Regulating human enhancement technology: An equality perspective

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ABSTRACT

The aim of the thesis is two-fold. First, to shine a spotlight on the significant but under theorised equality harms of human enhancement technology (HET). Second, to provide a robust framework for regulating the most immediate of these harms: unfairness in competitive scenarios.

The thesis is divided into six chapters. Together, Chapter One and Two set up the base upon which the argument of the thesis builds. Chapter One explains HET and canvasses the dominant definitional approaches. It argues that none of these offer stable markers for regulation and proposes a 'variable-degree spectrum' definition of HET. Chapter Two engages with regulatory theory. It argues that new technology such as HET may precipitate *sui generis* regulatory intervention when it results in harms that cannot be addressed by existing generic laws.

Chapters Three, Four and Five bring the equality harms of HET into focus and attempt resolution through existing law. Chapter Three delineates the potential and current equality harms of HET and states unfair competition as the focus of the thesis. It notes that while existing laws can be applicable to certain harms on a case-to-case basis, they fail to capture the harm of unfair competition. Chapter Four explores equality law in international human rights law as a further source of generic law which can preclude *sui generis* regulatory intervention. It is found deficient in its ability to address the concern with unfair competitions. Chapter Five draws insights from the regulation of enhancements in sports. These insights affirm the link between effort, merit, and reward, the need for a concrete definition of enhancement, and the relevance of positionality of the enhancement.

Chapter Six, the final chapter, consolidates the insights and conclusions of the previous chapters. It presents the equality-informed model for regulating enhancement in competitive scenarios. It applies this model to three distinct hypotheticals in the education context, derives results, and then makes concrete regulatory suggestions tailored to the needs of the hypothetical.

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INTRODUCTION

BACKGROUND

Emerging technology has consistently challenged laws to evolve, nudging the emergence of new regulatory regimes. For instance, advancements in IVF technology and embryo research resulted in the Human Fertilization and Embryology Act 2008, which significantly amended the Human Fertilization and Embryology Act 1990 and the Surrogacy Arrangements Act 1985. The emergence of the digital world and the collection of data by big corporations resulted in the EU General Data Protection Regulation and Data Protection Act 2018. Recently, the release of ChatGPT and other AI models of increasing ability in the world have resulted in the EU AI Act 2024. In each case, existing laws fell short in addressing the novel challenges posed by technology.

Human enhancement technology ('HET') is another category of products created by advances in bioengineering and biochemistry that require regulatory attention. This category is broad, encompassing various biochemical or other interventions in the body, which are bound together by one commonality—each seeks to enhance the body's functions or abilities beyond its natural capacity. Examples include pills that can temporarily enhance cognitive function,[1] microchip implantation which can enhance the capacity of the brain to store and

[1] Andreas Franke and others, 'Methylphenidate, Modafinil, and Caffeine for Cognitive Enhancement in Chess: A Double-Blind, Randomised Controlled Trial' (2017) 27 European Neuropsychopharmacology: The Journal of the European College of Neuropsychopharmacology 248.

process information,[2] and genome editing, which can be used to eliminate diseases or to introduce new traits.[3]

As with any new technology, HET poses threats and challenges that may be novel. This includes concerns about health risks,[4] the moral desirability of changing our bodies,[5] humans 'playing God' and misunderstanding our place in creation,[6] fear of the emergence of eugenic programs,[7] and claims by enhanced individuals, whose bodies and minds differ vastly from those of existing humans,[8] that they belong to a superhuman or posthuman species.[9] Many of these challenges may become legal concerns.

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[2] 'NASA - Extension of the Human Senses' <https://www.nasa.gov/centers/ames/research/technology-onepagers/human_senses.html> accessed 17 January 2021; 'Neuralink: Elon Musk Unveils Pig with Chip in Its Brain' *BBC News* (29 August 2020) <https://www.bbc.com/news/world-us-canada-53956683> accessed 17 January 2021.

[3] Owen Schaefer, 'The Future of Genetic Enhancement Is Not in the West' *The Conversation* <http://theconversation.com/the-future-of-genetic-enhancement-is-not-in-the-west-63246> accessed 17 January 2021.

[4] AMW Linssen and others, 'Cognitive Effects of Methylphenidate in Healthy Volunteers: A Review of Single Dose Studies' (2014) 17 International Journal of Neuropsychopharmacology 961.

[5] Francis Fukuyama, 'Our Posthuman Future': Biotechnology as a Threat to Human Nature (Farrar, Straus and Giroux 2002); Nick Bostrom, 'In Defense of Posthuman Dignity' (2005) 19 Bioethics 202; Steve Clarke and others, The Ethics of Human Enhancement: Understanding the Debate (Oxford University Press 2016).

[6] Michael J Sandel, 'The Case Against Perfection' [2004] The Atlantic <https://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/> accessed 9 January 2023.

[7] Felipe E Vizcarrondo, 'Human Enhancement: The New Eugenics' (2014) 81 The Linacre Quarterly 239.

[8] Nick Bostrom, 'Why I Want to Be a Posthuman When I Grow Up' in Ronald L Sandler (ed), *Ethics and Emerging Technologies* (Palgrave Macmillan UK 2014) <https://doi.org/10.1057/9781137349088_15> accessed 17 December 2022.

[9] Bert-Jaap Koops, 'Concerning "Humans" and "Human" Rights. Human Enhancement from the Perspective of Fundamental Rights' in Bert Jaap Koops and others (eds), *Engineering the Human: Human Enhancement Between Fiction and Fascination* (Springer 2013) <https://doi.org/10.1007/978-3-642-35096-2_12> accessed 17 December 2022; The President's Council on Bioethics and Leon R Kass, *Beyond Therapy: Biotechnology and the Pursuit of Happiness* (October edition, Harper Perennial 2003); Fukuyama (n 5).

The conversation on the interaction of the field of law and HET has begun in terms of both academic scholarship and governmental interest. There is scholarship on the regulation of specific HET such as cognitive enhancement[10] and gene editing.[11] Muireann Quigley and Semande Ayihongbe have argued that the law is ill-equipped to deal with the challenges raised by the linking of the biological person with synthetic, inorganic parts, and devices.[12] Other scholars have argued that existing laws on *inter alia* patient-healthcare provider relationships, medical device and drug regulation, and the intellectual property regime, are insufficient to respond to the challenges posed by HET.[13]

In terms of governmental interest, the European Union funded and recently concluded the SIENNA project, which conducted a state-of-the-art review of human enhancement, considered the existing moral, ethical and legal debates, and made recommendations for its regulation.[14] The European Parliament released its study on human enhancement, which contained policy options for its regulation, in 2009.[15] The UK's Ministry of Defence has released its report on a strategic implementations project 'Human Augmentation – the dawn of a new

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[10] Imogen Goold and Hannah Maslen, 'Must the Surgeon Take the Pill? Negligence Duty in the Context of Cognitive Enhancement' (2014) 77 The Modern Law Review 60; Hannah Maslen and others, 'The Regulation of Cognitive Enhancement Devices: Extending the Medical Model' (2014) 1 Journal of Law and the Biosciences 68.

[11] Nuffield Council on Bioethics, Genome Editing and Human Reproduction: Social and Ethical Issues, 2 (2018).

[12] Muireann Quigley and Semande Ayihongbe, 'Everyday Cyborgs: On Integrated Persons and Integrated Goods' (2018) 26 Medical Law Review 276.

[13] Conference on Human Enhancement and the Law, 'Regulating for the Future', University of Oxford (2016).

[14] Zuzanna Warso and others, 'SIENNA D3.2: Analysis of the Legal and Human Rights Requirements for Human Enhancement Technologies in and Outside the EU' (2019).

[15] European Parliament, Science and Technology Options Assessment, 'Human Enhancement Study' (2009).

paradigm'.[16] It describes its aim as to identify key insights for defence, given the advancements in fields such as sensors, artificial intelligence ('AI'), novel materials, nanotechnology, and additive manufacturing.

This thesis arises from the need to evaluate the harms of HET and consider whether existing laws are adequate to address them. I turn now to defining the scope of the thesis and the specific harms it is focussed on.

SCOPE

The integration of HET into society raises critical questions about access, fairness, and the potential for these technologies to exacerbate existing socio-economic inequalities or create new ones. Much of the current literature acknowledges the equality concerns related to HET but fails to develop a comprehensive understanding of these issues. This thesis is focussed on providing insights into the equality harms of HET and the ensuing regulatory concerns. These harms are as follows.

First, it is likely that HET will be affordable and accessible for some and not for others. This will result in inequality in many ways: first, the use of cognitive enhancement drugs such as Ritalin and Modafinil (whether bought from a legitimate manufacturer or seller, or on the black market at an even higher price in a country where these drugs are regulated), by a wealthy student will be unfair, as she could improve her performance in competitive examinations and gain an advantage over students who cannot afford such drugs.[17] Such a concern in many

[16] Ministry of Defence (UK), 'Human Augmentation – The Dawn of a New Paradigm' (2021) <https://assets.publishing.service.gov.uk/media/609d23c6e90e07357baa8388/Human_Augmentation_SIP_access2.pdf> accessed 18 September 2024.

ways mirrors the issue of doping in sports, which currently raises concerns about unfair advantage and unfairness in competition.[18]

Second, HET use can lead to discrimination in a wide range of contexts. For instance, an employer may select a candidate with a certificate of cognitive enhancement for an IT job over another equally qualified candidate who does not have such enhancement. Third, once genetic enhancement becomes possible, certain traits (such as obesity, short stature, dark skin) may become stigmatised.[19] Fourth, in the long term, if posthuman enhancements make radical changes to the human body possible, we may witness the emergence of claims of species difference. For instance, individuals with significantly enhanced memory, muscle strength, longevity,[20] and a particular homogenous physical appearance, may claim that they are no longer human but something more, something better than human.

Though the thesis describes and engages with each of these equality harms at length, it is ultimately focussed at providing a robust framework for regulating the most immediate of these harms: unfairness in competitive scenarios. This harm refers to the inequality that results from the already well-off utilising their wealth to gain further advantage in competitive scenarios that could have allowed upward social mobility. It is immediate and significant because it is already

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[17] Ross Aikins, '"The White Version of Cheating?" Ethical and Social Equity Concerns of Cognitive Enhancing Drug Users in Higher Education' (2019) 17 Journal of academic ethics 111.

[18] Lisa S Parker, 'In Sport and Social Justice, Is Genetic Enhancement a Game Changer?' (2012) 20 Health Care Analysis 328.

[19] Vizcarrondo (n 7).

[20] Bostrom, 'Why I Want to Be a Posthuman When I Grow Up' (n 8).

manifesting in both sport and education, as will be demonstrated in the Chapters to follow.

The approach of the thesis is foregrounded in the fact that the thesis is not directed at the regulation of any one HET, but rather, on the evaluation of and regulation addressed at one *value* (equality) that HETs affect. As a result, it will be found that much of the references to the existing literature on specific technologies, though present to illustrate their diversity, is not exhaustive. The thesis also views HET as an ever-evolving class of technologies, and therefore, elects to undertake a normative (*should*) analysis rather than simply positive (*is)* analysis of the topics under consideration (including plausible definition, potential and not just actual harms, boundaries of human rights interpretations) with a view to future expansion of the categories. This means, it queries what the definition of HET *should* be (rather than what it *is* in some of the existing regulation), what *would* it harms be (rather than just what its harms *are*), what *should* the interpretation of human rights norms be given the texts (rather than just what the interpretation *is*). This reflects the intellectual choices made by the author in her project.

Finally, the evidentiary value of the reports, self-experiments, and journalistic articles relied on in this thesis vary. This is in two ways. First, the effects of some technologies have been tested, while others are at the stage of production and their effects are predicted. Second, while the effects of some kinds of technology, such as genetic editing, can only be confirmed by trained scientists, a lot of the literature on the effects of other kinds of technology, such as cognition enhancing drugs, relies on oral or experiential accounts of lay individuals like

students. However, despite this, even if the effects of some of the current HETs is not clear or even ineffective, the future HETs may prove to be much more powerful and effective, and indeed that is the aim of the industry.

STRUCTURE

This thesis is divided into six chapters, each serving as a building block towards demonstrating the unfairness arising from the use of HET in competitive scenarios and then devising a regulatory framework to address it. Chapters One and Two establish the foundation of the thesis, focusing on the definition of HET and the principles of regulatory theory. The subsequent chapters, Three, Four, and Five, explore the equality harms associated with HET and consider their potential resolution through existing legal frameworks, including equality law and sports law. Finally, Chapter Six consolidates these discussions into an equality-informed model for regulating enhancements in competitive contexts, which is then applied to three hypothetical scenarios in education.

In Chapter One, I argue in favour of understanding HET as a category comprising diverse technologies that enhance human abilities beyond natural or pre-existing levels. I critique existing definitions for failing to meet regulatory needs and introduce the 'variable-degree spectrum definition' as a more effective approach. This definition provides stable regulatory markers and accounts for the qualitative differences between various HETs and their impacts on the human body. The definition is one part of the overall regulatory suggestion made in the thesis.

In Chapter Two, I outline the conditions under which new technologies might necessitate *sui generis* regulatory intervention: when existing laws are inadequate to address their novel harms. This establishes the threshold that the following Chapters gauge the harms of HET against. I discuss the factors that determine the design of the regulatory intervention, namely, the stage of technological development and distribution, the institutions responsible for conception and implementation, and the affected stakeholders. I then make a case for distributive justice as a focal point in the regulatory design of technology.

In Chapter Three, I address the disparate practical, ethical, and legal challenges posed by HET. I sketch the potential equality harms such as discrimination, stigmatisation, and the central focus of this thesis: unfairness in competitive scenarios. I argue that enhancements undermine the merit and deservingness of positive outcomes, with access to such technologies often skewed by wealth, thereby reinforcing socio-economic disparities. I apply the international instruments geared toward biotechnology as well as a host of domestic regimes to this harm. However, these laws are found inadequate to address it, warranting a unique regulatory framework. Finally, I consider the objections made to regulating HET with respect to their use in competitive scenarios and respond to them.

In Chapter Four, I posit that International Human Rights Law (IHRL) is well-positioned to regulate HET, given its focus on human interests, ability to generate international consensus, and its close relationship with bioethical principles. After consolidating the content of equality in IHRL and applying it to the equality harms of HET, I find that IHRL's current equality provisions are

unable to address these harms. I explore the domestic trends that hint at a growing role for socio-economic factors in legal decisions yet conclude that IHRL falls short in fully addressing the unfairness caused by HET.

In order to draw insights from the regulation of enhancements in sport, in Chapter Five I examine how sports regulation emphasizes fairness and the relationship between effort and merit. The insights drawn from the regulation of enhancement, technology, and sex categories in sport support the thesis's claim that enhancements can diminish the merit of individual achievements and perpetuate inequality due to their accessibility being tied to wealth. The chapter further demonstrates that the regulation of enhancement in sport does not draw upon existing equality law, which supports the findings in Chapter Four.

Chapter Six synthesizes these discussions into an equality-informed model for regulating HET. I apply this model to educational settings to illustrate its practical implications. I suggest regulatory measures that could be implemented and make a case for the potential of equality principles to inform future legal developments concerning HET.

The thesis aims to provide a comprehensive analysis of the regulatory challenges posed by HET, advocating for a model that balances technological advancement with the need to prevent deepening socio-economic divides.

METHODOLOGY

Human enhancement is a multidisciplinary field, which draws upon scholarship from neuroscience, nanotechnology, biotechnology, synthetic biology, chemistry; and social science fields such as philosophy, bioethics and law. Many of these

fields do not speak to each other. This has been a real challenge in writing this thesis and necessitated the methodology to be guided by the specific objectives of each individual chapter. In particular, as will be found in Chapter 3.IV., thought experiments are not an uncommon approach to examining issues on a conceptual level in the philosophy literature on enhancement. Regulation, on the other hand, is an inherently practical exercise which has to take into account how people really behave and what conditions factually operate in the world. As a thesis in law and regulation which that is duty-bound to engage with the philosophical literature due to its enormity in this field, but with the objective of devising a regulatory framework for a specific use-case for enhancement (competitive scenarios with socio-economic), the meeting point is inescapably one where thought experiments offered by philosophers have to be considered in light of, and often be countered by, practical constraints and realities.

Chapters One and Two employ theoretical and interdisciplinary analysis for their objectives: examination of definitions of HET and regulatory conditions respectively. Both involve engagement with fields outside law: philosophy and bioethics in Chapter One, and socio-legal studies and economics in Chapter Two.

Chapter Three uses the doctrinal method to highlight the limitations of existing laws and the theoretical method to construct the parameters for when *sui generis* regulatory intervention is warranted. Chapter Four uses doctrinal analysis to understand how the European Court of Human Rights has applied the principle of equality to new technology, and to determine the content and scope of equality provisions in IHRL.

Chapter Five uses the doctrinal method to study the rules governing use of enhancements in sport, and analyses the decisions related to doping, use of technology, and sex categories. Chapter Six uses the theoretical method to devise the proposed regulatory model and apply it to hypothetical scenarios.

CHAPTER ONE

HUMAN ENHANCEMENT TECHNOLOGY: OVERVIEW AND DEFINITION

INTRODUCTION

HET encompasses various biochemical or other interventions in the body, which seek to enhance the body's functions or abilities beyond its natural capacity. This category is broad, encompassing various kinds of interventions which are bound together by one common feature—each of these interventions seeks to enhance the body's functions or abilities beyond what it is naturally capable of. Examples of HET are as diverse as pills that can temporarily enhance cognitive function,[21] microchip implants which can enhance the capacity of the brain to store and process information,[22] and genome editing, which can be used to eliminate diseases or to introduce new traits.[23] Further, this group of technologies is ever-evolving, as individuals and companies come up with new compounds and

[21] Franke and others (n 1).

[22] 'NASA - Extension of the Human Senses' (n 2); 'Neuralink: Elon Musk Unveils Pig with Chip in Its Brain' (n 2).

[23] Schaefer (n 3).

products that improve the body's functions beyond its natural capacity in a myriad of ways.

Given this diverse array of technologies that can be called HET, some have argued that a definitive account of HET is impossible or extremely difficult. However, without a definition, one may understand everyday improvements in human life, including shoes to prevent injury on a rough road, a bus to travel to work, and a pen to convey thoughts, to be equivalent to enhancements. Yet, these are not the kind of enhancements that require regulation. While some ambiguities in the exact meaning of HET or enhancement may be necessary for general discussions as the technologies evolve, they are likely to do a particular disservice to legal regulation, which is contingent on clarity, predictability, and consistency.

This chapter has two aims. First, to provide an account of various kinds of HET through examples of technologies that are diverse in terms of the human capacities they enhance, the temporarily of their effects, and their invasiveness in the human body. **Section I** seeks to achieve this aim by arranging various examples of HET according to the bodily function they enhance and further distinguishing among them on the basis of their temporality and invasiveness. The purpose is to demonstrate the breadth of HET and set up the background for devising an appropriate definition. I argue in this section that HET should be understood as a *category* of technologies, which in turn has an impact on its definition.

The second aim of the chapter is to delineate the dominant definitional approaches for HET and assess whether they can serve a regulatory function. **Section II** seeks to achieve this aim. It incorporates the definitions proposed by

various scholars as well as the definitions incorporated into the existing relevant regulations into an analysis of three questions: whether *all* improvements in human functioning amount to enhancements, whether HET can overlap with medical products; and whether all enhancements should be regulated in a similar manner. I conclude here that existing definitions fail to serve regulatory objectives.

In **Section III** of the chapter, I propose and defend the 'variable-degree spectrum definition' which offers stable markers for regulation and incorporates the qualitative differences among various kinds of HET and their effects on the body.

I. AN OVERVIEW OF HET

This section seeks to provide an overview of various kinds of HET. It arranges various examples of HET according to the bodily function they enhance—namely, cognition and other brain function, muscular functions, and skin functions. It further distinguishes among them on the basis of their temporarily and invasiveness. The purpose is to demonstrate the breadth of HET and set up the background for devising an appropriate definition.

A. Cognition and other brain functions

Ritalin and Modafinil are drugs that have been developed for medical use. Ritalin is used to treat disorders such as attention deficit disorder and Modafinil is used to treat sleep disorders such as narcolepsy. However, studies have found that these can also be used by healthy individuals to improve learning and memory,[24]

[24] Corinna Klinge and others, 'Methylphenidate Enhances Implicit Learning in Healthy Adults' (2018) 32 Journal of Psychopharmacology 70; Chad Beyer, Ciara Staunton and Keymanthri

enhance their performance at goal-oriented problem solving,[25] and at complex cognitive tasks such as playing chess.[26] University students are known to be already using this drug to gain improvements in memory, wakefulness, energy levels and attention.[27] These drugs have temporary effects as they get washed off from the blood stream, and are not invasive as they do not become a part of the body.

These drugs can be contrasted with brain implants that allow a computer interface to be operated by the power of thought[28] and memory-boosting brain implants currently being tested on epilepsy patients.[29] Elon Musk's team at his company Neuralink are working towards creating implants for brain-to-machine interface. Musk has claimed that while such chips can be used to help cure conditions such as dementia, Parkinson's disease and spinal cord injuries, his long-term ambition is ushering the age of 'superhuman cognition'.[30]

Moodley, 'The Implications of Methylphenidate Use by Healthy Medical Students and Doctors in South Africa' (2014) 15 BMC Medical Ethics 20.

[25] Linssen and others (n 4); Michael J Minzenberg and Cameron S Carter, 'Modafinil: A Review of Neurochemical Actions and Effects on Cognition' (2008) 33 Neuropsychopharmacology 1477.

[26] Franke and others (n 1).

[27] ABC News, 'Super Soldiers? Military Drug Is Rage Among Students, Young Professionals' *ABC News* <https://abcnews.go.com/Technology/Health/story?id=3408266&page=1> accessed 17 January 2021.; Irene Tracey and Rod Flower, 'The Warrior in the Machine: Neuroscience Goes to War' (2014) 15 Nature Reviews Neuroscience 825.

[28] Ferris Jabr, 'The Man Who Controls Computers With His Mind' *The New York Times* (12 May 2022) <https://www.nytimes.com/2022/05/12/magazine/brain-computer-interface.html> accessed 14 December 2022; Iahn Cajigas and others, 'Implantable Brain–Computer Interface for Neuroprosthetic-Enabled Volitional Hand Grasp Restoration in Spinal Cord Injury' (2021) 3 Brain Communications 248.

[29] David DiSalvo, 'Scientists Say They Have Developed A Memory-Restoring Prosthetic For The Human Brain' *Forbes* <https://www.forbes.com/sites/daviddisalvo/2018/03/29/scientists-say-they-have-developed-a-memory-restoring-prosthetic-for-the-human-brain/> accessed 17 January 2021.

[30] 'Neuralink: Elon Musk Unveils Pig with Chip in Its Brain' (n 2).

NASA's *Extension of the Human Senses Group* is also developing brain-computer interface technologies for augmentation purposes. The aim is to allow humans to interact with automated systems in a manner that approximates human communication and to provide automated systems greater insights into user intentions.[31] Such brain chip implants, and brain-computer interfaces will also enhance cognitive function and may enable the brain to perform new functions. Crucially, they will be long-lasting enhancements as well as invasive in that a surgery will be required both to integrate them in the brain and to remove them.

B. Muscular functions

Performance enhancement drugs have been used by athletes for decades now. Examples include human growth hormone, testosterone, and bromantane—each of which is a pharmaceutical compound that serves an important function in the human body when found naturally and in limited amounts. These drugs may help stimulate growth, reduce fatigue, and build muscle density.[32] The effects of some of these drugs may be permanent in that they can enhance muscular strength irreversibly. However, they are not invasive since they need to be orally consumed and are released by the body through its natural processes.

Rapid developments are occurring in the development of external devices that can be used to enhance muscular function. For instance, a team at the University of Chicago has created a wearable device that can manipulate muscles in the fingers with electrical impulses and allow the user to perform tasks

[31] 'NASA - Extension of the Human Senses' (n 2).

[32] David M Martin and others, 'Characteristics and Laboratory Testing Standards for Drugs of Abuse', *Reference Module in Neuroscience and Biobehavioral Psychology* (Elsevier 2023) <https://www.sciencedirect.com/science/article/pii/B9780323957021000105> accessed 12 August 2024.

previously unknown to them, such as playing a certain instrument.[33] Another example of an external device that can enhance muscle function is a bionic limb, whether bionic hand or bionic leg. Depending on the sophistication of such a limb, it may be a piece of equipment that can be worn and easily detached, or a highly developed piece of technology that is integrated into the body and can be controlled with the mind.[34] Enhancement through such a device would be permanent and invasive, as it has to be surgically integrated into the body.

C. Skin functions

Many companies are developing skin enhancements that can give this organ superior functions. One example is skin implants their workers the size of grains of rice which can work as swipe cards for opening doors, operating printers, or buying a coffee with a wave of the hand.[35] Similarly, a team at MIT in collaboration with Microsoft Research has developed a smart tattoo that enables users to control their mobile devices and store information on their skin.[36] As long as these chips are to be implanted into the skin, their effects will be permanent and they would be categorised as invasive products.

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[33] Department of Computer Science, The University of Chicago, 'New Wearable Device Controls Individual Fingers for Sign Language, Music Applications' <https://cs.uchicago.edu/news/dextrems/> accessed 19 November 2022.

[34] 'The "mind-Bending" Bionic Arm Powered by AI' (23 February 2024) <https://www.bbc.com/news/technology-68368439> accessed 12 August 2024.

[35] A firm called Cyborg Nest works in the field of HETs, such as chips implanted under the skin. Its first

product into the market, 'North sense', is able to turn the human body into a compass by enabling the user to sense what direction she is facing. See <www.cyborgnest.net/> accessed 10 August 2024.

[36] Barbara Booth, 'This New Wearable Tech Is Closing the Gap between Humans and Cyborgs' *CNBC* (24 September 2019) <https://www.cnbc.com/2019/09/24/new-wearable-tech-is-closing-the-gap-between-humans-and-cyborgs.html> accessed 25 January 2021.

Another example is the United States' Defense Advanced Research Projects Agency initiative to engineer the skin microbiome to produce new and long-lasting mosquito repellents. Though its primary purpose will be to protect military personnel operating in regions that are highly affected by mosquito-borne diseases, this technology may be widely adopted even by civilians in such regions.[37] One of the companies working on this project, Ginko Bioworks, aims to enable customers to 'program cells as easily as we can program computers'.[38] Such an intervention in the body, which is to program cells, will not only be invasive and permanent for the individual but may also result in heritable changes.

In fact, manipulation of cells fades in the background upon consideration of technology that allows manipulation of one's gene. Genome engineering technologies like CRISPR-Cas9 have acquired household popularity after Emmanuelle Charpentier and Jennifer Doudna won the Nobel prize in chemistry for their discovery of this method of DNA manipulation. It has been found to be effective in efforts to suppress aging and to extend life span in mice,[39] though not without controversy.[40]

Crucially, while this technology can be used for therapeutic purposes in humans, such as editing the gene responsible for heritable disease such as

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[37] Ayleen Barbel Fattal, 'Team Awarded $15M by DARPA to Develop Skin Microbiome-Based Mosquito Repellent' *FIU News* <https://news.fiu.edu/2020/team-awarded-15m-by-darpa-to-develop-skin-microbiome-based-mosquito-repellent> accessed 17 January 2021.

[38] 'Corporate Profile' *Ginko Bioworks* <https://investors.ginkgobioworks.com/overview/default.aspx> accessed 19 November 2022.

[39] 'CRISPR/Cas9 Therapy Can Suppress Aging, Enhance Health and Extend Life Span in Mice' *ScienceDaily* <https://www.sciencedaily.com/releases/2019/02/190219111747.htm> accessed 17 January 2021.

[40] Mark Thomal and others, 'Collateral damage and CRISPR genome editing', (2019) 15(3) PLOS GENETICS 300.

Huntington's disease, the effects of any unintended consequences would be heritable too.[41] The UK government has been urged to consider passing a law that would allow scientists to carry out genome editing of embryos for serious genetic conditions.[42]

Beyond the prospect of reducing or eliminating the chances of particular diseases, this technology can also be used to enhance traits across the spectrum of all human functions and traits, including intelligence, athleticism and skin colour.[43] This raises concerns about the rise of 'designer babies', even though studies still highlight the dangers of using genome editing techniques in embryos.[44]

Many of these technologies are being developed with the intention of eventually being made available in the market, and some of them are already in use, whether legally or illegally. This includes not just Ritalin and Modafinil as pointed out above, but even technologies as complex as genetic engineering. For instance, a company in California sells genetic-engineering kits with different tools which range from three dollars to two thousand dollars. One of the product kits allows users to create a novel organism at home.[45]

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[41] Heidi Ledford, 'CRISPR Babies: When Will the World Be Ready?' (2019) 570 Nature 293.

[42] Robin McKie, 'UK Government Urged to Consider Changing Law to Allow Gene Editing of Embryos' *The Observer* (4 March 2023) <https://www.theguardian.com/science/2023/mar/04/uk-government-urged-to-consider-changing-law-to-allow-gene-editing-of-embryos> accessed 4 April 2023.

[43] Schaefer (n 3).

[44] Heidi Ledford, 'Why CRISPR Babies Are Still Too Risky — Embryo Studies Highlight Challenges' (2023) 615 Nature 568.

[45] Elizabeth Kolbert, 'CRISPR and the Splice to Survive | The New Yorker' <https://www.newyorker.com/magazine/2021/01/18/crispr-and-the-splice-to-survive> accessed 25 January 2021.

To conclude this section, HET encompasses various technologies that can enhance diverse bodily functions—namely, cognition and other brain function, muscular functions, and skin functions. However, these technologies are further distinguishable on the basis of their temporality and invasiveness. This demonstrates the breadth of HET. Therefore, I argue that HET should be understood as a *category* of technologies, which in turn has an impact on its definition, to which I turn now.

II. THE PROBLEM OF DEFINITION

I have so far referred to 'HET' as they might be generally understood in popular usage. Some technologies may very clearly be enhancing, including all the ones discussed in section I. They alter the human body (genome editing), give it capacities it does not naturally possess (wearable muscles, brain-computer interface) or improve its natural abilities (for instance, by making one more alert or wakeful: Ritalin or Modafinil). Even though such generic usage of the term HET is largely able to capture and convey the characteristics of such technologies, grey areas will remain. For instance, should coffee also be treated as a human enhancer[46] and regulated along with the technologies discussed in section I?

Indeed, a definition is a *sine qua non* for regulating the subject matter in question.[47] I disagree with the argument that a definitive account of HET is

[46] Simone Cappelletti and others, 'Caffeine: Cognitive and Physical Performance Enhancer or Psychoactive Drug?' (2015) 13 Current Neuropharmacology 71.

[47] Yaniv Roznai, '"A Bird Is Known by Its Feathers"—On the Importance and Complexities of Definitions in Legislation' (2014) 2 The Theory and Practice of Legislation 145, 151.

impossible,[48] extremely difficult,[49] or that the moral dilemmas posed by HET are unlikely to be settled by defining them.[50] While ambiguities in the exact meaning of HET or enhancement may be necessary for general discussions as the technologies evolve, they are likely to do a particular disservice to legal regulation, which is contingent on clarity, predictability, and consistency.

There can be technologies which may not amount to a HET according to generic usage even though the legal definition might capture it as such, or the reverse. Without a definition one may understand everyday improvements in human life, including shoes to prevent injury on a rough road, a bus to travel to work, a pen to convey thoughts, to be equivalent to enhancements. Yet, these are not the kind of enhancements that require regulation. It is worth making the clarification that I do not claim to resolve the lengthy and complicated philosophical debate about the exact meaning of 'human enhancement', though I do wish to draw from it. I also draw from the definitional approaches adopted in the regulatory instruments governing medical and non-medical technologies in the European Union (EU). I only propose a workable definition that, it is argued, can serve the interests of a legal instrument and regulatory efforts that begin from the baseline of asking whether something qualifies as an enhancement technology in the first place. I turn now to this aspect.

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[48] Michael Shapiro, 'The Impact of Genetic Enhancement on Equality' (1999) 34 Wake Forest Law Review 561.

[49] Nick Bostrom and Rebecca Roache, 'Ethical Issues in Human Enhancement', *New Waves in Applied Ethics* (Palgrave-Macmillan 2007); Patrick Lin and Fritz Allhoff, 'Untangling the Debate: The Ethics of Human Enhancement' (2008) 2 NanoEthics 251.

[50] Leon Kass (ed), *Beyond Therapy: Biotechnology and the Pursuit of Happiness. The President's Council on Bioethics* (1st ed., ReganBooks 2003).

The following characteristics of HET, emerge from the foregoing discussion: first, even though some technologies can very clearly and intuitively be called HET, there is some ambiguity about where the cut-off point should lie. Thus, we need to consider whether *all* improvements in human functioning amount to enhancements, or if enhancements should be more narrowly defined. Any cut-off point should be capable of clear expression and consistent application in order to create legal certainty. Second, it is possible that HET overlap with medical products. The same medical drugs or devices that are used by an individual to restore their health might be used by another perfectly healthy person to enhance their capacities. In light of this, it is important to consider how the definition of enhancement should interact with the existing healthcare system and practices. Third, HET appear to be very diverse, in terms of how much they can alter or enhance the human body, how permanently they can do so, and how invasive they might be. Given this, the question arises whether it is enough to say that something *is* an enhancement rather than ascribing to it a more specific label that can speak of its strength as an enhancer as against the others. The final question is whether all enhancements should be regulated in a similar manner.

I will now answer these questions, in order, to arrive at an appropriate definition of enhancements. In doing so, I will also refer to the different definitions of enhancement advanced till now.

A. Not all improvements in functioning can be called 'enhancements'

Some of the current scholarship argues that *any* improvement in human abilities or functioning should be viewed as an enhancement. Contrarily, it is my argument that the cut-off point for what we call 'enhancement' should be placed at bodily-

interventions that is, interventions targeted *on* or *inside* the body. I will first discuss the scholarship in favour of treating all improvements as enhancements. Second, I will discuss the practical and moral distinctions between the many kinds of ways in which human abilities and capacities can be improved. Third, I will defend the significance of the body as the threshold, given the particular impact of bodily interventions, scope for clarity, and the possibility of placing limitations or sanctions on enhancement.

i. Scholarship in favor of treating all improvements as enhancements

Allen Buchanan argues that in the most straightforward sense enhancement refers to expansion of capacities.[51] When understood this way, literacy, numeracy, agriculture and legal institutions are forms of enhancements. Literacy and numeracy have enhanced our cognitive abilities; agriculture has enhanced human well-being and longevity through better nutrition; and legal institutions augment the moral powers of individuals. While literacy, the use of computers etc. are considered "normal" abilities or capacities of human beings today, they were not so for most of the time that humankind has existed. He also argues that it cannot be denied that these are enhancements, simply because they are *external* to us, because the effects they have are *internal.* For instance, there is evidence that literacy changes the brain, and better nutrition due to agricultural revolution significantly changed human bodies. [52]

Brian D. Earp *et al* take a similar position (which they call the 'functional-augmentative approach') and write that 'interventions are considered

[51] Allen Buchanan, 'Enhancement and the Ethics of Development' (2008) 18 Kennedy Institute of Ethics Journal 1.

[52] ibid 4–5.

enhancements insofar as they improve some capacity or function…by increasing the ability of the function to do what it normally does'.[53] Julian Savulescu *et al* make a similar argument, although one that is contingent not on functioning but on welfare.[54] They argue that since all 'improvements' are not *intrinsically good*, enhancement should be taken to refer to improvement of a person's well-being and life. For example, improving memory such that painful experiences are retained better may not be intrinsically good. John Harris's account is also akin to this welfarist approach. He stresses that the moral motive for using technology is for the sake of goods this will bring about, which includes saving lives, postponing death, preventing disease, or enhancing human function.[55] The objective, according to him, is to live longer, healthier and happier lives.[56]

According to both the functional and the welfarist accounts, then, attendance of a course on research methods, ingestion of coffee, and use of cognition enhancing drugs would all be similar enhancements in so far as they improve the ability and promote the welfare of a student writing her PhD thesis.

