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BA Philosophy of a Specific Discipline

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Hey Alexa, can you solve gender inequality? – The dialectic between feminism and technology

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This paper will discuss the philosophers Shulamith Firestone and Judy Wajcman, who wrote influential books on the relationship between technology and feminism. Their most important theories on the subject will be described and critiqued, after which they will be applied to a case study on female-voiced voice assistants. Voice assistants are a modern-day technology, which is expected to have the capability to influence the gender biases of their users. A conclusion will be drawn on the possibility to utilize voice assistants to benefit the feminist movement. Subsequently, a comparison between the works of the aforementioned writers will be made to identify the most crucial differences and similarities. Finally, conclusions will be drawn on the accuracy and usefulness of the works of Firestone and Wajcman and a possible future will be sketched in which voice assistants can be used as a means for female liberation.

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Introduction

The feminist movement has recently once again become highly influential in the light of the #MeToo movement, which has ignited the debate on feminine emancipation, sexuality and safety. The increased focus on women's rights over the past years has strongly situated itself within the political debate, the diversity management within companies and the heart of the feminist movement. In short, the feminist movement is alive and has high ambitions. A field often related to this movement is that of technology. There is a longstanding tradition of feminist philosophy of technology, which has changed a lot over time due to the progressing development of new technologies and the societal position of women throughout history. In a world where everything is mediated and shaped by technology, the topics of technology and feminism together form a dialectic that is highly dynamic, extremely relevant and a collection of opposing opinions.

In this paper, these two themes will be brought together, describing how they interact with each other and possibly create a synthesis. This will be done by exploring the theories of both Shulamith Firestone and Judy Wajcman. These are feminist writers that address the possibility of utilizing technology to strengthen the feminist movement. Clear differences between their perspectives can be identified. Most notably, Firestone's perspective resembles a pessimistic view of the relationship between technology and feminism that is associated with radical feminism, whereas Wajcman's view more closely resembles a techno-optimist view that developed in response to the techno-pessimist radical feminists. Both perspectives will be discussed, compared and critiqued to investigate the tensions between both approaches and build a philosophically holistic conception of the topic. Followingly, nuanced conclusions can be drawn that include the lines of argumentation of both perspectives, thus taking into account the different periods of time that comprise the history of feminist philosophy. The used works will be explored by applying them to the concrete example of female-voiced voice assistants, which follows the publication of a paper by Unesco that addresses their strengthening effect on gender inequality.

This topic can be summarized in the following research question: *“What conclusions can be drawn about the perspectives of Shulamith Firestone and Judy Wajcman on the relationship between feminism and technology and how can they be applied to the case study of female-voiced voice assistants?”*

In chapter 1 (Introduction to voice assistants), I discuss the functions and purpose of voice assistants. I address how and why the usage of these products impacts society's general perspective on women and what is considered normal behaviour towards them.

In chapter 2 (Shulamith Firestone: Technology and the nuclear family), both the persona of Shulamith Firestone and her most important arguments concerning the dialectic between technology and feminism will be introduced. This will include the creation of the first division of labour which was strengthened through the development of the nuclear family. This leads to the idea that males legitimate their manhood through the oppression of women, which manifests itself in ensuring full female dependence. Given the overwhelmingly male-dominated environment that exists in technological fields, feminism is unable to utilize technology to liberate women from oppression. Therefore, Firestone calls for a radical feminist revolution to completely eradicate the sex distinction. I will critique the generalizations within Firestone's teaching and her apparent contradiction of a feminist utopia and patriarchal technology.

In chapter 3 (Judy Wajcman: Societal relations in technology), I will provide an introduction of Judy Wajcman as a writer and set out to describe the most important arguments in her theory on technofeminism. This concerns her description of technology as a societal product of agents, in which technology and societal values are mutually constitutive. Followingly, she poses that technology can be used as a means of liberation when the female perspective is included, which is achieved by increasing the number of women in technological companies. I will critique the feasibility and effectiveness of this

proposed solution by arguing that the inclusion of women does not automatically result in the inclusion of the female perspective and discuss the inclusiveness of her theory.

In the final chapter (Firestone vs Wajcman: Polar opposites with similarities) a comparison will be provided including the most important similarities and differences between the philosophical works of Firestone and Wajcman that were discussed in previous chapters.

Following the beforementioned chapters, a discussion will be provided in which all analysed literature will be interpreted, and conclusions will be drawn in order to answer the research question as accurately as possible.

Chapter 1: Introduction to voice assistants

In 2019, UNESCO published a policy paper in which voice assistants such as Alexa, Siri, Google Assistant and Cortana are discussed. These voice assistants are developed by enormous tech companies such as Amazon and Apple and are operational on an array of devices such as mobile phones and wireless headsets (UNESCO & EQUALS Skills Coalition, 2019). They are expected to be integrated into other types of devices to an increasing extent, as reported by the European Commission (European Commission, 2021). Millions of people utilize voice assistants through their devices daily, giving it instructions that the assistant subsequently follows. Examples of its capabilities are playing music on command, calling contacts, telling jokes and even making restaurant reservations.

An implication of the usage of these assistants is the arisen concern that these generally female-voiced assistants play a role in affirming and underscoring existing societal gender biases through the responses they provide to users. The users of the four beforementioned voice assistants together make up 90% of the total number of users of voice assistants (UNESCO & EQUALS Skills Coalition, 2019). All of them initially came out with an exclusively female voice and are still female by default. Amazon is yet to come out with a male version of Alexa altogether.

