Buana Gender

Jurnal Studi Gender dan Anak

Buana Gender
Vol. 8, Nomor 1, Januari-Juni 2023
ISSN: 2527-8096 (p); 2527-810x (e)
LP2M UIN Raden Mas Said Surakarta

Whose Women's Bodies Belong to: FemTech's Feminist Political Economy (FPE) and Potential Risks

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Abstract

Femtech opens space to fulfill women's right to information on sexual and reproductive health and raises the potential for control over women's bodies. This study aims to explore the potential risks of FemTech related to women's bodies in cyberspace and uncover the exploitation and misuse of women's data. Women as users in an organized manner are seen as commodity objects, which indirectly makes women digital laborers. This study uses analysis of the Feminist Political Economy (FPE) lens from Bezanson & Luxton in three conceptual areas, namely the expansion of production models, the sex/gender system, and the analysis of domestic labor as a contribution to labor reproduction. This article develops an FPE analytical framework for studies of technology-related reproductive health. The researcher summarizes user data collected in Indonesia's top ten FemTech applications by entering the keyword' menstrual calendar' in the iOS App Store and Android Play Store. This research finds that women as Femtech users are shackled in the reality of hegemonic masculinity and lack of reproductive freedom, are in a commodity circle, and are exposed to risks as digital workers.

Keywords: FemTech, Feminist Political Economy, Digital Labor, Social Reproduction

Introduction

Femtech opens space to fulfill women's right to information on sexual and reproductive health and raises the potential for control over women's bodies. This control threat is caused because femtech companies "collect, aggregate, interpret, and sell the resulting data to third parties" (Mishra & Suresh, 2021). Femtech is a new public health innovation in the form of "software, diagnostics, products and services that use technology to support women's health"

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(Kathrin, 2019). For the most part, Femtech accommodates needs regarding menstruation, sexual health, pregnancy, to general health. This technology overcomes the lack of information and inequality of access related to women's sexual and reproductive health.

Apart from Femtech, reproductive health information is obtained through PHC, WHO mentions PHC (Primary Health Care) as essential in sustainable development in disseminating reproductive health information (Universal Access to Sexual and Reproductive Health, 2022). In Indonesia, one of the PHCs is the puskesmas (Community Health Center). Unfortunately, the number of puskesmas that provide access to reproductive health information is also not evenly distributed. In 2014, only 85% of the districts had around four health centers in their districts that held reproductive health education programs. The condition is still far below the government's target for 2019, which reached 45% overall. IDHS data for 2017 stated that only about 33% of young women and 37% of young men knew about reproductive health (Arifah & Sharfina, 2019).

Reproductive information problems are uneven and considered taboo by some people in Indonesia. The term' sex education' itself reaps the pros and cons and is seen as education that teaches sexual activity. It has become a vital issue in the sustainable development of reproductive health care in America. About half of the US states (24 plus DCs) require schools to provide reproductive health information, and 34 states teach HIV education. Other minority states require contraceptive information to be included in reproductive health information programs (Ranji et al., 2019). In Indonesia, the focus on reproductive health is still concentrated on programs at the Puskesmas.

So that the presence of the internet helps, especially in providing information related to reproduction and encouraging the use of Femtech, but the fact is, according to a survey of women conducted in the United Kingdom in 2022, 44 percent of respondents experienced "not being taken seriously by healthcare professionals." In addition, around 40 percent of women felt that when accessing health services, there was a lack of understanding of women's lives and experiences. At the same time, more than a third reported that a lack of understanding of women's bodies was problematic when accessing health services (Stewart, 2022).

The femtech industry includes many technologies that visualize women's sexual and reproductive processes, from tracking the menstrual cycle to Kegel exercise tutorials. Even so, several Femtech companies offer products that are more than about the "womb" of women but

overall the welfare of women(Mishra & Suresh, 2021). The female body and its reproductive processes are more visible than ever. Every stage of every process is now available to predict, monitor, or view in the abstract through medical devices and now Personal Health Tracking Technology (PHTT) (McMillan, 2022).

Femtech refers to software, diagnostics, products, and services that use technology to support women's health (Kathrin, 2019). The term was first coined in 2016 by Ida Tin, founder of Clue's period tracking app (Mishra & Suresh, 2021). Femtech describes its epistemology from liberal feminism, which claims that historically, women were excluded from clinical trials, decision-making, and health research, making health data male-centered. Carolina Parez explains in her book that women have historically been marginalized in health research because they are in a patriarchal environment where men's bodies can already represent them (Criado, 2019). This historical foundation is the basis for Femtech to operate in that women and men have genetically different biological bodies. Digital technologies that are the focus of Femtech include fertility, pregnancy, nursing care, sexual and gynecological health, chronic disease, and lifestyle or well-being.

