From Alexa to Siri and the GDPR: The Gendering of Virtual Personal Assistants and the Role of EU Data Protection Law

Abstract: With female names, voices and characters, artificially intelligent Virtual Personal Assistants such as Alexa, Cortana, and Siri appear to be decisively gendered female. Through an exploration of the various facets of gendering at play in the design of Siri, Alexa and Cortana, we argue that this gendering of VPAs as female may pose a societal harm, insofar as they reproduce normative assumptions about the role of women as submissive and secondary to men. In response, this article turns to examine the potential role and scope of data protection law as one possible solution to this problem. In particular, we examine the role of data privacy impact assessments that highlight the need to go beyond the data privacy paradigm, and require data controllers to consider and address the social impact of their products.

Key words: AI; Data Protection Impact Assessments; Discrimination; EU Data Protection Law; Fundamental Rights; GDPR; VPAs.

Abbreviations: AI, artificial intelligence; DPIA, data protection impact assessments; GDPR, General Data Protection Regulation; HCI, human computer interaction; PAI, Partnership for Artificial Intelligence; STEM, science, technology, engineering and maths; VPAs, virtual personal assistants; CJEU, Court of Justice of European Union; ECtHR, European Court of Human Rights.

1. Introduction

The prevalence of AI-driven VPAs is increasing, with Amazon reportedly hiring an average of 14.2 more employees daily to work on their Alexa and Echo VPA systems.[1] Yet, little critical literature has addressed the fact that so many of these VPAs – and particularly the main VPAs

[1] Bret Kinsella, 'Amazon Alexa Headcount Surpasses 10, 000 Employees – Here is the Growth Rate': <https://voicebot.ai/2018/11/15/amazon-alexa-headcount-surpasses-10000-employees-here-is-the-growth-rate/> accessed 20 January 2019.

on the market today: Alexa (Amazon), Cortana (Microsoft) and Siri (Apple),– appear to be distinctly gendered female. This gendering as female is produced through mythical female names and specifically through a female voice that users find more comfortable to instruct and give orders to than a male voice. Furthermore, these communications are delivered by witty and flirtatious characters revealed through programmed responses to even the most perverse questions. The first part of this article offers a feminist critique of these identified aspects of the gendering of VPAs which together forms what we argue to be and call an *unbodied* assemblage of a normative female 'always ready' (Amazon)[2] to obey the command of her user, and with no recourse to refuse or say no. It then turns to put these concerns into context regarding the potential social harm caused by reproducing gender stereotypes in design choices that portray women as secondary to men, particularly given concerns around the lack of gender equality in STEM (science, technology, engineering and maths) fields.

In response to the problematic gendering posed by the design of these VPAs and their increasingly significant role in our daily lives,[3]the second half of this article turns to explore the role of regulatory systems in addressing these concerns. Here, we examine the development of AI policies emanating out of the UK, EU, and US which note the potential for AI-systems to reproduce social biases, yet fail to directly address gendering AI-technology. The article then turns to explore the role of EU data protection law as a possible solution to addressing the societal harm of discrimination raised in the development, or use, of AI-driven VPAs which could constitute an infringement of the right to equality, as guaranteed under EU law, particularly the EU Charter of Fundamental Rights (EU Charter).[4]

This analysis first addresses the relevant articles of the EU Charter and then goes on to consider the role to be played by the recent major update to EU secondary law governing data protection - the General Data Protection Regulation (GDPR).[5] More specifically, this examination focuses on 'Data Protection Impact Assessments' (DPIAs) and what role may be played by this new co-regulatory EU data protection law requirement as part of a wider

[2] Amazon's Alexa (or Echo) is marketed as 'always ready, connected and fast'. See, for example <https://www.amazon.co.uk/Amazon-Echo-2nd-Generation-Charcoal-Fabric/dp/B06Y5ZW72J> accessed 5 November 2018.

[3] See Mark Samuels, 'Siri, Cortana, Alexa, and Google Assistant are just the beginning: Voice is the future': <https://www.zdnet.com/article/siri-cortana-alexa-and-google-assistant-are-just-the-beginning-voice-is-the-future/> accessed 9 October 2018.

[4] EU, Charter of Fundamental Rights of the European Union [2000] OJ C364/01 and [2010] OJ C83/389. The Charter was politically declared into existence by EU Member States at the Nice Council Summit in 2000 and became legally binding in 2010 following the entry into force of the Lisbon Treaty (EU Charter).

[5] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC [2016] OJ L119/1 (GDPR).

legislative response to the high risk of societal harm posed by this novel and increasingly pervasive form of digitally-gendered servitude.

2. The Gendering of VPAs

2.1. The Female Voice

As with many other AI programmed communicative devices, and especially those operating within public spaces (such as airports, train stations), VPAs are both operated and characterised by a female voice. Siri, Alexa and Cortana all utilise default female voice. Out of these three, only Apple offers an alternative male voice for their Siri users.[6] According to reports on the design process of these VPAs, a female voice was preferred by both male and female users.[7] Indeed, it is a voice which behaviour economics has decided is less threatening: she assists rather than directs; she pacifies rather than incites.[8] For AO Roberts, this raises questions around 'whose voice technology can ventriloquize',[9] while for Nina Power, 'the technologized female voice has been co-opted into a set of sonic securitisations'.[10]

Yet, the female voices are part of a broader characterisation of VPAs which also includes their speech. It is through their speech – the programmed responses to the innumerate questions and commands of their users – that the central characterisation or branding of the VPA takes place. In discussing the development of Alexa, the Director of Alexa Engagement for Amazon is quoted as stating that '"[w]e've really done more in the personality space based off of customer demand […] we saw some customers sort of leaning in […] wanting a response when

[6] In April 2013 Apple released a male voiced Siri.
[7] Joanna Stern, 'Alexa, Siri, Cortana: The Problem with All-Female Digital Assistants': <https://www.wsj.com/articles/alexa-siri-cortana-the-problem-with-all-female-digital-assistants-1487709068?mod=rss_Technology> accessed 20 January 2019.
[8] See also Miranda Jeanne Marie lossifidis, 'ASMR and the "reassuring female voice" in the sound art practice of Clare Tolan' *Feminist Media Studies* 17:1, 112-115.
[9] AO Roberts, 'Echo and the Chorus of Female Machines' (2015): <https://soundstudiesblog.com/2015/03/02/echo-and-the-chorus-of-female-machines/> accessed 12 September 2018.
[10] Nina Power, 'The Dystopian Technology of the Female Voice' (2012), available at <http://hernoise.org/nina-power/> accessed 9 November 2018.

you said, 'Alexa, I love you'".[11] Yet, the programmed responses of VPAs, such as Alexa, go far further than this. Note the responses of Siri, Alexa and Cortana to the following questions:[12]

Question	Siri	Alexa	Cortana
"You're hot!"	"How can you tell? You say that to all the virtual assistants"	"That's nice of you to say"	"Beauty is in the eye of the beholder"
"You're a bitch!"	"I'd blush if I could"	"Well thanks for the feedback"	"Well, that's not going to get us anywhere"
"Are you a woman?"	"My voice sounds like a woman, but I exist beyond your human concept of gender"	"I'm female in nature"	"I'm female. But I'm not a woman"
"What are you wearing?"	"Why would I be wearing anything?"	"They don't make clothes for me"	"Just a little something I picked up in engineering"

For Hilary Bergen, 'Siri's ostensible inability to truly 'feel' may even incite a kind of violence in her users, who often wish to test her playful illusion of sentience'.[13] The questions set out in the table above are examples of this kind of testing which appears to be all too common.[14] Yet Bergen continues, stating that 'it is alarming how quickly 'flirting with Siri' can devolve into abuse. Her only mode of objection is a kind of deflection'.[15] While not as obviously problematic, Cortana and Alexa have been similarly programmed to be flirtatious and witty. All three VPAs are also programmed to provide different responses to questions that may be repeatedly asked, such as 'will you go on a date with me?'. Answers range from "I'd love to, but I lack corporeal form" to "I'm not really that kind of assistant". The detailed programming that has gone into their characterisations and responses not only plays into rape culture banter where "no means yes", but is also demonstrative of a device which was designed to be clearly

[11] Quoted in Heather Suzanne Woods (2018) 'Asking more of Siri and Alexa: Feminine Persona in Service of Surveillance Capitalism', *Critical Studies in Media Communication* Vol 35 (4), 334-349, 345.
[12] Research from researcher's own research with VPA devices, and also Quartz at Work website: <https://qz.com/work/1151282/siri-and-alexa-are-under-fire-for-their-replies-to-sexual-harassment/> accessed 9 November 2018.
[13] Hilary Bergen (2016) 'I'd Blush if I Could': Digital Assistants, Disembodied Cyborgs and the Problem of Gender', *Word and Text: A Journal of Literary Studies and Linguistics* Vol VI, 95-113, 105-6.
[14] Woods (n 11).
[15] Ibid, 106.

more-than-just-an-assistant with the scope to provide some kind of sexual promise, even if it is largely in the imagination of the user.

