



DISCUSSION PAPER

Information Asymmetries in the Digital Sexual and Reproductive Health Space

March 2021

United Nations Development Programme



Contents

INTRODUCTION	3
A Rights-Based Approach to Sexual and Reproductive Health	5
SRH and the Digital Health Knowledge Economy	8
Digital Platforms as SRH Information Gatekeepers	12
The Inscrutability of Algorithmic Processes	17
Algorithmic Opacity and the Rise of Digital Surveillance	17
Algorithmic Authority.....	19
RECOMMENDATIONS	22
Supporting Greater Regulation of Online Platforms	22
Developing Transparent and Reliable SRH Information Platforms	23
Regulating for Greater Algorithmic Transparency	25
Algorithms as ‘Global Public Goods’	27
CONCLUSION	30

This discussion paper was prepared by Natalie Druce, LL.M. Graduate, May 2020, New York University School of Law, as part of the NYU Law International Finance and Development Fellowship program.

The fellowship assignment was supervised by Serge Kapto, Policy Specialist, Data for Development, SDG Integration Team, Bureau for Policy and Programme Support, UNDP and Kenechukwu Esom, Policy Specialist, Human Rights, Law and Gender, HIV, Health and Development Practice, Bureau for Policy and Programme Support, UNDP.

Copyright ©UNDP 2021. All rights reserved.
One United Nations Plaza, NEW YORK, NY10017, USA

The analysis and recommendations expressed in this discussion paper do not necessarily reflect the official views and positions of the United Nations, its agencies or its Member States. Textual material may be freely reproduced with proper citation and/or attribution to the authoring agency.

UNDP is the leading United Nations organization fighting to end the injustice of poverty, inequality, and climate change. Working with our broad network of experts and partners in 170 countries, we help nations to build integrated, lasting solutions for people and planet.

Learn more at undp.org or follow at @UNDP.

INTRODUCTION

The proliferation of digital technologies in the health care context has important implications for fulfilment of the health-related Sustainable Development Goals ('SDGs'). This is particularly evident when it comes to the SDG targets relating to sexual and reproductive health ('SRH').¹ Technological developments offer an opportunity to expand the availability and accessibility of sexual and reproductive health services, especially for those populations that traditional health systems fail to reach. Digital

While digital technologies have the potential to subvert traditional knowledge asymmetries between clinicians and patients in the health sector, information disparities between technology providers and the general user population impede meaningful access to the digital

technologies in the form of smartphone applications ('apps'), social media websites and other online platforms offer an important source of information about SRH for people living in communities where such topics remain taboo.² Access to accurate information is a key determinant of sexual and reproductive health. Indeed, SDG target 3.7 makes explicit reference to ensuring universal access to SRH information and education.³ Platforms that provide information on topics like menstruation, contraception and HIV have enormous potential in contexts where social and cultural norms preclude open discussion of these issues, and may be especially useful for people who do not feel comfortable disclosing certain

health issues to in-person providers for fear of being stigmatized.

COVID-19 is reshaping the way in which people access SRH services and information.⁴ The pandemic has underscored the transformative potential of digital technologies in improving public health initiatives, yet it also raises a number of rights-based issues regarding equitable use of and access to such technologies. Chief amongst these is the power imbalance produced by information asymmetries between technology providers and users regarding how these technologies generate and disseminate content, collect, store and reuse personal data, and deploy algorithms to provide health advice and diagnoses. The aim of this paper is to make international organizations, including UN agencies and other stakeholders involved in the implementation of digital health strategies, aware of the ethical and human rights risks relating to information asymmetries in the context of digital technologies and SRH.

¹ The key SDG targets that explicitly address sexual and reproductive health include SDG 3.7 ("By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes") and SDG 5.6 ("Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences"); noting that other targets, such as SDG 3.3 ("By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases"), also fall within the sphere of sexual and reproductive health.

² See GIRL EFFECTS & WOMEN DELIVER, GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS 12-15 (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>.

³ U.N. DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, SUSTAINABLE DEVELOPMENT: GOAL 3, <https://sdgs.un.org/goals/goal3> (last visited Jan. 18, 2021).

⁴ Laura D. Lindberg et al., *Early Impacts of the COVID-19 Pandemic: Findings from the 2020 Guttmacher Survey of Reproductive Health Experiences*, GUTTMACHER INSTITUTE (Jun. 2020), <https://www.guttmacher.org/report/early-impacts-covid-19-pandemic-findings-2020-guttmacher-survey-reproductive-health>.

This paper embraces an understanding of the health system as a 'knowledge economy', in which physicians and other health care professionals serve as gatekeepers who exist to make available medical expertise to patients.⁵ The discussion will primarily focus on digital technologies in the form of existing online platforms like Facebook, Twitter, Whatsapp and Google, which are increasingly becoming important sources of SRH information,⁶ as well as SRH apps developed for smart phones. These platforms allow users to act as 'apomediators' in the digital health knowledge economy, facilitating the sharing and dissemination of SRH information on a broader scale.⁷ They also give rise to some of the more egregious information asymmetry risks because they are often developed and operated by private entities with their own commercial interests and incentives. Given the global reach of these technologies, the scope of this paper is not limited to a specific set of countries, but it does focus on lower and middle-income countries ('LMICs') because they often have pluralistic health care systems in which participants are more heavily reliant on alternative sources of health information⁸ and where the risks posed by information asymmetries may be higher because of lower digital literacy levels and inadequate health and technological infrastructure.

This paper argues that, while digital technologies have the potential to subvert traditional knowledge asymmetries between clinicians and patients in the health sector, information disparities between technology providers and the general user population impede meaningful access to the digital health knowledge economy. This undermines the proper enjoyment of sexual and reproductive rights, which is necessary for attainment of the SDGs. In support of this argument, it makes the following claims: (1) in the digital era, technology providers function as gatekeepers of crucial SRH information. This poses a threat to sexual and reproductive rights because technology providers are not commercially incentivized to slow the spread of inaccurate health information. These platforms also withhold important educational content that is arbitrarily classified as sexually explicit; (2) the inscrutability of algorithms underlying digital technologies means that users do not understand how their data is used and processed to generate SRH-related content and advice; and (3) the illusion of algorithmic authority places technology providers and developers in a position to dictate norms surrounding SRH in a way that is opaque to users. The paper concludes by making recommendations as to how information asymmetries may be addressed by international organizations to better support the SRH-related SDGs in a manner that conforms to international human rights and ethical principles.

⁵ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 *GLOBALIZATION & HEALTH* 1, 2 (2017).

⁶ See eg, Linda Waldman et al., 'We Have the Internet in Our Hands': *Bangladeshi College Students' Use of ICTs for Health Information*, 14 *GLOBALIZATION & HEALTH* 1, 7 (2018); Constanze Pfeiffer et al., *The Use of Social Media Among Adolescents in Dar es Salaam and Mtwara, Tanzania*, 22 *REPROD. HEALTH MATTERS* 178, 182-84 (2014); GIRL EFFECTS & WOMEN DELIVER, *GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS* 12-15 (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>.

⁷ Gunther Eysenbach, *Credibility of Health Information and Digital Media: New Perspectives and Implications for Youth*, in *DIGITAL MEDIA, YOUTH AND CREDIBILITY* 123, 129-130 (Miriam J. Metzger & J. Flanagin eds., 2008).

⁸ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 *GLOBALIZATION & HEALTH* 1, 3 (2017).

A Rights-Based Approach to Sexual and Reproductive Health

The discourse surrounding the relationship between SRH, human rights and sustainable development has evolved significantly over the last few decades. The 1994 International Conference on Population Development ('ICPD') Programme of Action marked a monumental paradigm shift in the way that the international community thought about SRH.⁹ It was the first time that reproductive rights were acknowledged as an integral part of the international human rights framework.¹⁰ Access to family planning services, for instance, was treated as a means of empowering women to take control of their own reproduction instead of as a population control issue.¹¹ The Beijing Platform for Action, adopted the following year, sought to afford greater attention to sexual health and rights.¹² Since then, advocates have sought to realize a more expansive sexual and reproductive health and rights agenda, which was reflected in the efforts of advocates in the lead up to the adoption of the SDGs.¹³ Unlike the Millennium Development Goals ('MDGs'), the SDGs capture a broader understanding of SRH, veering away from a much narrower focus on maternal mortality.¹⁴ International human rights are 'embedded in the architecture of the SDGs'¹⁵ and SRH-related rights permeate the various targets and indicators.¹⁶ Goals 3 and 6 contain targets that explicitly refer to SRH but, because the SDGs are intended to be read as 'integrated and indivisible',¹⁷ improving SRH globally necessarily entails initiatives that touch on multiple goals and targets.

This paper takes up the integrated, comprehensive definition of SRH originally proposed by the Guttmacher-Lancet Commission¹⁸ and adopted by the United Nations Population Fund,¹⁹ which conceives of good sexual and reproductive health as a 'state of complete physical, mental and social well-being in all matters relating to sexuality and the reproductive system'.²⁰ This includes the right to autonomy in SRH decision-making and to a safe and satisfying sex life.²¹ The control that technology providers exert over a user's informational environment and the impenetrability of algorithmic processes underlying the production of SRH information create information asymmetries that inhibit the proper enjoyment of sexual and reproductive health and rights. They do so by undermining the ability of individuals and communities to make full and informed decisions regarding sex and reproduction and shaping the context in which those decisions are made.

⁹ UNFPA, *Sexual and Reproductive Health and Rights: An Essential Element of Universal Health Coverage*, Background Document for the Nairobi Summit on ICPD25 – Accelerating the Promise 15 (Nov. 2019), https://www.unfpa.org/sites/default/files/pub-pdf/SRHR_an_essential_element_of_UHC_2020_online.pdf.

¹⁰ *Id.*

¹¹ *Id.*

¹² See U.N. Women, *Beijing Declaration and Platform for Action: Beijing +5 Political Declaration and Outcome* (2014), https://beijing20.unwomen.org/~media/headquarters/attachments/sections/csw/pfa_e_final_web.pdf#page=61.

¹³ Alicia Ely Yamin, *Power, Politics and Knowledge Claims: Sexual and Reproductive Health and Rights in the SDG Era*, 10 *GLOBAL POL'Y* 52, 54-55 (2019).

¹⁴ *Id.* at 52.

¹⁵ *Id.* at 55.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ Ann M. Starrs, *Accelerate Progress – Sexual and Reproductive Health and Rights For All: Report of the Guttmacher-Lancet Commission*, 391 *THE LANCET* 2642 (2018).

¹⁹ UNFPA, *Sexual and Reproductive Health and Rights: An Essential Element of Universal Health Coverage*, Background Document for the Nairobi Summit on ICPD25 – Accelerating the Promise 8 (Nov. 2019), https://www.unfpa.org/sites/default/files/pub-pdf/SRHR_an_essential_element_of_UHC_2020_online.pdf.

²⁰ *Id.*

²¹ *Id.*

Information asymmetries in the digital SRH sphere also implicate a number of other human rights. The quality of SRH information available on digital platforms impacts both the right to health and the right to freedom of expression,²² while, the collection and use (or misuse) of personal data affects the right to privacy, the right to informational self-determination and, in cases where sensitive SRH data is shared, the right to non-discrimination. These rights are overlapping and multifaceted. To fully understand the threat that knowledge disparities pose to individual rights, we must consider a more expansive understanding of the content of these rights. The right to an adequate standard of health, for example, which is provided for in a number of international instruments such as the Universal Declaration of Human Rights, Article 25 and International Covenant on Economic, Social & Cultural Rights, Article 12, extends beyond the right to access health care to include some of the underlying determinants of health i.e., health-related education and information.²³ The conversation about the right to health also now includes questions regarding the extent to which people have the right to understand the underlying technologies used to provide health information and advice.²⁴ Freedom of expression includes the right to receive and impart information²⁵ and is guaranteed by the exchange of reliable information and ideas based on factual truths.²⁶ Disseminating misinformation or withholding information undermines this right by impeding the ability of individuals' to understand their informational environment.²⁷ The right to privacy and reproductive autonomy are frequently linked, especially in countries like the United States where the right to privacy serves as the constitutional foundation of reproductive rights. It also arises, albeit in a different form, in respect of digital technologies due to the vast troves of personal data collected and stored by different technologies.

