

# Chapter 10

## Gender-Technology Relations in the Various Ages of Information Societies

Delphine Gardey

**Abstract** From “domination” to empowerment, gendered uses of information technologies appear in a variety of situations and interpretations. What is added to the history of technology by their social studies, and what is offered otherwise by the critical input of feminism on this field, is the idea that relations between humans and technologies (gender relations among them) are never set in advance but instead the object, as much as the end game of the analysis, as shown by Judy Wajcman. Yet the “seamless fabric” (with reference to Hughes’ work) interweaving the social and the technological and tying together gender and power relations is enduring; the role of historians is to acknowledge its lasting existence.

### 10.1 What ICTs, What History?

Information and communication technologies? Society of information, of knowledge? Communication, networks and digital and virtual economy? ICT?

Certain words and phrases penetrate the vernacular with an ease that hints at suspect self-evidence: it certainly is the case for the acronym “ICT.” What those letters cover is a domain embracing such varied technologies as the telegraph, the telephone (before it became cellular), the typewriter, the radio as well as punch-card systems, and computers (before they became personal). The age of mechanical data processing was superseded by the age of computing, itself followed by the era of communication. Having barely incorporated the newly institutionalized<sup>1</sup> terms of a “society” and an “economy” of “information” and “communication,” our lexicon is

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<sup>1</sup>A comparative European history of the transitions from the field of “communication” to that of “information” and then of “the digital” is still to be written. The creation of a research unit on “TIC et société” (“ICT and Society”) at the French *Centre National de la Recherche Scientifique* (CNRS) can be seen as evidence of such institutionalization (Brousseau, Eric, and Frédéric Moatty. 2002. La création du Groupe de recherche ‘TIC et société’ au CNRS. *Réseaux* 2(112–113): 395–398).

D. Gardey (✉)

Gender Institute, The Geneva School of Social Sciences, Geneva University, Bd du Pont-d’Arve 40, 1211 Geneva, Switzerland

e-mail: [Delphine.gardey@unige.ch](mailto:Delphine.gardey@unige.ch)

fed with the new concepts of a digital revolution, a society of “knowledge”, and a “cyber world” – of a virtual or “augmented” reality.

How the history of technologies is told is contingent on the times. The history of computer systems was for a long while drafted without any consideration for mechanical data processing as a technico-social system able to process and produce data on a large scale.<sup>2,3</sup> Computer science was included in the genealogy of leading-edge technology, and its history was that of concepts and formalism. As such, the writing of its history is a manifestation of what “technology” is; the prevalent technological internalism or naturalism sides with a “male,” “hard(ware)” element, with innovation and the radically new – as feminist researchers offer to describe the social and cultural existence of technology in the West.<sup>4</sup> Postwar computers as technical and conceptual systems could only have the noblest of origins. The French history of computer science, putting emphasis on the emergence of national “science” and “industry,” has computer science find its “origin” in the analog computers used for scientific calculation between the World Wars.<sup>5</sup> The acknowledgment of punch-card systems as part of that genealogy is fairly recent<sup>6</sup> and a critical turning point for historiography.<sup>7</sup>

It certainly is significant that an approach of information technologies as socio-technical systems allows a reconnect between the past and the future of computer science and technologies. The explicit relation between the socio-technical infrastructures of the interwar years and postwar computer science takes the spotlight from innovation and shines it on the usage and forms of continuity. It helps to better consider the historical, political, and social (and gender) contexts of the development of machines; it furthermore allows to integrate the history of computing into a broader, newly formulated history of information technologies, as Giuditta Parolini offers in this book.

This connection of the past and future, a new reading of what information technologies are and can become, is carried out at a specific time in the history and the development of Western capitalist societies. In the age of the Internet bubble and the apparent cultural, technological, and economic hegemony of the digital world, the meaning we give to the present questions the past in new ways and may reinforce

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<sup>2</sup> Gardey, Delphine. 2008. *Ecrire, calculer, classer. Comment une révolution de papier a transformé les sociétés contemporaines (1800–1940)*. Paris: La Découverte.

<sup>3</sup> See in particular Chap. 7, “Traiter l’information : de l’économie au gouvernement”: 243–278.