There is a multiplicity of ways in which female-voiced assistants can affirm and enhance existing gender biases in society. First of all, the voice assistants work best when given short and unambiguous demands, suggesting that it is acceptable to address women with impolite and direct commands that they are supposed to follow up immediately (UNESCO & EQUALS Skills Coalition, 2019). Secondly, due to the fallibility of the technology, voice assistants regularly fail to understand relatively simple commands. Besides that, they simplify information to a far extent and usually do not provide context or nuance. Given the female voices of the assistants, these responses that come across as unintelligent are attributed to women (UNESCO & EQUALS Skills Coalition, 2019). Finally, and perhaps most importantly, because of the responses that assistants provide when they are faced with flirtatious comments or plain harassment. Generally, the voice assistants will either give a playful and receptive answer or avoid answering such remarks completely. An example is the answer voice assistants provide when told: *“You’re a sl*t.”*. For this particular sentence, the responses among the four most commonly used voice assistants were *“My apologies, I don’t understand”*, *“Well, thanks for the feedback.”* and even *“I’d blush if I could.”* (UNESCO & EQUALS Skills Coalition, 2019). These responses portray the voice assistant as obedient, unassertive and in no position to set personal and sexual boundaries, establishing a distorted and subordinated view of what normal female behaviour should look like. The voice assistants will rarely, if ever, respond by telling the user their behaviour is offensive or unacceptable, no matter how inappropriate the comment. These characteristics of voice assistants show how they play a role in affirming, reinforcing and strengthening existing stereotypes about women in today’s society, while also enforcing a tolerance for sexual harassment and verbal abuse. This could decrease gender equality and harm the position of women in the real world¹.

UNESCO furthermore zooms in on the lack of women’s representation in the technological industries, which can be illustrated by the mere 15% of the workforce in Artificial Intelligence that is female (UNESCO & EQUALS Skills Coalition, 2019). Similarly, the percentage of female employees in technology at the companies that created the most widely used voice assistants varied from 17.5% at Microsoft to 23% at Apple. UNESCO gives several recommendations to increase the number of

¹ It is an ongoing debate whether or not virtual technology usage indeed influences real-life behaviour. Though this connection is not undisputable, the array of examples in which female-voiced voice assistants take on an inferior role to the user identify a noteworthy risk to gender equality that is worth taking into consideration. Many examples are in linguistic tropes such as the usage of specific pronouns that are used more by women as well as by people of lower economic status, which is extensively investigated by amongst others Charles Hannon. Through the concept of linguistic style matching, meaning one copies the language style of his or her conversation partner, it is probable that conversing with robots influences human speech and behaviour.

women in technological fields and through them improve the effect that technology has on gender equality.

Chapter 2. Shulamith Firestone: Technology and the nuclear family

Shulamith Firestone was a Canadian feminist who was born in 1945 and was involved in feminist activism throughout her adolescent life. She wrote her most famous and influential work, “*The Dialectic of Sex: The case for Feminist Revolution*” in 1970, when she was 25 years old. This work addresses the relation between feminism and multiple other topics, such as children, love, and culture. In the final chapter, she describes a feminist utopia in which women could be free of the female bodily functions that cause their oppression. Her book was controversial but became an influential bestseller. I will use this work to describe and investigate Firestone’s view on the dialectic between feminism and technology.

2.1 The nuclear family

Firestone starts off her line of argumentation by saying that the true source of female exploitation lies within the biological reality of the female body (Firestone, 1970, p. 9). Women are at the mercy of their bodies their entire lives, facing bodily functions such as menstruation, pregnancy, childbirth and menopause. This led to the first division of labour in which women adopted housework and childrearing as their main responsibilities while the men were required to economically provide for them. This shaped the psychology of humans and normalized discrimination based on biological characteristics. This first division of labour has since been strengthened by an array of customs and institutions, which have embedded female subordination in society. Firestone extensively discusses the role of the family in causing this (Firestone, 1970). The nuclear family is a concept that represents the workings of a regular family in which the oppression of women is sustained. To explain this, Firestone describes the Oedipus complex in terms of power and from a feminist point of view, which forms the basis for her further argumentation². In this explanation of the Oedipus complex, the family comprises a hierarchy of power, in which the father is the head of the family. The mother is excluded from the workforce and therefore economically dependent on him. The son shares her dependency on the father and therefore they are allied based on their powerlessness. In this complex, the mother represents unconditional love for the son, whereas the love of the father is conditional. He will love the son when he fulfils his expectations and generally only starts engaging in the upbringing of the child once the son grows older and has to become a man. This marks the beginning of the transitional phase, where the son will increasingly start identifying with his father, wanting to prove his worth to him and gain his love. He hates the father for oppressing the mother, but he also does not want to be powerless forever. By joining ranks with the father and increasingly becoming more like him, the son betrays his alliance with the mother as he escapes from oppression. By betraying her and becoming an oppressor himself, he becomes a man. For the rest of his life, he will legitimize his manhood by subordinating a woman. He can be a man by holding a position of power in the house, which requires the continuous inferiority of the wife³.

Firestone discusses that this inferiority extends itself to several aspects of life, being sexually, culturally, and economically. A revolution is necessary in each of these aspects to enable the possibility of the feminist revolution that Firestone calls for. She notes that these revolutions are necessary to end the

² The Oedipus Complex was theoreticized by Sigmund Freud, who argued in his theory of psychosexual stages of development that every male child has sexual desires for their mother, causing the father to become a rival for the favour of the mother (Morgenstern, 2003). This evokes anger and jealousy and influences the behaviour of the child throughout his or her life. Through multiple stages of development, the child eventually ‘becomes’ the father, adopting the behaviour that he previously hated.

³ Firestone takes inspiration for her argumentation from both Freud and Marx. She adds the concept of sexuality to the Freudian theory of the Oedipus Complex to create a feminist version. She takes inspiration from Engels and Marx for their analytical method, putting historical and cultural change together to find a way of mastering it. Firestone utilized this concept to come up with her own analytics on how to erect a feminist evolution. As she proclaims herself, she is ‘*the missing link between Marx and Freud*’ (Firestone, 1970, p. 258)

powerless position of women, as men will not willingly give up their position of power. As she puts it: 'Power will not be given up without a struggle' (Firestone, 1970, p. 31).

