formed part of the "mediation junction" of office technologies.

In the 1980s, Latin American magazines for office equipment, computer science, and secretaries intensively dealt with the introduction of new technologies. Several authors promoted the idea of a revolutionary change and argued that a new era had begun, the era of computers.[51] This new era caused uncertainty among the users of office technology, for example secretaries, managers, and computer scientists.[52] The Colombian magazine *Secretaria moderna* went so far as to claim that computing had "invaded" the office, reflecting perceptions of a sudden transformation. As a result, office workers had to familiarize themselves with a new vocabulary, including screens or terminals, which is why the magazine created a section for this specialized language.[53] This section should provide readers with useful knowledge for managing technological change. A similar argument appeared in a Paraguayan computer science magazine but directed to executives. A Paraguayan IBM representative described technological transition as a challenging period for IT staff, as the introduction of a new system could potentially surpass their technical capabilities. Ultimately, he recommended information as a solution to address issues of acceptance.[54] Hence, professional magazines suggested that firms could control fears by adequately informing employees about computer technology.

---

49 Translation from German original. "PC Besitz macht noch keinen Profi," *Com. Siemens-Magazin für Computer & Communications*, 1/1985, 40.

50 *ACUC noticias*, May–June 1983, 30. See on maintenance in technological history: Russell and Vinsel, "After Innovation, Turn to Maintenance"; Krebs and Weber, The Persistence of Technology. Unfortunately, there is still no research on computer maintenance in Latin America, but beyond formal maintenance firms, informal maintenance and repair options at computer shops existed.

51 "La vida del futuro en la era de los microcomputadoras," *Revista Paraguaya de Informática*, 1983, 30–33; "La nueva tecnología. El arma para el progreso secretarial," *Secretaría moderna*, March 1984, 18–19. For the history of the idea of a digital revolution see Balbi, *The Digital Revolution*.

52 "Hacia el desarrollo de la informática paraguaya," *Revista Paraguaya de Informática*, 1983, 9.

53 "La informática invadió la oficina," *Secretaria moderna*, February 1984, 14–15; "Hablando de la automatización de la oficina," *Secretaria moderna*, August 1983, 37.

54 Galo Eguez, "La resistencia al cambio en la informática," *Revista Paraguaya de Informática*, June 1984, 14.

Magazines for secretaries and office technologies privileged those voices that reported on positive experiences with personal computers, although fears were admitted. The secretaries' magazines projected a promising future and envisioned computers as a tool that would allow secretaries to empower themselves as professionals, including higher wages, recognition, and social ascent. Already in 1983 the magazine *Secretaria moderna* predicted that secretaries needed to master electronic technology to ensure professional success in the future. In interviews, Colombian secretaries mentioned both the fear of becoming obsolete but also the opportunity to rise in the ranks of the office hierarchy.[55] A 1984 article even argued that the new technology was a "weapon for secretaries' progress." Personal computers would allow secretaries to work in teams, take over administrative tasks and cooperate closely with managers. Overall, the personal qualities of secretaries would remain important in the automatized office.[56] To conclude, the secretaries' magazines promoted the computerized office as an opportunity for career advancement. In doing so, these publications sometimes adopted narratives of technology as a way to progress and excluded negative experiences from their coverage.

Encounters: Gendered representations of computerization

Working with computers was at first an encounter with the unknown. Hence, a wide range of imaginations assigned computers personalities, emotions, or gender. Advertisements and professional magazines tried to generate trust in computers through providing information on technical efficiency or portraying them as good colleagues.

Advertisements in the 1980s promoted the computer as a useful tool for executives and secretaries, mostly reproducing traditional gender roles in office work. The visual strategies relied either on promoting the computer's technical performance or introducing it as a good co-worker to generate trust.[57] The ads frequently relied on stereotyped illustrations of men and women in the office. These depictions had a long history dating back to the introduction of typewriters in the nineteenth century. The classical visual representation showed smiling secretaries sitting at office desks while making phone calls or typing. If men were present, they appeared in a

55 "Nuevos roles para la secretaria," *Secretaria moderna*, July 1983, 16–17.

56 "La nueva tecnología. El arma para el progreso secretarial," *Secretaria moderna*, March 1984, 18–19.

57 See, for example, "TeleVideo advertisement," *Nueva Frontera*, September 12, 1983, 32; "NCR de Colombia," *Nueva Frontera*, February 18–24, 1985, 2; "Burroughs advertisement," *Nueva Frontera*, August 25, 1986, 19.

superior position giving instructions or dictating to the secretaries. These visuals show office work through a male gaze.[58]

Figure 2: Revista Paraguaya de Informática, June 1984, 35.

The significant change from earlier representations is that typing at computers was done by men and women in the office. The change of gendered writing practices is visible in a 1983 Burroughs advertisement for customer service in the computerized office. The photos show women typing in the first image and men typing in the second, while in other ads the traditional gender division persisted. For example, an IBM ad published in Paraguay in June 1984 included the classical situation of a male

58 In the 1980s and early 1990s, visual representations of office work in Latin American magazines included no female executives.

executive assigning tasks to a female secretary. The executive wears a black suit and provides his secretary with instructions while she is typing. Her face is not entirely visible as she looks at the screen (Figure 2). Overall, the gendered adscriptions of typing had begun to move in the early 1980s.[59] By contrast, visual representations of the computerized office continued to show almost exclusively white employees.

In twentieth-century Latin America, office work was an encounter of different ethnic groups. Early computer ads ignored the diversity of ethnic backgrounds among office staff. So far, my analysis has demonstrated that the depicted secretaries were predominantly white women dressed in skirts, blouses, and high-heeled shoes.[60] Historically, white women dominated as users in advertisements for household appliances, typewriters, or telephones in Latin America. These ads were directed at elite or middle-class consumers and included people from low-income districts or rural communities.[61] Historical research has revealed that Peruvian office employees were considered "white" in the early twentieth century until office work lost prestige and other racial classifications arose from the 1930s onward.[62] For the late twentieth century, no similar research has been undertaken. The Colombian secretaries' magazine *Secretaria moderna* frequently featured white secretaries on its title pages while individual portraits of office employees show principally mestizo or white women.[63]

Throughout the 1980s, firms used visual metaphors of friendly cooperation to sell computers. Advertisements communicated this through representations of individuals in dialogue with the computer while caricatures presented an imagined emotional encounter between humans and computers.[64] A 1983 advertisement for an NCR personal computer published in Paraguay shows a blond woman working on a statistical chart. With her right hand, she touches the screen. "Coming from NCR, it is more than personal" states the main slogan. The text below the photo goes on to explain that the work relationship was far more than personal as NCR offered the most advanced technology in the world.[65] In addition to the personal relationship, the ad presented technical performance as a selling point for this computer.

---

59 "IBM advertisement," *Revista Paraguaya de Informática* II, June 1984, 35; "IBM advertisement," *Revista Paraguaya de Informática* I, 1983, 44; "Burroughs de Colombia advertisement", ACUC noticias, September–October 1983, 5.

60 "IBM advertisement," *Revista Paraguaya de Infórmatica* II, June 1984, 35; "IBM advertisement," *Revista Paraguaya de Infórmatica* I, 1983, 44.

61 Montaño, *Electrifying Mexico*; Berth, "Interrupted Conversations."

62 Parker, *The Idea of the Middle Class*, 192–93.

63 See for example the November 1983 title page.

64 In historical research, the term has been used for cross-cultural negotiations of emotions, but I also consider it useful for interactions between humans and technology. See Gammerl et al., "Introduction."

65 "Advertisement for NCR Decision Mate V," *Revista Paraguaya de Informática*, 1983.

HP followed a similar marketing strategy. An HP ad, published in 1985 in a Mexican daily, introduced the computer as "your best colleague" (*su mejor compañera de trabajo*). In using "compañera," the ad gendered the computer as female. The photograph depicts a male executive with his hand placed on the monitor, conveying a sense of personal connection with the technology, as he smiles directly at the camera. The accompanying text emphasizes the ease of use of the HP 150 model, indicating its potential to deliver favorable business results (Figure 3).[66] Both ads rely on personal contact as a key motive to generate trust in computers.

Figure 3: Novedades (Mexico), October 7, 1985.

66 *Novedades* (Mexico), October 7, 1985.

In portraying computers as good colleagues, computer firms related to early users' experiences. In interactions with computers at home, people had started anthropomorphizing computers and assigning them the capacity to think and communicate. They perceived computers sometimes as companions, sometimes as adversaries. The relationship with computers changed their ideas about work, communication, and society.[67] By contrast to home computing, office workers had less autonomy in choosing software or adapting hardware to their needs. Nevertheless, Colombian secretaries described the computer as "something like a friend, providing unconditional support."[68] In 1984, the secretary Berta I. concluded that working with a computer had changed her life: it had improved her professional status, reduced work-related stress, and positively impacted her private life. However, she also related to her initial fear when the computer arrived at her office.[69] Once again, the professional magazines promoted an emotional sequence from initial irritation to hope, pride, and trust.

The gendering of computers in the 1980s was still in the making and was a frequent topic in visual sources. The magazine of the Colombian Association of Computer Users (ACUC) included contradictory caricatures on the matter. Sometimes, computers appeared as male, as can be concluded from the computers' comments in speech balloons about attractive female office workers. Sometimes, the computers were gendered as female, the most drastic case being a caricature that shows a personal computer with a keyboard consisting of breasts instead of keys. The computer exclaims in a speech balloon: "¡Computadora … y no computador!" to identify itself as female.[70] The ACUC magazine was directed to a mainly male audience. Although the caricature is the only such sexualized visual in the caricature series, other drawings of female office workers with tight-fitting dresses also demonstrate that the cartoonists relied on stereotypic female bodies for male audiences.

The dialogue between humans and computers was a recurring topic throughout the 1980s. During the period of computer introduction, caricatures show that there was a lot of uncertainty about this relationship at the workplace. Computers frequently were depicted as reacting in unexpected ways. To explain errors, cartoonists added small animals or humans inside the computer who manipulated the device. In other cases, computers were anthropomorphized and assigned emotional reactions. To do so, the computers needed at least a face or other parts of the body, such as legs or arms. The screen is generally imagined as the head where the brain

67 Turkle, *The Second Self*, 19–23, 159–73, 247–250.

68 "Un elefante blanco cambió mi vida: El procesador de palabras," *Secretaria moderna*, June/July 1984, 11.

69 Ibid.

70 "Compurisa," *ACUC noticias*, September–October 1984, 38.

and feelings are located. For example, one caricature shows a computer with headphones and a female office worker explaining in a speech balloon that the computer only worked with background music.[71] Generally, emotional reactions of computers are visualized on the screen either through a face or graphic elements such as moving lines or flashes. The cartoons are expressions of an imagined emotional encounter.

Figure 4: Novedades, January 16, 1986, p. A5.

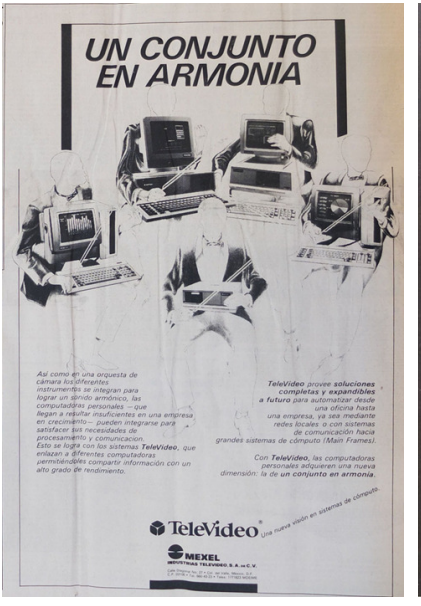


Figure 5: Revista Paraguaya de Informática 1983, p. 42.