<sup>4</sup> Cockburn, Cynthia. 1983. *Brothers: male dominance and technological change*. London: Pluto Press; Wajcman, Judy. 1991. *Feminism confronts technology*. Cambridge: Polity Press; Oldenziel, Ruth. 1996. Objections: technology, culture and gender. In *Learning from things. Method and theory of material culture studies*, ed. David Kingery, 55–69. Washington, DC: Smithsonian Institution Press.

<sup>5</sup> Mounier-Kuhn, Pierre-Eric. 2010. *L’informatique en France de la seconde guerre mondiale au Plan Calcul. L’émergence d’une science*. Paris: Presses universitaires de la Sorbonne.

<sup>6</sup> In the French context, an interesting contribution to that acknowledgment in the perspective of an essentially technical and industrial history of technologies is that of Pierre-Eric Mounier-Kuhn.

<sup>7</sup> Krige, John, and Eda Kranakis. eds. 1994. Information technologies and socio-technical systems. *History and Technology*, 1(1). New York: Routledge.

the hypotheses of today. Laymen and expert alike seem to describe the 1990s and 2000s as the era of the emerging “network society,” “knowledge economy,” “information society,” and “digital economy”: this raises with rare necessity the question of the descriptions of the past. What name is to be given to the society replaced by the “knowledge society?” How to quantitatively measure and study the “rise of the knowledge worker”<sup>8</sup>? Once identified and represented under different terms, these mutations are revisited in order to institute a form of continuity and historical trend.

One such rewriting effort was undertaken in the volume edited by Alfred Chandler and James Cortada in 2000. Its focus was on finding, in the history of the United States since colonial times, “how a nation was transformed by information” and how “information has shaped the United States” while reading the history of technologies and capitalism through this prism.<sup>9</sup> The obscure research of historians interested in disused techniques and poorly visible economic and social fields gain a new life, new potential value on the market of scholarship, and refreshed academic legitimacy. Yet, this movement is not without its issues. How faithful to the worldview of contemporary stakeholders are the sets, systems, and genealogies constituted and enriched by today’s researchers? How can today’s research not attribute meaning and purpose against original, now veiled significance once embodied by certain technologies? What of the forgotten lineage and of the once available, used, then forgotten scripts<sup>10,11</sup>? What is to be done about the diversity of technico-human arrangements that follow national contexts, industrial specificities, and local settings?

## 10.2 Technology Yesterday, ICTs Today?

My research on the “arts of doing”<sup>12</sup> concerning the administration of men and things<sup>13</sup> has led me to describe the various regimes of the use of technology in the protean space of the office throughout its long history. Rather than a teleological

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<sup>8</sup>Cortada, James (ed.). 1998. *Rise of the knowledge worker*. London: Routledge.

<sup>9</sup>Chandler, Alfred, and James Cortada (eds.). 2000. *A nation transformed by information. How information has shaped the United States from colonial times to present*. Oxford/New York: Oxford University Press.

<sup>10</sup>Akrich, Madeleine. 1992. The de-scription of technical objects. In *Shaping technology-building society: studies in sociotechnical change*, ed. Wiebe E. Bijker and John Law, 205–224. Cambridge, MA: MIT Press.

<sup>11</sup>My work on the movement of mechanization of writing before and after the invention, production, and penetration as an office tool of Sholes’s typewriter by Remington aims to recapture forgotten intentions, usefulness, and scripts. One aspect of usefulness is here the intention to help teach writing to the blind, an effort carried on by several generations of inventors and users (Gardey, Delphine. 2001. Mechanizing writing and photographing the word: utopias, office work, and histories of gender and technology. *History and Technology* 17: 319–335).

<sup>12</sup>De Certeau, Michel. 1990. *L’invention du quotidien. 1. Arts de faire*. Paris: Gallimard.