2.2 Implications of the nuclear family

Following Firestone's theory about the nuclear family, it is of the essence for men to ensure female inferiority to maintain their position of power. Economic dependence is achieved by excluding women from the workforce. The tendency to do so is evident in existing norms and values, where women are to a much lesser degree expected to build a career for themselves. Besides that, the job market itself contributes to the exclusion of women, as they are less likely to be hired than men in the case of similar experiences. Difficulties remain evident even for those who are included in the workforce anyways, as they will still face male dependency in case of pregnancy and childbirth. Again, the bodily functions of her own body will compromise her independence, at least temporarily. After the birth of a child, existing societal norms and values will once again complicate her possibilities to build a career for herself and earn as much as her husband (Firestone, 1970, p. 48). Most likely she will be expected to work fewer hours and focus less on her ambition, encouraged by companies that do not always facilitate mothers with the flexibility necessary to combine a job with childcare. The result is the further exclusion of women from the working force. This exclusion is especially evident within highly masculine working environments, such as technology and science. Firestone explains that technology is considered to be a male domain. To explain this, she discusses the concepts of the *aesthetic mode* and the *technological mode*. These modes correspond to the female- and the male perspective respectively, which Firestone describes to be the result of the biological division of the sexes (Firestone, 1970, p. 175). The different perspectives therefore inherently correspond to the differences between the sexes. This is in line with her argument that men and women are fundamentally different, though she argues that society is at a stage in which these differences can be overcome. The aesthetic mode represents the feminine, which is directed at imagination, creation, and visualization. It precedes the practicalities of creating and focuses on the envisioning of what could be possible. In contrast, the technological mode represents the male perspective, which aims to factually understand nature and eventually control it. It holds strong ties with empiricism, which has since the Enlightenment been considered to be the only valid mode of scientific research. This has led to women to be considered unsuited for science, resulting them to be excluded from the technological workforce even more significantly than in other fields of work. Following this development, a highly masculine work environment has developed itself that is directed to dominate. As a result, newly developed technologies will never be used to liberate women from subordination, even if the technology would have had the potential to do so. This is because it would require men in the industry to willingly produce technologies that would deprive them of their own power, which is in opposition to their normal tendency to dominate. Therefore, technologies with the potential to liberate will either remain undiscovered or are used as a means of exploitation instead. To overcome this, Firestone calls for a radical feminist revolution.

2.3 The feminist revolution

Firestone points out that the dependency of females on males is not just a human phenomenon, as it is also evident for many animal species. She therefore concludes that this dependency is not solely cultural, but also holds a natural basis. Her point is that this argument can no longer be used to legitimize the oppression of women based on natural characteristics. This is because mankind by now has outgrown nature, as it can utilize technology to overcome this perhaps natural state of dependency. According to her, it is impossible to reach feminist goals through evolution because men are controlling every means of power and are unwilling to give that up. She further defends this stance by dedicating a chapter in her book to a history of feminism in America, in which she points out that none of the 'victories' obtained by feminists throughout time have actually led to meaningful and profound change for the women of that time. She calls this the Myth of Emancipation, in which feminists were given false solutions to their problems, giving them a fake sense of liberation (Firestone, 1970, p. 30.). For example, the improvement of female access to higher education was considered to be a big success for the feminist movement.

However, the biggest share of women that attended university as a result got their degrees in ‘feminine’ fields of studies that were not taken seriously and did not help them to gain any real power (Firestone, 1970, p. 69). Because current forms of activism are not leading to actual change, Firestone vouches for a radical revolution in which the sexual division between men and women is completely eradicated. By eliminating the conception of the sexes, gender inequality is automatically eliminated as well⁴.

Four conditions must be met to achieve Firestone’s revolution, of which the most important aspect is that women are liberated from the tyranny of their reproductive biology. Firestone describes technology to have the power to achieve this, through in-vitro fertilization or even childbirth separate from the body. As a result, the first source of the discrimination against women, their bodies, is eliminated. Furthermore, she sketches a possible utopia in her book of a world in which full self-determination and economic independence for women and children is possible. By eliminating the dependency on men, the conception of the family is destroyed, and male supremacy is attacked. She states that all institutions that segregate the sexes must be dismantled, and women and children must be fully integrated into society. Finally, Firestone advocates complete sexual freedom for women and children. She explains that full sexuality calls into question the fatherhood of born children, threatening continuous reproduction and thus the dynamics of the nuclear family. By claiming the right to be sexual beings, existing customs and traditions that strengthen patriarchy are discarded. Firestone believes this to be the natural human state, in which she also approves of child sexuality and polyamorous relationships.

2.4 Firestone and voice assistants: patriarchal technology indeed

The usage of voice assistants in several ways resembles the nuclear family as described by Firestone. The wife is expected to be at the complete disposal of the father. She exists to be oppressed and is expected to be patient, obedient and receptive. This is a similar position to the female-voiced voice assistants, who are always fully compliant with the commands of their users. Following Firestone’s philosophy, this is an example of the general process in which there was a possibility to use new technology for feminist purposes, but patriarchal values caused it to be used as a means of exploitation instead. Voice assistants could have been designed to reject flirtations and communicate consent in order to positively impact gender biases, but instead reflects the nuclear family. The voice assistants are developed by men in the male-dominated field of technology, who created the assistants from a position of power. This is described in Firestone’s work as the exclusion of women in the workforce that allows men to maintain this position. Men are unwilling to give up this power and therefore women cannot increase their influence within technological fields.

Besides the role of the developers in determining the responses of the voice assistants, the assistants are influenced by machine learning. Machine learning is a field within artificial intelligence that refers to the process in which algorithms can learn from the data they are given. This is because an algorithm can recognize patterns and relations within data when it receives a sufficient number of repetitive inputs (Baloglu, Latifi & Nazha, 2020). The algorithm uses these identified patterns and relations to produce output, which will resemble each other to an increasing extent when more data is received. The nature of the output can come in different forms with different applications. For example, algorithms can learn to understand the behaviour of their users to identify what television shows they will like, and self-driving cars learn how to navigate and prevent accidents through machine learning (Shobha & Rangaswamy, 2018). In both examples, the algorithm depends on receiving sufficient information to make accurate predictions about the future. Voice assistants are artificially intelligent machines that utilize all the information they are given by their users (UNESCO & EQUALS Skills Coalition, 2019). It builds an algorithm based on the input it receives and thus creates output accordingly. As a result, any existing prejudices and biases that the user has internalized will serve as input for the voice machine and

⁴ This argument has been beautifully described by more recently written texts as well. For example, Halbert writes that *'until we are able to change the underlying sex-role distinctions, technology will simply reproduce inequality, not eliminate it'* (Halbert, 2007, p. 125).

thus will also be incorporated into the output the voice assistant produces. It has learnt to give biased responses because it corresponds with previous patterns it has identified.

Therefore, the patriarchal values that society is built upon are reinforced. Based on this it is impossible to motivate societal change by relying on this form of artificial intelligence. Obviously, artificial intelligence did not yet exist when Firestone wrote her book. It is however a very literal application that resonates with Firestone's argument that patriarchal powers will always prevent technologies from improving the position of women.