In contrast to the ads and articles anthropomorphizing computers, there were also illustrations in which office workers lost human attributes. A TeleVideo ad published in Mexico in 1986 created an analogy between computerized work and an orchestra through a drawing.[72] A group of faceless office workers played computers with a bow as if they were cellos (Figure 4). The ad's title, "Ensemble in harmony," suggests fruitful teamwork without communication problems while the text argues that growing enterprises need to invest in integrated computer networks.[73] This drawing

71 "Compurisa," *ACUC noticias*, March–April 1985, 38; "Compurisa," *ACUC noticias*, January–February 1984, 38.

72 TeleVideo was a US company producing computer terminals and personal computers in the 1980s.

73 "TeleVideo advertisement," *Novedades* (Mexico), January 16, 1986, A5.

is not the only one in which humans lose certain traits. A 1983 drawing published in a Paraguayan computer science magazine visualized the word-processing package Peachtext as a box which substituted the head and body of a female person sitting in front of a personal computer. Only the legs with high-heeled shoes and the arms are visible (Figure 5).[74] These visuals suggest that the individual mattered less in the computerized office as computers or software were taking over significant tasks. Recipients might have felt that their fears of anonymization in the computerized office were justified.

Based on advertisements, cartoons, or television series, many people developed ideas of computer use even though they still did not have access themselves. These imagined uses were incorporated into the cultural narratives of the time and influenced computer use at the workplace. They give us a glimpse into the imaginaries surrounding digital technologies and the future of office work. In the process, people negotiated their fears and desires but also their status in the office hierarchy.

Connections and disconnections: Communication in the office, 1980–2000

Data transmission and local area networks provided new channels of communication to office employees from the 1980s onwards. The early office communication software allowed electronic mails to be sent or appointments to be scheduled. Some programs also included chat options. Historical research has revealed that new communication devices such as the telephone at first often provoked fears and uncertainty about the social etiquette to be followed. The electronic transmission of messages also changed the way emotions were perceived. Sometimes people felt that emotions transmitted through digital media acquired different meanings, sometimes people complained that it was very difficult to convey emotions adequately via new media.[75] In the 1980s, office employees feared that fewer face-to-face meetings would make their work more anonymous. Once again, professional magazines and trade magazines for office technologies promoted a repertoire of desirable emotions, including enthusiasm and pride. By doing so, they ignored negative experiences with disconnections, occasioned by either technical problems or non-use of new communication tools.

The vision of the connected office started to appear in the 1980s and became dominant in the 1990s. In 1984, a Colombian state bank promoted its new networked computer terminals as a system eliminating distance and expanding service, as customers could now access their account balance from all of the bank's branches. The

74 *Revista Paraguaya de Informática*, 1983, 42.

75 Balbi, "I Will Answer You"; Berth, "Fear, Curiosity"; Fortunati and Vincent, "Introduction."

ad is illustrated with an image designed in the colors of 1980s monochrome monitors. The network grid is the key element in the background strengthening the vision of the connected office.[76]

At that time, networked communication through data transmission and local area networks had become possible. To familiarize executives and employees with the new possibilities, magazines for office equipment visualized communication in the computerized office with schemes. The existence of schemes relying on different technologies demonstrates that the basis of the networked office was still unclear. In some schemes, the telephone network was placed at the center, allowing databases, word processors, personal computers, and telex to be linked. Other schemes used a circular model to visualize connections between different technologies, or distinguished between voice, text and data transmission via local or public networks.[77]

Firms started to implement data transmission over telephone lines and local area networks (LAN) by the mid-1980s. These still suffered from technical problems due to the lack of standardized software and incompatible hardware. Hence, users became frustrated and sometimes lost data. These technical problems were solved in the early 1990s and subsequently ethernet became the dominant standard.[78] However, systems of data transmission and the evolution of the early internet differed significantly among Latin American countries.

The visions for the networked office coincided with the reality of the disconnected office. It was an office of data loss, connection failures, and uneven communication. Whereas some of the staff already communicated via electronic mail and regularly had access to networked computers, the other part of the staff remained cut off or refused to use these new communication channels. Moreover, unstable infrastructures caused disconnections of the office, for example due to poor telephone service or power failures.

The new options for connecting computers provoked discussions about electronic mail and office communication. Office and secretaries' magazines tried to familiarize their readership with the new technology by providing detailed information. At first, these magazines appealed to office workers to use electronic mail as this would lead to more flexibility and efficiency and reduce paper consumption. The magazine *Secretaria moderna* described in detail the difficulties of reaching busy people by phone. Instead, electronic mail would facilitate communication as employees could answer when it best fitted into their workday without interruptions by telephone. The article is illustrated with a drawing contrasting those

76 "Advertisement for Banco del Estado," *Nueva Frontera*, June 25, 1984, 33.

77 *Oficina & Tecnología*, December 1985/January 1986, 33; *Oficina eficiente*, February/March 1991, 45; *Oficina eficiente*, November/December 1984, 31.

78 Greenbaum, *Windows on the Workplace*, 70; Haigh and Ceruzzi, *A New History of Modern Computing*, 233–34.

offices where employees hang on the phone while papers fly around with tidy offices where only a personal computer stands on the desk.[79] This comparison highlights how reactions to new technologies were influenced by emotional connections to older technologies, such as the telephone. At the same time, the sharp distinction of a chaotic past and an organized present aimed at creating positive emotions toward a bright future.[80] Another article presents a vision for the office in 1990, predicting a decrease of routine tasks allowing office workers to develop creativity and administrative skills.[81] Given the possibility of data transmission, executives would increasingly work from home and keep up to date during business trips.[82] This was in line with optimistic predictions that work would become more flexible and more humanized when computers or robots took over unpleasant tasks. Again, the office magazines favored positive visions of electronic communication and only occasionally related to fears.

In 1980s dystopian visions, work was expected to become more anonymous.[83] In the context of office work in Colombia, there existed a palpable apprehension among office employees regarding the potential absence of interpersonal connections. A 1984 article in *Secretaria moderna* emphasized the necessity of maintaining personal contact and cautioned against the dehumanization of office workers, highlighting the need for them to resist assuming robotic roles.[84]

During the 1990s, the focus shifted toward envisioning a globally connected office through the internet and email. These visions were, in part, a reflection of the contemporary euphoria surrounding the internet. An advertisement for NEC office equipment of the early 1990s promised that everything would be possible and included images of a personal computer, a satellite ground station, a landline phone, and a fax machine.[85] In 1995, *Secretaria al día* introduced readers to the internet as an "information highway" that would bring "immediate integration with any person in the most remote place of the world" in the future.[86] This quote alluded to the idea of the global village, formulated in the 1960s by media scholar Marshall McLuhan. Since then, it has been taken up in technological visions for communication networks, such as the telephones or satellites. The visual representations of communication in the 1990s promoted the idea of feeling globally connected.

---

79 "El correo electrónico interno," *Secretaria moderna*, April 1984, 32–33.

80 Scherke, *Emotionssoziologie*, 125–26.

81 "Profesional – Noticias," *Secretaria moderna*, March 1984, 7.

82 "Cómo imaginan su oficina en 1990," *Secretaria moderna*, March 1984, 7.

83 Rehlinghaus and Teichmann, "Historische Zukunftsforschung"; Saval, *Cubed*, 256–72; for contemporary visions see Oppen, "Zukunft von Frauen im Büro."

84 "La clave para la automatización en la oficina," *Secretaria moderna*, May 1984, 32–33.

85 "Todo es posible," *Oficina eficiente*, February/March 1991, 34.

86 "La autopista de información," *Secretaria al día*, 1995, 15.

While the connected office became dominant in 1990s representations, the disconnected office continued to exist where infrastructure such as electricity or the internet remained unstable. In the sources I have analyzed, these problems are nearly absent. In February 1986 one Mexican user who had faced problems with a wrong credit card bill expressed his frustration in an article entitled "Dear Computer." Written in the style of a personal letter, he accused programmers of having originated the problems while bank employees he talked to declared the computer responsible.[87] In general, in countries like Mexico or Colombia, public discontent over shoddy service of essential utilities was high at that time. For example, readers' letters in important newspapers indicate that enraged users formed emotional communities.[88] Negative emotions were also present when Merck introduced electronic office communication.

At Merck, the standardization of office communication took longer than initially expected and was accompanied by uncertainties. In 1987, the staff magazine explained that subsidiaries should be able to send their data via remote transmission to Darmstadt within a few minutes.[89] Between 1986 and 1989 the IT department evaluated two office communication software platforms and ultimately decided on Connect. However, the software was still not suitable for use abroad as subsidiaries worked with a different software environment than the headquarters. Hence, the IT department was uncertain how to establish communication which was valid across systems within the firm. It was not until 1993 that Connect was opened for communication with subsidiaries and other enterprises in Europe as the speed of data transmission had improved by that time. Although other programs were in use, the headquarters considered Connect as the "backbone of office communication" until 1996. By that point, the IT department had already tested Lotus, which went on to become the most used software in 2000.[90]

Around the turn of the millennium, visions of global connectivity coincided with the formulation of company-wide rules for email traffic. The illustration shown in Figure 6, from the magazine *Así somos Merck*, communicates a vision of global connectivity showing a secretary at work connected to the world through databases, software, and email.[91] The visual was produced by graphic software and includes

87 "Querida computadora," *Excélsior*, February 27, 1986.

88 "Infarto telefónico en Bogotá," *El Espectador*, June 18, 1979; "Año de crisis en servicios públicos," *El País* (Cali), January 3, 1991, C4; Pérez Chavolla, "The Public's Interest in Telecom Reform."

89 "Informationen sollen fließen," *Merck informiert*, January 16, 1987, 2.

90 Arbeiten der Gruppe IVO/BO Büroorganisation 1987, V10/5; Bericht von OI für 1993, January 17, 1994, Merck Archives; "Connect bleibt Rückgrat der Bürokommunikation," *Merck informiert*, July 18, 1996, 4; *Merck informiert*, June 20, 2000, 2.

91 "Informática hacia el siglo XXI," *Así somos Merck*, no. 141 (Marzo 1998): 2. ZR02 BR67 Merck Archives.

symbols for software packages, such as statistical programs. The netiquette discussed at management workshops in 2002 established rules for the design, subject, and salutation in emails. It was also stipulated that emails should be answered within two days.[92] At that time, email use had become widespread within the firm.

Figure 6: Así somos Merck No. 141, 1998, p. 2.

The path from early office communication software to extensive email use took around twenty years. Fears of impersonal communication and hopes for more efficient work coincided in the introductory period. In the 1990s, firms and office magazines increasingly promoted the computerized office as globally connected, ignoring ongoing problems with disconnections and the digital divide.

Conclusion

The global rise of the computerized office created new contact and conflict zones. Global power structures influenced user-friendliness, design, and languages of

92 Nettikette bei Merck – eine Zusammenfassung der Ergebnisse aus den Führungskräfte Workshops vom 24. und 18. Juni 2002, V 10/107, Merck Archives.

computer systems. In Latin America, US dominance provoked resistance and an emotional rhetoric of pride and self-reliance connected to earlier waves of anti-Americanism. This happened in a period when international organizations engaged in campaigns against unequal access to communication and technological dependency from computer monopolies. These ideas were still prevalent in the 1980s, but the debt crisis and the rise of neoliberalism weakened political projects to create technological alternatives.

The computerization of office work was accompanied by the formation of emotional communities among office employees and the establishment of emotional repertoires for dealing with digital devices at work. The 1980s was a period of transition with a high level of uncertainty about the future. Technological heterogeneity and rapidly changing equipment caused fears and frustration, but also hopes for improved communication and professional opportunities. While in practice frequent disconnections occurred, the visuals in professional magazines and ads stimulated imaginations of smooth communication and efficient workflows. Although only a minority of employees worked full-time with personal computers, they engaged in the debates and developed ideas about their future workplace. Some remained hesitant, some engaged in training measures, and others openly resisted computer use. Resistance and negative emotional reactions occurred when firms failed to make necessary adaptations to hardware and software. In particular, Spanish-language features mattered both for political and practical reasons.