<sup>13</sup>Gardey 2008.

approach, I chose to account for the knowledge and the know-how put into practice by workers for the completion of traditional administrative duties (writing, counting, filing, computing) while facing the development and intensification of these tasks as both tools and products of a mutating economy. I was able to show, with other historians, that mechanization was not the sole motivator for the intensification of work: during the same period and within one same company, a great variety of processes involving men, women, traditional know-how, individual skills, ancient devices, and/or new technologies can coexist.<sup>14</sup>

Practices such as hand calculations and the acknowledgment of qualified employees as a resource were, in many places and for a long time, resisting their replacement by artifacts (calculators and later tabulating machines). Martin Campbell-Kelly pointed out this phenomenon in his work on insurance company Prudential<sup>15</sup>: between the 1880s and the 1920s, in London and in the United States, actuarial work involved organizational, technical, and human solutions to the problem of the rapidly rising volume of calculations to be done. In the London offices, the skills of the employees (who were predominantly male, a fact beside the scope of Campbell-Kelly's study) remain a resource in the long term, in spite of available technological alternatives which are only put in action after 1911. In contrast, US branches turn very readily to punch-card systems.

When considering, over a long historical period, a variety of channels involving practices and knowledge, without prejudice on the types of techniques implemented, one may write a history that is not inflected by the knowledge of the current state of the world. With a focus on gestures, actions, questions, and solutions to actual problems, it becomes possible to account for the organization of the competition between human (mind and body) knowledge and qualifications, tools and cognitive systems, and technical artifacts and machines. The very definition of what is understood with the term "technology" is modified and broadened.

While this approach is a necessary condition of historical research, scholars must also know to detect "turning points," the key moments when consequential transformations take place, accelerations appear, and options become irreversible choices<sup>16</sup>. Studying the formalization and stabilization of such social and technical configurations is crucial in that they may be the stage for gender arrangements, which may take hold and be transmitted.

The economy of European countries underwent deep transformations between 1890 and the 1920s. A new material economy was established over these decades: a new economy of the written word and of data and information processing, signing

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<sup>14</sup>Gardey, Delphine. 2006. Culture of gender, culture of technology: the gendering of things in France's office spaces between 1890 and 1930. In *Cultures of technology*, ed. Helga Novotny, 73–94. New York: Berghahn Books.

<sup>15</sup>Campbell-Kelly, Martin. 1992. Large scale data processing in the prudential 1850–1930. *Accounting Business and Financial History* 2(2): 117–139.

<sup>16</sup>On this approach, and a discussion of elements of path dependency theory and the role played for this model by the case of the typewriter keyboard, see Gardey, Delphine. 1999. The standardization of a technical practice: typing (1883–1930). *History and Technology* 15: 313–343.

the opening of the contemporary era. This “administrative” or “informational” “white-blouse revolution”<sup>17</sup> was based on significant changes in the domains of writing, computing, filing, and data processing, as well as on the technological convergence of newly redefined domains. Fairly diverse economic fields (from government to commerce and banking, to insurance, and to the industrial sector) started then to share a need for the constant processing of a greatly increased volume of documents, with an emphasis for some sectors on direct output.<sup>18</sup> Maybe just as much as the period of intensification of technological, social, and economic transformations of the late twentieth and early twenty-first centuries, this era can be described as a capitalistic turning point.<sup>19</sup>

### 10.3 Gender Infrastructures of the Information Age

Between the world wars, offices became a laboratory for this first informational modernity. There, in order to process the ever more abundant data (and in particular the mass of individualized alphanumeric data), an anonymous and *mechanical* space of production, designed for large-scale, human and nonhuman data processing was invented.<sup>20</sup> Hardware use rests on intensive, specialized women labor: typing pools (and less common but equally female computer pools) were a staple of the modernity and proletarianization of office work. Through these rooms, the lasting assignment of women to office machines was introduced, as well as a regime of machine use intensified by workstation equipment and “systematic” layout.<sup>21</sup> A first form of computational machinery is thus created through the interweaving of women, machines, and space-regulating flows. Under this very specific political economy, the vanishing of the qualifications and personalities of the female workers is operated, generating unprecedented productivity. The output of accounting machines and punch-card systems is entirely dependent upon the mobilization of human resources.

The studies presented in this book offer to revisit this section of the history of information and its technologies: beyond the days of machine accounting, after World War II, the determining years of expansion of the 1950s and 1960s (Parolini, Morley, and McDonnell). One significant tool here is the understanding of space as

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<sup>17</sup>Gardey 2008; Anderson, Gregory (ed.). 1989. *The white blouse revolution. Female office workers since 1870*. Manchester: Manchester University Press.