Some research on Femtech discusses the minority of women in the field of Femtech(Figueroa et al., 2021), also about the risks of Femtech's existence which violates data privacy(Mehrnezhad et al., 2022). From a critical perspective there is also research on discourse on Femtech using the perspective of ontology, normative femininity, epistemic injustice, and ideas heterosexist female sexuality, which undermines the rhetoric of liberation from this digital health technology (Hendl & Jansky, 2022). While research in developing countries such as India on women in Femtech is put on the exploitation of the body for profit and masculine epistemology (Mishra & Suresh, 2021).

The authors found a research gap in these studies that has yet to focus on the potential for commodifying women's data and women's digital labour as user femtech. So research related to femtech in the Indonesian context is important to do. This research aims to explore the potential risks of Femtech related to women's bodies in cyberspace and uncover the exploitation and misuse of women's data. Women as users in an organized manner are seen as commodity objects, which indirectly makes women digital laborers.

Research Methods

This study uses a feminist approach with a Feminist Political Economy (FPE) lens. FPE challenges the neoliberal footprint in Indonesia that was present during the New Order era in 1996. This research begins by analyzing the Femtech industry, which focuses on applications related to women's reproductive health. The researcher summarizes user data collected in Indonesia's top ten Femtech applications by entering the keyword 'menstrual calendar' in the iOS App Store and Android Play Store. Next, researchers analyze the potential risks of Femtech's presence regarding the existence of data shared with third parties. Risk analysis uses a Feminist Political Economy lens with three discussion themes: production-reproduction, sex & gender systems, and social reproduction.

The FPE approach, according to (Bezanson & Luxton, 2006) , resulted in three conceptual developments: 'expansion of production models, sex/gender system, and analysis of domestic labor as a contribution to labor reproduction' (p.11). This article develops an FPE analytical framework for studies of technology-related reproductive health. Class and production models are related to the oppression and exploitation of women in the digital space. Next, the system of sex or gender is related to material, biological sex differences between women and men. In contrast, the gender system is a pattern of femininity and masculinity that is socially or culturally constructed. Finally, women as a digital workforce where there is a concept of social reproduction which, according to (Bezanson & Luxton, 2006) is a way of understanding how countries, markets, and households all interact in the daily reproduction and generation of the international workforce' (p.35).

The Hegemony of Masculinity and Reproductive Freedom

Femtech, a technological innovation related to women's health and wellness, has experienced a long journey due to the lack of research and the perceived taboo in discussing menstruation, pregnancy, and reproductive health(Hartman, 2022). Women are even excluded from biomedical research and innovation because female hormonal variations would complicate findings (Beery &Zucker, 2011). This injustice towards women departs from the injustice committed by humans against nature (Arivia, 1964). Where women are also imagined as fields that produce plants to help meet human needs, it is the same as women having a uterus and producing humans.

Gender roles shaped by the environment influence how society sees women in Indonesia in the context of reproductive health. Gender and sex are something neutral referring to the majority; sex and gender are also products of certain social relations that govern them" (RUBIN, 2021). The power of the sex/gender system lays the groundwork for the possibility of linking social organization and subjectivity in that procreation and "parenting" are the main processes by which individual gender subjectivity is generated (Bezanson & Luxton, 2006). Biological sexuality is transformed by society into a product of 'human activity, identity, desire, and sexuality, and ensures that biological sexual reproduction occurs continuously' (Bezanson & Luxton, 2006).

The concept of a sex/gender system is a product of the history and culture of an environment formed, raising important questions for feminist political economy regarding reproductive work such as childbirth, child-rearing, and parenting is the responsibility of women in a systematic way of livelihood and wealth production. Reproductive health is regulated through government regulation NO 61 of 2014 concerning. In reproductive health, unfortunately, in reality, women still experience inequality, especially regarding reproductive welfare, where the benchmark of welfare must be seen from all sides, both biological, social, and mental aspects, one of which influences inequality is the gender norm. WHO states that there are three determinants of reproductive health status: biology, namely anatomy, physiology, genetics, and the immune system; socio-cultural differences where there are roles and responsibilities; and access to and control over health resources (Health, 2011).