It is difficult to fully grasp the potential cost of information asymmetries from a human rights perspective when focusing only on *individual* rights. Information asymmetries in the digital health space also risk undermining collective societal values (i.e., participatory democracy) that form the foundations of the international human rights regime.²⁸ As Karen Yeung argues, existing human rights language may be inadequate to capture the risks posed by technologies.²⁹ Firstly, because it is difficult to identify with any certainty the individual rights that are being violated when users do not understand how these technologies work.³⁰ And secondly, because information and power asymmetries in relation to complex technologies pose a threat to the 'broader and more amorphous moral, social and political culture and context in which advanced digital technologies operate'.³¹ The

²² Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) for the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 24 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

²³ WHO & OHCHR, *The Right to Health: Factsheet No. 31*, 3 <https://www.ohchr.org/documents/publications/publications/factsheet31.pdf>.

²⁴ MATTHEW FENECH ET AL., *ETHICAL, SOCIAL, AND POLITICAL CHALLENGES OF ARTIFICIAL INTELLIGENCE IN HEALTH, FUTURE ADVOCACY* 44 (2018), <https://wellcome.org/sites/default/files/ai-in-health-ethical-social-political-challenges.pdf>.

²⁵ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) for the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 24 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

²⁶ FORUM ON INFORMATION & DEMOCRACY, *WORKING GROUP ON INFODEMICS: POLICY FRAMEWORK* 122-23 (Nov. 2020), https://informationdemocracy.org/wp-content/uploads/2020/11/ForumID_Report-on-infodemics_101120.pdf.

²⁷ *Id.*

²⁸ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) for the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 36 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.*



potential dangers presented by digital technologies extend beyond infringing individual rights to molding the societal conditions under which individuals seek SRH information, advice and care. Thus, a rights-based discourse regarding information asymmetries and digital health must also consider the 'collective, aggregate and cumulative' risks that digital technologies may present.³²

³² *Id.*

SRH and the Digital Health Knowledge Economy

The health care sector is characterized by vast knowledge disparities between clinical professionals and patients.³³ This is the case in many different industries involving service provision but is particularly consequential in the health care context due to the vital interests at stake. Gerald Bloom and colleagues argue that conceptualizing the health sector as a 'knowledge economy' provides a useful framework for understanding the formal and informal channels through which healthcare is provided, particularly in pluralistic health systems which are characteristic of many LMICs.³⁴ In a pluralistic health system, there are many different providers of health care that operate alongside the official health sector and individuals assume more responsibility for their own health.³⁵ Facilitating access to SRH in these countries is thus more heavily dependent on alternative sources of information and health services.³⁶ The health knowledge economy framing also emphasizes a multidimensional understanding of SRH as it embraces forms of health-related activities that fall outside the traditional bounds of disease diagnosis and determining the absence of infirmity and dysfunction.³⁷

In the traditional health knowledge economy, clinical experts act as gatekeepers who control access to information and expertise about medicine and other forms of health care.³⁸ SRH presents a special case as there are many socio-cultural barriers that stand in the way of access to SRH-related information and care and a greater variety of actors that engage in gatekeeping practices, including teachers, community leaders and family members.³⁹ This is particularly true for adolescents in LMICs who shoulder the greatest SRH burden.⁴⁰ Digital technologies have the potential to subvert traditional information asymmetries in the SRH context by empowering individuals to take control of their own sexual and reproductive health through providing a forum in which to share SRH information and educational materials in a less hierarchical fashion. This is a process referred to as 'disintermediation'.⁴¹ Digital platforms help transform users into 'apomediaries' who 'stand alongside' their peers, enabling peer-to-peer sharing of SRH content while preserving the autonomy and agency of individuals seeking health information.⁴²

Digital platforms like Facebook, Twitter, Whatsapp, Google and Youtube are increasingly being used as sources of SRH information in countries where socio-cultural norms preclude open discussion of topics like contraception, menstruation and

³³ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 *GLOBALIZATION & HEALTH* 1, 2 (2017).

³⁴ *Id.*

³⁵ *Id.* At 2-3.

³⁶ *Id.* at 3.

³⁷ Linda Waldman et al., *'We Have the Internet in Our Hands': Bangladeshi College Students' Use of ICTs for Health Information*, 14 *GLOBALIZATION & HEALTH* 1, 2 (2018).

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ Rose Grace Grose et al., *Sexual and Reproductive Health Outcomes of Violence Against Women and Girls in Lower-Income Countries: A Review of Reviews*, 58 *J. SEX RES.* 1, 2 (2021).

⁴¹ Gunther Eysenbach, *Credibility of Health Information and Digital Media: New Perspectives and Implications for Youth*, in *DIGITAL MEDIA, YOUTH AND CREDIBILITY* 123, 129-130 (Miriam J. Metzger & J. Flanagin eds., 2008); Linda Waldman et al., *'We Have the Internet in Our Hands': Bangladeshi College Students' Use of ICTs for Health Information*, 14 *GLOBALIZATION & HEALTH* 1, 3 (2018).

⁴² *Id.*

sex.⁴³ For many marginalized populations, the stigma surrounding SRH issues can be prohibitive in exercising their right to health. Legal barriers also stand in the way of access to SRH information for certain populations, notably requirements for parental or guardian consent to access HIV counselling services⁴⁴ and laws criminalizing HIV transmission, sex work and consensual sex with same sex partners.⁴⁵ In many countries, unmarried women and men are reticent to approach health care providers about SRH issues like contraception due to fear of judgment and potential privacy breaches.⁴⁶ College students in Bangladesh reported being directed to seek out SRH information online by teachers who felt too embarrassed to engage with them on these issues.⁴⁷

Social media sites play an increasingly significant role in LMICs as they offer a platform for knowledge dissemination and sharing that may not exist to the same extent in an in-person setting. UNESCO has pointed to the ‘enormous potential’ of social media to facilitate access to ‘positive, accurate and non-judgmental’ SRH information.⁴⁸ A study in Bangladesh revealed that 95% of young people surveyed reported Facebook use as their primary online activity.⁴⁹ In Rwanda, India and Malawi, young women and girls reported making use of platforms like Facebook, Whatsapp and Youtube to search for information about their sexual and reproductive health.⁵⁰ These platforms also facilitate the sharing of information within communities in a way that affords more privacy and allows users to choose when, how and what content they circulate. In the social media context, users are ‘authors, recipients and curators of information’.⁵¹ Public health professionals are increasingly making use of social media to promote sexual health, especially for populations classified as ‘high risk’.⁵² Both social media and smartphone apps offer opportunities for public health interventions that cater to individuals with lower levels of health literacy by replacing blocks of text with infographics or videos.⁵³ They are interactive, updated in real-time and convey health information more succinctly than

⁴³ See, e.g., Linda Waldman et al., ‘We Have the Internet in Our Hands’: *Bangladeshi College Students’ Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 7 (2018); Constanze Pfeiffer et al., *The Use of Social Media Among Adolescents in Dar es Salaam and Mtwara, Tanzania*, 22 REPROD. HEALTH MATTERS 178, 182-84 (2014); GIRL EFFECTS & WOMEN DELIVER, GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS 12-15 (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>.

⁴⁴ UNDP, Making the Law Work for Women and Girls in the Context of HIV 14 (Apr. 2020), <https://www.undp.org/content/undp/en/home/librarypage/hiv-aids/making-the-law-work-for-women-and-girls-in-the-context-of-hiv.html>.

⁴⁵ *Id.* at 12-13.

⁴⁶ GIRL EFFECTS & WOMEN DELIVER, GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS 12-13 (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>; Linda Waldman et al., ‘We Have the Internet in Our Hands’: *Bangladeshi College Students’ Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 10 (2018).

⁴⁷ Linda Waldman et al., ‘We Have the Internet in Our Hands’: *Bangladeshi College Students’ Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 12 (2018).

⁴⁸ UNESCO, International Technical Guidance on Sexuality Education: An Evidence Informed Approach 24 (2018), <https://www.unfpa.org/sites/default/files/pub-pdf/ITGSE.pdf>.

⁴⁹ Linda Waldman et al., ‘We Have the Internet in Our Hands’: *Bangladeshi College Students’ Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 6 (2018).

⁵⁰ See GIRL EFFECTS & WOMEN DELIVER, GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>.

⁵¹ Paul Byron, *Social Media Platforms and Sexual Health*, in THE ROUTLEDGE COMPANION TO MEDIA, SEX AND SEXUALITY 214, 216 (Clarissa Smith et al. eds., 2018).

⁵² *Id.* at 214-15; Elia Gabarron & Rolf Wynn, *Use of Social Media for Sexual Health Promotion: A Scoping Review*, GLOBAL HEALTH ACTION 9 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5030258/pdf/GHA-9-32193.pdf>.

⁵³ Xuewei Chen et al., *Health Literacy and Use and Trust in Health Information*, 23 J. HEALTH COMM. 724, 730-31 (2018).

official government sources or medical websites.⁵⁴ They also offer spaces for online patient communities to interact and provide/receive support.⁵⁵

The advent of the 'Quantified Self' movement⁵⁶ has prompted the development of hundreds of thousands of health-adjacent apps. In 2017, there were more than 325,000 health-related apps in major app stores.⁵⁷ In the SRH space, there is a trend toward digital self-tracking in the form of menstruation apps that collect data on, among other things, users' menstrual cycles, moods, smoking and drinking habits and sexual activity. These apps (which are part of a broader industry commonly referred to as 'femtech') were downloaded over 200 million times in 2016⁵⁸ and some estimates project that femtech will be a \$50 billion market by 2025.⁵⁹ These apps can be used for three distinct purposes: period-tracking, fertility-related reasons and contraception. These systems create opportunities to collect more granular data about users and make that data widely available so as to 'demystify the reproductive cycle'.⁶⁰ Menstruation is a commonly neglected topic in many countries and substantial numbers of young people have knowledge gaps and misconceptions about their menstrual cycles.⁶¹

By offering freely accessible SRH content, these platforms serve an important function in the SDG era by empowering individuals to become more informed and better educated about crucial SRH topics. This has significant implications for the exercise of bodily autonomy and sexual and reproductive decision-making. UNESCO's technical guidance on comprehensive sexuality education ('CSE') highlights the impact that CSE has on SRH.⁶² It contains findings from two evidence review processes conducted in 2008 and 2016 that CSE can increase the use of condoms and other forms of contraception and reduce sexual risk-taking behavior.⁶³ While the emphasis of the research has been on how CSE facilitates behavioral and attitudinal change, the guidance also suggests that CSE can contribute to much broader outcomes such as gender equitable norms, reduction of intimate partner violence and decrease in discrimination.⁶⁴ CSE is primarily discussed in relation to official school curricula but digital technologies are becoming an increasingly relevant medium through which SRH information is consumed. Indeed, UNESCO's technical guidance explicitly acknowledged that adolescents frequently learn about SRH issues through informal channels like

⁵⁴ *Id.*

⁵⁵ Yael Frish & Dov Greenbaum, *Is Social Media a Cesspool of Misinformation? Clearing a Path for Patient-Friendly Safe Spaces Online*, 17 AM. J. BIOETHICS 19, 19 (2017).

