

The double-edged drone: Gendered emotional responses, attitudes, and inequalities in Indonesia

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Introduction

Drones are a disruptive technology, often referred to as unmanned aerial vehicles (UAVs). As varied as the purposes for which they are used – in warfare, surveillance, agriculture, infrastructure monitoring, filmmaking, and delivering medicine to patients, among others – are their technological features, sizes, and prices. Depending on the purpose of the drone, it has different technological affordances. Civil drones, for example, often use cameras and are comparatively small. When used at work, their size is frequently larger – they may come with large tanks for spraying plants on fields – but these drones are usually more expensive.

Like previous generations of computers, drones rely on algorithms – for example, for navigation and flight control. Users, such as operators, process the data collection and analysis. A case in point is precision farming, where drones equipped with sensors monitor crop health, and farmers can assess the data. The spatial properties of drones and AI can carry Light Detection and Ranging (LiDAR) sensors to create detailed 3D maps of construction sites, allowing for more accurate planning.

Considering how this contribution speaks to this volume's broader theme of computerization, it is useful to think about the advent of drones into both civilian and professional life alongside the insights from the computer age. The fascination with drones lies not just in their technological feats and features, but also in how institutions and authorities have narrated them to us as magical, flying machines that promise new perspectives and a new era of possibilities for work – particularly for countries with national-developmental aspirations. Therefore, how people think about or react to the “power” of drones shapes their emotional responses. What the emerging discourse on drones shows is that many of the same themes from the computer age of the 1970s and 1980s are still present when thinking about drones.

There is no standard “workplace for drones,” but specific characteristics can be identified. Drones and their operators also have high mobility, just like people in today's office work, who use laptops and smartphones. The office is not necessar-

ily the primary site of drone-related labor; operators often work in open-air environments such as agricultural fields, construction sites, and open landscapes. Many drone operators work independently, on fixed-term contracts or part-time, reflecting the general trend in the gig economy. The line between work and hobby often blurs for those who use drones for photography and filming, a popular application of this technology.

Depending on their purpose, drones can evoke emotions ranging from fear and anger to happiness. If used for recording beautiful landscapes, for example, these visuals may stimulate a sense of awe and desire to care for the environment. Gestures, rhythms, and changing points of view in drone filming result in a blending of the senses.¹ This heightened emotional response fosters a deep and meaningful connection with the images received and promotes the idea that sensory perception, technology, and experience contribute to the formation of sensations within drone footage.²

How people emotionally respond to images is grounded in numerous factors, one of which is their cultural background. In Indonesia, an archipelago with 285.7 million inhabitants and the focus of this chapter, there exists a remarkable diversity of cultures and emotional expressions.³ Despite these differences, norms of politeness and respect are widespread. On the main island, Java, people are expected to behave in a refined manner (*halus*) rather than in a coarse way (*kasar*). This expectation, particularly for women, tends to influence the regulation of emotions toward the outside world.

Scholarship on emotions in Indonesia has pointed out that caregivers fulfill an important role in trying to “attune their children’s behaviors, actions, and emotions to normatively approved rules and cultural values.”⁴ Several scholars have highlighted how, for example, *malu*, shame, matters in several Indonesian societies and affects local practices.⁵ As argued elsewhere, Indonesian autobiographical writing typically avoids explicit discussion of personal emotions, focusing instead on public identity and social history.⁶ Personal emotions are often downplayed, which reflects cultural conventions that prioritize collective and national narratives over individual emotional expression.

While the individual expression of emotions is often culturally restrained, techno-nationalism characterizes government and media discourse – the belief

1 Petersen, “Dispatched Drone,” 313.

2 Petersen, 316.

3 See “Indonesia Population 2025,” World Population Review.

4 Röttger-Rössler et al., “Socializing Emotions in Childhood,” 189.

5 Röttger-Rössler et al.; Lindquist, “Veils and Ecstasy.”

6 Arnez, “Indonesia – Blurred Boundaries.”

that technological advances strengthen national sovereignty and power. The Indonesian government fosters drones as they regard them as a tool that can solve a variety of “problems” in a cost-efficient way; they frame it as an innovative technology for the future. Having been on the upswing in recent years, the market revenue of drone-related products more than doubled from 2018 to 2024, from \$3.1 million in 2016 to \$7.0 million in 2024.⁷ Signs in the Indonesian drone industry point to growth, with projections to reach a market value of nearly \$12.8 million by 2030.⁸

However, this growth also requires a sufficient number of skilled workers in the digital economy, which is currently not the case. Having identified a shortage of skilled labor in the digital sector, including in drones, the authorities saw a need for action. In the early twenty-first century, drones became part of a discussion about creating new jobs through digitalization. According to projections from the Ministry of Manpower (*Kementerian Tenaga Kerja, Kemenaker*), 46 million new jobs would emerge in the technology era, including for drone operators.⁹ Five years later (2024), the Deputy Minister of Communications and Informatics, Nezar Patria, corrected the number to “27 to 46 million new jobs will be created in technological fields by 2030,” saying that many of these jobs cannot yet be filled due to the annual shortage of around 600,000 digital talents.¹⁰ This statement underscores the growing importance of digital skills and the significant role Indonesian authorities attribute to technology in shaping the future workforce.

The Indonesian government invests in the military uses of drones, such as border patrol and surveillance. Although the history of drone technology in Indonesia is not well-documented, the military used this technology early for espionage. According to the Center for a New American Security, in 1994, graduates from the Institute of Aviation Technology in Bandung wanted to develop an indigenous UAV, which led to the establishment of the drone manufacturing company PT Uavindo.¹¹ The first UAV to emerge from this endeavor was the “Sky-Spy-5” in 2003, which the military used for intelligence-gathering missions.¹² In 2006, Indonesia acquired four Israeli “UAV

7 Nurhayati-Wolff, “Media in Indonesia – Statistics & Facts,” Statista, January 12, 2024. <https://www.statista.com/topics/11792/media-in-indonesia/#topicOverview>.

8 “Indonesia Drone Market,” Knowledge Sourcing Intelligence. <https://www.knowledge-sourcing.com/report/indonesia-drone-market>.

9 Ade Miranti Karunia and Yoga Sukmana, “Otomatisasi Digital, 46 Juta Pekerjaan Baru Akan Muncul,” Kompas.com, November 13, 2019. <https://money.kompas.com/read/2019/11/13/075154226/otomatisasi-digital-46-juta-pekerjaan-baru-akan-muncul>.