On the second point, related to social differences, the emergence of reproductive freedom in Indonesia was not spared from the 'New Order' gender ideology, which required that women be determined by their reproductive role as passive and sexually submissive housewives (Elenora, n.d.), which has an impact on women, especially on health. This situation is also implemented in unequal reproduction policies. The law on Health and Population Growth, as well as on Family Planning, which was adopted in 1992, further objectifies the role of women as mothers and caretakers. The Family Planning (KB) policy, which is a "tool" for the state to control women's bodies (reproductive organs), has become popular in explaining how power and the state collaborate to commit "crimes" against women's bodies (Susilo & Kodir, 2016).

The power capacity is attached to women's bodies, and the landscape of control is state control over women's reproductive and sexual organs". This fact illustrates the gender dichotomy of reproduction, which impacts spatial inequality and discrimination against women.According to (Elias & Rai, 2019), social reproduction 'is placed in a social space whose boundaries are fluid and relational, in a continuum of time and rhythm, which attracts both structural and individual violence and which in turn provokes Resistance to such violence through the mobilization of agents.' Gender reproduction in Indonesia experiences inequality in the fact space and cyber/digital space.

In the fact room, the 2018 Basic Health Research (Riskesdas) conducted by the Ministry of Health shows that an estimated number of pregnant women who experience anemia is around 48.9 percent, and chronic energy deficiency is 17.3 percent (Lina et al., 2022)especially for the reproductive age group. The World Health Organization (WHO. Meanwhile, in cyberspace, women and reproduction also experience inequality. This is shown through the unequal number of consumers in Femtech, the objectification of women in the context of reproductive health, and the misuse of Femtech user data, which results in commodities placing users as consumers.

Women in The Commodity Circle

The rise of FemTech is a paradox. On the one hand, its presence is a solution to maintaining women's reproductive health. However, on the other hand, it is a real exploitation of women in cyberspace. When traced, the forerunner of FemTech is related to the women's movement in the 1960s, demanding sexual and reproductive rights and introducing the contraceptive pill that gave women control over their bodies (Mishra & Suresh, 2021). The ideology of liberalism promoted in internet technology cannot be separated from the shadow of women as commodity objects. It can be seen from the lack of adequate protection for women's data even though Indonesia has passed Law No. 27 of 2022 concerning Personal Data Protection (PDP) or the PDP Law.

FemTech, via iOS and Android, was detected sharing data with third parties for analytical, advertising, or marketing purposes. The PDP Law forms the basis for data protection, including consequences for electronic system operators (PSE) such as Femtech, which are public and private bodies, as well as international organizations in the territory

of Indonesia in the event of leakage or misuse of personal data from third parties (CNN Indonesia, 2023). Even though this regulation has been passed since it was promulgated in Jakarta on October 17, 2022, it raises problems with third-party data. In the PDP Law, there is a data transfer policy that has the potential to liberalize data by reducing the competitiveness of third-party cookies or third-party data processors whose resources are limited while being able to adapt to the law will have an impact on improving services costs to business owners and websites so that big companies like Google will survive (The Conversation, 2022)

To examine Femtech's exploits, researchers investigated the security of user data from the iOS App Store and Android Play Store. On the iOS App Store, Indonesia's top ten FemTech apps were detected sharing user data with third parties for developer advertising or marketing purposes. In addition, the data collected is also used for analytical purposes, product personalization, and application functions. The table below shows data shared for developer advertising or marketing purposes. From the iOS App Store, it was found that eleven data were used for the benefit of advertisers, namely user ID, contact information, usage, purchases, location, health and fitness, user content, diagnostics, search history, sensitive information, and other data. Apart from being related to menstruation (menstrual calendar, prediction of fertility, and ovulation), the ten Femtechs also have pregnancy features (opportunities, preparation for getting pregnant). In contrast, the 'Meet You' application has parenting features.

From the list of applications on the iOS App Store, the Flo application is the FemTech application that collects the most user data compared to other applications, followed by Clover and Period Tracker. All three have in common that they share sensitive user information with third parties. Clover and Period Tracker also collect 'other data,' which is not stated in detail as to what data is taken when viewing the privacy policy.