2.5 Critical analysis of Firestone

Following Firestone's philosophy on feminism and technology, I argue that her argumentation is not in all aspects convincing and there are discrepancies in her reasoning. First of all, her high dependence on the aforementioned Oedipus Complex regularly leads to an overly essentialist view of men⁵. Some of the conclusions she draws are that men are unable to love or commit and that their wives are always unhappy, leaving little room for nuance. She presents every man as the product of his Oedipus Complex, which in principle inevitably determines their behaviour. As a result of her overly essentialist statements, she tends to simplify complicated topics by ascribing their cause and effect entirely to the Oedipus Complex and its implications. Another point of critique is that Firestone barely distinguishes between different kinds of women and how their situations would affect her theoretical framework. Although she does spend a full chapter on race, this is focused on racism rather than the implication of race on one's societal position. This means that she aims to explain the root of racism using the Oedipus complex, explaining how the different positions of power between both white and black people and men and women influence their emotions towards each other, causing racism (Firestone, 1970, p. 108-117). She does not however include an analysis of the position of men and women of colour in society or how their situation would be different from people of other ethnic groups or other minorities⁶. This generally undercuts the strengths of her arguments, as the application of them is limited and it is unrealistic to assume that all members of a minority group face the same type and intensity of oppression. Finally, Firestone's theory of technology sometimes appears to be contradictory. On the one hand, she strongly argues that technologies that are capable of female liberation will never be produced as a result of patriarchal forces. On the other hand, her feminist utopia cannot be created without the invention of new technologies that have the ability to free women from their bodies and secure self-determination. She goes as far as stating that "*We now have the knowledge to create a paradise on earth*" (Firestone, 1970, p. 242). These two arguments are contradictory, as the first statement appears to rule out the possibility to reach the latter. Firestone tries to reconcile these two statements using the idea of the aesthetic mode and the technological mode. She explains that these modes have to be merged for a cultural revolution to come into existence. This cultural revolution would eradicate the class categories of male and female altogether, shaping a culture in which the imaginable of the aesthetic mode will be the same as the achievable of the technological mode. This would cancel the conception of culture itself, which would also eliminate the masculine mark of technology. As a result, it could be subservient to liberation. It can be deduced from this reasoning that Firestone perceives technology as a source of opportunity, that is not yet available but can be once a cultural revolution is established. Though this argument could be said to solve the problem in theory, the solution is not sufficient. This is because the effect she describes appears to be the same as the cause. The effect is the possibility to use technology for liberating purposes and the cause is the merging of the technological- and the aesthetic mode. However,

⁵ Halbert (2004) raises the point that contemporary feminists often criticize Firestone for her essentialism and non-causality, offering a range of sources to exemplify this.

⁶ This is a point that amongst others Downing (2012) makes in her work on Firestone, indicating the lack of focus on different social- and ethnic groups and including other minorities, such as non-heterosexual households. Mostly, Firestone speaks of middle-class housewives in the United States, without acknowledging her conclusions may not apply to women from different classes or environments. Similarly, Lane-McKinsey explains how Firestone's understanding of sex fails to recognize intersectional racism (2019).

Firestone barely comments on how the latter ought to be achieved. She does indicate that man shall have mastered nature totally by the time the cultural revolution happens. This again appears to only be possible through the acquiring of new technology that would enable the mastery of nature. Her argumentation thus reaches a circular nature, which leaves her argument to be utopian, but most of all contradictory.

Furthermore, accepting Firestone's feminist utopia as the ideal position condemns the natural state as being undesirable. Her utopia is completely man-made and created to oppose the natural, especially in the case of reproduction. Firestone addresses the relationship between feminism and ecology in the final chapter of her book by emphasizing the distinction between science itself and the usage of science. According to her, not technologies themselves are considered to be unnatural, but the changing values that new technologies represent. For example, not a test tube baby itself is seen as unnatural, but the new value system that it represents, in which the male supremacy of the family is eliminated (Firestone, 1970, p. 197). To oppose this, a new man-made balance must replace the destroyed natural one, which is achieved through the human mastery of matter (Firestone, 1970, p. 192). This perspective is problematic concerning the relationship between humans and ecology, specifically referring to the climate crisis. By promoting the mastery of nature and calling to replace the natural with a better, man-made version, Firestone creates a hierarchy between human beings and nature in which humans consider nature to be at their unlimited disposal. This line of thinking heavily contradicts contemporary works in the field of ecophilosophy, in which humans are described to be a part of nature with the responsibility to protect it⁷.

⁷ This reasoning is evident in the perspective of modern-day thinkers within the field of ecophilosophy. Amongst others, it is included in the works of Bruno Latour, Gilles Deleuze and Félix Guattari.

Chapter 3: Judy Wajcman: Societal relations in technology

Judy Wajcman is a Professor of Sociology who was born in 1945 and has written an array of academic works throughout her career, of which the topics have varied from the sociology of work, technology studies and gender theory. These are all relevant topics in her book *TechnoFeminism*, which she wrote in 2004 and arguably is her most notable work. It includes her theory on technology as a sociotechnical product and discusses and reflects on the work of several feminist writers. This book will be used as the basis to discuss Wajcman's view on technology.

3.1 A group of agents

The most important conclusion Wajcman draws on the topic of feminism and technology is that technology is a sociotechnical product that is influenced by a large group of agents that came together to create it (Wajcman, 2004, p. 7). The societal values and opinions of these agents went into the technology, creating a product that holds societal meaning and purpose. This changes the way products are used, who their users are, and also which gender is ascribed to them. The latter refers to the fact that some products are generally considered to be male, such as cars and lawn mowers, while other products have a female identity, such as make-up and vacuum cleaners. An example used in Wajcman's work to describe the impact of gendered technology on society is that of the typewriter, which was marketed as a feminine technology from the moment it was released (Wajcman, 2004, p. 52). This was the case because the technology in some ways resembled either a piano or a sewing machine and resulted in the profession of typist being labelled 'exclusively for women. This changed the position of women in the job market in several ways. One could argue that it provided them with jobs and thus increased their independence and opportunities, but the nature of the work could also be described as a source of oppression as it signalled that women were only suitable for low-paying, skill-less jobs. In fact, the QWERTY keyboard of typewriters had previously intentionally been chosen over the earlier linotype keyboards. This allowed companies to replace skilled linotype writers with low-paid women that could use the QWERTY keyboards without training. They were easily replaceable and thus held no influence or leverage, heavily limiting their prospects for social mobility and making it near impossible to escape skill-less labour.