10 Ihfa Firdausya, “Jutaan Pekerjaan Baru akan Muncul Akibat Otomatisasi, Indonesia Kekurangan Talenta Digital,” MediaIndonesia.com, July 22, 2024. <https://mediaindonesia.com/humaniora/686974/jutaan-pekerjaan-baru-akan-muncul-akibat-otomatisasi-indonesia-masih-kekurangan-talenta-digital>.

11 Rahakundini and Prasetya, *Proliferated Drones*.

12 Rahakundini and Prasetya.

Searcher II" spy drones for the Indonesian military through a Philippine distributor, Kital Philippines.¹³

Since 2017, the country has "developed its military drones through research and development conducted by ministerial institutions, as well as by universities, private companies, the military, and individuals."¹⁴ In 2020, Indonesia's first medium-altitude long-range drone, called "Elang Hitam" (Black Eagle), was developed to further spread drone technology in Indonesia. For example, Presidential Regulation No. 8/2021 mentions UAVs as one of three priority programs for the military, the others being military satellites and underwater sensing. However, as it turned out in 2021, after "Elang Hitam" failed to fly in a test, decisions were taken to use it for civilian purposes, including monitoring forest fires and mapping purposes.¹⁵ The media framed this failure as a success story, focusing on government investment, strategic planning, and the importance of local drone development, which aligns with techno-nationalism.¹⁶ This example reveals a strong sense of pride in technology, and failure has been transformed into a discourse on success.

This chapter explores how gendered emotional responses to drone technology highlight different attitudes toward drones and reveal underlying inequalities. I draw on findings from an online survey with respondents in the Indonesian language (Bahasa Indonesia) in the spring of 2024. The survey aimed to gain insights into how younger Indonesians emotionally react to drones. The survey results have been coded using the qualitative software MAXQDA. I also examined dozens of articles published in Indonesian print media, such as the weekly magazine *Tempo.co*, the online versions of daily newspapers, *Kompas.com* and *Republika.co*, and coded them with the same software to gain insights into the media discourse about drones in Indonesia.

This chapter is structured as follows. First, the unequal landscape of drone technology in Indonesia is explored, and how it relates to media discourse on drones. Relevant scholarly literature is used to show that this inequality manifests itself at the national scale, as well as in terms of gender. Next, drawing on survey results on gendered emotional responses to drones in Indonesia, I show how these responses can be understood through three key themes: *techno-sophistication*, *drones as a double-*

13 AP and Jpost.com Staff, "Indonesia to Buy Four Israeli Spy Drones," The Jerusalem Post, October 22, 2006. <https://www.jpost.com/israel/indonesia-to-buy-four-israeli-spy-drones>.

14 CSIS Indonesia, "Maximizing Indonesia's Drone Potential for Military and Civil Purpose," CSIS Notes (blog), May 18, 2022. <https://blog.csis.or.id/tagged/drones-industry>.

15 Aryo Putranto Saphohutomo, "Proyek 'Drone' Elang Hitam Disebut Salah Langkah sejak Awal," Kompas.com, September 20, 2022. <https://nasional.kompas.com/read/2022/09/20/12225691/proyek-drone-elang-hitam-disebut-salah-langkah-sejak>.

16 Nicholas Ryan Aditya and Novianti Setuningsih, "Drone Elang Hitam Jenis MALE Bakal Diuji Coba Bulan Depan," Kompas.com, February 26, 2025. <https://nasional.kompas.com/read/2025/02/26/16365591/drone-elang-hitam-jenis-male-bakal-diuji-coba-bulan-depan>.

edged sword, and the *intrusive and out-of-control drone*. Within these topics, the extent to which the attitudes of male, female, and diverse respondents toward drones differ is examined. A synthesis of the results concludes the chapter.

The unequal landscape of drone technology

When considering drones, it is crucial to examine closely which groups in society hold hegemonic knowledge about them – who exercises control over their use. In Indonesia, the Indonesian military, government agencies, and economic elites largely control drones in the Java region, especially around Jakarta and across Java. Several of the “parties involved in drone development” mentioned in the following quote are located there:

Currently, there are many parties involved in drone development, with research and development (R&D) conducted by ministerial institutions as well as by non-ministerial government institutions, universities, private institutions, individuals, and the military. All of these UAVs were developed for civilian surveillance purposes.¹⁷

Halo Robotics¹⁸ and Terra Drone Corporation,¹⁹ well-known drone companies, are also located in Jakarta. They offer solutions for various industries, including agriculture, mining, and construction. Halo Robotics, a domestic company, distributes drones in Indonesia for industrial purposes, with a range of drones from the Chinese company DJI, the market leader in the field of drones,²⁰ on offer. The Japanese company Terra Drone Corporation, in turn, has a strong foothold in Indonesia, with its subsidiary Terra Drone Indonesia. This enterprise offers specialized drone training for mining companies, including mapping pits and carrying out land surveys. They also market drones for precision farming. This company primarily develops and deploys its own (Japanese) proprietary drone technologies and solutions.

17 Rahakundini and Prasetya, *Proliferated Drones*.

18 See “Halo Robotics,” homepage, <https://halorobotics.com/>.

19 See “Terra Drone Indonesia,” homepage, <https://terra-drone.co.id/>.

20 China generated the highest revenue with US\$1.6bn in 2025 and is the leader of the “global drone market with its advanced technology, vast manufacturing capabilities, and strong government support.” The Chinese company DJI is the market leader in the field of drones and sells its drones widely on the Indonesian market. See “Drones: China,” Statista Market Insights, 2025. [https://www.statista.com/outlook/cmo/consumer-electronics/drones/china](https://www.statista.com/outlook/cmo/consumer-electronics/drones/china;); “Drones: Worldwide,” Statista Market Insights, 2025. <https://www.statista.com/outlook/cmo/consumer-electronics/drones/worldwide>.

Drones can be conceptualized as an extension of the government's arm, because their versatility and deployment options, even at remote locations, allow for effective surveilling even in remote areas. When used as flying robots, a human is not even required on the site. The state uses its power over drones to better control the national territory, including remote areas and border regions.