Table 1. User Data captured and shared within the FemTech app on iOS

Femtech/ Data Data Used	Kalender Menstruasi Ovulasi	Clue Kalender Menstruasi	Flo	Kalender Menstruasi	Meet You	Clover	Ovulasi dan Kalender Masa Subur	Period Tracker	Kalender menstruasi: Masa subur	Kalender Menstruasi dan Ovulasi
User's ID	✓	✓	✓	✓	✓	✓	-	✓	-	✓
Usage	✓	✓	✓	✓	✓	✓	-	✓	✓	-
Purchase	-	-	✓	-	-	✓	-		✓	-
Location	-	✓	✓	-	-	✓	✓	✓	✓	-
Contact Information	✓	✓	✓	✓	✓	-	-	✓	-	-
Health and Wellness	✓	✓	✓	✓	✓	✓	-	-	-	-
User Content	-	✓	✓	-	✓	✓	-	✓	✓	✓
Diagnostic	-	-	✓	✓	✓	✓	-	✓	-	✓
Search History	-	-	✓	-	-	-	-	-	-	-
Sensitive Information	✓	✓	✓	✓	-	✓	-	✓	-	-
Other Data	-	-	-	-	-	✓	-	✓	-	-

This search result differs from the Android Play Store, where only five out of ten applications share data with third parties. Two of the three Femtechs that collect the most valuable data to be shared with third parties in the iOs App Store wrote statements not to share data in the Android Play Store (Flo and Period Tracker). Flo and Period Tracker ads only appear when entering keywords related to the 'menstrual calendar.' On Android, Clover is the Femtech that shares the most personal data with third parties for various purposes. The following sequence is Clue and the Period Calendar. However, advertising or marketing is only taken from location data and device/other IDs. The rest is used for analysis; personalization; fraud prevention, security, compliance, and developer communication.

This difference shows Google's efforts to provide application containers on the Play Store to improve user data security. Google states that 2024 will be the end of cookies that help with ad relevance(Weatherbed, 2023). Cookies are code snippets to recognize browser users who can identify ad categories, and this data is usually shared with third parties, namely advertising or marketing companies(CNN Indonesia, 2021). Cookies are used by third-party data players, which are companies engaged in programmatic ads, a form of data-based marketing whose advertising operations are assisted by AI (Lee & Cho, 2020). This type of advertising is problematic due to a need for more data security and responsiveness regarding

digital privacy issues. The process of this type of advertising is unknown primarily to women as users. Obtaining the personal data of women as users requires informed consent requests and decision-making (Martínez-Martínez et al., 2017).

Google is a large technology company that provides end-to-end services. This completeness is summarized by Sudibyo (2021) that Google:

> 'For content distribution, publishers depend on Google Search. For video distribution, publishers depend on Google Youtube. For news reach analysis, publishers depend on Google Analytics. As for advertising technology, they use Google Ad Manager. Programmatic ad requests can also come from Google Exchange. While the need for push notifications to users, publishers use Google Firebase. Signing in users before accessing publisher content is also easiest through a Google account' (p.14).

Table 2. User Data captured and shared within the FemTech app on Android

Femtech/Data Used	Period Tracker Period Calender	Period Calender Cycle Tracker	Flo	Cycle, Period Tracker PinkBird	Ovulation & Period Tracker	Meet You	Clue Period	Clover	Period Calendar	Maya
Personal info	-	-	-	-	-	✓	✓	✓	-	-
App activity	-	-	-	-	-	-	✓	✓	✓	✓
Location	-	-	-	-	-	-	✓	✓	✓	-
Health and Fitness	-	-	-	-	-	-	✓	✓	-	-
App info & Performance	-	-	-	-	-	-	✓	✓	✓	✓
Device or other ID	-	-	-	-	-	-		✓	✓	✓
Personal info	-	-	-	-	-	✓	✓	✓	-	-
App activity	-	-	-	-	-	-	✓	✓	✓	✓
Location	-	-	-	-	-	-	✓	✓	✓	-
Health and Fitness	-	-	-	-	-	-	✓	✓	-	-

Apple also launched App Tracking Transparency in 2021, allowing users to choose 'whether an app can track its activity across other company apps and websites for advertising purposes or sharing with data brokers' (Apple, 2023). However, the existence of this application is criticized as limited and difficult to understand by most iPhone users. Because everything happens in a line of code in advertising technology that ordinary people do not understand (Morisson, 2022), the change request "Ask the Application Not to Track" sometimes appears when the user opens the application.

The personal data of female users is a use-value that can be transformed into an exchange value or what Mosco (2009) calls commodification. The anticipation from the two technology companies will not stop the practice of commodification of Femtech companies.

By all means, Femtech companies track and collect data to target women in advertisements. Women as users do have control over reproductive and sexual health rights, but their recorded data is shrouded in ignorance of the process behind it. Of course, what the Femtech company does violates the right to privacy.