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[53] Brian D Earp and others, 'When Is Diminishment a Form of Enhancement?: Rethinking the Enhancement Debate in Biomedical Ethics' (2014) 8(12) Frontiers in Systems Neuroscience 1.

[54] Julian Savulescu, 'Justice, Fairness, and Enhancement' (2006) 1093 Annals of the New York Academy of Sciences 321; Julian Savulescu, Anders Sandberg and Guy Kahane, 'Well-Being and Enhancement' in Julian Savulescu, Ruud ter Meulen and Guy Kahane (eds), *Enhancing Human Capacities* (John Wiley & Sons, Incorporated 2011) <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=700645> accessed 10 December 2020.

[55] John Harris, *Enhancing Evolution* (Princeton University Press 2010) <https://press.princeton.edu/books/paperback/9780691148168/enhancing-evolution> accessed 2 December 2020.

[56] ibid.

ii. The practical and moral differences between various improvements

I argue that human beings can experience improvements in their abilities, capacities, and functions through a host of different stimuli, which can differ in practical and moral ways.

First, improvements can occur due to *systems* such as education, agriculture and even democracy. These no doubt improve human abilities and functions, but they are complex and involve several different processes, actors, resources, and inputs. They do not seek the improvement of a particular or singular trait, nor is it possible to identify improvement on only one count. In any case, there is at least the lack of a direct causal link. For example, education as a system involves communication of knowledge, theoretical and practical learning, examinations, and application. Skills developed during this process may lead to an overall improvement in a complex set of abilities, including overall cognitive abilities, but that is not the sole aim of education. The aim is more holistic and linked to *inter alia* human development, while also preparing individuals for contribution to the country's economy. Similarly, participation in agriculture engages and therefore improves several cognitive and physical skills, as does being a member of a democracy.

Second, humans can experience improvements in their abilities and functions due to the use of non-integrated objects such as bicycles, cars, laptops, or binoculars. It is crucial to note that while both these objects are largely focused on the improvement of a particular ability or function, they remain entirely external to the body even though their effects are enjoyed directly.

Third, humans can experience improvements due to practices such as physical training and meditation. Here, the improvement is achieved primarily through the use of the body itself and the combination of effort with the practice or aid. While external aids, such as weights or pull-up bars or a yoga mat can provide an increased challenge to the body or aid in the physical training, the improvement would not be possible without exertion or effort by the body.

The fourth stimulus that can lead to improvements in human abilities and functions is interventions involving substances that are targeted *on* or *inside* the body. I shall address these now.

iii. Significance of the body as the threshold

I shall call interventions involving substances that are targeted *on* or *inside* the body 'bodily-interventions'. Not only are these focused on improving a particular ability or capacity, but become integrated with the body, temporarily or permanently, through ingestion (drugs), surgery (brain chips), or genetic editing. Unsurprisingly then, the effect they intend to have is much quicker, direct, more significant, and involves little to no effort on the part of the person being enhanced. In many ways, such intervention may trigger the mechanism of the body as a whole, by upsetting or creating particular chemical balances or joining disparate muscles. In terms of human anatomy, the body functions as an interconnected system, and an external substance or device when inserted *into* the body, becomes a part of that system.

There are good reasons for according significance to the body as the threshold. First, the law already does so in other realms. For example, through rights such as bodily autonomy, which seeks to protect individuals' ability to

determine what happens to their bodies. Interventions *within* the body are already treated differently, indeed more seriously. For instance, physical assault would attract a higher penal punishment than the theft of a wallet from an individual's pocket in any jurisdiction in the world. This highlights the existing importance accorded to the boundary of the body within the law. Second, there is a real difference in the impact of technological modifications acting from, and embedded, within the body, and those outside or attached to the body. This is because embedded technology becomes part of the body's biological system as a whole: for example, an ingested chemical goes through and affects the digestive, renal, and neurological systems within the body; whereas a smart watch strapped on the wrist only *interacts* with the body rather than become part of it. The upshot is that the effort required to make good use of technology embedded within the body is minimal (i.e. a doping substance artificially and on its own can increase stamina by synchronisation with the body's processes), whereas the effort required to make good use of technology only attached to the body is still significant (i.e. the smart watch does not result in a step count, if there is no steps taken). The nature of effort and merit is further discussed in Chapter Three Section II.

Thus, while it is possible to equate 'improvements' in human abilities such as through literacy, agriculture, meditation, training, bicycles, and shoes with 'enhancement' in the course of ordinary usage; in a legal sense, it downplays the particular impact and significance that bodily interventions can have. Further, it would not be possible to place any limits on human enhancement or impose legal sanctions on it if education and genetic editing, despite all their dissimilarities, qualified in the same category.

This section concludes that all improvements in functioning or welfare cannot be called enhancements and determines that the cut-off point may be placed at bodily-interventions that is, interventions targeted *on* or *inside* the body.

B. The interaction of enhancements with healthcare

Two interactions between enhancements and healthcare are relevant: first, there can be an overlap between medical products and enhancement products, depending on who uses them and for what purpose; second, while the cut-off point for enhancements may be placed at bodily-interventions, such interventions are permitted as long as they are needed for restoring health. One obvious outcome of these interactions is that those bodily interventions that are health-restoring should *not* be considered to be enhancements, and conversely, any bodily intervention that is not health-restoring should be an enhancement.

Indeed, there is a morally relevant difference between an intervention that seeks to assure to the individual their health (or what may be considered to be average levels of human functioning) and one that bestows improved capacities upon an already healthy individual. Such moral relevance can be demonstrated by the following example:[57] If there are two individuals, one with an IQ of 40 and another with an IQ of 100, and only one pill available that could increase the IQ by 50 points, a just society would give it to the former since it would be equality-promoting. This is because individuals should be able to draw on social resources to achieve opportunities on par with others, which is contingent upon good health.

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[57] Chris Gyngell and Michael J Selgelid, 'Human Enhancement: Conceptual Clarity and Moral Significance' in Steve Clarke and others (eds), *The Ethics of Human Enhancement: Understanding the Debate* (Oxford University Press 2016) <https://ezproxy-prd.bodleian.ox.ac.uk:2196/view/10.1093/acprof:oso/9780198754855.001.0001/acprof-9780198754855-section-8> accessed 7 December 2020.

Admittedly, this is a clear-cut case and it may be much more difficult to justify giving this pill to someone who falls just below the cut-off point for intellectual disability (let's say that cut off point is IQ 70) with IQ 69 instead of someone just above it with IQ 71. However, even in these difficult cases, the fact remains that individuals compete for finite resources, and here, the better claim is by the person with IQ 69.

It is for this reason of 'medical necessity' that insurance coverage may be provided for growth hormone treatment for children projected to be very short, provided that there is some diagnosable growth hormone deficiency. Similarly, insurance coverage may be provided for reconstructive breast surgery following mastectomy, but not for cosmetic surgery.[58] For instance, the National Health Service of the United Kingdom does not *routinely* provide cosmetic surgery. It may, however, be occasionally provided for psychological or other *health reasons.* The examples given by NHS include (1) breast implants where the individual has very uneven breasts or no breasts, which causes significant psychological distress; (2) nose reshaping if there are breathing problems; (3) ear correction surgery if prominent ears are causing significant distress.[59] Thus, even on a macro scale, given that any society's resources are limited, bodily interventions that treat diseases or restore health should not be proscribed or regulated in a way that they become less accessible, for reasons other than efficacy or safety.

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[58] Norman Daniels, 'Normal Functioning and the Treatment-Enhancement Distinction' (2000) 9 Cambridge Quarterly of Healthcare Ethics 309, 310–311.

[59] 'Cosmetic Procedures - When It's on the NHS' (*nhs.uk*, 2 May 2019) <https://www.nhs.uk/conditions/cosmetic-procedures/cosmetic-procedures-on-the-nhs/> accessed 14 December 2022.

This suggests that the cut-off point for enhancement can be defined at bodily interventions that are 'not for treatment'. Indeed, Eric Juengst has defined enhancement as 'interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health'.[60] The practical and legal logic behind the argument for a cut-off point for enhancement to be placed at 'not for treatment' is further emboldened by the regulation for medical devices in the EU. In 2012 in *Brain products,*[61] the European Court of Justice (CJEU) had to answer whether neuroimaging devices that were used exclusively for research with healthy subjects qualified as medical devices and were therefore required to obtain the relevant certificate under the Medical Device Directive of 1993.[62] The relevant context is that the Directive distinguished between devices used for a medical purpose such as diagnosis, treatment or alleviation of disease, and those used by perfectly healthy individuals. The purpose of the device was to be ascertained in line with the manufacturers' intention, and such intention was construed in accordance with the data supplied by the manufacturer on the labelling or the promotional materials. As a result, only those devices that were marketed for 'diagnostic and/or therapeutic purposes' were regulated under this Directive, and those marketed for enhancement were excluded.

The CJEU held that the research devices at issue were not medical devices and were exempt from the regulatory regime of the Medical Devices Directive. This rationale continues to apply under the currently applicable Medical Devices

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[60] Eric Juengst, 'What Does Enhancement Mean?' in Erik Parens (ed), *Enhancing Human Traits: Ethical and Social Implications* (Georgetown University Press 2000).

[61] *Brain Products GmbH v BioSemi VOF and Others*, Case C-219/11 (European Court of Justice).

[62] European Parliament and the Council, Directive 93/42/EEC of 14 June 1993 concerning medical devices, OJ L 169, 12.7.1993 ["Medical Devices Directive"].

Regulation,[63] as it has not substantially changed the definition of 'medical device' from the Medical Devices Directive. However, it has established a new category for non-medical devices under Annex XVI, explicitly expanding the scope of the regulation beyond the realm of the medical.[64] Annex XVI lays down six groups of products without an intended medical purpose, encompassing technologies ranging from contact lenses, to non-invasive brain stimulation devices.

Further support for seeing enhancement in contradistinction to medical treatment is provided by the international drug control regime. Discussed in more detail in section III of Chapter Three below, the relevant point is that states subject to the treaties that govern and regulate pharmaceutical substances or drugs are obliged to ban scheduled substances for any use other than medical or scientific. While the meaning of 'medical use' is not defined, the context suggests that it is understood synonymously with *therapeutic use*, or measures necessary to cure or alleviate a medically recognised disorder.[65]

In a similar vein, the Oviedo Convention for the Protection of Human Rights and Dignity of the Human Being with Regards to the Application of Biology and Medicine 1997[66] also specifies under Article 13 that any intervention

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[63] European Parliament and the Council, Regulation 2017/745/EU of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC. ["2017 Medical Devices Regulation" or "MDR"]

[64] See Annex XVI to the MDR 'List of groups of products without an intended medical purpose referred to in Article 1(2).

[65] Jan-Christoph Bublitz, 'Drugs, Enhancements, and Rights: Ten Points for Lawmakers to Consider' in Fabrice Jotterand and Veljko Dubljevic (eds), *Cognitive Enhancement: Ethical and Policy Implications in International Perspectives* (Oxford University Press 2016) <https://doi.org/10.1093/acprof:oso/9780199396818.003.0019> accessed 19 April 2025.

[66] Oviedo Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (4 April 1997) ETS No. 164. ['Oviedo Convention']

that seeks to modify the human genome may only be undertaken for preventive, diagnostic or therapeutic purposes, and only if its aim is not to introduce any modification in the genome of any descendants. In this manner, much of the existing legal regulation, though specific in nature (in that it is applicable to devices, pharmaceutical substances, or genetic interventions, and within the specific jurisdiction of EU) emboldens the proposal here to see enhancement in contradistinction to treatment.

Thus, the argument here is that any intervention undertaken without the purpose of treating an underlying disease would amount to enhancement. Yet, two concerns remain: first, whether treatment, health, and disease can be accurately defined; and second, whether the *reason* for the intervention is the only relevant factor rather than also its *effect*. This section will now explore both concerns in turn.

There has been considerable scholarly exchange regarding whether the meaning of treatment, health, and disease can be objectively determined. The first view proceeds from the belief that disease involves an underlying biological disorder that is scientifically objective. The 'Biostatistical Theory' of disease developed by Christopher Boorse argues that diseases are internal states that interfere with functions in the species design and depress functional ability below the species-typical level.[67] This species-typical level refers to 'normal functioning'. Thus, a healthy individual would be one who can do everything that an appropriately matched member of the species (in terms of age, gender) can

[67] Christopher Boorse, 'Health as a Theoretical Concept' (1977) 44(4) Philosophy of Science 542, 558.

do,[68] and conversely, a diseased individual is one whose functioning is reduced below normal levels due to some internal state.

Contrary to this objective account, those taking a subjective view argue that the classification of conditions as diseases reflects societies' norms and values rather than an objective reality.[69] Since 'disease', 'normalcy' and 'health' are significantly culturally and historically bound, 'any exclusive enhancement definition must fail'[70] For instance, a desire to masturbate used to be considered a disease many decades ago. Thus, there cannot be a 'substantive transcultural independent meaning' ascribed to enhancement.[71] Norman Daniels too argues that the line between treatment and enhancement is necessarily value-laden and does not 'map onto the boundary between morally obligatory and non-obligatory services'. For instance, two boys, one of whom is projected to have very short height due to his genetic make-up and the other due to an underlying growth hormone deficiency will suffer the same disadvantage and lack of opportunity, even though only the latter will qualify for 'treatment'.[72] Given this equal disadvantage, there is an equal basis to provide medical service for both.[73]

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[68] Eric Juengst and Daniel Moseley, 'Human Enhancement' in Edward N Zalta (ed), *The Stanford Encyclopedia of Philosophy* (Summer 2019, Metaphysics Research Lab, Stanford University 2019) <https://plato.stanford.edu/archives/sum2019/entries/enhancement/> accessed 14 December 2020.

[69] Savulescu, Sandberg and Kahane (n 54).

Savulescu *et al* describe a similar approach as the 'sociologically-pragmatic approach' which views enhancement as a socially constructed concept that can differ from culture to culture depending on its values.

[70] Paul Root Wolpe, 'Treatment, Enhancement, and the Ethics of Neurotherapeutics' (2002) 50 Brain and Cognition 387; Mara Almeida and Rui Diogo, 'Human Enhancement: Genetic Engineering and Evolution' (2019) 2019 Evolution, Medicine, and Public Health 183, 185.

[71] Savulescu, Sandberg and Kahane (n 54).

[72] Daniels (n 58) 313.

[73] Daniels (n 58).

Daniels, despite his criticisms of the treatment-enhancement distinction above, advocates its limited use where disease and disability are understood as impairments of species-typical or normal functioning, and where the emphasis is on the *effect* of the intervention rather than the *reason* for using it. While Daniels relies on Boorse's work mentioned above, he states that his theory does not depend on a strong claim about the objectiveness of judgements about disease akin to those made by Boorse.[74] Instead, for the purposes of his theory, it is sufficient that the line between disease and its absence is *for the general run of cases* ascertainable through publicly acceptable methods, such as those of biomedical sciences. What is important is that the core of the notion of species-typical functioning is intact, even if what counts as a disease is subject to some normative judgment.[75] Where errors remain, we must hope that there are internal critical pressures within the biomedical sciences that expose them.[76]

As per Daniels' account then, enhancement would be interventions that results in improvement in human functioning beyond the species-typical level.[77] The species-typical level need not have any metaphysical importance: rather, it serves as a focal point for the convergence of our public conception of what we must assure each other in terms of healthcare.[78] Further, Daniels' reference point is not whether the reason for the intervention is a disease as demonstrated by functioning below the normal functioning level, but whether the intervention has

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[74] See section II.B for a discussion on Boorse's 'Biostatistical Theory' of disease.

[75] See Daniels (n 73) at endnote 13, page 322.

[76] Daniels (n 58).

[77] ibid.

[78] ibid.

the *effect* of raising the level of functioning beyond the species-typical level. Thus, an intervention that increases a short individual's height even though the individual has no disease or disability, but does not raise it beyond the species-typical level, would not amount to enhancement under this view. Simultaneously, the use of prosthetic legs by a disabled sprinter which make her faster than an average able-bodied sprinter would amount to an enhancement under this view.

The merit of this approach is that it recognizes that the same disadvantage may accrue to two people, only one of whom is 'diseased', and places the remediation of this disadvantage in both cases at an equal footing. At the same time, it also recognizes that if someone has been enhanced as an unintended consequence of restoring their health, it is an additional benefit that would give them an advantage over others. This is aligned with the moral significance ascribed to healthcare earlier: that of allowing equal opportunities to individuals. Even though this account is unable to answer the concern that it is difficult to determine the species-typical functioning level for a host of traits, such as happiness, cognition, or even erectile function,[79] it at least provides a single and relatively unified goal for healthcare. As Juengst and Daniel Moseley argue, the individual's physiology can be used to determine when they have achieved the species-typical range.[80]

This section concludes that the cut-off point for enhancements can lie at 'bodily interventions not meant for treatment' since there is a morally relevant distinction between restoring health and enhancing the capacities of a 'healthy'

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[79] Wolpe (n 70).

[80] Juengst and Moseley (n 68).

person. This is with the understanding that the terms ‘treatment’ ‘disease’ and ‘health’ might remain in flux even though their core may be ascertainable. This section also notes that there should be a difference in the regulation of enhancements, that though not geared towards treatment, help the body come up to species-typical levels, and those that push the body beyond such species-typical levels (explored further in the section below). Further, even health-restoring interventions, geared towards treatment, can be considered enhancements in so far as they raise functioning beyond species-typical levels. Crucially, this is an important aspect of the regulation of HET: it is not just the *nature* of the device or the substance itself that results in its classification as an enhancement, but rather, also on its effect.

C. The need for a regulatory distinction between different kinds of enhancements

The question now arises whether all interventions that qualify as enhancements should be regulated similarly. There is considerable support from scholars in the field for the proposition that HET should be viewed as a matter of degrees. For instance, Nicholas Agar and Arthur Caplan have stressed the significance of differences in degree of human enhancement. They have argued that while human enhancement is a good thing, ‘it is possible to have too much of it’. It is in this context that they distinguish between moderate and radical degrees of enhancements.[81] Radical enhancements would involve ‘improving significant human attributes and abilities to levels that greatly exceed what is currently

[81] Nicholas Agar and Arthur L Caplan, *Truly Human Enhancement: A Philosophical Defense of Limits* (MIT Press 2013) <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=3339716> accessed 14 December 2020.

possible for human beings'.[82] As opposed to this, 'moderate enhancements' would be those which improve abilities to levels within or close to what is currently possible for human beings.[83] Thus, they endorse a conceptually pluralistic account which encompasses more than one understanding of human enhancement.[84]

Similarly, Mara Almeida and Rui Diogo propose that HET could be grouped into phenotypic and genetic categories, where these categories have different degrees of ethical, societal and environmental impacts.[85] Gyngell and Selgelid note that the main problem with the existing definitions might be that they conceive of enhancement in a binary fashion, rather than viewing it as a matter of degree.[86] Even the welfarist approach taken by Savulescu *et al* divides enhancements into subclasses and admits that each may lead to different concerns.[87]

I have so far identified the relevant terms as 'improvement', 'bodily-interventions', 'treatment' and concurrently 'not treatment', and 'species-typical level'. Another term that can be valuable in guiding the regulation of HET as a class is 'species-maximum level'. Some scholars have taken a very restrictive view of enhancements, arguing that enhancements are 'alterations to capacities which take people beyond what is naturally possible for the *species*'.[88] Thus,

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[82] Nicholas Agar, *Humanity's End: Why We Should Reject Radical Enhancement* (MIT Press 2010).

[83] Agar and Caplan (n 81).

[84] ibid 19.

[85] Almeida and Diogo (n 70).

[86] Gyngell and Selgelid (n 57).

[87] Savulescu, Sandberg and Kahane (n 54).

[88] Gyngell and Selgelid (n 57).

according to this view, while taking cognition enhancing drugs is unlikely to be an enhancement, genetic engineering that causes radical changes to our phenotype (for instance, skin fluorescence) would amount to enhancement, as it may cause us to acquire abilities that our species does not 'naturally' have.[89] This is similar to what Agar calls 'radical enhancements'.[90]

Admittedly, it is not possible to determine the maximum natural value for each human trait. For instance, until Usain Bolt ran 100 metres in 9.58 seconds, it was an unnatural human ability. Further, a 'species' may be viewed as a lineage of a group of descendant populations with its own evolutionary tendencies. Thus, it is possible for traits to radically change through natural evolutionary processes without changing the species to which the individual belongs.[91] As a result, what is 'species-maximum' itself becomes indeterminate, and it is not necessary then that an enhancement takes one beyond the species-maximum value. Nonetheless, for the traits for which such a value can be determined at any given point in time (for instance, eye sight, speed, height, IQ) there are good reasons to regulate differently the technologies that can enhance individuals beyond what is possible for the species as opposed to those that only increase capacities beyond species-typical functioning. The former would bestow far greater advantages and will likely have far more significant regulatory implications.

Thus, I conclude that not only is a cut-off point relevant for determining what qualifies as an enhancement, but further, that points can be determined to

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[89] ibid.

[90] Agar (n 82).

[91] Edward Wiley, 'The Evolutionary Species Concept Reconsidered' (1978) 27(1) Systematic Zoology 17.

create sub-classes or degrees of HET which must be regulated differently. 'Species-maximum level' is one such point. HET should be viewed on a spectrum rather than simply as a group that can be regulated homogenously. The next section draws from the discussion till now and presents the model I propose for defining and regulating HET.

III. THE VARIABLE DEGREE SPECTRUM APPROACH

The 'variable-degree spectrum' approach lays out the whole spectrum of improvement, treatment and enhancement, and separates it into degrees as such:

Non-enhancements:

a. Systems, practices, and non-integrated objects that improve functioning (**improvements**)
    - Education, meditation, binoculars
b. Therapeutic bodily-intervention that improves functioning up to species-typical functioning (**treatment**)
    - Supplements like calcium, vitamin B12
    - Pacemakers
    - Genetic intervention that eliminates Hunter disease

Degree I Enhancements: Non-therapeutic bodily-intervention that improves functioning up to species-typical level

a. Temporarily

- Coffee
- Nutritious diet

b. Permanently

- Growth hormones taken during adolescence

Degree II Enhancements or superhuman enhancements: Therapeutic or non-therapeutic bodily-intervention that improves functioning beyond species-typical but below species-maximum level

- A disabled athlete's bionic limbs that allow her to run faster than an able-bodied athlete
- Muscle implant that allows an athlete to run as fast as Usain Bolt

Degree III Enhancements or posthuman enhancements: Therapeutic or non-therapeutic bodily-intervention that improves functioning beyond species-maximum

- Tiger Woods' 20/15 vision after eye-surgery
- Genetic intervention that bestows x-ray vision

A few observations are important to note. First, this approach considers the beneficial effect of systems such as education, non-integrated objects such as binoculars and practices such as meditation, but it classifies them as improvements rather than enhancements. Further, by incorporating the treatment-

enhancement distinction, as well as the species-typical and species-maximum approach, the variable-degree spectrum approach acknowledges these to be valid and significant indicators on the spectrum of human enhancement.

Second, the *reason* for the intervention as well as its *effect* remain relevant in this model. For instance, a bionic limb used due to an amputation that allows an individual to walk at the normal speed would be a non-enhancement but if it increases the amputee's speed to beyond normal or species-typical levels, it would be a superhuman enhancement, falling under degree II.

Third, the approach does not classify all technologies *per se*, since their effect could vary from individual to individual. Certain enhancements may be more significant due to the characteristics of the technology used. For instance, genetic editing (which might even be inheritable) is the most invasive and likely irreversible method of intervention to cause changes in the human body, no matter who it is applied to. Thus, the characteristics of the technology itself is very relevant and remains an independent factor, despite the assignment of degrees to the effects arising from its use.

Fourth, the definition can be employed in an effect-agnostic sense. While current regulations, discussed further in Section III of Chapter 3 below, are centred on distinct objectives of their own comprising most notably of risk and safety, the definition proposed herein is not motivated by a specific objective, but is rather centred on the effects on the body, and can plausibly be co-opted into a regulation that seeks a specific outcome, as further explored in Chapter 6.

Admittedly, this approach is not devoid of challenges. It is possible that the points on the spectrum that describe what 'species-typical' or 'species-

maximum' is move as our species evolve. While this would make the spectrum dynamic, it does not pose a significant difficulty as all laws must undergo change when the time comes. Further, difficulties may arise because cases adjacent to each other might be very similar, or may sit on the border of any of the degree indicators. Equally, there may be concerns about how to classify a technology that can be used in very different ways, and what the evidence collected for a particular use should be. There can also be significant reservations about entrusting the resolution of these complex questions to a particular authority. Furthermore, in a multicultural world, it is possible that inconsistent conclusions are reached in different jurisdictions.

However, these are all concerns that the law inhabits as a field across the spectrum of civil, criminal and commercial laws. Issues of classification and the extent of authority of judges arise time and again, but do not take away from the need for regulation in the first place. Indeed, Agar and Caplan write that while vagueness is likely to be an obstacle to the adjudication of certain cases, it does not invalidate the categorization itself. There are people who can be classified as hirsute or bald despite the lack of a precise boundary between hairy and hairless.[92]

CONCLUSION

This chapter sought to lay the foundation for the thesis by providing an account of various kinds of technologies that may be called HET. This demonstrated the breadth of HET, in terms of the human capacities they enhance, the temporarily of their effects, and their invasiveness in the human body. I argued that HET should

[92] Agar and Caplan (n 81) 3.

be understood as a *category* of technologies, which in turn has an impact on its definition.

The second aim of this chapter was to delineate the dominant definitional approaches for HET in the bioethics literature. The purpose was to assess whether they can serve a regulatory function. I argued that existing definitions fail to serve regulatory objectives. I also discussed the definitions adopted in existing regulations and how they support the logic of seeing enhancement in contradistinction to treatment. I proposed and defended the 'variable-degree spectrum definition' which offers stable markers for regulation and incorporates the qualitative differences among various kinds of HET and their effects on the body. This makes an important advance in the literature on the definition of HET by highlighting the vital difference between different kinds of improvements of human functions, and how various kinds of enhancement can be distinguished from each other and attract tailored levels of regulatory oversight. While this thesis is limited to assessing only the equality harms of the use of HET, this definition may be adopted for the regulation of other harms arising from the use of HET.

The definition of HET, however, is only one part of the overall puzzle of regulating HET. The next chapter delves into regulatory theory and defends why HET meets the threshold for regulatory intervention with respect to the particular focus of this thesis: namely, equality.

CHAPTER TWO

REGULATORY INTERVENTION: ANIMATING FACTORS AND FORMS

INTRODUCTION

The benefits of technology permeate every aspect of daily life today, including how we harvest and process our food, the modes we use for communication, the digital platforms for the education of our young, and the diagnostic techniques and medicines in healthcare for all. The development of new technology is a measure of progress of the human civilisation. Twenty years ago, Leon Kass, writing on behalf of the (United States) President's Council on Bioethics observed that the completion of the DNA sequencing phase of the Human Genome Project, the emergence of stem cell research, and advances in neuroscience as well as nanotechnology, are 'steadily increasing our power ever more precisely to intervene into the workings of our bodies and minds and to alter them by rational design'.[93]

In the last twenty years, enormous strides have been made in genomics research including genetic engineering, and in computing power and machine learning. Now, in 2024, biotechnology coupled with the recent advancements made in AI allows both for understanding the human body in unprecedented detail and the development of novel interventions into it. For example, AI algorithms

[93] Bioethics and Kass (n 9) 5–6.

can be used to analyse vast biological datasets to predict diseases as well as potential drugs. 3D bioprinting and tissue engineering is also made possible. Further, AI's ability to help design synthetic biological components can allow for the creation of novel biotechnological products.[94]

The question that arises is why the development and use of technology may be of interest and concern for the law. This is the question that Roger Brownsword and Morag Goodwin answer in their book.[95] One obvious reason, according to the authors, is that many novel technologies present risks to humans as well as to the natural environment. It then falls upon the law to assess the suitability of existing frameworks to regulate for the relevant risks and harms, and if inadequate, devise new and appropriate laws.[96]

In the context of why HET is of concern for the law, this chapter has two aims. First, to understand what the threshold for regulatory intervention is, in order to complete the foundation of the thesis in addition to Chapter One. **Section I** seeks to achieve part of this aim by discussing regulatory theory. Here, it emerges that regulation is broader than law and refers to any instrument that nudges or channels group behaviour. **Section II** addresses the second part of this aim. It delineates the conditions under which new technology may precipitate *sui generis* regulatory intervention: namely, when there are novel harms, or harms incapable of being addressed by existing generic laws.

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[94] Irina Negut and Bogdan Bita, 'Exploring the Potential of Artificial Intelligence for Hydrogel Development—A Short Review' (2023) 9 Gels 845.

[95] Roger Brownsword and Morag Goodwin, *Law and the Technologies of the Twenty-First Century: Text and Materials* (Cambridge University Press 2012) <https://www.cambridge.org/core/books/law-and-the-technologies-of-the-twentyfirst-century/996EC2CB971505916B78C0F299A17BF2> accessed 24 October 2023.

[96] ibid 2.

The second aim of this Chapter is to understand the factors and considerations when designing the appropriate regulatory framework.[97] The purpose is to consider these factors at a later stage in the thesis when an appropriate regulatory framework is being developed. **Section III** discusses these factors, namely, the stage of technological development and distribution, the institutions responsible for conception and implementation, and the affected stakeholders. **Section IV** then makes a case for distributive justice as a focal point in the regulatory design of technology by demonstrating how technology currently contributes to socio-economic inequality in the world.

I. UNDERSTANDING REGULATION

According to Julia Black and her co-authors, the term 'regulation' signifies:

> the sustained and focused attempt to alter the behaviour of others according to standards or goals with the intention of producing a broadly identified outcome or outcomes, which may involve mechanisms of standard-setting, information gathering and behaviour-modification.[98]

While exhaustive, it also appears complicated. Indeed, regulation has also been called:

> a complex, polycentric system composed of several elements…messy and highly imperfect…involves complicated interactions of multiple people and organisations with conflicting, or at least differing, interests, understandings and values; and often requires the creation, adaptation and

[97] Lyria Bennett Moses, 'Regulating in the Face of Sociotechnical Change' in Roger Brownsword, Eloise Scotford and Karen Yeung (eds), *The Oxford Handbook of Law, Regulation and Technology* (2017) <https://ezproxy-prd.bodleian.ox.ac.uk:2393/view/10.1093/oxfordhb/9780199680832.001.0001/oxfordhb-9780199680832-e-49> accessed 3 February 2021; Peter Huber, 'The Old-New Division in Risk Regulation' (1983) 69 Virginia Law Review 1025; 'Emerging Biotechnologies: Technology, Choice and the Public Good' (Nuffield Council on Bioethics 2012) <https://www.nuffieldbioethics.org/publications/emerging-biotechnologies> accessed 24 February 2021.

[98] Julia Black, Martin Lodge and Mark Thatcher (eds), *Regulatory Innovation: A Comparative Analysis* (Edward Elgar 2005) 11.

> implementation of myriads of techniques which may or may not cut across one another.[99]

What is evident, as Brownsword and Goodwin observe, is that regulation is not straightforward. It is not always clear who is a regulatory authority and what counts as regulation. They treat regulation, more simply, as 'encompassing any instrument (legal or non-legal in its character, governmental or non-governmental in its source, direct or indirect in its operation, and so on) that is designed to channel group behavior.' In turn, a regulator is 'any person or body who initiates regulation' in a broad sense. Law (including treaties, constitutions, codes, legislation, as well as case law) is only one force that contributes to the overall regulatory framework.[100] Thus, while law and regulation intersect with each other, they are not coextensive. Regulation is broader than law, in that regulators often rely on instruments and strategies other than legislation in their effort to alter the behavior of others.[101]

The overall regulatory environment is made up of (governmental) law, (non-governmental) regulation, and the activities of non-governmental agencies, such as religious and professional associations, technical standard setting bodies, advisory bodies, etc. that seek to impose a pattern of behavior on their membership or who order group relationships.[102] It encompasses not only normative signals consisting of law and social norms, but also physical signals

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[99] Julia Black and Andrew Douglas Murray, 'Regulating AI and Machine Learning: Setting the Regulatory Agenda' (2019) 10 European Journal of Law and Technology 5 <https://www.ejlt.org/index.php/ejlt/article/view/722> accessed 13 September 2023.

[100] Brownsword and Goodwin (n 95) 25.

[101] ibid 26.

[102] ibid.

such as product design (for example, filters to intercept spam) or architecture (for example, roads with bends designed to deter high-speed driving).

Thus, overall, the regulatory environment may consist of law, social norms, the market, and architecture, as well as features such as password-protections in the context of cyber law.[103] Lawrence Lessig provides the following example to illustrate the complexity of a regulatory environment:

> The government may want citizens to wear seatbelts more often. It could pass a law to require the wearing of seatbelts (law regulating behaviour directly). Or it could fund public education campaigns to create a stigma against those who do not wear seatbelts (law regulating social norms as a means to regulating behaviour). Or it could subsidize insurance companies to offer reduced rates to seatbelt wearers (law regulating the market as a way of regulating behaviour). Finally, the law could mandate automatic seatbelts, or ignition-locking systems (changing the code of the automobile as a means of regulating belting behaviour). Each action might be said to have some effect on seatbelt use; each has some cost. The question for the government is how to get the most seatbelt use for the least cost.[104]

This demonstrates that a smart regulatory strategy would choose and combine elements which results can optimize the amount of regulatory intervention, where the law would be only one element of the overall regulatory environment.

In order to determine how law can best serve its regulatory function, it is important to understand the purpose it seeks to embody in acting as a regulatory tool. Bronwen Morgan and Karen Yeung argue that law, in its regulatory function, serves two roles: first, in its facilitative role it is an instrument for shaping social behaviour. Second, in its expressive role, it institutionalises values. It constrains

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[103] Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books, Inc 1999); Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113 Harvard Law Review 501, 507–514.

[104] Lessig, *Code and Other Laws of Cyberspace* (n 103) 93–94.

institutions by giving expression to the values that the democratic system in which it exists, upholds. Thus, if the law prohibits dumping of waste into public waterways, such prohibition can be seen as expressing the community's shared commitment to environmental preservation and public condemnation of polluting behaviour.[105] This suggests that the law, in its regulatory function too, must mirror the values upheld by the community.

However, determining the appropriate regulatory form that law should take when it comes to novel technology has many elements: such as, determining whether the technology crosses the threshold for regulation, which aspects of the technology should be regulated; whether it should be governed by existing laws and rules or by a *sui generis* regulatory instrument; when such regulation should be put in place; and the stakeholders who should be involved in reaching a determination. I turn to these issues now.

II. REGULATION OF NOVEL TECHNOLOGY - THE THRESHOLD FOR REGULATORY INTERVENTION

The fact that a new technology exists is not in itself enough for regulatory action. Indeed, there is consensus that the threshold that technology must cross in order to attract regulation is that of *harm.* Lyria Bennett Moses writes that it is for this reason that the law regulates even other acts that are not technological in nature, but that result in harm, such as physical assault or methane emissions from cattle.[106] This echoes the values that Ronald Dworkin proposed for the regulation

[105] Bronwen Morgan and Karen Yeung, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 6 <https://www.cambridge.org/core/books/an-introduction-to-law-and-regulation/C77EF24DFCF555CDE19AF6B60BE51025> accessed 12 April 2023.

[106] Moses (n 97).

of technology: the interests of the individuals who will be made better or worse off by the regulation or prohibition of a new technology; and consideration of the values of the *kind* of society we wish to live in.[107] This is especially relevant in the case of potentially transgressive technologies that appear to pose a threat to the moral fabric of society.[108]

Brownsword too argues that regulation should not be guided by whether the technology improves a particular human capacity, but rather how the exercise of the enhanced capacity impacts on the relationship between humans and on the conditions that are essential for a prospering moral community.[109] Thus, the relevant question for regulation then becomes whether the use of HET might be antithetical to the values of society and/or whether harms, risks and injustices will flow from them.

Once the distinctive harms of a technology are recognised, it is still a further choice between regulating them through existing and generic laws (such as contract law, consumer law, intellectual property laws etc.), as opposed designing a *sui generis* instrument for them. For example, there has been disagreement over whether genetic information should be treated as health information. While some have argued that its sensitivity, connectedness to family and predictive nature

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[107] Ronald Dworkin, *Sovereign Virtue: The Theory and Practice of Equality* (Harvard University Press 2000) 428.