Indonesian media forces play an important role in spreading information about new developments in the drone sector, including new technological possibilities of drones. They frame them as a kind of computerized "all-round-fix" that helps extend the government's arm, fostering the nation's security and safeguarding its sovereignty, promoting smart technology and business interests. Online media play a major role in the Indonesian economy. Among selected Southeast Asian countries, Indonesia reached approximately 8 billion US dollars in 2024 in online media market value, compared to 3 billion US dollars each for Singapore, Malaysia, and the Philippines.²¹ The media in Indonesia is multi-platform and characterized by conglomerates that are very similar in their business model. At the time of writing, eight conglomerates dominated the media market,²² which led some scholars to conclude that "media and viewpoint plurality in Indonesia are at risk."²³

The Indonesian media frequently amplifies government and military voices when discussing drone deployment. For instance, in a *Kompas.com* article from March 1, 2024,²⁴ Major General Maruli from the Indonesian Army (TNI AD) explained the current and future use of drones in border areas: "We have only reached drone surveillance in small areas. So maybe in the future, we will suggest drones at the border as well, so that it is not difficult for people to control the details." The people referred to in this quote are soldiers. The statement "to control the details" suggests that drones will ease the process of monitoring the border area in a detailed and thorough manner, which would be more difficult without them. Previously, border surveillance was done manually by personnel physically inspecting certain areas. This process is time-consuming, labor-intensive, and often difficult to do thoroughly, especially in vast or hard-to-reach regions.

21 Thuy D., "Value of the Online Media Market in Southeast Asia in 2024, by Country," Statista, June 25, 2025. <https://www.statista.com/statistics/1007205/southeast-asia-online-media-market-value-country>.

22 Masduki and d'Haenens, "Concentration of Media Ownership," 2253.

23 The online newspapers *Kompas.com*, *Tempo.co*, and *Republika.id* that were used for this article are part of these conglomerates. Among the reasons for selecting these sources is that they publish articles in the Indonesian language, are well known in Indonesia, and have raised the topic of drones in several of their contributions.

24 Nirmala Maulana Achmad and Icha Rastika, "TNI AD Berencana Manfaatkan 'Drone' untuk Awasi Daerah Perbatasan," *Kompas.com*, March 1, 2024. <https://nasional.kompas.com/read/2024/03/01/07474451/tni-ad-berencana-manfaatkan-drone-untuk-awasi-daerah-perbatasan>.

In the same article, Maruli confirmed that drones are already operational in Papua for military posts: “The process has been ongoing since last year; many forward posts in Papua are already using drones for security.”

It should be noted here that Papua is a “fiercely contested part of Indonesia,”²⁵ which was under Dutch influence until 1962 and acquired by Indonesia in 1969. Indonesia wanted to achieve national unity in Indonesia by asserting historical claims – consolidating territories that were once under Dutch control – and gaining access to raw materials. They were criticized for manipulating the “Act of Free Choice” (1969) so that the alleged result, the agreement of the inhabitants of West Papua to be integrated into Indonesia, did not correspond to reality.²⁶

While the military uses drones to secure Indonesia’s sovereignty, UAVs are popular at work for different reasons. They are recognized as versatile tools capable of addressing specific challenges, particularly in industries such as construction and farming. A case in point is an article published in *Kompas.com*, which reads:

Daily documentation allows project managers to determine whether contractors can complete construction on schedule. To monitor progress, weekly photos must be taken, ensuring that construction developments can be tracked in real time. Drones also enable comprehensive oversight of all tasks, including height and angles, with just the press of a button.²⁷

The use of drones is widespread in agriculture, particularly for fertilizing fields and spraying pesticides. An article about “increasingly sophisticated farmers,” published in *Kompas.com* from 2021, emphasizes drones as a versatile tool for fast spraying, thus increasing efficiency and reducing manual labor. Ina Dewi, Head of Food Security at the Agriculture and Food Service of Bandung Regency, was reported as saying that educating the former in using drones for fertilizer spraying is one of the efforts to increase production of rice through a technological approach. *Kompas.com* quoted her as follows: “Our farmers are now assisted by technology. Previously, organic fertilizer had to be bagged and carried manually-around 100 kg per trip, requiring multiple trips. With Ponska OCA liquid fertilizer, farmers’ workloads are lightened...”²⁸

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- 25 Agustinus Allan Porajow, “West Papua’s Shifting Signifiers: Across History of Colonialism and Nationalism in Indonesia,” *Oxford Political Review*, July 5, 2024. <https://oxfordpoliticalreview.com/2024/07/05/west-papuas-shifting-signifiers-across-history-of-colonialism-and-nationalism-in-indonesia>.
 - 26 Brad Simpson, ed., “Indonesia’s 1969 Takeover of West Papua Not by ‘Free Choice,’” The National Security Archive, July 9, 2004. <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB128>.
 - 27 Rosiana Haryanti and Hilda B. Alexander, “Manfaat ‘Drone’ bagi Proyek Konstruksi,” *Kompas.com*, September 20, 2018. <https://properti.kompas.com/read/2018/09/20/200415121/manfaat-drone-bagi-proyek-konstruksi>.
 - 28 Agie Permadi and Aprillia Ika, “Petani di Bandung Makin Canggih, Dikenalkan Teknologi ‘Drone’ untuk Pemupukan,” *Kompas.com*, December 1, 2021. <https://regional.kompas.com/re>

Other articles likewise emphasize that UAVs can be used to fertilize huge wet rice fields, 40,000 hectares in size, in this case in a South Papuan food estate.²⁹

Another theme that emerges in the Indonesian media when discussing drones is regulations. In these articles, there is a trend to explain which drone regulations have been introduced, or how people do not know about them and violate them.³⁰ *Tempo.co* reported on August 22, 2019 that many drone enthusiasts in Indonesia remain unaware of regulations governing their operation. The Ministry of Transportation is therefore reported to carry out annual outreach events where they inform about the rules dictating where drones can fly, with designated green (free), yellow (restricted), and red (prohibited) zones, ensuring aviation safety and national security. Airports, the Presidential Palace, and military bases are among the restricted areas, and violations can result in forced landings or even interception.³¹

Notably, media reporting tends to repeat official statements, but there is a lack of critical or investigative engagement with issues concerning gender, privacy, and ethical concerns. The coverage is often descriptive, and it focuses on government announcements, regulatory frameworks, and technological developments. It is striking that women are largely absent from media coverage of drones. Drones are part of a techno-nationalist discourse focused on the country's security and progress, and efficiency through sophisticated technology. When images on this topic appear in the media, they usually show men posing with drones – for instance, in preparation for flying them in agriculture or featuring the signing of bilateral agreements, such as between Turkey and Indonesia to build a drone factory in Indonesia.³²

This leads us to point out that technology and gender are not neutral, but an inclusive and critical discourse on modern technology is needed. As Janina Loh³³ argues, the “rejection of the thesis of neutrality of technics” is a key element of a

ad/2021/12/01/193521678/petani-di-bandung-makin-canggih-dikenalkan-teknologi-drone-untuk-pemupukan.