The potential for exploitation of women's data is not only visible in third-party data. Tech companies, especially Femtech, who know the cookie era is ending, will turn to the first data party strategy, which is not banned in the play store or app store. The first data party is the party that owns the application and collects data from its users. Those who have yet to get data, such as advertisers, can only rely on data from femtech applications for advertising and analytics. Therefore, they are competing to produce first-party data by forcing users to enter email addresses in order to be able to record user data. If a company still needs to get its own first-party data source, they have two lucrative options. Either they build it now or join forces with other companies to acquire it (Morisson, 2022).

Companies are also competing to build their health applications. The why two sizeable multinational technology companies are competing with each other, namely Google and Apple. They build health applications, namely Google Fit and Apple Health. Samsung, an electronics company, also installs the Samsung Health application, which has a menstrual calendar feature on its devices. This competition from multinational companies makes women's data potentially owned by a few people. According to their data, women are hegemony by a handful of companies.

Moreover, it was predicted by the sociologist Irving Zola who calls it medicalization. According to Zola in Conrad (1992), medicalization is a process in which many problems related to daily life will grow under the power, influence, and supervision of medical matters. Initially, women only saw menstruation as a process of puberty and pregnancy as a means of fertility. This term was also medicalized, so women were encouraged to see this event as a condition requiring medical attention. Women's lifestyle has also changed, with increasing awareness of a healthy lifestyle for the sake of fertility and a regular menstrual cycle by monitoring their activities, from diet to exercise.

In its development, the term individual biomedicalization describes the relationship between technology and biological sciences. This term is a technoscience attempt to improve the biological condition of a person with high-tech medical practices (Ross, 2018). These

Femtech applications are individual biomedicalization with ovulation prediction features, where women as users monitor themselves by recording the time of menstruation and their health condition. Women, as users, are not aware that they are being watched and exploited by the owner of the Femtech application. The data is used for development needs to make a profit by selling their data. Filling in the menstrual calendar and other features in femtech applications considered free time is free labour for women who are not paid.

The Risks of Women's Digital Work as Femtech Users

In FPE, Femtech users are positioned as digital workers. Women as users indirectly become capital suppliers for femtech applications through the ownership of important data that can be modified by femtech owners either addressed to third parties such as the interests of advertisements, companies, and countries or for ownership of first-party data. Roetman (2020) argues that biomedicalization, or self-tracking Femtech, is a new category of the digital workforce that focuses on the 'management and reproduction of the female body of fertile, hormonal and sexual normative Post-Fordism.' Post-Fordism is a Marxist concept of Autonomy that explains a change in capitalist production methods that are more flexible, no longer dependent on mass production, and individualization of labor relations (Aoyama et al., 2011). Even though the presence of Femtech gives women advantages in providing information and managing reproductive health, women's digital work as users of Femtech creates several risks.

The emergence of digital workers presents a potential risk of exploitation of women as digital workers from Femtech. Women's digital work is understood as a social factory in the post-fordism Marxist concept of Autonomy. Various life processes have become integral in the economic calculation of capital, where in the logic of capitalism, there is a continuous extension and reconfiguration of the working day, and the boundaries between work and what is not work are blurred (Jarrett, 2014; McEwen, 2018).

This exploitation risk is described by Terranova (2000) in two frames, namely production and consumption. The production and consumption of content is like reproductive work, which is unpaid and not considered work (McEwen, 2018). Femtech turns users into prosumers (producers and consumers) who work for nothing from engagement with digital media that are exploited by others for economic gain (Ritzer, 2014). Femtech companies extract value

from the production and consumption of femtech users by self-tracking in applications and then convert it to capital and investment of subjectivity immanent to capitalism (Terranova, 2000). Women's digital work as users becomes external capital for companies in the interest of upgrading their user interface (UI), user experience (UX) and features, and their data is also an important part of advertising and marketing analysis. There are around 3.95 billion women in the world with a purchasing power of more than 31.8 trillion dollars per year, controlling more than 80% of health care decisions, while in Indonesia, the number of women is 136 million (Badan Pusat Statistik, 2022; Hartman, 2022). This large population underscores the high potential of women's digital work for advertising and marketing analysis.

The next potential risk, women's digital work as femtech users, raises privacy and data security issues. The data here is obtained through data provided by Femtech users who are none other than female digital workers. Data recorded in Femtech, according to (Rosas, 2019), should be included in Protected Health Information (PHI) which must be included in the regulation of The Health Insurance Portability and Accountability Act of 1996 (HIPAA) which currently does not yet protect reproductive health information. In Indonesia, the PDP Law regulates health or medical data protection but does not specifically mention reproductive health data and has not regulated its management.