⁵⁶ A term coined by Gary Wolf and Kevin Kelly, editors of *Wired Magazine*, to describe the phenomenon of using digital tools to collect personalized data for the purpose of self-tracking. Wolf and Kelly summarized it as 'self-knowledge through numbers'. See Gary Wolf & Kevin Kelly, *Know Thyself: Tracking Every Facet of Life, from Sleep to Mood to Pain*, 24/7/365, WIRED MAG. (Jun. 22, 2009 at 12:00 PM), <https://www.wired.com/2009/06/lbnp-knowthyself/>.

⁵⁷ Asos Mahmood et al., *Use of Mobile Health Applications for Health-Promoting Behavior Among Individuals with Chronic Medical Conditions*, 5 DIGITAL HEALTH 1, 2 (2019).

⁵⁸ Jane Dreaper, *Women Warned About Booming Market in Period Tracker Apps*, BBC NEWS (Aug. 11, 2016), <https://www.bbc.com/news/health-37013217>.

⁵⁹ Alisha Haridasani Gupta & Natasha Singer, *Your App Knows You Got Your Period: Guess Who it Told?* N.Y. TIMES (Jan. 28, 2021), <https://www.nytimes.com/2021/01/28/us/period-apps-health-technology-women-privacy.html>.

⁶⁰ *Id.*

⁶¹ UNDP, *Making the Law Work for Women and Girls in the Context of HIV* 15 (Apr. 2020), <https://www.undp.org/content/undp/en/home/librarypage/hiv-aids/making-the-law-work-for-women-and-girls-in-the-context-of-hiv.html>.

⁶² UNESCO, *International Technical Guidance on Sexuality Education: An Evidence Informed Approach* (2018), <https://www.unfpa.org/sites/default/files/pub-pdf/ITGSE.pdf>.

⁶³ *Id.* at 28.

⁶⁴ *Id.* at 28-29.

social media⁶⁵ and bodies like the World Health Organization ('WHO') have deployed a range of digital tools in SRH educational interventions targeted at youth.⁶⁶

Yet, the empowerment narrative risks conceiving of digital technologies as a set of tools marked by neutrality and predictability, which obscures the 'complexity of assemblages' within digital technologies.⁶⁷ Paula Baraitser and Alan Cribb offer an alternative conception of digital technologies as 'non-human actors... with their own agency', allowing us to parse the underlying values reflected by a piece of technology and consider factors like interface design, marketing tactics, underlying algorithms and language.⁶⁸ Technology providers with their own commercial incentives now stand in the place of traditional health care intermediates. They exercise a great deal of control over SRH information, deploying complex algorithms informed by personal data that dictate the type of SRH content people receive, when they receive it and in what form. Exactly what this means from a human rights perspective is not yet entirely clear, in part due to the opacity of algorithmic decision-making and lack of transparency surrounding the corporate and political interests at play.

⁶⁵ *Id.* at 24.

⁶⁶ WHO, *Youth-Centred Digital Health Interventions: A Framework for Planning, Developing and Implementing Solutions with and for Young People 3* (2020), CC BY-NC-SA 3.0 IGO, <https://apps.who.int/iris/bitstream/handle/10665/336223/9789240011717-eng.pdf>.

⁶⁷ Paula Baraitser & Alan Cribb, *Putting People in Charge of Their Own Health and Care? Using Meta-Narrative Review and the Example of Online Sexual Health Services to Re-think Relationships Between E-health and Agency*, 22 HEALTH EXPECTATIONS 838, 845 (2019).

⁶⁸ *Id.* at 844-45.

Digital Platforms as SRH Information Gatekeepers

In LMICs, where poor network coverage and resource limitations impede widespread internet use, certain digital platforms monopolize the internet. One example of this is Free Basics, which is a platform operated by Facebook that has the aim of ‘connecting the unconnected’.⁶⁹ Facebook has partnered with mobile operators in a number of LMICs to provide phone bundles that include free access to Free Basics (essentially a pared-down version of the internet that provides users with access to a limited number of websites, including Facebook). Free Basics sits under the umbrella of Facebook’s Internet.org initiative, and has drawn the ire of regulators in different countries for violating network neutrality.⁷⁰ In Bangladesh, where Free Basics was only recently phased out,⁷¹ a 2018 study found that Facebook use was so ubiquitous that many young people did not distinguish between Facebook and the wider internet.⁷² For many users, Facebook ‘offers an illusion of using the whole internet’,⁷³ which destabilizes the idea of an open internet.

Facebook allows advertisers to target users based on personal data that it has mined from online activities and search behaviors, which renders users ‘vulnerable to unscrupulous market exploitation that does not have their health interests at heart’.⁷⁴ A 2018 study conducted in Spain found that Facebook had labeled 73% of users in the European Union as having ‘sensitive interests’ for advertising purposes.⁷⁵ ‘Reproductive health’ was included as a sensitive ad preference.⁷⁶ In some instances, users are targeted on the basis of personal data collected by other platforms. An investigation carried out by Privacy International revealed that certain widely-downloaded menstruation apps were selling user data to parties like Facebook.⁷⁷ In some cases, the data was shared before users had even consented to the app’s privacy policy.⁷⁸ The US Federal Trade Commission filed a complaint in January 2021 against period-tracking app, Flo, alleging that the app was passing along intimate consumer health data to companies like Google and Facebook for advertising purposes.⁷⁹ As Privacy International explains, certain data

⁶⁹ Zara Rahman, *The Potential Impact of Free Basics on SRHR Advocacy in Bangladesh*, 22 ARROW FOR CHANGE 25, 25 (2016), <https://www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf>.

⁷⁰ Olivia Solon, *‘It’s Digital Colonialism’: How Facebook’s Free Internet Service Has Failed Its Users*, GUARDIAN (Jul. 27, 2017 at 8:00 AM), <https://www.theguardian.com/technology/2017/jul/27/facebook-free-basics-developing-markets>.

⁷¹ Ravi Agrawal, *Asian Countries Are Waking Up to the Dangers of Social Media*, FOREIGN POL’Y (Jul. 23, 2020 at 5:29 PM), <https://foreignpolicy.com/2020/07/23/asian-countries-waking-up-dangers-social-media-net-neutrality-tiktok-india-bangladesh-pakistan/>.

⁷² Linda Waldman et al., *‘We Have the Internet in Our Hands’: Bangladeshi College Students’ Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 12 (2018).

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ Jose Gonzalez Cabanas et al., *Unveiling and Quantifying Facebook Exploitation of Sensitive Personal Data for Advertising Purposes*, 27th USENIX SECURITY SYMPOSIUM 479 (2018), <https://www.usenix.org/system/files/conference/usenixsecurity18/sec18-cabanas.pdf>.

⁷⁶ *Id.* at 483.

⁷⁷ PRIVACY INTERNATIONAL, *NOBODY’S BUSINESS BUT MINE: HOW MENSTRUATION APPS ARE SHARING YOUR DATA* (2019), <https://privacyinternational.org/long-read/3196/nobody-business-mine-how-menstruations-apps-are-sharing-your-data>.

⁷⁸ *Id.*

⁷⁹ Alisha Haridasani Gupta & Natasha Singer, *Your App Knows You Got Your Period: Guess Who it Told?* N.Y. TIMES (Jan. 28, 2021), <https://www.nytimes.com/2021/01/28/us/period-apps-health-technology-women-privacy.html>.

collected by the app like data on a user's mood is particularly valuable for advertisers who can time advertisements so that they target users at a time when their mood renders them more vulnerable to suggestion.⁸⁰

Individual users labeled as having an interest in reproductive health can be targeted with SRH-related content that may be medically inaccurate. The social media algorithms that determine the content users see prioritize engagement over accuracy because their primary objective is to sell targeted advertising space.⁸¹ The mechanics of how these platforms facilitate the flow of misinformation are extraordinarily complex but, in short, studies have revealed that social media sites have a commercial incentive to promote inaccurate or divisive content because users are more likely to engage with it.⁸² A 2019 investigation demonstrated that a neutral search for 'vaccine' on platforms like Facebook and Youtube generated high volumes of anti-vaccine content regardless of the user's profile and search history.⁸³ False online content appears to generate more user engagement than the truth. In fact, research published by MIT Sloane professors in the journal *Science* revealed that falsehoods are 70% more likely to be retweeted than truthful content.⁸⁴

SRH topics are often the subject of online *disinformation* campaigns, which refers to online content created with an intent to deceive.⁸⁵ Third party actors have discovered ways to manipulate online platforms like Facebook, Google and Whatsapp to deliberately promote inaccurate SRH information with the aim of dissuading people from seeking abortions. An investigation by Privacy International revealed the methods deployed by pro-life groups, primarily based in the United States, to disseminate disinformation regarding pregnancy and family planning.⁸⁶ Often, these campaigns target women in Latin American countries who are led to believe that they are interacting with abortion providers.⁸⁷ These online resources provide inaccurate information on issues like bleeding and what the abortion procedure entails.⁸⁸ This extends into the physical space as women are encouraged by advertisements and websites to visit clinics where they are barraged with anti-abortion messaging and materials.⁸⁹ Public debates regarding the legalization of abortion spawned a misinformation campaign agitating against CSE in Argentina and led to over one million euros being spent on Facebook ads during the Irish referendum on repealing a Constitutional amendment

⁸⁰ *Id.*

⁸¹ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 5 (2020).

⁸² See, e.g., Susan Margolin, *Why Are Social Media Platforms Still So Bad at Combating Misinformation?*, KELLOG INSIGHT (Aug. 3, 2020), <https://insight.kellogg.northwestern.edu/article/social-media-platforms-combating-misinformation>; Chengcheng Shao et al., *Anatomy of an Online Misinformation Network*, 13 PLOS ONE (2018), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0196087#sec012>.

⁸³ Julia Carrie Wong, *How Facebook and Youtube Help Spread Anti-Vaxxer Propaganda*, GUARDIAN (Feb. 1, 2019 at 04:20 PM), <https://www.theguardian.com/media/2019/feb/01/facebook-youtube-anti-vaccination-misinformation-social-media>.

⁸⁴ Soroush Vosoughi et al., *The Spread of True and False News Online*, 359 SCI. 1146, 1149 (2018).

⁸⁵ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 1 (2020).

⁸⁶ PRIVACY INTERNATIONAL, A DOCUMENTATION OF DATA EXPLOITATION IN SEXUAL AND REPRODUCTIVE RIGHTS (Apr. 2020), <https://privacyinternational.org/long-read/3669/documentation-data-exploitation-sexual-and-reproductive-rights>.

⁸⁷ Isabella Cota, *Revealed: US-Linked Anti-Abortion Centres 'Lie' and 'Scare Women' Across Latin America*, OPEN DEMOCRACY (Feb. 12, 2020), <https://www.opendemocracy.net/en/5050/revealed-us-linked-anti-abortion-centres-lie-and-scare-women-across-latin-america/>.

⁸⁸ *Id.*

⁸⁹ *Id.*

that restricted abortion legislation.⁹⁰ These groups have also developed sophisticated strategies for obtaining Google's Adwords Grant for nonprofits that allows them to promote their content and services on Google.⁹¹ According to Privacy International, it is impossible for users to determine at face value the identity of organizations responsible for these advertisements, often hosted on social media platforms.⁹² The lack of transparency regarding who is behind certain pieces of content puts users at an extreme disadvantage in terms of their ability to make informed choices about SRH-related care.