29 Hendriyo Widi, “‘Drone’ dan Bibit Tebu Impor di ‘Food Estate’ Merauke,” *Kompas.id*, July 28, 2024. <https://www.kompas.id/baca/ekonomi/2024/07/27/drone-dan-bibit-tebu-impor-di-food-estate-merauke>.

30 Mutia Ramadhani and Winda Destiana Putri, “Kemenpar Bantu Sertifikasi Drone untuk Kembangkan Pariwisata,” *Republika.co*, August 4, 2015. https://ameera.republika.co.id/berita/nsj_qnm359/kemenpar-bantu-sertifikasi-drone-untuk-kembangkan-pariwisata.

31 “Kemenhub: Kenali Regulasi Drone,” *Tempo.co*, August 22, 2019. <https://www.tempo.co/info-tempo/kemenhub-kenali-regulasi-drone-714729>.

32 Agie Permadi and Aprillia Ika, “Petani di Bandung Makin Canggih, Dikenalkan Teknologi ‘Drone’ untuk Pemupukan,” *Kompas.com*, December 1, 2021. <https://regional.kompas.com/read/2021/12/01/193521678/petani-di-bandung-makin-canggih-dikenalkan-teknologi-drone-untuk-pemupukan>; Firda Cynthia Anggrainy, “Indonesia dan Turki Sepakat Kerja Sama Bangun Pabrik Drone,” *Detiknews.com*, February 12, 2025. <https://news.detik.com/berita/d-7775031/indonesia-dan-turki-sepakat-kerja-sama-bangun-pabrik-drone>.

33 Loh, “Feminist Philosophy of Technology,” 16–17.

“feminist technophilosophical plea” that emphasizes the importance of an inclusive and critical discourse on modern technology. Although not explicitly discussed, this also includes drones. Loh’s call to action includes, for example, “responsible acting” in computer science and ethics education as well as in feminist philosophy, to train a diverse range of participants that will shape the discourse on technology.

Neda Atanasoski and Kalindi Vora³⁴ are interested in how the alleged enchantment of technology, its framing as “smart” and “intelligent,” for example, comes at a cost as it hides the hidden, often racialized, power of labor behind the curtain of enchanted technology. When addressing drones, they argue that drones are not truly “unmanned” because they rely on human labor and decision-making processes. The notion that they operate independently obscures how military technology perpetuates historical patterns of control, as related to race, gender, and imperialism. They challenge the myth that machines are autonomous and call attention to how they reshape what it means to be human. They also point out that robots are seen as autonomous when they are capable of violence – but that same autonomy makes them a threat that must be controlled. This fear leads to attempts to subjugate them again, just as humans have historically controlled others based on race and class. The authors argue that the idea of killer robots and enslaved robots is connected in a way that reflects racialized power dynamics. They refer to drones as “cobots,” “collaborative robots, that continually remake the bounds of the human.”³⁵

Highlighting how drones reshape the boundaries of humanity and reflect colonial structures in warfare, they relate the supposed autonomy of the drone to colonial structures:

[T]he drone mediates the relation to humanity of both potential killers (soldiers) and potential targets (victims or casualties). The surrogate effect of roboticized warfare thus renders the fantasy of remote control as a reconceptualization of empire that, by being human-free, can disassociate its power from earlier modes of colonial conquest.³⁶

Drones, in other words, create distance between soldiers and victims, making war feel less personal. This illusion of remote control helps redefine imperialism in a modern sense as “human-free,” hiding its connection to past colonial domination.

Drones are constituted by what Waltrip and Bruun,³⁷ in their research about gendered reactions to drones in Denmark, have referred to as the “drone gaze” – it is a predominantly male gaze. Men dominate drones because they are usually the ones

34 Atanasoski and Vora, *Surrogate Humanity*.

35 Atanasoski and Vora, 136.

36 Atanasoski and Vora, 149.

37 Waltrip and Bruun, “Flying Drones,” 122.

who use them, but also because they can invade women's privacy through drones. This research highlighted that the most common concern expressed by women about drones was that they would expose them and that the images would be circulated.³⁸ Another study about responses to drones in Germany³⁹ noted that male respondents perceive drones more positively than women do. It also mentioned that, in addition to gender, age, place of residence, and the level of interest in technology, information about civil drones influenced their acceptance.⁴⁰

Like Denmark and Germany, the high proportion of men in the drone industry in Indonesia underlines a consistent pattern of gender imbalance in this technology sector. In drone companies, there are hardly any female drone operators or engineers working in this field. In my research about drones in Indonesia, I have rarely encountered women operating drones. For example, in a search for drone operators on LinkedIn in Indonesia in April 2024, only six women were shown, compared to 393 men. Training options for women in Indonesia are also still limited. An exception is the Jakarta School of Photography, which has offered drone training for women. They wrote in their course advertisement from 2022:

Sometimes people see women as less developed than men, due to the perception that women are weak. But not with the current millennial era, women are required to be versatile and must be able to master the fields mastered by men. Drones have now become a necessity in all fields and circles. It is not only men who are starting to need drones, but women are also participating in learning this unmanned aircraft. The need in work also requires women to be able to fly drones.⁴¹

This addresses the prejudice that considers women inferior to men, the modern-day requirement for women to perform the same tasks as men, and the demand for drone operators for work purposes as reasons why drone training for women is required. Elements of this training are the efficient and safe operation of drones according to applicable regulations and an introduction to the principles of drone flight, drone maintenance, and practical training. This mirrors trends in other countries where, according to a study published in 2019, the "average rate of women's employment was 13% across the various countries" in the drone sector.⁴² This research was carried out in 112 drone companies in the UK, France, Germany, Spain, the USA, Canada, and Australia, and found that "women are concentrated in non-

38 Waltorp and Bruun.

39 Eißfeldt et al., "Acceptance of Civil Drones."

40 Eißfeldt et al.

41 "Kursus Drone Untuk Wanita," Jakarta School of Photography. <https://jsp.co.id/kursus-drone-untuk-wanita/>.

42 Kuzma and Dobson, "Gender Diversity in UAV," 373.

technical positions, such as sales and administration. Men, however, hold the majority of drone pilot and technical managerial positions.”