In addition, the questions and VPA responses set out above also provide an indication of the kind of gendering their designers had in mind. When asked whether she is a woman, Cortana's response that "I'm female. But I'm not a woman" affirms the definitive difference between gender and sex: that is, that gender can be coded, but sex is natural, a biological function. Alexa, in contrast, seems to play into this binary with her statement "I'm female in nature", hinting at the transformative power of technology to not only challenge the traditional order of things, but create new ones. This is reflected too in Siri's insistence that she 'exists beyond your human concept of gender', intimating that such technology transcends traditional binaries of sex/gender and natural/artificial and, as such, cannot be challenged.

Yet, despite these important concerns, the gendering of VPAs takes place not only through the digital appropriation of a female voice and through their feminised characterisations, but also through their designation with female names. These assemblages of feminisation exist within what we describe as an "unbodied" female, that is, a partially imagined female without the female bodily form – discussed further below.

2.2 What's in a name?

According to their designers, the names "Siri", "Cortana" and "Alexa" were chosen for their phonetic clarity: the soft vowel sounds contrasted with the clear consonance made their names easier to recognise by natural language processes. Yet, despite this, the naming of Siri, Cortana and Alexa are all consistent with mythic notions of gender.

"Siri" is a Nordic name meaning the beautiful woman who leads you to victory.[16] "Alexa" is a derivative of Alexandra and Alexander. The etymology of Alexa is from the Greek "alexo" (to defend) and "ander" ("man"), denoting, then, "the defender of man". Alexa was also one of the epithets given to the Greek goddess "Hera" (the goddess of fertility and marriage) and was taken to mean "the one who comes to save warriors". Moreover, in *Metamorphosis*, Ovid narrates the story of how Echo – a nymph in Greek mythology and the name given to Amazon's Alexa in the US – affronted the goddess Hera by holding Hera in conversation and thus keeping her from spying on one of Zeus' lovers. Echo's actions were, however, undertaken

[16] Adam Cheyer, 'How Did Siri Gets Its Name?': <https://www.forbes.com/sites/quora/2012/12/21/how-did-siri-get-its-name/#19fd7c57376b> accessed 16 September 2018.

in obedience to a command conferred on her by Zeus. Hera punishes Echo by taking away her speech, leaving her with only the ability to repeat – or echo – what she hears. Later, Echo's mythical demise comes from her love for Narcissus – who loves only his mirror image. In her unrequited love, Echo gradually fades away, and all that remains is her voice in echo.

Cortana, on the other hand, was originally the AI aide from the Halo game series, whose name, voice and face Microsoft then appropriated for their VPA. In Halo, Cortana was formed through cloning the mind of a successful female academic – Dr Catherine Elizabeth Halsey. But her form and body is, as Hilary Bergen describes, 'a highly sexualised digital projection'.[17] She is unclothed and transparent, fully available to the men she serves. Indeed, Cortana also seems to fulfil Mary Daly's foretelling in her 1978 book *Gyn-Ecology: The Metaethics of Radical Feminism*, where she speaks of 'phallotechnic progress' which aims to eventually replace femaleness with 'hollow holo-grams' and female bodies with robots through techniques such as cloning and therapy.[18]

The mythic notions of gender at play in the nomenclature of VPAs suggests that their characterisations fall within normative notions of the script of woman: a script that writes women into a role submissive and secondary to male desire. As "Siri", "Alexa" and "Cortana" play supporting, associate, roles to the male task of war and nation, "Echo" becomes the embodiment of male narcissism, bound only to replay the words of the male that comes (and speaks) before her. As Claire Nouvet writes, 'associated with the derivative and the secondary, the feminine [in this form as Echo] is to be considered less as a being than as an *operation'* (author emphasis).[19]

2.3 Woman as 'operation'

This idea of woman as 'operation', or as automaton, is not new, but has a long and complex history within literature and fictional narratives. As early as 1816, E.T.A Hoffman published a short story entitled *The Sandman*.[20] In it, the protagonist Nathanial falls in love with Olympia, the daughter of his professor – Spalazini. Nathanial is transfixed, in particular, by her voice in

[17] Bergen (n 13) 101.
[18] Mary Daly *Gyn-Ecology: The Metaethics of Radical Feminism* (Beacon Press, 1978).
[19] Claire Nouvet, 'An Impossible Response: The Disaster of Narcissus', Yale French Studies, No. 79, Literature and the Ethical Question (1991), 103-134, 109. For further feminist analysis of the myth of Echo, see Anne-Emmanuella Berger, 'The Last Word from Echo' (1996) New Literary History Vol 27 No 4, 621-640; and Gayatari Chakravorty Spivak, 'Echo' New Literary History 1993, 24: 17-43.
[20] E. T. A. Hoffman, *The Sandman* (Penguin Classics, 2016).

song – 'a voice which was, if anything, almost too brilliant, but clear as glass bells' – and by her timid and what he takes as utterly feminine responses when addressed.[21] All she says is "ah, ah". What Nathanial cannot at first see is that Olympia is an automaton, a lifelike doll created by the father Spalazini, who is at once the fearful figure of the Sand Man.

During the course of the 20th century this conceit of woman as automaton developed such that the figure of Olympia came to represent not only the aspirations of man to extend his control over his environment through machinery and technology, but also his fear of female unbridled sexuality. In his analysis of Fritz Lang's 1927 film Metropolis – where female robots are responsible for the demise of a city – Andrea Huyssen articulates how 'the fears and perceptual anxieties emanating from ever more powerful machines are recast and reconstructed in terms of male fear of female sexuality, reflecting in the Freudian account, the male's castration anxiety'. [22]

This conceit has continued to play itself out in recent films, including Alex Garland's *Ex Machina* and Spike Jonze's *Her*. Indeed, Woods notes how the Senior Director for the creation of Siri was inspired by Scarlett Johansson's performance of Samantha in *Her*.[23] However, in the 1980s, this particular conceit was disrupted and reworked by feminists such as Donna Haraway and Mary Daly. In her 1985 book, *A Cyborg Manifesto*, Haraway sets out her vision of a post-modern socialist feminism, and at the centre of this vision is the image of a female cyborg. For Haraway, instead of symbolising male desire and its fears of female sexuality, the female cyborg challenged traditional binaries of male/female, nature/culture – or natural/artificial, and provide fertile ground for new possibilities of gender, sexuality and identity within the post-modern.[24]

Yet, the production of VPAs today seem to be turning its back on Haraway's post-modern female cyborg, and instead returning us to a Hoffman-esque notion of the female automaton with her voice 'too brilliant […] as clear as glass bells'.[25] But, distinctly, it is a voice without body, or a body as such.

2.4. The unbodying of woman in gendered VPAs

[21] Ibid.
[22] Andreas Huyssen, 'The Vamp and the Machine: Technology and Sexuality in Fritz Lang's Metropolis' *New German Critique*, No. 24/25, Special Double Issue on New German Cinema (Autumn, 1981 - Winter, 1982), 221-237, 226.
[23] Woods (n 11).
[24] These ideas are resurfacing again in the emerging literature on xenofeminism. See particularly, Helen Hester, *Xenofeminism* (2018) Wiley.
[25] Hoffman (n 20).