The deluge of information available online places a cognitive strain on people's ability to adequately parse that information.⁹³ Digital disintermediation requires users to be more informationally self-sufficient,⁹⁴ but navigating the complex data and informational ecosystems in which users are embedded can be incredibly challenging. One aspect of this is the ability to distinguish between credible and non-credible sources, which can be especially difficult for communities where structural inequalities reduce opportunities to acquire the know-how to achieve this. Research has found that, as of 2020, there are 300 million fewer women than men using internet connected mobile phones, with the gap in South Asia – at 51% - being the highest gender divide.⁹⁵ In Bangladesh, young women reported being discouraged from spending time on their phones or online by older family members.⁹⁶ In addition, women who experience intimate partner violence often lack control over their mobile devices and have their internet use monitored.⁹⁷

UNESCO points out that skill deficits have actually superseded access issues as the main cause of the digital gender divide.⁹⁸ According to a 2019 report prepared by UNESCO and EQUALS, women and girls are 25% less likely than men to know how to leverage technology for basic purposes.⁹⁹ There are manifold reasons for this including prohibitively high costs, lack of educational opportunities and a scarcity of relevant and empowering content.¹⁰⁰ Contrary to popular belief, this problem is not limited to LMICs. Richer countries with high levels of gender equality, such as those in Europe, have some of the lowest proportions of women pursuing advanced degrees in computer science.¹⁰¹ A report produced by the World Wide Web

⁹⁰ PRIVACY INTERNATIONAL, A DOCUMENTATION OF DATA EXPLOITATION IN SEXUAL AND REPRODUCTIVE RIGHTS 64-65 (Apr. 2020), <https://privacyinternational.org/long-read/3669/documentation-data-exploitation-sexual-and-reproductive-rights>.

⁹¹ *Id.* at 66.

⁹² *Id.*

⁹³ Ulrich K. H. Ecker, *Why Rebuttals May Not Work: The Psychology of Misinformation*, 44 MEDIA ASIA 79, 80 (2017).

⁹⁴ Gunther Eysenbach, *Credibility of Health Information and Digital Media: New Perspectives and Implications for Youth*, in DIGITAL MEDIA, YOUTH AND CREDIBILITY 123, 131 (Miriam J. Metzger & J. Flanagin eds., 2008).

⁹⁵ GSMA, THE MOBILE GENDER GAP REPORT 2020 3 (2020), <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf>.

⁹⁶ Linda Waldman et al., *'We Have the Internet in Our Hands': Bangladeshi College Students' Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 5 (2018).

⁹⁷ Loraine J. Bacchus et al., *Using Digital Technology for Sexual and Reproductive Health: Are Programs Adequately Considering Risk?* 7 GLOBAL HEALTH: SCI. & PRAC. 507, 508 (2019).

⁹⁸ UNESCO, *I'd Blush If I Could: Closing Gender Divides in Digital Skills Through Education* 16 (2019), <https://unesdoc.unesco.org/ark:/48223/pf0000367416/PDF/367416eng.pdf.multi.page=1>.

⁹⁹ *Id.* at 15.

¹⁰⁰ WORLD WIDE WEB FOUNDATION, WOMEN'S RIGHTS ONLINE: REPORT CARDS 1 (2016), http://webfoundation.org/docs/2016/09/WRO-Gender-Report-Card_Overview.pdf.

¹⁰¹ UNESCO, *I'd Blush If I Could: Closing Gender Divides in Digital Skills Through Education* 76 (2019), <https://unesdoc.unesco.org/ark:/48223/pf0000367416/PDF/367416eng.pdf.multi.page=1>.

Foundation argues that the digital divide is specifically exacerbated by an absence of quality information on SRH issues.¹⁰² It identified SRH information as one of the critical content areas that would most affect women's rights and opportunities.¹⁰³ The Foundation surveyed ten LMICs¹⁰⁴ and found a scarcity of 'user-friendly, locally relevant' SRH information.¹⁰⁵ In addition, online information is primarily focused on childbirth and child-rearing as opposed to areas like contraception use and access to safe abortions.¹⁰⁶

Populations with poor digital literacy are disadvantaged because they are not in a position to verify the accuracy of the information they receive from online sources and are at greater risk of being exploited by actors with hidden commercial or otherwise nefarious agendas.¹⁰⁷ There also appears to be a correspondence between people with low levels of eHealth literacy and reliance on digital sources of health information that are of poorer quality.¹⁰⁸ Making SRH decisions founded on biased or poor-quality online health advice may have serious ramifications for users. Jessica Morley and colleagues suggest that we recognize the quality of the digital health information environment, which they refer to as the 'infosphere', as a social determinant of health.¹⁰⁹ To do so would serve as an acknowledgment that the way in which people process, absorb and react to information from digital sources has a demonstrable effect on their physical health. Research on responses to COVID-19 misinformation, for example, revealed that it affected individual decision-making in relation to their health i.e., their willingness to accept a vaccine when one becomes available.¹¹⁰ To the extent that users are aware of the risk of inaccurate information being disseminated via online platforms, this may have a chilling effect on the exercise of SRH rights. Research has shown that young women in Rwanda, Malawi and India are reluctant to seek follow-up sexual and reproductive health care on the basis of information sourced from digital platforms because of their belief that the information may be untrustworthy.¹¹¹ Others refuse to search certain topics due to privacy concerns.¹¹² A failure to understand, act on and apply credible health information can lead to negative health consequences.¹¹³

¹⁰² WORLD WIDE WEB FOUNDATION, WOMEN'S RIGHTS ONLINE: REPORT CARDS 3 (2016), http://webfoundation.org/docs/2016/09/WRO-Gender-Report-Card_Overview.pdf.

¹⁰³ *Id.*

¹⁰⁴ Namely Kenya, Uganda, Mozambique, Nigeria, Ghana, Egypt, Colombia, India, Indonesia and the Philippines.

¹⁰⁵ WORLD WIDE WEB FOUNDATION, WOMEN'S RIGHTS ONLINE: REPORT CARDS 4 (2016), http://webfoundation.org/docs/2016/09/WRO-Gender-Report-Card_Overview.pdf.

¹⁰⁶ Promotion, Protection and Enjoyment of Human Rights on the Internet: Ways to Bridge the Gender Digital Divide From a Human Rights Perspective, Report of the United Nations High Commissioner for Human Rights, A/HRC/35/9, 9 (2017), <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/111/81/PDF/G1711181.pdf?OpenElement>.

¹⁰⁷ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 5 (2020).

¹⁰⁸ Xuewei Chen et al., *Health Literacy and Use and Trust in Health Information*, 23 J. HEALTH COMM. 724, 728-31 (2018).

¹⁰⁹ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, pp. 6-7 (2020).

¹¹⁰ Sander van der Linden et al., *Inoculating Against Fake News About COVID-19*, 11 FRONTIERS IN PSYCH. 1, 2 (2020).

¹¹¹ GIRL EFFECTS & WOMEN DELIVER, GOING ONLINE FOR SEXUAL AND REPRODUCTIVE HEALTH: MEANINGFULLY ENGAGING ADOLESCENT GIRLS AND YOUNG WOMEN FOR SMARTER DIGITAL INTERVENTIONS IV (2020), <https://womendeliver.org/wp-content/uploads/2020/08/Going-Online-for-Sexual-and-Reproductive-Health.pdf>.

¹¹² *Id.* at 20.

¹¹³ Xuewei Chen et al., *Health Literacy and Use and Trust in Health Information*, 23 J. HEALTH COMM. 724, 724 (2018).

In addition to enabling the flow of mis- and disinformation, online platforms delimit the type of SRH information to which users have access by censoring content that they deem 'sexually explicit' or otherwise inappropriate. In this respect, they function as moral gatekeepers, imposing their own norms regarding sexual behavior and health on users. Facebook's advertising policy, for example, requires that adverts for contraceptives focus on the 'contraceptive features of the product and not on sexual pleasure or sexual enhancement'.¹¹⁴ This may capture advertisements encouraging safe sex practices that paint sex in a positive, as opposed to 'neutral', light.¹¹⁵ This has caused issues for public health interventions that make use of social media and other online platforms to reach target audiences. In a 2015 investigation by the Atlantic, a sexual health organization reported that Google had banned the sale of their contraceptive education kits online because they were classified as sex toys.¹¹⁶ Thus, even in situations where public health professionals attempt to harness online platforms to provide accurate and reliable SRH content, commercial providers stand in the way of access to quality SRH information and education.

Conceptualizing online platforms as objective tools that do no more than empower users to better exercise their sexual and reproductive rights disguises the way in which technology providers control and shape the flow of SRH information to serve their own pecuniary interests. Traditional information gatekeepers have been replaced by technology providers with their own financial incentives who operate under a 'façade of peer-to-peer mediation'.¹¹⁷ It is undeniable that digital technologies have to some extent facilitated disintermediation in health care, allowing users to circumvent certain intermediaries that restrict their access to SRH information and care. But actors in the digital health space must be cognizant of how online spaces fall short of supporting sexual and reproductive rights and the SRH-related SDGs due to commercial gatekeeping practices.

¹¹⁴ Facebook Advertising Policies, 8. Adult Products or Services, https://www.facebook.com/policies/ads/prohibited_content/adult_products_or_services (last visited Dec. 28, 2020).

¹¹⁵ Amber Madison, *When Social-Media Companies Censors Sex Education*, ATLANTIC (Mar. 4, 2015), <https://www.theatlantic.com/health/archive/2015/03/when-social-media-censors-sex-education/385576/>.

¹¹⁶ *Id.*

¹¹⁷ Linda Waldman et al., *We Have the Internet in Our Hands: Bangladeshi College Students' Use of ICTs for Health Information*, 14 GLOBALIZATION & HEALTH 1, 12 (2018).

The Inscrutability of Algorithmic Processes

Algorithmic Opacity and the Rise of Digital Surveillance

At the heart of these technologies are complex algorithms that use machine learning technologies to mine user data and make predictions about user behavior, offer health diagnoses or deploy targeted advertising. Many of these algorithms use models that are so complex that the logic underlying certain outputs is inaccessible to all but the most sophisticated technology experts.¹¹⁸ The explainability of human error is a key distinguishing feature that sets human decision-making apart from algorithmic decision-making. In some cases, algorithms developed by commercial providers are the subject of intellectual property rights and are thus immune from public scrutiny.¹¹⁹ Colloquially referred to as ‘black boxes’, these algorithms are shrouded in secrecy and not easily explainable.¹²⁰ Users do not have access to the default settings that apply when apps generate outputs, the data on which those outputs are based and how it is processed. On top of this, apps featuring more sophisticated forms of artificial intelligence may generate highly unpredictable and unstable outcomes, which raises governance and regulatory concerns.

The ‘Quantified Self’ movement and pervasive social media use has led to this concept of ‘participatory surveillance’, whereby users voluntarily submit to the mining and repurposing of their personal data, sometimes engaging in self-monitoring as in the case of self-tracking apps.¹²¹ Digital technologies are transforming the way that individuals engage with their sexual and reproductive health by creating dynamic, asynchronous and interactive spaces for users to seek out SRH information and care. However, this also means that health services are intruding into intimate spheres of people’s private lives to an unprecedented extent, amassing enormous volumes of sensitive personal data.¹²² Data collected by apps and other platforms which, in isolation, may seem fairly innocuous can, in the aggregate, reveal extremely comprehensive pictures of individuals’ intimate lives.¹²³ As Deborah Lupton argues, the participatory surveillance narrative renders opaque the ways in which users’ data may be misused by platform providers because these technologies are framed as open and collaborative spaces that empower users to take control of their own health data.¹²⁴ While providers have access to extremely granular data about their users, the same is not true in reverse – users know little to nothing about how these platforms process their information. Even in situations where technology users are prompted to read and acknowledge a privacy policy, the information is often presented in an ambiguous and

¹¹⁸ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 15-16 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹¹⁹ *Id.*

¹²⁰ MATTHEW FENECH ET AL., ETHICAL, SOCIAL, AND POLITICAL CHALLENGES OF ARTIFICIAL INTELLIGENCE IN HEALTH, *FUTURE ADVOCACY* 31 (2018), <https://wellcome.org/sites/default/files/ai-in-health-ethical-social-political-challenges.pdf>.