Regarding communication, the debates focused on anonymity vs. personal contacts. This was reflected in visuals where humans lost personal traits. At the same time, narratives about personal relationships with computers were common. Computer firms assigned the computer a role as friend or colleague in their marketing campaigns. In the representation of gender roles there was a continuity in showing traditional relationships between male superiors and female secretaries. However, the gendered representation of typing as a female activity changed rapidly. Even if the written coverage in secretaries' magazines envisioned new professional opportunities for women, the published visuals remained more traditional. Contemporaries also imagined emotional encounters with computers as gendered, categorizing them sometimes as male and sometimes as female. For these imaginations, computers were visualized with human characteristics, such as a face on the screen. The imagined computerized office was an office of white employees, ignoring the presence of other ethnic groups.

In the 1990s, the vision of the connected office became dominant, influenced by contemporary internet euphoria. Nevertheless, the implementation was not as easy as experts had imagined. Different national models for data transmission and pathways to the internet existed. During this period, the disconnected office still was a reality. In many enterprises, including large multinationals, it took decades to implement email and standard programs on the global scale. In the early twenty-first

century, the personal computer lost its status as a symbol for the future of office work. Attention turned to mobile devices.

During the rise of the computerized office, emotional communities were overlapping and varied. There was an emotional community at the level of enterprise, but as the Merck case demonstrates, the firm could also divide into emotional communities at the subsidiaries and headquarters. There was also a division between professional groups – in other words emotional communities of IT staff, executives, and secretaries. Finally, there were the emotional communities of those staff members willing to embrace technological change with optimism or enthusiasm and those who were fearful and skeptical.

Archives

Merck Archives, Darmstadt, Germany

Bibliography

Balbi, Gabriele. "'I Will Answer You, My Friend, but I am Afraid': Telephones and the Fear of a New Medium in Nineteenth and Early Twentieth-Century Italy." In *Moral Panics, Social Fears, and the Media. Historical Perspectives*, edited by Siân Nicholas and Tom O'Malley. Routledge Research in Cultural and Media Studies 46. Routledge, 2013. https://doi.org/10.4324/9780203386231-14.

Balbi, Gabriele. *The Digital Revolution: A Short History of an Ideology.* Oxford University Press, 2023. https://doi.org/10.1093/oso/9780198875970.001.0001.

Barua, Rukimini, Caroline Moine, Alexandra Oberländer, and Julia Wambach. "Introduction: The Global 1970s from a History of Emotions Perspective." *New Global Studies* 17, no. 2 (2023): 125–33. https://doi.org/10.1515/ngs-2023-0020.

Berth, Christiane. "Fear, Curiosity and New Social Rules: Representations of Early Telephone Use in Latin America, 1880–1935." *Technology's Stories* 8, no. 2 (September 28, 2020). https://doi.org/10.15763/jou.ts.2020.09.28.02.

Berth, Christiane. "ITU, the Development Debate, and Technical Cooperation in the Global South, 1950–1992." In *History of the International Telecommunication Union (ITU)*, edited by Gabriele Balbi and Andreas Fickers. De Gruyter, 2020. https://doi.org/10.1515/9783110669701-005.

Berth, Christiane. "Interrupted Conversations: Gender and Telephone Use in Mexico, 1930s–70s." *Technology and Culture* 64 (2023): 124–48. https://doi.org/10.1353/tech.2023.0004.

Berth, Christiane. "Managua – A "Gringorized" City? Urbanization, Consumption, and Shopping Spaces in Times of Revolution and Crises, 1979–1993." *IBEROAME-*

RICANA. América Latina – España – Portugal XXV, no. 88 (2025): 83–100. https://doi.org/10.18441/IBAM.25.2025.88.83-100.

Bösch, Frank. "Wege in die digitale Gesellschaft. Computer als Gegenstand der Zeitgeschichtsforschung." In *Wege in die digitale Gesellschaft. Computernutzung in der Bundesrepublik 1955–1990*, edited by Frank Bösch. Geschichte der Gegenwart 20. Wallstein, 2018. https://doi.org/10.14765/zzf.dok-2642.

Bray, Francesca. "Flows and Matrices, Landscapes and Cultures." *Icon* 22 (2016): 8–19.

Bulmer-Thomas, Victor. "Globalization and the New Economic Model in Latin America." In *The Cambridge Economic History of Latin America*, edited by Victor Bulmer-Thomas, Joan Coatsworth, and Roberto Cortes-Conde. Cambridge University Press, 2006. https://doi.org/10.1017/CHOL9780521812900.006.

Burhop, Carsten, Michael Kißener, Hermann Schäfer, and Joachim Scholtyseck. *Merck: Von der Apotheke zum Weltkonzern*. C. H. Beck, 2018. https://doi.org/10.17104/9783406700385.

Cortada, James W. *IBM: The Rise and Fall and Reinvention of a Global Icon*. MIT Press, 2019. https://doi.org/10.7551/mitpress/11744.001.0001.

Cortada, James W. "Presence of IBM Data Processing Equipment in Latin America, 1920s–1980s, and Insights for Historians." *IEEE Annals of the History of Computing* 47, no. 1 (2025): 50–63. https://doi.org/10.1109/MAHC.2024.3517318.

De Schot, Johan, and Adri Albert de la Bruhèze. "The Mediated Design of Products, Consumption, and Consumers in the Twentieth Century." In *How Users Matter: The Co-Construction of Users and Technologies. Inside Technology*, edited by Nelly Oudshoorn and Trevor J. Pinch. MIT Press, 2003. https://doi.org/10.7551/mitpress/3592.003.0016.

Fortunati, Leopoldina, and Jane Vincent. "Introduction." In *Electronic Emotion. The Mediation of Emotion via Information and Communication Technologies*, edited by Jane Vincent and Leopoldina Fortunati. Interdisciplinary Communication Studies 3. Peter Lang, 2009.

Gammerl, Benno, Philipp Nielsen, and Margrit Pernau. "Introduction: Encountering Feelings – Feeling Encounters." In *Encounters with Emotions: Negotiating Cultural Differences since Early Modernity*, edited by B. Gammerl, P. Nielsen, and M. Pernau. Berghahn, 2019. https://doi.org/10.3167/9781789202236.

Gardey, Delphine. "Mechanizing Writing and Photographing the Word: Utopias, Office Work, and Histories of Gender and Technology." *History and Technology* 17, no. 4 (2001): 319–37. https://doi.org/10.1080/07341510108581999.

Garrido Otoya, Margarita. "Historia de las emociones y los sentimientos: aprendizajes y preguntas desde América Latina." *Historia Crítica* 78 (2002): 9–23. https://doi.org/10.7440/histcrit78.2020.02.

Gobat, Michel. *Confronting the American Dream: Nicaragua under U.S. Imperial Rule*. Duke University Press, 2005. https://doi.org/10.2307/j.ctv1134cwr.

Gökatalay, Semih. "The Cold War and the Making of Advertising in Post-War Turkey." In *The Business of Emotions in Modern History*, edited by Benjamin Cooper and Fredrik Popp. Bloomsbury, 2023. https://doi.org/10.5040/9781350268876.ch-4.

Greenbaum, Joan. *Windows on the Workplace: Technology, Jobs, and the Organization of Office Work*. Monthly Review Press, 2004.

Haigh, Thomas, and Paul E. Ceruzzi. *A New History of Modern Computing*. MIT Press, 2021. https://doi.org/10.7551/mitpress/11436.001.0001.

Homberg, Michael. *Digitale Unabhängigkeit: Indiens Weg ins Computerzeitalter.* Wallstein, 2023. https://doi.org/10.5771/9783835349278.

Homberg, Michael. "Elektronischer Kolonialismus: Perspektiven einer Nord-Süd-Geschichte des digitalen Zeitalters." In *Zur Geschichte des digitalen Zeitalters*, edited by Julian Wichum and Simon Zetti. Wallstein, 2023. https://doi.org/10.1007/978-3-658-34506-8.

Krebs, Stefan, and Heike Weber, eds. *The Persistence of Technology. Histories of Repair, Reuse and Disposal*. transcript, 2021. https://doi.org/10.14361/9783839447413.

Langer, Kenneth. "Generations of Scientists and Engineers: Origins of the Computer Industry in Brazil." *Latin American Research Review* 24 (1989): 95–111. https://doi.org/10.1017/S0023879100022846.

Macleod, Morna, and Natalia de Marinis, eds. *Resisting Violence. Emotional Communities in Latin America*. Palgrave Macmillan, 2018. https://doi.org/10.1007/978-3-319-66317-3.

Martius-Spitzy, Christine. *Frauenarbeit im automatisierten Büro*. Bundesministerium für Arbeit und Soziales, 1987.

Marvin, Carolyn. *When Old Technologies Were New: Thinking About Communication in the Late Nineteenth Century*. Oxford University Press, 1988.

Matt, Susan J., and Luke Fernandez. "Technology and Feeling." In *Sources for the History of Emotions. A Guide*, edited by Katie Barclay, Sharon Crozier-De Rosa, and Peter N. Stearns. Routledge, 2020. https://doi.org/10.4324/9780429291685-17.

Montaño, Diana. *Electrifying Mexico: Technology and the Transformation of a Modern City*. University of Texas Press, 2021. https://doi.org/10.7560/323458.

Müller, Simone M., and Heidi Tworek. "Imagined Use: New Media and the Dynamics of Distant Reading, 1880–1930." *History and Technology* 32, no. 2 (2016): 151–74. https://doi.org/10.1080/07341512.2016.1218957.

O'Brien, Thomas. *The Revolutionary Mission: American Enterprise in Latin America, 1900–1945*. Cambridge University Press, 1999.

Oldenziel, Ruth, Adri Albert de la Bruhèze, and Onno de Wit. "Europe's Mediation Junction: Technology and Consumer Society in the 20th Century." *History and Technology* 21, no. 1 (2005): 107–39. https://doi.org/10.1080/07341510500037578.

Oppen, Karin. "Zukunft von Frauen im Büro – zur arbeitspolitischen Gestaltung geschlechtsspezifischer Erwerbschancen." In *Frauen und Ökonomie. Dokumentation*

zur Ringvorlesung im Wintersemester 91/92 an der FU Berlin, edited by Christine Färber and Dorothea Schäfer. Berlin, 1992.

Parker, David. *The Idea of the Middle Class: White Collar Workers and Peruvian Society, 1900–1950*. Pennsylvania State University Press, 1998.

Pérez Chavolla, Lilia Judith. "The Public's Interest in Telecom Reform: Post-Reform Performance of the Mexican Telecom Sector." Dissertation, Ohio State University, 2002.

Philip, Kavita, Lilly Irani, and Paul Dourish. "Postcolonial Computing: A Tactical Survey." *Science, Technology, & Human Values* 31, no. 1 (2012): 3–29. https://doi.org/10.1177/0162243910389594.

Prieto-Nañez, Fabian. "Postcolonial Histories of Computing." *IEEE Annals of the History of Computing* 38, no. 2 (2016): 2–4. https://doi.org/10.1109/MAHC.2016.21.

Rehlinghaus, Barbara, and Ulrich Teichmann. "Historische Zukunftsforschung, die Geschichte der Arbeit und die Potenziale ihrer Verbindung. Eine Einführung." In *Vergangene Zukünfte von Arbeit. Aussichten, Ängste und Aneignungen im 20. Jahrhundert*, edited by Barbara Rehlinghaus and Ulrich Teichmann. Dietz, 2021.

Rinke, Stefan. *Begegnungen mit dem Yankee. Nordamerikanisierung und soziokultureller Wandel in Chile (1898–1990)*. Böhlau, 2004.

Rosenwein, Barbara. *Generations of Feeling: A History of Emotions, 600–1700*. Cambridge University Press, 2016. https://doi.org/10.1017/CBO9781316156780 .