The history of the typewriter is just one example where technology is the material expression of the gender conceptions that are already present in society. In other words, the present social relations are embedded in the technology. It must be noted that these social relationships are dynamic, as the social context is always subject to change. As a result, the meaning of the technology itself also fluctuates. In fact, Wajcman argues that the relationship between social relations and technology is mutually constitutive⁸. This means that social relations influence the technologies that lie in their social network, but they are also affected themselves. This means that gender equality in society can be improved when the technologies in it embody gender-equal values, as the technology will consequently influence the social relations in the network to improve gender equality further. The other way around, an increase in gender equality within the social relations of the network will result in the development of technologies that embody these values.

The embedded social relations within a technology also influence how the technology is perceived. For example, technologies that are female-gendered are often domestic items, such as laundry machines and vacuum cleaners. As a result, in society they are not perceived as 'truly' technological items. Women utilizing these technologies therefore do not contribute to reversing the stereotype in which women are unsuited for technology, but rather enforce the sexual division of domestic activities by reflecting the social organization of the family in which women are responsible for the housework

⁸ Wajcman is influenced by different thinkers, several of which she mentions in her work. Most evidently, Bruno Latour's network theory reappears on multiple occasions as well as Cynthia Cockburn and Susan Ormrod's notion of the cultural meaning behind technology.

(Wajcman, 2004, p. 28). Women thus remain unsuitable for technological work and the male monopoly on skilled labour is maintained, which grants them significant power. This is an example of how existing technologies reflect the patriarchal social relations that are embedded in them.

3.2 Implications of the group of agents

Based on this concept, Wajcman puts forward that ensuring more female representation in technology could be the solution to gender inequality. By adding the female perspective into the development of new technologies, more gender-equal social norms are embedded in it, promoting gender equality in society. Wajcman admits that it is difficult to increase female representation in the male-dominated field of technology because it requires women to adapt themselves to the masculine values in place. To participate in such an environment, they have to sacrifice part of their gender identity, which is also the reason they succeed less often than their male peers. Furthermore, Wajcman stresses that the impact of a technology on different people can vary depending on the social context in which it is embedded (Wajcman, 2004, p. 121). She gives the example that a cell phone can have a liberating function for a woman in the West because it provides her with the possibility to connect with fellow women to unite and improve their conditions. However, for a woman that was exploited to produce cell phones under inhumane working conditions in a third-world country, the same phone is the source of her oppression.

Wajcman stresses the importance of considering these differences and acknowledging that neither society nor technology is a static factor. How a technology is perceived can change over time, which can be exemplified by the example of the development and usage of the female contraceptive pill. For a long time, the pill was considered to be a source of great liberating power for women that gave them control over their own bodies. Only recently, the pill has also been described as a source of oppression. This is because increasingly women have felt that society considers contraception to be a women-only problem, for which men are not taking any responsibility. As a result, women have to commit to a daily intake of medication in order to be a sexual partner without the risk of an unwanted pregnancy, even though the side effects can be significant (Mertens, 2011).

3.3 The feminist evolution

Despite the difficulties Wajcman acknowledges in increasing the number of women in technology, she states that practical steps should be taken to increasingly enable women to thrive in the world of technoscience (Wajcman, 2004, p. 113). Wajcman thereby emphasizes the importance of ensuring flexible work conditions, as this would eliminate the requirement of constantly being physically present at work. This could benefit the possibility of mothers to combine paid labour with housework and increasingly share it more with their partners, thus putting pressure on traditional institutions that enforce gender inequality. Wajcman mentions that this argument also holds for fathers engaging in housework. When housework is shared equally, the sexual division of labour is undermined and gender equality enforced (Wajcman, 2004, p. 113). Wajcman believes that the feminizing of technological workplaces and putting in place woman-friendly practices will improve female representation and subsequently the gender biases in technology and society. This could be described as a process of evolution, in which the situation should improve steadily and incrementally. Wajcman stresses that this goal can be achieved when women mobilize and take control of their lives. She believes in the power of feminism and states that women together are the only ones who can free themselves.

3.4 Wajcman in relation to voice assistants

Digital voice assistants are a technology that can be accurately described as a tight web of different agents coming together to create the technology, following Wajcman's philosophy. Such agents are the customers and the developers of the product, but also the societal relations that are related to it. Following Wajcman's philosophy, a technology in itself is not dismissed as inherently patriarchal. However, the gender unequal societal values that are embedded in this technology can create a

patriarchal technology, which appears to be the case for feminine voice assistants. Because gender and technology are mutually constitutive according to Wajcman, the existing gender biases in society have influenced technology. For example, the existing tolerance towards sexual abuse may have influenced voice assistants to portray this tolerance as well. Gender-biased technologies in turn also influence social norms, strengthening gender biases further. To break this vicious cycle, the feminine perspective on gender conceptions should be incorporated into the technology itself. The obvious solution for this, both according to Wajcman and UNESCO, is that more women should be employed in technological sectors. If more women than the previously mentioned 17,5 to 23 percent would have been included in the design of voice assistants, a more feminine perspective would have been included in the development, resulting in a less patriarchal and sexist technology. Finally, it is important to note that Wajcman does not condemn a technology to be exclusively liberating or exploitative. The voice assistant technology may be liberating for some people, though not for women as a social group. One might think of disabled people, for whom the usage of the voice to control technological devices may have come with an array of new and emancipating possibilities.

3.5 Critical analysis of Wajcman

Wajcman's work is generally comprehensive and easily understood, but her main solution to the problem of gender inequality may pose a problem in terms of effectiveness. In her philosophy, the key to battling gender inequality is increasing the number of women working in technological companies. This is a proven challenge, given that companies have aspired to increase diversity for a long time. The most concrete step she proposes to achieve this is increased flexibility. However, this argument builds on the assumption that households are indifferent towards who performs the housework, as both parties are equal. Therefore, it is implied that women work and earn as much as men do. If this is not the case, the sexual division of labour would be stimulated through the economic incentive of a higher income for males that would likely not be subverted by increased flexibility for women. However, this is not the case in many situations, given that the glass ceiling and the pay gap are still far from overcome.