¹²¹ Deborah Lupton, *Quantified Sex: A Critical Analysis of Sexual and Reproductive Self-Tracking Using Apps*, 17 *CULTURE HEALTH & SEXUALITY* 440, 446 (2014).

¹²² Paula Baraitser & Alan Cribb, *Putting People in Charge of Their Own Health and Care? Using Meta-Narrative Review and the Example of Online Sexual Health Services to Re-think Relationships Between E-health and Agency*, 22 *HEALTH EXPECTATIONS* 838, 846 (2019).

¹²³ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 25-26 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹²⁴ Deborah Lupton, *Quantified Sex: A Critical Analysis of Sexual and Reproductive Self-Tracking Using Apps*, 17 *CULTURE HEALTH & SEXUALITY* 440, 447 (2014).

convoluted manner.¹²⁵ In the case of the period-tracking app, Flo, the app's privacy policy allegedly misled users regarding to the extent to which their personal health data would be shared with third parties.¹²⁶

The resulting information asymmetries create serious human rights concerns where, for instance, personal data is sold to third parties.¹²⁷ In certain contexts, for example, the disclosure of HIV status can be extraordinarily dangerous for criminalized populations who may face prosecution under discriminatory laws. As of 2019, 75 countries criminalized HIV non-disclosure, exposure or transmission, including unintentional transmission.¹²⁸ Revealing information about the termination of a pregnancy can expose people to social and legal discrimination in countries where abortion remains illegal. It also increases the risk of intimate partner violence in situations where women are subject to reproductive coercion.¹²⁹ As discussed in the previous section, certain social media platforms allow advertisers to target users based on personal data they have collected or bought. As Yeung points out, individual profiling and data repurposing undermines not only the right to privacy but the right to 'informational self-determination',¹³⁰ which is the right of the individual to determine 'when and within what limits information about [her] private life should be communicated to others'.¹³¹

This trend toward data-driven analysis and profiling allows digital technologies to offer advice and diagnoses without revealing to users how their personal data is being processed to generate this information. Some apps offer preliminary diagnoses of health conditions on the basis of data inputs. Two major menstruation-tracking apps, Flo and Clue, assess a person's risk for polycystic ovary syndrome. However, there is evidence that these apps do not conduct 'high level clinical studies' to determine the accuracy of these diagnostic tools nor do they properly consider the repercussions of misdiagnoses.¹³² Users have few insights into how these tools work, nor do they understand the basis on which these health assessments are made. This shift from quantification to medicalization¹³³ is especially troubling because of the potentially deleterious consequences of inaccurate diagnoses.

¹²⁵ I. van Ooijen & Helena U. Vrabec, *Does the GDPR Enhance Consumers' Control Over Personal Data: An Analysis From a Behavioral Perspective*, 42 J. CONSUMER POL'Y 91, 94-96 (2019).

¹²⁶ Alisha Haridasani Gupta & Natasha Singer, *Your App Knows You Got Your Period: Guess Who it Told?* N.Y. TIMES (Jan. 28, 2021), <https://www.nytimes.com/2021/01/28/us/period-apps-health-technology-women-privacy.html>.

¹²⁷ A Privacy International investigation revealed that several menstrual cycle tracking apps were selling users' personal data to Facebook for targeted advertising purposes. See PRIVACY INTERNATIONAL, *NOBODY'S BUSINESS BUT MINE: HOW MENSTRUATION APPS ARE SHARING YOUR DATA* (2019), <https://privacyinternational.org/long-read/3196/no-bodys-business-mine-how-menstruations-apps-are-sharing-your-data>.

¹²⁸ SALLY CAMERON & EDWIN J. BERNARD, *ADVANCING HIV JUSTICE 3: GROWING THE GLOBAL MOVEMENT AGAINST HIV CRIMINALISATION*, HIV JUSTICE NETWORK 6 (May 2019), <https://www.hivjustice.net/wp-content/uploads/2019/05/AHJ3-Full-Report-English-Final.pdf>.

¹²⁹ Loraine J. Bacchus et al., *Using Digital Technology for Sexual and Reproductive Health: Are Programs Adequately Considering Risk?* 7 GLOBAL HEALTH: SCI. & PRAC 507, 507-08 (2019).

¹³⁰ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 25 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹³¹ BVerfG, 1 BvR 209/83, 1 BvR 484/83, 1 BvR 440/83, 1 BvR 420/83, 1 BvR 362/83, 1 BvR 269/83, Dec. 15, 1983 at 32, https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/1983/12/rs19831215_1bvr020983.html.

¹³² Natasha Singer, *Period-Tracking Apps Say You May Have a Disorder. What if They're Wrong?*, N.Y. TIMES (Oct. 27, 2019), <https://www.nytimes.com/2019/10/27/technology/personaltech/health-apps-hormonal-disorder-pcos.html#:~:text=Flo%20and%20Clue%2C%20two%20popular,the%20app's%20developer%2C%20Flo%20Health.>

¹³³ *Id.*

Menstrual-tracking apps also convey information in a way that blurs the line between medical and lifestyle advice. As a result, they often do not fall within the purview of national health regulators.¹³⁴ When providing menstrual cycle predictions, many of these apps present users with ‘unreliable binary predictions’ instead of probabilities, which conceal the uncertainty of these outputs.¹³⁵ A study analyzing health apps on Apple’s app store found that the majority did not reveal where they source health information and advice.¹³⁶ As Bloom and colleagues point out, while diagnostic guidelines are generally developed in the public eye, the algorithms used by apps to diagnose and advise are inaccessible to users.¹³⁷ In some instances, app providers may have covert relationships with pharmaceutical companies and are thus incentivized to give advice on and encourage drug usage.¹³⁸ The impenetrability of how these technologies provide health advice poses complex accountability questions. How can users who receive poor quality SRH information or advice seek redress when they do not understand how the system generates that information or advice in the first instance?¹³⁹

Algorithmic Authority

Because AI-based technologies promise objectivity and neutrality,¹⁴⁰ many users are prone to simply accepting algorithmic outputs as representing an infallible truth. This creates an illusion of ‘algorithmic authority’, which belies the hidden value systems embedded in these technologies. The creation of platforms that utilize algorithms inevitably involves a series of decisions that reflect the belief systems of the people that make them.¹⁴¹ Decisions such as feature selection, training data and validating models are all made by humans with their own biases and prejudices.¹⁴² A 2017 study revealed that some AI technologies replicate human-like semantic biases.¹⁴³ Researchers analyzed millions of words and found that machine learning models made empirical associations with words that reflected cultural stereotypes and biases. Male names, for instance, were closely associated with career-related terms, while female names had family-related associations.¹⁴⁴

Another issue with the use of AI in providing health information and diagnoses is that training datasets that inform algorithmic outputs are often incomplete or biased as they fail to capture data from underrepresented and marginalized

¹³⁴ See, e.g., Alisha Haridasani Gupta & Natasha Singer, *Your App Knows You Got Your Period: Guess Who it Told?* N.Y. TIMES (Jan. 28, 2021), <https://www.nytimes.com/2021/01/28/us/period-apps-health-technology-women-privacy.html>.

¹³⁵ Daniel A. Epstein et al., *Examining Menstrual Tracking to Inform the Design of Personal Informatics Tools*, PROC. SIGCHI CONF. HUM. FACTOR COMPUTER SYS. 6876 (2017) (manuscript at 12) (on file with authors), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5432133/pdf/nihms855306.pdf>.

¹³⁶ Deborah Lupton, *Apps as Artefacts: Towards a Critical Perspective on Mobile Health and Medical Apps*, SOCIETIES 606, 609-10 (2014).

¹³⁷ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 GLOBALIZATION & HEALTH 1, 6 (2017).

¹³⁸ *Id.* at 7. Deborah Lupton, *Apps as Artefacts: Towards a Critical Perspective on Mobile Health and Medical Apps*, SOCIETIES 606, 610 (2014).

¹³⁹ Lindsey Andersen, *Artificial Intelligence in International Development: Avoiding Ethical Pitfalls*, J. PUB. & INT. AFF. (2019), <https://jpia.princeton.edu/news/artificial-intelligence-international-development-avoiding-ethical-pitfalls>.

¹⁴⁰ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 31 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹⁴¹ CENTER FOR DEMOCRACY & TECHNOLOGY, *HEAL-GORITHMS: UNDERSTANDING THE POTENTIAL FOR BIAS IN MHEALTH APPS* 15-20 (Jul. 2018), <https://cdt.org/wp-content/uploads/2018/09/2018-09-11-Healgorithms-Understanding-the-Potential-for-Bias-in-mHealth-Apps.pdf>.

¹⁴² *Id.*

¹⁴³ Aylin Caliskan et al., *Semantics Derived Automatically from Language Corpora Containing Human-Like Biases*, 356 SCI. 183 (2017).

¹⁴⁴ *Id.* at 183.

groups.¹⁴⁵ Women, for example, have historically been ‘othered’ in medical research.¹⁴⁶ Machine learning models that draw on research data that does not consider health issues specific to women risk encoding gender bias in algorithmic outputs.¹⁴⁷ Moreover, the standards and expectations as to what constitutes ‘normal’ in relation to SRH issues draw primarily on aggregated data from American and European white women.¹⁴⁸ This inevitably impacts the quality of health information and advice provided by these apps.¹⁴⁹

The notion that algorithmic outputs are somehow unimpeachable also means that technology providers and developers are in a position to configure norms surrounding sexual and reproductive bodies and impose their own conceptions of what types of SRH-related activities and behaviors are acceptable. It is worth noting that rarely do these actors represent the broader population that these technologies serve.¹⁵⁰ At Google, for example, only 10% of machine intelligence employees are women.¹⁵¹ Moreover, the values promoted by these platforms may not be compatible with the democratic values and international human rights frameworks that should inform public health dialogues,¹⁵² threatening to erode the ‘socio-technical foundations of moral and democratic community’.¹⁵³ Deborah Lupton has examined the normative impact of sexual and reproductive self-tracking apps.¹⁵⁴ On Lupton’s account, SRH apps are not simply tools but are ‘sociocultural products located within pre-established circuits of discourse and meaning’.¹⁵⁵ These technologies reduce sexual and reproductive bodies to ‘rigid normalized categories’¹⁵⁶ that fail to capture the complexity and nuance of how people experience SRH issues. Lupton argues that, in the case of period-tracking apps, data is used to create narratives that focus on risk and medicalization and perpetuate ideas about women’s bodies as ‘chaotic’ or ‘disorderly’.¹⁵⁷ Studies focused on the design of menstruation tracking app interfaces have found that they are steeped in heteronormative assumptions and use ‘stereotypically feminine attributes’ i.e., color schemes featuring a lot of pink and flower graphics.¹⁵⁸ This type of exclusionary design can be very alienating for some user populations.¹⁵⁹

¹⁴⁵ CENTER FOR DEMOCRACY & TECHNOLOGY, HEAL-GORITHMS: UNDERSTANDING THE POTENTIAL FOR BIAS IN MHEALTH APPS 17-18 (Jul. 2018), <https://cdt.org/wp-content/uploads/2018/09/2018-09-11-Healgorithms-Understanding-the-Potential-for-Bias-in-mHealth-Apps.pdf>.