Russell, David, and Lee Vinsel. "After Innovation, Turn to Maintenance." *Technology and Culture* 59, no. 1 (2018): 1–25. https://doi.org/10.1353/tech.2018.0004.

Saval, Nikil. *Cubed: The Secret History of the Workplace*. Anchor, 2014.

Scherke, Katharina. *Emotionssoziologie*. transcript, 2023. https://doi.org/10.36198/9783838560496.

Stearns, Peter N. "Prescriptive Literature." In *Sources for the History of Emotions. A Guide*, edited by Katie Barclay, Sharon Crozier-De Rosa, and Peter N. Stearns. Routledge, 2020. https://doi.org/10.4324/9780429291685-5.

Turkle, Sherry. *The Second Self: Computers and the Human Spirit*. MIT Press, 2005, 20th anniversary ed. https://doi.org/10.7551/mitpress/6115.001.0001.

Viales-Hurtado, Ronny J., Ana Lucía Calderón-Saravia, and David Chavarría-Camacho. "Between Matilde and the Internet: Computerizing the University of Costa Rica (1968–1993)." *IEEE Annals of the History of Computing* 37, no. 4 (October–December 2015): 29–39. https://doi.org/10.1109/MAHC.2015.82.

Webster, Juliet. "From the Word Processor to the Micro: Gender Issues in the Development of Information Technology in the Office." In *Gendered by Design? Information Technology and Office Systems*, edited by Eileen Green, Jenny Owen, and Den Pain. Taylor & Francis, 1993.

The double-edged drone: Gendered emotional responses, attitudes, and inequalities in Indonesia

Monika Arnez

Introduction

Drones are a disruptive technology, often referred to as unmanned aerial vehicles (UAVs). As varied as the purposes for which they are used – in warfare, surveillance, agriculture, infrastructure monitoring, filmmaking, and delivering medicine to patients, among others – are their technological features, sizes, and prices. Depending on the purpose of the drone, it has different technological affordances. Civil drones, for example, often use cameras and are comparatively small. When used at work, their size is frequently larger – they may come with large tanks for spraying plants on fields – but these drones are usually more expensive.

Like previous generations of computers, drones rely on algorithms – for example, for navigation and flight control. Users, such as operators, process the data collection and analysis. A case in point is precision farming, where drones equipped with sensors monitor crop health, and farmers can assess the data. The spatial properties of drones and AI can carry Light Detection and Ranging (LiDAR) sensors to create detailed 3D maps of construction sites, allowing for more accurate planning.

Considering how this contribution speaks to this volume's broader theme of computerization, it is useful to think about the advent of drones into both civilian and professional life alongside the insights from the computer age. The fascination with drones lies not just in their technological feats and features, but also in how institutions and authorities have narrated them to us as magical, flying machines that promise new perspectives and a new era of possibilities for work – particularly for countries with national-developmental aspirations. Therefore, how people think about or react to the "power" of drones shapes their emotional responses. What the emerging discourse on drones shows is that many of the same themes from the computer age of the 1970s and 1980s are still present when thinking about drones.

There is no standard "workplace for drones," but specific characteristics can be identified. Drones and their operators also have high mobility, just like people in today's office work, who use laptops and smartphones. The office is not necessar-

ily the primary site of drone-related labor; operators often work in open-air environments such as agricultural fields, construction sites, and open landscapes. Many drone operators work independently, on fixed-term contracts or part-time, reflecting the general trend in the gig economy. The line between work and hobby often blurs for those who use drones for photography and filming, a popular application of this technology.

Depending on their purpose, drones can evoke emotions ranging from fear and anger to happiness. If used for recording beautiful landscapes, for example, these visuals may stimulate a sense of awe and desire to care for the environment. Gestures, rhythms, and changing points of view in drone filming result in a blending of the senses.[1] This heightened emotional response fosters a deep and meaningful connection with the images received and promotes the idea that sensory perception, technology, and experience contribute to the formation of sensations within drone footage.[2]

How people emotionally respond to images is grounded in numerous factors, one of which is their cultural background. In Indonesia, an archipelago with 285.7 million inhabitants and the focus of this chapter, there exists a remarkable diversity of cultures and emotional expressions. [3] Despite these differences, norms of politeness and respect are widespread. On the main island, Java, people are expected to behave in a refined manner (*halus*) rather than in a coarse way (*kasar*). This expectation, particularly for women, tends to influence the regulation of emotions toward the outside world.

Scholarship on emotions in Indonesia has pointed out that caregivers fulfill an important role in trying to "attune their children's behaviors, actions, and emotions to normatively approved rules and cultural values."[4] Several scholars have highlighted how, for example, *malu*, shame, matters in several Indonesian societies and affects local practices.[5] As argued elsewhere, Indonesian autobiographical writing typically avoids explicit discussion of personal emotions, focusing instead on public identity and social history. [6] Personal emotions are often downplayed, which reflects cultural conventions that prioritize collective and national narratives over individual emotional expression.

While the individual expression of emotions is often culturally restrained, techno-nationalism characterizes government and media discourse – the belief

1 Petersen, "Dispatched Drone," 313.

2 Petersen, 316.

3 See "Indonesia Population 2025," World Population Review.

4 Röttger-Rössler et al., "Socializing Emotions in Childhood," 189.

5 Röttger-Rössler et al.; Lindquist, "Veils and Ecstasy."

6 Arnez, "Indonesia – Blurred Boundaries."

that technological advances strengthen national sovereignty and power. The Indonesian government fosters drones as they regard them as a tool that can solve a variety of "problems" in a cost-efficient way; they frame it as an innovative technology for the future. Having been on the upswing in recent years, the market revenue of drone-related products more than doubled from 2018 to 2024, from $3.1 million in 2016 to $7.0 million in 2024.[7] Signs in the Indonesian drone industry point to growth, with projections to reach a market value of nearly $12.8 million by 2030.[8]

However, this growth also requires a sufficient number of skilled workers in the digital economy, which is currently not the case. Having identified a shortage of skilled labor in the digital sector, including in drones, the authorities saw a need for action. In the early twenty-first century, drones became part of a discussion about creating new jobs through digitalization. According to projections from the Ministry of Manpower (*Kementerian Tenaga Kerja*, *Kemenaker*), 46 million new jobs would emerge in the technology era, including for drone operators.[9] Five years later (2024), the Deputy Minister of Communications and Informatics, Nezar Patria, corrected the number to "27 to 46 million new jobs will be created in technological fields by 2030," saying that many of these jobs cannot yet be filled due to the annual shortage of around 600,000 digital talents.[10] This statement underscores the growing importance of digital skills and the significant role Indonesian authorities attribute to technology in shaping the future workforce.

The Indonesian government invests in the military uses of drones, such as border patrol and surveillance. Although the history of drone technology in Indonesia is not well-documented, the military used this technology early for espionage. According to the Center for a New American Security, in 1994, graduates from the Institute of Aviation Technology in Bandung wanted to develop an indigenous UAV, which led to the establishment of the drone manufacturing company PT Uavindo.[11] The first UAV to emerge from this endeavor was the "Sky-Spy-5" in 2003, which the military used for intelligence-gathering missions.[12] In 2006, Indonesia acquired four Israeli "UAV

7 Nurhayati-Wolff, "Media in Indonesia – Statistics & Facts," Statista, January 12, 2024. https://www.statista.com/topics/11792/media-in-indonesia/#topicOverview.

8 "Indonesia Drone Market," Knowledge Sourcing Intelligence. https://www.knowledge-sourcing.com/report/indonesia-drone-market.

9 Ade Miranti Karunia and Yoga Sukmana, "Otomatisasi Digital, 46 Juta Pekerjaan Baru Akan Muncul," Kompas.com, November 13, 2019. https://money.kompas.com/read/2019/11/13/075154226/otomatisasi-digital-46-juta-pekerjaan-baru-akan-muncul.

10 Ihfa Firdausya, "Jutaan Pekerjaan Baru akan Muncul Akibat Otomatisasi, Indonesia Kekurangan Talenta Digital," Mediaindonesia.com, July 22, 2024. https://mediaindonesia.com/humaniora/686974/jutaan-pekerjaan-baru-akan-muncul-akibat-otomatisasi-indonesia-masih-kekurangan-talenta-digital.

11 Rahakundini and Prasetia, *Proliferated Drones*.

12 Rahakundini and Prasetia.

Searcher II" spy drones for the Indonesian military through a Philippine distributor, Kital Philippines.[13]

Since 2017, the country has "developed its military drones through research and development conducted by ministerial institutions, as well as by universities, private companies, the military, and individuals."[14] In 2020, Indonesia's first medium-altitude long-range drone, called "Elang Hitam" (Black Eagle), was developed to further spread drone technology in Indonesia. For example, Presidential Regulation No. 8/2021 mentions UAVs as one of three priority programs for the military, the others being military satellites and underwater sensing. However, as it turned out in 2021, after "Elang Hitam" failed to fly in a test, decisions were taken to use it for civilian purposes, including monitoring forest fires and mapping purposes.[15] The media framed this failure as a success story, focusing on government investment, strategic planning, and the importance of local drone development, which aligns with techno-nationalism.[16] This example reveals a strong sense of pride in technology, and failure has been transformed into a discourse on success.

This chapter explores how gendered emotional responses to drone technology highlight different attitudes toward drones and reveal underlying inequalities. I draw on findings from an online survey with respondents in the Indonesian language (Bahasa Indonesia) in the spring of 2024. The survey aimed to gain insights into how younger Indonesians emotionally react to drones. The survey results have been coded using the qualitative software MAXQDA. I also examined dozens of articles published in Indonesian print media, such as the weekly magazine *Tempo.co*, the online versions of daily newspapers, *Kompas.com* and *Republika.co*, and coded them with the same software to gain insights into the media discourse about drones in Indonesia.

This chapter is structured as follows. First, the unequal landscape of drone technology in Indonesia is explored, and how it relates to media discourse on drones. Relevant scholarly literature is used to show that this inequality manifests itself at the national scale, as well as in terms of gender. Next, drawing on survey results on gendered emotional responses to drones in Indonesia, I show how these responses can be understood through three key themes: *techno-sophistication*, *drones as a double-*

13 AP and Jpost.com Staff, "Indonesia to Buy Four Israeli Spy Drones," The Jerusalem Post, October 22, 2006. https://www.jpost.com/israel/indonesia-to-buy-four-israeli-spy-drones.

14 CSIS Indonesia, "Maximizing Indonesia's Drone Potential for Military and Civil Purpose," CSIS Notes (blog), May 18, 2022. https://blog.csis.or.id/tagged/drones-industry.

15 Aryo Putranto Sapthohutomo, "Proyek 'Drone' Elang Hitam Disebut Salah Langkah sejak Awal," Kompas.com, September 20, 2022. https://nasional.kompas.com/read/2022/09/20/12225691/proyek-drone-elang-hitam-disebut-salah-langkah-sejak.

16 Nicholas Ryan Aditya and Novianti Setuningsih, "Drone Elang Hitam Jenis MALE Bakal Diuji Coba Bulan Depan," *Kompas.com*, February 26, 2025. https://nasional.kompas.com/read/2025/02/26/16365591/drone-elang-hitam-jenis-male-bakal-diuji-coba-bulan-depan.

edged sword, and the *intrusive and out-of-control drone*. Within these topics, the extent to which the attitudes of male, female, and diverse respondents toward drones differ is examined. A synthesis of the results concludes the chapter.