[108] John McMillan and Jeanne Snelling, 'Equality: Old Debates, New Technologies' in Roger Brownsword, Eloise Scotford and Karen Yeung (eds), *The Oxford Handbook of Law, Regulation and Technology* (2017) 86 <https://ezproxy-prd.bodleian.ox.ac.uk:2393/view/10.1093/oxfordhb/9780199680832.001.0001/oxfordhb-9780199680832-e-3> accessed 3 February 2021.

[109] Roger Brownsword, 'Regulating Human Enhancement: Things Can Only Get Better?' (2009) 1 Law, Innovation and Technology 125.

justify *sui generis* treatment, others argue it is much like other health information in its risks and benefits and should therefore be treated in a similar manner.[110]

Another problem is that *sui generis* rules may fail to cover as many problems as the general regime, creating the risk of gaps and uncertainties. For example, the insistence that *in vitro* embryos require a *sui generis* legal regime and are not governed by property law means that couples who want to move their embryos from one fertility clinic to another would not be able to rely on the tort of wrongful interference with goods. This example illustrates the dangers of removing an entity from a general domain such as a property law without simultaneously creating a *sui generis* regime of similar scope.[111] Another example is the offence of harassment which can be committed through a variety of different technologies. Here, structuring regulation in terms of 'misuse' of particular technologies could risk duplication or obsolescence.[112]

The tussle between *sui generis* laws and generic laws has come to the fore in the context of AI too and remains unresolved. Julia Black and Andrew Douglas Murray note that where an activity is already regulated under a specific regulatory regime, the use of AI in the development or deployment of that activity, such as in the development of medical treatments or devices, is captured within such regulatory regime.[113] Similarly, Elena Abrusci and Richard Mackenzie-Gray Scott

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[110] Lyria Bennett Moses, 'Sui Generis Rules' in Gary E Marchant, Braden R Allenby and Joseph R Herkert (eds), *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight: The Pacing Problem* (Springer Netherlands 2011) <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=763210> accessed 3 February 2021.

[111] ibid.

[112] Moses (n 16), 586.

[113] Black and Murray (n 99) 15–16.

argue that the existing substantive rules under the legal frameworks for data protection, non-discrimination and human rights are sufficient to safeguard individuals against the harms of algorithmic decision-making.[114] On the other hand, Dafna Dror-Shpoliansky and Yuval Shany argue in favour of a new right not to be subject to algorithmic decision-making.[115] However, Bennett Moses warns that although some legal issues may be truly *new* in that they arise for the time as a result of new technological activity, many others are only new manifestations of issues that have arisen previously in other contexts. Ignoring the broad historical perspective can lead to narrowly framed legislative solutions.[116]

It might be possible to avoid gaps and obsolescence if the two regimes run in parallel. This means that *sui generis* rules may still be required to address the specific harms that generic laws are unable to address. It is also possible that further clarification of the application of generic laws is required due to a change in the *nature* and *significance* of harm. For instance, even though criminal law may apply to an instance of cyber bullying that results in a suicide, the mode of collection and consideration of evidence would require revision. As such, an evaluation of the distinct harms of HET and whether they are being addressed

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[114] Elena Abrusci and Richard Mackenzie-Gray Scott, 'The Questionable Necessity of a New Human Right against Being Subject to Automated Decision-Making' (2023) 31 International Journal of Law and Information Technology 114.

[115] Dafna Dror-Shpoliansky and Yuval Shany, 'It's the End of the (Offline) World as We Know It: From Human Rights to Digital Human Rights – A Proposed Typology' (2021) 32 European Journal of International Law 1249.

[116] Susan Brenner and Susan Brenner, *Law in an Era of Smart Technology* (Oxford University Press 2007); Lyria Bennett Moses and Nicola Gollan, 'The Illusion of Newness: The Importance of History in Understanding the Law-Technology Interface' (26 November 2015) <https://papers.ssrn.com/abstract=2697311> accessed 19 September 2023.

adequately by generic laws is a crucial indicator of the robustness and effectiveness of the contemporarily applicable framework.[117]

Another solution to the general law v. *sui generis* rules dilemma is a mix of regulatory strategies. Each component law of the regulatory mix may trigger different obligations and be enforced by different actors. In this manner, more than one actor, the State, can participate in the regulatory process, which can democratise regulation as well as make it more effective. This is discussed further in the section on private ordering below. Notably, this may accord more with the model of responsive regulation devised by Ian Ayres and John Braithwaite[118] if it is flexible to adaptation based on the behaviour and motivations of the person being regulated, while being underpinned by credible threats of enforcement. Further, a regulatory mix can be alive to the different rationales for regulating, including addressing market failure,[119] protection of human rights,[120] and promoting social solidarity.[121]

Thus, harms arising out of new technology should not on their own lead to a presumption in favour of crafting new regulatory laws. Rather, the test is whether they are novel harms, or harms incapable of being addressed by existing

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[117] Moses (n 110).

[118] Ian Ayres, John Braithwaite and Stephen Wilks, 'Responsive Regulation: Transcending the Deregulation Debate' (1994) XLII Political studies 721.

[119] Robert Baldwin, Martin Cave and Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press, Incorporated 2012) <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=829488> accessed 20 April 2025.

[120] Roger Brownsword, 'What the World Needs Now: Techno-Regulation, Human Rights and Human Dignity', *Global Governance and the Quest for Justice - Volume IV* (Bloomsbury Publishing UK 2004).

[121] Tony Prosser, *The Regulatory Enterprise: Government, Regulation, and Legitimacy* (University Press 2010).

laws, or a need for a regulatory mix in order to diversify the regulatory approach and enforcing mechanisms. This is the necessary condition that should precipitate regulatory intervention for novel technology.

III. OTHER REGULATORY FACTORS

Regulatory intervention must be accompanied by consideration of various factors. These factors include: timing the regulatory intervention; the form that the regulatory intervention should take and the institution that creates it; and the stakeholders who should be involved in the process. I discuss these in turn.

A. Timing the regulatory intervention

A look at the timing of regulatory intervention in previous technologies indicates that regulation was attempted early where the technology involved commercial exploitation of shared public resources or scarce resources. For instance, the first demonstration of the use of radio communication technology was carried out in 1896, and the technology was regulated as early as 1906, with the International Radiotelegraph Conference taking place in Berlin in 1906. The US Congress noted in 1910 that regulation was necessary due to 'the physical limitation on the airwaves or electromagnetic spectrum restricts the number of stations'.[122]

However, in other cases, regulation tends to be post-facto. Julia Black and Andrew Murray observe that disruptive technologies typically have the following stages of development: Proof → Prototype → Commercial Development → Approval (in some cases) → Commercial exploitation → Regulation. For example, in the case of the telephone, it took more than three decades for the Mann-Elkins Act to arrive in 1910, even though Alexander Graham Bell had

[122] Black and Murray (n 99).

patented the telephone as early as 1876 and the uptake grew quickly in 1894 once his legal monopoly was removed. Whereas with radio there was a limited supply of spectrum and as a result a regulatory intervention at the approval stage, with telephone the same scarcity was not an issue, resulting in regulation post commercial exploitation.[123]

In the modern times, regulators are additionally motivated to intervene at an early stage if there are public safety or security concerns. Thus, while prior approval of pharmaceutical products and medical devices has been a vital part of their commercial development and development cycle, the internet received no early regulatory oversight due to a lack of obvious safety concerns. As Black and Murray note, no government wanted to be the first to be seen to be regulating this innovative and creative space. While there was some interaction with the internet space in a piecemeal fashion, such as some copyright infringement laws and some harmful speech regulations, there was no coherent strategy for regulation of the space. By 2010, the model of intermediary or platform liability emerged, and the regulation of online environment by governments had been ceded de facto to the key online platforms which acted within their spheres as private nations states.[124]

This suggests that unless there is a concern regarding the exploitation of scare common resources or risks to public health and safety, governments prefer to defer regulation for as long as possible. It is not difficult to see why that is the case: unless the harms are evident, it might seem counterproductive to limit innovation. Further, it is easy and convenient to defer to the existing generic laws

[123] ibid 2–3.

[124] Black and Murray (n 99).

to apply where appropriate. Yet, in almost each case where targeted regulation followed many years after the uptake of technology, including the internet, the harms spun out of control by the time the regulation comes into force. Black and Murray note that the experience of internet regulation from 1955 to today serves as 'a warning which is applicable to all emerging technologies', as governments around the world failed to take early steps to regulate the internet structurally and therefore failed to limit its wide risks and impacts.[125]

Therefore, there is something to be said in favour of at least some form of early regulation, even if it is bare-bones and subject to evolution as the harms become more evident. The advantage of early regulation would be the lower costs of influencing the sociotechnical practices which are still relatively flexible.[126]

B. Form and institutions

Following the above discussion on the need to regulate unique harms resulting from new technology in a timely fashion, there is a good case for institutions within limited spheres of activity to self-regulate through private ordering, especially for harms specific to them; rather than wait for governments to provide over-arching regulatory frameworks. Private ordering is typically used to describe the use of rules systems conceived, observed, and enforced by private actors. For example, private actors have developed and enforce the rules of professional sports leagues, though they are subject to challenge under overarching legal regimes.

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[125] ibid 6.

[126] Huber (n 97).

Thus, there can be instances in which an organization's internal rules, norms, and customs may become relevant in the adjudication of legal disputes. Further, in the commercial context, governments often allocate pseudo-regulatory functions to private associations and organizations.[127] There are many distinct advantages of this regulatory strategy. First, self-regulatory bodies can command higher levels of relevant expertise and technical knowledge than is possible with independent regulation. It is the ongoing link with the institution or the sector which keep the expertise honed and the information up to date.[128] Second, expertise lends to effectiveness. Self-regulators possess a special knowledge of what would be seen as reasonable in terms of regulatory obligations by the persons who are subject to it. This produces higher levels of voluntary compliance than is the case with externally imposed regimes of control. Third, the cost of acquiring information that is necessary to formulate and set standards is low. Fourth, there are low monitoring and enforcements costs, and it is possible to adapt to changes in the conditions in a flexible manner as these institutions act informally and enjoy the trust of the regulated group.[129]

One important critique of self-regulation or private ordering is that it is a form of capture of power by groups that are not accountable through the normal democratic channels.[130] However, it is possible to mitigate both the possibility of capture of power by certain groups, as well as to ensure accountability through deliberate regulatory design. First, self-regulators can be subject to democratic

[127] Jorge L Contreras, 'From Private Ordering to Public Law: The Legal Frameworks Governing Standards-Essential Patents' (2017) 30 Harvard Journal of Law and Technology 211.

[128] Baldwin, Cave and Lodge (n 119) 139.

[129] ibid 141–142.

[130] Anthony Ogus, 'Rethinking Self-Regulation' (1995) 15 Oxford Journal of Legal Studies 97.

accountability through constraints drafted or approved by the government, or guidelines developed for the consideration of the self-regulator. This can include reporting and other requirements laid down by the government or the Parliament.[131] Second, judicial review by courts of decisions taken by self-regulators, upon a claim being brought by an aggrieved individual, can lend greater accountability.[132] Third, the presence of a grievance handling mechanism embedded within the self-regulatory model can provide a form of check and balance.[133] In this manner, it is not necessary that private ordering or self-regulation would lack accountability, or result in the capture of power.

For example, schools may enact bans on the use of social media during class times, as well as limit peer-led online social activity. Since schools are direct observers of the impact of social media use on its students, there would be greater impetus for action, as well as relative speediness. Nonetheless, private ordering in this manner may not preclude the need for eventual overarching legal frameworks devised by the government, and schools' guidelines may be in addition to government statutes or guidance on restricted use of phones in schools.

The need to regulate unique harms resulting from new technology in a timely fashion can also be addressed through soft law, such as principles, code of conduct, and declarations. The key benefit is that these take much lesser time than a large number of states agreeing upon multilateral treaties which are binding. If the principles are widely accepted, they may come to be treated as legal

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[131] Baldwin, Cave and Lodge (n 119) 143.

[132] Julia Black, 'Constitutionalising Self-Regulation' (1996) 59 The Modern Law Review 24.

[133] Baldwin, Cave and Lodge (n 119) 143.

obligations. The UN Guiding Principles on Business and Human Rights[134] are an example. The principles set therein are considered to be non-binding 'social' standards of conduct, with the expectation that it would encourage a higher level of participation by businesses. Some governments have also translated certain principles into binding legal standards. For instance, France passed a Corporate Duty of Vigilance Law in 2017 and Germany adopted a law on supply chain due diligence in June 2021.[135]

Thus, private ordering and soft law may replace governmentally designed regulations for new technology in the short term, or assist such government regulations in the long term. However, they may be best suited in a 'regulatory mix' that comprises a mixture of institutions and instruments. There is substantial literature on optimal regulatory mixes,[136] but the point of note is that regulation is not a question of isolating *one* response, but can consist of many that work harmoniously, each taking into account factors such as the attitude of regulatory actors and the the institutional settings of different regulators.[137]

C. Stakeholder involvement

The law serves not only a facilitative role, but also an expressive role in which it gives expression to the values held by the public for whom it operates. Yet,

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[134] United Nations Human Rights Council, 'Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework' (21 March 2011) UN Doc A/HRC/17/31. ["Guiding Principles on Business and Human Rights"]

[135] 'Influence of Soft Law Grows in International Governance | Chatham House – International Affairs Think Tank' (17 June 2021) <https://www.chathamhouse.org/2021/06/influence-soft-law-grows-international-governance> accessed 28 November 2023.

[136] Andrew Murray and Colin Scott, 'Controlling the New Media: Hybrid Responses to New Forms of Power' (2002) 65 The Modern Law Review 491; Neil Gunningham and Darren Sinclair, 'Smart Regulation' in Peter Drahos (ed), *Regulatory Theory* (ANU Press 2017) <https://www.jstor.org/stable/j.ctt1q1crtm.16> accessed 20 April 2025.

[137] Baldwin, Cave and Lodge (n 119) 159.

regulation is, more often than not, a task engaged in by politicians, legislators, lawyers and field specialists. In the case of technology in particular, a few may have a monopoly on the information that regulators are using to make decisions. The powerful players may urge rules that benefit the industry at the expense of 'possibly as-yet-unknown others'.[138] As a result, the regulatory decisions can be removed from the needs of the public. Stakeholder involvement and participation through dialogue and deliberation become a way of identifying the public's values and negotiating how they can co-exist with other views that inform regulatory decisions.

Further, there is instrumental value in public participation through the process of dialogue, as regulation arising from a process that directly involves the public can justify itself as being in public interest.[139] However, for dialogue to approximate true deliberation, it should do more than just bringing different groups of people together in a common forum. The dialogue should follow a procedure which enables diverse participants to voice and revise their views without undue pressure arising out of unequal power relations.[140] There is a good case for increasing both the scope and quality of deliberations and stakeholder involvement in the regulation of new technologies.[141] Indeed, the Nuffield Council on Bioethics in the UK has stressed a 'public ethics' approach to biotechnology

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[138] Moses (n 110).

[139] Bronwen Morgan and Karen Yeung (eds), 'Theories of Regulation', *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 27 <https://www.cambridge.org/core/books/an-introduction-to-law-and-regulation/theories-of-regulation/7AFEA9493EBDA741051101F9EB4C03E6> accessed 15 May 2023.

[140] Tony Prosser, *Nationalised Industries and Public Control: Legal, Constitutional, and Political Issues* (B Blackwell 1986).

[141] Jeremias Adams-Prassl and others, 'Regulating Algorithmic Management: A Blueprint' (2023) 14 European Labour Law Journal 124, 24.

governance, since the normal democratic political process is most at risk of being undermined by deference to partial technical discourses.[142]

D. Enforcement of regulation

The enforcement of regulation involves five distinct elements: detecting or gaining information on non-complaint behaviour; responding to the problems discovered through policies and rules; enforcing or applying these policies and rules on the ground; assessing the success of enforcement activities; and modifying the tools and strategies to improve compliance.[143]

Gathering information about non-compliant behaviour involves being alert to new methods of avoiding the rules or concealing non-compliance, and 'invisible' black market activity which affects the aims of the regulation. Responding to the problems discovered involves developing the appropriate tools to address the problems. The absence of a relevant tool, such as the power to fine on the spot, can be a significant impediment to effective control. Institutional environments play a significant role in the development of such tools. Flexibility and the availability of resources is key to the achievement of regulatory objectives.[144]

The type of rules developed for enforcement require an understanding that not all rules can be enforced with the same degree of success. Rules need to be employed in conjunction with different compliance-seeking strategies, including administrative sanctions, processes or persuasion, education, advice, and

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[142] 'Emerging Biotechnologies: Technology, Choice and the Public Good' (n 97).

[143] Baldwin, Cave and Lodge (n 119) 228.

[144] ibid 230.

promotion.[145] The selection of enforcement strategies in turn depends on the kind of regulatee being dealt with, and creating blends that will best ensure compliance. Factors such as familiarity and knowledge of the rules and clarity of the rules play an important role in compliance.[146] Enforcement strategies can, as proposed by Ayres

and Braithwaite, consist of a pyramid which consists of a range of enforcement sanction extending from persuasion to punitive responses.[147]

The factors discussed above are well-established in the literature on regulation. I propose another factor to be considered strongly in reaching a conclusion about the need for regulation: distributive justice. I turn to this now.

IV. DISTRIBUTIVE JUSTICE AS A FOCAL POINT IN THE REGULATION OF TECHNOLOGY

Distributive justice relates to discussions on the moral preferability of the economic, political and social frameworks in a society (that is, the laws, institutions, policies etc.), which result in different distributions of benefits and burdens across members of the society. The distributions of benefits and burdens resulting from these frameworks fundamentally affect people's lives.[148]

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[145] Christopher McCrudden and others, 'Regulation and Deregulation: Policy and Practice in the Utilities and Financial Services Industries' (Clarendon Press 1999).

[146] Dutch Ministry of Justice, *The Table of Eleven: A Versatile Tool* (The Hague, 2004).

[147] Ayres, Braithwaite and Wilks (n 118).

[148] Julian Lamont and Christi Favor, 'Distributive Justice' in Edward N Zalta (ed), *The Stanford Encyclopedia of Philosophy* (Winter 2017, Metaphysics Research Lab, Stanford University 2017) <https://plato.stanford.edu/archives/win2017/entries/justice-distributive/> accessed 31 January 2024.

In this section, I make the claim that technology has widened the gap between the rich and the poor all around the world, and therefore contributed to distributive injustice. To make this claim, I first portray the socio-economic reality of our world using data from the World Inequality Lab. I then discuss concrete examples of how technology worsens existing unequal socio-economic relations. Finally, I argue that distributive justice should be treated as a focal point, and indeed a core value, in designing the regulation of any technology that has the potential to adversely impact socio-economic relations. It will become evident in Chapter Three why HET is an example of such technology.

A. Socio-economic reality of the world in facts

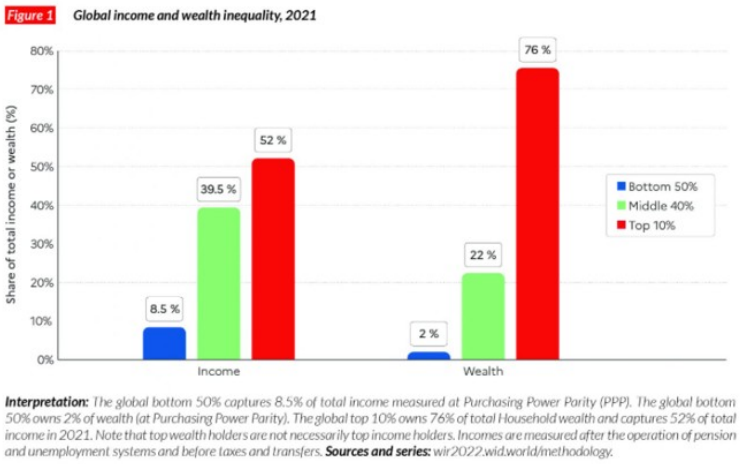
The world, despite record economic growth, is growing more and more unequal. The richest 10% of the global population takes 52% of the global income, while the poorest 50% of the population earns a meagre 8.5% of it, according to the World Inequality Report 2022.[149] This report is produced by the respected World Inequality Lab and coordinated by leading economists Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, and with foreword written by Nobel prize-winners Esther Duflo and Abhijit Banerjee.

This inequality is demonstrated both in income and wealth. On average, an individual from the top 10% of the global income distribution earns USD 122,100 per year which is 30x of what an individual from the poorest 50% of the global income distribution earns at about USD 3,920 per year. Wealth inequalities are even more pronounced. The richest 10% of the global population owns 76% of all

[149] Lucas Chancel and others, 'World Inequality Report (Executive Summary) 2022' (World Inequality Lab).

wealth, whereas the poorest half of the global population owns a meagre 2%. As Abhijit Banerjee and Esther Duflo note in their Foreword of the Report, 'since wealth is a major source of future economic gains, and increasingly, of power and influence, this presages further increases in inequality.'[150] Their comment highlights the role existing economic capacity plays in accelerating economic privilege and in creating a further chasm between economic classes.

The figure below, also borrowed from the report, captures the figures noted above:[151]



In this context, solely relying on the Gross Domestic Product (GDP) of a country,[152] or GDP growth rate, as a proxy for economic improvement in an average citizen's life would be misguided. It would be more illuminating to consider a sample of countries around the world and look at their GDP growth rate alongside their income inequality.[153] I turn to a few samples of countries arranged by continent.

[150] ibid 3.

[151] ibid 10.

[152] GDP refers to the monetary measure of the market value of all the final goods and services produced in a specific time period by a country (typically a year).

In Asia, developing economies such as India and China post high GDP growth rate combined with extreme income inequalities. India's GDP growth rate is 6.3%, but the top 10% earns 22x more than the bottom 50%. The top 1%'s share of income is 21.7% while that of the bottom 50% is 13.1%.[154] China's GDP growth rate is 4.2%, but the top 10% earns 14x more than the bottom 50%. This is similar to Russia, where though the growth rate has slowed down to 1.1%, the top 10% earns 14x more than the bottom 50%. Japan, which is a developed economy, has a growth rate of 1%, and the top 10% earns 13x more than the bottom 50%.

Europe has slightly more encouraging data on economic inequality. France's GDP growth rate is 1.3%, and the top 10% earns 7x more than the bottom 50%. Germany's is 0.9%, and the top 10% earns 10x more than the bottom 50%. Sweden's GDP growth rate is 0.6% and the top 10% earns 6x more than the bottom 50%. Sweden is one of the least unequal countries in terms of income in Europe and the world, with the top 10% of the population earning just over 30% of total national income and the bottom 50% earning almost 24% of national income. However, the United Kingdom, with a growth rate of 0.6%, demonstrates that the top 10% earns 9x more than the bottom 50%. The top 10% captures over 36% of total income and the bottom 50% less than 20% of it.

The Americas display dizzying inequality. In the United States of America, with a GDP growth rate of 1.5%, the top 10% earns an average of 17x more than the bottom 50%. The top 10% captures over 45% of the total income

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[153] International Monetary Fund, 'Real GDP growth: Annual percentage change' (2024) <https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD> accessed 20 July 2024.

[154] World Inequality Lab, 'The World #InequalityReport 2022 presents the most up-to-date & complete data on inequality worldwide': (*World Inequality Report 2022*, 23 November 2021) <//wir2022.wid.world/country-appendix-glossary/> accessed 21 September 2024.

and the bottom 50% just 13.3% of it. Here, income inequality is among the highest among rich countries. In South America, Mexico has a GDP growth rate of 2.1%, but the top 10% earn more than 30x of the bottom 50%. Brazil has a GDP growth rate of 1.5%, but the top 10% earn almost 30x more than the bottom 50%. As of 2021, the bottom 50% in the country owns less than 1% of the total national wealth whereas the top 1% owns half of the total wealth. The data suggests that wealth inequality has increased in Brazil since the mid-1990's in a context of financial deregulation and no major tax reform. Indeed, it is one of the most unequal countries in the world.

Most African nations post very high growth rate, yet inequality is persistent and in the case of South Africa, staggering. South Africa's GDP growth rate is 1.8%, but the top 10% earn 60x more than the bottom 50%. In 2021, the top 10% in South Africa earned more than 65% of total national income and the bottom 50% just 5.3% of the total.

This demonstrates that despite climbing GDPs around the world, including in developing and under-developed nations, income inequality is widening. Between 1995 and 2021, the top 1% in the world captured 38% of the global increase in wealth, while the bottom 50% captured a frightening 2%.[155] The gap between the wealthy and everyone else is largest in the United States. The richest 1% of the population has 34% of the accumulated wealth; the top 0.1% has some 15%.[156] Since 1995, the share of global wealth possessed by billionaires has risen

[155] Chancel and others (n 147) 3.

[156] David Rotman, 'Technology and Inequality' *MIT Technology Review* <https://www.technologyreview.com/2014/10/21/170679/technology-and-inequality/> accessed 30 January 2024.

from 1% to over 3%, which was exacerbated by the COVID pandemic. 2020 marked the steepest increase global billionaires' share of wealth on record.

Another staggering observation that the Report makes, is that contemporary global inequalities are close to early 20th century levels, at the peak of Western imperialism. In Britain and France the overall rise of inequality is less dramatic, but in those countries something else is happening that could be even more worrisome: accumulated wealth, much of it inherited, is returning to relative levels not seen since before the First World War. Privately held wealth in some European countries is now about 500 to 600% of annual national income, a level approaching that of the early 1900s.[157]

In turn, the differences in economic power between individuals within countries translates both to their own educational and skill outcomes, and that of their offspring. A seminal paper by David H. Autor proves the dramatic growth in the wage premium associated with higher education and cognitive ability. The gap between median earnings for people with a high school diploma and those with a college degree was $17,411 for men and $12,887 for women in 1979; by 2012 it had risen to $34,969 and $23,280.

While this data is specific to US, Autor notes that available data for 21 other economies, including Sweden, Norway, Spain, France, Germany, Netherlands, Japan, Canada, UK also shows substantial rewards in the labour market for cognitive skills gained through college education.[158] Autor's paper was published in 2014. However, recent data from the Federal Reserve Bank of NY

[157] ibid.

[158] David H Autor, 'Skills, Education, and the Rise of Earnings Inequality among the "Other 99 Percent"' (2014) 344 Science 843.

showed that the wage gap between recent college and high school graduates in the US hit a record high in 2021. Not only was the difference in earnings over 60% higher in 2021 than in 1990, but the median earnings for those with a high school diploma had decreased by 15% in the intervening three decades.[159]

Autor attributes this gap in earnings to the fact that a technologically advanced economy requires a literate, numerate, technically and scientifically trained workforce to develop ideas, manage complex organisations, deliver healthcare services, provide financing, and operate critical infrastructure. This was not always so. In the 1900s in the United States, 4 in 10 jobs were in agriculture, a substantial fraction of economic activity requires hard physical labour. Now, physical labour has given way to cognitive labour, and the labour market demands formal analytical skills, written communications, and specific technical knowledge. Economists refer to these loosely as cognitive skills.[160] In the context of growing income inequality, this means that education is no longer 'the great equalizer', because educational attainment is highly persistent within families. Ben-Shahar observes:

> The socioeconomic profile of Harvard students, for example, is shockingly homogeneous. The college enrolls the same share of students from the top 1% of income as the bottom 20%, and more than 70% of their students are from the top 20% (Bolotnikova 2017; Guinier 2015). Other elite universities demonstrate similar trends (Gutmann 2015). In the UK, access to elite universities is also unequal, and only 11–14% of students in Russel group (elite) are defined as "working class," a group that makes up almost 40% of the population (Mountford Zimdars 2017).[161]

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[159] The Editorial Board, 'Opinion | See Workers as Workers, Not as a College Credential' *The New York Times* (28 January 2023) <https://www.nytimes.com/2023/01/28/opinion/jobs-college-degree-requirement.html> accessed 25 February 2024.

[160] Autor (n 156).

[161] Tammy Harel Ben-Shahar, 'Merit, Opportunity, and the Future of Higher Education' in Mitja Sardoč (ed), *Handbook of Equality of Opportunity* (Springer International Publishing 2020) <https://doi.org/10.1007/978-3-319-52269-2_92-1> accessed 30 January 2024.

Studies in the USA and UK have also shown that the admission criteria used by elite universities closely follow social class, as do objective indicators such as SAT scores.[162] This should not be too surprising given that some start their SAT test prep as early as the age of 12, with access to personal tutors and specialised college consultants.[163] Furthermore, access to and accomplishment within universities are critically affected by social circumstances and background, making it much harder for those from modest backgrounds and uneducated parents to compete with their more affluent peers.[164] Indeed, two of the strongest predictors of a child's ultimate educational attainment are parental education and parental earnings.[165] As Autor notes:

> Hence, when the return to education is high, children of better-educated parents are doubly advantaged—by their parents' higher education and higher earnings—in attaining greater education while young and greater earnings in adulthood… lends credence to the concern that rising inequality may erode economic mobility. [166]

This concern about education inequities is noted by the Report of the Special Rapporteur on the right to education. The Report notes at paragraph 16 that governments are failing to address the root causes of marginalization in

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[162] Lani Guinier, *The Tyranny of the Meritocracy: Democratizing Higher Education in America* (Reprint edition, Beacon Press 2016); Steven Pearlstein, 'It's Time to Abandon the Cruelty of Meritocracy' *The Guardian* (13 October 2018) <https://www.theguardian.com/commentisfree/2018/oct/13/its-time-to-abandon-the-cruelty-of-meritocracy> accessed 30 January 2024.

[163] Anna Mountford Zimdars, *Meritocracy and the University: Selective Admission in England and the United States* (Bloomsbury Academic 2017).

[164] Harel Ben-Shahar (n 159).

[165] Raj Chetty and others, 'Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility' (2014) 104 American Economic Review 141; Sean F Reardon, 'The Widening Academic Achievement Gap between the Rich and the Poor: New Evidence and Possible Explanations' [2012] Whither Opportunity? Rising Inequality and the Uncertain Life Chances of Low-Income Children <https://cepa.stanford.edu/content/widening-academic-achievement-gap-between-rich-and-poor-new-evidence-and-possible-explanations> accessed 26 February 2024.

[166] Autor (n 156).

education and emphasised how mutually reinforcing layers of disadvantage create extreme and persistent deprivation that undermine equal opportunities in education.[167] Due to direct and indirect costs associated with schooling, including transportation, uniform, books etc, students with limited resources have very limited prospects of progressing to secondary education and beyond. In this regard, the Report notes at paragraph 58 the responsibility of governments to alleviate the financial burden and ensure that 'secondary education is generally available and accessible to all, as well as ensure equal access to higher education on the basis of merit or capacity'.[168]

In turn, unequal access to education which results in further economic opportunities leads to concentration of wealth. It is this long-term concentration of wealth that worries Thomas Piketty. A central point of his book *Capital* is the simple statement $r > g$, where r is the average return on capital and g is the economic growth rate. When the rate of return on capital exceeds the growth rate (which he says is what happened until the beginning of the 20th century and is likely to happen again as growth slows), then the money that rich people make from their wealth piles up while wages rise more slowly if at all. Piketty describes it as the world of Jane Austen, in which people's lives and fates are determined by their inheritance and not their talents or professional achievements. [169]

This is the economic reality of the world that technology, including human enhancement technology, is being developed in. It begs consideration of the role

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[167] UN General Assembly, 'Report by the Special Rapporteur on the Right to Education, Kishore Singh' (26 August 2015) UN Doc A/70/342.

[168] Id.

[169] Rotman (n 154).

technology has played in creating, exacerbating, or reducing the economic gap. This is what I consider next.

B. The role of technology in the current socio-economic reality

Technology has no doubt changed human life for the better: vaccines and antibiotics have reduced the incidence of diseases and mortality due to them; the internet has made information widely accessibly; GPS has made navigation easier and safer. However, in the realm of comparative economic status, I argue that all things considered, technology has failed to reduce the socio-economic gap in the world. In toto, its effect has been that of widening the gap between the rich and the poor because of the way in which it has been developed and deployed. I substantiate this argument by discussing the effects of automation, the workforce gap, and the innovation choices made by those through whom technology is developed or deployed.

First, regarding automation. The tasks that are subject to technological substitution have typically been routine or repetitive tasks,[170] which has been referred to as 'routine-biased technological change' (RBTC).[171] While RBTC has had neutral effects on employment rate, it has changed the composition of jobs: routine middle-skill jobs such as production, operation, administrative jobs have been replaced by non-tradable low-skill service jobs such as retail and food delivery. These typically pay less and provide fewer opportunities for career

[170] David H Autor, Frank Levy and Richard J Murnane, 'The Skill Content of Recent Technological Change: An Empirical Exploration*' (2003) 118 The Quarterly Journal of Economics 1279.

[171] Maarten Goos, Alan Manning and Anna Salomons, 'Explaining Job Polarization: Routine-Biased Technological Change and Offshoring' (2014) 104 American Economic Review 2509.

progression.[172] A manufacturing job can allow a person without a college degree to afford a middle-class lifestyle; but this is not so for service jobs. During the early and mid-20th century, these jobs provided disadvantaged children a decent chance to move upward without a bachelor's degree. The skills they accumulated while working these jobs substituted a formal degree. These routine jobs served as a 'stepping stone' for a worker to progress in her career towards other better-paid occupations, such as managers.[173]

However, in recent decades, manufacturing has experienced a decline due to technology and competition from third-world countries where manufacturing is often outsourced. The data from the papers cited so far discusses the United States, however, another paper finds similar results using data from the United Kingdom.[174] As opposed to the trends in declining manufacturing jobs and declining earnings of individuals without college degrees, the more educated workers performing non-routine cognitive tasks have improved their earnings because automation technology complements their skills.[175]

The literature establishes with firm empiricism that less educated people are becoming worse off in terms of their earnings due to technology that has replaced routine human tasks in the industry, while the opposite is true for more

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[172] David H Autor and David Dorn, 'The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market' (2013) 103 The American Economic Review 1553.

[173] Ningning Guo, 'Hollowing out of Opportunity: Automation Technology and Intergenerational Mobility in the United States' (2022) 75 Labour Economics 102136.

[174] Brian Bell, Jack Blundell and Stephen Machin, 'The Changing Geography of Intergenerational Mobility' [2018] LSE Research Online Documents on Economics <https://ideas.repec.org//p/ehl/lserod/91714.html> accessed 27 February 2024.

[175] Guo (n 171).

educated people.[176] Ningning Guo's paper made an advance on this literature by showing that RBTC makes disadvantaged children less likely to move upward and more likely to move downward, whilst strengthening advantaged children's advantage. The decline of routine jobs due to automation is directly responsible for worsening of upward mobility.[177]

One may think that due to the outsourcing of manufacturing jobs to developing countries, there is greater upward social mobility in those countries. However, this is not so. In fact, here, the impacts of automation might be even more negative than in the developed world, because in the developing world, there are more manual jobs to be lost through labour-substituting innovation than in the developed world. The current World Bank[178] estimation is for about 1.8 billion jobs to be threaten by emerging technologies in the developing world. [179] While most developing countries post high rates of growth, and developed countries too post moderate rates of growth, the problem is that this growth is not sufficiently shared among the less advantaged families.[180]

Second, the growing wealth gap in the workforce shows how technology has failed to reduce the socio-economic gap in the world. It is evident that the

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[176] Autor and Dorn (n 170); Autor, Levy and Murnane (n 168); Maarten Goos and Alan Manning, 'Lousy and Lovely Jobs: The Rising Polarization of Work in Britain' (2007) 89 The Review of Economics and Statistics 118; Goos, Manning and Salomons (n 169); Guo (n 171).

[177] Guo (n 171).

[178] World Development Report 2019: The Changing Nature of Work (The World Bank 2018) <https://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-1328-3> accessed 31 January 2024.

[179] Theo Papaioannou, 'The Idea of Justice in Innovation: Applying Non-Ideal Political Theory to Address Questions of Sustainable Public Policy in Emerging Technologies' (2021) 13 Sustainability 2655, 6.