¹⁴⁶ Cara Tenenbaum, *Not Intelligent: Encoding Gender Bias*, 21 MINN. J. L. SCI. & TECH. 283, 285 (2020).

¹⁴⁷ *Id.*

¹⁴⁸ Vanessa Rizk & Dalia Othman, *Quantifying Fertility and Reproduction Through Mobile Apps: A Critical Overview*, 22 ARROW FOR CHANGE 13, 15 (2016), <https://www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf>.

¹⁴⁹ A classic example of this is the different heart attack symptoms experienced by women and men. Machine learning models trained using data that only captures symptoms typically experienced by men may lead to underdiagnosis of heart attacks in women. See Cara Tenenbaum, *Not Intelligent: Encoding Gender Bias*, 21 MINN. J. L. SCI. & TECH. 283, 286 (2020).

¹⁵⁰ CENTER FOR DEMOCRACY & TECHNOLOGY, HEAL-GORITHMS: UNDERSTANDING THE POTENTIAL FOR BIAS IN MHEALTH APPS 17 (Jul. 2018), <https://cdt.org/wp-content/uploads/2018/09/2018-09-11-Healgorithms-Understanding-the-Potential-for-Bias-in-mHealth-Apps.pdf>.

¹⁵¹ UNESCO, *I’d Blush If I Could: Closing Gender Divides in Digital Skills Through Education* 19 (2019), <https://unesdoc.unesco.org/ark:/48223/pf0000367416/PDF/367416eng.pdf.multi.page=1>.

¹⁵² Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 34-35 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹⁵³ *Id.* at 6.

¹⁵⁴ Deborah Lupton, *Quantified Sex: A Critical Analysis of Sexual and Reproductive Self-Tracking Using Apps*, 17 CULTURE HEALTH & SEXUALITY 440 (2014).

¹⁵⁵ *Id.* at 441.

¹⁵⁶ *Id.* at 449.

¹⁵⁷ *Id.* at 447.

¹⁵⁸ Daniel A. Epstein et al., *Examining Menstrual Tracking to Inform the Design of Personal Informatics Tools*, PROC. SIGCHI CONF. HUM. FACTOR COMPUTER SYS. 6876 (2017) (manuscript at 12) (on file with authors), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5432133/pdf/nihms855306.pdf>.

¹⁵⁹ *Id.* at 12-14.

The other consequence of technology providers stepping into this norm setting role is the creation of a base norm of SRH-related behavior that promotes individual self-management of health. There is a risk that an overemphasis on ‘self-care’ effectively shifts the burden of health care from the state to individuals. According to Lupton, this is a product of neoliberal policies that makes citizens responsible for management of health and stigmatizes those who deviate from these expectations.¹⁶⁰ This presents a problem for attainment of the SRH-related SDGs and securing the right to health as it detracts from the obligations of the state to provide health care to its citizens. Ultimately, digital technologies that provide SRH information and care must be deployed in conjunction with a robust health infrastructure that includes adequate funding for more traditional health care programs.¹⁶¹ Some scholars have in fact suggested replacing the rhetoric of ‘digital empowerment’ with the concept of ‘digital health companionship’, acknowledging the limitations of digital technologies as a substitute for certain forms of in-person care.¹⁶² Endometriosis, an incredibly painful reproductive health condition that notoriously takes many years to diagnose, is a good example of a condition that benefits from digital health companionship. Digital technologies have been used to enable patients to document their symptoms of endometriosis and share them with clinicians but ultimately treatment of this disease can only be achieved surgically.¹⁶³

The upshot of this is that in the digital health knowledge economy decisions regarding public health norms are increasingly subject to hidden privatization.¹⁶⁴ The opacity surrounding the extent to which the private sector shapes these norms makes it difficult for the public to understand the underlying values at play or the ‘value trade-offs’ being made.¹⁶⁵ There are significant implications for people living in LMICs where pluralistic health systems present challenges for implementing ‘pro-equity’ strategies,¹⁶⁶ so the stereotypes perpetuated by these apps regarding sexual and reproductive bodies may be particularly harmful. Because users have a limited understanding of how these technologies operate, they are not in a position to challenge the implicit claim to authority made by algorithms relying on quantitative information. Meanwhile, on the other side of the information equation, technology providers with all kinds of intimate insights into individuals’ health profiles, sexual behaviors and preferences, and reproductive concerns have the capacity to alter the way that people approach their sexual and reproductive health.

¹⁶⁰ Deborah Lupton, *Quantified Sex: A Critical Analysis of Sexual and Reproductive Self-Tracking Using Apps*, 17 *CULTURE HEALTH & SEXUALITY* 440, 449-50 (2014).

¹⁶¹ See e.g., WHO, *Youth-Centred Digital Health Interventions: A Framework for Planning, Developing and Implementing Solutions with and for Young People 3* (2020), CC BY-NC-SA 3.0 IGO, <https://apps.who.int/iris/bitstream/handle/10665/336223/9789240011717-eng.pdf>.

¹⁶² Jessica Morley & Luciano Floridi, *Enabling Digital Health Companionship is Better than Empowerment*, 1 *THE LANCET* e155, e155-56 (2019).

¹⁶³ *Id.* at e156.

¹⁶⁴ Karen Yeung, *A Study of the Implications of Advanced Digital Technologies (including AI Systems) For the Concept of Responsibility Within a Human Rights Framework*, MSI-AUT (2018) 05, 34-35 (Nov. 9, 2018), <https://ssrn.com/abstract=3286027>.

¹⁶⁵ *Id.* at 34.

¹⁶⁶ THE WORLD HEALTH REPORT 2003, HEALTH SYSTEMS: PRINCIPLED INTEGRATED CARE, WORLD HEALTH ORGANIZATION [WHO] 122 (2003), <https://www.who.int/whr/2003/en/Chapter7.pdf>.

RECOMMENDATIONS

Supporting Greater Regulation of Online Platforms

Dr. Tedros Adhanom Ghebreyesus, Director-General of WHO, used the term ‘infodemic’ to describe the informational wars being

fought over COVID-19.¹⁶⁷ However, the pace of regulatory action in the digital health space to date has been slow.¹⁶⁸ New commercial entrants into the digital health sector have a great deal of political negotiating power because of the control they wield over information¹⁶⁹ and are seeking to mold the regulatory landscape to their advantage i.e., by promoting self-regulation. Objections to regulatory intervention are animated by concerns regarding free speech and the pluralistic values of openness, tolerance and inclusivity.¹⁷⁰ As such, regulatory behavior that is viewed as ‘censorious’ faces significant public opposition on the basis that it prohibits expression of controversial opinions.¹⁷¹ Indeed, a report produced by the Broadband Commission examined state intervention into digital disinformation on

COVID-19 and observed that many of these measures did not comply with international standards of proportionality and necessity.¹⁷² In some instances, these laws were enforced against legitimate producers of independent journalism, seriously curtailing the right to freedom of expression.¹⁷³

But given the ease with which misinformation spreads, the failure of online platforms to take sufficient steps to curb malicious SRH disinformation campaigns, the inadequacy of standalone educational interventions¹⁷⁴ and the very real threats posed by inaccurate SRH information, it is clear that state-led intervention must be part of the solution.¹⁷⁵ Specifically, regulatory action should aim to address the power disequilibrium that exists between online platforms and users by requiring providers to inform users about how and why certain SRH content is made available to them. International organizations such as the UN and

¹⁶⁷ Tedros Adhanom Ghebreyesus, Speech of WHO Director-General at Munich Security Conference (Feb. 15, 2020), <https://www.who.int/director-general/speeches/detail/munich-security-conference>.

¹⁶⁸ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 1 (2020). Morley and colleagues have identified four key interrelated justifications for the lack of state intervention thus far in relation to digital health: paternalism, autonomy, freedom of speech and plurality.

¹⁶⁹ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 GLOBALIZATION & HEALTH 1, 7 (2017).

¹⁷⁰ Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 4 (2020).

¹⁷¹ *Id.*

¹⁷² BROADBAND COMMISSION FOR SUSTAINABLE DEVELOPMENT, BALANCING ACT: COUNTERING DIGITAL DISINFORMATION WHILE RESPECTING FREEDOM OF EXPRESSION, BROADBAND COMMISSION RESEARCH REPORT ON ‘FREEDOM OF EXPRESSION AND ADDRESSING DISINFORMATION ON THE INTERNET’ 110 (Kalina Bontcheva & Julie Posetti eds., 2020), https://www.broadbandcommission.org/Documents/working-groups/FoE_Disinfo_Report.pdf.

¹⁷³ *Id.*

¹⁷⁴ See, e.g., Jessica Morley et al., *Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health*, 22 J. MED. INTERNET. RES. e19311, at 1, p. 5 (2020) (arguing that education alone is insufficient as research has demonstrated that educational interventions in the vaccination misinformation space had the unintended consequence of reinforcing inaccurate beliefs.)

¹⁷⁵ *Id.* (arguing that it is ‘reasonable to make an ethically-sound case’ for regulating health misinformation online as other areas have witnessed aggressive content moderation, especially in the aftermath of the last two US elections.)

WHO can support this through 'collective action' and by lobbying national governments to 'secure a safe space for the health-related internet that abides by ethical principles, practices, and rules that honor public health interests' and guarantees the veracity of SRH information found online.¹⁷⁶ Acknowledging that the right to health, and more specifically the right to sexual and reproductive health, includes the right to accurate information (as is recognized by the SDGs) should be a priority of international human rights and health-focused organizations.¹⁷⁷

In December 2020, the European Union Commission introduced a draft legislative package that would regulate online intermediary services and impose, among other things, transparency obligations requiring providers to disclose information regarding the operation of targeted advertising and algorithmic processes.¹⁷⁸ Similar regulatory action is needed in LMICs. In supporting such action, international organizations have a critical standard-setting function to fulfil in developing guidelines and principles for regulatory action that demands greater transparency from providers while respecting freedom of expression. Such transparency obligations should be proportionate to the power and influence that respective platforms wield over information consumption¹⁷⁹ and the parameters should be determined by reference to the risk posed by different types of misinformation. In the SRH sphere, because of the way in which targeted advertising is manipulated by anti-abortion actors, enforcing requirements that platforms 'disclose in real time the advertisements viewed on their services', along with information including the advertiser, selection criteria for targeting recipients and revenues,¹⁸⁰ may be particularly relevant.

Developing Transparent and Reliable SRH Information Platforms

In response to free speech concerns, the Broadband Commission suggests balancing restrictive measures with enabling measures that promote the flow of accurate information in online spaces.¹⁸¹ These initiatives mostly take the form of counter-disinformation campaigns.¹⁸² The initiative most pertinent to this discussion is 'Verified', a platform launched by the United Nations that aims to increase the volume and reach of accurate COVID-19 related information.¹⁸³ A similar initiative in the SRH space could be an effective means of facilitating access to reliable content on SRH issues, ensuring that users can identify the

¹⁷⁶ *Id.* at pp. 1, 9. Tim Ken Mackey et al, *Health Domains for Sale: The Need for Global Health Internet Governance*, 16 J. MED. INTERNET RES. e62, p. 8 (2008).

¹⁷⁷ Tim Ken Mackey et al, *Health Domains for Sale: The Need for Global Health Internet Governance*, 16 J. MED. INTERNET RES. e62, p. 8 (2008).

¹⁷⁸ See *Proposal for a Regulation of the European Parliament and of the Council on a Single Market for Digital Services (Digital Services Act) and amending Directive 2000/31/EC*, COM (2020) 825 final (Dec. 15, 2020).

¹⁷⁹ FORUM ON INFORMATION & DEMOCRACY, WORKING GROUP ON INFODEMICS: POLICY FRAMEWORK 21 (Nov. 2020), https://informationdemocracy.org/wp-content/uploads/2020/11/ForumID_Report-on-infodemics_101120.pdf.