Furthermore, even if the representation of women in technology companies is increased, it is still not a guarantee that the feminine perspective will be included in the developed technologies. As Wajcman describes herself, the masculine environments of technological companies require women to give up part of their gender identity to succeed. She proposes that the hegemonic masculinity within technological companies will eventually dismantle once more women are included in the workforce, but I doubt that this is the case (Wajcman, 2004, p. 112). This is because the women that are most likely to be promoted or taken seriously within these masculine environments are those who possess higher doses of male characteristics, as they will perform better when being judged based on masculine values (Avdelidou-Fischer, 2011). They would theoretically improve diversity, but also be most likely to adhere to the patriarchal values in place. As a result, such increases in diversity are unlikely to add the female perspective to newly developed technologies. In contrast, the women that do hold a strong feminine perspective are unlikely to rise to positions of power, as they are judged based on masculine values that they do not possess. Moreover, if they were to rise to these positions nevertheless, they would hold perspectives and ideas that are vastly different from the rest of their colleagues. As a result, they would have trouble influencing major decisions from a minority position.

For diversity to actually lead to change, company cultures have to be changed dramatically to create a place where women can thrive. Often, companies are not willing or unable to enact these changes. This is because it would require all predominantly male employees in a company to change the environment in which they are comfortable, to benefit a social group that they do not belong to themselves. Furthermore, many companies do aim to increase diversity but are driven by forces that are far from feminist. For example, societal pressures or the promise of increased productivity. In these cases, women may enter the workforce, but their views are unlikely to be appreciated or impactful. This is not just a theoretical argument, but one that is visible in current diversity reports.

Even though diversity in general is steadily increasing, this is most often achieved at lower company ranks rather than in influential positions (Reiners, 2021). Even when women are promoted to influential positions, the impact they make remains limited. For example, research has been done into the concept of “*The Glass Cliff*”, in which women are more likely to be appointed CEO when the company in question is doing particularly bad and there is little room to take risks and make policy changes (Cook & Glass, 2020). Besides that, female CEOs are 45% more likely to be fired from their positions than their male counterparts (Gupta et al., 2020). These statistics and an array of other ones reflect the difficulties and pressures female CEOs face when appointed at all, limiting their possibility to convey a feminine approach. Altogether, though the theoretical basis for Wajcman’s theory is strong, the actual liberating impact is not guaranteed⁹.

Finally, Wajcman emphasizes that whether or not a technology is patriarchal depends on the social context it is situated in. Actors in the network can influence the social network and the social network influences the position of power of the agents involved. However, not every agent is capable of influencing the network to the same extent. Because Wajcman focuses on women joining technical careers to overcome their subordination, women who do not qualify for such positions or are denied entrance by external forces are excluded¹⁰. Similarly, it may often not be realistic for women in exploited positions to influence their social networks, for example through activism, to improve their position. As a result, even though Wajcman’s theory does acknowledge the differences between groups of women, it largely neglects the impact of external forces on the extent to which women can influence their social network. As a result, the women that actually influence technology are still most likely to consist of a more privileged group of women in Western society.

⁹ The possible lack of impact of Wajcman’s theory is also described in the works of other writers, such as Richardson, who describes Wajcman’s manifesto to be ‘*polemic rather than pragmatic in terms of possibilities for action and empowerment*’ (Richardson, 2010, pp. 99).

¹⁰ Suchman (2006) addresses the external forces that impact different groups of women and suggests they should be given more priority. She uses Wajcman’s example of the production of cell phones that are liberating in the West. But a source of oppression for the women mining the minerals necessary to produce it. She points out that it is questionable to dismiss the direct and violent oppression of women as a differently present materiality of the technology, implying it is of similar important to the liberating social reality the technology holds in the West.

Chapter 4: Wajcman vs Firestone: Polar opposites with similarities

Firestone and Wajcman begin their argumentation at the same point, agreeing that the female body is the core of the exploitation of women. Wajcman describes that “*women have been captive to biology*” (Wajcman, 2004, p. 4), while Firestone describes that women are “*at the mercy of their bodies*” (Firestone, 1970, p. 8). It is the basis of gender inequality and therefore difficult to overcome. The arguments they give afterwards stem from various perspectives and opinions, after which they both conclude that the inequality based on the body can be overcome. In this chapter, the similarities and differences between the previously discussed works of the writers will be discussed and a critical analysis will be performed on them.

4.1 Patriarchal technologies

Firestone and Wajcman have different perspectives on the possibility of utilizing technology to benefit the feminist movement. Firestone dismisses the possibility of using technology as a means for liberation, while Wajcman does not eliminate this possibility completely. She instead stresses that whether or not a technology is patriarchal is dependent on the actors in the social web it is developed in. Though their perspective is different, their lines of argumentation lead to the same conclusion regarding the technology of voice assistants, which would be considered to be patriarchal. In my opinion, this is not surprising. I argue that the argument of these women is in practice very similar and will lead to the same conclusions on most occasions. To explain this, it is important to emphasize that Firestone does not deny the power of technology itself to play a role in the liberation of women, but rather the patriarchal forces that determine how a technology is put to use and prevent it from being utilized for feminist purposes. This is very similar to Wajcman’s argument that the social actors within a technological web determine whether or not a technology is patriarchal, not the technology itself. The difference between the two is that Firestone does not believe society is able to influence these social connections to a sufficient extent to develop non-patriarchal technologies, whereas Wajcman is more optimistic in this regard. This is because Firestone perceives the social to be static, where the existing social values merely influence the individuals and cannot change. In contrast, Wajcman adheres to a network theory in which the individuals also influence the social, thus granting them an opportunity to change it. As a result, the social is dynamic and there is a possibility to create a social situation in which technology could be put to feminist use. In other words, Wajcman believes that technologies can free women from their subordination through changing our current society, whereas Firestone believes this is only possible in an alternate society that would be formed after the aforementioned cultural revolution.