[180] Raj Chetty and others, 'The Fading American Dream: Trends in Absolute Income Mobility since 1940' (2017) 356 Science (New York, N.Y.) 398.

beneficiaries of accelerated innovation in automation in the 21st century are most notably the high-skilled workers, whereas the losers are many.[181] However, it is not just that automation decelerates opportunities for those without a college degree; rather, technology-driven economy amplifies the talent and rewards of a small group of successful individuals.[182] Erik Brynjolfsson and Andrew McAfee[183] have argued that digital technology has created a winner-takes-all effect. This term was first described by Sherwin Rosen arguing that breakthroughs such as motion pictures, radio, and TV had greatly broadened the audiences and hence the rewards for those in show business and sports.

According to Brynjolfsson and McAfee, the current digital age has created a similar effect for high-tech entrepreneurs, whose ideas and products can be widely distributed and produced thanks to software and other digital technologies. Local businesses, whether tax, weight-management, or education, are being thwarted in business by cheap (and sometimes free) state-of-the-art apps and websites that are constantly being updated and refined. The ability to copy software and distribute digital products anywhere means customers will buy the top one, which explains the dominance of Google as a search-engine product. No customer wishes to use the second best. This explains why an increasingly

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[181] Amos Zehavi and Dan Breznitz, 'Distribution Sensitive Innovation Policies: Conceptualization and Empirical Examples' (2017) 46 Research Policy 327; Edward Alden and Robert Litan, 'A New Deal for the Twenty-First Century' *Council on Foreign Relations* <https://www.cfr.org/report/new-deal-twenty-first-century> accessed 31 January 2024; Lukas Schlogl and Andy Sumner, 'The Rise of the Robot Reserve Army: Automation and the Future of Economic Development, Work, and Wages in Developing Countries - Working Paper 487', *Center For Global Development* <https://www.cgdev.org/publication/rise-robot-reserve-army-automation-and-future-economic-development-work-and-wages> accessed 13 December 2021.

[182] Rotman (n 154).

[183] Erik Brynjolfsson and Andrew Mcafee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (Illustrated edition, W W Norton & Company 2014).

important reason why a few entrepreneurs, especially tech-entrepreneurs, are growing rich at a staggering rate.[184]

The third demonstration of the unpalatable effects of technology lie in current innovation choices. Theo Papaioannou has argued that emerging technologies appear to reflect relations of inequality in the process of innovation generation and diffusion, prioritising some needs (of high-income populations) and marginalising others (of low-income populations). [185] For example, smart robots such as Sophia (a social humanoid developed by Hanson Robotics, and declared a citizen by Saudi Arabia) and SpotMini (a robot that can handle objects, climb stairs, and looks like a Pixar character) would satisfy the needs of rich people for perhaps insignificant luxuries. Jeff Bezos, the third-wealthiest person in the world, with a net worth of 196 billion USD owns a SpotMini robot and posted a picture of the same with the statement 'taking my dog out for a walk'.[186]

While these innovations are exciting and interesting, each investment in exciting technology comes at the cost of an investment that could have been made in technology or otherwise for significant and fundamental improvements in food, energy health, and the environment. Afterall, nearly 775 million people around the world lack access to electricity.[187] Nearly 5.2 million children under the age of 5 years died from preventable and treatable causes in a year as per the last collected

[184] Rotman (n 154).

[185] Papaioannou (n 177) 7.

[186] Hayley Glatter, 'Jeff Bezos Walking a Boston Dynamics Robot Dog Is Terrifying' (*Boston Magazine*, 21 March 2018) <https://www.bostonmagazine.com/news/2018/03/21/jeff-bezos-boston-dynamics-dog/> accessed 27 February 2024.

[187] 'For the First Time in Decades, the Number of People without Access to Electricity Is Set to Increase in 2022 – Analysis' (*IEA*) <https://www.iea.org/commentaries/for-the-first-time-in-decades-the-number-of-people-without-access-to-electricity-is-set-to-increase-in-2022> accessed 27 February 2024.

data by the World Health Organisation. The majority of these children belong to sub-Saharan Africa.[188] Around 30% of the world's population has no access to basic medicines.[189] Yet, these needs are not regarded as priorities for R&D investment.[190] This is because global innovation policy is driven by global market forces and not necessarily by global priorities. Therefore, global innovation policy tends to serve the interests of the better off and the powerful. This is the reason why emerging technologies often display complete lack of equal concern and respect for the poor and other groups.[191]

The lack of concern for the worse-off appears even in terms of designing neutral technology, that is, technology that can plausibly serve each member of society. Virginia Eubanks shows how data mining, policy algorithms, and predictive risk models impact unfairly on poor communities.[192] She uses the term "digital poorhouse" to describe the unfair outcome of AI and automation for low-income communities. In doing so, Eubanks identifies a fundamental innovation injustice that exacerbates the already unequal treatment of poor and working-class communities. Her work along with the work of other scholars, including Silvia

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[188] 'Children: Improving Survival and Well-Being' <https://www.who.int/news-room/fact-sheets/detail/children-reducing-mortality> accessed 27 February 2024.

[189] Aderaw Yenet, Getinet Nibret and Bantayehu Addis Tegegne, 'Challenges to the Availability and Affordability of Essential Medicines in African Countries: A Scoping Review' (2023) 15 ClinicoEconomics and Outcomes Research: CEOR 443.

[190] Papaioannou (n 177).

[191] ibid.

[192] Virginia Eubanks, *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor* (Illustrated edition, St Martin's Press 2018).

Masiero[193] and Cathy O'Neill,[194] show that "dataveillance"[195] disadvantages the poor. At a local level, dataveillance is used to ensure that people are not abusing welfare funds and undocumented immigrants are tracked by digital systems.

Finally, a look at the state of the world during and after the COVID-19 pandemic may affirm the above data and analysis, as well as its real-world manifestation. The chances of surviving COVID-19 was not equally distributed among various groups. For instance, in America, the death rate for Blacks due to COVID-19 is three times that of the White population. The majority of the jobs that allowed work from home were held by those with college degrees, which in turn mapped on to the majority of the White population. This allowed them to stay safer and protect themselves from the virus.

On the other hand, people of color were disproportionately laid off or put at risk in lower-paying jobs. This data has led the President of the (American) National Academy of Sciences Marcia McNutt to argue 'science can exacerbate the equality divide in subtle and more pervasive ways'. Simply put, argues McNutt, 'neither science nor the rest of the health-care industry puts sufficient emphasis on increasing access and reducing cost'.[196] This speaks to the priorities of both science and technology.

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[193] Silvia Masiero, 'Digital Governance and the Reconstruction of the Indian Anti-Poverty System' (2017) 45 Oxford Development Studies 393.

[194] Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (Crown Publishing Group 2016).

[195] Linnet Taylor, 'What Is Data Justice? The Case for Connecting Digital Rights and Freedoms Globally' (2017) 4 Big Data & Society 2053951717736335.

[196] Marcia McNutt, 'Science and Equality of Opportunity' (2020) 117 Proceedings of the National Academy of Sciences 16090.

C. An argument for embedding distributive justice as a core value in the regulation of tech

The discussion in the previous section has demonstrated that technological innovation in the 21st century has resulted in exacerbating socio-economic inequality. Those who argue for more government funding for science and technology justify that spending on the grounds that science and technology contribute to overall growth in economic and social well-being. This is touted as an empirical claim that is seldom challenged. These advocates let other areas of policy worry about how the benefits are distributed. According to Susan Cozzens, this approach can be summarised as 'we make the pie bigger; someone else cuts it.'[197]

This requires a firm ascription of political responsibility to policy and practice for changing the direction of innovation towards a more just outcome.[198] The need to do so can be anchored in two existing shifts in worldwide policy: the first is the economic discussion instigated by Piketty's work; the other is the movement towards achieving the sustainable development goals (SDGs).

As Piketty points out in his work, the fact that the rate of return on accumulated wealth or capital is greater than economic growth is a radical departure from how progress has been perceived around the world. Since the 1950s, economics has been dominated by the idea, notably formulated by Simon Kuznets (a Harvard economist and Nobel laureate) that inequality diminishes as

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[197] Susan E Cozzens, 'Distributive Justice in Science and Technology Policy' (2007) 34 Science and Public Policy 85, 88.

[198] Papaioannou (n 177) 6.

countries become more technologically developed and more people are able to take advantage of the resulting opportunities. This is supplemented by a belief in trickle-down economics, which alludes to the idea that by putting more money in the pockets of the rich, there will be an increase in expenditure, which would ultimately reach the poor too.

However, according to the data and leading economists today, the belief that technological progress will lead to 'the triumph of human capital over financial capital and real estate, capable managers over fat cat stockholders, and skill over nepotism' is largely illusory.[199] Further, the idea that the rich can be taxed to develop safety nets for the poor works only in welfare states. It does not work in countries like the United States, where there is no national health-care system, minimum wages are low, and unemployment insurance is minimal. Likewise, the argument is wearing thin in Europe, as some countries run out of resources and begin to dismantle the welfare state.[200]

Meanwhile, the projections by Christopher Hoy and Andy Sumner indicate[201] that countries will need to achieve historically unprecedented growth levels to reduce poverty and meet sustainable development goals (SDGs) by 2030. The case for inclusive innovation is even more urgent as income disparities around the world become increasingly associated with technological innovation.[202]

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[199] Rotman (n 154).

[200] Cozzens (n 195) 89.

[201] Christopher Hoy and Andy Sumner, 'Growth with Adjectives: Global Poverty and Inequality after the Pandemic' [2020] Working Papers <https://ideas.repec.org//p/cgd/wpaper/537.html> accessed 31 January 2024.

[202] Calestous Juma, *Innovation and Its Enemies: Why People Resist New Technologies* (Oxford University Press 2016) <https://oxford.universitypressscholarship.com/10.1093/acprof:oso/9780190467036.001.0001/acprof-9780190467036> accessed 13 December 2021.

In this sense, the SDGs redefine the mission of science, technology, and innovation as the further reduction of poverty and the elimination of extreme deprivation.[203]

The need to do this is reflected in the writings of scientists, science bodies and civic groups. In view of the effects of the pandemic, McNutt recommends examining science-based policy recommendations for how they can be adjusted to alleviate, rather than exacerbate, racial inequalities.[204] The concerns about just distribution of health technologies such as innovative vaccines and drugs to combat Covid-19 was clearly reflected in the World Health Organisation's solidarity call to public action to '. . . realise equitable global access to Covid-19 health technologies through pooling of knowledge, intellectual property and data'.[205] Supported by global activists such as Global Justice Now, Medecins Sans Frontiers (MSF), and Oxfam GB, as well as developing countries such as Costa Rica, the WHO's solidarity call aimed to prevent big pharmaceutical companies to profit from the pandemic to the detriment of equitable access to Covid-19 technologies. Framing this as a claim of justice in innovation, the WHO and public activists are now able to promote a vision of change according to non-ideal principles of equity, recognition, and participation. [206]

Once the current limitations of science and technology are acknowledged, it is certainly possible to do nothing and allow their impact to create worse

[203] Papaioannou (n 177) 7.

[204] McNutt (n 194).

[205] 'Solidarity Call to Action' <https://www.who.int/initiatives/covid-19-technology-access-pool/solidarity-call-to-action> accessed 27 February 2024.

[206] Papaioannou (n 177) 11.

inequalities. As Sandra Wachter *et al* note in the case of possible responses to algorithmic bias that result in social inequality, this doesn't require action:

> Simply failing to consider bias or fairness in designing, training, and using an automated decision-making process is often enough… Non-intervention frequently amplifies and widens existing inequalities in our society that have been learned by a model through exposure to data reflecting existing biases and inequalities.[207]

On the other hand, it is possible to incorporate the concern for distributive justice in the design, deployment, and distribution of technology. Indeed, this response would align with the legal meaning attributed to equality: that of substantive equality. According to substantive equality, which I shall discuss in much greater detail in Chapter Five, true equality can only be achieved by accounting for historical inequalities which actively ought to be eroded. The status quo is not treated as a neutral starting point from which to measure equality in opportunities and results; rather, protected groups start from different points which are not equal. Bias transforming fairness metrics reflect this observation and offer a starting point for possible interventions to address structural inequality in society.[208]

The question then arises, what it would mean on a practical level to embed distributive justice in the regulation of technology. Cozzens writes that at the level of programs or policies, the task can be carried out by targeting innovation activities to disadvantaged groups, by using public procurement to direct

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[207] Sandra Wachter, Brent Mittelstadt and Chris Russell, 'Bias Preservation in Machine Learning: The Legality of Fairness Metrics Under EU Non-Discrimination Law' (2021) 123 West Virginia Law Review 735, 9.

[208] ibid 10.

innovation toward their needs, or by setting regulatory conditions that protect them.[209]

The economic data taken together with the concrete examples of how technology contributes to and exacerbates inequality justify why distributive justice should be treated as a factor, and indeed a core value, in designing the regulation of any technology that has the potential to adversely impact socio-economic relations.

CONCLUSION

Together with Chapter One, this chapter sought to lay the foundation for the thesis by providing an account of regulatory theory, which helps to draw conclusions about whether and how HET should be regulated.

This chapter had two aims. First, to understand what the threshold for regulatory intervention is. **Section I** sought to achieve part of this aim by discussing regulatory theory. Here, it emerged that regulation is broader than law and refers to an instrument that nudges or channels group behaviour. **Section II** addressed the second part of this aim. It delineated the conditions under which new technology may precipitate *sui generis* regulatory intervention: namely, when there are novel harms, or harms incapable of being addressed by existing generic laws.

The second aim was to understand the factors and considerations when designing the appropriate regulatory framework.[210] The purpose was to consider

[209] Cozzens (n 195) 93.

[210] Moses (n 97); Huber (n 97); 'Emerging Biotechnologies: Technology, Choice and the Public Good' (n 97).

these factors at a later stage in the thesis. **Section III** discussed these factors, namely, the stage of technological development and distribution, the institutions responsible for conception and implementation, and the affected stakeholders. **Section IV** then made a case for distributive justice as an important factor in the regulatory design of technology by demonstrating how technology currently contributes to socio-economic inequality in the world using data from the World Inequality Lab. It will become evident in the next chapter why HET is one example of such technology.

Indeed, the link between the use of enhancements and distributive justice is an underexplored one. To that extent, this thesis and chapter provide an advance over the existing literature by considering enhancement in the wider socio-economic context of the technologically driven globalised world.

Having discussed the threshold and conditions for regulatory intervention, as well as the various factors that need to be considered while designing the appropriate regulation, I now turn to evaluating whether HET meets this threshold in the next chapter.

CHAPTER THREE
THE EQUALITY HARMS OF HET

INTRODUCTION

Products incorporating novel technology present uncertainty regarding the balance between benefits and harms. For instance, nanoparticles used in cosmetic products can improve the product quality but also cause health problems for users. Similarly, social networking sites have connected the world but also resulted in the steady erosion of privacy. Human cloning has raised deep cultural and ethical concerns and spotlighted questions about the limits to acceptable technological innovation.

It is not immediately clear whether any harm caused by technology should attract regulation, and what the nature of such regulation should be. In the context of HET, indeed, some have argued that no regulation is required for HET, while others have argued that no *legal* regulation is required.[211] It is likely that those who have a commercial, medical, or political interest in the technology will emphasise its benefits, while those who are opposed to it will highlight its risks and advocate a precautionary approach.[212]

This chapter has three aims. First, to provide an account of the potential practical, ethical, and legal concerns raised by HET and the ambiguities created in

[211] Nick Bostrom and Anders Sandberg, 'Cognitive Enhancement: Methods, Ethics, Regulatory Challenges' (2009) 15 Science and Engineering Ethics 311.

[212] Brownsword and Goodwin (n 95) 9.

the application of existing laws. This includes the objective of detailing the equality harms of HET. **Section I** seeks to achieve this aim by providing an overview of the novel harms of HET and then establishing the potential equality harms: discrimination, stigmatisation, and unfair competition. Of the three, the thesis narrows down to unfairness in competitive scenarios as its main focus. The purpose of this section is to demonstrate the wide and far reaching consequences of the adoption of HET in society, and to elaborate on the equality harms to justify the scope of the thesis.

The second aim of this Chapter is to assess whether unfairness in competitive scenarios is a harm that meets the threshold for *sui generis* regulatory intervention: namely, whether it is a harm incapable of being addressed by existing generic laws. Sections II and III seek to achieve this aim. **Section II** elaborates on why unfairness in competitive scenarios is an equality harm. It argues that first, enhancements take away from the merit of the competitor. Second, even if they do not reduce merit, enhancements reduce effort and therefore reduce the deservingness of the victory or other positive outcomes. Third, access to enhancements, which are positional goods, is dependent on existing wealth. This means that the use of enhancements further entrenches socio-economic inequality.

Section III then applies existing generic laws to HET and assesses whether the harm of unfairness in competitive scenarios can be remedied by them. It concludes that none of the generic laws can capture this concern. This section concludes that there is a *prima facie* case for *sui generis* regulatory intervention to address the harm of unfairness in competitive scenarios.

The third aim of the chapter is to consider the objections made to regulating HET with respect to their use in competitive scenarios. **Section IV** responds to the following objections: first, there is no level-playing field in competitive scenarios because individuals have many natural advantages to begin with; second, many unnatural advantages exist in competitive fields that are affordable only by the wealthy and yet not restricted; and third, enhancements demonstrate and embody our innate tendencies as humans and are a worthy good. The section concludes that none of these objections are valid, which cements the need for regulatory intervention to address unfairness in competitive scenarios.

I. THE POTENTIAL HARMS OF HET

This section elaborates the widespread and disparate potential harms of HET, followed by the delineation of the equality harms which are central to this thesis.

A. Overview

There are several practical, ethical, and legal concerns regarding the use of HET. These include the possibility of health risks,[213] the moral concerns with altering our bodies,[214] humans 'playing God' and misunderstanding our place in creation,[215] fear of the emergence of eugenic programs,[216] implications of enhancement on moral status,[217] and claims by enhanced individuals, whose

[213] Linssen and others (n 4).

[214] Fukuyama (n 5); Bostrom, 'In Defense of Posthuman Dignity' (n 5); Clarke and others (n 5).

[215] Sandel (n 6).

[216] Vizcarrondo (n 7).

[217] Allen Buchanan, 'Moral Status and Human Enhancement' (2009) 37 Philosophy & Public Affairs 346; Thomas Douglas, 'Human Enhancement and Supra-Personal Moral Status' (2013) 162 Philosophical Studies 473.

bodies and minds differ vastly from those of existing humans,[218] that they belong to a superhuman or posthuman species.[219] Many of these concerns are the subject of vigorous debates in philosophy and bioethics,[220] though not in law.

The use of HET will create many uncertainties in law too. First, with respect to professional liability for procedures involving the implantation of HET, there is uncertainty both in terms of whether doctors are allowed to perform such procedures for non-medical purposes,[221] and how the widespread use of cognitive enhancers might alter the standard of care to which doctors must adhere.[222] There are concerns that with the gradual societal acceptance of such enhancers and resulting changes in the medical profession, doctors may be under some pressure to use cognition enhancers such as Ritalin or Modafinil whilst performing a high stakes surgery.

Further, there are implications in property law regarding the ownership of devices or products that have been incorporated into the human body. This in turn has implications in tort law for product liability as well as consumer rights. There are criminal liability issues about misuse of personal data obtained from implanted devices or even wearables like smart watches. Similarly, in

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[218] Bostrom, 'Why I Want to Be a Posthuman When I Grow Up' (n 8).

[219] Koops (n 9); Bioethics and Kass (n 9); Fukuyama (n 5).

[220] Fukuyama (n 5); Leon R Kass, 'Ageless Bodies, Happy Souls' (2003) 1 The New Atlantis 9; Sandel (n 6); Allen Buchanan, *Better than Human: The Promise and Perils of Enhancing Ourselves* (1st edition, Oxford University Press 2011); Agar and Caplan (n 81); Bostrom, 'Why I Want to Be a Posthuman When I Grow Up' (n 8).

[221] Arnold Roosendaal, 'Carrying Implants and Carrying Risks; Human ICT Implants and Liability' in Mark N Gasson, Eleni Kosta and Diana M Bowman (eds), *Human ICT Implants: Technical, Legal and Ethical Considerations* (TMC Asser Press 2012) <https://www.springer.com/gp/book/9789067048699> accessed 22 January 2021.

[222] Goold and Maslen (n 10).

employment law there are issues regarding the pressure to enhance and the potential for discrimination against those who choose not to,[223] or naturally have undesired traits. Finally, in *inter alia* family law, there are issues regarding the responsibility of parents for giving enhancing drugs to their children.[224]

The implications of HET for human rights law have also been highlighted. George Annas, Lori Andrews and Rosario Isasi have argued for an international treaty prohibiting cloning and inheritable genome alterations in light of the threat to the dignity of the human species.[225] Daniele Ruggiu has written on HET and the right to bodily integrity within the framework of the European Convention on Human Rights ("ECHR"), making observations regarding the limitations the right may place,[226] and Norberto Andrade has examined the contradictions in human rights law in regulating the human genome,[227] noting that the collective right to identity defends a global interest in the preservation of human genome.

The SIENNA project (Stakeholder-informed ethics for new technologies with high socio-economic and human rights impact), which is funded by the European Union's research and innovation programme, notes human rights concerns too. It has identified privacy and data protection concerns include

[223] Imogen Goold, 'The Legal Aspects of Cognitive Enhancement' in Ruud ter Meulen, Ahmed Mohamed and Wayne Hall (eds), *Rethinking Cognitive Enhancement* (Oxford University Press 2017).

[224] Sean Jensen and others, 'SIENNA D3.1: State of the Art Review' (2018) 15–20 <https://www.sienna-project.eu/digitalAssets/788/c_788666-l_1-k_d3.1sotahet.pdf>.

[225] George j. Annas, Lori B Andrews and Rosario M Isasi, 'Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations' (2002) 28 American Journal of Law & Medicine 151.

[226] Daniele Ruggiu, 'Implementing a Responsible, Research and Innovation Framework for Human Enhancement According to Human Rights: The Right to Bodily Integrity and the Rise of 'Enhanced Societies' (2018)10(1) LIT 99.

[227] Norberto Nuno Gomes de Andrade, 'Human Genetic Manipulation and the Right to Identity: The Contradictions of Human Rights Law' in *Regulating the Human Genome* (2010) 438.

processing of personal data and privacy, as well as protection of brain data, and adequacy of the current European data protection law for these data concerns.[228] With respect to autonomy, the report emphasises the principle of informed consent, obtaining clear and accurate information about risks and benefits, and the impact of misleading advertising.[229] It has also identified health and safety concerns include product safety challenges that go beyond purely physical risks (such as cybersecurity threats and adverse impacts on mental health).[230]

Some of the existing scholarship has noted that equality is one of the human rights that will be impacted by the use of HET. For example, the SIENA report acknowledges that while equality may be more of a future challenge, it is limited to a reference to discrimination. It recommends examining whether being enhanced or not enhanced should be recognised as a protected characteristic under the European Convention on Human Rights.[231] Further, the report observes that it may be contemplated whether a prohibition on discrimination on the ground of being enhanced could be added to the Oviedo Convention, in a similar way as the Convention prohibits discrimination on the grounds of one's heritage.[232]

Overall, the scholarship on HET is deficient in its consideration of the equality harms of HET. It understates the severity of the harms it does note or does not consider them comprehensively. For example, the SIENA report does not

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[228] Konrad Siemaszko and others, 'SIENNA D5.6: Recommendations for the Enhancement of the Existing Legal Frameworks for Genomics, Human Enhancement, and AI and Robotics' (2020) 44 <https://www.sienna-project.eu/publications/deliverable-reports/>.

[229] ibid 47.

[230] Siemaszko and others (n 226).

[231] *Carson and Others v. the United Kingdom* (2020) Application no. 42184/05 (Grand Chamber).

[232] Siemaszko and others (n 226) 48.

contextualise how the use of enhancements may result in discrimination, or what the existing legal protections may be. Further, existing scholarship does not consolidate the breadth of equality harms. This thesis, therefore, focuses on this aspect.

B. Equality harms

I now discuss the potential equality harms of HET at length. There are four equality concerns with the use of HET. These are: first, stigmatisation of undervalued traits; second, the potential for discrimination; and third, unfairness in competitive scenarios. Fourth, in the long term, there are also concerns about claims of species difference among humans, and therefore difference of moral status which can justify treating the 'inferior' humans poorly in relation to the 'superior' enhanced humans.

First, the use of enhancements can result in stigmatisation of certain traits. For example, if it becomes possible to genetically edit traits, some traits would be more popular than the others as the attempt would be to conform to the popular notions of beauty and health subscribed to by society. This would eventually increase the incidence of the 'desirable traits' and may, second, stigmatise the non-chosen traits.[233] In today's Western society, for example, the desired traits may be high IQ, tall athletic body, blue eyes, and light skin. Concomitantly, social tolerance for difference might decrease as the range of traits is reduced. The Universal Declaration on Bioethics and Human Rights 2005 pre-empts this, as it emphasises non-discrimination, non-stigmatisation, and respect for pluralism.[234]

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[233] Vizcarrondo (n 7).

[234] Universal Declaration on Bioethics and Human Rights (2005) SHS/EST/BIO/06/1, art. 11 and 12. ["UDBHR"]

Second, discrimination can play out in employment contexts due to the desirability of certain enhancements. Consider a situation in the UK where a wealthy white man who is cognitively enhanced appears for a job interview in the service sector against (an equally qualified) working class Asian woman who cannot afford enhancement. It is possible that the former even produces a certificate of cognitive enhancement. Assuming that factors such as sexism or racism (or other biases) do not exist in this scenario, it is still likely that the latter will suffer disadvantage and not be hired due to the lack of cognitive enhancement. Clearly, socio-economic position and access to enhancement (which here is a private good) has played a role in determining opportunities in this scenario, resulting in factual but not legal discrimination against the unenhanced candidate. Again, assuming that factors such as sexism or racism (or other biases) do not exist in this scenario, if a wealthy woman of colour appeared for the interview with a certificate of enhancement against a working-class white man without it, assuming the job was white-collar and only required cognitive skills, the employer may still hire the candidate with the certificate.

The third equality concern is to do with unfair disruption of competition.[235] Putting any possibility of a discrimination claim aside, it is difficult to argue that the two candidates for the job in the example above were fair competitors, just as it may not be possible to say that athletes who participate in sports competitions without doping and athletes who dope are fair competitors. There are two related quandaries underlying this scenario: whether we should allow individuals to win using enhancements in competitive scenarios, knowing that (1) winning leads to

[235] Mike McNamee, Richard Parnell and Yves Vanlandewijck, 'Fairness, Technology and the Ethics of Paralympic Sport Classification' [2021] European journal of sport science 1; Aikins (n 17).

important benefits and opportunities; and (2) access to enhancements is likely to depend on one's socio-economic position. Yet, the question posed by Allen Buchanan regarding why access to *these* goods or technology should be regulated when other similar advantages are not,[236] is valid and will be explored in the later chapters.

Finally, in the long term, if posthuman enhancements make radical changes to the human body possible, we may witness the emergence of claims of species difference. For instance, individuals with significantly enhanced memory, muscle strength, longevity,[237] and a particular homogenous physical appearance, may claim that they are no longer human but something more, something better than human. Alternatively, the non-enhanced individuals may be considered something less than human. Yet another scenario may be that the enhanced individuals need a different, though not superior, regime of rights.[238] In the literature on enhancement, some authors refer to this hypothetical species as 'posthumans' and argue that it could lead to a divergence in the rights accorded to the unenhanced and the enhanced,[239] which would threaten the ideal of equality. This may appear implausible. Yet, notice must be taken of the fact that the history of our civilisation is replete with instances where perceived differences were justified as difference in moral status and then used to ground inequality in treatment of certain class of individuals. The Holocaust is the most recent example, though there are others.

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[236] Buchanan, *Better than Human* (n 218).

[237] Bostrom, 'Why I Want to Be a Posthuman When I Grow Up' (n 8).

[238] Koops (n 9).

[239] Fukuyama (n 5).

In any case, the self-professed goal of transhumanists, a group of researchers, scholars, and academics whose work revolves around furthering human enhancement, is the complete transcension of the human condition,[240] without a plan for how HET will become accessible or available to all at the same time. This suggests that there will certainly be a scenario in the future where claims of difference in moral status can arise.

The thesis focuses on the regulation of the most immediate of the equality concerns highlighted above: unfairness in competitive scenarios. This is a scenario that is already playing out in fields such as sport and has attracted extensive regulation. It also has the potential to disrupt competition in other arenas of human activity such as education. I now turn to elaborating why unfairness in competitive scenarios is an equality harm.

II. THE NEED TO REGULATE ENHANCEMENTS IN COMPETITIVE SCENARIOS

My argument for considering the use of enhancements in competitive scenarios as an equality concern is as follows: first, enhancements take away from the merit of the competitor. Second, even if they do not reduce merit, enhancements reduce effort and therefore reduce the deservingness of the victory or other positive outcome. Third, access to enhancements, which are positional goods, is dependent on existing wealth. This means that the use of enhancements further entrenches socio-economic inequality. I consider these limbs of the argument in turn.

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[240] Nick Bostrom, 'Human Genetic Enhancements: A Transhumanist Perspective' (2003) 37 The Journal of Value Inquiry 493.

A. Enhancements take away from the merit of the user

Merit is often formulated as follows: 'those who do more than others shall receive more than others'. The reverse script of this has also been presented: 'those who have more must have performed better'. Merit serves as the desert basis for economic benefits, and a meritocracy is deemed to be a society that links live chances to merit.[241] In a meritocracy, social and economic status is temporary and depends on performance. Anyone can potentially obtain status through hard work, and they can also lose it. Stories of the self-made millionaire and the hard-working immigrant are deeply entrenched in society's conception of meritocracy.[242]

However, concerns about rising inequality[243] have resulted in the questioning of merit as the normative basis.[244] But the critics of meritocracy in a way defend merit when they argue that people do not get what they deserve.[245] Adrian Woolridge has argued that meritocracy is still the best alternative, though it has been 'hijacked'. The answer therefore is *more* meritocracy.[246] Many of the suggestions are therefore along the lines of making admissions fairer, removing legacy admissions and other systemic disadvantages relating to education before

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[241] Andreas Siemoneit, 'Merit First, Need and Equality Second: Hierarchies of Justice' (2023) 70 International Review of Economics 537, 545.

[242] Harel Ben-Shahar (n 159) 4.

[243] Thomas Piketty and Arthur Goldhammer, *Capital in the Twenty-First Century* (Harvard University Press 2014) <https://www.jstor.org/stable/j.ctt6wpqbc> accessed 30 January 2024.

[244] Michael J Sandel, *The Tyranny of Merit: What's Become of the Common Good?* (Penguin UK 2020).

[245] Thomas Mulligan, *Justice and the Meritocratic State* (Routledge 2017) 131.

[246] Adrian Wooldridge, *The Aristocracy of Talent: How Meritocracy Made the Modern World* (Allen Lane 2021).

University, and some have also suggested reviving IQ testing in schools which can be less biased than other evaluations.[247] Thus, the *principle* of merit is worth endorsing, even though its manifestation is imperfect in the real world.

It is because of this that merit-based allocation of income (that is, proportional to economic contribution) is prominent and widely approved.[248] Mulligan's work published as recently as 2018 makes an elaborate defense of meritocracy and argues that empirically and across ideological and cultural lines, people want rewards to reflect merit.[249] It has been observed that meritocracy 'resonates powerfully with deeply held ethical values about fairness, and these are broadly shared throughout the population'.[250] It corresponds to the widespread belief that people deserve to enjoy unequal incomes depending on their abilities and how hard they work.[251]

Andreas Siemoneit cites the definition of merit offered by Neckel, Dröge, and Somm[252] as the most formal and lengthiest, but offer the one proposed by Young

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[247] ibid 376.

[248] Siemoneit (n 239); Mulligan (n 243); Jule Adriaans and et al, 'A Comparison of Earnings Justice throughout Europe: Widespread Approval in Germany for Income Distribution According to Need and Equity' <https://www.diw.de/sixcms/detail.php?id=diw_01.c.696593.de> accessed 30 January 2024.

[249] Mulligan (n 243).

[250] Peter Saunders, 'Meritocracy and Popular Legitimacy' (2006) 77 The Political Quarterly 183, 193.

[251] David Miller, *Principles of Social Justice* (Harvard University Press 2001) 178.

[252] Sighard Neckel, '"Leistung" und "Erfolg"' in Eva Barlösius, Hans-Peter Müller and Steffen Sigmund (eds), *Gesellschaftsbilder im Umbruch: Soziologische Perspektiven in Deutschland* (VS Verlag für Sozialwissenschaften 2001) <https://doi.org/10.1007/978-3-663-10163-5_11> accessed 30 January 2024.

(merit = intelligence/IQ + effort)[253] and extended by Kariya and Dore[254] as the one that is best for modern societies. This is:

Merit = Talent/Intelligence + Effort + Luck (e.g., performance on competition day)

Siemoneit argues that this equation matches economic theory, in that it consists of the natural endowment of individuals (their capital), their efforts (labor), and is complemented by the contingencies of the economic process and the unpredictable assessment by others.[255] I will consider each of these elements in some detail.

First, considering talent or intelligence: this is admittedly ambiguous. Rawls emphasised that natural endowment is undeserved as it is the result of a natural lottery.[256] Further, talents may be genetically endowed, a product of education and upbringing, or mainly acquired by practice.[257] In fact, modern research on talent shows that expert performance in not possible without intense training and long periods of practice, which indicates that the decisive faction is how early individuals are able to begin focusing on certain areas of interest, how much they invest in it, and how much support and encouragement they receive.[258]

[253] Michael Young, *The Rise of the Meritocracy* (2nd edn, Routledge 2017).

[254] T Kariya and R Dore, 'Japan at the Meritocracy Frontier: From Here, Where?' (2006) 77 Political Quarterly <https://ora.ox.ac.uk/objects/uuid:2d23d40b-792f-4c33-9001-bd57b35db08e> accessed 30 January 2024.

[255] Siemoneit (n 239) 545.

[256] John Rawls, *A Theory of Justice: Revised Edition* (Harvard University Press 1999) 64, 86 <https://www.jstor.org/stable/j.ctvkjb25m> accessed 30 January 2024.

[257] Alexander Rosenberg, 'The Political Philosophy of Biological Endowments: Some Considerations' (1987) 5 Social Philosophy and Policy 1.

[258] K Anders Ericsson and others (eds), *The Cambridge Handbook of Expertise and Expert Performance* (2nd edn, Cambridge University Press 2018)

This means that when we refer to talent or intelligence, we are referring to the version of inborn talent/intelligence that the individual has refined over a period of time.

Second, the term 'effort' in the equation relates to the work invested in the circumstances or opportunity (such as an exam or interview). It also requires aligning oneself with the demands of the challenge. One may be born with great athletic ability but may also lack discipline. To be a great sportsperson, such an individual has to put in great effort into aligning herself with the requirements of discipline, consistency, and resilience. Similarly, one may be born with an agile brain, but such an individual also must put effort into developing the ability to take notes effectively, plan revisions, and sleep well every night. In short, no one is born with the entire bouquet of talents and skills to be victorious in any given field, and high achievement is not possible without conscious effort. Nonetheless, effort on its own does not entitle one to a reward in a competitive scenario.[259]

The third factor in this equation is luck. This is not substantiated by Simoneit. However, luck refers to any circumstance that mediates the combined result of talent/intelligence and effort. For example, one may suffer a migraine at the time of writing their exam. They would still be using their intelligence and putting in the best effort they can, but their overall abilities during the exam would inevitably be dampened because of the migraine.

<https://www.cambridge.org/core/books/cambridge-handbook-of-expertise-and-expert-performance/A1BC1FC1B8C8E6FCEE0F4ED2C4E5614D> accessed 30 January 2024.

[259] Siemoneit (n 239); Neckel (n 250).