How does this gender dynamic relate to the assessment of gender imbalance in the workplace? In the Global Gender Gap Index 2024, Indonesia ranks 112th. A significant issue is the gender pay gap, with women's estimated earned income “just half that of men's, resulting in a parity score of 51.7%.”⁴³ Political participation remains the weakest area in this index, with a score of 0.138 and 107th place.⁴⁴ The low representation of women in ministerial offices and women's low access to management positions show a need for systematic action here. Among the measures proposed by scholars to increase women's participation in the labor force are providing childcare facilities, flexible working arrangements, and implementing campaigns to counteract the idea that women are the primary carers.⁴⁵

Although new opportunities have emerged for women in the last decades, including new possibilities offered through online platforms, Indonesia still faces significant gender disparities in the workplace. One factor is contested laws and deep-rooted cultural norms.⁴⁶ Labor force participation for women stood at 52.5% compared to 81.5% for men as of 2023, whereas vulnerable employment affected 59.4% of women and 45% of men. Although women hold 24.8% of senior and middle management positions, these figures highlight persistent inequalities in the Indonesian workforce.⁴⁷

To further explore the context of gendered experiences of technology, it is important to consider how people respond to it emotionally. With this in mind, let us zoom in on my study, which focuses on the emotional responses of the study participants.

Gendered emotional responses to drones

Let me begin this section with a reflection on methodology. The Lime survey “Emotional Responses to Drone Technology in Indonesia”⁴⁸ was designed to provide initial insights into emotional responses rather than as a quantitative tool. Questions were asked about gender and age range; however, the survey guaranteed anonymity. Twenty-five respondents fully completed the survey, whose responses are used as

43 Pal et al., *Global Gender Gap 2024*, 32.

44 Pal et al., 207.

45 Cameron, “Gender Equality and Development.”

46 Arnez, “Gender, Islam, and Sexuality.”

47 World Bank Group, “Gender Data Portal: Indonesia.” <https://genderdata.worldbank.org/en/economies/indonesia>.

48 In Indonesian, the survey is titled *Tanggapan Emosional Terhadap Teknologi Drone di Indonesia*.

the dataset for this chapter. Nine respondents identified as female, one did not provide any information about their gender, and fifteen identified as male.

I shared an English test version with Christiane Berth, the co-editor of this volume, and an Indonesian test version with Ramayda Akmal, a lecturer at Gajah Mada University, and incorporated the feedback. With the support of Perplexity AI, I quickly translated the survey into Bahasa Indonesia. I then revised the content to stay true to the original intent. Once the changes were deemed satisfactory, the final versions were saved in both languages. On the same day (March 20, 2024), I launched the survey and sent it to selected people in Indonesia (former PhD students, one postdoc) with a request to distribute the survey (snowball system). This means that the respondents who answered the questions most likely have a university background and are based on Java. Before distribution, I made sure that my survey was activated in LimeSurvey. I created a link in LimeSurvey that participants could access to complete the survey. In total, twenty-five fully completed surveys – nine by female respondents, one by a person who did not disclose their gender, and fifteen male respondents – were used for the analysis in addition to the qualitative software program MAXQDA and the media articles. In terms of the latter, I coded dozens of articles from various Indonesian online daily newspapers (*Kompas.co*, *Tempo.co*, *Republika.co*), and reports from companies, organizations, and universities in Indonesia.

Generating and assigning codes in this study was fundamental to understanding emotional responses to drone technology. Over time, I collected relevant media articles and processed them using MAXQDA. The survey was processed similarly. This first step helped me get an overview of the material. I identified particular text passages related to the research topic. I categorized those passages deemed particularly relevant for the research topic and further refined the code structure. Subsequently, I identified overarching themes pertinent to the codes, the first of which is techno-sophistication.

Techno-sophistication

Techno-sophistication refers to the admiration people have for advanced technologies due to their remarkable capabilities and innovations. In the survey “Emotional Responses to Drone Technology in Indonesia” several respondents used words when addressing drones that can be associated with techno-sophistication. A prominent one was “kemajuan” (progress), highlighting the perception that drones symbolize technological progress. Words like “canggih” (advanced or sophisticated), “menakjubkan” (amazing), and “dunia” (world) reveal that respondents associate drones with global technological advancement.

Both women and men recognized the techno-sophistication of drones in their ability to take pictures and videos. These capabilities serve various purposes, such

as creating films, traveling, and producing content. They associated drones with the possibility to create high-quality, stunning footage, and several explicitly mentioned *canggih* in their responses. A young man, aged 18–24, for instance, commented:

The world is becoming more sophisticated and modern – also Indonesia is not left behind in the development of technology existing in the world, and I highly appreciate drone technology because it eases an issue by using technology and eases access to something and to find information.

A woman in the same age range associated drones with a “technology for taking sophisticated images.” A woman aged 35–44 pointed out: “When I hear and see drone technology, I am quite impressed because it can help particularly with visual work and more sophisticated observation.” A young female respondent praised drones as a versatile substitute for helicopters:

When I first learned about this technology, I was amazed because, until now, we have known that capturing images from high altitudes required a helicopter. With the presence of drones, it has become much easier for someone to record images from a certain height without having to board a helicopter or airplane.

A female respondent, aged 18–24, referred to drones as a “cool and amazing technology.” Another young female participant, aged 25–34, framed sophistication in different terms. She did not emphasize the drone as merely a flying tool for capturing images but instead recognized its sophistication in terms of providing care and assistance: “Drones are a sophisticated technology that help human beings very much who are facing shortages.”

A male respondent aged 18–24 remarked that a common trend is using drones to capture landscape images and videos. Another young man in the same age range commented: “As far as know, in Indonesia, drones are often used to make video recordings for content creators, for example, my friend is a nature lover – each time when he goes on a new tour, he flies his own drone.” He agrees with the statement: “Drones have the potential to significantly improve various aspects of society’s life.” A young female participant wrote that she thinks drone technology is an “important part of the photography/videography world in our age group.” She also highlighted that the drone technology “serves as an avenue to explore opportunities for expanding future job prospects.” She mentioned that while she had not operated a drone herself, she had already created videos with her friends, with fulfilling results. Her statement suggests that according to her, the potential of drones for women in Indonesia has not yet been fully exploited. This is consistent with the observations in the previous section of this chapter that women have not yet played a significant role in the drone sector.