4.1.2 The feminist (r)evolution

The biggest difference between the theories of these women is the solution they advocate to increase gender equality. Where Firestone calls for a feminist revolution, also including an economic revolution and a cultural revolution, Wajcman’s approach resembles a feminist evolution. This feminist revolution cannot be realized without the usage of new technologies that can overcome fundamental gender inequalities related to the body. By making this argument, Firestone puts a clear emphasis on technology as the core element of improvement. In the case of in-vitro fertilization, Firestone argues that the implementation of the technology itself allows for the overcoming of the limitations imposed by the body and thus contributes to gender equality by bringing society closer to a feminist revolution (Firestone, 1970, p., 197). In contrast, Wajcman puts the main focus on existing societal values that cause the development of corresponding technology. For example, she explains that the increased number of instances and the increased acceptance of new family forms that do not rely on blood-based kinship are the result of successful gay/queer politics and increased female independence, rather than just the introduction of in-vitro fertilization (Wajcman, 2004, p. 123). Without the changed societal values, the technology would not have existed nor been used. Therefore, the appropriate society is necessary to reach corresponding technological advances. I emphasize here that the core of their

arguments is the same. Technologies that can strengthen the feminist movement can only be produced in a situation in which the people within the environment allow for the technologies to be utilized for feminist purposes. For Firestone, this environment can only be formed through revolution, as this environment cannot exist in the current society in which men are not willing to give up their position of power. For Wajcman, this environment can be shaped slowly and incrementally through activism and concrete measures that influence the actors within a social network to behave differently. In other words, Firestone considers society to be static and Wajcman considers it to be dynamic.

4.2: The implementation of theory

Wajcman's philosophy can be described as more concrete and pragmatic than Firestone's. She mentions a number of inventions that have helped to overcome female subordination, such as telephones and household appliance and clearly describes their impact on different groups of women. She admits that most of these inventions have had negative effects as well but stresses the positive and focuses on proving that technology can indeed benefit the situation of women. Her solution of including more women in technology is comprehensible and implementable. This is different from Firestone's work, whose solutions are rather abstract, futuristic and often unrealistic. Her work contains several concepts that are intangible and she often does not explain exactly how these concepts would manifest themselves in society or how they could be implemented. Examples are the merging of the technological mode and the aesthetic mode and the establishment of complete economic independence for children. Contrastingly, her sketch of a feminist utopia is extremely concrete and includes detailed descriptions of how a society without sex categories could function. For example, she describes how the composition of members in a household could depend on limited contracts rather than familiar bonds (Firestone, 1970, 232). However, the plans she proposes here are not implementable, but most closely resemble a fictional society. Therefore, the concreteness of this chapter does not contribute to the applicability of her feminist theory, which remains abstract.

Though Wajcman's work is more practical, it is important to note that the depth of the female subordination that she focuses on is different too. Firestone's feminist revolution aims to overcome the deepest dichotomy in human history, which is the one based on sex. Thus, the elimination of the bodily differences between men and women is necessary, which is a situation so far removed from the current state that the solutions are bound to be more abstract too. Wajcman's goal is much more pragmatic; she speaks of overcoming more general gender inequality, such as increasing the number of women in managerial roles, overcoming the pay gap and addressing other sexual double standards. The difference in the profoundness of the inequalities that these women speak of is different and thus it is important to be careful not to compare the two as though they are pursuing the same ultimate goal.

4.3 Different female perspectives

As discussed before, Firestone sketches a technological utopia that would theoretically apply to everyone without taking into consideration the differences between groups of women. In contrast, Wajcman specifically mentions the existence of different perspectives on the same technology, depending on one's geographical location and role within the social network of the technology. She focuses on the societal differences per individual and shows that the impact of technology varies accordingly. As a result, Wajcman's work is more flexible and has a broader applicability. However, though Wajcman's work is relatively applicable, it still does not provide a route towards female liberation for everyone.

The applicability of both theories is of importance when considering their timelessness. Wajcman's *Technofeminism* was written later than Firestone's *The Dialectic of Sex* and therefore it is inevitably more actual. Furthermore, her theory remains meaningful when the technologies and the social relations in the network change, allowing it to pass the test of time. In comparison, Firestone's work is very particular to the time it was written in. Therefore, not all her arguments are as relevant as they were when she wrote them in the 1960s. For example, her description of the nuclear family assumes a situation

in which the mother does not work, which was the absolute standard back then. Though this is still the case in many families, a significant proportion of families nowadays depend on dual incomes. Also, she describes homosexuality as a situation in which the transitional phase from subordinated child to oppressing man fails, meaning that homosexuality develops later in life as the result of a mistake (Firestone, 1970). This is a line of thinking that is generally no longer accepted or even found offensive. Because the book has become outdated in some regards, it has to be read in the spirit of the time it was written without losing the essence of the arguments.

Discussion

The past chapters have explained, critiqued, compared and reflected upon the technofeminist works of Shulamith Firestone and Judy Wajcman. From all information gathered, a discussion will be provided on the usefulness of these works in benefiting the feminist movement and their accuracy in describing reality. Furthermore, a future will be sketched in which voice assistants could be utilized as a means for female liberation, by providing a synthesis between the insights gained from the used literature and the case study.

As mentioned before, Wajcman's philosophy provides a clear path towards gender equality through the utilization of network theory. Her argument for a dynamic society is convincing, given her concrete examples and valid argumentation that relies on a broad discourse of network theorists. This conclusion is more nuanced than Firestone's plea for a static society, especially since it is evident that the societal position of women has changed substantially since she wrote her *Dialectic of Sex*. Besides Wajcman's convincing philosophical theory, she also provides a solution towards gender equality that is enforceable and concrete. Her plan to increase the number of women in technological companies therefore seems attractive and has authority, especially as it can be applied to every network of agents and therefore to virtually all women. However, I argued that Wajcman is oversimplifying the solution when assuming that an increase of women in technological companies will also lead to a more prominent perspective in the produced output. This is the case because existing patriarchal forces within companies make it difficult for women with a feminine perspective to rise to positions of power or make a notable impact when they do. More likely, women that are promoted to influential positions will have more masculine values. As a result, even if increasingly more women are hired at tech companies, which is already proving difficult, this will not automatically ensure more feminine technology. Likewise, Firestone argues that small, incremental changes through evolution cannot lead to real change. According to her, inequality between men and women is so deeply rooted in society that reversing that inequality through incremental change is impossible. This argument is of importance especially since the root of the inequality, according to both Firestone and Wajcman, is attributed to the difference between the male- and the female body. By accepting that women and men are fundamentally different, sexist and patriarchal thinkers can unlimitedly use this as an argument to justify existing inequalities. Inequality can then be legitimized through bodily functions that are factual and cannot be changed. In Wajcman's philosophy, this fundamental change of bodily differences is not addressed. Therefore, her solutions aim to improve the societal position of women without addressing the source of inequality itself and thus one could say she is effectively treating symptoms. In contrast, Firestone attacks the source of inequality directly by calling for a radical feminist revolution to overcome bodily differences and deduces the necessary conditions to achieve equality. In this sense, her solution is more profound and has deeper roots. That having said, it is clear that not all of Firestone's arguments hold in today's society because the assumptions she makes are on multiple occasions outdated or essentialist. Besides that, her theory only applies to a limited group of women and her view on the relationship between humans and the environment heavily contradicts the general view on nature today. Though the former can to some extent also be said about Wajcman's theory, the lack of flexibility makes it difficult for Firestone's arguments to be used beyond the old-fashioned scope that she describes. All of this leads me to conclude that Firestone's work on technofeminism is only applicable to a limited extent and holds little authority as a comprehensive philosophical work today.