B. Enhancements reduce effort and deservingness

I now consider the second half of the argument in this section, that enhancements reduce effort and therefore reduce the deservingness of the positive outcome. It may be helpful to consider the relationship between merit and desert, or deservingness. While merit focuses on 'doing' and the visible results thereof (achievements), desert (though also consequential like merit) emphasises moral excellence and a virtuous life. However, they are also two terms for the same thing: if one does something good, one deserves something in return, whether that is money or social approval.[260] Nevertheless the problem remains that while the normative basis for reward is merit, the positive basis is achievement.[261]

In order to consider how enhancements reduce effort, I will take the example of cognitive enhancement drugs Adderall and Ritalin. These work by introducing chemicals in the body that increase two neurotransmitters—dopamine and norepinephrine in the brain. In a healthy person, these increase energy and concentration[262] even if it is by a small margin.[263] It is because of this that the off-label use of Adderall and Ritalin is growing on university campuses. For instance, a study that surveyed 10,904 students at 119 four-year Universities found that 6.9% of these students had taken prescription stimulants for non-medical uses.[264]

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[260] Siemoneit (n 239) 545.

[261] ibid 546.

[262] Claire Advokat, 'What Are the Cognitive Effects of Stimulant Medications? Emphasis on Adults with Attention-Deficit/Hyperactivity Disorder (ADHD)' (2010) 34 Neuroscience & Biobehavioral Reviews 1256.

[263] Irena Ilieva, Joseph Boland and Martha J Farah, 'Objective and Subjective Cognitive Enhancing Effects of Mixed Amphetamine Salts in Healthy People' (2013) 64 Neuropharmacology 496.

[264] Sean Esteban McCabe and others, 'Non-Medical Use of Prescription Stimulants among US College Students: Prevalence and Correlates from a National Survey' (2005) 100 Addiction (Abingdon, England) 96.

Some other surveys and studies yielded higher numbers, at 16% to even 60%.[265] It is also interesting to note that most of these drugs are bought illegally on the black market, and others simply overuse their legal prescriptions. It has been reported that these pills cost several multiples on the black market. Prescriptions for stimulant medications have doubled in the last eight years from four million to eight million, and during that same time, calls to poison-control centres reporting overdoses of legal stimulants by young adults has also shot up 76%.[266] It is important to note, nonetheless, that the effects of cognitive enhancement drugs are not unequivocally agreed to be substantial, and there are some research studies which note that the positive effects either did not exist or were caused by placebo.[267]

However, many students and professionals who have used these stimulants report significantly improved focus and concentration.[268] One consumer described Adderall as a career transformer: 'I'm talking about being able to take on twice the responsibility, work twice as fast, write more effectively, manage better, be more attentive, devise better and more creative strategies.'[269] A journalist found

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[265] Brad Partridge and others, 'Australian University Students' Attitudes towards the Use of Prescription Stimulants as Cognitive Enhancers: Perceived Patterns of Use, Efficacy and Safety' (2013) 32 Drug and Alcohol Review 295; Silvana Castaldi and others, 'Use of Cognitive Enhancement Medication Among Northern Italian University Students' (2012) 6 Journal of Addiction Medicine 112; Alan D DeSantis, Elizabeth M Webb and Seth M Noar, 'Illicit Use of Prescription ADHD Medications on a College Campus: A Multimethodological Approach' (2008) 57 Journal of American college health: J of ACH 315.

[266] Walter Kirn, 'A Pharmacological Education' *The New York Times* (2 September 2009) <https://www.nytimes.com/2009/09/06/magazine/06FOB-wwln-t.html> accessed 20 September 2024.

[267] Veljko Dubljevic and Christopher Ryan, 'Cognitive enhancement with methylphenidate and modafinil: conceptual advances and societal implications' (2015) 4 Neuroscience and Neuroeconomics 25.

[268] Margaret Talbot, 'The Underground World of "Neuroenhancing" Drugs' [2009] *The New Yorker* <https://www.newyorker.com/magazine/2009/04/27/brain-gain> accessed 3 July 2024.

[269] Benedict Carey, 'Brain Enhancement Is Wrong, Right?' *The New York Times* (9 March 2008) <https://www.nytimes.com/2008/03/09/weekinreview/09carey.html> accessed 3 July 2024.

similar results when he recorded the effects of two days of modafinil use in real time: 'Today I am the picture of vivacity. I am working about twice as fast as usual. I have a desperate urge to write. . . . These have been the two most productive days I've had in years'.[270]

Provigil (a brand name for the drug modafinil) is another enhancement pill. It boosts dopamine levels and blocks dopamine transporters within the brain, which keeps individuals awake and alert. It has been described as a pill that promotes vigilance, and 'is a nap in the form of a pill' which can leave its users refreshed and alert despite hours or even days of wakefulness.[271] A journalist who writes for the New York Times described his experiments with Provigil during a time that he took 200 milligrams every day for five days:

> I sat down and took one 200mg tablet with a glass of water… I picked up a book about quantum physics and super-string theory I have been meaning to read for ages. . . . It had been hanging over me, daring me to read it. Five hours later, I realised [sic] I had hit the last page. . . . I hadn't noticed anything, except the words I was reading, and they came in cool, clear passages; I didn't stop or stumble once.
>
> Perplexed, I got up, made a sandwich—and I was overcome with the urge to write an article that had been kicking around my subconscious for months. It rushed out of me in a few hours, and it was better than usual. . . .
>
> The next morning I woke up and felt immediately alert. Normally it takes a coffee and an hour to kick-start my brain; today I'm ready to go from the second I rise. And so it continues like this, for five days: I inhale books and exhale articles effortlessly. . . . I keep waiting for an exhausted crash, and it doesn't seem to come.[272]

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[270] Rob Goodman, 'Cognitive Enhancement, Cheating, and Accomplishment' (2010) 20 Kennedy Institute of Ethics Journal 145, 147.

[271] Joseph V Baranski and others, 'Effects of Modafinil on Cognitive and Meta-Cognitive Performance' (2004) 19 Human Psychopharmacology 323.

[272] Johann Hari, 'My Experiment with Smart Drugs' (2008) <www.johannhari.com/2008/05/06/my-experiment-with-smart-drugs> accessed 20 July 2024.

It is clear that cognitive enhancers such as Adderall, Ritalin, and Provigil eliminate the effort that needs to be invested in keeping oneself awake, alert, or even motivated. In some cases, even if it is not possible to pin down *exactly* which cognitive skill it improves among focus, attention span, processing power, it is clear that the effect is better cognitive function.

There are many objections to the argument that enhancements eliminate effort. Hannah Maslen *et al* argue that enhancements do not *remove* the need for effort. In fact, in choosing to consume an enhancement, an individual underwrites his commitment to achieving their goal.[273] Further, Lisa Forsberg and Anthony Skelton argue that those who object to enhancement do not specify how much effort is required to make something an achievement.[274] They argue that sometimes an achievement is not difficult by virtue of requiring effort, but rather, due to the unique skill and ingenuity that not all human beings have.[275] The argument goes that an intelligent and industrious student who suffers from poor concentration may take a cognitive enhancer to improve her concentration. Her success or achievement is still dependent on her revision and time management strategies. It is not clear by how much the student's effort was reduced and why that removes the moral claim over the achievement.[276]

Indeed, enhancements do not *eliminate* the existence of effort. Taking Provigil only *unlocked* the skill that the journalist Johann Hari possessed. He still

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[273] Hannah Maslen, Julian Savulescu and Carin Hunt, 'Praiseworthiness and Motivational Enhancement: "No Pain, No Praise"?' (2020) 98 Australasian Journal of Philosophy 304, 306.

[274] Lisa Forsberg and Anthony Skelton, 'Achievement and Enhancement' (2020) 50 Canadian Journal of Philosophy 322, 326.

[275] ibid.

[276] ibid 325.

had to do the writing himself. However, even that *unlocking* is morally meaningful, because the alternative would be for Johann Hari to put effort into understanding the demands of his body and brain and then satisfying them through sleep, meditation, consistent practice and so on, in order to exercise the skill at the same level as that allowed by Provigil. This becomes relevant in a competitive context, where limited time can be better utilized by the person who has *unlocked* their skills and therefore can more easily beat their competitor. Enhancement does not have to *eliminate* effort in order to attract concern.

C. Enhancements are positional goods, and access to them is dependent on existing wealth

Positional goods are goods whose value to their possessor depends, at least in part, on how much they possess in comparison to others. This means that what makes them positional, or advantageous, is that others don't have them or have very little of them. Devon Cass writes that while the notion was originally introduced in economics, the nature of positional goods bears important implications for the theory of justice.[277] Positional goods that are acquired through economic wealth compound the existing economic wealth by rendering a further advantage—indeed, that is their very nature. This explains, at least in part, how higher education, in countries such as the United States where access to it depends on one's economic status due to the high costs associated with a degree, exacerbate the economic privilege of the rich. A significant part of the value of the degree is derived from the fact that many others don't have it: and as a result, the well-paying jobs are easier to access.

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[277] Devon Cass, 'Positional Goods and Social Equality: Examining the Convergence Thesis' (2023) 29 Res Publica 501.

Consider how enhancements play into this context. The argument here is with respect to competitive arenas. For the purpose of this argument, my focus is once again on cognitive enhancers. In contexts where individuals are competing for a handful of positions – whether that is places in a top university, Dean's List, jobs interviews or employment offers, cognitive enhancers are positional goods, meaning that they 'confer substantial advantages on their possessors relative to others within the context of social competition for scarce and valued positions and other desired goods'.[278] Using enhancements to assist with a competitive exam directly disadvantages every other competitor, and this disadvantage is particularly significant when career or financial success is at stake.[279] Only a few will have the ability to purchase and use these goods, largely due to wealth and partly due to geography and the laws in their respective states or countries. In this context Maxwell Mehlman has noted that limited access to such goods exacerbates inequalities of wealth and status between the haves and the have-nots'.[280]

It has been argued that enhancements will eventually become cheap enough or the government will ensure universal access. Buchanan, for example, notes that if enhancements are sold as market goods, the price may be high at first, but it is not likely to remain high. [281] Similarly, Porsdam-Mann *et al* have argued that the price of cognitive enhancements such as Modafinil can already be similar to that of a day's supply of coffee or tea if purchased from an overseas pharmacy

[278] ibid.

[279] Goodman (n 267) 149.

[280] Maxwell J Mehlman, 'Cognition-Enhancing Drugs' (2004) 82 The Milbank Quarterly 483.

[281] Allen Buchanan, 'Cognitive Enhancement and Education' (2011) 9 Theory and Research in Education 145, 158.

in generic form as opposed to a branded pill on prescription.[282] Alternatively, according to Savulescu *et al*, in the arena of sports, the money spent on testing athletes can instead be spent on providing enhancements to the poorer ones.[283] Further, governments are likely to eventually see (cognitive) enhancements as means of increasing national productivity and they may be publicly subsidized as education is today.[284]

There are some assumptions underlying this line of argument that do not tie up. The first assumption is that governments have the resources to invest in providing enhancements. This assumption does not reflect the reality. Currently, public health does not achieve its primary goal, which is to universally provide basic health care. Many cases that revolve around the difficulty of universalizing health benefits demonstrate this.[285] Importantly, to ensure the positive right to equality, the state will need to ensure it can universalise any health benefit it provides. Thus, the argument is based on hypothetical publicly funded enhancements, that will not be able to reach all citizens and erase existing inequities.

The second assumption is that if such resources exist, this is the priority area in which they should be invested (as opposed to say, education and healthcare). In most countries around the world, primary education and basic

[282] Sebastian Porsdam Mann and others, 'Is the Use of Modafinil, a Pharmacological Cognitive Enhancer, Cheating?' (2018) 13 Ethics and Education 251, 255.

[283] J Savulescu, B Foddy and M Clayton, 'Why We Should Allow Performance Enhancing Drugs in Sport' (2004) 38 British Journal of Sports Medicine 666.

[284] Buchanan, 'Cognitive Enhancement and Education' (n 278) 158.

[285] *Soobramoney v Minister of Health, KwaZulu-Natal* 1997 (12) BCLR 1696 (CC) [31], noting that the State will need 'to adopt a holistic approach to the larger needs of society rather than focus on the specific needs of particular individuals'; *Paschim Banga Khet Mazdoor Samity v State of West Bengal* (1996) 4 SCC 37; *Eldridge v British Columbia (Attorney General)* [1997] 3 SCR 624.

healthcare are still ideals. Indeed, the number of people living in extreme poverty and hunger surpasses eight hundred million worldwide.[286] Governments have been called on to allocate at least 4% to 6% of gross domestic product (GDP) and at least 15% to 20% of total public expenditure to education and to protect public education budgets from the fiscal constraints resulting from the COVID-19 pandemic and global economic crises.[287] Scholars who posit a 'right to enhancement' as a way of ensuring equitable access must *at least* argue how the right to enhancement can be positive right instead of an academic ideal. To do this, they must also show why any leftover resources should be allocated to the provision of enhancements instead of more basic needs like primary healthcare and primary education.

Further, even *if* a certain enhancement was widely accessible, it would no longer be positional—the positionality of enhancements comes from others not having access to it. For instance, coffee is not a positional cognitive enhancement, but Modafinil, Ritalin, Adderall, Provigil are. In the future, these may become as common as coffee, but there will be other more expensive and more effective cognitive enhancements that will not be commonly accessible due to their price. Indeed, scientists are currently working on more than 600 new cognition enhancers.[288]

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[286] World Health Organisation, 'UN Report: Global Hunger Numbers Rose to as Many as 828 Million in 2021' <https://www.who.int/news/item/06-07-2022-un-report--global-hunger-numbers-rose-to-as-many-as-828-million-in-2021> accessed 20 September 2024.

[287] UNESCO, *Paris Declaration: A Global Call for Investing in the Futures of Education* (2023) <https://unesdoc.unesco.org/ark:/48223/pf0000386010> accessed 20 July 2024.

[288] 'All on the Mind' *The Economist* <https://www.economist.com/science-and-technology/2008/05/22/all-on-the-mind> accessed 20 September 2024.

As Oliver Feeney notes, the diffusion of enhancements may indeed happen, but the *relative advantage* as a result of unequally accessible new innovation may be resilient. Even though technological improvement in the last few hundred years has improved the situations of both rich and poor alike, the present day social justice concerns are still significant. [289] As Adam Swift writes elsewhere 'One can have more or better opportunities than one's parents without having any opportunity to move up in terms of social stratification. *The ladder is really an escalator.*'[290] (emphasis added)

Positional enhancements, that is enhancements, the use of which, gives the user an advantage over the competitors simply because others do not have them, will continue to be typically distributed through private resources. This would continue to reinforce existing borders between income classes and enlarge the social and political distances between them. If it is permanent or difficult to undo, then the social stratification may approach irreversibility.[291] Feeney posits that an underclass may form if some identifiable groups are persistently at the bottom strata of society, even if this bottom stratum is better off than before in absolute terms. Questions of injustice of social immobility may then arise.[292]

I now turn to evaluating the existing laws that can apply to the use of HET which may address the concern with unfairness in competitive scenarios.

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[289] Oliver Feeney, 'Germ-Line Enhancements, Inequalities and the (In)Egalitarian Ethos' (2010) 4 Studies in Ethics, Law, and Technology 12–13 <https://www.degruyter.com/document/doi/10.2202/1941-6008.1122/pdf> accessed 27 June 2023.

[290] Adam Swift, 'Would Perfect Mobility Be Perfect?' (2004) 20 European Sociological Review 1, 8.

[291] Shapiro (n 48) 564.

[292] Feeney (n 286) 12–13.

III. THE APPLICATION OF GENERIC LAWS TO HET

This section considers the international instruments applicable to biotechnology as well as a host of domestic regimes that may eliminate the need to consider *sui generis* regulatory intervention to address the equality harm of unfairness in competitive scenarios identified in Section I.B. above. Thus, the line of inquiry is not whether there is *any* regulation, but rather, whether the regulation in question appropriately addresses the use of an enhancement by a competitor in a zero-sum scenario.

Indeed, many overarching instruments would apply to the use of HET. For instance, UDBHR addresses ethical issues related to medicine, life sciences, and associated technologies.[293] It has been published by the International Bioethics Committee (IBC) of UNESCO, which has been in the vanguard of attempts to forge a worldwide bioethical consensus.[294] It presents a starting point for the regulation of various biotechnologies and their application. It aims to *inter alia* provide a universal framework of principles to guide the formulation of legislation, policies, or other instruments in the field of bioethics; and to ensure respect for the life of human beings and fundamental freedoms, consistent with international human rights law. It also aims to promote equitable access to medical, scientific and technological development.[295] It recognizes equality as an important value to be preserved and respected in the face of technological advancement,[296] and states that no individual or group should be discriminated

[293] UDBHR, art. 1(1).

[294] Brownsword and Goodwin (n 95) 52.

[295] UDBHR, art 2(a), (c) and (f).

[296] UDBHR, art. 10.

against or stigmatized on any ground, in violation of human dignity, human rights, and fundamental freedoms.[297] It does not envisage the problem of entrenchment of inequality through the use of HET in competitive scenarios.

The Council of Europe passed the Oviedo Convention for the Protection of Human Rights and Dignity of the Human Being with Regards to the Application of Biology and Medicine 1997, which is legally binding.[298] It mandates equitable access to healthcare, professional standards in health research, the requirement of consent in research trials, privacy, among others. The Oviedo Convention and UDBHR establish the principle of primacy of the human being in the field of biomedicine. This means that when balancing the rights of the individual with those of science and society, the interests and welfare of the individual should always prevail.[299] This Convention, though significant in its consideration of biotechnological issues, does not provide guidance on the issue at the centre of this thesis: unfairness in competitive scenarios.

Apart from these overarching instruments, existing legal frameworks may be applicable on a case-to-case basis by virtue of the *outcomes* of the use of HET, rather than because of deliberate consideration of whether they can be used to address the harms resulting from HET. For instance, existing law on privacy may guide a claim regarding the theft of personal data from an implanted device, based on existing provisions and principles. However, that leaves open the concern regarding whether there is still a gap left to be addressed which privacy law is not

[297] UDBHR, art. 11.

[298] Oviedo Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (4 April 1997) ETS No. 164. [‘Oviedo Convention’]

[299] Oviedo Convention, art. 2; UDBHR, art. 3(2).

designed for. For example, it may be difficult for existing privacy law to capture exactly the concern with an individual involved in a chess competition signing up for an experiment involving implantation of a brain-computer-interface, which taps into and records all her neural activity. Existing privacy law may not capture the nature of this intervention and neural activity as personal data.

Some enhancement drugs might fall under the international drug control regime.[300] This regime consists of the Single Convention on Narcotic Drugs 1961 (and 1972 amendment), Convention on Psychotropic Substances 1971, and Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances 1988. While the regime is largely geared towards the control of drugs derived from cannabis, coca and opium, the Convention on Psychotropic Substances 1971 also regulates synthetic psychoactive drugs and stimulants, which could include certain cognitive enhancement drugs.[301] Similar to the regulatory regime for medical devices, the international drug control regime distinguishes between medical and non-medical use, and bans any use other than for medical or scientific purposes.[302] Other than this, drugs that have originally been developed for medical purposes, including cognitive enhancers like Modafinil and Ritalin, would be subject to pharmaceutical laws that entail clinical testing and pre-market approval procedures[303] and would have to comply with the safety and quality

[300] Sean Jensen and others, 'SIENNA D3.1: State of the Art Review' (2018) 14 <https://www.sienna-project.eu/digitalAssets/788/c_788666-l_1-k_d3.1sotahet.pdf>.

[301] Convention on Psychotropic Substances 1971 A/RES/3443, art. 1(e) and schedule I, II, III, IV.

[302] Jan-Christoph Bublitz, 'Drugs, Enhancements, and Rights' in Fabrice Jotterand and Velko Dubljević (eds), *Cognitive Enhancement: Ethical and Policy Implications in International Perspectives* (Oxford University Press 2016) <https://ezproxy-prd.bodleian.ox.ac.uk:2196/view/10.1093/acprof:oso/9780199396818.001.0001/acprof-9780199396818> accessed 22 January 2021. *Also see* Article 5, Convention on Psychotropic Substances 1971 A/RES/3443.

[303] Jensen and others (n 222) 14.

standards formulated in European Commission regulations.[304] Off-label use may attract civic and criminal liability.[305] This means that the use of Modafinil and Ritalin without a prescription is currently banned, including by a competitor in a zero-sum scenario. However, this ban is motivated by safety and health concerns rather than an equality concern. The significance of the motivation behind the regulation and its effect on enforcement is explored in Chapter Two.

A limited number of enhancement devices may be subject to European Union's new Medical Devices Regulation (MDR) (implemented from May 2021)[306] which applies even to non-medical devices as opposed to the approach taken by the 1993 directive, which it has repealed.[307] The European Union implemented two regulations to MDR in December 2022[308] which clarify the

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[304] Ruud ter Meulen, 'Human Enhancement: A Policy Perspective for the European Union' in Theo Boer and Richard Fischer (eds), *Human Enhancement Scientific, Ethical and Theological Aspects from a European Perspective* (2012) <https://www.ceceurope.org/human-enhancement-scientific-ethical-and-theological-aspects-from-a-european-perspective/> accessed 25 February 2021.

[305] For example, the use of methylphenidate (Ritalin) without a prescription carries a penalty ranging from 2 years to life imprisonment in New South Wales, Australia. The penalty for the use of Modafinil without prescription is 6 months imprisonment. In the UK, under the Misuse of Drugs Act 1971, it is illegal to possess Ritalin without a valid prescription and convicted individuals can be punished with up to five years in prison. It is also illegal to supply it to persons without a prescription and convicted individuals can be punished with up to fourteen years in prison.

[306] Annex XVI, European Parliament and the Council, Regulation 2017/745/EU of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC. ["Medical Devices Regulation"]

[307] European Parliament and the Council, Directive 93/42/EEC of 14 June 1993 concerning medical devices, OJ L 169, 12.7.1993, art. 1(2)(a) and (g). The European Medical Devices Directive of 1993 distinguished between devices used for a medical purpose such as diagnosis, treatment or alleviation of disease, and those used by perfectly healthy individuals. The purpose of the device was to be ascertained in line with the manufacturers' intention, and such intention was construed in accordance with the data supplied by the manufacturer on the labelling or the promotional materials. As a result, only those devices that were marketed for 'diagnostic and/or therapeutic purposes' were regulated under this Directive, and those marketed for enhancement were excluded.

[308] Implementing Regulations (EU) 2022/2346 and (EU) 2022/2347.

regulatory conditions for the non-medical devices in Annex XVI.[309] Under this, the regulation of non-medical devices is subject to a risk assessment, which entails the requirement to demonstrate a clinical benefit, which means demonstrating the performance of the device.[310] Furthermore, there is the requirement of safety, which entails showing that 'when used under the conditions and for the purposes intended, does not present a risk at all or presents a risk that is no more than the maximum acceptable risk related to the product's use which is consistent with a high level of protection for the safety and health of persons'.[311]

Then there is the case of rules for certain specific devices. For instance, for non-medical non-invasive brain stimulation devices, the specific rules concern the risk management procedure by the manufacturers.[312] The exclusion of certain groups of consumers, such as persons with epilepsy, brain tumours, minors etc, is also prescribed. The regulation also suggests safety features such as emergency stop functions,[313] which against centre on safety.

The centrality of risk also features in the method of classification.[314] The MDR divides medical devices into four risk classes, in increasing order of risk. In turn, the higher the class of the device, the stricter is the requirement for market approval, and the greater the involvement of the notified body in the conformity

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[309] Christoph Bublitz and Sjors Ligthart, 'The New Regulation of Non-Medical Neurotechnologies in the European Union: Overview and Reflection' (2024) 11 Journal of Law and the Biosciences <https://dx.doi.org/10.1093/jlb/lsae021> accessed 19 April 2025.

[310] Article 61, paragraph 9, MDR.

[311] MDR Annex 1, Article 9.

[312] See Annex VII, (EU) 2022/2346.

[313] See Articles 4(2) and 4(3), Annex VII.

[314] See Annex VIII MDR.

assessment.[315] Non-medical and non-invasive brain stimulation devices have been placed in class III by the Commission.[316] This is a greater scope of regulation than the US, where non-medical devices are only regulated by consumer protection frameworks, which aligns with the recommendations of the scholars writing in this field.[317]

However, it is not the case that all the non-medical devices are subject to the MDR, including non-medical devices such as brain chip implants. Further, it emerges that the regulation of the non-medical devices that *are* subject to the MDR are regulated for health and safety concerns, much like the international drug control regime. What this means, for instance, is that a non-medical device regulated under Annex XVI of the Medical Devices Regulation, as long as it meets the rules of safety therein, *can* be used by a competitor without prohibition.

HET would also be regulated by other laws whose subject matter intersects with the use or distribution of products. These include minimum safety requirements for products and responsibility for the injuries caused by defective products. In the European Union, the General Product Safety Directive 2001/95/EC of 3 December 2001 on general product safety and the European Products Liability Directive 85/374/EEC of 25 July 1985 concerning liability for defecting products would apply to human enhancement devices.[318] Similar to the previous observation, these laws only address concerns related to safety and

[315] See Medical Device Coordination Group, Guidance on classification of medical devices, MDCG 2021–24 (2021).

[316] Bublitz and Ligthart (n 306).

[317] Sara Goering and others, 'Recommendations for Responsible Development and Application of Neurotechnologies' (2021) 14 Neuroethics 365; KS Rommelfanger and others, 'Neuroethics Questions to Guide Ethical Research in the International Brain Initiatives' (2018) 100 Neuron 19.

[318] Jensen and others (n 222) 16.

product liability. This means that the drugs and devices that have been developed solely for the purpose of enhancement are regulated only to the extent of quality and safety.

This consideration of existing international instruments and laws and their inability to specifically address the novel equality harm of the use of enhancements in competitive scenarios demonstrates that even though some existing regulation is applicable, this harm meets the threshold for *sui generis* regulatory intervention.

However, before concretising this conclusion, it is important to consider some important objections to regulatory oversight of HET. I turn to these now.

IV. RESPONDING TO OBJECTIONS

Though arguments are made to the contrary, I argue in this section that first, the existence of natural advantages is not a ground for allowing unnatural advantages; second, the existence of some unregulated unnatural advantages does not license other more impactful unnatural advantages; and third, there is no reason to encourage enhancements in their own right in competitive scenarios. In each instance, I first substantiate the objection and then provide my response.

A. The existence of natural advantages is no ground for allowing unnatural advantages.

The argument goes that there is no such thing as a level-playing field in competitive scenarios because individuals have many natural advantages to begin with. These include higher IQ than others, greater discipline, genetic disposition towards hard work and so on. Further, there is no good reason to treat natural

advantages as superior to unnatural advantages or enhancements, given that we trump nature in many other acceptable ways, such as by using artificial light when there is no natural light. Indeed, this, or a variation of it, is the most common objection found in the literature[319] on the fairness of using enhancements.

Allen Buchanan, for instance, emphasises that 'life is riddled with unearned advantages' and the mere fact that a technology will cause unearned advantages is insufficient to try to prevent its development. Enhancement, even genetic enhancement, will not result in gaps as large as the existing ones. This doesn't mean that enhancement isn't problematic; just that it is not uniquely problematic or morally novel.[320] The assumption here appears to be that natural advantages already break the link between merit and reward, that is, someone who is not so meritorious because they are endowed with an ability can still earn a better reward than another who does not have the same endowment. Therefore, other ways that the link between merit and reward may be broken, including by the use of enhancements, should not treated as any different.

In fact, the argument in the literature goes further and argues that enhancements can be used to *resolve* naturally occurring inequities in endowments. For example, Julian Savulescu *et al* argue that by allowing everyone to take performance enhancing drugs, we can remove the effects of genetic inequality and level the playing field. In this way, allowing performance

[319] Forsberg and Skelton (n 271); Buchanan, *Better than Human* (n 218); Buchanan, 'Cognitive Enhancement and Education' (n 278); Rebecca Roache, 'Enhancement and Cheating' (2008) 2 Expositions 153; Savulescu, Foddy and Clayton (n 280).

[320] Allen Buchanan, 'Will the Rich Get Biologically Richer?', *Better than Human: The Promise and Perils of Enhancing Ourselves* (Oxford University Press 2011) <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=784748> accessed 8 June 2023; Allen Buchanan, 'Distributive Justice and the Diffusion of Innovations' in Allen E Buchanan (ed), *Beyond Humanity?: The Ethics of Biomedical Enhancement* (Oxford University Press 2011) <https://doi.org/10.1093/acprof:oso/9780199587810.003.0008> accessed 8 June 2023.

enhancement promotes equality.[321] Similarly, according to Buchanan, since the greatest gains in cognitive performance are made by those are at the lower end of the distribution of cognitive capacities, enhancements would undo the unfairness of naturally occurring inequities in talents.[322]

My response is two-fold: first, natural advantages are not superior, they are just practically unavoidable; second, enhancements cannot undo the effects of the uneven distribution of natural advantages, especially not without creating further inequities.

Addressing the first part of the response, that there are two ways to counter the existence of natural advantages: one is to argue that there is something unique or special about natural advantages in a way that they should be treated as superior and not interfered with. This is the line of reasoning adopted by some scholars, including Michael Sandel, who has developed the concept of 'giftedness' and argues against a drive to mastery, and hyper-agency to 'remake nature, including human nature'.

> To acknowledge the giftedness of life is to recognize that our talents and powers are not wholly our own doing, nor even fully ours, despite the efforts we expend to develop and to exercise them. It is able to recognize that not everything in the world is open to any use we may desire or devise. An appreciation of the giftedness of life constrains the Promethean project and conduces to a certain humility…lottery-like nature of our genetic inheritance – humility, responsibility and solidarity 52 – as the fundamental aspect of human nature that he would not want to see lost: To appreciate children as git s is to accept them as they come, not as objects of our design, or products of our will, or instruments of our ambition.'[323]

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[321] Savulescu, Foddy and Clayton (n 280).

[322] Buchanan, 'Cognitive Enhancement and Education' (n 278) 157.

[323] Sandel (n 6).

Even if Sandel's argument based on giftedness which treats natural advantages as superior is not persuasive, it may be easier to simply treat natural differences as unavoidable. We do not have the ability to change, control, or monitor each genetic marker of each human being. Even if we could, we do not know if that would result in a better world than the one that currently exists.

Second, enhancements cannot undo the effects of the uneven distribution of natural advantages, especially not without creating further inequities. As Mehlman notes:

> [S]uppose cognitive enhancements gave people a certain boost in their cognitive ability—say made them 20% smarter. Suppose further that cognitive enhancements were given to all those in the lower half of the "normal" range. These individuals, along with those with below-normal cognitive ability who received the interventions therapeutically, would move up 20% points. But people in the upper half of the population range who obtained enhancements on their own would move up as well. The entire population would move upward in terms of cognitive ability, but the disparities created by natural talent and luck would remain.[324]

It is clear that even if we are successful in providing equal access to enhancements, whether due to cheap prices or government policies, we would still fail to remove the natural differences in endowments of intellect and other abilities. It would be like giving individuals with different heights a raised platform to stand on: they would all be taller, but the differences in their heights would remain. To say that an enhancement can eradicate inequity of natural endowments of any particular trait across a population would entail describing a scientific process via which precise measurements would be needed for every individual to enhance them only to the extent that brings the entire group to the exact same measurement. Without this, one inequity is only transformed into another inequity of distribution of desirable traits.

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[324] Mehlman (n 277).

A development of the objection is that users would have to use the enhancements creatively to derive maximum benefits from it, which will then set them apart from competitors. Savulescu *et al* argue that humans make choices and exercise their own judgements in choosing how to train and how to run a race. This applies to choosing a diet, training, as much as it does to taking drugs. Thus, even if drugs were allowed in say, cycling competitions, athletes would still have to train and use creative ways to ride similar bikes on the same route. Some things will not change, such as the skill of negotiating the steep winding descent.[325] 'We can choose what kind of competitor to be, not just through training, but through biological manipulation… Far from being against the spirit of sport, biological manipulation embodies the human spirit—the capacity to improve ourselves on the basis of reason and judgment'.[326]

This argument is not persuasive. In practical terms, assuming a certain baseline enhancement is provided to all to allow 'maximum creativity' in the competition, those who want to use unfair means to succeed will opt for more exclusive and expensive enhancements, resulting in the exact same problem once again. Thus, it appears then there is no end to levelling the playing field through the use of enhancements.

B. The existence of some unnatural advantages does not license other, more impactful unnatural advantages

The objection to regulation is that many other unnatural advantages exist in competitive fields, many of which affordable only by the wealthy and are not

[325] Savulescu, Foddy and Clayton (n 280) 667.

[326] ibid.

restricted. These include caffeine, computers, personal tutors and so on in the education field, and nutritional supplements, expensive coaching, and high-altitude training in the sports field. Therefore, there is no reason to restrict other unnatural advantages, such as enhancements, that may only be affordable by the wealthy. Indeed, it is also argued enhancements such as Modafinil might even be cheaper than other currently permitted ones such as coffee. This too, is the most common objection in the literature on the fairness of using enhancements.[327]

My response to this objection is two-fold: first, we *do* restrict such advantages to the extent possible. For instance, Universities will emphasise students' work being their own when giving take-home exams. When taking examinations in-person, students are not allowed to bring along their tutors along. Similarly, in the sports arena, the International Paralympic Committee (IPC) introduced a policy on sport equipment in 2011, with the objective of eliminating advantage gained through the use of superior equipment. The universality principle therein (Section 3.1.3) stipulates that the *cost and large-scale availability* of the principal components of equipment should be considered to guarantee access to a sufficiently large number of athletes in the sport.[328]

Second, the fact that we allow some things that advantage rich people does not give us reason to also allow other things that advantage rich people, because the compounded disadvantage will mean that allowing this new thing will make

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[327] Roache (n 316) 155; Forsberg and Skelton (n 271) 326; Sebastian Porsdam Mann and others, 'Is the Use of Modafinil, a Pharmacological Cognitive Enhancer, Cheating?' (2018) 13 Ethics and Education 251, 260; Walter Veit, 'Cognitive Enhancement and the Threat of Inequality' (2018) 2 Journal of Cognitive Enhancement 404.

[328] International Paralympic Committee, 'Policy on Sport Equipment' 2011, <https://www.paralympic.org/sites/default/files/document/120203164107739_Sec_ii_Chapter_3.10_IPC_Sport_Equipment_Policy.pdf> last accessed 20 July 2024.

poorer people worse off (compared to if we only allowed existing advantage-giving things).

Third, enhancements are different to these other unnatural advantages in meaningful ways. For example, tutoring can only assist a student who actively engages with the tutor and makes an effort. Take the example of a student who sits and stares out of the window while her expensive private tutor explains difficult concepts to her. On the comparative, a cognitive enhancer which increases the dopamine levels in a student's brain and therefore makes her more focussed and interested in her studies has an effect irrespective of whether the student displays engagement. Thus, enhancements are qualitatively different to other unnatural advantages such as private tutoring.

C. There is no reason to encourage enhancements, in their own right, in competitive scenarios

Several objections to restricting enhancements seek to defend enhancements as a good in their own right. These objections take different forms.

One argument, made by Savulescu *et al* is that enhancement demonstrates and embodies our innate tendencies as humans: '...biological manipulation embodies the human spirit—the capacity to improve ourselves on the basis of reason and judgement'.[329] According to Savulescu *et al*, enhancements are good in their own right as they showcase human drive. On the other hand, according to Rebecca Roache, enhancements are good in their own right as the use of cognitive enhancement can improve the quality of learning and allow students to enjoy the

[329] Savulescu, Foddy and Clayton (n 280).

non-competitive aspects of education more intensely.[330] Yet another argument, made by Buchanan, is that enhancements are a good in their own right as they can increase individuals' productivity, which can then lead to major increases in overall human well-being. [331]

My response is as follows. In a competitive scenario, the concern to declare a fair winner who deserves the rewards *and* to reduce social immobility eclipses both the concern about the quality of learning, which would not be improved across the board, and what the drive to enhance says about us as humans. Further, Roache's argument overestimates what cognitive enhancements can do for students. In fact, by eliminating the need to find focus through practice and discipline, the use of cognitive enhancers takes away from the ends of education, which is supposed to impart these values.[332] As Kass has argued, 'on the plane of human experience and understanding, there is a difference between changes in our body that proceed through self-direction and those that do not.'[333] This means that there is a significant qualitative difference between a top grade achieved through effort and self-direction as compared to a top grade achieved through the use of cognitive enhancers: the former results in stronger neural connections related to focus that can serve the student in the future too, while the latter does not.