The results reveal that the respondents, across genders, highlight drones as an amazing technology that allows people to capture stunning footage. Notably, female respondents emphasize techno-sophistication more than their male counterparts. This may partly stem from the reported moderate knowledge of drones among women in this sample. One woman indicated her knowledge as being very good, two as good, three as moderate, and one as poor. In contrast, two men claimed their knowledge of drones was very good, two rated it as good, seven said moderate, two reported it as poor, and one identified their knowledge as very poor. Two women, aged 18–24 and 35–44, respectively, mentioned that they have taken photos, done a photo shoot, or created drone videos, either alone or with friends. The person who did not identify their gender wrote that they used drones to do photo shoots. Among the male respondents, two men, aged 35–44, mentioned that they have flown drones, and one of them made drones himself. Two of them mention having used drones in a professional capacity, flying manual to automatic drones, and implementing films.

The survey results indicate that the female respondents are more fascinated by drones than male participants because they see it as a sophisticated technology they would like to use and know more about. In contrast, those male respondents who claimed to have the most knowledge about drones tended to have a more mixed view. For example, the respondent who wrote that he created drones himself and operated them, with sizes ranging from 250mm to 1100mm and equipped with a mirrorless camera, cautioned that “For communication between crew and pilots, the use of satellites should be maximized to extend the operational range of drones.” He also voiced his concern about the lack of domestic production and dependence on foreign technology: “[We are] still relying on foreign technology and lacking support from the government in the development of drones.” According to another male respondent, the government needs more accurate data about drones and their use: “I think the government does not yet have accurate data about the amount of drones, drone community, regulations of drones and so on.”

When correlating the emotional responses in the above answers with gender, positive emotions prevail but respondents also mentioned negative feelings like fear, sadness, and anger. This corresponds to the finding that hopefulness was the emotion with the highest score in the whole dataset, with an average 3.5 out of 5, and pride followed closely behind with 3.48. The average score for enthusiasm was 3.32, followed by 3.26 for happiness. The feelings fear, sadness, anger, and disappointment received values below 3, including 2.88 for fear (highest), 2.48 for sadness and 2.44 for disappointment and anger. The female respondents stated that they feel or strongly feel the following emotions: hope and fear, enthusiasm and happiness. One respondent also mentioned sadness and anger, while being neutral on disappointment. Another participant cited happiness, enthusiasm, and hope as neutral. The men stated that they feel or strongly feel happiness, hope, and enthusiasm, except ID 21; this respondent expresses a neutral attitude toward hope in this context.

In connection with the overall data regarding emotions in the survey, it should be noted that most respondents, men and women, expressed a neutral attitude toward the statement “I feel negative emotions toward drone use in Indonesia.” Nine men expressed a neutral attitude, three disagreed, one strongly disagreed, one agreed, and two strongly agreed with this statement. In turn, six out of nine women expressed neutrality, one disagreed, and two strongly agreed with the statement. The person who did not identify their gender likewise expressed neutrality.

The tendency to frame drones in both positive and negative terms is reflected in the dataset. While several respondents, especially women, expressed amazement at drone technology, the dataset also reveals mixed reactions, reflecting a double-edged sword that will be explored in the following theme.

Drones as a double-edged sword

After coding and reviewing the material again, I identified drones as a *double-edged sword* as a key theme. Both men and women indicated in their responses that they are positive about some aspects of drones, but not others. Some of the positive associations with drones mentioned by male respondents were that drones bring about progress, save labor, and minimize human accidents; they are also a children's toy, which should be forbidden, as an elderly male respondent wrote in his recommendation about drone technology in Indonesia. He also pointed out their potentially destructive effects when associating drone technology with “surveillance and bombs.”

The double-edged nature of drones is captured by a male respondent, 35–44 years old, writing that they are “progress and a threat.” His final recommendation was an appeal to the government to “issue appropriate, strict, and clear regulations so that the concerns do not result in significant negative impacts.” Another male respondent in the same age group, who highlighted the drone as a labor-saving tool, also regarded drones as a threat, a privacy-invading military tool. He also explicitly mentioned concerns about privacy violations: “The use of drones in residential areas is particularly vulnerable to invasion of privacy.”

Women pointed out, in turn, that drones are part of advancing technology in Indonesia, play an important role in various sectors, including industry, agriculture, and security, take aerial pictures or photographs, and are a sophisticated tool that helps human beings in need. On the negative side, the first woman, aged 35–44, wrote: “There is advancement, but improvements need to be made, specifically in the area of regulations.” She also pointed out that “Drones have benefits, but if not used responsibly, there are many negative aspects,” without specifying these further. A young woman, aged 18–24 years, thought that the media coverage does not take safety issues about drones sufficiently into account. Therefore, she called on the media to educate users on the safe use of drones. She wrote: “The use of drones in

news coverage in Indonesia must prioritize safety first, such as checking the drone's condition and following standard operating procedures (SOP)."

Some respondents mentioned both positive and negative associations with drones in one sentence. A woman aged 25–34 directly mentioned the double-edged nature of drones: "Technology is always a double-edged sword (*pisau bermata ganda*); without supervision and tight control, its unexpected effects (often negative) can come to the fore." Furthermore, she wrote that "When I hear and see drone technology, I am quite impressed because it can help particularly with visual work and more sophisticated observation. However, I also think of other harmful characteristics, especially the privacy violation of other people." A male respondent, aged 35–44 years, representing the main gender and age group, observed: "The phrase 'drone technology' provides an interpretation of the realm of technological sophistication used in human civilization. I feel that drone technology is like an alien creature ready to invade civilization, rather than helping humans."

The third main theme of this dataset revolves around the respondents' specific concerns about drones being intrusive, violating people's privacy, and endangering safety due to operators not adhering to regulations and the lack of proper control over their use.

The intrusive and out-of-control drone

Most respondents – women, men, diverse⁴⁹ – clearly expressed the need for privacy protection and stronger government regulation of drones. It is interesting to note that women emphasized this somewhat more strongly, but a concern with the two issues – privacy and stronger regulation – is also clearly visible among men. Four out of nine female respondents strongly agreed and another four agreed with the statement "I am afraid of potential privacy violations due to drone use in Indonesia," while one expressed a neutral stance. Five out of fifteen men strongly agreed, seven agreed, three were neutral, and one disagreed. The person who did not indicate their gender agreed. If we combine the analysis of these answers and consider the responses to the open questions in the survey about privacy, some gendered differences are notable. Interestingly, women hardly commented on privacy in the open questions, while some men did so. Those women who mentioned privacy concerns associated it either with their person or with people more broadly. One woman, aged 18–24, expressed her apprehension by stating, "Because I have just learned about the primary function of drones as recording devices, and as a woman, I must protect the privacy of my body; responsible drone usage is essential for shared security and comfort." This indicates a concern among women about how technology can infringe

49 The options respondents had regarding gender-related information were male, female, and diverse. One respondent did not indicate how they identified themselves in terms of gender.

upon their personal space and autonomy. The other comments on privacy by female respondents mentioned that “there is a feeling of fear because privacy is easily violated” and “I think of other harmful characteristics, especially the privacy violation of other people.”