Women also face criminal risks in cyberspace, where we know that many sensitive data entered into femtech applications can be used to threaten someone; most of the data Femtech receives is given to advertising companies so that users no longer have privacy space (Cox, 2022). Moreover, three iOS App Store apps, Flo, Clover, and Period Tracker, share sensitive information with third parties. Additionally, a Guardian investigation in 2019 uncovered points where fertility-tracking apps received funding from anti-abortion, anti-gay, and Catholic campaigning motives and where it was unclear how the data set was intentionally generated and used by donors (Glenza, 2019).

Through Femtech, women's bodies are at risk of becoming like a prolonged project of technology, so Femtech instructions heavily influence women's decisions about their bodies. Roetman (2020) shared his experience with the MyFlo application, where when he typed in a problem with acne or weight gain, he received instructions on how to improve these symptoms. Femtech as digital self-tracking is "gender technology" with individual self-discipline and self-improvement, so building a healthy female body is a project that must be

continuously managed, regulated, and supervised (Sanders, 2017). Women's digital work has the risk of becoming a new body project which, apart from being converted into advertising capital for companies, also produces a 'normal' standard.

The standard of 'normal' generated by Femtech creates the risk of certain female populations becoming 'the other.' According to Corbin (2019), the other means' imposing the projection of differences on those outside themselves and the norms proclaimed by society, contributing to internalized alienation, marginalization, and oppression (p.18). Femtech replaces medical professionals and simplifies the female body in 'more refined, customized and internalized forms of measurement, management and control' (Roetman, 2020). Corbin (2019) gave an example of an application that limits data input beyond the average cycle so that it implicitly informs that 'abnormal' cannot be recorded. Some applications congratulate women for not menstruating, overruling individual experiences that may have been raped, sexually abused, or disinterested in parenting (p.20).

The presence of Femtech was initially shown to give advantages to women in providing information and managing reproductive health. This goal is campaigned through social media with the breath of feminism to benefit women. However, it does not yet represent marginalized women, including those with low incomes (Figueroa et al., 2021). In addition to the traditional male and female biases, Femtech also generates the construction of women's identities according to what is considered normal by society and men so that they are designed for those who are healthy, fit, and do not have poverty, mental or physical problems, and ignore the experiences of women who are not heterosexual (Corbin, 2019).

Conclusion

Femtech, as an innovation for women's reproductive health problems, is dealing with the potential ownership of data, which is predicted to be owned by large corporations in the future. These corporations carry agendas from donors who, in the Guardian's investigation, are against feminism, such as anti-abortion and anti-gay (Glenza, 2019). This fact meets the reality that there are various imbalances in the gender and sex systems to data protection policies and reproductive health in Indonesia. Through the lens of Bezanson & Luxton's Feminist Political Economy (FPE) (2006), researchers analyze based on three conceptual developments: 'expansion of mode of production, sex/gender systems, and analysis of domestic labor as a contribution to labor reproduction.'

The researcher summarizes user data collected in Indonesia's top ten FemTech applications with the keyword 'menstrual calendar' on the iOS App Store and Android Play Store. This study describes the findings in three parts: the reality of hegemonic masculinity and reproductive freedom, dismantling the position of women as a commodity in the digital space through Femtech, and showing the risks of women's digital work as users of Femtech. Women's digital work through Femtech can experience exploitation, privacy, and data security issues, become victims of cybercrime, and become objects of prolonged body projects until they are marginalized.

Through this research, women are expected to be more selective in choosing menstrual calendar applications by paying attention to 'data safety' when downloading. Meanwhile, Femtech companies should create a secure platform, not share sensitive user information with third parties, and create an inclusive platform. This research also found a need for data protection regulations related to reproductive health information, which currently cannot be overcome by the PDP Law and more equal reproductive health policies. Future research can analyze Femtech from an ethical perspective, create a Femtech framework based on feminist principles, and examine policies regarding digital labor.

References

Aoyama, Y., Murphy, J. T., & Hanson, S. (2011). Economic Geography. In *GeoJournal Library* (Vol. 109). https://doi.org/10.1007/978-94-017-8792-5_5

Apple. (2023). *If an app asks to track your activity*. https://support.apple.com/en-us/HT212025

Arifah, I., & Sharfina, M. F. (2019). Hambatan Akses Informasi Kesehatan Reproduksi Pada Mahasiswa Kesehatan Universitas Muhammadiyah Surakarta. *Jurnal Kesehatan*, *11*(2). https://doi.org/10.23917/jk.v11i2.7532

Arivia, G. (1964). *Feminisme: Sebuah kata hati*. Kompas.