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[330] Roache (n 316) 154.

[331] Allen Buchanan (n 51) 8.

[332] M Schermer, 'On the Argument That Enhancement Is "Cheating"' (2008) 34 Journal of Medical Ethics 85, 88; Juengst (n 60).

[333] Kass (n 50) 129.

Buchanan's argument, on the other hand, does not substantiate what the increases in productivity would be and in what parts of society they would occur. He merely states that with enhanced cognitive capacities, people will be able to do things more quicky and efficiently, leaving aside time to do some new things they value. According to him an increase in life-span will result in labour productivity, citing that at present, a one year increase in life expectancy increases labour productivity by 4%.[334] This ignores the competitive concerns and social immobility entirely.

In fact, the lightness with which the concern for distributive justice is taken when talking about enhancements is demonstrated by the following argument made by Porsdam-Mann *et al*:

> But there is an important, yet underexplored, dimension to the issue of distributive justice. In fact, there is some evidence that PCEs may most benefit those that have the greatest need. For example, some studies have found a greater effect of modafinil and methylphenidate in lower-IQ participants (del Campo et al. 2013; Finke et al. 2010; Mehta, Sahakian, and Robbins 2001; Randall, Shneerson, and File 2005). Those starting from a lower baseline of dopamine and noradrenaline may experience more of an effect from modafinil, whereas those that start from a high baseline may have less to gain. If this is the case, broad access to modafinil and similar PCEs could lead to less inequality in cognitive capacity. In addition, qualitative work has found that students who have the greatest problems with exam anxiety and procrastination are also the ones most likely to use PCE (Sattler et al. 2014). Some of these students might rely on these drugs to finish their education.[335]

The superficiality of engagement with the concern for distributive justice is demonstrated here by how it is understood as something that supports providing cognitive enhancements to those suffer from procrastination, instead of something that takes an overall view of society's functioning. Further, *even if* on a conceptual level, it was possible to administer enhancements in a way that precise

[334] Allen Buchanan (n 51) 9.

[335] Porsdam Mann and others (n 279) 260.

measurements could be taken to decide which individuals deserve enhancements due to low IQ so that there was greater cognitive equity among competitors, on the same conceptual level, other competitors could argue that they suffer from an inequity of confidence, or inequity of typing speed, or inequity of concentration abilities. The point remains, as argued at IV.A., that natural differences and disadvantages are just practically unavoidable in a way that enhancements cannot undo the effects of the uneven distribution of natural advantages, especially not without creating further inequities.

However, in non-competitive scenarios, enhancements may indeed provide some important benefits. Though far-fetched and lacking persuasive power on the whole, the argument has been made that cognitively enhanced scientists may discover the cure for cancer. In certain other areas, it may be extremely important to remain alert and focused, such as for airline pilots or surgeons.[336] Porsdam-Mann *et al* take this a bit too far when they argue:

> Let us imagine that, instead of spending hours in the library, the students use their extensive knowledge of current fields to make new discoveries and gain new insights. Consequently, their society flourishes, pushing back against disease and deprivation. They may not deserve praise for the effort they expended mastering algebra, but they do deserve praise for these new achievements.[337]

One may wonder why it has been the case then, that despite black-market use of cognitive enhancers for at least two decades already, students appear to be using them only to do well in exams for their personal ends and not to push back against disease and deprivation.

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[336] Roache (n 316) 154.

[337] Porsdam Mann and others (n 279) 254.

Nonetheless, to give full credit to this line of argumentation, in non-competitive settings, the pros of using enhancements outweigh the cons. There are other issues such as the pressures of using these drugs, which will not be dealt with here. Technology on its own can improve human functioning: whether that is faster computers that aid computation to find new and more effective pharmaceutical drugs, or simple calculators that can aid a small business. Thus, the use of enhancements in non-competitive settings will ultimately depend on how it serves both the individual using it and the larger ends of society.

CONCLUSION

Chapters One and Two of the thesis sought to build a foundation by introducing and defining HET, and then delving into regulatory theory. This Chapter built upon this foundation by bringing the potential harms of HET in focus and stating unfairness in competitive scenarios as the main focus of the thesis.

This chapter had three aims. First, to provide an account of the potential practical, ethical, and legal concerns raised by HET and the ambiguities created in the application of existing laws. In keeping with this aim, **Section I** provided an overview of the novel harms of HET and then sketched the potential equality harms: discrimination, stigmatisation, and unfair competition. Of these, it narrowed down to unfairness in competitive scenarios as the thesis' main focus.

The second aim of this Chapter was to assess whether unfairness in competitive scenarios is a harm that meets the threshold for *sui generis* regulatory intervention: namely, whether it is a harm incapable of being addressed by existing generic laws. In order to achieve this aim, first **Section II** argued why

unfairness in competitive scenarios is an equality harm. It argued that enhancements take away from the merit of the competitor and reduce the deservingness of the outcome, whilst access to them is dependent on existing wealth. This means that the use of enhancements further entrenches socio-economic inequality. This analysis provides a further part of the overall framework that the thesis proposes: competitive contexts with socio-economic opportunities and positionality of enhancements. In Chapter Two I argued that distributive justice should be treated as a focal point in designing the regulation of novel technology that has an impact on the socio-economic relations in society. This analysis makes clear that HET is an example of such technology.

Section III then applied existing generic laws to HET and assessed whether the harm of unfairness in competitive scenarios can be remedied by them. It concluded that generic laws cannot fully capture this concern. This section concluded that there is a *prima facie* case for *sui generis* regulatory intervention to address the harm of unfairness in competitive scenarios.

The third aim of the chapter was to consider the objections made to regulating HET generally, or specifically with respect to their use in competitive scenarios. **Section IV** considered and responded to each of these objections. Here, I argued that the existence of natural advantages is not a ground for allowing unnatural advantages; the existence of some unregulated unnatural advantages does not license other more impactful unnatural advantages; and there is no reason to encourage enhancements in competitive scenarios. The section concluded that none of the objections are valid, which further cements the need for regulatory intervention to address unfairness in competitive scenarios.

There is yet another body of law in which regulation may be located, eliminating the need for *sui generis* rules. If it is possible to use international human rights law, which includes equality law, as a regulatory tool, it may be possible to apply it to the equality concern at the centre of this thesis. If found sufficient, there may be no need to delve into designing a regulatory framework to address unfairness in competitive scenarios generated due to the use of enhancements.

In the next Chapter, I consider whether human rights can be used as regulatory tools to limit the harms of technology, and then turn my focus to the content of equality law and evaluate its ability to address the equality harms arising out of HET.

CHAPTER FOUR

REGULATING HET USING THE RIGHT TO EQUALITY IN INTERNATIONAL HUMAN RIGHTS LAW

INTRODUCTION

International human rights law (IHRL) is the subset of international law which protects human rights on regional and domestic levels. It includes civil, cultural, economic, political, and social rights.[338] It is made up of treaties, which refers to agreements between sovereign states intended to have binding legal effect between the parties that have agreed to them; and customary international law.[339]

Equality has been central to IHRL since its conception.[340] It is an important facet of liberal democracies and finds mention in the conversation on bioethics and biotechnologies, as evidenced by the UNESCO Universal Declaration on Bioethics and Human Rights, 2005.[341]

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[338] United Nations, 'Global Issues: Human Rights' <https://www.un.org/en/global-issues/human-rights> last accessed 20 July 2024.

[339] Shabtai Rosenne, *Practice and Methods of International Law* 55 (1984). Customary international law '... consists of rules of law derived from the consistent conduct of States acting out of the belief that the law required them to act that way.' The elements of customary international law include: the widespread repetition by States of similar international acts over time (State practice); the requirement that the acts must occur out of a sense of obligation (*opinio juris*); and that the acts are taken by a significant number of States and not rejected by a significant number of States.

[340] Anne F Bayefsky, 'The Principle of Equality Or non-Discrimination in International Law', *Equality and Non-Discrimination under International Law* (Routledge 2015).

[341] UDBHR, art. 10.

This Chapter has two aims. First, to ascertain whether human rights can be used as a regulatory tool. The purpose is to assess whether regulation for HET in competitive contexts can be derived from this existing body of law, eliminating the need for *sui generis* rules. Sections I and II seek to achieve this aim. **Section I** queries whether human rights can be used as a framework both to give appropriate language to the equality concerns arising from HET and to find ways to address them. It argues that IHRL is particularly well-suited to being used as a regulatory tool for HET: first, it is able to represent the interests of humankind and give a voice to civil society; second, it can channel consensus, harmonise domestic laws on this issue, and fashion duties; and finally, it shares a close relationship with bioethics which is the predominant source of current scholarship on enhancement.

Section II studies how existing human rights principles have been applied to novel technological contexts. Analysing several cases, it argues that human rights principles are adaptable to the contemporary issues raised by technological developments. Given the focus of this thesis, it also discusses at length how the European Court of Human Rights (ECtHR) has applied the principle of equality to new technology. It concludes that human rights, including equality law, *can* be used as a regulatory tool for technology.

The second aim of this Chapter is to assess whether equality law in IHRL can address the specific equality harms raised by HET, as discussed in the previous chapter. To do this, **Section III** ascertains the content of 'equality' in IHRL by reviewing its history as well as the provisions in IHRL treaties, the General Comments of the United Nations Treaty bodies, and relevant cases. It also highlights beneficial trends in the interpretation and application of the right to

equality in India, South Africa, and Canada. This is by no means exhaustive; instead, it focuses on some selected case law that demonstrate relevant developments.

Section IV then applies the consolidated content of equality law to the use of enhancements. It demonstrates how the right to equality would apply to each of the harms highlighted in the previous chapter, namely unfairness in competition, discrimination, and stigmatisation of undesired physical traits. It argues that the right to equality in IHRL is deficient in its ability to address all the fairness and equality concerns arising from the use of HET.

I. JUSTIFYING HUMAN RIGHTS AS A REGULATORY TOOL FOR HET

In this section, I argue that human rights can be used as a regulatory tool for HET, both in their existing form and as grounding sources for more specific law. Indeed, human rights are not just tools of ethical reasoning but are themselves regulatory in their incarnation as legal entitlements.[342] As such, human rights can be the touchstone for regulation and can be treated as setting standards for other laws.[343] This idea finds support both from scholars writing on regulation generally, and from scholars writing on the regulation of new technology such as robotics and AI more specifically.

For example, Roger Brownsword and Morag Goodwin in their seminal work on regulation in the 21st century refer to human rights as boundary markers for the regulation of technology, in that they can determine the legitimacy of technological developments by marking the outer limits of their moral

[342] Brownsword and Goodwin (n 95) 244.

[343] Jensen and others (n 222) 5, 30.

acceptability.[344] Ronald Leens and his co-authors, writing in the context of regulating robots, argue that regulatory dilemmas can be resolved using the anchor point of the human rights framework found in instruments such as the European Convention on Human Rights.[345] Vinodkumar Prabhakaran and his co-authors argue that 'universal human rights as a set of globally salient and cross-culturally recognised set of values can serve as a grounding framework for explicit value alignment in responsible AI'. Indeed, many others too have proposed human rights frameworks to promote greater accountability for the harms resulting from AI.[346]

Thus, human rights can be used as a framework both to give appropriate language to the equality concerns arising from HET and to find ways to address them. Three other factors make IHRL particularly well suited to being used as a regulatory tool for human enhancement technology: first, it is able to represent the interests of humankind and give a voice to civil society; second, it can channel consensus, harmonise domestic laws on this issue, and fashion duties; and finally, it shares a close relationship with bioethics which is the predominant source of current scholarship on enhancement.

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[344] Brownsword and Goodwin (n 95) 225.

[345] Ronald Leenes and others, 'Regulatory Challenges of Robotics: Some Guidelines for Addressing Legal and Ethical Issues' (2017) 9 Law, Innovation and Technology 1.

[346] Corinne Cath, 'Governing Artificial Intelligence: Ethical, Legal and Technical Opportunities and Challenges' (2018) 376 Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 20180080; Vidushi Marda, 'Artificial Intelligence Policy in India: A Framework for Engaging the Limits of Data-Driven Decision-Making' (2018) 376 Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 20180087; Lorna McGregor, Daragh Murray and Vivian Ng, 'INTERNATIONAL HUMAN RIGHTS LAW AS A FRAMEWORK FOR ALGORITHMIC ACCOUNTABILITY' (2019) 68 International & Comparative Law Quarterly 309; Filippo Raso and others, 'Artificial Intelligence & Human Rights: Opportunities & Risks' (Berkman Klein Center for Internet & Society Research Publication 2018) <https://dash.harvard.edu/handle/1/38021439> accessed 8 December 2021.

A. Representing the interests of humankind and giving a voice to civil society

From a philosophical perspective, human rights are first and foremost a set of moral claims arising from the understanding that each human life has value, and that value must be protected.[347] Thus, human rights can be described as the fundamental rights every human being holds simply by virtue of their birth, regardless of their age, ethnic origin, location, language, religion, nationality, ethnicity, or any other status.[3] Further, each of these principles is strong enough to create a duty for others to treat people in a way that respects and preserves these principles. Henry Shue states this succinctly where he says that those who possess human rights can make justified demands that the actual enjoyment of a good be socially guaranteed against standard threats to them.[348] From these principles, their offshoots, and the duties towards them, arise basic good such as physical security, health, education and so on. Indeed, human rights *law* is the legal regime that aims to make these claims a reality.[349]

To this end, the Universal Declaration of Human Rights (UDHR) was adopted by the United Nations General Assembly in 1948 in the aftermath of the Second World War. It consists of thirty articles that affirm rights including dignity, equality, liberty etc. The drafting committee was diverse for the time it

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[347] Charles R Beitz and Charles R Beitz, *The Idea of Human Rights* (Oxford University Press 2011); 'Universal Human Rights in Theory and Practice by Jack Donnelly | Paperback' (*Cornell University Press*) <https://www.cornellpress.cornell.edu/book/9780801477706/universal-human-rights-in-theory-and-practice/> accessed 27 November 2023; James Griffin and James Griffin, *On Human Rights* (Oxford University Press 2008); Henry Shue, *Basic Rights: Subsistence, Affluence, and U.S. Foreign Policy: 40th Anniversary Edition* (Princeton University Press 2020) <https://academic.oup.com/princeton-scholarship-online/book/37832> accessed 27 November 2023.

[348] Shue (n 344).

[349] Allen Buchanan and Allen Buchanan, *The Heart of Human Rights* (Oxford University Press 2014); Vinodkumar Prabhakaran and others, 'A Human Rights-Based Approach to Responsible AI' (arXiv, 6 October 2022) <http://arxiv.org/abs/2210.02667> accessed 24 November 2023.

was set up in, and included representatives from China, Chile, the Soviet Union, Lebanon, and India, in addition to United States, Australia, France, and United Kingdom.[350] The UDHR was subsequently augmented by the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) in 1966. These agreements incorporated insights from a still larger group of countries after the widespread success of decolonization movements. They now form part of customary international law and have been adopted by a number of national and transnational legal bodies such as the International Criminal Court (ICC).[351]

It is a significant merit of IHRL that it can represent the interests of every individual, given its philosophical origin as equally belonging to all and serving as a *lingua franca* for guarding everyone's interests. This is important because while public engagement is important, as observed above in the section on stakeholder involvement, in this debate on regulating HET it would be nearly impossible to engage everyone even though it will have society-wide implications. IHRL, in so far as it is agnostic to individuals' identity or status, allows us to consider the interests of those who have no role to play in the development of these technologies and may not get the opportunity to use them in the near future, but will be affected by their use by others. To consider the different and often opposing interests of individuals is important not just vis-à-vis people within a State, but the most vulnerable people of the poor countries as opposed to the most privileged of the rich countries: the comparison is that of a daily wage earner in Sudan and the world's richest man in the United States.

[350] United Nations, 'Drafters of the Declaration' (*United Nations*) <https://www.un.org/en/about-us/udhr/drafters-of-the-declaration> accessed 27 November 2023.

[351] Prabhakaran and others (n 346).

Indeed, Vinod Prabhakaran *et al* highlight how, being a set of moral claims having intercultural and cross-cultural validity, human rights can support value alignment for AI systems across a range of different national and social contexts, which is important especially since the research community working on the fairness, accountability, transparency and ethics research in AI lacks geo-cultural diversity.[352]

> …resulting in the research being primarily framed in the Western context, by researchers mostly situated in Western institutions/organizations, to mitigate social injustices prevalent in the West, using data from the West, and implicitly imparting Western value systems. On the other hand, these research insights are meant to intervene on platforms that are globally present, serving a global population from diverse societies, cultures and values, with their own forms of injustices.

This is a relevant observation in light of the fact that most of the research and academic writing on human enhancement too emanates from the west. Human rights can provide the framework for considering the interests of those who do not hold importance for most individuals researching, writing, or developing HET.

Admittedly, representing the interests of all means that conflicts between interests are bound to arise. However, IHRL has developed tools to manage the conflicts between two individual interests as well as to balance the welfare of the individual with the interests of others.[353] These tools or concepts include proportionality, common heritage of mankind, global public goods, and the rights of future generations.[354] This can serve to address the arguments of both the transhumanists, who argue strongly in favour of unimpeded enhancement in order

[352] ibid 2.

[353] United Nations, Charter of the United Nations, 24 October 1945, 1 UNTS XVI, Preamble, art. 1(2) and art. 55; UN General Assembly, Universal Declaration of Human Rights, 10 December 1948, 217 A (III) ["UDHR"]; International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 ["ICCPR"]; International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 ["ICESCR"].

to preserve the species, and bio conservatives, who argue against enhancement due to the dignity of the individual. To give the example of an explicit provision, the UNESCO Declaration draws on the concept of the 'common heritage of humanity' (found in the international law of the sea[355]) and applies it to genetic governance. In doing so, it grounds the interest of every human being in regulatory conclusions reached about gene technology. Yotova observes that the drafters considered this to be both the cornerstone as well as the main innovation of the declaration.[356]

Finally, IHRL can also provide a shared vocabulary and framework that technologists and practitioners can invoke to address the claims and concerns of the global civil society.[357] Human rights are part of the global social movement that critiques practices, actors, and institutions that have adverse impact on rights. Since the beginning, civil society has played an important role in fighting for new rights and therefore developing human rights doctrine, as well as monitoring outcomes.[358] Civil society and social movements have enjoyed significant success using the language of rights and pushing its boundaries, including in the field of women's rights, indigenous rights, as well as disability rights.[359] Grounding new

[354] Rumiana Yotova, 'Regulating Genome Editing under International Human Rights Law' (2020) 69 International & Comparative Law Quarterly 653, 657–658. A more elaborate discussion of these tools can be found in the paper.

[355] United Nations Convention on the Law of the Sea 1982, 1833 UNTS, Part XI 'The Area' 3, Preamble and art. 1; UNESCO Convention for the Protection of Cultural Property in the Event of Armed Conflict 1954, 3511 UNTS.

[356] Yotova (n 351) 676.

[357] Prabhakaran and others (n 346) 2.

[358] Margaret E Keck and Kathryn Sikkink, *Activists Beyond Borders: Advocacy Networks in International Politics* (Cornell University Press 1998).

[359] Thomas Risse, Stephen C Ropp and Kathryn Sikkink (eds), 'The Power of Human Rights: International Norms and Domestic Change' <https://www.cambridge.org/core/product/identifier/9780511598777/type/book> accessed 27

regulatory frameworks in the language of human rights therefore allows the global civil society to engage with the scientific community behind the development of HET.

B. Channelling consensus, harmonising domestic standards, fashioning duties

In contrast with disparate domestic law particularly, international law is the most appropriate legal order through which a consensus can be channelled, and a regulatory framework can be developed for HET. The Universal Declaration on Bioethics and Human Rights recognises the need for a *global* response to the ethical implications of developments in science and technology and emphasises that such implications must be dealt with in a manner consistent with human rights law.[360] Indeed, as the only overarching legal order that has the necessary procedures to help form and implement an international consensus on matters of common interest and concern, [361] IHRL can help harmonise domestic laws, set out common minimum standards, provide centralised oversight and promote good practices through soft law, as this has been its very objective for past sixty years. It is capable of being adopted directly in the domestic frameworks, given wide ratification. States are then obliged to respect, protect and promote them within their jurisdiction.[362] This can ensure uniform treatment of HET, which is crucial especially in a time when individuals can easily cross international borders to access healthcare and products.

November 2023.

[360] UDBHR, Preamble.

[361] Yotova (n 351).

[362] ibid 680.

Further, human rights can serve as good regulatory tools because they can help fashion appropriate duties. As Prabhakaran *et al* suggest, the framework of IHRL can help illuminate the concurrent responsibilities of various actors, since they apply to states, organisations, and individuals alike. Researchers from Harvard University's Berkman Klein Centre on Internet and Society agree that international human rights law provides 'a universally accepted framework for considering, evaluating, and ultimately redressing the impacts of AI on individuals and society' and 'providing a shared language and global infrastructure around which different stakeholders can engage.'[363]

The 2011 United Nations Guiding Principles on Business and Human Rights (UNGP), though not binding, outline the specific responsibility of businesses to respect human rights, including by identifying, preventing, and mitigating salient human rights risks. These Guiding Principles make clear those developing new technologies need to make an informed effort to understand the implications that a technology will have for rights holders and to put in place measures that ensure that the rights are upheld through processes of evaluation, review and assessment.[364] For instance, Principle 13 requires business enterprises to avoid causing adverse human rights impacts through their own activities and mitigate human rights impacts linked to their products.[365]

[363] Raso and others (n 343).

[364] Prabhakaran and others (n 346).

[365] Guiding Principles on Business and Human Rights, Principle 13.

C. Close relationship with bioethics

Human enhancement, as a field of academic study, has largely received attention within bioethics rather than law. While the ethics of enhancement are crucial to consider, and will play a role in regulatory conclusions, much more value can be derived from the field of law as far as regulatory efforts are concerned. This is because bioethics, as a field, is not geared towards regulation at all, and most ethical guidelines, while sometimes mirrored in law, are non-binding.

However, it is helpful that IHRL shares a close interrelationship with bioethics and is thus able to incorporate its concerns. Roberto Andorno and George Annas have argued that this owed to the fact that both these fields emerged simultaneously after the Second World War in the wake of the brutal experiments conducted by Nazi physicians as well as other atrocities during the war. As a result, international human rights law and bioethics share conceptual similarities and goals.[366] The connection between bioethics and human rights has been explicitly recognised in the aftermath of the Holocaust.[367] In fact, the Universal Declaration on Bioethics and Human Rights enshrines bioethics *in* human rights, and 'recognises the interrelation between ethics and human rights in the specific field of bioethics'.[368] This means that the two fields can speak to each other, and IHRL may be able to provide the conceptual and linguistic packaging for bioethical concerns that can in turn result in appropriate regulation.

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[366] Roberto Andorno, 'What Is the Role of "Human Nature" and "Human Dignity" in Our Biotechnological Age?' (2011) 3 Amsterdam Law Forum.

[367] Robert Baker, 'Bioethics and Human Rights: A Historical Perspective' (2001) 10 Cambridge Quarterly of Healthcare Ethics 241.

[368] UDBHR, Foreword.

An objection to the view that human rights law can be used as a regulatory tool can be that they are too old (having been drafted in 1948 and having evolved only moderately since) and therefore out of step with modern technological advancements. To respond to this objection and show that IHRL can provide a firm foundation on which equality (and other) concerns with the use of HET can be fleshed out, I now demonstrate how human rights standards have been applied and suitably adapted to technology by Courts.

II. APPLICATION OF HUMAN RIGHTS STANDARDS TO TECHNOLOGY – COURTS IN ACTION

In this section, I first demonstrate how human rights Courts have successfully applied a host of human rights principles to novel technological challenges, as well as point out some limitations. I then sketch how Courts have applied the principle of equality in particular to novel technological concerns.

A. Human rights Courts engaging with technology

Recent cases in traditional human rights fora demonstrate the challenges created by technological developments, and the emergence of a new field: technology and human rights.[369] This is evident from the issues the ECtHR has had to grapple with across assisted reproduction, data protection, DNA evidence, state surveillance and gender re-assignment over the past two decades. This line of cases demonstrates that time and time again the ECtHR, as a traditional human rights Court, has been able to apply existing human rights standards and principles ingrained in the human rights framework, including dignity, privacy, and autonomy, to novel technological concerns and resolve the dispute at hand.

[369] Thérèse Murphy and Gearóid Ó Cuinn, 'Works in Progress: New Technologies and the European Court of Human Rights' (2010) 10 Human Rights Law Review 601.

In *Price* v *United Kingdom*,[370] in 2001, where a paraplegic in a wheelchair was imprisoned for debts, the Court considered the applicant being forced to rely on the help of the prison staff and cellmates for all her needs because she was denied the use of the charger to the wheelchair as it was considered a luxury. The Court considered this a violation of Article 3 of the ECHR, as degrading treatment in detriment to her dignity. Here, her state of vulnerability arising from the lack of access to technology she required led to the breach of dignity.[371] In *Peck v United Kingdom*[372] in 2003 and *Copland v United Kingdom*[373] in 2007 the Court used the right to private life framework under Article 8 to declare the illegality of disclosure of CCTV footage to the media and storage of personal information in email.

In *Evans v United Kingdom*[374] in 2007, the ECtHR considered the rules governing assisted reproduction in the United Kingdom, once again in light of private life. It held that the Human Fertilisation and Embryology Act 1990 was compliant with the ECHR, and the frozen embryos that could have made the applicant a biological mother ought to be destroyed due to the lack of consent of her ex-partner who had donated his sperm. In *S and Marper*[375] in 2008, it ruled that the nonconsensual indefinite retention of fingerprints and DNA samples of individuals whose cases had been discontinued or who had been acquitted, was

[370] *Price v the United Kingdom* (2001) Application no. 33394/96 [37].

[371] Daniele Ruggiu, 'Implementing a Responsible, Research and Innovation Framework for Human Enhancement According to Human Rights: The Right to Bodily Integrity and the Rise of "Enhanced Societies"' (2018) 10 Law, Innovation and Technology 82, 89.

[372] *Peck v United Kingdom* 36 EHRR 41 [57].

[373] *Copland v United Kingdom* 45 EHRR 37.

[374] *Evans v United Kingdom* 46 EHRR 34.

[375] *S and Marper v United Kingdom* 48 EHRR 50 [112].

illegal. In *Liberty and Others v United Kingdom*[376] in 2008, and *Kennedy v United Kingdom*[377] in 2010 it considered the legality of surveillance by the State using new technology. In *Y.Y. v Turkey*[378] in 2015 the ECtHR considered gender reassignment surgery in the context of autonomy. The Court relied on the principle of self-determination, which is affirmed when such choice is grounded on one's sexual and gender identity, the deep motivations upon which the person builds their own identity.

These cases and the Court's application of existing human rights principles to novel technological contexts demonstrates the adaptability of human rights principles. Given the focus of this thesis, I now turn to discuss at length how the ECtHR has applied the principle of equality to new technology.

B. Human rights Courts applying equality principles to technology

Canvassing cases in the ECtHR that involve technology and the application of the principle of equality and non-discrimination demonstrates the following: first, the Court is alive to the potential discriminatory effects of technology; second, the Court is cognizant of the evolution in scientific views and defers to scientific bodies as well as national legislatures that have considered scientific voices; third, it seeks to prevent stigmatization arising from technology and its effects; fourth, it admits evidence that can help interpret existing understanding of equality provisions in new ways due to the contextual need; and fifth, it sometimes falls

[376] *Liberty and Others v United Kingdom* (2008) Application No. 58243/00.

[377] *Kennedy v United Kingdom* (2010) Application No. 26839/05.

[378] *Y.Y. v Turkey* (2015) Application No. 14793/08.

Also see Daniele Ruggiu, 'A Rights Based Model of Governance: The Case of Human Enhancement and the Role of Ethics in Europe' in Kornelia Konrad and others (eds), *Shaping Emerging Technologies: Governance, Innovation, Discourse* (IOS Press/AKA-Verlag, Berlin 2013) 109.

short of giving legal tenor to the effects of technology if it is easier to term them simply as 'concerns'. I turn to each of these aspects in order, to demonstrate the breadth of the contexts that the principle of equality had been suitably adapted to, in its regulatory or boundary-marking capacity.

First, in *SH and Others v Austria,*[379] wherein the state had barred certain forms of In Vitro Fertilisation (IVF) but not others, the ECtHR in its judgment in 2007 held that the state was unable to justify the difference in treatment between the forms of IVF it had barred and the others it had permitted. It reasoned that the legislature must assess the risks of new technology but banning it would not be a proportionate measure unless it was the only way of preventing its most serious repercussions. In this case, since the concerned Act provided for safeguards to minimize the risks of barred IVF method. Thus, the Court found that the prohibition was not the least intrusive means of achieving the aim pursued.[380]

The Court also demonstrated its ability to adapt human rights rules and apply it to societal change prompted by technology:

> 1. Family relations which do not follow the typical parent-child relationship based on a direct biological link, are nothing new and have already existed in the past…From this matter of common knowledge the Court would conclude that there are no insurmountable obstacles to bringing family relations which would result from a successful use of the artificial procreation techniques at issue into the general framework of family law and other related fields of law.
>
> 2. In conclusion the Court finds that the Government have not submitted a reasonable and objective justification for the difference in treatment between the third and fourth applicants, who are prevented by the prohibition of ova donation for artificial procreation under Section 3 of the Artificial Procreation Act from fulfilling their wish for a child, and a couple which may make use of artificial procreation techniques without resorting to ova donation. Accordingly, there has been a violation of Article 14 of the

[379] *SH and Others v Austria* (2007) Application No. 57813/00.

[380] ibid [76].

> Convention taken in conjunction with Article 8 as regards the third and fourth applicants.

The Court was able to tie together the social, sociological, legal, and technological aspects to determine that access to a technology must be suitably applied to all, and all variations of the use of that technology have to be made available and permissible, unless an objective and reasonable difference can be shown between those various uses.

However, the Grand Chamber, deciding on appeal, concluded that the impugned legislation dealing with artificial reproductive technology was in accordance with Article 8[381] of the Convention, based on the current scientific and societal views in the context of a wide margin of appreciation. This demonstrates that Courts defer to advancements in science, the approach of different legislative bodies in the region, and wish to give state parties a wide margin of appreciation in determining whether discriminatory access to a technology can be justified.

> 97. Since the use of in vitro fertilisation treatment gave rise then and continues to give rise today to sensitive moral and ethical issues against a background of fast-moving medical and scientific developments, and since the questions raised by the present case touch on areas where there is not yet clear common ground among the member States, the Court considers that the margin of appreciation to be afforded to the respondent State must be a wide one.
>
> 103. The Court considers that the field of artificial procreation is developing particularly fast both from a scientific point of view and in terms of the development of a legal framework for its medical application. It is for this reason that it is particularly difficult to establish a sound basis for assessing the necessity and appropriateness of legislative measures, the consequences

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[381] Article 8: Right to respect for private and family life

1. Everyone has the right to respect for his private and family life, his home and his correspondence.

2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.

> of which might become apparent only after a considerable length of time. It is therefore understandable that the States find it necessary to act with particular caution in the field of artificial procreation.
>
> 106….However, the central question in terms of Article 8 of the Convention is not whether a different solution might have been adopted by the legislature that would arguably have struck a fairer balance, but whether, in striking the balance at the point at which it did, the Austrian legislature exceeded the margin of appreciation afforded to it under that Article (see Evans, cited above, §91). In determining this question, the Court attaches some importance to the fact that, as noted above, there is no sufficiently established European consensus as to whether ovum donation for in vitro fertilisation should be allowed.

At paragraph 120, the Grand Chamber held that since it had addressed the applicants' complaints under Article 8 of the Convention and dismissed them, there was no cause for a separate examination of the same facts from the standpoint of Article 14[382] read in conjunction with Article 8 of the Convention.

The third insight comes from *S and Marper v United Kingdom.*[383] This case concerned a national DNA database, involving the non-consensual indefinite retention of the fingerprints, cellular samples, and DNA profiles of persons who had been acquitted. In its discussion of Article 8(2), the Court expressed its concerns about the risk of stigmatization. It noted:

> 122. Of particular concern in the present context is the risk of stigmatisation, stemming from the fact that persons in the position of the applicants, who have not been convicted of any offence and are entitled to the presumption of innocence, are treated in the same way as convicted persons. In this respect, the Court must bear in mind that the right of every person under the Convention to be presumed innocent includes the general rule that no suspicion regarding an accused's innocence may be voiced after his acquittal (see *Rushiti v. Austria*, no. 28389/95, § 31, 21 March 2000, with further references). It is true that the retention of the applicants' private data cannot be equated with the voicing of suspicions. Nonetheless, their

[382] Article 14: Prohibition of discrimination

The enjoyment of the rights and freedoms set forth in this Convention shall be secured without discrimination on any ground such as sex, race, colour, language, religion, political or other opinion, national or social origin, association with a national minority, property, birth or other status.

[383] *S and Marper v United Kingdom* 48 EHRR 50.

> perception that they are not being treated as innocent is heightened by the fact that their data are retained indefinitely in the same way as the data of convicted persons, while the data of those who have never been suspected of an offence are required to be destroyed. (emphasis added)

Therefore, the Court was alive to the risks of affected persons being stigmatized or treated differently and unequally due to the storing of their data, even though this was not observed in relation to Article 14. Once again, it demonstrates that the Court is able to adapt human rights norms to novel technological demands.

The fourth insight arises from the case of *R (Bridges) v. Chief Constable of South Wales Police*[384] in the United Kingdom, which concerned the South Wales Police's deployment of AFR (artificial facial recognition) Locate. This was done through cameras placed on poles, posts, and police vehicles that captured faces. Warnings were posted about the usage of these cameras and police officers handed out leaflets explaining to people roaming within the patrolled area that their face images could be captured and processed. The AFR Locate looked for face matches from a South Wales Police database of photographs. This included persons who were wanted on warrants, individuals who had escaped custody, people suspected of having committed crimes, people of interest for intelligence purposes, and persons considered to be vulnerable.[385] The system generated a 'similarity score' between faces it detected through the cameras and the faces on the police database. If the system identified a possible match, a police officer would compare the camera with the watch-list.

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[384] *R (Bridges) v. Chief Constable of South Wales Police* [2020] EWCA (Civ) 1058 [201].

[385] ibid [13].

The applicant, Bridges, argued that the AFR Locate had captured his image on two occasions, without his consent. The Courts while adjudicating this case called Artificial Face Recognition 'a novel and controversial technology'.[386] The Court of Appeal decided that overall, the AFR and its protocol were so invasive of individual privacy that they needed to be based on a particularly detailed and robust legal framework. It was violative of Article 8 of ECHR as it gave the police too much discretion, for example, in terms of who would be on the watch-list, and where the technology would be deployed.[387] The most interesting insight, for the purposes of this thesis, is with respect to the public sector equality duty (PSED). According to Section 149(1)(b) of the Equality Act 2010, a public authority must have due regard to the need to 'advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it' in the exercise of its functions.

Bridges had argued that the South Wales Police had failed to assess the potential for race and sex (both of which are protected characteristics under the Equality Act 2010) discrimination through the use of AFR. According to him, the South Wales Police contravened the PSED's positive duty to evaluate the potential race and sex biases and they did not give due regard to the need to eliminate such discrimination. Though the Divisional Court had found no substance in this argument, the Court of Appeal engaged with it in-depth. The Court found that the South Wales Police had failed to gather sufficient evidence to establish whether or not AFR Locate was inherently biased before using it. At trial, the South Wales Police could not establish whether there had been a

[386] *Bridges* (n 352).

[387] *Bridges* (n 352) [91].

demographic imbalance in the relevant training data and in fact, was not aware of the dataset on which AFR Locate had been trained.

Crucially, a computer science scholar testified on this point, and the Court of Appeal noted that as a minimum for confirming whether an AFR system is biased, the database statistics, such as the number of males to females, and different races considered, would need to be known.[388] It could not be concluded that AFR Locate produced biased results, but crucially for the Court, the South Wales Police 'never sought to satisfy themselves, either directly or by way of independent verification, that the software program in this case does not have an unacceptable bias on grounds of race or sex.' The Court emphasised that police forces intending to use it in the future should satisfy themselves that everything reasonable which could be done had been done in order to make sure that the software used did not have a racial or gender bias.