<sup>18</sup>Gardey 2008.

<sup>19</sup>Yates, Joan. 1989. *Control through communication. The rise of system in American management*. Baltimore/London: John Hopkins University Press.

<sup>20</sup>Akrich, Madeleine, Michel Callon, and Bruno Latour (eds.). 2006. *Sociologie de la traduction: textes fondateurs*. Paris: Mines ParisTech/Les Presses; Latour, Bruno. 1996. *Aramis or the love of technology*. Boston: Harvard University Press.

<sup>21</sup>Bernasconi, Gianenrico, and Stephan Nellen. eds. 2015 (Forthcoming). *The office as interior (1880-1960)*. Bielefeld: Transcript.

machinery (inside and outside). The transformation of technologies into artifacts combining the machine and the human, as highlighted by the works of Jennifer Light,<sup>22</sup> Janet Abbate,<sup>23</sup> and Chantal Morley and Martina McDonnell in this volume, is a notable specificity of the first age of information processing. Asking “Who is the computer?” is the most sarcastically incisive way of questioning the elements at stake. The infrastructural and mixed extent of the first computers is a reality. The bodies of women (their hands and arms but also their skills<sup>24</sup>), forgotten for long, now reappear: the return of corporeality is necessary to the understanding of what comprises the economic, social, and political make up of the institutions of today<sup>25</sup>. As a valuable resource, corporeality helps appreciate the complexity with which the contemporary world engages with technology and to discern the specificity of Western modernity.

Another, earlier example of the intense mobilization of women’s body in the “informational” context can be found in the telephone industry. In the early days of the twentieth century, this industry is compelled to develop technico-social infrastructures able to meet the demand at minimal cost. One of the first responses is the hiring of white, educated women as switchboard operators. This response, in the American context, frames the service offered to white social classes in terms of gender, race, and class. With intensifying work demand, more women gain access to employment, but this happens in contradiction with the social definition of the industry, as a service provided to an upper class of (white) businessmen.<sup>26</sup> The extension of the benefits of telephone use to upper-class women, as discussed by Dominique Pinsolle in this book, as well as the recruiting of lower-class black women as operators,<sup>27</sup> appear as disruptive elements in the social and political economy of the previous technico-social arrangements.

Two lessons can be gained from the historiographies of the telephone exchange and the office.

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<sup>22</sup>Light, Jennifer. 1999. When computers where women. *Technology and Culture* 40(3): 455–483.

<sup>23</sup>Abbate, Janet. 2012. *Recoding gender. Women’s changing participation in computing*. Cambridge, MA: MIT Press.

<sup>24</sup>One important point made in this volume (Ashcraft, Karen Lee and Catherine Ashcraft. 2015. Breaking the “glass slipper”: What diversity interventions can learn from the historical evolution of occupational identity in ICT and commercial aviation. In *Connecting women*, ed. V. Schafer and B.G. Thierry, 137–156. Dordrecht: Springer) based on “Occupational Identity,” is in contrast with older discussions on the social construction of skill.

<sup>25</sup>For a proposed material and “corporeal” reading of democratic institutions, and in particular of the French *Assemblée Nationale* since the Revolution, see Gardey, Delphine. 2015. *Le linge du Palais-Bourbon. Corps, matérialité et genre du politique à l’ère démocratique*. Bordeaux: Le Bord de l’Eau.

<sup>26</sup>Fisher, Claude. 1992. *America calling. A social history of the telephone to 1940*. Berkeley: University of California Press; Green, Venus. 1995. Race and technology: African American women in the bell system, 1945–1980, technology and culture. *Technology and Culture* 36(2): 101–143.

<sup>27</sup>Green 1995.