Badan Pusat Statistik. (2022). *Perempuan dan Laki-Laki di Indonesia*.

Beery, A. K., & Zucker, I. (2011). Sex bias in neuroscience and biomedical research. *Neuroscience and Biobehavioral Reviews*, *35*(3), 565–572. https://doi.org/10.1016/j.neubiorev.2010.07.002

Bezanson, K., & Luxton, M. (2006). Social reproduction: Feminist political economy challenges neo-liberalism. *Social Reproduction: Feminist Political Economy Challenges*

Neo-Liberalism, 1–323.

CNN Indonesia. (2021). *Mengenal Cookies, si Penguntit Kegiatan di Browser Internet*. https://www.cnnindonesia.com/teknologi/20210312200545-185-616900/mengenal-cookies-si

CNN Indonesia. (2023). *RI Sudah Punya UU PDP, Kenapa Kebocoran Data Masih Terjadi?* https://www.cnnindonesia.com/teknologi/20230717075320-192-974200/ri-sudah-punya-uu-pdp-kenapa-kebocoran-data-masih-terjadi.

Conrad, P. (1992). Medicalization and Social Control. *Annual Review of Sociology*, *18*, 209–232.

Corbin, B. A. (2019). Digital Micro-Aggressions and Discrimination: Femtech and the'Othering'of Women. *Nova Law Rev*.

Cox, J. (2022). Data Marketplace selling info about who use period tracking Apps. *Vice*. https://www.vice.com/en/article/v7d9zd/data-marketplace-selling-clue-period-tracking-data

Criado, P. C. (2019). *Invisible Women: Data Biasin a World Designed for Men*.

Elenora, W. S. S. (n.d.). *Penghancuran Gerakan Perempuan di Indonesia*. Garba Budaya da Kayanamitra.

Elias, J., & Rai, S. M. (2019). Feminist everyday political economy: Space, time, and violence. *Review of International Studies*, *45*(2), 201–220. https://doi.org/10.1017/S0260210518000323

Figueroa, C. A., Luo, T., Aguilera, A., & Lyles, C. R. (2021). The need for feminist intersectionality in digital health. *The Lancet Digital Health*, *3*(8), e526–e533. https://doi.org/10.1016/S2589-7500(21)00118-7

Glenza, J. (2019). Revealed:Women's fertility app is funded by anti-abortion campaigner. *Guardian*. https://www.theguardian.com/world/2019/may/30/revealed-womens-fertility-app-is-funded-by-anti-abortion-campaigners

Hartman, S. G. (2022). Femtech: the next big technology boom. *The Patent Lawyer*, *February*, 8–11.

Health, E. (2011). *INTRODUCTION TO REPRODUCTIVE HEALTH AND THE (Draft for review) Training Module 1 Children ' s Environmental Health Basic hormone and endocrine functions Reproductive physiology Importance of environmental exposures*.

Hendl, T., & Jansky, B. (2022). Tales of self-empowerment through digital health technologies: a closer look at 'Femtech.' *Review of Social Economy*, *80*(1), 29–57. https://doi.org/10.1080/00346764.2021.2018027

Jarrett, K. (2014). The relevance of "women's work": Social reproduction and immaterial labor in digital media. *Television and New Media*, *15*(1), 14–29. https://doi.org/10.1177/1527476413487607

Kathrin, F. (2019). *So what is Femtech, Anyways?* https://femtechinsider.com/what-is-femtech/

Lee, H., & Cho, C. H. (2020). Digital advertising: present and future prospects. *International Journal of Advertising*, *39*(3), 332–341. https://doi.org/10.1080/02650487.2019.1642015

Lina, Arbaiyah, & Meliani Sukmadewi Harahap. (2022). Relationship between Chronic Energy Deficiency and Compliance with Taking Fe Tablets with the Incidence of Anemia in Pregnant Women at Kuala Simpang City Health Center Aceh Tamiang. *Science Midwifery*, *10*(4), 3047–3052. https://doi.org/10.35335/midwifery.v10i4.759

Martínez-Martínez, I. J., Aguado, J. M., & Boeykens, Y. (2017). Ethical implications of digital advertising automation: The case of programmatic advertising in Spain. *Profesional de La Informacion*, *26*(2), 201–210. https://doi.org/10.3145/epi.2017.mar.06