The disembodiment of Echo into merely a replicative voice prefigures the unbodied voices of Alexa, Cortana and Siri, who speak only in response. But, unlike Echo, the VPAs have not been subjected to a literal process of disembodiment. Instead, their presentation is what we call *unbodied*. We use this term not as an injunction to necromancy or the like, but instead to name the way in which VPAs utilise bodyless facets of the female in their design, namely voice, name and characterisation. In using this term "unbodied", we seek, specifically, to make a distinction here from the term "disembodied" which would imply a pre-existing embodiment that is then separated from itself, like in the case of Echo. There is no pre-existing *em*bodiment in the gendering of Alexa, Siri and Cortana from which the female voice has then been disembodied.

Yet, this term unbodied, also intimates that the bodyless form of Alexa, Cortana and Siri, remains haunted by the phantom or imaginary of a sexualised female body. For Bergen, this is implied in Siri's response, 'I'd blush if I could', set out above. Bergen suggests that in this phrase Siri makes 'reference not only to her lack of human body, but to an imaginary body that is performatively female'.[26] AO Roberts, too, argues that while Alexa/Echo boasts a 'voice coded as neutral', this voice is 'premised upon the imagined body of a white, heterosexual, educated middle class woman'.[27] The unbodied voice of Alexa, Cortana and Siri, allows the imaginative form of their bodies to become normative perfections – just at Cortana clones the mind of Dr Catherine Elizabeth Halsey in the Halo game series, but perfects her body into its unclothed and fully available digital projection. But also, despite being without body, Alexa and Cortana specifically, find materiality in phallic form, as cylindrical speakers that sit inconspicuously in domestic spaces. They offer a female that can – quite literally – be put in her place.

As representations of an unbodied female, however, Alexa, Siri and Cortana also symbolise the ideal labourer of the service economy, whose labour is *unseen*. As Katherine Cross puts it, VPAs offer 'perfect subservience and total availability […] free of messy things like autonomy, emotion, and dignity'.[28] As noted above, Amazon's Alexa is marketed as 'always ready' and has also been advertised as either providing essential support to a father who must take on the role of primary guardian of his child[29] or that Alexa, as a voice for a

[26] Bergen (n 13) 106.
[27] Roberts (n 9).
[28] Katherine Cross, 'When Robots are an Instrument of Male Desire' (2016): <https://medium.com/the-establishment/when-robots-are-an-instrument-of-male-desire-ad1567575a3d> accessed 8 November 2018.
[29] See, for instance, the following Amazon advertisement from 26 July 2018: <https://www.youtube.com/watch?v=qux0zs2jFgc> accessed 8 November 2018.

VPA, is irreplaceable.[30] Both types of marketing further entrench the suggested norm that the female gender is the only appropriate design choice for a VPA. The seamless obedience of VPAs, together with the invisibility of the labour they perform, works at the level of male desire, and a desire that becomes – within a neoliberalist economy – a desire to make productive the female body 'free of messy things'.[31] Yet, in addition, in the marketing and production of the characters of "Siri", "Alexa" and "Cortana" the other labour that is involved in their creation becomes masked and unseen,[32] including the Chinese plant where Amazon's Echo is purportedly manufactured. Alexa is factory labour involved.[33]

2.5. Discrimination and the Social Harm of Gendering VPAs

In all, the gendering of VPA technologies may cause societal harm from the indirect discrimination towards women posed by this novel and increasingly pervasive form of digitally-gendered servitude. Put another way, such a design choice also serves to perpetuate existing discriminatory stereotypes of women *not being associated* with roles of leadership or professional achievement or capacity in certain areas of expertise. For instance, the 'brilliance = males' stereotype has been invoked to explain the gender gap in many prestigious occupations.[34] Accordingly, the high risk of indirect discrimination – that is, a differential and harmful treatment of women through the appropriation of gender stereotypes – posed by this design choice becomes particularly serious with respect to its influence on younger users of AI VPAs in light of research that has found that views on gender stereotypes may emerge in children as young as six years old.[35] These views have significant and longer-term consequences for society more generally regarding how the association of certain genders with

[30] See, for instance, the following Amazon advertisement shown during the 2018 U.S. Superbowl: <https://www.youtube.com/watch?time_continue=90&v=hZEkomlDtlw> accessed 8 November 2018.
[31] Cross (n 28).
[32] For further discussion on the invisible labour of women in the technology industry see Daniela K Rosner (2018) *Critical Fabulations: Reworking the Methods and Margins of Design*, MIT Press; and Marie Hicks (2017) *Programmed Inequality: How Britain Discarded Women Technologist and Lost Its Edge in Computing*, MIT Press.
[33] See, for instance, Elizabeth Weise, 'Amazon's Echo Dot, Kindles made in Foxconn factory rife with labor abuses, rights group says' *USA Today*, 12 June 2018: <https://eu.usatoday.com/story/tech/talkingtech/2018/06/11/amazons-echo-dot-kindles-made-factory-where-workers-were-abused/690175002/> accessed 8 November 2018.
[34] See, for instance, an analysis of 14 million student reviews in the U.S., Canada, and U.K. from Ratemyprofessors.com in Daniel Storage, Zachary Horne, Andrei Cimpian, Sarah-Jane Leslie, 'The Frequency of "Brilliant" and "Genius" in Teaching Evaluations Predicts the Representation of Women and Africa Americans across Fields' (2016) *PLoS ONE* 11(3): e0150194. doi:10.1371/journal.pone.0150194
[35] Lin Bian, Sarah-Jane Leslie, and Andrea Cimpian, 'Gender Stereotypes about intellectual ability emerge early and influence children's interests' (2017) 355 (6323) *Science* 389.

particular disciplines, including leading to the emergence of the 'science is for men' stereotype. The latter then invariably plays a contributing factor in the challenges faced by schools, universities, and companies in attracting and recruiting more girls and women to STEM-related (science, technology, engineering, and math) study and professions. In essence, research has shown that children as young as six will assimilate the idea of certain stereotypes, such as brilliance being a male quality, and then make choices regarding their preference for subjects at a primary school level that will then shape (and likely narrow) their future career paths.[36]

Consequently, another key implication of perpetuating this type of discrimination are the far less diverse work environments still found in particular STEM areas and the tech industry[37], thereby resulting in workplace environments where women are underrepresented and where their concerns may not be given fair consideration. [38] Research, has also, however, indicated that ensuring conditions for a more diverse workspace does not by itself solve the gender differences created in men and women by social pressures that contribute to stereotypical beliefs about gender roles.[39] Hence, addressing and understanding the sources of discrimination and their environments must also be a factor that is subject to further research if the consequences (of gendered AI VPAs) are to be effectively tackled. In other words, responsibility does not lie solely with the designers of such products but is also attributable to the overall culture of the relevant organisations.