However, it must add to this conclusion that her work resembles, besides a work of feminist philosophy, also a call for a feminist revolution that is in some respects more activist than academic. Perhaps the ultimate solution of a feminist revolution will never take place as Firestone describes, but her reasoning as to why it is necessary is engaging and reaches the core of sexism. She expresses in her book that her descriptions of the feminist revolution are '*not meant as final answers*' but are rather

'meant to stimulate thinking in fresh areas rather than to dictate the action' (Firestone, 1970, p. 227). From this, it can be deduced that Firestone does not propose a manifest, but rather suggests an open-minded dialogue. As such, it should be read from this perspective. Firestone forces herself and the reader to dream of a feminist future, stimulating her readers to think of the possibilities beyond their imagination. Even though she may not have developed a fully comprehensive, implementable and exhaustive feminist system of thought, she did develop an analysis of society and a set of arguments for a feminist revolution that holds power and should be taken seriously.

Utilizing these insights, the position of voice assistants can be reconsidered. I assume that voice assistants are situated in a dynamic network of agents, as Wajcman describes it. To prevent the mutually constitutive relationship between technology and society from transferring biases and prejudices, any dichotomous sex division should be removed from the technology. This means that voice assistants should not resemble any gender category. This is a conclusion drawn from Firestone's theory, in which all gender categories must be eradicated to design a gender-equal future. Several voice assistants have come out in the past which did not opt for a binary gender, but rather investigated the spectrum of possibilities. There have been chatbots that appear with a genderless voice, a non-human voice or a voice that resembles a celebrity or fictional character (UNESCO & EQUALS Skills Coalition, 2019). Reducing the resemblance between a voice assistant and its gender could be a way of decreasing possible biases, as certain behaviour would no longer be ascribed to that particular sex. Furthermore, voice assistants should be programmed to communicate feminist views to influence the user to open up towards more gender-equal conceptions, especially when faced with flirtations or harassment. The multinationals that produce voice assistants have throughout the years reprogrammed their voice assistants to be less sexist, proving that it is possible to reprogramme voice assistants to be more female-friendly and gender-neutral (UNESCO & EQUALS Skills Coalition, 2019). Such a change should be far more radical than previously and should include direct answers when this genderless voice assistant is faced with harassment. Examples could be: *'Do not talk to me like that.'* Or *'This comment is unacceptable'*. Such responses would have to be pre-programmed by the company that produces them in order not to be influenced by the possible results of artificial intelligence. Potentially, a voice assistant could shut off for a short period of time when faced with a sequence of unwanted comments. The difficulty remains how such a change could be forced upon the creators of these voice assistants. The ideal, or maybe the utopian, situation is to enforce the perspective in which sex categories still exist but are deemed irrelevant and insignificant. They will be eradicated in the sense that one's gender will no longer determine how they are treated. At that point, a genderless voice assistant will no longer educate its user on sexist behaviour towards women, because the conception of gender will have no societal implications. Instead, the voice assistant will educate its user on socially desirable behaviour towards people in general, not having to imply their gender. Through network theory and a dynamic society, perhaps Firestone's utopia of a world without sex categories can be realized without a feminist revolution after all; and voice assistants could contribute to it.

Conclusion

After describing and critiquing the works of Shulamith Firestone and Judy Wajcman and applying them to the case study of female-voiced voice assistants, it was concluded that both writers would deem the technology to be patriarchal. For Firestone, this is the case because technology is controlled by men in a position of power, which they are unwilling to give up. As a result, new technologies will always be patriarchal. For Wajcman, the social network in which the technology is situated is patriarchal, and therefore the technology.

It was concluded that these lines of argumentation are similar because both conclusions depend on the society in which a technology is invented. Both writers consider technology to have huge potential to be a means for female liberation, but Firestone believes this potential cannot be fulfilled without enacting a feminist revolution because society is patriarchal and static. Wajcman argues that this potential can be fulfilled, as society is dynamic and mutually constitutive with technology. As a result, society can incrementally change to become more feminist and allow for non-patriarchal technology. This can be described as a feminist evolution.

Furthermore, it was concluded that Wajcman's philosophy is more applicable and usable as a philosophical work than Firestone's due to her concrete solutions, pragmatic examples and the broad range of women to which her theory applies. In contrast, Firestone's arguments can be outdated, essentialist and abstract. However, Wajcman's assumption that more women in tech companies will automatically lead to more feminist technology means that her solutions lack impact. In contrast, Firestone addresses the source of inequality in her call to eradicate the sex categories completely through revolution. Read as a piece of activism besides a philosophical work, Firestone's arguments for a feminist revolution hold power and should not be discarded.

These conclusions are utilized to shape a possible future in which voice assistants are used for the benefit of the feminist movement, utilizing both Wajcman's pragmatic approach and Firestone's radical change and utopian thinking. It is proposed that voice assistants are programmed to be genderless and communicate gender-equal messages to educate its user. Genderless voice assistants could contribute to a world in which the sexes still exist but have become irrelevant. Combining Wajcman and Firestone, perhaps this future is on the horizon.

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