McEwen, K. D. (2018). Self-Tracking Practices and Digital (Re)productive Labour. *Philosophy and Technology*, *31*(2), 235–251. https://doi.org/10.1007/s13347-017-0282-2

McMillan, C. (2022). Monitoring Female Fertility Through 'Femtech': the Need for a Whole-System Approach To Regulation. *Medical Law Review*, *30*(3), 410–433. https://doi.org/10.1093/medlaw/fwac006

Mehrnezhad, M., Shipp, L., Almeida, T., & Toreini, E. (2022). Vision: Too Little too Late? Do the Risks of FemTech already Outweigh the Benefits? *ACM International Conference Proceeding Series*, 145–150. https://doi.org/10.1145/3549015.3554204

Mishra, P., & Suresh, Y. (2021). Datafied body projects in India: Femtech and the rise of reproductive surveillance in the digital era. *Asian Journal of Women's Studies*, *27*(4), 597–606. https://doi.org/10.1080/12259276.2021.2002010

Morisson, S. (2022). The winners and losers of Apple's anti-tracking feature. *Vox.Com*. https://www.vox.com/recode/23045136/apple-app-tracking-transparency-privacy-ads

Mosco, V. (2009). The Political Economy of Communication: A Living Tradition. In *Media Asia* (Vol. 36, Issue 3). https://doi.org/10.1080/23776277.2009.12224389

Ranji, U., Long, M., Kff, A. S., Silow-Carroll, S., Rosenzweig, C., Rodin, D., Health, R. K., & Associates, M. (2019). *Beyond the Numbers: Access to Reproductive Health Care for Low-Income Women in Five Communities*. *November*. https://www.kff.org/womens-health-policy/report/beyond-the-numbers-access-to-reproductive-health-care-

Ritzer, G. (2014). Prosumption: Evolution, revolution, or eternal return of the same? *Journal of Consumer Culture*, *14*(1), 3–24. https://doi.org/10.1177/1469540513509641

Roetman, S. (2020). Self-Tracking 'Femtech': Commodifying & Disciplining the Fertile Female Body. *AoIR Selected Papers of Internet Research*, *October*. https://doi.org/10.5210/spir.v2020i0.11320

Rosas, C. (2019). The Future is Femtech: Privacy and Data Security Issues Surrounding Femtech Applications. *Hastings Business Law Journal*, *15*(2), 319.

Ross, A. (2018). Tracking Health and Fitness: A Cultural Examination of Self-Quantification, Biomedicalization, and Gender. In *eHealth: Current Evidence, Promises, Perils and Future Directions*. https://web.p.ebscohost.com/ehost/ebookviewer/ebook/ZTAwMHh3d19fMTcxMzAxNV9fQU41?sid=f768d771-4bda-4db8-a6c3-889883158160@redis&vid=3&format=EB&rid=4

RUBIN, G. S. (2021). The Traffic in Women. In *Deviations* (pp. 33–65). https://doi.org/10.2307/j.ctv11smmmj.5

Sanders, R. (2017). Self-tracking in the Digital Era: Biopower, Patriarchy, and the New Biometric Body Projects. *Body and Society*, *23*(1), 36–63. https://doi.org/10.1177/1357034X16660366

Stewart, C. (2022). *Main issuess experienced by women when accessing healthcare in thr united kingdom as of 2022*. https://www.statista.com/statistics/1333397/issues-women-face-accessing-healthcare-in-the-uk/#statisticContainer

Sudibyo, A. (2021). *Dialektika Industri Media Nasional Menghadapi Disrupsi Digital*. Dewan Pers.

Susilo, D., & Kodir, A. (2016). Politik Tubuh Perempuan: Bumi, Kuasa, dan Perlawanan. *Jurnal Politik*, *1*(2). https://doi.org/10.7454/jp.v1i2.19

Terranova, T. (2000). Free Labor: Producing Culture for the Digital Economy. *Social Text*, *18*(2), 33–58.

The Conversation. (2022). *Sisi lain UU PDP: Melihat dampaknya bagi bisnis dan tata kelola data di Indonesia*. https://theconversation.com/sisi-lain-uu-pdp-melihat-dampaknya-bagi-bisnis-dan-tata-kelola-data-di-indonesia-191945

Weatherbed, J. (2023). *Google will switch on its cookie-replacing tools for Chrome developers next week*. The Verge. https://www.theverge.com/2023/7/20/23801435/google-chrome-privacy-sandbox-cookies-api-release-enabled