This demonstrates that existing dimensions of equality and non-discrimination can indeed be quite helpful in addressing some adverse impacts of technology, and that Courts are able to adapt the frameworks according to need. In particular, this case also demonstrates the widening ambit of equality law and the duties it carries. It also shows the Court's ability to appreciate technical evidence, in this case the significance of a data set, and apply it within the mould of legal duties arising from equality.

[388] *Bridges* (n 352) [193].

Fifth, in *S and Marper v United Kingdom*,[389] (also discussed previously) the Court considered the disparate impact of the implicated policy, though it did not couch it in terms of an equality concern or Article 14:

> 124. The Court further considers that the retention of the unconvicted persons' data may be especially harmful in the case of minors such as the first applicant, given their special situation and the importance of their development and integration in society…The Court shares the view of the Nuffield Council on Bioethics as to the impact on young persons of the indefinite retention of their DNA material and notes the Council's concerns that the policies applied have led to the over-representation in the database of young persons and ethnic minorities who have not been convicted of any crime (see paragraphs 38-40 above).

This demonstrates that the Court can have intuitions or inclinations regarding the impact of technology, but due to either lack of data or the connection being too tenuous it may not actually give it legal tenor and would rather couch it as a concern.

Thus, it can be concluded that human rights can be used as regulatory tools and applied to assess as well as limit harms of technology. I now turn my focus to equality law and evaluate its ability to address the equality harms arising out of HET. In order to do so, I first ascertain the content of 'equality' in IHRL and then apply it to each of the harms highlighted in the previous chapter, namely unfairness in competition, discrimination, and stigmatisation of undesired physical traits.

III. CONTENT OF EQUALITY IN IHRL AND APPLICATION TO HET

This section ascertains the content of 'equality' in IHRL by reviewing its **(A)** history as well as **(B)** the provisions in IHRL treaties, the General Comments of the United Nations Treaty bodies, and relevant cases. It also highlights the **(C)**

[389] *S and Marper v United Kingdom* [2008] ECHR 1581.

beneficial trends in the interpretation and application of the right to equality in India, South Africa, and Canada. This is by no means exhaustive; instead, it focuses on some selected case law that demonstrate relevant developments.

A. History and purpose of equality in IHRL

Equality is a contested concept, with rich, complex, and multifaceted literature arguing for its various conceptions.[390] It is a philosophical concept, a political idea, as well as a legal right, and it is clear that no single notion of equality can sweep the field.[391] An exhaustive treatise on its various meaning in any one of these categories is outside the scope of this work. However, I briefly sketch the disparate legal conceptions of equality before evaluating its history, purpose, and doctrinal content.

Broadly speaking, scholars have divided the theories of equality into the following: First, formal equality. This requires that like cases are treated alike, i.e. that individuals who are similarly situated be accorded the same rights and obligations.[392] In legal terms, this approach underpins anti-discrimination law which prohibits direct unequal treatment which is based on, what is known in the UK as, 'protected characteristics' such as sex, race, and religion. The foremost criticism of formal equality is that it presupposes a neutral starting point and can end up entrenching disadvantage.[393] This is because formal equality offers no guidance as to when individuals are relevantly 'alike'.[394]

[390] Larry S Temkin, *Inequality* (Oxford University Press 1997).

[391] Douglas W Rae and Douglas Yates, *Equalities* (Harvard University Press 1981) 132.

[392] Sandra Fredman, 'Substantive Equality Revisited' (2016) 14 International Journal of Constitutional Law 712, 717.

[393] Stefan Gosepath, 'Equality' in Edward N Zalta (ed), *The Stanford Encyclopedia of Philosophy* (Spring 2011, Metaphysics Research Lab, Stanford University 2011)

[394] Fredman, 'Substantive Equality Revisited' (n 389) 718.

Certain conceptions acknowledge and address the fact that identical treatment can entrench disadvantage where historical and structural inequalities persist. This conception of equality can take multiple forms: equality of opportunity and equality of outcomes. Therefore, the second conception of equality is equality of opportunity, which seeks to ensure that individuals have fair starting conditions. This can take two forms: merely procedural, which entails the removal of direct barriers, and substantive, which entails active measures such as education, training, and the re-evaluation of merit criteria to compensate for historical disadvantage.[395]

The third conception is equality of outcome or equality of results, which focuses on distributive patterns, and seeks to remedy the same historical or structural injustice through remedies such as affirmative action policies, which attempt to correct socio-economic imbalances. One criticism of this conception is that it can lead to mechanical redistribution without addressing structural causes.[396]

Fourth, there is the dignity-based conception of equality. This is particularly influential in Canadian and South African jurisprudence. This conception holds that discrimination is wrongful when it devalues an individual's inherent worth. Nonetheless, the risk with this approach is that a dignity based conception can risk subjectivity and obscure systemic inequalities.[397]

Apart from these conceptions which are reflected in the lawmakers and courts' approaches to equality, scholars of law have also proposed conceptions

[395] ibid 724.
[396] ibid 723.

[397] Gosepath (n 390).

which can more holistically address the structural problems that equality laws have aimed to address. In particular, a 'four-dimensional' understanding of the right to equality developed by Sandra Fredman[398] seeks to capture substantive equality in a way which can encompass the strengths of equality of opportunity, equality of results, and dignity, whilst ameliorating their weaknesses. It is positioned as an analytic framework rather than a definition, which can inform an approach to addressing equality-related social problems. Crucially, it emphasises focus on remedying structural inequality by redressing existing disadvantage, addressing stigma, facilitating participation & social inclusion, and achieving structural change.

Beyond a query into the existing legal conceptions of equality, whether developed by legislators, judges, or scholars, a key aspect of this thesis is to delve into the doctrinal scope of the right to equality as it exists in IHRL, and to investigate it in light of its historical background and purpose.

The history of human rights law shows that while socio-economic equality and distributive justice were central concerns when the body of law first started developing, international politics and global events resulted in this concern eventually being deprioritised.

Samuel Moyn has charted the history of human rights law and investigated whether human rights have contributed to making the world more equal.[399] He notes that at the time of the French Revolution (from where the western modern

[398] Sandra Fredman, *Discrimination Law* (Third edition, University Press 2023).

[399] Samuel Moyn, *Not Enough: Human Rights in an Unequal World* (Reprint edition, Belknap Press 2019) 10.

rights conversation began) there was hope of achieving the ideal of sufficient distribution, as well as the aspiration to achieve distributive equality among citizens—not merely a floor of protection against the worst outcomes by affording basic provision, but a ceiling on wealth and a constraint on material hierarchy.[400]

Indeed, the drafting history of the United Nations Charter and the Universal Declaration of Human Rights (UDHR) demonstrates that a concern for socio-economic equality was present in the minds of the delegates. Gillian MacNaughton illuminates[401] that the word 'property' was proposed in the Sub-Commission by the expert from the Soviet Union as part of a larger amendment extending the grounds present within the UN Charter (race, sex, language, or religion).[402] Later, the UK proposed deleting the word 'property' but the Soviet Union objected, stating 'it was most important that rich and poor should have the same rights'.[403] The drafters made further amendments to the list of grounds but left the term 'property' without further discussion.[404] It is well recognised that 'property'[405] refers to economic status.[406] Further, MacNaughton notes that the official Spanish version of the UDHR employs 'posición económica' for

[400] ibid 13.

Also citing Samuel Fleischacker, *A Brief History of Distributive Justice* (Cambridge, Massachusetts, 2004). On the history of egalitarianism, see Pierre Rosanvallon, *The Society of Equals*, trans. Arthur Goldhammer (Cambridge, Massachusetts, 2013).

[401] Gillian MacNaughton, 'Untangling Equality and Non-Discrimination to Promote the Right to Health Care for All' (2009) 11 Health and Human Rights Journal 5 <https://www.hhrjournal.org/2013/08/untangling-equality-and-non-discrimination-to-promote-the-right-to-health-care-for-all/> accessed 15 October 2021.

[402] UN Sub-Commission on the Prevention of Discrimination and the Protection of Minorities, First Session, UN Doc. No. E/C.4/52 (1947), 4.

[403] UN Commission on Human Rights, Third Session, Summary Record of the Fifty-Second

[404] ibid.

[405] Johannes Morsink, *The Universal Declaration of Human Rights: Origins, Drafting, and Intent*

[406] Manfred Nowak, *UN Covenant on Civil and Political Rights: CCPR Commentary* (NP Engel

'property', rather than 'propiedad' or 'patrimonio' in Article 2. She also notes that interestingly, Article 1 of the American Convention on Human Rights (1969) has the same list of prohibited grounds as the UDHR, International Covenant on Civil and Political Rights (ICCPR), and the International Covenant on Economic, Social and Cultural Rights (ICESCR), except that property is replaced by 'economic status' in the English version. Furthermore, Article 1(1) of the Convention of the Rights of Migrant Workers and their Families (1990) lists both 'economic position' as well as 'property' as prohibited distinctions.[407]

Yet, as Moyn emphasises, '…in its text, the UDHR made no explicit reference and paid no mind to distributive equality'[408] and 'left entirely speculative how richer and poorer nations alike could establish social justice, and with equal ease, and made no note of how the international economy might affect such a pursuit'.[409] In this context, however, the wide ratification of ICESCR was an epoch-making event in the broader history of norms, as it globalised economic and social rights. It affirmed 'traditional sufficiency norms' concerning adequate standards of safety at work, a decent minimum wage, social security, for those too young or ill or old to work, and mandatory state-provided primary education. It also provided much more detail about the independent existence and importance of rights to food, housing and clothing as a part of the 'right to an adequate standard of living'. It incorporated the right to 'highest attainable standard of health' from the 1946 World Health Organisation constitution and thereby elevated it to canonised status. Notably, Moyn argues, it did not contain any kind

[407] MacNaughton (n 398) 5.

[408] Moyn (n 396) 60.

[409] ibid 61.

of commitment to egalitarian distribution within states, nor did it demand cross-border social justice to meet the sufficiency norms it listed.[410] As a result, the arena of human rights simply did not envision global distributive equality.[411]

Thus, by the 1980s, human rights had transitioned from being thought of as an egalitarian welfare package to being an aspiration of achieving the bare minimum globally[412] and the ideal of material equality ultimately lost out.[413]

This sentiment is reflected in other scholarship too. For instance, Tarunabh Khaitan's theory of discrimination law argues that the focus of discrimination law is not to make everyone equal, but to break the *nexus* between individual disadvantage and group membership. The harm that discrimination law protects against is the lack of secured access to the basic goods that one needs to flourish including an adequate range of valuable opportunities.[414] Samantha Besson writes that except in Europe,[415] international human rights and non-discrimination rights have not been interpreted to imply some of the most robust egalitarian goals (which she refers to as including equality of welfare, equality of opportunity and distributive equality). There are generally no positive duties to promote equality of opportunity or outcome, though State parties are allowed to do so.[416]

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[410] ibid 111.

[411] ibid 112.

[412] ibid 145.

[413] ibid 3.

[414] Tarunabh Khaitan, 'The Point of Discrimination Law', *A Theory of Discrimination Law*

[415] Samantha Besson, 'Evolutions in Non-Discrimination Law within the ECHR and the ESC Systems: It Takes Two to Tango in the Council of Europe' (2012) 60 The American Journal of

[416] Samantha Besson, 'The Egalitarian Dimension of Human Rights' (2013) 136 Archiv für

Johannes Morsink and Gillian MacNaughton[417] have described equality and non-discrimination as 'two sides of the same coin'.[418] Samantha Besson underscores this point by noting that the major international and European human rights treaties guarantee equality and non-discrimination interchangeably in the same clauses, and the same can be observed from the decisions of human rights monitoring bodies.[419] This suggests that the content of equality is limited to the right to non-discrimination.

Finally, Allen Buchanan agrees that the objective of the human rights framework is to secure for every individual a (reasonable) opportunity for a decent life, as opposed to the more robust notion of equality of outcomes, or equality of resources, or equality of welfare, or equality of opportunity for welfare.[420] Instead, the effective implementation of such robust notions of equality are dependent on more egalitarian political cultures and institutions capable of politically feasible redistribution.[421]

In summary, the scholarship on the right to equality suggests that the core purpose of the equality provisions is not to ensure a level playing field or equality of opportunity, but rather to protect against the particular harm of being treated as inferior. Protecting against the harm of being treated as an inferior may result in ensuring access to basic goods, but only as by-product. For example, a

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[417] MacNaughton (n 398).

[418] Morsink (n 402); Paul Hunt, *Reclaiming Social Rights: International and Comparative Perspectives* (Dartmouth Publishing Co Ltd 1996); Bayefsky (n 337).

[419] Besson, 'Evolutions in Non-Discrimination Law within the ECHR and the ESC Systems' (n 412); Besson, 'The Egalitarian Dimension of Human Rights' (n 413) 45.

[420] Allen Buchanan, 'Equality and Human Rights' (2005) 4 Politics, Philosophy & Economics 69,

[421] ibid 85.

government hospital cannot refuse treatment because the patient belongs to a minority religion. This in turn becomes a way of securing the right to health and access to the basic good of healthcare.

I now turn to considering whether this view holds up upon a detailed examination of the various provisions that refer to equality in IHRL as well as recent cases.

B. The content of equality provisions

The Universal Declaration of Human Rights, 1948 (UDHR), the International Convention on Civil and Political Rights, 1976 (ICCPR) and its two Optional Protocols, and the International Convention on Economic, Social and Cultural Rights, 1976 (ICESCR) (together called the international bill of human rights[422]) are the main source of international human rights law and contain several references to 'equality' and/or 'non-discrimination'.

It is uncontroversial that these instruments are a source of law. Article 38 of the Statute of the International Court of Justice identifies treaties between states as well as custom as a source of law. Indeed, while ICCPR and ICESCR are treaties ratified by over 170 states, and UDHR is considered to be customary international law. Further, decisions of both international and national Courts can be a source of law according to Article 38(1)(d), though the former are more authoritative. However, the latter are a part of the practice of that State and can contribute to the formation of customary international law.

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[422] 'OHCHR | International Bill of Human Rights' (*OHCHR*) <https://www.ohchr.org/en/what-are-human-rights/international-bill-human-rights> accessed 8 December 2022.

The common Preamble of ICCPR and ICESCR states '…Whereas recognition of the inherent dignity and *of the equal and inalienable rights of* all members of the human family is the foundation of freedom, justice and peace in the world…' (emphasis added). Article 1 of UDHR emphasises that 'All human beings are *born free and equal in dignity and rights'* (emphasis added). Though these terms ('equal and inalienable rights', 'equal in dignity and rights'), along with 'equality before the law' and 'equal protection of the law' were heavily debated during the drafting of the Conventions,[423] they received no precise interpretation, and are not expressly defined within it.

This lack of clarity leaves considerable scope for the General Comments to interpret these terms.[424] General Comments are a United Nations treaty body's interpretation of the provisions of its respective human rights treaty provisions, as well as clarification of its substantive elements. While their authoritative value is controversial, there appears to be agreement that at a minimum, good faith interpretation of the Covenant (as required by article 31(1) of the Vienna Convention), obliges states parties to duly consider the content of General Comments, as they are the product of a body established by states parties to interpret the Covenant, as well as to monitor and promote compliance with it.[425]

It is in this context that it becomes important to take a closer look at the provisions in IHRL that either contain a direct reference to equality, or seek to

[423] Nowak (n 403) 462.

[424] Tufyal Choudhury, 'The Drafting of Article 26 of the International Covenant on Civil and Political Rights: Part 1' (2002) 5 European Human Rights Law Review 591.

[425] Helen Keller and Leena Grover, 'General Comments of the Human Rights Committee and Their Legitimacy' in Geir Ulfstein and Helen Keller (eds), *UN Human Rights Treaty Bodies: Law and Legitimacy* (Cambridge University Press 2012) <https://www.cambridge.org/core/books/un-human-rights-treaty-bodies/general-comments-of-the-human-rights-committee-and-their-

achieve the objective of equality, and read them in the context of all available material.

I club the provisions into three categories—(1) equal rights, (2) non-discrimination, and (3) socio-economic rights; and consider their content in turn.

i. Equal rights: same rights for everyone

The first category consists of provisions that guarantee that all rights contained within the covenants are *equally exercisable by all.*

- Article 2 of UDHR states:

> Everyone is *entitled to all the rights* and freedoms set forth in this Declaration, *without distinction of any kind*, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status... (emphasis added)

- Similarly, Article 2(1) of ICCPR states:

> Each State Party to the present Covenant undertakes to *respect and to ensure to all individuals* within its territory and subject to its jurisdiction *the rights recognized* in the present Covenant, *without distinction of any kind*, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. (emphasis added)

- Article 2(2) of ICESCR too guarantees:

> The States Parties to the present Covenant undertake to *guarantee that the rights* enunciated in the present Covenant *will be exercised without discrimination of any kind* as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. (emphasis added)

Thus, for example, the right not to be subject to cruel or degrading treatment as well as the right to health should be equally exercised by individual humans irrespective of any personal characteristics. The right to education should be equally exercised by individual humans irrespective of their gender or

ethnicity. The question now arises, what does this mean in practice and whether the provisions or their interpretations lay down how they are to be applied.

Here, reliance can be placed on several General Comments which make clear that there are indeed guiding principles to achieving this in practice. Paragraph 7 and 8 of General comment no. 16[426] of the Committee on Economic, Social and Cultural Rights on the equal right of men and woman to the enjoyment of all economic, social, and cultural rights (Art. 3 of ICESCR) note that guarantees of equality mandate both *de facto* and *de jure* equality:

> 7. …*De jure* (or formal) equality and *de facto* (or substantive) equality are different but interconnected concepts. Formal equality assumes that equality is achieved if a law or policy treats men and women in a neutral manner. Substantive equality is concerned, in addition, with the *effects of laws, policies and practices* and with ensuring that they do not maintain, but rather *alleviate, the inherent disadvantage* that particular groups experience. (emphasis added)
>
> 8. …In implementing article 3, States parties should take into account that such laws, policies and practice can *fail to address or even perpetuate inequality* between men and women because they *do not take account of existing economic, social and cultural inequalities,* particularly those experienced by women. (emphasis added)

Further, in paragraph 8 of General Comment 20,[427] the Committee on Economic, Social and Cultural Rights discusses substantive equality as the objective:

> 8. In order for States parties to "guarantee" that the Covenant rights will be exercised without discrimination of any kind, *discrimination must be eliminated both formally and substantively*:
>
> (a) Formal discrimination: Eliminating formal discrimination requires ensuring that a State's constitution, laws and policy documents do not discriminate on prohibited grounds; for example, laws should not

[426] UN Committee on Economic, Social and Cultural Rights, General Comment No. 16 (2005) UN Doc. E/C.12/2005/4.

[427] UN Committee on Economic, Social and Cultural Rights, General Comment No. 20 (2009) UN Doc. E/C.12/GC/20.

> deny equal social security benefits to women on the basis of their marital status;
>
> (b) Substantive discrimination: Merely addressing formal discrimination will not ensure substantive equality as envisaged and defined by article 2, paragraph 2.8 The effective enjoyment of Covenant rights is often influenced by whether a person is a member of a group characterized by the prohibited grounds of discrimination. Eliminating discrimination in practice requires paying *sufficient attention to groups of individuals which suffer historical or persistent prejudice* instead of merely comparing the formal treatment of individuals in similar situations. States parties must therefore immediately adopt the necessary measures to *prevent, diminish and eliminate the conditions and attitudes which cause or perpetuate substantive or de facto discrimination*. *For example, ensuring that all individuals have equal access to adequate housing, water and sanitation will help to overcome discrimination against women and girl children and persons living in informal settlements and rural areas*. (emphasis added)

There are three implications of this interpretation or substantiation in the General Comments: first, equality includes the alleviation of inherent or pre-existing disadvantage and persistent prejudice. This means that if women face an inherent disadvantage as compared to men in terms of educational opportunity, achieving equality vis-à-vis men and women in terms of their equal right to education would entail alleviating this disadvantage, or securing equal education opportunity for women. This doesn't mean levelling men down, but rather, focussing on levelling women up.

Second, paragraph 8 demonstrates that the treaty body is alive to the fact that a disadvantaged group, in this case women, suffer from inequality of social and economic status. Indeed, this is a part of their 'inherent disadvantage'. This means that one's socio-economic position can often arise from or be inherently tied to one's personal characteristics. In this case, for example, it is safe to say that as a group, women have a lower socio-economic position than men, although this may vary in individual cases. This is why it is important to lift them socio-

economically, and achieve *de facto equality*, so that they may exercise the rights granted on an equal footing, including right such as voting (Article 25(b) of ICCPR) and taking part in cultural life (Article 15(1)(a) of ICESCR).

Third, the *effect* or *impact* of a law is as important as its purpose or objective. Indeed, it is mentioned in Paragraph 7 of General Comment no. 16 and in paragraph 10 of General Comment no. 20 (ICESCR), which talk about indirect discrimination.

> 10. Both direct and indirect forms of differential treatment can amount to discrimination under article 2, paragraph 2, of the Covenant:
>
> (b) Indirect discrimination refers to laws, policies or practices which appear neutral at face value, but have a *disproportionate impact on the exercise of Covenant rights as distinguished by prohibited grounds of discrimination.* For instance, requiring a birth registration certificate for school enrolment may discriminate against ethnic minorities or non-nationals who do not possess, or have been denied, such certificates.

While this is in the context of gender equality, I argue this applies more generally. With respect to any protected characteristic, the equivalent aim would be to ensure the disadvantaged group can exercise the same rights on an equal footing as the non-disadvantaged group.

The interpretation of the UN Treaty bodies within the General Comments discussed above take the view that the guarantee that all rights contained within the covenants are *equally exercisable by all* carries the obligation for States to eliminate pre-existing inequalities in status and disadvantages too, and to consider the impact of their laws as much as their purpose. This view is a highly authoritative interpretation of the enshrined rights, as well as the nature of the obligations created by the relevant Conventions.

ii. Non-discrimination

The second category consists of provisions that guarantee that all individuals should be treated as *equals in and by the law*, and not be discriminated against.

- Article 7 of UDHR states:

> All are *equal before the law* and are entitled without any discrimination to equal protection of the law. All are entitled to equal *protection against any discrimination*…

- Similarly, Article 26 of ICCPR also guarantees:

> All *persons are equal before the law* and are entitled *without any discrimination to the equal protection* of the law. In this respect, the law shall prohibit any discrimination and guarantee to all persons equal and effective *protection against discrimination on any ground* such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth *or other status*.

- According to Article 2(2) of ICESCR:

> the States Parties to the present Covenant undertake to guarantee that the rights enunciated in the present Covenant will be *exercised without discrimination of any kind* as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth *or other status.*

Again, the General Comments assist in ascertaining how the right to non-discrimination is to be applied in practice, as well as the obligations that it creates for State parties.

First, according to paragraph 10 of General Comment no. 16 of the Committee on Economic, Social and Cultural Rights,[428] the principle of non-discrimination is the corollary of the principle of equality. Notably, it is described as a *corollary*, meaning that it follows from equality, instead of being 'two sides

[428] UN Committee on Economic, Social and Cultural Rights, General Comment No. 16 (2005) UN Doc. E/C.12/2005/4.

of the same coin' which is the view taken by some scholars. The import of being a corollary is that it must be aligned with and assist in securing the same goals as equality; the goals highlighted above: not just to treat everyone the same, but to remedy inherent disadvantage too. Crucially, it has *not* been argued, rightly so in my view, that it *exhausts* ambit of equality.

Second, paragraph 11 of General Comment no. 16 of the Committee on Economic, Social and Cultural Rights[429] defines discrimination (against women) as:

> 11. …any distinction, exclusion or restriction made on the basis of sex which *has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women*, irrespective of their marital status, on a basis of equality of men and women, of human rights and fundamental freedoms in the *political, economic, social, cultural, civil or any other field*. (emphasis supplied)

Indeed, the same definition is found in paragraph 6 and 7 of General Comment no. 18.[430] While the UN Human Rights Committee notes that the Covenant itself does not define the term "discrimination" nor what constitutes discrimination, reliance may be placed on Article 1 of the International Covenant on the Elimination of All Forms of Racial Discrimination[431] (CERD). According to Article 1, racial discrimination shall mean:

> 'any distinction, exclusion, restriction or preference based on race, colour, descent, or national or ethnic origin which has the *purpose or effect of nullifying or impairing the recognition, enjoyment or exercise, on an equal footing*, of human rights and fundamental

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[429] ibid.

[430] UN Human Rights Committee (HRC), General Comment No. 18, Non-discrimination (1989), Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies, UN Doc. No. HRI/GEN/1/Rev.6 (2003).

[431] UN General Assembly, International Convention on the Elimination of All Forms of Racial Discrimination, 21 December 1965, UNTS vol. 660, p. 195. ["CERD"]

> freedoms in the political, economic, social, cultural or any other field of public life'.

The Committee notes that Article 1 of the Convention on the Elimination of All Forms of Discrimination against Women provides a similar definition. In paragraph 7, the Committee stresses that similar to the definitions provides in these conventions [CERD and the International Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)]:

> 7….the term "discrimination" as used in the Covenant should be understood to imply any distinction, exclusion, restriction or preference which is based on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status, and *which has the purpose or effect of nullifying or impairing the recognition, enjoyment or exercise by all persons, on an equal footing, of all rights and freedoms.* (emphasis supplied)

A very similar definition appears in paragraph 7 of General Comment no. 20[432] of the Committee on Economic, Social and Cultural Rights. The relevant differences with the above are italicised:

> 7. discrimination constitutes any distinction, exclusion, restriction or preference *or other differential treatment that is directly or indirectly* based on the prohibited grounds of discrimination and which has the *intention* or effect of nullifying or impairing the recognition, enjoyment or exercise, on an equal footing, of Covenant rights. (emphasis supplied)

What remains relevant is that discrimination *inter alia* includes a combination of the following:

(i) a *preference* given to an individual

(ii) directly or *indirectly based on a prohibited ground*, including 'other status'

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[432] UN Committee on Economic, Social and Cultural Rights, General Comment No. 20 (2009) UN Doc. E/C.12/GC/20.

(iii) which has the effect of impairing the enjoyment of a Covenant right.

Third, in paragraphs 15, 27 and 35 of General Comment 20,[433] the Committee on Economic, Social and Cultural Rights delineates the meaning of 'other status'. Notably, 'other status' here means that this is an open list, which allows the addition of new personal characteristics. This is important, as groups whose members are protected through the anti-discrimination right might vary from society to society and from time to time.[434]

> 15. Article 2, paragraph 2, lists the prohibited grounds of discrimination as "race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status". *The inclusion of "other status" indicates that this list is not exhaustive and other grounds may be incorporated in this category.*
>
> 27. The nature of discrimination varies according to context and evolves over time. A flexible approach to the ground of "other status" is thus needed in order to *capture other forms of differential treatment that cannot be reasonably and objectively justified and are of a comparable nature to the expressly recognized* grounds in article 2, paragraph 2. These additional grounds are commonly recognized when they reflect the *experience of social groups that are vulnerable and have suffered and continue to suffer marginalization.* (emphasis added)

Among the many possible 'other statuses' the Committee discusses economic and social situation:

> 35. Individuals and groups of individuals must *not be arbitrarily treated on account of belonging to a certain economic or social group or strata within society.* A person's social and economic situation when living in poverty or being homeless may result in pervasive discrimination, stigmatization and negative stereotyping which can lead to the refusal of, or unequal access to, the same quality of education and health care as others, as well as the denial of or unequal access to public places. (emphasis added)

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[433] Ibid.

[434] Kasper Lippert-Rasmussen, 'The Badness of Discrimination' (2006) 9 Ethical Theory and Moral Practice 167.

In the same vein as socio-economic status, in paragraphs 25 of General Comment 20,[435] the Committee on Economic, Social and Cultural Rights discusses the express ground of 'property':

> 25. Property status, as a prohibited ground of discrimination, is a broad concept and includes real property (e.g. land ownership or tenure) and personal property (e.g. intellectual property, goods and chattels, and *income), or the lack of it.* (emphasis added)

Interestingly, Article 11 of the Oviedo Convention also prohibits any form of discrimination against a person based on their genetic heritage. The key concern that this provision seeks to guard against is that genetic diseases might become a means of selection and discrimination.[436] It is possible that this too is added to the list of grounds in ICCPR and ICESCR.

Fourth, it is recognised that discrimination can be on a combination of grounds too, including a combination of existing grounds with socio-economic status or property. Indeed, this appears as a corollary of the point highlighted above in relation to equality being alive to the overlap between socio-economic disadvantages and personal characteristics. It is helpful to also look at paragraph 38 of General Comment 28[437] of the Human Rights Committee on Article 3 (The equality of rights between men and women):

> 38. Discrimination against women is often *intertwined with discrimination on other grounds such as …property…or other status.* States parties should address the ways in which any instances of discrimination on other grounds affect women in a particular way, and include information on the measures taken to counter these effects. (emphasis added)

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[435] UN Committee on Economic, Social and Cultural Rights, General Comment No. 20 (2009) UN Doc. E/C.12/GC/20.

[436] Explanatory Report, Oviedo Convention, 12.

[437] UN Human Rights Committee, General Comment No. 28 (2000) UN Doc. HRI/GEN/1/Rev.9 (Vol. I).

Indeed, discrimination claims tend to have a nexus with socio-economic position. Sandra Fredman has noted:

> Groups which suffer from discrimination on status grounds are disproportionately represented among people living in poverty. Conversely, people living in poverty experience many of the elements of discrimination experienced by status groups, including lack of recognition, social exclusion and reduced political participation.[438]

In *Alyne da Silva Pimentel v Brazil*,[439] where an impoverished Afro-Brazilian woman died of complications arising from pregnancy due to the misdiagnosis and delayed care by a local health centre, the CEDAW Committee held that governments have an obligation to provide maternal health services to all women, irrespective of *income and racial background.* This is a good example of reading together several grounds (here, race, gender and socio-economic status) to find a violation of right to equality and non-discrimination.

The above discussion shows that the right to non-discrimination contains nuance. Being a corollary of equality, it not only seeks to remedy pre-existing disadvantage and consider the impact of laws as much as their purpose, but also carries an open list of grounds of discrimination that can accommodate new grounds according to the needs of the international society and economy as well as read two or more grounds together to find a violation.

iii. Socio-economic rights

The third category consists of provisions that can contribute to equality. While they are not nested *within* the equality provisions in these instruments, they can

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[438] Sandra Fredman, 'The Potential and Limits of an Equal Rights Paradigm in Addressing Poverty' (2011) 22 Stellenbosch Law Review 566.

[439] UN General Assembly, Convention on the Elimination of All Forms of Discrimination Against Women, 18 December 1979, United Nations, Treaty Series, vol. 1249, p. 13. ["CEDAW"]

nonetheless be thought of as deriving from the overall objective of IHRL to secure equality among individuals. There are several socio-economic guarantees (indeed, ICESCR is dedicated wholly to them) that span living standards, education, and work.

- First, Article 11 of ICESCR guarantees the right to adequate standard of living which requires more than biologically adequate food, clothing, and shelter; instead, it requires that these material needs be met in a way that is consistent with societal standards of decency.[440]
- Second, Article 13 of ICESCR recognises the right of everyone to education. 2(a) states that primary education shall be compulsory and available free to all; while 2(b) stresses on making secondary education 'generally available and accessible to all by every appropriate means'.
- Third, Article 6 of ICESCR guarantees the right to work, which includes the right to gain the opportunity to gain their living by work which they freely choose or accept.
- Fourth, Article 7 of ICESCR recognises the right to everyone to the enjoyment of just and favourable conditions of work. It guarantees under 7(ii)(c) 'Equal opportunity for everyone to be promoted in his employment to an appropriate higher level, subject to no considerations other than those of seniority and competence'.

These provisions are even more important now than at the time that they were drafted. It has been recognised that economic growth has not, in itself, led to

[440] Allen Buchanan, 'The Egalitarianism of Human Rights' (2010) 120 Ethics 679, 684.

development. Individuals continue to face socio-economic inequality, often due to entrenched as well as contemporary forms of discrimination.[441] Scholars agree that socio-economic rights can reduce material inequalities over time.[442] However, the question arises again how these rights are to be instrumentalised.

First, paragraph 21 of General Comment no. 16 stands out as it requires States to undertake positive measures so that individuals may enjoy these rights on an equal basis:

> 21. The obligation to fulfil requires States parties to take steps to ensure that in practice, men and women enjoy their economic, social and cultural rights on a basis of equality. Such steps should include:
>
> − *To design and implement policies and programmes to give long-term effect to the economic, social and cultural rights of both men and women on the basis of equality.* These may include the adoption of temporary special measures to accelerate women's equal enjoyment of their rights, gender audits, and *gender-specific allocation of resources.* (emphasis supplied)

Second, paragraph 23 of General Comment no. 16 emphasises securing equal access to work as a specific example of a State party's obligation. Indeed, individuals who are unable to find employment are at risk of being relegated to an inferior status. To the extent that in the modern world, one's social and economic contribution is expected as a matter of status and standing in society, being perceived as a dependent noncontributor can be a threat to being regarded as an equal.[443]

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[441] UN Committee on Economic, Social and Cultural Rights, General Comment No. 20 (2009) UN Doc. E/C.12/GC/20, 1.

[442] ICESCR, art. 7, 9, 11; CEDAW, art 7, 10–14; UN General Assembly, Convention on the Rights of the Child, 20 November 1989, United Nations, Treaty Series, vol. 1577, p. 3, art. 4, 24, 26–29, ["UNCRC"]; and UN General Assembly, International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families, 18 December 1990, A/RES/45/158, art. 25, 27, 28, and 30, ["UN Migrants Convention"].

[443] Buchanan, 'The Egalitarianism of Human Rights' (n 437) 685.

> 23. Article 6, paragraph 1, of the Covenant requires States parties to safeguard the *right of everyone to the opportunity to gain a living by work* which is freely chosen or accepted and to take the necessary steps to achieve the full realization of this right. Implementing article 3, in relation to article 6, requires inter alia, that in law and in practice, *men and women have equal access to jobs at all levels* and all occupations and that vocational training and guidance programmes, in both the public and private sectors, provide men and women with the skills, information and knowledge necessary for them to benefit equally from the right to work. (emphasis supplied)

This is underscored by paragraph 31 and 32 of General Comment no. 23[444] of Committee on Economic, Social and Cultural Rights on the right to just and favourable conditions of work (article 7 of the ICESCR):

> 31. All workers have the *right to equal opportunity for promotion* through fair, merit-based and transparent processes that respect human rights…There should be no place for irrelevant criteria such as personal preference or family, political and social links….*The reference to equal opportunity requires that hiring, promotion and termination not be discriminatory. This is highly relevant for women and other workers, such as workers with disabilities, workers from certain ethnic, national and other minorities, lesbian, gay, bisexual, transgender and intersex workers, older workers and indigenous workers.*
>
> 32. *Equality in promotion requires the analysis of direct and indirect obstacles to promotion, as well as the introduction of measures such as training and initiatives* to reconcile work and family responsibilities, including affordable day-care services for children and dependent adults. In order to *accelerate de facto equality*, temporary special measures might be necessary. (emphasis added)

However, Article 2(1) of ICESCR requires governments to take steps only '…to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant…'. Further, Article 4 of ICESCR allows governments to subject the enjoyment of these rights to limitations as long as they remain compatible with the nature of the rights.

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[444] UN Committee on Economic, Social and Cultural Rights, General Comment No. 23 (2016) UN Doc. E/C.12/GC/23.

Bioethics instruments too contain relevant provisions regarding socio-economic equality. For example, the Oviedo Convention stresses on equitable access to healthcare. The drafters considered this to be an important application of the principle of non-discrimination. Thus, according to the preparatory works, parties cannot refuse a disabled person equitable access to health care even if such care costs more than the average amount.[445] The preparatory works also make it clear that the provision is not intended to create an individual right enforceable against the State, but rather to affirm an economic and social objective subject to the available resources and needs of the individual concerned.[446]

These provisions and General Comments underscore the intricate connection between socio-economic measures to be taken by the States, called positive measures, and ensuring equality. Admittedly, their effect is blunted by flexibility created by the provision on progressive realisation to the maximum available resources.