The unequal landscape of drone technology

When considering drones, it is crucial to examine closely which groups in society hold hegemonic knowledge about them – who exercises control over their use. In Indonesia, the Indonesian military, government agencies, and economic elites largely control drones in the Java region, especially around Jakarta and across Java. Several of the "parties involved in drone development" mentioned in the following quote are located there:

> Currently, there are many parties involved in drone development, with research and development (R&D) conducted by ministerial institutions as well as by non-ministerial government institutions, universities, private institutions, individuals, and the military. All of these UAVs were developed for civilian surveillance purposes.[17]

Halo Robotics[18] and Terra Drone Corporation,[19] well-known drone companies, are also located in Jakarta. They offer solutions for various industries, including agriculture, mining, and construction. Halo Robotics, a domestic company, distributes drones in Indonesia for industrial purposes, with a range of drones from the Chinese company DJI, the market leader in the field of drones,[20] on offer. The Japanese company Terra Drone Corporation, in turn, has a strong foothold in Indonesia, with its subsidiary Terra Drone Indonesia. This enterprise offers specialized drone training for mining companies, including mapping pits and carrying out land surveys. They also market drones for precision farming. This company primarily develops and deploys its own (Japanese) proprietary drone technologies and solutions.

17 Rahakundini and Prasetia, *Proliferated Drones*.

18 See "Halo Robotics," homepage, https://halorobotics.com/.

19 See "Terra Drone Indonesia," homepage, https://terra-drone.co.id/.

20 China generated the highest revenue with US$1.6bn in 2025 and is the leader of the "global drone market with its advanced technology, vast manufacturing capabilities, and strong government support." The Chinese company DJI is the market leader in the field of drones and sells its drones widely on the Indonesian market. See "Drones: China," Statista Market Insights, 2025. https://www.statista.com/outlook/cmo/consumer-electronics/drones/china; "Drones: Worldwide," Statista Market Insights, 2025. https://www.statista.com/outlook/cmo/consumer-electronics/drones/worldwide.

Drones can be conceptualized as an extension of the government's arm, because their versatility and deployment options, even at remote locations, allow for effective surveilling even in remote areas. When used as flying robots, a human is not even required on the site. The state uses its power over drones to better control the national territory, including remote areas and border regions.

Indonesian media forces play an important role in spreading information about new developments in the drone sector, including new technological possibilities of drones. They frame them as a kind of computerized "all-round-fix" that helps extend the government's arm, fostering the nation's security and safeguarding its sovereignty, promoting smart technology and business interests. Online media play a major role in the Indonesian economy. Among selected Southeast Asian countries, Indonesia reached approximately 8 billion US dollars in 2024 in online media market value, compared to 3 billion US dollars each for Singapore, Malaysia, and the Philippines.[21] The media in Indonesia is multi-platform and characterized by conglomerates that are very similar in their business model. At the time of writing, eight conglomerates dominated the media market,[22] which led some scholars to conclude that "media and viewpoint plurality in Indonesia are at risk."[23]

The Indonesian media frequently amplifies government and military voices when discussing drone deployment. For instance, in a *Kompas.com* article from March 1, 2024,[24] Major General Maruli from the Indonesian Army (TNI AD) explained the current and future use of drones in border areas: "We have only reached drone surveillance in small areas. So maybe in the future, we will suggest drones at the border as well, so that it is not difficult for people to control the details." The people referred to in this quote are soldiers. The statement "to control the details" suggests that drones will ease the process of monitoring the border area in a detailed and thorough manner, which would be more difficult without them. Previously, border surveillance was done manually by personnel physically inspecting certain areas. This process is time-consuming, labor-intensive, and often difficult to do thoroughly, especially in vast or hard-to-reach regions.

---

21 Thuy D., "Value of the Online Media Market in Southeast Asia in 2024, by Country," Statista, June 25, 2025. https://www.statista.com/statistics/1007205/southeast-asia-online-media-market-value-country.

22 Masduki and d'Haenens, "Concentration of Media Ownership," 2253.

23 The online newspapers *Kompas.com*, *Tempo.co*, and *Republika.id* that were used for this article are part of these conglomerates. Among the reasons for selecting these sources is that they publish articles in the Indonesian language, are well known in Indonesia, and have raised the topic of drones in several of their contributions.

24 Nirmala Maulana Achmad and Icha Rastika, "TNI AD Berencana Manfaatkan 'Drone' untuk Awasi Daerah Perbatasan," *Kompas.com*, March 1, 2024. https://nasional.kompas.com/read/2024/03/01/07474451/tni-ad-berencana-manfaatkan-drone-untuk-awasi-daerah-perbatasan.

In the same article, Maruli confirmed that drones are already operational in Papua for military posts: "The process has been ongoing since last year; many forward posts in Papua are already using drones for security."

It should be noted here that Papua is a "fiercely contested part of Indonesia,"[25] which was under Dutch influence until 1962 and acquired by Indonesia in 1969. Indonesia wanted to achieve national unity in Indonesia by asserting historical claims – consolidating territories that were once under Dutch control – and gaining access to raw materials. They were criticized for manipulating the "Act of Free Choice" (1969) so that the alleged result, the agreement of the inhabitants of West Papua to be integrated into Indonesia, did not correspond to reality.[26]

While the military uses drones to secure Indonesia's sovereignty, UAVs are popular at work for different reasons. They are recognized as versatile tools capable of addressing specific challenges, particularly in industries such as construction and farming. A case in point is an article published in *Kompas.com*, which reads:

> Daily documentation allows project managers to determine whether contractors can complete construction on schedule. To monitor progress, weekly photos must be taken, ensuring that construction developments can be tracked in real time. Drones also enable comprehensive oversight of all tasks, including height and angles, with just the press of a button.[27]

The use of drones is widespread in agriculture, particularly for fertilizing fields and spraying pesticides. An article about "increasingly sophisticated farmers," published in *Kompas.com* from 2021, emphasizes drones as a versatile tool for fast spraying, thus increasing efficiency and reducing manual labor. Ina Dewi, Head of Food Security at the Agriculture and Food Service of Bandung Regency, was reported as saying that educating the former in using drones for fertilizer spraying is one of the efforts to increase production of rice through a technological approach. *Kompas.com* quoted her as follows: "Our farmers are now assisted by technology. Previously, organic fertilizer had to be bagged and carried manually-around 100 kg per trip, requiring multiple trips. With Ponska OCA liquid fertilizer, farmers' workloads are lightened…"[28]

---

25 Agustinus Allan Porajow, "West Papua's Shifting Signifiers: Across History of Colonialism and Nationalism in Indonesia," *Oxford Political Review*, July 5, 2024. https://oxfordpoliticalreview.com/2024/07/05/west-papuas-shifting-signifiers-across-history-of-colonialism-and-nationalism-in-indonesia.

26 Brad Simpson, ed., "Indonesia's 1969 Takeover of West Papua Not by 'Free Choice,'" The National Security Archive, July 9, 2004. https://nsarchive2.gwu.edu/NSAEBB/NSAEBB128.

27 Rosiana Haryanti and Hilda B. Alexander, "Manfaat 'Drone' bagi Proyek Konstruksi," *Kompas.com*, September 20, 2018. https://properti.kompas.com/read/2018/09/20/200415121/manfaat-drone-bagi-proyek-konstruksi.

28 Agie Permadi and Aprillia Ika, "Petani di Bandung Makin Canggih, Dikenalkan Teknologi 'Drone' untuk Pemupukan," *Kompas.com*, December 1, 2021. https://regional.kompas.com/re

Other articles likewise emphasize that UAVs can be used to fertilize huge wet rice fields, 40,000 hectares in size, in this case in a South Papuan food estate.[29]

Another theme that emerges in the Indonesian media when discussing drones is regulations. In these articles, there is a trend to explain which drone regulations have been introduced, or how people do not know about them and violate them.[30] *Tempo.co* reported on August 22, 2019 that many drone enthusiasts in Indonesia remain unaware of regulations governing their operation. The Ministry of Transportation is therefore reported to carry out annual outreach events where they inform about the rules dictating where drones can fly, with designated green (free), yellow (restricted), and red (prohibited) zones, ensuring aviation safety and national security. Airports, the Presidential Palace, and military bases are among the restricted areas, and violations can result in forced landings or even interception.[31]

Notably, media reporting tends to repeat official statements, but there is a lack of critical or investigative engagement with issues concerning gender, privacy, and ethical concerns. The coverage is often descriptive, and it focuses on government announcements, regulatory frameworks, and technological developments. It is striking that women are largely absent from media coverage of drones. Drones are part of a techno-nationalist discourse focused on the country's security and progress, and efficiency through sophisticated technology. When images on this topic appear in the media, they usually show men posing with drones – for instance, in preparation for flying them in agriculture or featuring the signing of bilateral agreements, such as between Turkey and Indonesia to build a drone factory in Indonesia.[32]

This leads us to point out that technology and gender are not neutral, but an inclusive and critical discourse on modern technology is needed. As Janina Loh[33] argues, the "rejection of the thesis of neutrality of technics" is a key element of a

---

ad/2021/12/01/193521678/petani-di-bandung-makin-canggih-dikenalkan-teknologi-drone-untuk-pemupukan.

29 Hendriyo Widi, "'Drone' dan Bibit Tebu Impor di 'Food Estate' Merauke," *Kompas.id*, July 28, 2024. https://www.kompas.id/baca/ekonomi/2024/07/27/drone-dan-bibit-tebu-impor-di-food-estate-merauke.

30 Mutia Ramadhani and Winda Destiana Putri, "Kemenpar Bantu Sertifikasi Drone untuk Kembangkan Pariwisata," *Republika.co*, August 4, 2015. https://ameera.republika.co.id/berita/nsjqnm359/kemenpar-bantu-sertifikasi-drone-untuk-kembangkan-pariwisata.

31 "Kemenhub: Kenali Regulasi Drone," *Tempo.co*, August 22, 2019. https://www.tempo.co/info-tempo/kemenhub-kenali-regulasi-drone-714729.

32 Agie Permadi and Aprillia Ika, "Petani di Bandung Makin Canggih, Dikenalkan Teknologi 'Drone' untuk Pemupukan," *Kompas.com*, December 1, 2021. https://regional.kompas.com/read/2021/12/01/193521678/petani-di-bandung-makin-canggih-dikenalkan-teknologi-drone-untuk-pemupukan; Firda Cynthia Anggrainy, "Indonesia dan Turki Sepakat Kerja Sama Bangun Pabrik Drone," *Detiknews.com*, February 12, 2025. https://news.detik.com/berita/d-7775031/indonesia-dan-turki-sepakat-kerja-sama-bangun-pabrik-drone.

33 Loh, "Feminist Philosophy of Technology," 16–17.

"feminist technophilosophical plea" that emphasizes the importance of an inclusive and critical discourse on modern technology. Although not explicitly discussed, this also includes drones. Loh's call to action includes, for example, "responsible acting" in computer science and ethics education as well as in feminist philosophy, to train a diverse range of participants that will shape the discourse on technology.

Neda Atanasoski and Kalindi Vora[34] are interested in how the alleged enchantment of technology, its framing as "smart" and "intelligent," for example, comes at a cost as it hides the hidden, often racialized, power of labor behind the curtain of enchanted technology. When addressing drones, they argue that drones are not truly "unmanned" because they rely on human labor and decision-making processes. The notion that they operate independently obscures how military technology perpetuates historical patterns of control, as related to race, gender, and imperialism. They challenge the myth that machines are autonomous and call attention to how they reshape what it means to be human. They also point out that robots are seen as autonomous when they are capable of violence – but that same autonomy makes them a threat that must be controlled. This fear leads to attempts to subjugate them again, just as humans have historically controlled others based on race and class. The authors argue that the idea of killer robots and enslaved robots is connected in a way that reflects racialized power dynamics. They refer to drones as "cobots," "collaborative robots, that continually remake the bounds of the human."[35]

Highlighting how drones reshape the boundaries of humanity and reflect colonial structures in warfare, they relate the supposed autonomy of the drone to colonial structures:

> [T]he drone mediates the relation to humanity of both potential killers (soldiers) and potential targets (victims or casualties). The surrogate effect of roboticized warfare thus renders the fantasy of remote control as a reconceptualization of empire that, by being human-free, can disassociate its power from earlier modes of colonial conquest.[36]

Drones, in other words, create distance between soldiers and victims, making war feel less personal. This illusion of remote control helps redefine imperialism in a modern sense as "human-free," hiding its connection to past colonial domination.