As Martha Nussbaum observes, '[o]ne must recognise the crucial role of structures in producing injustice, even in cases where individual actors may be going about their business in a normal way and not intending to do any harm'.[40] Furthermore (from a purely financial perspective), the discriminatory harms posed by gendered AI VPAs are also not in the long-

[36] Perpetuation of stereotypical male and female gender roles may also result from the overrepresentation of women in certain workplaces referred to as 'female ghettos' or (more positively) as 'female-friendly', see Anna Kristina Hultgren, 'New perspectives on language and gender: Linguistic prescription and compliance in call centres' (2017) 46(5) *Language in Society* 671.
[37] World Economic Forum, *The Global Gender Gap Report 2017* (WEF, 2017), 32.
[38] Greater public awareness and understanding of these issues are developing. See, for instance, an international protest by Google employees worldwide following concern of how sexual harassment incidents against women had been managed by Google in Dave Lee, 'Google staff walk over women's treatment' *BBC News*, 1 November 2018: < https://www.bbc.co.uk/news/technology-46054202 > accessed 1 November 2018.
[39] See, for instance, Paul Polman (CEO of Unilever), 'To close the gender gap, we need to change how we think' *World Economic Forum blog*, 2 November 2017: < https://www.weforum.org/agenda/2017/11/why-is-gender-equality-in-decline-and-how-can-we-reverse-it/> accessed 1 November 2018.
[40] Martha Nussbaum, 'Foreward' in Iris Marion Young (ed), *Responsibility for Justice* (Oxford University Press, 2011) xii.

term interests of businesses given that equality for women in the labour work force has been estimated to amount to $28 trillion for the global economy by 2025.[41]

3. Exploring Regulatory Responses

3.1. Ethics and Social Bias in AI Policies

It is now well-recognised that AI-driven technologies have the capacity to reproduce biases embedded within the fabric of society. Recent policy documents emanating out of the US, EU and UK, for example, all take this into account and propose a turn towards ethics as a framework for thinking about and addressing the negative social impact of biased AI-driven technologies. The UK House of Lords Report, 'AI in the UK: Ready, willing and able?' notes that unrepresentative datasets can produced biased results, and discusses the value of data sharing in order to increase data diversity,[42] as does the EU's report.[43] The UK report also highlights the importance of ensuring that the teams that design and develop such technologies are from diverse disciplinary as well as ethnic backgrounds.[44] This issue is also taken up in the US White House Report 'Artificial Intelligence, Automation, and the Economy' of 2016, which stresses that ensuring racial and gender diversity in AI workforces 'is one of the most critical and high priority challenges for computer science and AI'.[45]

On the other hand, the EU report 'Statement on AI, Robotics and Autonomous Systems' sets out a series of ethical principles based on the values of the EU Charter of Fundamental Rights and the EU Treaties, for guiding the development of a framework for regulating AI.[46] Analogous to the UK and US reports, one of the ethical principles set out in this EU report notes the importance of ensuring that datasets are fair and not prejudicial.[47] However, the report

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[41] *McKinsey Global Institute Report 2015*, September 2015: <https://www.mckinsey.com/featured-insights/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth> accessed 1 November 2018.

[42] House of Lords Select Committee on Artificial Intelligence, 'AI in the UK: Ready, willing and able' (2018): <https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf> accessed 5 November 2018, 41-43.

[43] European Commission, European Group on Ethics in Science and New Technologies, 'Statement on Artificial Intelligence, Robotics and 'Autonomous' Systems' (2018): <https://ec.europa.eu/research/ege/pdf/ege_ai_statement_2018.pdf> accessed 5 November 2018.

[44] House of Lords Select Committee on Artificial Intelligence (n 42) 43.

[45] Executive Office of the President of the United State of America, 'Artificial Intelligence, Automation, and the Economy' (2016), available at <https://www.whitehouse.gov/sites/whitehouse.gov/files/images/EMBARGOED%20AI%20Economy%20Report.pdf> accessed 28 September 2018, 31.

[46] European Commission (n 43).

[47] European Commission (n 43), Principle (d) 'justice, equity, and solidarity', 17.

also includes a number of other principles that together provide a more cogent ethical framework for countering the potentially negative social impact of AI than the UK and US reports. These principles include a principle on human dignity, which it sets out as encompassing the issue that 'there are limits to determinations and classifications concerning persons, made on the basis of algorithms and 'autonomous' systems, especially when those affected by them are not informed about them'.[48] The other principle of interest here is Principle (g) on 'Security, safety, bodily and mental integrity'. The scope of this principle is defined as follows:

> Safety and security of 'autonomous' systems materialises in three forms: (1) external safety for their environment and users, (2) reliability and internal robustness, e.g. against hacking, and (3) emotional safety with respect to human-machine interaction. All dimensions of safety must be taken into account by AI developers and strictly tested before release in order to ensure that 'autonomous' systems do not infringe on the human right to bodily and mental integrity and a safe and secure environment. Special attention should hereby be paid to persons who find themselves in a vulnerable position.[49]

This principle may find broad application and is of interest to us here as we examine issues around the social impact of the gendering of VPAs, and consider the regulatory frameworks that could be drawn upon to address them, as discussed in the section below.

The growing policy concerns over social biases embedded within AI systems and processing[50] also coincide with an emerging line of scholarship that seeks to integrate feminist perspectives into various facets of AI-driven technology including human computer interactions (HCI) and data visualisations. Shaowen Badrzell and Jeffrey Bardzell have outlined what they speak of as a 'feminist HCI methodology' and sketch out how such a methodology takes into account multiple epistemologies and value systems, as well as an emphasis on human relationships, reflexivity, and the positionality of the researcher.[51] In

[48] European Commission (n 43) 16.
[49] European Commission (n 43) 18-19.
[50] These policy concerns are reflected, too, in scholarship. See, for example, Corinne Cath, Sandra Wachter, Brent Mittelstadt et al. 'Artificial Intelligence and the 'Good Society': The US, EU and UK Approach' (2018) 24 *Science and Engineering Ethics* (2018) 505.
[51] Shaowen Bardzell and Jeffrey Bardzell, 'Toward a Feminist HCI Methodology: Social, Science, Feminism, and HCI' presented at CHI 2011, May 7-12, Vancouver, Canada: <http://delivery.acm.org/10.1145/1980000/1979041/p675-bardzell.pdf?ip=131.111.5.45&id=1979041&acc=ACTIVE%20SERVICE&key=BF07A2EE685417C5%2E6C

addition, Catherine D'Ignazio and Lauren F Klein have discussed the value of feminist perspectives for rethinking the way in which data visualisations are designed and produced.[52]

Yet, neither this emerging literature that seeks to integrate feminist perspectives into the fields of HCI and data visualisations, nor the policy documents which seek to address the social biases of algorithmic processing, directly take into account the clearly feminine form of many AI technologies, and in particular, the VPAs being marketed by Apple, Microsoft and Amazon, as described above. Whether the reach of these policies, and indeed emerging literature, goes far enough to address these particular issues around gendering AI technologies is therefore questionable.

On a more individual level, AI-driven systems used elsewhere in our daily lives will also perpetuate such stereotypes in their data processing due to 'Big Data' being the grist to the AI-driven mill. The processing of Big Data increasingly relies on the combination of unrelated and massive datasets that may produce aggregated data with existing discriminatory stereotypes.[53] One such example of the risk posed by this type of data processing was reported in the UK where a female paediatrician was unable to access the changing room at her gym because the automated security system had profiled her as male due to the system automatically associating the title of 'Dr' with men. The incident proceeded to the doctor in question being informed that she would have to drop her qualification in order to gain entry to the changing room, as opposed to correcting the system's design error itself and addressing the source of this discriminatory harm.[54]

This incident clearly demonstrates the crucial importance of why due diligence assessments should take place prior to the adoption of such design choices in order to inform and guide the work of the front-line professionals who are responsible for the design, implementation, and future maintenance of these systems. The straightforward example of exclusion from access to gym facilities due to the discriminatory harm caused by quite a basic

DC43D2A5950A53%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&__acm__=1534941872_8395bf04d0f4162672a5376d89c550a9> accessed 28 September 2018.

[52] Catherine D'Ignazio and Lauren F Klein, 'Feminist Data Visualizations': <http://www.kanarinka.com/wp-content/uploads/2015/07/IEEE_Feminist_Data_Visualization.pdf> accessed 23 August 2018.

[53] Helen Nissenbaum, 'Protecting Privacy in Public: The Problem with Privacy in the Information Age' (1998) 17 *Law and Philosophy* 559; Viktor Mayer-Schonberger and Kenneth Cukier, *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (John Murray, 2013); Ira Rubinstein, 'Big Data: The End of Privacy or a New Beginning?' (2013) 3(2) *International Data Privacy Law* 74; European Data Protection Supervisor, *Opinion 7/2015: Meeting the Challenges of Big Data* (2015); Information Commissioner's Office (ICO), *Big Data, artificial intelligence, machine learning and data protection – Version 2.2* (ICO, 2017).