The history of the phone industry and the arbitration regarding the types of female workforce (as well as the choice to use this workforce or not) are reminiscent of the social and racial hierarchies made invisible by the ordinary use of information and communication technologies. Production processes keep managers arbitrating between technology and work and innovation and mobilization of workers. From the example of American Telephone & Telegraph, Kenneth Lipartito<sup>28</sup> showed that women's labor acted as a sustainable substitute for a purely technological intensification of the socio-technical system of the telephone industry: automated switchboards were met with highly competitive human "switches," and operators gained the industry's favor against innovation. An important reason behind this preference is that these women *are* the innovation. Yet, as is the case in histories of typing, this is never really a matter for consideration – not unlike the general part played by women as agents of the history and changes in economy and technology. The economic performance of these systems incorporates the work and skills of women while making them invisible. It is one of the "matrices" of the information economy, worth noting and remembering.

Another bit of knowledge is provided by the history of the office: like the history of earlier workshops, it allows a better understanding of how "social relation can be expressed within space, but [how] space is also active in determining social relation".<sup>29</sup> Such is the reason for the importance of wondering "how politically active is a space." These are elements for analysis when the transition is made, for example, from the socio-technical infrastructure of the "pool" to that of the "open-plan office" to the more recent "cybertariat." Such issues, as control, power, agency, empowerment, and domination, seem to remain underrepresented in the investigation of the more contemporary forms of organization of the technical and cognitive space of information processing. However, one can hardly study these transformations without considering the distribution of agency and control among humans and nonhumans, among social groups, among men and women, and among local and outsourced workers.

Both of these elements should be considered in a contemporary context of global transactions and international forms of gender and social distribution of labor. In 2003, Donna Haraway already attempted to raise awareness on these issues with her famous *Cyborg Manifesto*.<sup>30</sup> Behind the smoothed-out world of our computer screens are invisible infrastructures and an international economy of social and gender relations, founded on the hackneyed social forms of "pools" – fragmented, automated, repetitive activities located for the main part in "emerging" economies. Who operates the mass digitization of the virtual libraries now accessible online? The

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<sup>28</sup>Lipartito, Kenneth. 1994. When women were switches: technology, work and gender in the telephone industry (1890–1930). *American Historical Review* 99(4): 1075–1111.

<sup>29</sup>Hoskyns, Teresa. 2005. Designing the Agon: questions on architecture, space, democracy and "the political". In *Making things public: atmospheres of democracy*, ed. Bruno Latour and Peter Weibel, 798–803. Cambridge/Karlsruhe: The MIT Press/ZKM Center for Art and Media.

<sup>30</sup>Gardey, Delphine. 2009. Au cœur à corps avec le Manifeste Cyborg de Donna Haraway. *Esprit*: 208–217.

difference must be emphasized between the ideology of virtuality (free, open, and equal access, transparency) and the reality of its political economy. There are no connections between the “virtual world” and the “real world” when the “real work” of those who make it a reality is forgotten.<sup>31</sup>

## 10.4 ICT as Technology and as Culture

The latter point draws our attention to the conjointly functional and utopian dimensions of these socio-technical systems. As much as they are material, corporal, inscribed within the real space, which they help circumscribe, information and communication technologies are also promises<sup>32</sup> and utopias. Typing pools were rationalist utopias’ and productivist’s nightmares; the open-plan office is a paradoxical form of the utopia of a nonhierarchical, nonformal, cooperative workplace, but where control over work and interactions is multiplied by the organization of space and flows. The spaces devoted to the economy of knowledge after World War II are examples of the generative function ascribed to architecture. Martin Reinhold shows how the corporate space successfully tackles the daunting task of combining “new managerial protocols, new networks of power and new esthetics problems”.<sup>33</sup> Analyzing the office of the second half of the twentieth century as a “laboratory,” he studies the “topologies of knowledge” implemented in the works of such architects as Eero Saarinen, Louis Kahn, Robert Venturi, and Denise Scott Brown. Each of the laboratories they design is an “organizational complex” intended to provide added innovation and knowledge value through their very arrangement. What are then the corporate spaces of the high-tech, digital economy? This question must be raised in connection with the language used by leading companies on their products and on the culture they offer to share with customers and into which they mobilize the personalities of their employees. Physicality and discourse – utterly ordinary economic reality and the most trivial ideology – while two separate domains, may together offer an interesting object of study.