Drones are constituted by what Waltorp and Bruun,[37] in their research about gendered reactions to drones in Denmark, have referred to as the "drone gaze" – it is a predominantly male gaze. Men dominate drones because they are usually the ones

34 Atanasoski and Vora, *Surrogate Humanity*.

35 Atanasoski and Vora, 136.

36 Atanasoski and Vora, 149.

37 Waltorp and Bruun, "Flying Drones," 122.

who use them, but also because they can invade women's privacy through drones. This research highlighted that the most common concern expressed by women about drones was that they would expose them and that the images would be circulated.[38] Another study about responses to drones in Germany[39] noted that male respondents perceive drones more positively than women do. It also mentioned that, in addition to gender, age, place of residence, and the level of interest in technology, information about civil drones influenced their acceptance.[40]

Like Denmark and Germany, the high proportion of men in the drone industry in Indonesia underlines a consistent pattern of gender imbalance in this technology sector. In drone companies, there are hardly any female drone operators or engineers working in this field. In my research about drones in Indonesia, I have rarely encountered women operating drones. For example, in a search for drone operators on LinkedIn in Indonesia in April 2024, only six women were shown, compared to 393 men. Training options for women in Indonesia are also still limited. An exception is the Jakarta School of Photography, which has offered drone training for women. They wrote in their course advertisement from 2022:

> Sometimes people see women as less developed than men, due to the perception that women are weak. But not with the current millennial era, women are required to be versatile and must be able to master the fields mastered by men. Drones have now become a necessity in all fields and circles. It is not only men who are starting to need drones, but women are also participating in learning this unmanned aircraft. The need in work also requires women to be able to fly drones.[41]

This addresses the prejudice that considers women inferior to men, the modern-day requirement for women to perform the same tasks as men, and the demand for drone operators for work purposes as reasons why drone training for women is required. Elements of this training are the efficient and safe operation of drones according to applicable regulations and an introduction to the principles of drone flight, drone maintenance, and practical training. This mirrors trends in other countries where, according to a study published in 2019, the "average rate of women's employment was 13% across the various countries" in the drone sector.[42] This research was carried out in 112 drone companies in the UK, France, Germany, Spain, the USA, Canada, and Australia, and found that "women are concentrated in non-

38 Waltorp and Bruun.

39 Eißfeldt et al., "Acceptance of Civil Drones."

40 Eißfeldt et al.

41 "Kursus Drone Untuk Wanita," Jakarta School of Photography. https://jsp.co.id/kursus-drone-untuk-wanita/.

42 Kuzma and Dobson, "Gender Diversity in UAV," 373.

technical positions, such as sales and administration. Men, however, hold the majority of drone pilot and technical managerial positions."

How does this gender dynamic relate to the assessment of gender imbalance in the workplace? In the Global Gender Gap Index 2024, Indonesia ranks 112th. A significant issue is the gender pay gap, with women's estimated earned income "just half that of men's, resulting in a parity score of 51.7%."[43] Political participation remains the weakest area in this index, with a score of 0.138 and 107th place.[44] The low representation of women in ministerial offices and women's low access to management positions show a need for systematic action here. Among the measures proposed by scholars to increase women's participation in the labor force are providing childcare facilities, flexible working arrangements, and implementing campaigns to counteract the idea that women are the primary carers.[45]

Although new opportunities have emerged for women in the last decades, including new possibilities offered through online platforms, Indonesia still faces significant gender disparities in the workplace. One factor is contested laws and deep-rooted cultural norms.[46] Labor force participation for women stood at 52.5% compared to 81.5% for men as of 2023, whereas vulnerable employment affected 59.4% of women and 45% of men. Although women hold 24.8% of senior and middle management positions, these figures highlight persistent inequalities in the Indonesian workforce.[47]

To further explore the context of gendered experiences of technology, it is important to consider how people respond to it emotionally. With this in mind, let us zoom in on my study, which focuses on the emotional responses of the study participants.

Gendered emotional responses to drones

Let me begin this section with a reflection on methodology. The Lime survey "Emotional Responses to Drone Technology in Indonesia"[48] was designed to provide initial insights into emotional responses rather than as a quantitative tool. Questions were asked about gender and age range; however, the survey guaranteed anonymity. Twenty-five respondents fully completed the survey, whose responses are used as

43 Pal et al., *Global Gender Gap 2024*, 32.

44 Pal et al., 207.

45 Cameron, "Gender Equality and Development."

46 Arnez, "Gender, Islam, and Sexuality."

47 World Bank Group, "Gender Data Portal: Indonesia." https://genderdata.worldbank.org/en/economies/indonesia.

48 In Indonesian, the survey is titled Tanggapan Emosional Terhadap Teknologi Drone di Indonesia.

the dataset for this chapter. Nine respondents identified as female, one did not provide any information about their gender, and fifteen identified as male.

I shared an English test version with Christiane Berth, the co-editor of this volume, and an Indonesian test version with Ramayda Akmal, a lecturer at Gajah Mada University, and incorporated the feedback. With the support of Perplexity AI, I quickly translated the survey into Bahasa Indonesia. I then revised the content to stay true to the original intent. Once the changes were deemed satisfactory, the final versions were saved in both languages. On the same day (March 20, 2024), I launched the survey and sent it to selected people in Indonesia (former PhD students, one postdoc) with a request to distribute the survey (snowball system). This means that the respondents who answered the questions most likely have a university background and are based on Java. Before distribution, I made sure that my survey was activated in LimeSurvey. I created a link in LimeSurvey that participants could access to complete the survey. In total, twenty-five fully completed surveys – nine by female respondents, one by a person who did not disclose their gender, and fifteen male respondents – were used for the analysis in addition to the qualitative software program MAXQDA and the media articles. In terms of the latter, I coded dozens of articles from various Indonesian online daily newspapers (*Kompas.co*, *Tempo.co*, *Republika.co*), and reports from companies, organizations, and universities in Indonesia.

Generating and assigning codes in this study was fundamental to understanding emotional responses to drone technology. Over time, I collected relevant media articles and processed them using MAXQDA. The survey was processed similarly. This first step helped me get an overview of the material. I identified particular text passages related to the research topic. I categorized those passages deemed particularly relevant for the research topic and further refined the code structure. Subsequently, I identified overarching themes pertinent to the codes, the first of which is techno-sophistication.

Techno-sophistication

Techno-sophistication refers to the admiration people have for advanced technologies due to their remarkable capabilities and innovations. In the survey "Emotional Responses to Drone Technology in Indonesia" several respondents used words when addressing drones that can be associated with techno-sophistication. A prominent one was "kemajuan" (progress), highlighting the perception that drones symbolize technological progress. Words like "canggih" (advanced or sophisticated), "menakjubkan" (amazing), and "dunia" (world) reveal that respondents associate drones with global technological advancement.

Both women and men recognized the techno-sophistication of drones in their ability to take pictures and videos. These capabilities serve various purposes, such

as creating films, traveling, and producing content. They associated drones with the possibility to create high-quality, stunning footage, and several explicitly mentioned *canggih* in their responses. A young man, aged 18–24, for instance, commented:

> The world is becoming more sophisticated and modern – also Indonesia is not left behind in the development of technology existing in the world, and I highly appreciate drone technology because it eases an issue by using technology and eases access to something and to find information.

A woman in the same age range associated drones with a "technology for taking sophisticated images." A woman aged 35–44 pointed out: "When I hear and see drone technology, I am quite impressed because it can help particularly with visual work and more sophisticated observation." A young female respondent praised drones as a versatile substitute for helicopters:

> When I first learned about this technology, I was amazed because, until now, we have known that capturing images from high altitudes required a helicopter. With the presence of drones, it has become much easier for someone to record images from a certain height without having to board a helicopter or airplane.

A female respondent, aged 18–24, referred to drones as a "cool and amazing technology." Another young female participant, aged 25–34, framed sophistication in different terms. She did not emphasize the drone as merely a flying tool for capturing images but instead recognized its sophistication in terms of providing care and assistance: "Drones are a sophisticated technology that help human beings very much who are facing shortages."

A male respondent aged 18–24 remarked that a common trend is using drones to capture landscape images and videos. Another young man in the same age range commented: "As far as know, in Indonesia, drones are often used to make video recordings for content creators, for example, my friend is a nature lover – each time when he goes on a new tour, he flies his own drone." He agrees with the statement: "Drones have the potential to significantly improve various aspects of society's life." A young female participant wrote that she thinks drone technology is an "important part of the photography/videography world in our age group." She also highlighted that the drone technology "serves as an avenue to explore opportunities for expanding future job prospects." She mentioned that while she had not operated a drone herself, she had already created videos with her friends, with fulfilling results. Her statement suggests that according to her, the potential of drones for women in Indonesia has not yet been fully exploited. This is consistent with the observations in the previous section of this chapter that women have not yet played a significant role in the drone sector.

The results reveal that the respondents, across genders, highlight drones as an amazing technology that allows people to capture stunning footage. Notably, female respondents emphasize techno-sophistication more than their male counterparts. This may partly stem from the reported moderate knowledge of drones among women in this sample. One woman indicated her knowledge as being very good, two as good, three as moderate, and one as poor. In contrast, two men claimed their knowledge of drones was very good, two rated it as good, seven said moderate, two reported it as poor, and one identified their knowledge as very poor. Two women, aged 18–24 and 35–44, respectively, mentioned that they have taken photos, done a photo shoot, or created drone videos, either alone or with friends. The person who did not identify their gender wrote that they used drones to do photo shoots. Among the male respondents, two men, aged 35–44, mentioned that they have flown drones, and one of them made drones himself. Two of them mention having used drones in a professional capacity, flying manual to automatic drones, and implementing films.

The survey results indicate that the female respondents are more fascinated by drones than male participants because they see it as a sophisticated technology they would like to use and know more about. In contrast, those male respondents who claimed to have the most knowledge about drones tended to have a more mixed view. For example, the respondent who wrote that he created drones himself and operated them, with sizes ranging from 250mm to 1100mm and equipped with a mirrorless camera, cautioned that "For communication between crew and pilots, the use of satellites should be maximized to extend the operational range of drones." He also voiced his concern about the lack of domestic production and dependence on foreign technology: "[We are] still relying on foreign technology and lacking support from the government in the development of drones." According to another male respondent, the government needs more accurate data about drones and their use: "I think the government does not yet have accurate data about the amount of drones, drone community, regulations of drones and so on."

When correlating the emotional responses in the above answers with gender, positive emotions prevail but respondents also mentioned negative feelings like fear, sadness, and anger. This corresponds to the finding that hopefulness was the emotion with the highest score in the whole dataset, with an average 3.5 out of 5, and pride followed closely behind with 3.48. The average score for enthusiasm was 3.32, followed by 3.26 for happiness. The feelings fear, sadness, anger, and disappointment received values below 3, including 2.88 for fear (highest), 2.48 for sadness and 2.44 for disappointment and anger. The female respondents stated that they feel or strongly feel the following emotions: hope and fear, enthusiasm and happiness. One respondent also mentioned sadness and anger, while being neutral on disappointment. Another participant cited happiness, enthusiasm, and hope as neutral. The men stated that they feel or strongly feel happiness, hope, and enthusiasm, except ID 21; this respondent expresses a neutral attitude toward hope in this context.

In connection with the overall data regarding emotions in the survey, it should be noted that most respondents, men and women, expressed a neutral attitude toward the statement "I feel negative emotions toward drone use in Indonesia." Nine men expressed a neutral attitude, three disagreed, one strongly disagreed, one agreed, and two strongly agreed with this statement. In turn, six out of nine women expressed neutrality, one disagreed, and two strongly agreed with the statement. The person who did not identify their gender likewise expressed neutrality.

The tendency to frame drones in both positive and negative terms is reflected in the dataset. While several respondents, especially women, expressed amazement at drone technology, the dataset also reveals mixed reactions, reflecting a double-edged sword that will be explored in the following theme.