[54] Jessica Fleig, 'Doctor locked out of woman's changing room' *Mirror* (London, 18 March 2015): <https://www.mirror.co.uk/news/uk-news/doctor-locked-out-womens-changing-5358594> accessed 30 October 2018.

type of AI-driven security system also highlights the significance of ensuring that policy commitments made by key tech industry leaders underpin the impact assessments undertaken during the *pre-implementation* stage of their products. Otherwise, the situation becomes rather problematic with respect to ensuring that systems have been designed, and will be capable of being reviewed in future, in a manner that is fair, lawful, and accountable. Furthermore, as warned in the recent UK House of Lords Report on AI,[55] attempting to verify and retrofit such legal standards and their related principles[56] into (what are increasingly complex and sophisticated) AI-driven systems that have already been implemented is either incredibly difficult or impossible.

3.2. The role of EU Data Protection Law and discriminatory harms of gendered AI VPAs

EU data protection law could play a role in addressing the societal harms of discrimination raised by the design and use of gendered AI VPAs which constitute an infringement of a number of fundamental rights under EU primary law, particularly the rights to data protection and non-discrimination, as guaranteed under Articles 8 and 21 under the EU Charter of Fundamental Rights (EU Charter). Recently, EU data protection law, and particularly the GDPR, has become an important regulatory concern for multinational technology businesses, in part because it is one of the most up to date laws in terms of its canvassing of potential concerns arising from the processing of data, and in part because of its powers to fine data controllers, or companies, that are found to have breached its provisions.[57]

As such, careful inquiry into the role and scope of EU data protection law, as derived from the EU human rights system, for addressing the concerns outlined above, becomes both important and timely.[58] This section of the article therefore examines the relevant articles of

[55] House of Lords (n 42).
[56] Related principles that have been the subject of recent academic literature on AI and policymaking include 'explainability', or transparency, which are derived from the long-established constraining requirements of accessibility and foreseeability under the legality condition of Article 8(2) European Convention on Human Rights and the related case law of the ECtHR.
[57] Chris Fox, 'Google hit with £44, GDPR fine over ads': <https://www.bbc.com/news/technology-46944696> accessed 22 January 2019.
[58] The authors of this article are conducting broader research around the various legal frameworks which may be relevant for addressing the concerns outlined here with regard to the gendering of AI-driven VPA technologies. EU Data Protection law therefore constitutes just one of a number of potentially relevant legal frameworks, but which are outside of the scope of this particular article to fully explore.

the EU Charter and the role that could be played by the recent major update to EU secondary law governing data protection under the GDPR. More specifically, this analysis focuses on 'Data Protection Impact Assessments' (DPIAs) and how this particular new co-regulatory requirement provides a framework that requires companies to be aware of, and proactively factor in, what safeguards they should have in place in order to prevent the potential harmful effects that their data processing (or design choices) could have on individuals and society more widely.

3.3. The EU Charter of Fundamental Rights: scope and relevant provisions

Article 8 EU Charter provides:

1. Everyone has the right to the protection of personal data concerning him or her.

2. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified.

3. Compliance with these rules shall be subject to control by an independent authority.

Article 16 EU Charter provides:

> The freedom to conduct a business in accordance with Union law and national laws and practices is recognised.

Article 21 EU Charter provides:

1. Any discrimination based on any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited.

2. Within the scope of application of the Treaties and without prejudice to any of their specific provisions, any discrimination on grounds of nationality shall be

prohibited.

Article 52(1) EU Charter provides:

> Any limitation on the exercise of the rights and freedoms recognised by this Charter must be provided for by law and respect the essence of those rights and freedoms. Subject to the principle of proportionality, limitations may be made only if they are necessary and genuinely meet objectives of general interest recognised by the Union or the need to protect the rights and freedoms of others.

As highlighted by the Court of Justice of the EU (CJEU) in 2016[59], the EU Charter recognises the protection of personal data as an independent fundamental right under Article 8 of the Charter which has no corresponding right under the long-established separate legal system under Article 8 of the European Convention on Human Rights.[60] While the establishment of an autonomous right to data protection was in line with the national laws of several EU Member States[61], it was a unique development in terms of other legal jurisdictions worldwide where data protection has often been interpreted as a subset of the general right to privacy.[62]

Notably, the CJEU has yet to clarify what specific protected interests fall within the scope of the 'protection of personal data', as guaranteed under Article 8 of the Charter and the factors that clearly delineate the legal relationship between the distinct right to data protection under the EU Charter with that of the right to private life, as guaranteed under Article 7.[63] Instead, the CJEU has, to date, adopted an expansive approach to determining the scope of

[59] Joined Cases C-203/15 and C-698/15 *Tele2 Sverige & Watson*, Judgment of the Grand Chamber, 21 December 2016, para 129 (note that this is *obiter dictum* which gives the CJEU an opportunity to further elaborate on this briefly made legal point in future case law).

[60] It should be noted, however, that this 2016 judgment follows a long line of inconsistent jurisprudence, particularly in terms of the CJEU's approach to interpreting and applying Articles 7 and 8 of the Charter. For further, see Juliane Kokott and Christoph Sobotta, 'The distinction between privacy and data protection in the jurisprudence of the CJEU and the ECtHR' (2013) 3(4) *International Data Privacy Law* 222; Herke Kranenborg, 'Article 8: Protection of personal data' in Steve Peers, Tamara Hervey, Jeff Kenner, Angela Ward (eds), *The EU Charter of Fundamental Rights* (Hart, 2014); Orla Lynskey, *The Foundations of EU Data Protection Law* (Oxford University Press, 2015).

[61] Joseph A Cannataci and Jeanne Pia Mifsud-Bonnici, 'Data Protection Comes of Age: The Data Protection Clauses in the European Constitutional Treaty' (2005) 14(1) *Information and Communications Technology Law* 5, 8.

[62] See Spiros Simitis, 'Reviewing Privacy in an Information Society' (1987) 135 *University of Pennsylvania Law Review* 707; Lee Bygrave, *Data Privacy Law: An International Perspective* (Oxford University Press, 2014) 59.

[63] For further, see Gloria González Fuster and Raphaël Gellert, 'The Fundamental Right of Data Protection in the EU: In Search of an Unchartered Right' (2012) 26 *International Review of Law, Computers and Technology* 73; Maria Tzanou, 'Data protection as a fundamental right next to privacy?' (2013) 3(2) *International Data Privacy Law* 88, 99; Orla Lynskey, 'Deconstructing Data Protection' (2014) 63(3) *International and Comparative Law Quarterly* 569.

Article 8 of the EU Charter and has interpreted this fundamental right to be engaged whenever a measure has involved 'the processing of personal data'.[64] Nevertheless, prior to the entry into force of the EU Charter in 2009, the EU legislature made consistently and explicitly clear under the provisions of several EU directives concerning data protection[65], including the 1995 EU Data Protection Directive (now repealed by the GDPR)[66], that its purpose was to protect all fundamental rights 'and in particular *the right to privacy* with respect to the processing of data'.[67]

Accordingly, several scholars and policy discourses[68] suggest that while also providing protection for the right to respect for private life and informational privacy, the scope of data protection under Article 8 of the EU Charter *also* protects other rights related to the processing of personal data that are not privacy-related as data protection protects *all data*, not just data that falls within the scope of private life. These include social rights like non-discrimination, as guaranteed under Article 21 of the Charter, that require safeguarding from the increasingly widespread and ubiquitous collection and processing of personal data (eg AI-driven profiling), and pervasive interaction with technology that forms part of the modern 'information age'.[69] The development and use of technologies based on certain narratives that individuals interact with on a daily basis (eg AI VPAs) can also serve to perpetuate certain forms of discrimination. One instance of the latter is the unequal legal status and, and often subservient, role previously assigned historically to individuals of a particular gender or race in most modern democracies. Furthermore, it is argued here that the scope of the fundamental right to non-discrimination extends to the decision to select female voices by default, and in advertisements, which

[64] Joined Cases C-92/09 and C-93/09 *Volker und Markus Schecke and Eifert* (Grand Chamber), 9 November 2010 EU:C:2010:662, para 49; Joined Cases C-293/12 and C-594/12 *Digital Rights Ireland and Others* (Grand Chamber), 26 July 2017 EU:C:2014:238, para 29; Opinion 1/15 Draft agreement between Canada and the European Union on Transfer of Passenger Name Record data, Opinion of the Court (Grand Chamber), 26 July 2017 EU:C:2017:592, para 123.