The comments by men, in turn, reflected a different focus; they were more concerned with privacy issues as related to tensions between territory, authorities, and individuals. For example, they emphasized the significance of privacy within residential areas and the negative implications of drone technology if left unchecked. They called on authorities to prevent potential misuse. In terms of territory, one man, aged 35–44, for instance, mentioned that “the use of drones in residential areas is particularly vulnerable to invasion of privacy.” A man in the age range 55–64 highlighted how drones could conflict with (private) spaces: “Drone technology enables use for negative purposes and has the potential to infringe upon territories and individuals’ privacy.” Two men highlighted the role of authorities: “Impacts on the realm of privacy and certain authorities still need to be considered” and “This drone technology must have its usage regulated by the relevant authorities, as there are concerns about potential misuse, such as privacy and personal surveillance.”

Unlike other research on drones, such as on gender and privacy in Denmark,⁵⁰ concerns about exposure are not as pronounced in this survey, which could be rooted in the fear of exposure not being as pronounced among women in Indonesia, who are mostly veiled and often follow Islamic dress codes. The men’s emphasis on territoriality and authority maps onto societal norms about masculinity and power dynamics. Without intending to generalize here, there is a widespread social expectation that men are politically active and have a closer relationship with authority figures, and also are more territorial than women. This trend is also reflected in the Global Gender Gap Index 2024, where Indonesia’s low political representation of women in politics was observed.⁵¹

One interesting finding is the high level of agreement across genders, with the statement “The Indonesian government must have strong regulations to ensure that drones are operated safely and responsibly in Indonesia.” All women agreed with this statement, eight of them strongly, and out of fifteen men fourteen agreed, nine of them strongly. One man expressed a neutral stance.

Several respondents noted that drones are being used improperly and that the government must enact clear regulations to ensure the safety of citizens. Similar to privacy issues, male respondents were more verbose than women. Some participants pointed out that they expect the government to regulate the use of drones to prevent harmful effects resulting from the misuse of drones. Two respondents stated that clear regulations are needed to prevent misuse and accidents. One male

50 Waltorp and Bruun, “Flying Drones,” 122.

51 Pal et al., *Global Gender Gap 2024*.

respondent in the age range 55–64 noted: “Now more and more people are using drones. To prevent misuse and avoid negative impacts, drone use should be well regulated, and its limits must be clear.” A male participant, 35–44 years old, highlighted: “If there are no clear regulations, drone misuse and accidents that are caused by drones can become more widespread.” Another male respondent, 45–54 years old, offered a more optimistic viewpoint, commenting: “If regulations are in place and implemented consistently, drones will actually become a necessary tool in the future.”

There was only one female respondent, aged 18–24, who mentioned the government’s responsibility to create suitable policies. She explicitly connected drones with harm when stating that the government should “set policies for responsible drone use that do not harm other people.” One female respondent, aged 35–44, when writing a comment about the future development of drone technology in Indonesia, said: “There is advancement, but improvements need to be made, specifically in the area of regulations.”

Some respondents highlighted the pressing issue of irresponsible drone use among operators and stressed the need for suitable regulations. A 25–34-year-old female participant emphasized that “regulations need to be applied so that the users do not freely fly drones in certain areas, for example, in residential areas and close to airports.” Similarly, a young woman in the same age range stated, “If the drone pilot does not violate the regulations, I am just fine with the wish to fly a drone.” A male respondent, 35–44 years old, echoed this concern. He remarked: “Many people still carelessly fly drones, especially commercial-grade drones, despite the dangerous consequences. For instance, exceeding the maximum allowed altitude or flying over crowded areas – many disregard safety regulations.” In addition to these sentiments, a 45–54-year-old participant raised an important point about ethics. He stated: “Before the public widely uses drone technology, like mobile phones, the government needs to be cautious by creating regulations and a code of ethics for drone usage. Additionally, best practices for utilizing drones in agriculture, fisheries, and other fields are necessary.”

The dataset does not reveal the extent to which respondents themselves have witnessed “out-of-control drones.” Judging from the setup of the survey, the region where most respondents were likely to live is Java, Indonesia’s most populous island. A feeling of vulnerability in the face of possible drone accidents in densely populated residential areas is therefore very understandable. It is also well known that drones are often used by tourists in Indonesia – for example, to take beautiful landscape photos – and as children’s toys. Some of the respondents were likely to have had experience with this. One female respondent, aged 18–24, mentioned that “there are still some individuals flying drones in prohibited areas, which is very dangerous,” and it is likely that she either knew about such cases or witnessed an incident herself. An additional factor that may have influenced the concerns about intrusive and

out-of-control drones is the media. The above-mentioned reports by *Kompas*, *Republika*, and *Tempo*, all media outlets based in Java, have repeatedly covered the topic of regulations, and it is likely that the respondents, who are presumably predominantly Javanese, would have come across some of them.

The analysis of the three themes – *techno-sophistication*, *drones as a double-edged sword*, and the *intrusive and out-of-control drone* – paints a multifaceted picture of emotional responses to drones in Indonesia. Female respondents were even more likely than their male counterparts to associate drones with techno-sophistication. According to their statements, the women had less knowledge about drones overall, while some of the men had professional experience with them. This techno-sophistication is expressed in different ways, on the one hand, in men's descriptions of specific technical features of the drones – for instance, a mirrorless camera and specific sizes – or, in the case of female respondents, expressions of awe and amazement at cool technology. In this context, experienced male respondents highlighted the need for future improvements in drone technology, including extending the range, reducing reliance on foreign technology, and addressing the lack of drone data. The theme *drones as a double-edged sword* captures the mix of positive and negative aspects of drones mentioned by respondents in the dataset. On the positive end, several participants referred to drones as useful devices that can play an important role in the work sector. They referred to their potential to save labor and their use in different sectors, for example, agriculture, security, and filmmaking. Their potential to minimize human accidents was also indicated, as well as to help people in need. On the negative end, respondents highlighted the threatening and privacy-invading nature of drones. Threats were associated with “surveillance and bombs,” but also with being an annoying children's toy that should be forbidden. One respondent pointed out that there was a lack of education on safe drone usage in the media. The third theme, the *intrusive and out-of-control drone*, explicitly captures the concerns that some respondents already mentioned in the previous theme. We can see that respondents across genders agree that safe drone flights are a key concern the government should pay attention to. Expressions like “its use should not be free” (*penggunannya tidak secara bebas*), “privacy violations” (*pelanggaran privasi*), “misuse of drones and accidents” (*penyalahgunaan drone dan kecelakaan*), and a call for “tight controls” (*kontrol yang ketat*) underline these concerns.