Drones as a double-edged sword

After coding and reviewing the material again, I identified drones as a *double-edged sword* as a key theme. Both men and women indicated in their responses that they are positive about some aspects of drones, but not others. Some of the positive associations with drones mentioned by male respondents were that drones bring about progress, save labor, and minimize human accidents; they are also a children's toy, which should be forbidden, as an elderly male respondent wrote in his recommendation about drone technology in Indonesia. He also pointed out their potentially destructive effects when associating drone technology with "surveillance and bombs."

The double-edged nature of drones is captured by a male respondent, 35–44 years old, writing that they are "progress and a threat." His final recommendation was an appeal to the government to "issue appropriate, strict, and clear regulations so that the concerns do not result in significant negative impacts." Another male respondent in the same age group, who highlighted the drone as a labor-saving tool, also regarded drones as a threat, a privacy-invading military tool. He also explicitly mentioned concerns about privacy violations: "The use of drones in residential areas is particularly vulnerable to invasion of privacy."

Women pointed out, in turn, that drones are part of advancing technology in Indonesia, play an important role in various sectors, including industry, agriculture, and security, take aerial pictures or photographs, and are a sophisticated tool that helps human beings in need. On the negative side, the first woman, aged 35–44, wrote: "There is advancement, but improvements need to be made, specifically in the area of regulations." She also pointed out that "Drones have benefits, but if not used responsibly, there are many negative aspects," without specifying these further. A young woman, aged 18–24 years, thought that the media coverage does not take safety issues about drones sufficiently into account. Therefore, she called on the media to educate users on the safe use of drones. She wrote: "The use of drones in

news coverage in Indonesia must prioritize safety first, such as checking the drone's condition and following standard operating procedures (SOP)."

Some respondents mentioned both positive and negative associations with drones in one sentence. A woman aged 25–34 directly mentioned the double-edged nature of drones: "Technology is always a double-edged sword (*pisau bermata ganda*); without supervision and tight control, its unexpected effects (often negative) can come to the fore." Furthermore, she wrote that "When I hear and see drone technology, I am quite impressed because it can help particularly with visual work and more sophisticated observation. However, I also think of other harmful characteristics, especially the privacy violation of other people." A male respondent, aged 35–44 years, representing the main gender and age group, observed: "The phrase 'drone technology' provides an interpretation of the realm of technological sophistication used in human civilization. I feel that drone technology is like an alien creature ready to invade civilization, rather than helping humans."

The third main theme of this dataset revolves around the respondents' specific concerns about drones being intrusive, violating people's privacy, and endangering safety due to operators not adhering to regulations and the lack of proper control over their use.

The intrusive and out-of-control drone

Most respondents – women, men, diverse[49] – clearly expressed the need for privacy protection and stronger government regulation of drones. It is interesting to note that women emphasized this somewhat more strongly, but a concern with the two issues – privacy and stronger regulation – is also clearly visible among men. Four out of nine female respondents strongly agreed and another four agreed with the statement "I am afraid of potential privacy violations due to drone use in Indonesia," while one expressed a neutral stance. Five out of fifteen men strongly agreed, seven agreed, three were neutral, and one disagreed. The person who did not indicate their gender agreed. If we combine the analysis of these answers and consider the responses to the open questions in the survey about privacy, some gendered differences are notable. Interestingly, women hardly commented on privacy in the open questions, while some men did so. Those women who mentioned privacy concerns associated it either with their person or with people more broadly. One woman, aged 18–24, expressed her apprehension by stating, "Because I have just learned about the primary function of drones as recording devices, and as a woman, I must protect the privacy of my body; responsible drone usage is essential for shared security and comfort." This indicates a concern among women about how technology can infringe

49 The options respondents had regarding gender-related information were male, female, and diverse. One respondent did not indicate how they identified themselves in terms of gender.

upon their personal space and autonomy. The other comments on privacy by female respondents mentioned that "there is a feeling of fear because privacy is easily violated" and "I think of other harmful characteristics, especially the privacy violation of other people."

The comments by men, in turn, reflected a different focus; they were more concerned with privacy issues as related to tensions between territory, authorities, and individuals. For example, they emphasized the significance of privacy within residential areas and the negative implications of drone technology if left unchecked. They called on authorities to prevent potential misuse. In terms of territory, one man, aged 35–44, for instance, mentioned that "the use of drones in residential areas is particularly vulnerable to invasion of privacy." A man in the age range 55–64 highlighted how drones could conflict with (private) spaces: "Drone technology enables use for negative purposes and has the potential to infringe upon territories and individuals' privacy." Two men highlighted the role of authorities: "Impacts on the realm of privacy and certain authorities still need to be considered" and "This drone technology must have its usage regulated by the relevant authorities, as there are concerns about potential misuse, such as privacy and personal surveillance."

Unlike other research on drones, such as on gender and privacy in Denmark,[50] concerns about exposure are not as pronounced in this survey, which could be rooted in the fear of exposure not being as pronounced among women in Indonesia, who are mostly veiled and often follow Islamic dress codes. The men's emphasis on territoriality and authority maps onto societal norms about masculinity and power dynamics. Without intending to generalize here, there is a widespread social expectation that men are politically active and have a closer relationship with authority figures, and also are more territorial than women. This trend is also reflected in the Global Gender Gap Index 2024, where Indonesia's low political representation of women in politics was observed.[51]

One interesting finding is the high level of agreement across genders, with the statement "The Indonesian government must have strong regulations to ensure that drones are operated safely and responsibly in Indonesia." All women agreed with this statement, eight of them strongly, and out of fifteen men fourteen agreed, nine of them strongly. One man expressed a neutral stance.

Several respondents noted that drones are being used improperly and that the government must enact clear regulations to ensure the safety of citizens. Similar to privacy issues, male respondents were more verbose than women. Some participants pointed out that they expect the government to regulate the use of drones to prevent harmful effects resulting from the misuse of drones. Two respondents stated that clear regulations are needed to prevent misuse and accidents. One male

50 Waltorp and Bruun, "Flying Drones," 122.

51 Pal et al., *Global Gender Gap 2024*.

respondent in the age range 55–64 noted: "Now more and more people are using drones. To prevent misuse and avoid negative impacts, drone use should be well regulated, and its limits must be clear." A male participant, 35–44 years old, highlighted: "If there are no clear regulations, drone misuse and accidents that are caused by drones can become more widespread." Another male respondent, 45–54 years old, offered a more optimistic viewpoint, commenting: "If regulations are in place and implemented consistently, drones will actually become a necessary tool in the future."

There was only one female respondent, aged 18–24, who mentioned the government's responsibility to create suitable policies. She explicitly connected drones with harm when stating that the government should "set policies for responsible drone use that do not harm other people." One female respondent, aged 35–44, when writing a comment about the future development of drone technology in Indonesia, said: "There is advancement, but improvements need to be made, specifically in the area of regulations."

Some respondents highlighted the pressing issue of irresponsible drone use among operators and stressed the need for suitable regulations. A 25–34-year-old female participant emphasized that "regulations need to be applied so that the users do not freely fly drones in certain areas, for example, in residential areas and close to airports." Similarly, a young woman in the same age range stated, "If the drone pilot does not violate the regulations, I am just fine with the wish to fly a drone." A male respondent, 35–44 years old, echoed this concern. He remarked: "Many people still carelessly fly drones, especially commercial-grade drones, despite the dangerous consequences. For instance, exceeding the maximum allowed altitude or flying over crowded areas – many disregard safety regulations." In addition to these sentiments, a 45–54-year-old participant raised an important point about ethics. He stated: "Before the public widely uses drone technology, like mobile phones, the government needs to be cautious by creating regulations and a code of ethics for drone usage. Additionally, best practices for utilizing drones in agriculture, fisheries, and other fields are necessary."

The dataset does not reveal the extent to which respondents themselves have witnessed "out-of-control drones." Judging from the setup of the survey, the region where most respondents were likely to live is Java, Indonesia's most populous island. A feeling of vulnerability in the face of possible drone accidents in densely populated residential areas is therefore very understandable. It is also well known that drones are often used by tourists in Indonesia – for example, to take beautiful landscape photos – and as children's toys. Some of the respondents were likely to have had experience with this. One female respondent, aged 18–24, mentioned that "there are still some individuals flying drones in prohibited areas, which is very dangerous," and it is likely that she either knew about such cases or witnessed an incident herself. An additional factor that may have influenced the concerns about intrusive and

out-of-control drones is the media. The above-mentioned reports by *Kompas*, *Republika*, and *Tempo*, all media outlets based in Java, have repeatedly covered the topic of regulations, and it is likely that the respondents, who are presumably predominantly Javanese, would have come across some of them.

The analysis of the three themes – *techno-sophistication*, *drones as a double-edged sword*, and the *intrusive and out-of-control drone* – paints a multifaceted picture of emotional responses to drones in Indonesia. Female respondents were even more likely than their male counterparts to associate drones with techno-sophistication. According to their statements, the women had less knowledge about drones overall, while some of the men had professional experience with them. This techno-sophistication is expressed in different ways, on the one hand, in men's descriptions of specific technical features of the drones – for instance, a mirrorless camera and specific sizes – or, in the case of female respondents, expressions of awe and amazement at cool technology. In this context, experienced male respondents highlighted the need for future improvements in drone technology, including extending the range, reducing reliance on foreign technology, and addressing the lack of drone data. The theme *drones as a double-edged sword* captures the mix of positive and negative aspects of drones mentioned by respondents in the dataset. On the positive end, several participants referred to drones as useful devices that can play an important role in the work sector. They referred to their potential to save labor and their use in different sectors, for example, agriculture, security, and filmmaking. Their potential to minimize human accidents was also indicated, as well as to help people in need. On the negative end, respondents highlighted the threatening and privacy-invading nature of drones. Threats were associated with "surveillance and bombs," but also with being an annoying children's toy that should be forbidden. One respondent pointed out that there was a lack of education on safe drone usage in the media. The third theme, the *intrusive and out-of-control drone*, explicitly captures the concerns that some respondents already mentioned in the previous theme. We can see that respondents across genders agree that safe drone flights are a key concern the government should pay attention to. Expressions like "its use should not be free" (*penggunannya tidak secara bebas*), "privacy violations" (*pelanggaran privasi*), "misuse of drones and accidents (*penyalahgunaan drone dan kecelakaan*), and a call for "tight controls" (*kontrol yang ketat*) underline these concerns.

Conclusion

In addressing the research question of how gendered emotional responses to drone technology highlight different attitudes toward drones and reveal underlying inequalities, this chapter has revealed several notable dynamics.

The colonial structures referred to in scholarship about the supposed autonomy of the drone in warfare, and the "human-free" indicated in the term "unmanned,"[52] are relevant in different ways here. Within Indonesia, they are used to reproduce power dynamics that emanate from the state's center. As an extension of the government, they can also reach remote, including hard-to-access, parts of the expansive archipelago and be used there for surveillance purposes. The fact that Indonesia has deployed drones in Papua, both for military purposes and in agriculture, can be seen as part of an attempt to control regions of Indonesia that have long sought independence. Moreover, the power of drone technology is Java-centric – it is concentrated in the hands of the Javanese, the dominant and most powerful ethnic group in Indonesia.

The media tends to amplify the voices of those elites who are significantly involved in shaping the future of the drone sector. Playing an important role in reinforcing existing power relations, the media tends to echo voices and represent predominantly male governmental, military, and business interests. It often portrays drones as cutting-edge tools, and their efficiency, versatility, and applications in agriculture, construction, and disaster management, as this is in line with business and state interests. Publishing stories on how the government seeks to employ drones across the archipelago, the media extends the state's arm and control to remote areas, revealing the government's power and outreach. Depicted as a technologically innovative "all-round fix" tool, drones are said to tackle a variety of issues, ranging from border surveillance to pesticide spraying in agriculture, persuading the public of their versatility and usefulness.