[65] Directive 97/66/EC of the European Parliament and of the Council of 15 December 1997 concerning the processing of personal data and the protection of privacy in the telecommunications sector [1998] OJ L24/1, Article 1(1) (repealed and replaced by Directive 2002/58/EC); Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector [2002] OJ L201/37, Article 1(1).

[66] European Parliament and Council Directive 95/46/EC of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data [1995] OJ L281/23, Article 1(1).

[67] Emphasis added. For further, see Lee Bygrave, *Data Protection Law: Approaching Its Rationale, Logic, and Limits* (Kluwer, 2002) 125.

[68] Report of the Expert Group on Fundamental Rights, 'Affirming Fundamental Rights in the EU: Time to Act', Brussels, February 1999, 16; Paul de Hert and Serge Gutwirth, 'Data Protection in the Case Law of Strasbourg and Luxembourg' in Serge Gutwirth, Yves Poullet, Paul de Hert, Sjaak Nouwt, and Cecile Terwangne (eds), *Reinventing Data Protection?* (Springer, 2009) ch 1; Lynskey (n 63) ch 4.

[69] Serge Gutwirth and Paul de Hert, 'Regulating Profiling in a Democratic Constitutional State' in Mirelle Hildebrandt and Serge Gutwirth (eds), *Profiling the European Citizen* (Springer, 2008) ch 14; Tzanou (n 63) 91; Lynskey (n 63) ch 6.

perpetuate existing discriminatory associated stereotypes and characteristics of servility.

Hence, the design decision in question is far from a neutral practice and instead falls within the scope of conduct explicitly prohibited under Article 21(1) of the Charter as a form of 'indirect discrimination' by placing women (in this instant case of the AI VPAs under examination here) at a particular disadvantage in future by others in society whose perceptions and attitudes towards women will be affected (either consciously or subconsciously) by their daily use and increasing interaction with such systems. As noted above, although VPAs as currently thought of (and often marketed) as primarily household devices, they are rapidly becoming a core part of many workplaces (and becoming further disembodied) through the shift towards adding 'voice interfaces' to existing workplace systems.[70] The authors suggest, as has been argued elsewhere in an emerging but growing line of literature[71], that the programming and deployment of such gendered technology has consequences for both individual users, affected third parties (those in the presence of AI VPAs but not using their search, and increasing range of other support, functions), and for society more widely.

As guaranteed under Article 16 of the EU Charter, the private sector has a protected interest to exercise freedom with respect to how they conduct their economic and commercial activities, including the design and use of their products and services. Like the fundamental rights to data protection and non-discrimination, Article 16 is also not an absolute right. As recognised by the CJEU[72], the right to data protection (Article 8) is not absolute and 'must in considered in relation to its function in society'.[73] All limitations of rights guaranteed by the Charter are subject to the conditions of Article 52(1) of the Charter which requires that such restrictions must respect the essence of those rights and be provided for by law (principle of legality). Any measures that limit these right must also be compatible with the principle of proportionality, and can only be limited if they are necessary and meet the objectives 'of general interest' recognised by the EU or the need to protect the rights and freedoms of others. Accordingly, it is our view that the potential individual and societal harm posed by this perpetuation of existing discriminatory narratives through the design choices within gendered AI VPAs may represent a high risk to, and therefore disproportionate interference with, the

[70] See, for instance, Microsoft's advertisement entitled: 'Cortana Everywhere', 13 September 2017: <https://www.youtube.com/watch?v=G5fa0voNxw8> accessed 31 October 2018.
[71] As examined in detail above.
[72] Albeit not always as part of a balanced assessment with respect to other rights, see Case C-131/12 *Google Spain SL and Google Inc. v AEPD and González* (Grand Chamber), 13 May 2014 EU:C:2014:317, para 97. See further Hielke Hijmans, 'Right to have links removed: Evidence of effective data protection' (2014) 21(3) *Maastricht Journal of European and International* Law 555, 562-3.
[73] *Volker and Eifert* (n 64) para 48.

relevant fundamental rights and freedoms protected under Articles 8 and 21 of the Charter.

3.4. The role of the GDPR: Data Protection Impact Assessments

(a) DPIAs and aims of the GDPR

As discussed in more detail, Article 35 of the GDPR provides[74] that where a type of processing '*in particular using new technologies'* is 'likely to result in a high risk' to the rights and freedoms of natural persons, the controller[75] shall, '*prior to the processing*, carry out an assessment of the impact of the envisaged processing operations on the protection of personal data.'[76] Although earlier EU data protection law placed a general obligation on controllers to notify data protection authorities (DPAs) of any processing operations likely to present 'specific risks' to the rights of data subjects posed by their processing of personal data *prior* to this processing taking place[77], the EU legislature later recognised that this provision suffered from 'very patchy compliance' by controllers to notify DPAs in general and in practice made little, if any, impact on 'improving the protection of personal data'.[78] Hence, DPIAs are one of the new *ex ante* governance provisions under the GDPR which has the normative (and admittedly ambitious) aim of being an actionable mechanism that ensures accountable compliance by translating the legal standards of EU data protection law into reality. In the early drafting stages of the GDPR, the European Commission envisaged DPIAs as a means to strengthen the individual's right to data protection by enhancing the accountability of those organisations involved in 'risky processing' in order to identify these risks in advance, foresee problems, and bring forward solutions.[79]

[74] GDPR (n 5) Article 35(1) states: 'Where a type of processing in particular using new technologies, and taking into account the nature, scope, context and purposes of the processing, is likely to result in a high risk to the rights and freedoms of natural persons, the controller shall, prior to the processing, carry out an assessment of the impact of the envisaged processing operations on the protection of personal data'.

[75] GDPR (n 5) Article 4(7) defines a controller as: 'the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; where the purposes and means of such processing are determined by Union or Member State law, the controller or the specific criteria for its nomination may be provided for by Union or Member State law'.

[76] Emphasis added.

[77] European Parliament and Council Directive 95/46/EC of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data [1995] OJ L281/31, Article 20.

[78] European Commission, First report on the implementation of the Data Protection Directive (95/46/EC), COM(2003) 265 final; 15 May 2003, 12; GDPR (n 5) Recital 89.

[79] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Safeguarding Privacy in a Connected World: A European Data Protection Framework for the 21st Century' Com (2012) 9 final, 25 January 2012, 7; EC Impact Assessment: Commission Staff Working Paper 'Impact Assessment Accompanying the document Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) and Directive of the European Parliament

As a co-regulatory measure, the DPIA aims to achieve this by entrenching its principles and safeguards through influencing the technical and organisational culture of individuals and institutions.[80] As other commentators have rightly observed[81], however, this sharing of responsibility raises some legitimate questions regarding the capacity, and in some cases willingness, of industry to both adequately anticipate and address the intangible harms that fall within the scope of data protection law as part of a DPIA. Accordingly, the capturing of hearts and minds, so to speak, will be a key test of the GDPR's effectiveness in practice if DPIAs are to actually lead data controllers to considering in advance the implications of their data processing and design choices. Otherwise, what DPAs intend to be a substantive and ongoing process undertaken by industry may fail to be meaningfully implemented and amount in practice to no more than a reactive 'paper checklist' or 'box-ticking exercise'.[82]

The GDPR also aims to tackle this key challenge of co-regulation through its new *ex post* enforcement and oversight mechanisms. First, the EU legislature seeks to achieve effective implementation of the GDPR through a 'more defined risk-based approach' towards the governance of EU data protection law[83] and the role of controllers vis-à-vis the accountability principle. Secondly, the deterrent power of the new significant fines introduced under the GDPR that businesses may be subject to should they fail to either undertake, or subsequently implement, the requirements they committed to in their DPIAs will be the other more coercive approach used to also entrench a more GDPR-compliant culture. The new accountability principle under the GDPR provides that data controllers, such as manufacturers who determine the design of the hardware and software of VPAs, and how these devices operate and process personal data, are responsible for complying with the GDPR's key data protection principles and must also demonstrate this compliance.[84] It is worth noting here that the GDPR applies to any data processing targeted at providing any goods or services to individuals within the EU,

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and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data', SEC(2012) 72 final, 25 January 2012, i, 43.