¹⁸⁰ *Id.* at 30-31.

¹⁸¹ BROADBAND COMMISSION FOR SUSTAINABLE DEVELOPMENT, BALANCING ACT: COUNTERING DIGITAL DISINFORMATION WHILE RESPECTING FREEDOM OF EXPRESSION, BROADBAND COMMISSION RESEARCH REPORT ON 'FREEDOM OF EXPRESSION AND ADDRESSING DISINFORMATION ON THE INTERNET' 112 (Kalina Bontcheva & Julie Posetti eds., 2020), https://www.broadbandcommission.org/Documents/working-groups/FoE_Disinfo_Report.pdf.

¹⁸² Some examples include the UN Global Pulse teams, who are developing analytics tools, methodologies and frameworks to assist the UN in understanding the operational contexts in which disinformation is disseminated and received by audiences. In addition, UNESCO published two policy briefs analyzing the 'disinfodemic' and dissecting responses to COVID-19 disinformation. They also launched a mobile e-learning tool that allows users to test their level of disinformation literacy.

¹⁸³ UN Department of Global Communications, Verified Initiative Aims to Flood Digital Space with Facts Amid COVID-19 Crisis, (May 28, 2020), <https://www.un.org/en/coronavirus/%E2%80%98verified%E2%80%99-initiative-aims-flood-digital-space-facts-amid-covid-19-crisis>.

source of health information that they are consuming and, importantly, diminishing the control that commercial online platforms wield over users' informational environment by providing a trustworthy alternative.

Recent research suggests counter-disinformation campaigns should focus on providing detailed, alternative accounts to inaccurate online content rather than simply refuting or debunking false information.¹⁸⁴ Studies have found that retracting misinformation is 'notoriously ineffective'¹⁸⁵ because once people have processed information that they perceive as somewhat credible it is very difficult to roll it back.¹⁸⁶ Ulrick Ecker explains that individuals generally create mental models to make sense of the world. Retracting dis- or misinformation that constitutes a critical component of that mental model leaves a gap that can be very disruptive for peoples' cognitive processes.¹⁸⁷ The solution is to present plausible counter-messages that effectively fill that gap.¹⁸⁸ There are still limitations to this approach, namely that the counter-message may be overly convoluted or it is rejected because it doesn't align with someone's worldview.¹⁸⁹ But building platforms that dedicate attention and resources to constructing truthful counter-narratives regarding issues like menstruation, pregnancy, family planning and HIV would be a promising starting point. This is particularly true given the highly politicized nature of SRH, where actors have a range of incentives to perpetuate false messages about sexual behavior and reproductive health.¹⁹⁰ The existence of platforms that provide information from sources that are readily identifiable as credible and trustworthy will hopefully assist users in making informed decisions regarding the reliability of SRH information and ease their reliance on commercial providers.

In addition, inoculating individuals against the manipulation techniques underpinning disinformation campaigns may allow people to, using a virus analogy, develop their own 'antibodies'.¹⁹¹ A platform similar to Verified may do this by producing content that educates people about the strategies adopted by actors responsible for disseminating misleading content about sex and reproduction. This is referred to as 'active inoculation'.¹⁹² Alternatives to the existing commercialized and commodified online platforms that place a greater emphasis on privacy and data security would also enable users to exercise more control over their personal data.¹⁹³ Such platforms should be a collaborative effort and be rolled out in conjunction with education

¹⁸⁴ Ulrick K. H. Ecker, *Why Rebuttals May Not Work: The Psychology of Misinformation*, 44 MEDIA ASIA 79 (2017); BROADBAND COMMISSION FOR SUSTAINABLE DEVELOPMENT, BALANCING ACT: COUNTERING DIGITAL DISINFORMATION WHILE RESPECTING FREEDOM OF EXPRESSION, BROADBAND COMMISSION RESEARCH REPORT ON 'FREEDOM OF EXPRESSION AND ADDRESSING DISINFORMATION ON THE INTERNET' 121 (Kalina Bontcheva & Julie Posetti eds., 2020), https://www.broadbandcommission.org/Documents/working-groups/FoE_Disinfo_Report.pdf.

¹⁸⁵ Ulrick K. H. Ecker, *Why Rebuttals May Not Work: The Psychology of Misinformation*, 44 MEDIA ASIA 79, 80 (2017).

¹⁸⁶ *Id.* at 81.

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* at 82. See also Man-Pui Sally Chan et al., *Debunking: A Meta-Analysis of the Psychological Efficacy of Messages Countering Misinformation*, 28 PSYCHOL. SCI. 1531 (2017).

¹⁸⁹ Ulrick K. H. Ecker, *Why Rebuttals May Not Work: The Psychology of Misinformation*, 44 MEDIA ASIA 79, 82 (2017).

¹⁹⁰ See PRIVACY INTERNATIONAL, A DOCUMENTATION OF DATA EXPLOITATION IN SEXUAL AND REPRODUCTIVE RIGHTS 66 (Apr. 2020), <https://privacyinternational.org/long-read/3669/documentation-data-exploitation-sexual-and-reproductive-rights>.

¹⁹¹ Sander van der Linden et al., *Inoculating Against Fake News About COVID-19*, 11 FRONTIERS IN PSYCHOL. 1, 3 (2020).

¹⁹² *Id.*

¹⁹³ Deborah Lupton, *Health Promotion in the Digital Era: A Critical Commentary*, 30 HEALTH PROMOTION INT. 174, 181 (2014).

campaigns aimed at increasing digital health literacy, private sector initiatives that flag¹⁹⁴ or remove false information on existing platforms and regulatory action that respects freedom of expression.

Regulating for Greater Algorithmic Transparency

Given the influence exercised by technology providers in the digital health sphere, the ability of users to interpret and understand machine learning models is critical when exercising their sexual and reproductive rights. The General Data Protection Regulations ('GDPR'), which are often referred to as the 'gold standard'¹⁹⁵ of data protection frameworks, provides for what Bryce Goodman and Seth Flaxman have termed a 'right to explanation'.¹⁹⁶ The parameters of this right are still to be determined.¹⁹⁷ More specifically, Articles 13 to 15 of the GDPR requires data controllers to inform data subjects of, among other things, the controller's identity and contact details, the purpose and legal basis of data processing, recipients of the data and the right of access or erasure. In the automated decision-making and profiling context, data subjects are entitled to 'meaningful information'¹⁹⁸ about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject'.¹⁹⁹

Some scholars query whether a right to explanation risks creating a 'meaningless transparency paradigm'²⁰⁰ because the complex architecture of algorithms and their training models are often not interpretable in a way that is intelligible to the average layperson.²⁰¹ Humans lack the 'mental vocabulary of categories and concepts' to fully grasp multi-dimensional machine learning tasks with a large array of variables.²⁰² Moreover, the creation of simplified machine learning models that are more conducive to explanation may result in a performance-explicability trade-off.²⁰³ Edwards and Veale also point out that explanations may be unsatisfactory for users who provided inputs that are statistically anomalous relative to the dataset on which the system was

¹⁹⁴ Research has found that 'preemptive debunking' such as warnings may inoculate individuals against certain types of misinformation. See Sander van der Linden et al., *Inoculating Against Fake News About COVID-19*, 11 FRONTIERS IN PSYCHOL. 1, 3 (2020).

¹⁹⁵ Giovanni Buttarelli, *The EU GDPR As a Clarion Call For a New Global Digital Gold Standard*, EDPS (Apr. 1, 2016), https://edps.europa.eu/press-publications/press-news/blog/eu-gdpr-clarion-call-new-global-digital-gold-standard_fr.

¹⁹⁶ Bryce Goodman & Seth Flaxman, *European Union Regulations on Algorithmic Decision Making and a "Right to Explanation"*, 38 AI MAGAZINE 50 (2017).

¹⁹⁷ I. van Ooijen & Helena U. Vrabec, *Does the GDPR Enhance Consumers' Control Over Personal Data: An Analysis From a Behavioral Perspective*, 42 J. CONSUMER POL'Y 91, 96 (2019).

¹⁹⁸ There is scholarly debate as to whether 'meaningful information' refers only to a general overview of algorithmic decision-making or whether it requires the provision of more detailed information about individual decisions. See, e.g., Margot E. Kaminski, *The Right to Explanation, Explained*, 34 BERKELEY TECH. L. J. 189, 199-200 (2019) (arguing that when the text of the GDPR is read alongside the Working Party Guidelines and Recital 71, it creates a right to explanation of an individual decision.). See also I. van Ooijen & Helena U. Vrabec, *Does the GDPR Enhance Consumers' Control Over Personal Data: An Analysis From a Behavioral Perspective*, 42 J. CONSUMER POL'Y 91, 96-97 (2019) (arguing that it is not entirely clear whether the GDPR creates an ex post, as well as an ex ante, right to explanation leading to confusion as to when a right to explanation can be triggered.)

¹⁹⁹ GDPR, Article 13.

²⁰⁰ Lillian Edwards & Michael Veale, *Slave To The Algorithm? Why a 'Right to an Explanation' is Probably Not the Remedy You Are Looking For*, 16 DUKE L. & TECH. REV. 18, 23 (2019).

²⁰¹ See, e.g., Jenna Burrell, *How the Machine 'Thinks': Understanding Opacity in Machine Learning Algorithms*, BIG DATA & Soc'y 1, 2 (2016) (identifying one of the key categories of algorithmic opacity as the 'mismatch between the mathematical optimization in high-dimensionality characteristic of machine learning and the demands of human-scale reasoning and styles of semantic interpretation'.)

²⁰² Lillian Edwards & Michael Veale, *Slave To The Algorithm? Why a 'Right to an Explanation' is Probably Not the Remedy You Are Looking For*, 16 DUKE L. & TECH. REV. 18, 60 (2019).

²⁰³ *Id.* at 59.

trained.²⁰⁴ This is the case because interpretable machine learning models may struggle to capture complex outlier cases. Some menstrual cycle-tracking apps, for example, use AI to predict a user's next period. However, users with health conditions like PCOS may have irregular cycles that apps are unable to predict with any precision.²⁰⁵

While the complexity of algorithmic processes complicates regulatory attempts to secure greater transparency and accountability for users of digital technologies, regulatory intervention can still serve a very important function – requiring that technology providers make the basic contours accessible to users. The right to explanation potentially offers a novel legal mechanism for creating more transparency around algorithmic decision-making processes. One scholar argues that it requires ‘understandable (or “legible”), meaningful, and actionable’ communication regarding algorithmic decision-making.²⁰⁶ As Yukti Sharma and colleagues assert, there are varying levels of explainability and what is appropriate in any given context depends on contextual factors like risk, for whom the technology is being made explainable and why, the rights and regulations the application of AI engages with and other operational factors.²⁰⁷ Developing regulatory frameworks that strike a balance between accuracy and explainability and require technology providers to provide a ‘reasonable’ explanation in the circumstances²⁰⁸ should be prioritized, especially in LMICs where there is a conspicuous absence of enforceable regulatory mechanisms.

Broadly, international organizations should encourage national governments to play an active role in creating enhanced regulatory regimes that correct the power imbalance generated by information asymmetries between users and platform providers. Embedding digital health technologies within a robust regulatory framework is critical in guaranteeing accountability. More specifically, international organizations should consider how to guide the development and implementation of regulatory frameworks in LMICs in a way that emphasizes a right to meaningful explanation relative to context.²⁰⁹ The G20 Artificial Intelligence Principles specifically identify transparency and explainability as a key principle in advancing trustworthy AI.²¹⁰ These value-based and human-centered principles encourage member states to adopt measures that facilitate responsible disclosure regarding AI systems.²¹¹ This requires the provision of information that is ‘meaningful’, ‘appropriate to the context’ and ‘consistent with the state of art’.²¹² International organizations can work on further developing guidance as to what ‘reasonable explainability’²¹³ means from a regulatory perspective and what transparency requirements should be imposed on providers.