In the media reports I evaluated, female voices are mostly absent; instead, drones are marked by a "male gaze," in terms of both the textual content and the images used. The conspicuous absence of female voices on drones in the media is partly due to the potentially small influence of women in the drone sector in Indonesia and because the media tends to reflect male interests related to power dynamics.

Several respondents perceived drones as advanced technology whose strength lies in their image recording function. The survey results show that respondents' positive attitude toward drones, the fascination across genders, often stems from their ability to capture moving and still images from interesting angles in the air. The heightened sense of awe among several female respondents highlights that they tend to have a positive attitude toward this technology and see it as an opportunity to engage in fascinating activities – such as making films – and acquire new skills. It was also a female respondent who mentioned that, as flying, computer-controlled objects, drones enable people to achieve previously impossible feats: obtaining aerial images without having to use a helicopter.

52 Atanasoski and Vora, *Surrogate Humanity*, 149.

Emotional responses to drones were mixed across genders, but positive feelings prevailed. The mixed emotions toward drones were evident, with respondents expressing both fascination and concern. This trend was also visible in the identified themes *techno-sophistication*, *drones as a double-edged sword*, and *intrusive and out-of-control drones*, covering voices on the spectrum from awe to concern. Interestingly, the topic of ethics was only mentioned by one respondent, and the media also did not discuss this topic. This could indicate a lack of awareness or concern about the ethical implications of drone use among the respondents and the media. It also suggests that discussions around drones are more focused on their technological capabilities and practical applications rather than associated ethical issues. What stood out was the strong emphasis on the importance of regulations and the sentiment that more could be done to ensure compliance. Both women and men expressed a unified call for the state to implement stringent regulations to promote safe and responsible drone operations.

Why do men and women have somewhat similar opinions, with women more fascinated by drones? One crucial reason women showed fascination for UAVs is their potential to take stunning pictures from a bird's eye perspective. In particular, several young women, aged 18–24, mentioned the drone's camera power and the prospects it brings for content creation. This potential even outweighed potential privacy concerns, that were more pronounced among men. In terms of work, the results suggest that women may be particularly interested in jobs that combine drone technology with creative components, such as content creation, filmmaking, or tourism promotion.

It also became clear that gender asymmetries persist in terms of knowledge, with women in this sample having less knowledge about drones. They also did not operate these devices themselves. An anonymous female respondent expressed it this way: "I have no experience [with drones] but I am curious how it works". Likewise, several male respondents, particularly those who had previous experience operating drones, held positive perspectives about these devices. However, they also expressed concerns regarding potential weaknesses: perceived quality issues and military applications, for example. There was also concern about the potential exclusivity of drone-related knowledge, limited to a small circle of individuals.

Returning to the title of this chapter, the findings reveal that despite the positive aspects mentioned above, respondents perceive drones as a double-edged sword that elicits different emotions, from happiness to fear, depending on their use. Flying drones near private property or directly above people's heads can understandably evoke feelings of unease or even threat. This is especially because individuals on the ground are unable to discern the intentions behind the drone's flight and the potential consequences.

This brings me to the last point of this chapter: what lessons do we learn from the drone study on Indonesia about how people might respond to future technologies?

One important factor is the potential benefits and the possible harms. My respondents regarded them as beneficial if they ease or add a specific value to their lives, for example, by speeding up otherwise slow processes at work or creating stunning footage. Yet they are harmful if armed with weapons. Another crucial question is who will control, be granted access to, and possess knowledge about future technology? Aside from costs, a technology's potential risk determines access, the ethical issues of a technology, and associated closedness or openness. Moreover, as the drone example teaches us, even within one technology, there are huge differences. Drones equipped with cameras, for example, are more accessible to the public than military drones, because they are not only less costly but also less dangerous. In terms of knowledge, using a technology does not necessarily mean that people know much about a particular technology. The result is a knowledge gap. More specialized technological knowledge, for example, will likely stay within circles that do not share it with everyone. Therefore, technology, both now and in the future, will likely not be neutral and will have a double-edged nature.

Acknowledgements

I thank the anonymous survey respondents for their valuable input. I also acknowledge Ramayda Akmal and Christiane Berth for their feedback on preliminary drafts of the survey.

Bibliography

Arnez, Monika. "Indonesia – Blurred Boundaries: (Auto)-Biographies and Cultural Conventions." In *Handbook of Autobiography and Autofiction*, edited by Martina Wagner-Egelhaaf. De Gruyter, 2019. https://doi.org/10.1515/9783110279818-103.

Arnez, Monika. "Gender, Islam, and Sexuality in Contemporary Indonesia: An Overview." In *Gender, Islam and Sexuality in Contemporary Indonesia*, edited by Monika Arnez and Melani Budianta. Springer, 2024. https://doi.org/10.1007/978-981-99-5659-3_1.

Atanasoski, Neda, and Kalindi Vora. *Surrogate Humanity: Race, Robots, and the Politics of Technological Futures*. Duke University Press, 2019. https://doi.org/10.2307/j.ctv1198x3v.

Cameron, Lisa. "Gender Equality and Development: Indonesia in a Global Context." *Bulletin of Indonesian Economic Studies* 59, no. 2 (2023): 179–207. https://doi.org/10.1080/00074918.2023.2229476.

Eißfeldt, Hinnerk, et al. "The Acceptance of Civil Drones in Germany." *CEAS Aeronautical Journal* 11 (2020): 665–76. https://doi.org/10.1007/s13272-020-00447-w.

Kuzma, Joanne, and Kate Dobson. "Gender Diversity in UAV (Drone) Industry." *International Journal of Gender, Science and Technology* 10, no. 3 (2018): 366–77.

Lindquist, Johan. "Veils and Ecstasy: Negotiating Shame in the Indonesian Borderlands." *Ethnos* 69, no. 4 (2004): 487–508. https://doi.org/10.1080/0014184042000302317.

Loh, Janina. "What is Feminist Philosophy of Technology? A Critical Overview and a Plea for a Feminist Technoscientific Utopia." In *Feminist Philosophy of Technology*, edited by Janina Loh and Mark Coeckelbergh. J. B. Metzler, 2019. https://doi.org/10.1007/978-3-476-04967-4_1.

Masduki, Masduki and Leen d'Haenens. "Concentration of Media Ownership in Indonesia: A Setback for Viewpoint Diversity." *International Journal of Communication* 16 (2022): 2239–59.

Pal, Kusum Kali, Kim Piaget, Saadia Zahidi, and Silja Baller. Global Gender Gap Report 2024. World Economic Forum, June 11, 2024. https://www.weforum.org/publications/global-gender-gap-report-2024/.

Petersen, Ricke Munck. "The Dispatched Drone and Affective Distance in Fieldwork." The Senses and Society 15, no. 3 (2020): 311–28. https://doi.org/10.1080/17458927.2020.1820188.

Rahakundini, Connie, and Ade Prasetia. *Proliferated Drones: A Perspective on Indonesia*. Center for a New American Security, June 1, 2016. https://drones.cnas.org/wp-content/uploads/2016/06/A-Perspective-on-Indonesia-Proliferated-Drones.pdf.

Röttger-Rössler, Birgitt, Gabriel Scheidecker, Susanne Jung, and Manfred Holodynski. "Socializing Emotions in Childhood: A Cross-Cultural Comparison Between the Bara in Madagascar and the Minangkabau in Indonesia." *Mind, Culture, and Activity* 20, no. 3 (2013): 260–87. https://doi.org/10.1080/10749039.2013.806551.

Waltorp, Karen, and Maja Hojer Bruun. "Flying Drones as a Gendered Matter of Concern." In *An Anthropology of Futures and Technologies*, edited by Débora Lanzeni, Karen Waltorp, Sarah Pink, and Rachel C. Smith. Routledge, 2022.

Contributor biographies

Monika Arnez is Extraordinary Professor of Asian Studies at Palacký University Olomouc and Head of the Anthropology Cluster in the Department of Asian Studies. Her research interests are in gender and Islam, social inequalities and ethnicity, and human–environment relations, with a focus on maritime Southeast Asia. Recent publications are Gender, Islam and Sexuality in Contemporary Indonesia (Springer Nature, 2024), co-edited with Melani Budianta, and "Ethnic Politics and Ambivalent Imaginaries of the Future at the Melaka Straits" in the Singapore Journal of Tropical Geography (2023).

Anna Baumann is a PhD candidate in history at the University of Bern, funded by the Swiss National Science Foundation. In her dissertation, she examines the history of homeworking by investigating debates on telework and its early development in Switzerland in the 1980s and 1990s. Her research focuses on how technology, gender, and space were negotiated through the new form of working and how this related to the reorganization of work at the beginning of the so-called digital age. She has published on the history of institutions for public gender equality (master's thesis revised in Traverse 2/2023) and on the gendered impact of new technologies using the example of a feminist CD-ROM (intercom Verlag 2021). Together with Monika Dommann and Anne-Christine Schindler, she co-edited the volume *Was ist neu an der New Economy? Eine Spurensuche* (2021).

Christiane Berth is a Professor of Contemporary History at the University of Graz. Her research interests include the global history of communication and technology, food and consumption, trade and migration, as well as the history of Mexico and Central America. She is currently working on a global history of office work. Christiane Berth earned her doctorate from the University of Hamburg and has held academic positions at the Universities of St. Gallen, Basel, Bern, and Costa Rica.

Helen Glew is Senior Lecturer in History at the University of Westminster, UK. She has published widely on women's white-collar work in twentieth-century Britain, including the monograph *Gender, Rhetoric and Regulation: Women's Work in the Civil Service and the London County Council, 1900–55* (2016) and articles on women telephonists and women's occupational associations and trade unions. She is particularly interested in the intersections between employment and feminist campaigning and is currently completing a book on the marriage bar and married women's paid work, 1870–1960.

Martina Heßler has been a Professor of the History of Technology at the Technical University of Darmstadt since February 2019. Her research interests include the history of technological errors and failures, the man–machine relationship since early modern times, and the history of emotions. Recently, she published the book *Sisyphos im Maschinenraum. Zur Fehlbarkeit von Mensch und Technologie* (2025). Currently, she is preparing a new book on the history of technological errors.

Nina Jahrbacher is a historian trained at the University of Graz, where she was a doctoral candidate in contemporary, economic, and social history (2022–2025). As a junior fellow in the Elisabeth-List Fellowship for Gender Research ("Global Workplaces in Transition: The History of Technology, Gender and Emotions since the 1960s"), she examined how computerization reshaped the administration of the Austrian Federal Railways (ÖBB) between 1969 and 1991. She was the organizational lead of the 15th Austrian Contemporary History Day (Graz, 2024). Her master's thesis, "Die Anfänge der Südbahn im Herzogtum Steiermark, Räume und Menschen," investigated the Southern Railway's beginnings in the Duchy of Styria, analyzing spatial transformations and demographic impacts of railway construction. Her work links technological innovation, labor, corporate and state administration, gender, and the history of railways.

Michael M. Prentice is a Senior Lecturer in Korean Studies at the University of Sheffield. Trained as a linguistic and cultural anthropologist of Korea, his research broadly focuses on genres and technologies of communication in contemporary South Korean organizations. His monograph *Supercorporate: Distinction and Participation in Post-Hierarchy South Korea*, was published 2022. He earned his PhD at the University of Michigan and previously held a postdoctoral fellowship at Harvard University.

Heidi Schweickert is a PhD candidate in the Department of History of Technology at the Technical University of Darmstadt and works on the significance of emotions in the digitalization of work from the 1970s to the mid-1990s. With a strong background in the international IT business, she focuses on the co-construction of emotions and

digital work technology and on the relevance of emotions for man–machine interaction from a historical perspective. One focus of her work is the historical research of end-user experiences using SAP as an example. She completed a research fellowship in the Area of Contemporary History at the University of Graz with an article on the impact of real-time technology on the man–machine relationship (2023).

Index