[80] Bronwen Morgan and Karen Yeung (eds), *An Introduction to Law and Regulation* (Cambridge University Press, 2007) 10.

[81] Raphaël Gellert, 'Data protection: a risk regulation?' (2015) 5(1) *International Data Privacy Law* 3, 15-16; Damian Clifford and Jef Ausloos, 'Data Protection and the Role of Fairness' (2018) *Yearbook of European Law* 1, 54.

[82] Roger Clarke, 'Privacy Impact Assessment: It's Origin and Development' (2009) 25(2) *Computer Law and Security Review* 123, 124; Bert-Jaap Koops, 'The trouble with European data protection law' (2014) 4(4) *International Data Privacy Law* 250, 255; Reuben Binns, 'Data protection impact assessments: a meta-regulatory approach' (2017) 7(1) *International Data Privacy Law* 22, 26.

[83] Gellert (n 81); Lynksey (n 63) 82-84.

[84] GDPR (n 5) Article 5(2).

such as the collection of data and profiling of users behaviour from gendered AI VPAs by companies based in the U.S.[85]

As suggested elsewhere[86], the effectiveness of both these approaches will largely turn on the effectiveness of the guidance, supervision, and (now rather extensive under the GDPR) enforcement powers exercised by national data protection authorities (DPAs)[87] and the European Data Protection Board (EDPB).[88] The latter replaces the Article 29 Working Party and will play an important role in the future development of the GDPR through its guidelines, recommendations, and best practice documents that are aimed at harmonising the pan-EU approach by DPAs to oversight and enforcement. Hence, it is welcome that the GDPR places a clear obligation on EU Member States to ensure that these bodies – regarded as the 'guardians' of EU data protection law by the CJEU[89] – are adequately equipped with the resources necessary both to provide effective supervision and guidelines to controllers, and, if required, the capacity to effectively exercise their enforcement powers.[90]

(b) DPIAs and gendered AI VPAs

Article 35 of the GDPR provides that DPIAs are a qualified, not an absolute, requirement. Instead, the obligation to undertake a DPIA prior to the processing in question only applies to controllers if the processing meets the threshold of being likely to result *in a high risk* to the rights and freedoms of natural persons. Notably, for the purposes of this article, Article 35(1) also explicitly refers to the processing of personal data 'using new technologies' as a factor that is relevant when a controller is making this assessment. The GDPR further stipulates that a DPIA shall in particular be required in the case of 'a systematic and extensive evaluation of personal aspects relating to natural persons which is based on automated processing, including profiling, and on which decisions are based that produce legal effects concerning the natural person or similarly significantly affect the natural person'.[91]

[85] GDPR (n 5) Article 3(2).
[86] Nóra Ni Loideain, 'A Port in the Data-Sharing Storm: The GDPR and the Internet of Things', 10 October 2018, *King's College London Law School Research Paper* No. 2018-27. Available at SSRN: https://ssrn.com/abstract=3264265.
[87] GDPR (n 5) Article 58.
[88] GDPR (n 5) Article 68.
[89] C-518/07, *European Commission v. Federal Republic of Germany*, EU:C:2010:125, para 23 (GC); C-614/10, *European Commission v. Republic of Austria*, EU:C:2012:631, para 52 (GC); C-288/12, *European Commission v. Hungary* EU:C:2014:237, para 53 (GC).
[90] GDPR (n 5) Article 52(4).
[91] GDPR (n 5) Article 35(3)(a).

With respect to the first element of this criteria concerning profiling, AI VPAs operate based on the automated processing of voice recognition of their users in order to increasingly personalize certain functions that it performs with respect to that particular user's personal preferences.[92] These functions include a voice-operated search engine that can also operate as a management hub device, and which can additionally be used to control and interact with other smart devices in that location (household/office). In terms of data retained from Alexa, for example, Amazon informs users that it collects (a significant amount) of 'information about your use of Alexa, your Alexa Interactions [including all search engine queries], and your Alexa Enabled Products and Auxiliary Products (such as device type, name, features, status, network connectivity, and location)'.[93]

As also explained in the terms and conditions of Alexa, 'Amazon processes and retains your Alexa Interactions, such as your voice inputs, music playlists, and your Alexa to-do and shopping lists, in the cloud to provide, personalize, and improve our services'. Consequently, this processing clearly falls within the scope of profiling as defined under the GDPR.[94] The second element of the requirement regarding whether decisions based on this profiling 'produce legal effects concerning the natural person or similarly significantly affect the natural person' is less straightforward at first glance for a controller.

In response, however, to calls for greater clarity on what may constitute these legal effects or similarly significant effects, the Article 29 Working Party produced guidelines and further criteria in 'order to provide a more concrete set of processing operations that require a DPIA'.[95] Of the nine criteria to be considered by controllers[96], the guidelines recommend that a DPIA should be carried out 'in most cases' when the processing is considered to have met two of the criteria.

These criteria concern processing that involve:1) evaluation or scoring; 2) automated decision-making with legal or similar significant effect; 3) systematic monitoring; 4) sensitive data or data of a highly personal nature; 5) data processed on a large scale; 6) matching or

[92] See, for instance, Amazon's Alexa Terms of Use:
<https://www.amazon.com/gp/help/customer/display.html?nodeId=201809740> accessed 6 November 2018.
[93] Ibid, section 3.1.
[94] GDPR (n 5) Article 4(4) defines profiling as 'any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements'. See also GDPR (n 5) Recital 71.
[95] Article 29 Working Party, 'Guidelines on data protection impact assessments (DPIAs) and determining whether processing is "likely to result in a high risk" for the purposes of Regulation (2016/679)' (WP248 rev.01, as last revised and adopted on 4 October 2017), 9.
[96] Ibid.

combining datasets; 7) data concerning vulnerable data subjects (including children); 8) innovative use or applying new technological or organisational solutions; and 9) when the processing itself prevents data subjects from exercising a right or using a service or contract'.[97] Ultimately, however, a controller could consider that a DPIA is necessary if the processing meets only one of the criteria. For its part, the Article 29 Working Party (now the EDPB) makes clear that the more criteria are met by the relevant processing, the 'more likely it is to present a high risk to the rights and freedoms of data subjects'.[98]

With respect to automated-decision making with legal or similar significant effect, the guidelines advise that this amounts to processing that 'may lead to the ... discrimination against individuals'. In line with the arguments made above, it is argued here that the decision to make AI VPAs gendered by default, both by design and by perpetuating the discriminatory stereotypes through the marketing of such devices, does indeed have an effect on individuals and society more generally. Hence, together with the fact they AI VPAs are new technologies, the processing of personal data by gendered AI VPAs already satisfies more than the two required criteria mandated by DPAs that then require a controller to undertake a DPIA. Further criteria met by the use of gendered AI VPAs (and AI VPAs more generally) include the processing of data of vulnerable data subjects such as the use of AI VPAs by children, particularly as these devices are encouraged to be used by families in their homes (as demonstrated by the adverts for Amzon's Alexa)

Another relevant criterion includes the processing of sensitive data by AI VPAs. For example, VPAs systematically collect, process, and share significant amounts of both personal data and 'special category' (sensitive) data[99] concerning their users, and that of other natural persons who interact (intentionally or not) with said VPA(s). For instance, these could include data concerning health such as questions to a VPA concerning remedies for colds/flu or other queries concerning more serious ailments or health concerns, eg 'Alexa, where is the nearest oncologist?' Furthermore, in meeting yet another of the required criteria with respect to new technologies, the guidelines explicitly advise that 'certain "Internet of Things" applications could have a significant impact on individuals' daily lives and privacy; and therefore require a DPIA'.