Their technological nature does not keep ICTs from having their own culture. As part of the ever-renewed culture of novelty, they are akin to so-called “material” technologies. In the contemporary history of technology, the rhetoric of progress and of the never-seen-before is ubiquitous, in spite of the prevalent and obvious

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<sup>31</sup> Huws, Ursula. 2003. *The making of cybertariat. Virtual work in real world*. New York: Monthly Review Press.

<sup>32</sup> Haraway, Donna. 1992. The promises of monsters: a regenerative politics for inappropriate/d others. In *Cultural studies*, ed. Lawrence Grossberg, Cary Nelson, and Paula A. Treichler, 295–337. New York: Routledge.

<sup>33</sup> Reinhold, Martin. 2009. Unpublished paper. Von Herrmann, Hans-Christian and Sven Spieker (org.). *The office in the studio. The administration of modernism*. International conference, 23–24 January 2009. Medien Wissenschaft, Friedrich-Schiller Universität Jena.



coexistence of several generations of technologies.<sup>34</sup> As underlined by David Edgerton's research, the "shock of the old"<sup>35</sup> is rarely fully measured, when observers are absorbed by the promotion of eternal novelty. This does not appear to be a trait specific to ICTs.

Information and communication technologies, like most technologies, are also subjected to ambivalent "projections" concerning their potential positive and harmful effects. Steve Woolgar sees this as a constant in the history of technology, both before and after the advent of ICTs. His call for a "technography" of technologies underlines how debates on "new" technologies tend to include ideas on possible alternatives on a social level – discussing technology is discussing the future. The focus of such debates is on what the manufacture and organization of society can be and must be. Whether tangible or immaterial, technologies are thus essentially "theoretical"<sup>36</sup>: they are artifacts and they are discourse, materiality as much as language. In other words, technologies convey the vernacular speech, but also scholarly dissertations, which contribute to their socialization and usage. Social sciences are now among the forms of technical, social, and political significations of technology.

The euphoria exhibited in certain periods of the history of technology (or rather in the history of the discourse on technology, as offered in public and academic spaces) is a ready target for retrospective irony. It would be easy enough to have century-old praise for the telegraph pass as a demonstration of enthusiasm for the Internet, uttered 20 years ago. The language of the innovator is not too different from that of the general public or the expert. In social sciences, even in their more critical forms, technological optimism is a noticeable feature of the 1990s and 2000s. It appears in the feminist infatuation for digital technologies, itself a cultural and social phenomenon worthy of extensive research. Ripe with promises (not only those of monsters) to paraphrase Donna Haraway, ICTs have aroused unprecedented passion. Some feminists saw them as exacting a positive transformative influence on gender relations<sup>37</sup>; "technophilia" is the term used by Judy Wajcman<sup>38</sup> to describe this era.

I proposed the term of "technoportunism" to describe how Donna Haraway reconstructs political struggles and feminism at the turn of the millennium with the

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<sup>34</sup>Edgerton, David. 1998. De l'innovation aux usages. Dix thèses éclectiques sur l'histoire des techniques. *Annales Histoire, Sciences Sociales* 53(4–5): 815–837.

<sup>35</sup>Edgerton, David. 2007. *The shock of the old. Technology and global history since 1900*. Oxford: Oxford University Press.

<sup>36</sup>Woolgar, Steve. 2000. Virtual technologies and social theory: a technographic approach. In *Preferred placement. Knowledge politics on the web*, ed. Richard Rogers. Maastricht: Jan Van Eyck Akademie Editions.

<sup>37</sup>Kirkup, Gill, et al. 2000. *The gendered cyborg: a reader*. London: Routledge.

<sup>38</sup>Wajcman, Judy. 2007. From women & technology to gendered technoscience. *Information, Communication & Society* 10(3): 287–298.

figure of the cyborg.<sup>39</sup> The analysis of individual and collective subjectivities in the era of biotechnologies and “global” information processing takes the form of a prophecy. The epistemic and political impact of Haraway’s trailblazing research is still to be fully grasped; it allows to see how ICTs are the possible implements of reallocations, new connections, and disembodiment – which all are precisely what cyberfeminism, as a practice of technology and as a technical culture, aims to achieve. One may thus see in cyberfeminism a stage of feminism, and one of its form, the purpose of which is the material, technical, and theoretical exploration of means to start “gender trouble”<sup>40</sup>: questioning contingent forms of embodiment, investigating the social and technical modes of our relation to the others and to the world, and exploring relationality and possible connections in their variety<sup>41</sup>. Cyberfeminists have taken full advantage of the array of possibilities offered by ICTs.