Conclusion

In addressing the research question of how gendered emotional responses to drone technology highlight different attitudes toward drones and reveal underlying inequalities, this chapter has revealed several notable dynamics.

The colonial structures referred to in scholarship about the supposed autonomy of the drone in warfare, and the “human-free” indicated in the term “unmanned,”⁵² are relevant in different ways here. Within Indonesia, they are used to reproduce power dynamics that emanate from the state’s center. As an extension of the government, they can also reach remote, including hard-to-access, parts of the expansive archipelago and be used there for surveillance purposes. The fact that Indonesia has deployed drones in Papua, both for military purposes and in agriculture, can be seen as part of an attempt to control regions of Indonesia that have long sought independence. Moreover, the power of drone technology is Java-centric – it is concentrated in the hands of the Javanese, the dominant and most powerful ethnic group in Indonesia.

The media tends to amplify the voices of those elites who are significantly involved in shaping the future of the drone sector. Playing an important role in reinforcing existing power relations, the media tends to echo voices and represent predominantly male governmental, military, and business interests. It often portrays drones as cutting-edge tools, and their efficiency, versatility, and applications in agriculture, construction, and disaster management, as this is in line with business and state interests. Publishing stories on how the government seeks to employ drones across the archipelago, the media extends the state’s arm and control to remote areas, revealing the government’s power and outreach. Depicted as a technologically innovative “all-round fix” tool, drones are said to tackle a variety of issues, ranging from border surveillance to pesticide spraying in agriculture, persuading the public of their versatility and usefulness.

In the media reports I evaluated, female voices are mostly absent; instead, drones are marked by a “male gaze,” in terms of both the textual content and the images used. The conspicuous absence of female voices on drones in the media is partly due to the potentially small influence of women in the drone sector in Indonesia and because the media tends to reflect male interests related to power dynamics.

Several respondents perceived drones as advanced technology whose strength lies in their image recording function. The survey results show that respondents’ positive attitude toward drones, the fascination across genders, often stems from their ability to capture moving and still images from interesting angles in the air. The heightened sense of awe among several female respondents highlights that they tend to have a positive attitude toward this technology and see it as an opportunity to engage in fascinating activities – such as making films – and acquire new skills. It was also a female respondent who mentioned that, as flying, computer-controlled objects, drones enable people to achieve previously impossible feats: obtaining aerial images without having to use a helicopter.

52 Atanasoski and Vora, *Surrogate Humanity*, 149.

Emotional responses to drones were mixed across genders, but positive feelings prevailed. The mixed emotions toward drones were evident, with respondents expressing both fascination and concern. This trend was also visible in the identified themes *techno-sophistication*, *drones as a double-edged sword*, and *intrusive and out-of-control drones*, covering voices on the spectrum from awe to concern. Interestingly, the topic of ethics was only mentioned by one respondent, and the media also did not discuss this topic. This could indicate a lack of awareness or concern about the ethical implications of drone use among the respondents and the media. It also suggests that discussions around drones are more focused on their technological capabilities and practical applications rather than associated ethical issues. What stood out was the strong emphasis on the importance of regulations and the sentiment that more could be done to ensure compliance. Both women and men expressed a unified call for the state to implement stringent regulations to promote safe and responsible drone operations.

Why do men and women have somewhat similar opinions, with women more fascinated by drones? One crucial reason women showed fascination for UAVs is their potential to take stunning pictures from a bird's eye perspective. In particular, several young women, aged 18–24, mentioned the drone's camera power and the prospects it brings for content creation. This potential even outweighed potential privacy concerns, that were more pronounced among men. In terms of work, the results suggest that women may be particularly interested in jobs that combine drone technology with creative components, such as content creation, filmmaking, or tourism promotion.

It also became clear that gender asymmetries persist in terms of knowledge, with women in this sample having less knowledge about drones. They also did not operate these devices themselves. An anonymous female respondent expressed it this way: "I have no experience [with drones] but I am curious how it works". Likewise, several male respondents, particularly those who had previous experience operating drones, held positive perspectives about these devices. However, they also expressed concerns regarding potential weaknesses: perceived quality issues and military applications, for example. There was also concern about the potential exclusivity of drone-related knowledge, limited to a small circle of individuals.

Returning to the title of this chapter, the findings reveal that despite the positive aspects mentioned above, respondents perceive drones as a double-edged sword that elicits different emotions, from happiness to fear, depending on their use. Flying drones near private property or directly above people's heads can understandably evoke feelings of unease or even threat. This is especially because individuals on the ground are unable to discern the intentions behind the drone's flight and the potential consequences.

This brings me to the last point of this chapter: what lessons do we learn from the drone study on Indonesia about how people might respond to future technologies?

One important factor is the potential benefits and the possible harms. My respondents regarded them as beneficial if they ease or add a specific value to their lives, for example, by speeding up otherwise slow processes at work or creating stunning footage. Yet they are harmful if armed with weapons. Another crucial question is who will control, be granted access to, and possess knowledge about future technology? Aside from costs, a technology's potential risk determines access, the ethical issues of a technology, and associated closedness or openness. Moreover, as the drone example teaches us, even within one technology, there are huge differences. Drones equipped with cameras, for example, are more accessible to the public than military drones, because they are not only less costly but also less dangerous. In terms of knowledge, using a technology does not necessarily mean that people know much about a particular technology. The result is a knowledge gap. More specialized technological knowledge, for example, will likely stay within circles that do not share it with everyone. Therefore, technology, both now and in the future, will likely not be neutral and will have a double-edged nature.

Acknowledgements

I thank the anonymous survey respondents for their valuable input. I also acknowledge Ramayda Akmal and Christiane Berth for their feedback on preliminary drafts of the survey.

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