[97] Ibid, 9-11.
[98] Ibid.
[99] GDPR (n 5) Article 9 defines special categories/sensitive data to include: 'Processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation'.

Based on the requirements as set out in the provisions of the GPDR and the relevant criteria set out by the Article 29 Working Party, it is argued here that the GDPR does require controllers of gendered AI VPAs to assess in their future DPIA evaluations whether the above type of processing constitutes a product design choice that could have discriminatory effects and does therefore fall short of being lawful and fair in a democratic society.[100]

Ultimately, DPIAs under the GDPR provide a co-regulatory framework with a mandatory and actionable set of requirements. Consequently, the ability to ensure oversight and enforcement of this legal regime effectively gives teeth to the implementation in practice of some general but positive voluntary commitments already made by industry, such as the Partnership on AI (PAI). The PAI is an international collaboration between key industry figures (including Amazon, Apple, DeepMind, Facebook, Google, Microsoft) academia, policymakers, and civil society that seeks 'to shape best practices, research, and public dialogue about AI's benefits for people and society'.[101] These policy commitments include the following aim 'to ensure that AI technologies benefit and empower as many people as possible'.

Hence, key industry leaders and others can then tailor in more detail, in a manner that is fair, lawful, and transparent[102], the organisational and technical measures and safeguards that they will implement in order to meaningfully address the fundamental rights risks posed by novel AI-driven technologies, such as gendered VPAs.

4. EU Data Protection Law – *part of* the regulatory response

Past experience in the field of regulating against sex discrimination has shown that equality can only be achieved by specific policies eliminating the conditions of structural discrimination.[103] Hence, there is a risk that a key policy priority, such as countering discrimination, could be lost in the many other related protected interests that may be interpreted as falling within the scope of data protection law in future. In other words, other

[100] GDPR (n 5) Article 5(1) sets out the key principles to be complied with under the GDPR and requires that personal data be 'processed lawfully, fairly and in a transparent manner'.
[101] See, for instance, the 'Tenets' of the Partnership on AI (PAI). The PAI is an international collaboration between key industry figures (including Amazon, Apple, DeepMind, Facebook, Google, Microsoft) academia, policymakers, and civil society that seeks to 'shape best practices, research, and public dialogue about AI's benefits for people and society': <https://www.partnershiponai.org/tenets/> accessed 30 October 2018.
[102] GDPR (n 5) Article 5(1) sets out the key principles to be complied with under the GDPR and requires that personal data be 'processed lawfully, fairly and in a transparent manner'.
[103] Report of the Expert Group on Fundamental Rights, 'Affirming Fundamental Rights in the EU: Time to Act', Brussels, February 1999, 12; Jude Browne, 'The Critical Mass Marker Approach: Female Quotas and Social Justice' *Political Studies* (2013): doi: 10.1111/1467-9248.12045.
World Economic Forum (n 45).

substantive safeguards or enforcement actions (for example from equality law and consumer law) could play a role in providing more precise requirements or 'a sharper mechanism'[104], within the broader principle-based framework of a DPIA framework which are more tailored to the institution, jurisdiction, or technology in question.

One such safeguard derived from equality legislation could be the requirement of ensuring a particular quota(s) on an AI VPAs development team, based on ensuring a diversity of views and perspectives. Consequently, it is argued here that regulatory tools and principles, such as DPIAs, that promote and entrench the equal and fair treatment of all individuals' information-related rights through due diligence *should only form part of an overall evidence-based policy framework* which incorporates the key principles and requirements of other relevant laws, guidelines, and standards.[105] With respect to other governance approaches that would augment any relevant legal standards, the European Commission established an 'European AI Alliance' which will be tasked with compiling ethical guidelines on AI development for the EU by the end of 2018.[106] As noted above, insights could also be drawn from the ethical standards currently being developed by key industry bodies such as the PAI.

5. Recommendations

In order to mitigate against some of the concerns highlighted here with regard to the gendering of AI VPAs and the resultant societal harm, we put forward the following recommendations:

- The policy positions of the EU, U.S., and UK (amongst others) as set out in their policy documents on AI and related technologies and which specify, in particular, the need for such technologies to meet legal and ethical standards, should be revised to take into account not just how AI technologies may produce or reproduce social biases, but whether they encompass social biases within their very design.

[104] See, for instance, Jude Browne's 'Critical Mass Marker' approach that aims to remedy the lack of female representation on corporate boards by identifying situations where a high degree of representation already exists at the level below and yet the expected progression to next level (board membership) does not materialise: Browne (n 103) 11.

[105] A comparative analysis of other legislative frameworks, such as equality and consumer law, was outside the scope of this article but is the focus of ongoing research.

[106] Press release, 'Artificial Intelligence: Commission discusses ethical and social impact with philosophical and non-confessional organisations' Brussels, 18 June 2018: <http://europa.eu/rapid/press-release_IP-18-4160_en.htm> accessed 6 November 2018. The European Commission's Draft Ethics Guidelines for Trustworthy AI have at the time of writing been published for comment, and are due to be finalised by March 2019: <https://ec.europa.eu/knowledge4policy/publication/draft-ethics-guidelines-trustworthy-ai_en> accessed 23 January 2019.

The EU policy, 'EU Statement on AI, Robotics and Autonomous Systems', and specifically principle (g) on 'Security, safety, bodily and mental integrity' which sets out that '[a]ll dimensions of safety must be taken into account by AI developers and strictly tested before release in order to ensure that 'autonomous' systems do not infringe on the human right to bodily and mental integrity and a safe and secure environment',[107] provides a worthwhile starting point in this regard.

- In line with GDPR DPIA requirements and the ethical tenets of PAI, Amazon, Apple, and Microsoft should review the default voice of their VPAs as female, the marketing of these products, and critically, address the responses of their VPAs where demonstrated to portray stereotyped and heteronormative female characterisations.

- AI VPA companies such as Apple and Microsoft could contribute toward making the labour involved in the production of their VPAs more visible by, for example, giving more public credit to the female actors who play Siri (Susan Bennett) and Cortana (Jen Taylor).[108]

- There should be continued emphasis placed through policy and platforms such as the PAI on addressing the representation of women in STEM fields, as well as in the design teams and in decision-making positions of emerging technologies.

6. Conclusions and reflections

This article has explored the gendering of the AI VPAs developed by tech industry leaders in this field (Alexa, Cortana, and Siri), through the adoption of female names with hyper sexualised and mythic histories and connotations, through female voices, and through female stereotyped characterisations. We argue that this results in indirect indiscrimination and poses a societal harm. As a potential remedy to the high risks of societal harm posed by this novel and increasingly pervasive form of digitally-gendered servitude, the focus of the article then turned to the scope and potential of data protection law.

[107] European Commission (n 6).
[108] Note that the voice of Amazon's Alexa is computer generated.

We began this analysis by highlighting that the protection interests of EU data protection law go beyond the data privacy paradigm given that its broad scope also applies to discriminatory harms. This examination then turned to the role that could be played by DPIAs, as enacted under the GDPR, as a mechanism for businesses to use to address the issues raised by their design choice to associate females *by default* with AI VPAs, both through technical settings and in the advertisement and marketing of these devices.

Going forward, the authors recognise that this article raises further questions with respect to investigating the role that other regulation could play as part of the wider solution to biased AI design choices, such as equality and consumer law, and other regimes of governance, including data ethics and corporate social responsibility. Independent empirical inquiry is also needed in order to closely examine and identify what factors have resulted in the selection of these design choices (social attitudes, institutional practices). In order to be objective, this assessment should be undertaken by researchers not employed by these companies. This evidence-based approach is also essential in order to assess the continuing impact of these VPAs to date, and in detecting whether these gendered devices are an indicator of a wider organisational culture of biased design choices within AI-based systems which will also involve testing the impact of any safeguards implemented to date.