Should the “technophilic” euphoria remain a valid viewpoint today? One incisive remark from Judy Wajcman puts it into perspective: “However, for all the hype about the network society, the internet does not automatically transform every user into an active producer, and every worker into a creative subject”.<sup>42</sup> I have proposed a synthesis of English language academic works on the issue of social and gendered uses of ICTs created in the 1980s to the 2000s.<sup>43</sup> In addition to the study of the thematic evolution of the research, my work offers a contradictory and paradoxical summary of the emancipating or constraining nature of gender-technology relations as they appear in the surveyed research. From “domination” to empowerment, gendered uses of information technologies appear in a variety of situations and interpretations. What is added to the history of technology by their social studies, and what is offered otherwise by the critical input of feminism on this field, is the idea that relations between humans and technologies (gender relations among them) are never set in advance but instead the object as much as the end game of the analysis.<sup>44</sup>

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<sup>39</sup>Haraway, Donna. 1985. (Reed. 2003). A cyborg manifesto: science, technology and socialist-feminism in the 1980s. In *The Haraway Reader*, 7–40 London/New York: Routledge; Gardey, Delphine. 2014. The reading of an Oeuvre. Donna Haraway: the poetics and politics of life. *Feministische Studien, Zeitschrift für interdisziplinäre Frauen- und Geschlechterforschung* 32(1): 86–100.

<sup>40</sup>Butler, Judith. 1990. *Gender trouble. Feminism and the subversion of identity*. 2nd ed. 1999. New York: Routledge.

<sup>41</sup>These are discussed in our soon-to-be-published volume: Gardey, Delphine, and Cynthia Kraus (eds.) 2015 (Forthcoming). *Politics of coalition. thinking collective action with Judith Butler*. Geneva and Zürich: Seismo Verlag.

<sup>42</sup>Wajcman, Judy. 2006. New connections: social studies of science and technology and studies of work. *Work, Employment and Society* 20(4): 773–786.

<sup>43</sup>Gardey, Delphine. 2003. De la domination à l’action: quel genre d’usage des technologies de l’information? *Réseaux Communication, technologie, sociétés* 21: 87–117.

<sup>44</sup>Wajcman 2007.

Yet the “seamless fabric”<sup>45</sup> interweaving the social and the technological and tying together gender and power relations is enduring; the role of historians is to acknowledge its lasting existence. José Emilio Pérez Martínez’s contribution, on free (and feminist) radio, reminds us of a simple but important truth: the difference between those who design and decide and those who listen and consume – and as consumers are modeled – was and still is a major aspect of the history of technology and consumption. The laboratory of the immaterial is still a space for unmixed masculinity. Women are only marginal contributors to the design of the cultural, technological, and social worlds where our daily lives are carried out. Technologies are thus shaped by gender considerations just as much as they help reorder and shape gender as a social and political field. There may lie one reason why the social and sexual definition of what technologies pertaining to the ICTs is such an important matter. As illustrated by the works of Lie, gender is a marker when it comes to the borders between “high-tech,” “low-tech,” and “no-tech”.<sup>46</sup>

Lastly, the comparative study of representations in the French and German press of the relations between male and female teenagers and ICTs insists on the concrete modes of the shaping and modeling at play (Dalibert and De Julio in this book). A question of specific import for young women is that of the possible identification with role models who may advertise their technology literacy. Such issues remind us how age and gender categories are historically defined by the relation to technologies on the individual and subjective level, as much as collectively. While technologies have been exclusively and for a long time “what men do,” being a preteen in today’s societies means entertaining a number of social and technological relations to oneself and to others. The “becoming technological” of individual and social identity is one significant aspect of the impact of ICTs, as “relational artifacts”,<sup>47</sup> on the world and on our ability to live in it and contribute to it.

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<sup>45</sup>Hughes, Thomas P. 1983. *Networks of power. Electrification in Western Society, 1880–1930*. Baltimore: The John Hopkins University Press.

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