²⁰⁴ *Id.* at 60-61.

²⁰⁵ Jenny McGrath, *With Period-Tracking Apps, The Fate of Your Fertility Is Far From Clear*, DIGITAL TRENDS (Sep. 2, 2019), <https://www.digitaltrends.com/mobile/the-problems-and-promises-of-period-tracking-apps/>.

²⁰⁶ Margot E. Kaminski, *The Right to Explanation, Explained*, 34 BERKELEY TECH. L. J. 189, 213 (2019).

²⁰⁷ Yukti Sharma et al., ‘Reasonable Explainability’ for Regulating AI in Health, ORF ISSUE BRIEF NO. 401, 4-5 (2020), https://www.orfonline.org/wp-content/uploads/2020/09/ORF_IssueBrief_401_Explainability.pdf.

²⁰⁸ *Id.* at 3.

²⁰⁹ There are some existing data protection frameworks in LMIC regions, most of which are non-binding, that refer to ‘transparency’ as a guiding principle in personal data processing but do not explicitly establish a right to explanation (e.g., African Union Convention on Cyber Security and Personal Data Protection.)

²¹⁰ G20 MINISTERIAL STATEMENT ON TRADE AND DIGITAL ECONOMY, <https://www.mofa.go.jp/files/000486596.pdf> (last visited Dec. 29, 2020). *See also* OECD, *Recommendation of the Council on Artificial Intelligence*, OECD/Legal/0449 (May 21, 2019), <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449>.

²¹¹ G20 MINISTERIAL STATEMENT ON TRADE AND DIGITAL ECONOMY, <https://www.mofa.go.jp/files/000486596.pdf> (last visited Dec. 29, 2020)

²¹² *Id.*

²¹³ Yukti Sharma et al., ‘Reasonable Explainability’ for Regulating AI in Health, ORF ISSUE BRIEF NO. 401 (2020), https://www.orfonline.org/wp-content/uploads/2020/09/ORF_IssueBrief_401_Explainability.pdf.

A necessary part of that process involves coordinated, multilateral efforts to support countries and/or regions in developing policy frameworks (i.e., national strategies) that prioritize ‘reasonable explainability’ in the digital health space and are anchored in the G20 principles regarding transparency and explainability. The primary benefits of policy documents such as these are that they articulate a coherent strategy, identify objectives and offer mechanisms for implementation. In addition, they serve as a useful tool to guide specific regulatory action to reduce information asymmetries between technology providers and users by cementing a right to context-appropriate meaningful explanation. Support can take the form of progress reports, evaluation mechanisms for assessing implementation and impact, and technical frameworks for states to prepare strategies. Similar initiatives have been carried out in the information communications technology and statistics domain upon which something like this could be modelled.²¹⁴

Algorithms as ‘Global Public Goods’

Developing algorithms and machine learning systems for use in the digital health space as ‘global public goods’ (‘GPGs’)²¹⁵ may assist in reducing the informational imbalance between technology providers and the public.²¹⁶ A 2020 report of the UN Secretary-General entitled ‘Roadmap for Digital Cooperation’ draws on this idea of digital technologies like AI as GPGs by setting out the benefits of ‘digital public goods’ for attaining the SDGs, particularly for LMICs.²¹⁷ It defines digital public goods as ‘open-source software, open data, open artificial intelligence models, open standards and open content that adhere to privacy and other applicable international and domestic laws, standards and best practices and do no harm’.²¹⁸ It uses the example of the 2014-15 Ebola crisis in West Africa to illustrate how ‘real-time and predictive insights’ generated by big data and AI helped contain the virus.²¹⁹ Algorithms as GPGs would hopefully result in new insights into how these technologies mine and process personal data to provide SRH information, advice and diagnoses, tipping the informational scales in favor of users so that they can better access the digital health knowledge economy.

From a policy perspective, one consequence of classifying something as a public good is that the state must be an active participant in its distribution.²²⁰ National governments do so by providing direct support and by creating financial incentives for the private production of public goods.²²¹ At the international level, there are obviously limitations to what individual states can

²¹⁴ One example of this is Paris21, a multilateral coalition that is guiding the development of National Strategies for the Development of Statistics in LMICs.

²¹⁵ Gerald Bloom et al., *ICTs and the Challenge of Health System Transition in Low and Middle-Income Countries*, 13 *GLOBALIZATION & HEALTH* 1, 7 (2017).

²¹⁶ Public goods have two key defining characteristics: they are non-excludable, meaning no one can be prevented from consuming them, and they are non-rival, meaning one person’s consumption does not detract from anyone else’s. Global public goods have an international reach and their benefits transcend borders. See Richard D. Smith, *Global Public Goods and Health*, 81 *BULLETIN OF THE WORLD HEALTH ORGANIZATION [WHO]* 475 (2003), <https://apps.who.int/iris/bitstream/handle/10665/268992/PMC2572508.pdf?sequence=1&isAllowed=y>.

²¹⁷ U.N. Secretary-General, *Roadmap for Digital Cooperation*, U.N. Doc. A/74/821 (May 29, 2020).

²¹⁸ *Id.* at 7 fn.18.

²¹⁹ *Id.* at 7.

²²⁰ Joseph E. Stiglitz, *Knowledge As a Global Public Good*, in *GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY* 311 (Inge Kaul et al eds., 1999).

²²¹ *Id.* at 311-313 (stating that the issuance of patents and copyright protections are mechanisms for incentivizing the private production of knowledge). It is important to note that intellectual property regimes also act as a barrier to accessing knowledge i.e., they render knowledge excludable. See U.N. Secretary-

do in terms of providing GPGs on a global scale. Thus, international organizations have a crucial role to play in facilitating access to these underlying algorithms as GPGs. In making the case for knowledge as a GPG, Joseph Stiglitz argues that GPGs provide a ‘central rationale for international collective action’.²²² Knowledge, he argues, is key to successful development²²³ and conceiving of it as a GPG enables us to better understand the ‘special responsibilities’ borne by the international community to produce and disseminate knowledge.²²⁴ International organizations like the World Bank and the UNDP operate as knowledge banks, producing and disseminating knowledge on a broad scale. Applying this reasoning to the digital health realm, it is clear that global multi-stakeholder initiatives that work on producing common standards for the sharing of open AI models and focus on transmitting technical expertise would serve an integral function in distributing knowledge regarding algorithms as a GPG. One existing example of this is the Digital Public Goods Alliance,²²⁵ which offers a platform for sharing digital public goods, pooling data and creating communities of practice.²²⁶

UN agencies and other international organizations should consider how they can make better use of their convening role to support algorithms as GPGs at the intersection of SRH and digital health. The provision of an international, multilateral platform for the sharing of knowledge regarding transparent AI and machine learning models to be used in the SRH-related technology space would be a good starting point. While there has been some discussion of algorithms as GPGs in digital health more broadly, there are currently no initiatives focused specifically on SRH and the particular risks that algorithmic opacity poses to individual rights and attainment of the SRH-related SDGs.²²⁷ Convening achieves the collective action necessary to address common challenges.²²⁸ Facilitating dialogues in the form of high-level panels, working groups and conferences that speak to how algorithms as GPGs can decrease information asymmetries between technology providers and users in the area of SRH could help to place this issue at the center of international development agendas. This will require a concentration of resources, strong leadership and sustained operational work at the country level.²²⁹

Promoting algorithms as GPGs or encouraging the creation of digital public goods does not provide a ‘silver bullet’ solution to algorithmic opacity. It is also important to acknowledge that knowledge infrastructures of different countries shape the extent to which those populations can take advantage of digital public goods, which leads to uneven distribution in

General, *Roadmap for Digital Cooperation*, U.N. Doc. A/74/821 8 (May 29, 2020). It is outside the scope of this paper to discuss the interaction between knowledge as GPG and intellectual property regimes.

²²² Joseph E. Stiglitz, *Knowledge As a Global Public Good*, in *GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY* 320 (Inge Kaul et al eds., 1999).

²²³ *Id.* at 318-20.

²²⁴ *Id.* at 320.

²²⁵ The Digital Public Goods Alliance was formed in response to recommendations issued by the Secretary-General’s High-Level Panel on Digital Cooperation.

²²⁶ See DIGITAL PUBLIC GOODS ALLIANCE, <https://digitalpublicgoods.net/> (last visited Jan. 20, 2021.)

²²⁷ There are examples of similar initiatives in other spheres such as government e.g., Data For Policy, which is a ‘global forum for interdisciplinary and cross-sector discussions around the impact and potentials of the digital revolution in the government sector’. See DATA FOR POLICY, <https://dataforpolicy.org/about/> (last visited Jan. 20, 2021.)

²²⁸ Rasmus Heltberg & Anna Aghumian, *The World Needs Better Convening That Fosters Collective Action*, BROOKINGS (Oct. 5, 2020), <https://www.brookings.edu/blog/future-development/2020/10/05/the-world-needs-better-convening-that-fosters-collective-action/>.

²²⁹ *Id.*

geographic terms.²³⁰ The amount of tools, education and resources needed to exploit the 'basin of [freely available] knowledge' are non-trivial for many LMICs.²³¹ But the transition from an industry-led system to one that involves significant participation by governments, UN agencies and international coalitions will ideally prompt a paradigm shift that emphasizes international cooperation, state-sponsored initiatives and greater public support for private development of algorithms as GPGs.

²³⁰ Joseph E. Stiglitz, *Knowledge As a Global Public Good*, in GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY 317-18 (Inge Kaul et al eds., 1999); U.N. Secretary-General, *Roadmap for Digital Cooperation*, U.N. Doc. A/74/821 8 (May 29, 2020); UNIDO, PUBLIC GOODS FOR ECONOMIC DEVELOPMENT 84-85 (2008), https://www.unido.org/sites/default/files/2009-02/Public%20goods%20for%20economic%20development_sale_0.pdf.

²³¹ UNIDO, PUBLIC GOODS FOR ECONOMIC DEVELOPMENT, at 85, U.N. Sales No. E.08.II.B36 (2008).

CONCLUSION

Digital technologies have become a necessary part of the way that people access SRH information and care. Indeed, they increasingly play a crucial role in the dissemination of health knowledge and enable at-risk populations to bypass human intermediaries that may restrict access to pertinent SRH information. But information asymmetries between users and technology providers conceal the extent to which digital platforms like social media websites and smartphone apps are commodified spaces that are 'bent to commercial interests'.²³² There are some serious rights-based and ethical concerns arising from this that affect attainment of the SRH-related SDGs and implicate broader human rights such as the right to health, the right to privacy, the right to informational self-determination, the right to freedom of expression and the right to non-discrimination. By replacing traditional information gatekeepers, technology providers have the capacity to control the flow of SRH information and make normative decisions regarding public health values in a way that is opaque to users. They have also amassed enormous volumes of personal data, which not only infringes upon individual rights but threatens the socio-technical foundations of the human rights framework. International organizations must be cognizant of the threats presented by digital technologies in the SRH realm and leverage their role as global conveners, facilitators and standard setters to support both regulatory and non-regulatory action that reduce information disparities between technology providers and users.

²³² Deborah Lupton, *Health Promotion in the Digital Era: A Critical Commentary*, 30 HEALTH PROMOTION INT. 174, 180 (2014).

For more information: www.undp.org/

United Nations Development Programme

One United Nations Plaza • New York, NY 10017 USA