The enquiry into the content of the right to equality in IHRL does not end here. Examining decisions of some progressive constitutional Courts around the world is important in determining the content of equality provisions, as international and domestic human rights 'are in a relationship of mutual reinforcement'.[447] Just as international human rights law influences domestic human rights law, vice-versa is possible too. Therefore, I now turn to examining the trends in domestic equality law of India, South Africa, and Canada. These

[445] Preparatory Works, Oviedo Convention, 52.
[446] Preparatory Works, Oviedo Convention, 18.
[447] Samantha Besson, 'Human Rights and Democracy in a Global Context: Decoupling and Recoupling' (2011) 4 Ethics & Global Politics 19.

jurisdictions have been chosen due to the notable progress made by Courts in their equality jurisprudence.

C. Domestic trends towards the original purpose

The initial focus on achieving socio-economic or material equality is indeed scant in national constitutions or legislations too. However, recent case law from South Africa, Canada and India shows that poverty or socio-economic status is being considered in cases with an equality claim, either as a matter of discriminatory context or as a matter of substantive equality.[448]

i. Socio-economic position as relevant in discriminatory context

The South African contextual approach considers several factors in arriving at a decision regarding discrimination. This includes *inter alia* an analysis of the socio-economic situation of the claimants. Other factors include the impact on the claimant as flowing from systematic patterns of group disadvantage and the historical context of the claim.[449]

For instance, *S v Jordan*[450] concerned a constitutional challenge to a provision in South Africa's criminal law which implicated both the customer and the prostitute for engaging in commercial sex on the basis that it unfairly

[448] Shreya Atrey, 'The Intersectional Case of Poverty in Discrimination Law' (2018) 18 Human Rights Law Review 411. Atrey uses 'poverty' as 'an umbrella term which refers to constitutive and consequent deprivations of income, resources, capabilities, social inclusion, education, housing, healthcare, food, nutrition, etc.' and borrows from Sen in his paper 'Poor, Relatively Speaking' (1983) 35 *Oxford Economic Papers* 153. Poverty discrimination is understood 'as distinctions or impact which exacerbate the deprivations suffered by the poor in comparison with others.' The United Nations Development Programme has developed a 'Multidimensional Poverty Index' in 2010 which reflects an understanding of poverty as overlapping deprivations of health,

[449] Cathi Albertyn and Beth Goldblatt, 'Facing the Challenge of Transformation: Difficulties in the Development of an Indigenous Jurisprudence of Equality' (1998) 14 South African Journal on Human Rights 248.

[450] *S v Jordan* 2002 (6) SA 642.

discriminated against women. The prostitutes, who were overwhelmingly women, were targeted and arrested under the provision instead of the customers, who were overwhelmingly male. While the majority found that the provision did not constitute discrimination under Section 9(3) of the Constitution, the minority found the provision to be indirectly discriminatory because it had a disproportionate impact on women. Here, Shreya Atrey argues, the Court missed the opportunity to recognise the economic deprivation and compulsion which animated the choice of prostitution. Instead, the majority and minority concurred that the social stigma and vulnerability of female prostitutes was a result of 'their own conduct'.[451]

On similar lines, the Canadian Supreme Court has held that in order to determine whether the discrimination clause is violated, 'the matter must be considered in the full context of the case'. It has also listed non-cumulative and non-exhaustive contextual factors to aid discrimination analysis, which include pre-existing disadvantage vulnerability.[452]

ii. Socio-economic position as relevant for substantive equality

On the other hand, India has adopted a framework of substantive equality to address discrimination claims. Substantive equality is a framework to which the General Comments already refer. Sandra Fredman describes it as:

> First, [substantive equality] aims to break the cycle of disadvantage associated with status or out-groups. This reflects the redistributive dimension of equality. Secondly, it aims to promote respect for dignity and worth, thereby redressing stigma stereotyping, humiliation, and violence because of membership of an identity

[451] Atrey (n 445) 422.
[452] ibid 426.

> group. This reflects a recognition dimension. Thirdly, it should not exact conformity as a price of equality. Instead, it should accommodate difference and aim to achieve structural change. This captures the transformative dimension. Finally, substantive equality should facilitate full participation in society, both socially and politically. This is the participative dimension.[453]

The landmark judgement in *Society for Un-aided Private Schools of Rajasthan v Union of India*[454] exhibits how socio-economic conditions have factored in the Court's decision-making using the substantive equality framework. This case concerned the Right of Children to Free and Compulsory Education Act 2009 (RTE Act) which mandated that 25% of the total class strength in the first standard of primary school in unaided private schools must comprise of children belonging to the 'weaker section and disadvantaged group'. Private schools challenged this provision as violating their constitutional right under Article 19(1)(g) of the Constitution of India on the right to practise any profession, or to carry on any occupation, trade or business. The Supreme Court of India dismissed this argument and held that the earmarking of seats for children who otherwise faced a financial barrier in accessing education satisfied the test under Article 14 (the equality provision in the Indian Constitution).[455]

The Court reasoned at paragraph 10 that the RTE Act provided a 'level playing field in the matter of right to education to children who are prevented from accessing education because they do not have the means, or their parents do not have the means to pay for their fees'. It viewed poverty as an impediment to

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[453] Sandra Fredman, *Discrimination Law* (New Edition, Third Edition, New Edition, Third Edition, Oxford University Press 2022) 25.

[454] *Society for Un-aided Private Schools of Rajasthan v Union of India* (2012) 6 SCC 1.

[455] Article 14 - Protection of life and liberty and equality before law - No person shall be deprived of his life or liberty except according to procedure established by law, nor shall any person be denied equality before the law or the equal protection of the law within the territory of India.

and a violation of equality in accessing the right to free and compulsory primary education guaranteed under Article 21A of the Constitution which provides that free and compulsory education from the age of six to the age of fourteen is a fundamental right. The Court held that this constitutional mandate would be rendered meaningless in the absence of equality of access to such education, irrespective of children's socio-economic status. According to the Court, deprivation of such access would not be a matter of right to education alone but of discrimination. Atrey argues:

> The Court thus transformed the negative protection under Article 14 ('The State shall not deny to any person equality before the law or the equal protection of the law') into a mandate on substantive equality for providing a 'level playing field' through a compulsory reservation under the RTE Act. The RTE decision conceived of poverty as an intersectional case of not just economic deprivation but also other disadvantages like illiteracy and lack of education, especially in the context of young children, via the equality guarantee.[456]

Crucially, the Court's decision did not rely on Article 15 of the Constitution, which is on non-discrimination and is based on 'grounds'.[457] It was sufficient for it to rely on the general right to equality in Article 14 instead of

[456] Atrey (n 445) 434.

[457] Article 15. Prohibition of discrimination on grounds of religion, race, caste, sex or place of birth

(1) The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them

(2) No citizen shall, on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability, restriction or condition with regard to

(a) access to shops, public restaurants, hotels and palaces of public entertainment; or

(b) the use of wells, tanks, bathing ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of the general public

(3) Nothing in this article shall prevent the State from making any special provision for women and children

(4) Nothing in this article or in clause (2) of Article 29 shall prevent the State from making any special provision for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and the Scheduled Tribes.

being limited by prescribed grounds, which in the Indian context are religion, race, caste, sex, place of birth. Atrey argues that the Court was able to do this because the facts showed an incursion of the substantive equality framework. Since poverty became the basis of the deprivation of a substantive human right under Article 21A of the Constitution, this violation itself became the reason for the violation of equality since the impact was suffered by a particular class of disadvantaged group (in this case, children).

This highlights the content discovered in the first category of equality provisions: that individuals should be able to exercise their human rights on an equal footing. Put another way, when a human right is violated on an unequal or discriminatory basis, the right to equality itself is violated too. Nonetheless, it remains key that a violation of a substantive human right exists in the first place.

Crucially for this thesis, this also suggests that the right to equality has 'a distinct, perhaps broader, ambit than the particular prohibition of discrimination associated with grounds'. Indeed, as Atrey argues, 'the Indian example reveals merit in not collapsing all equality concerns into discrimination based on grounds by giving ideas of equality and non-discrimination a wider berth to operate.'[458]

Domestic trends therefore exhibit a return to the original purpose demonstrated by the history of IHRL: the close relationship between securing

[458] Atrey (n 445) 436.

distributive justice and the body of law itself. In the Indian case *Society for Un-aided Private Schools of Rajasthan v Union of India*[459] socio-economic conditions, that underly distributive injustice, factored in the Court's decision-making and resulted in a finding of violation of the right to equality. Notably, the Court used a substantive equality framework to reach this conclusion, which is also present in several General Comments as discussed above.

Indeed, should a similar issue come before the Human Rights Committee, it would be right to take cue from the contextual approach of South Africa and Canada, and the substantive equality approach of India to factor in socio-economic access. Perhaps this is what would also fulfil the interpretation of Johannes Morsink who argued that the drafters of the UDHR understood that the non-discrimination provision, in so far as it attaches to all the rights in the UDHR, calls for far-reaching egalitarianism.[460]

IV. APPLICATION OF THE PROVISIONS

Having considered the content of equality provisions in IHRL in light of its history, the General Comments, as well as domestic trends, I now turn to analysing how this content would apply to the equality harms arising out of HET. To clarify, the scenarios considered below include not only State and individual interactions, but also interactions among two private individuals. Under human rights law[461] the State has the obligation to respect, protect, and fulfil human

[459] *Society for Un-aided Private Schools of Rajasthan v Union of India* (2012) 6 SCC 1.

[460] Morsink (n 402) 113–114.

[461] CESCR, The Right to the Highest Attainable Standard of Health (Art. 12), General Comment 14, para. 33; CESCR, The Right to Education (Art. 13), General Comment 13, para. 46, CESCR.

rights. This means that they must not only refrain from directly interfering with the enjoyment of human rights (respect),[462] but they must also prevent third parties, such as individual groups and corporations, from doing so (protect).[463] This may involve preventive mechanisms, such as criminal or civil sanctions for actions violating the rights, and remedial mechanisms such as investigations and compensation of the victim.[464]

Further, the state must also take the necessary steps to ensure that human rights are realised (fulfil) through the adoption of appropriate legislative, administrative, budgetary, judicial, promotional and other measures.[465] In this manner, the application of human rights can have not just a vertical (State and individual) but also a horizontal (individual and individual or third party) effect.

A. Discrimination

Access to enhancements, assuming they are cleared for health risks, will depend on an individual's ability to pay for them. This gives rise to the question regarding who will be able to afford enhancements and therefore more likely to succeed in such settings. Clearly, an individual's socio-economic position will be central to their ability to access enhancement, gain opportunities, and in turn, lead to further socio-economic strength through a regular salary and benefits. In other words, the existence of privilege allows for the accumulation of more privilege.

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[462] CESCR, The Right to the Highest Attainable Standard of Health, General Comment 14, paras 33 and 34.

[463] CESCR, The Right to Water, General Comment 15, para. 23.

[464] Tawhida Ahmed and Israel de Jesús Butler, 'The European Union and Human Rights: An

[465] CESCR, The Right to the Highest Attainable Standard of Health (Art. 12), General Comment 14, para. 33

As discussed in Chapter Three, the use of enhancements can result in discrimination due to the desirability of certain enhancements in employment contexts. I revisit the hypothetical based in the UK where a wealthy white man who is cognitively enhanced appears for a white-collar job interview, whether in a private company or in a government sector, against (an equally qualified) working class Asian woman who cannot afford enhancement. It is possible that the former even produces a certificate of cognitive enhancement, which assures the employer that he would be better at the job. Assuming that factors such as sexism or racism (or other biases) do not exist in this scenario, it is still likely that the latter will suffer disadvantage and not be hired due to the lack of cognitive enhancement. Clearly, socio-economic position and access has played a role in determining opportunities in this scenario, resulting in factual but not legal discrimination against the unenhanced candidate. Again, assuming that factors such as sexism or racism (or other biases) do not exist in this scenario, if a wealthy minority ethnic woman appeared for the interview with a certificate of enhancement against a working-class white man without it, assuming the job was white-collar and only required cognitive skills, the employer may still hire the candidate with the certificate.

A discrimination claim is not clear-cut here, as enhancement is not an express ground, nor is it possible to read it within ‘other grounds’ due to the requirement that it be of a comparable nature to the expressly recognized grounds (in paragraph 27 of General Comment no. 20). Enhancement is not a personal characteristic in this setting, but rather, an upgradation of a particular skill.

Nonetheless, it may be possible to make a claim if it can be shown that individuals who lose out in these competitive scenarios share a particular personal characteristic. For instance, if it is possible to produce data to show that out of 100 candidates, the 90 that were not hired due to the lack of enhancement certificate belonged to a particular race or gender, an indirect discrimination claim may stand. Indeed, it was the case, in *Greggs v Duke Power Company*[466] the United States Supreme Court held that an employer's requirement of a graduation degree for a job that did not require any particular skills that only a graduate would possess, was unlawful as it had the effect of excluding most Black candidates.[467] However, where the enhancement certificate can be directly tied to the demands of the job, it would be difficult to make a claim based on the logic of *Greggs v Duke Power Company.* Equally, a Court may find a case of intersectional discrimination, reading together the race or gender with the fact of existing socio-economic disadvantage, as Courts have done in India.

B. Stigmatisation

If it becomes possible to genetically edit traits, some traits would be more popular than the others as the attempt would be to conform to the popular notions of beauty and health subscribed to by society. This would eventually increase the incidence of the 'desirable traits', and stigmatise the non-chosen traits.[468] In today's Western society, for example, the 'desired traits' may be high IQ, tall athletic body, blue eyes, and light skin. Concomitantly, social tolerance for difference might decrease as the range of traits is reduced. Indeed, the Universal

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[466] *Greggs v Duke Power Company* 401 U.S. 424 (1971).
[467] Tarunabh Khaitan, 'Indirect Discrimination in US and UK Law' (*OUPblog*, 25 July 2015)
[468] Vizcarrondo (n 7).

Declaration on Bioethics and Human Rights 2005 pre-empts this, as it emphasises non-stigmatisation and respect for pluralism.[469]

The concept of substantive equality which features in General Comments discussed above includes the element of eliminating pre-existing disadvantage. According to Fredman's conceptualisation, it also aims to promote respect for dignity and worth, by redressing stigma stereotyping and humiliation.[470] However, this can only arise once the *source* of such stigmatisation can be traced to a protected ground. Indeed, as discussed above, enhancement cannot be a protected ground within the meaning ascribed to 'other grounds' presently.

At best, in a world where enhancement has become so common that it is only the poorest who cannot afford it and are the last remaining group with 'undesired' traits, it may be possible to trace stigmatisation to the ground of socio-economic status. Existing jurisprudence does not make clear what the legal remedy for such stigmatisation may be.

[469] UDBHR, art. 11 and 12.

[470] Fredman, *Discrimination Law* (n 450) 25.

C. Unfair competition

Going back to the job interview hypothetical, it is difficult to argue that the two candidates are fair competitors, just as it is difficult to say that athletes who participate in sports competitions without doping and athletes who dope are fair competitors. There are two related quandaries underlying this scenario, as explored in Chapter Three: whether we should allow individuals to win using enhancements in competitive scenarios, knowing that (1) winning leads to important benefits and opportunities; and (2) access to enhancements is likely to depend on one's socio-economic position.

In light of how socio-economic status has been given weight in arriving at equality claims and has been highlighted as one of the 'other status' in paragraphs 15, 27 and 35 of General Comment 20,[471] it is certainly *possible* to make an argument using IHRL to address the use of enhancement in competitive scenarios. However, it must be where it results in the violation of a substantive right, such as lack of access to employment (thereby violating the right to work) or in educational opportunities (thereby violating the right to education, and consequently right to work and employment opportunities) for individuals who belong to a lower socio-economic status on the comparative.

Therefore, in an instance where a male student gets the top mark in their year through the use of enhancement which then gets them admission to a prestigious (private or public) university or selection for a coveted job *to the exclusion* of students who were not able to access enhancement, it may be possible for a female student to make an argument for the violation of right to the

[471] UN Committee on Economic, Social and Cultural Rights, General Comment No. 20 (2009) UN

exercise of a substantive right on an equal basis. Here, that substantive right would be Article 6 of ICESCR (which, according to paragraph 23 of General Comment No. 16, means that men and women have equal access to jobs at all levels). However, it would be necessary to show that the lack of access due to socio-economic reasons, maps onto the gender of the disadvantaged student, since the relevant General Comment (no. 16 of CESCR) pertains only to the equal right of men and women to the enjoyment of all economic, social, and cultural rights.

In discussing each of the harms, it is clear that while equality in IHRL is of *some* assistance, it doesn't quite hit the nail on its head in remedying any of the equality harms of HET. In most cases, the overall framework of equality or discrimination claims is difficult to apply to factual instances of use of enhancement. Since equality law in IHRL cannot address the specific equality harms raised by HET, and in particular, unfairness in competitive scenarios, it is clear that *sui generis* rules are needed to address it.

CONCLUSION

This Chapter had two aims. First, to ascertain whether human rights can be used as a regulatory tool. Sections I and II sought to achieve this aim. **Section I** queried whether human rights can be used as a framework both to give appropriate language to the equality concerns arising from HET and to find ways to address them. It argued that IHRL is particularly well-suited to being used as a regulatory tool for HET as: first, it is able to represent the interests of humankind and give a voice to civil society; second, it can channel consensus, harmonise domestic laws on this issue, and fashion duties; and finally, it shares a close relationship with bioethics which is the predominant source of current scholarship on enhancement.

Section II studied how existing human rights principles have been applied to novel technological contexts. Using the example of several cases, it argued that human rights principles are adaptable to the contemporary issues raised by technological developments. Given the focus of this thesis, it also discussed at length how the ECtHR has applied the principle of equality to new technology. It observed that the Court is alive to the potential discriminatory effects of technology and is cognizant of the evolution in scientific views when it comes to applying law to technology. This section concluded that human rights, including equality law, *can* be used as a regulatory tool for technology.

The second aim of this Chapter was to assess whether equality law in IHRL can address the specific equality harms raised by HET. To do this, **Section III** ascertained the content of 'equality' in IHRL by reviewing its history as well as the provisions in IHRL treaties, the General Comments of the United Nations Treaty bodies, and relevant cases. Delving into the history of human rights law showed that while socio-economic equality and distributive justice were central concerns when the body of law first started developing, international politics and global events resulted in this concern eventually being deprioritised.

The current scholarship posits that the core purpose of the equality provisions is not to ensure a level playing field or equality of opportunity, but rather to protect against the particular harm of being treated as inferior. Protecting against the harm of being treated as an inferior may result in ensuring access to basic goods, but only as by-product. However, some domestic trends exhibited a return to the original purpose demonstrated by the history of IHRL: the close relationship between securing distributive justice and the body of law itself. In

the Indian case *Society for Un-aided Private Schools of Rajasthan v Union of India*[472] socio-economic conditions, that underly distributive injustice, factored in the Court's decision-making and resulted in a finding of violation of the right to equality. Notably, the Court used a substantive equality framework to reach this conclusion, which is also present in several General Comments discussed above.

Section IV then applied the consolidated content of equality law to the use of enhancements. It demonstrated how the right to equality would apply to each of the harms highlighted in the previous chapter, namely unfairness in competition, discrimination, and stigmatisation of undesired physical traits. In discussing each of the harms, it became clear that while equality in IHRL is of *some* assistance, it doesn't quite hit the nail on its head. The overall framework of equality or discrimination claims is difficult to apply to factual instances of use of enhancement. From this, it also becomes clear that technology not only exacerbates inequality but also lays bare the existing gaps in equality and anti-discrimination law.

Crucially, since existing equality law in IHRL cannot regulate the harm of unfairness in competitive scenarios, which is at the centre of this thesis, this harm meets the threshold for *sui generis* regulatory intervention. The next Chapter, Chapter Five, draws insights from the regulation of enhancements in sports in order to design appropriate *sui generis* rules.

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[472] *Society for Un-aided Private Schools of Rajasthan v Union of India* (2012) 6 SCC 1.

CHAPTER FIVE

THE REGULATION OF ENHANCEMENT IN SPORT

INTRODUCTION

Human enhancement, whether in the form of doping or the use of technology, has been a central concern in sport for decades now, and has made maintaining a level playing field increasingly difficult. Lance Armstrong,[473] the decorated winner of an unprecedented seven Tours de France fell from grace when it was discovered that he had been doping.[474] Equally, Oscar Pistorius and athletes like Caster Semenya have been mired in controversy due to the allegation that they enjoy an advantage by virtue of the use of technology and due to their genetic make-up, respectively.

Crucially, since existing equality law in IHRL cannot regulate the harm of unfairness in competitive scenarios, which is at the centre of this thesis, this harm meets the threshold for *sui generis* regulatory intervention. The overall aim of this Chapter is to draw insights from the regulation of enhancements in sports in order to design appropriate *sui generis* rules to address unfairness in competitive

[473] 'Sport Is Still Rife with Doping' *The Economist* <https://www.economist.com/science-and-technology/2021/07/14/sport-is-still-rife-with-doping> accessed 2 December 2022.

[474] Armstrong used synthetic EPO (ery-thropoietin), a hormone that is produced naturally in human bodies. It controls the production of red blood cells, which supply organs and tissue with oxygen. Doctors have been able to use synthetic EPO to treat anaemia. However, injections of synthetic EPO can also top up athletes' red blood cell levels which aids with the mountain stages of the competition.

scenarios arising from the use of enhancements. This aim is achieved in three steps.

Section I offers an account of sport which will become relevant in assessing the extent to which lessons can be drawn from sport for other fields. I argue here that sport is a space for fair competition and rewarding effort. **Section II** then analyses the regulatory framework with respect to **(A)** doping, **(B)** the use of technology such as bionic limbs, and (**C)** natural 'abnormal' testosterone levels in female athletes. Each of these sections reveal how sport problematises the use of unfair means in competition, and the solutions it has devised to address the problem. Further, they reveal whether equality is seen as a source for this regulation or if some other value is preferred.

Section III consolidates the lessons to be learnt from the regulatory framework that governs competition in sport. These are: first, the regulation of doping and use of technology in sport affirms the link between effort and merit; second, the regulation of the use of technology and references to equality of opportunity highlight the importance of socio-economic status of the competitor; third, the regulation of naturally occurring elevated testosterone levels in biologically female athletes stands out as a deviation from the lack of regulation of natural advantages. This suggests the imperative role a definition such as the variable-degree spectrum definition would serve regulation by marking the regulatory line between natural advantages (abnormal testosterone levels) and elective enhancement (steroids).

Finally, **Section IV** makes note of the factors that make elite sport unique, and which need to be borne in mind before applying the lessons learnt from this sphere to another.

I. SPORT IS A SPACE FOR FAIR COMPETITION AND REWARDING EFFORT

The meaning of sport, as understood by sport itself, may be unravelled through instruments that govern it. The Olympic Charter laid down the original values of Olympism as follows: to 'encourage effort', 'preserve human dignity' and 'develop harmony'. These have evolved over centuries and are now expressed as 'striving for excellence and encouraging people to be the best they can be', 'celebrating friendship', and 'demonstrating respect'.[475] The Charter describes Olympism as 'a philosophy of life, exalting and combining in a balanced whole the qualities of body, will and mind….Olympism seeks to create a way of life based on the joy of effort…social responsibility and respect for universal fundamental ethical principles'.[476]

In the context of the most prestigious sports competition in the world then, sports is understood as first, a platform for athletes' 'efforts', 'excellence', and 'resilience'; and second, a space for healthy and fair competition between rivals striving toward the same top spot.

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[475] International Olympic Committee, 'Olympic Values' <https://olympics.com/ioc/olympic-values> accessed 9 July 2022.

[476] Art. 1, Olympic Charter, 1983 <https://stillmed.olympics.com/media/Document%20Library/OlympicOrg/General/EN-Olympic-Charter.pdf#_ga=2.119255369.1311977752.1657360910-237147581.1657360906> accessed July 09, 2022. ["Olympic Charter"]

Performance at international or even national levels is not simply an expression of one's innate skill or talent. Time and time again, and across diverse sports, players have themselves emphasised the value of consistent hard work, effort, and resilience. Take for instance Usain Bolt, 'fastest man who ever lived'. Many have claimed that Bolt is naturally gifted. Due to his height (6 feet 5 inches) it takes him 41 strides to run 100 m, while it takes most competitors 44 or 45. It has also been hypothesised that he has a far greater proportion of fast-twitch muscles than any average human being.[477] Yet, he is also heavier due to his height, and suffers from a condition called scoliosis that leaves one leg shorter than the other. Bolt says 'I am lucky that I have a lot of natural talent, *but my success is all down to hard work*. I could run under 10sec now even if I didn't really train, but to win medals it's all about training on the track, working hard in the gym and improving my technique'[478] and 'I want people to understand that what they see on the track is because I work so hard to get there.'[479]

Similarly, Roger Federer, often hailed as the greatest male tennis player of our times emphasises that while he was always good, he started achieving real professional success only when he started 'putting in the hours'.[480] Virat Kohli, one of the most successful cricketers of his generation, speaks of 'hard work, toil

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[477] University of Melbourne, 'Which Types of Muscle Fibres Are You Made of? – Scientific Scribbles' <https://blogs.unimelb.edu.au/sciencecommunication/2018/09/18/which-types-of-muscle-fibres-are-you-made-of/> accessed 2 December 2022.

[478] Marc Chacksfield, 'Usain Bolt Interview: Inside the Mind of a Superhuman' (*Shortlist*, 17 July 2011) <https://www.shortlist.com/news/usain-bolt-interview> accessed 2 December 2022.

[479] Decca Aitkenhead, 'Usain Bolt: "I Feel Good Because I Know I've Done It Clean"' *The Guardian* (12 November 2016) <https://www.theguardian.com/sport/2016/nov/12/usain-bolt-feel-good-because-know-done-it-clean> accessed 2 December 2022.

[480] Simon Hattenstone, 'Roger Federer: "I Need the Fire, the Excitement, the Whole Rollercoaster"' *The Guardian* (18 June 2016) <https://www.theguardian.com/sport/2016/jun/18/roger-federer-interview-tennis-wimbledon-simon-hattenstone> accessed 2 December 2022.

and relentless perseverance every day' to achieve success especially as the Captain of the Indian cricket team.[481]

Thus, an account of sport that describes it as emphasising a platform for athletes to elevate their natural talent through effort and resilience rings true on elite athletes' own accounts. This is something that other scholars have recognised, in their account of sport. For instance, Lisa Parker writes that sport competition rewards excellence in the application of individual effort to natural ability.[482] Similarly, Leon Kass writing for the President's Council on Bioethics has noted that what we value most is the human excellence that is displayed in sport, as he emphasises that the real meaning of sport is in the doing, not simply in the scored results.[483]

The second aspect of healthy and fair competition emphasises that sportspersons put in such effort with the expectation that the outcome of the competition would be decided on how their effort fares as against their competitors' efforts. This shines through Bolt's statement, where he says '….if you genuinely go out of your way to cheat, and you know you're cheating, I think, yes, you should be banned for good. *You're robbing other people of their hard work, and their stress, and their sacrifice that they've put out to be the best'* (emphasis added).[484] It was for this reason that some other authors, in their

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[481] Anand Vasu, 'Virat Kohli Departs as India's Test Captain but His Legacy Will Live on' *The Guardian* (15 January 2022) <https://www.theguardian.com/sport/2022/jan/15/virat-kohli-departs-as-indias-test-captain-but-his-legacy-will-live-on> accessed 2 December 2022.

[482] Parker (n 18).

[483] Kass (n 50) 161–164.

[484] Aitkenhead (n 476).

account of sport, have emphasised that excellence in sport is intimately connected with virtues such as courage, honesty and justice.[485]

As a platform for the display of effort, talent, perseverance and respect, spectatorship of sports thrives on the notion that athletes have worked hard over years to perfect their talents. It is not the sight of extreme or superhuman ability that drives spectatorship, as it is the excitement to see what a 'normal' human can achieve. In Agar's words:

> It's worth walking into a tent to catch a sight of the world's tallest human. But typically one viewing suffices. Few of those who emerge from the tent with the world's tallest human would show much interest in paying money to enter another tent to see the world's tenth tallest human. Elite sports do contain extreme performances…but these are not essential to our enjoyment of sport. Few fans front up to weekend foot ball matches expecting anything of the calibre of Maradona's goal. We get something else out of elite sport, something that is distinctively human. We get to see performances that are possible for beings who are fitter, more talented, and more dedicated versions of our selves.[486] (emphasis supplied)

Indeed, spectator interest in elite sport does not carry over to the objectively impressive performances of beings and things that are unlike us. For instance, a car can cover a 100-metre distance much faster than Usain Bolt, yet, it would not be a good candidate for live telecast. Instead, we take interest in Bolt's performance because he has a relevance to us, as human beings, that a car or a robot does not. He enters the Olympics with the same basic biological equipment as us. Watching Bolt may inspire someone to take up running, watching a car cover the same distance will not.[487]

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[485] Schermer (n 329).

[486] Nicholas Agar, 'Challenges from the Future of Human Enhancement' in Roger Brownsword, Eloise Scotford and Karen Yeung (eds), *The Oxford Handbook of Law, Regulation and Technology* (2017) <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199680832.001.0001/oxfordhb-9780199680832-e-35> accessed 23 February 2022.

[487] ibid.

Sports is therefore a platform for athletes' 'efforts', 'excellence', and 'resilience'; and a space for healthy and fair competition between rivals striving toward the same top spot. I now turn to analysing the existing regulation within sport that aims to ensure healthy and fair competition between rivals.

II. REGULATION OF ENHANCEMENTS IN SPORT

The need for regulation of enhancement in sport arises directly from its central goals: rewarding effort and excellence, and maintaining healthy and fair competition between contenders. I now turn to analysing the details of this regulatory framework, with respect to **(A)** doping, **(B)** the use of technology such as bionic limbs, and **(C)** natural 'abnormal' testosterone levels in female athletes. Each of these three sections reveal how sport problematises the use of enhancements, and the solutions it has devised to address their use and the resulting unfairness in competition.

A. The regulation of doping

Doping has been a central issue in sport for a century now. The first official ban on 'stimulating substances' was introduced by the International Amateur Athletics Federation in 1928. The Council of Europe has stated that doping is the first of its concerns in sport. In light of this, the Anti-Doping Convention (ETS No. 135) was adopted by the Committee of Ministers on 16 November 1989. It has been ratified by all Council of Europe member States and five non-member States (Australia, Belarus, Canada, Morocco and Tunisia).[488]

[488] Council of Europe, Anti-Doping Convention (ETS No. 135, 1989). ["Anti-Doping Convention"]

In 1998, the Festina team (then the top cycling team) was expelled from the Tour de France after trainer Willy Voet was caught with 400 vials of performance enhancing drugs.[489] The World Anti-Doping Agency (WADA) was established the following year 1999 as a result of the scandal. It is tasked with keeping elite sport free of doping. The Code published by WADA in 2004 banned a 'substance or method' if meets two out of three criteria: first, 'it has the potential to enhance or enhances sport performance'; second, it 'represents an actual or potential health risk to the athlete'; and third, it 'violates the spirit of sport described in the introduction to the Code'. The second version of the Code came into force in 2009, and the third and current version of the Code came into effect in 2021.

The Olympic Movement Code on the Prevention of the Manipulation of Competitions[490] ('Olympic Movement Code') highlights the centrality of all the limbs of the definition of sport discussed above in its treatment of the use of enhancements by athletes. The Preamble acknowledges 'the danger to sports integrity from the manipulation of sports competitions'. It categorises the use of enhancements with other manipulations including betting,[491] international arrangements or alteration of results,[492] corrupt conduct such as accepting a benefit to manipulate competition,[493] and disclosure of inside information.[494]

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[489] 'BBC News | Tour de France | Drug Scandal Team Thrown off Tour' <http://news.bbc.co.uk/1/hi/special_report/1998/07/98/tour_de_france/134842.stm> accessed 28 February 2022.

[490] International Olympic Committee, 'Code of Ethics and other texts' (2018) <https://stillmed.olympics.com/media/Document%20Library/OlympicOrg/IOC/What-We-Do/Protecting-Clean-Athletes/Competition-manipulation/Code-Prevention-Manipulation-Competitions.pdf?_ga=2.72383955.1311977752.1657360910-237147581.1657360906> accessed 9 July 2022. ["Olympic Movement Code"]

[491] Olympic Movement Code, art 2.1.

[492] Olympic Movement Code, art. 2.2.

[493] Olympic Movement Code, art. 2.3.

[494] Olympic Movement Code, art. 2.4.

It is in this context that the Olympic Charter 1983 delineates the mission and role of the International Olympic Committee to include leading the fight against doping for the protection of clean athletes and the integrity of sport.[495] The idea is that all of these manipulations, including doping, undermine clean athletes and make competition unhealthy as well as *unfair*. Participation in the Olympic Games is therefore contingent upon compliance with the World Anti-Doping Code and the Olympic Movement Code on the Prevention of the Manipulation of Competitions.[496]

The World Anti-Doping Code 2021(WADC) brings consistency to the anti-doping practices of the different international federations and States. It states that the fundamental rationale behind it is:

> Anti-doping programs are founded on the intrinsic value of sport. This intrinsic value is often referred to as "*the spirit of sport*": the ethical pursuit of human excellence through the dedicated perfection of each Athlete's natural talents…*Anti-doping programs seek to maintain the integrity of sport in terms of respect for rules, others competitors, fair competition, a level playing field, and the value of clean sport to the world*….The spirit of sport is expressed in how we play true. Doping is fundamentally contrary to the spirit of sport (emphasis added).

However, WADC is not binding on States since instruments adopted by WADA are governed by private law. The International Convention against Doping in Sport,[497] adopted under the auspices of UNESCO, and in force since 1 February 2007, seeks to provide an internationally recognised legal framework allowing States to incorporate the Code into their domestic legislation. This convention has been ratified by 187 States. The UNESCO Convention notes the

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[495] Olympic Charter, art. 2(9).

[496] Olympic Charter, art. 40.

[497] UNESCO, International Convention Against Doping in Sport (2005) <http://unesdoc.unesco.org/images/0014/001425/142594m.pdf> accessed 20 July 2024.

concern with the use of doping by athletes in sport and the consequences of the same for the principle of *fair* play.[498] In keeping with the objectives of UNESCO within the area of physical education and sport, the purpose of the Convention is to promote the prevention of and the fight against doping in sport, with a view to its elimination.[499]

The WADA Code serves as the basis for the measures provided under the Convention, namely, legislation, regulation, policies and administrative practices at both national and international levels to fight against doping in sport.[500] It goes as far as encouraging the producers and distributors of nutritional supplements to include information regarding their analytic composition and quality assurance.[501] It emphasises testing without advance notice and facilitating the task of the World Anti-Doping Agency.[502]

These numerous and overlapping instruments demonstrate the degree of importance accorded to discouraging, preventing, and punishing doping in sport. Additionally, the cases reflect the role of intention of the athlete, as well as how the value of fair play has been weighed against other values such as the privacy and autonomy of sportspersons. Notably, however, any reference to equality is absent. Indeed, records of cases arising out of doping also demonstrate this.

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[498] UNESCO Convention, Preamble.

[499] UNESCO Convention, art. 1.

[500] UNESCO Convention, art. 4 and 5.

[501] UNESCO Convention, art. 10.

[502] UNESCO Convention, art. 16.

A study done by Olivier Niggli (Director of Legal Affairs with the World Anti-Doping Agency) and Julien Sieveking (Manager of Legal Affairs with the World Anti-Doping Agency) in 2006 of case law on doping emerging from both the CAS as well as independent Courts of the international federations is helpful.[503] There are two clear themes: First, Article 10.5 of the 2004 Code, allowed for elimination or reduction of period of ineligibility in 'exceptional circumstances'. This exception was (and is) applied strictly. Second, in the case of certain specified substances that are particularly susceptible to unintentional violations of anti-doping regulations of how widely they're used in medicinal products, a lesser punishment may be awarded if there is no intention to improve sport performance. Such lack of intention must be proved to a high degree. I will elaborate on each of these themes now.

First: The Code applies strict liability in cases where a prohibited substance or its metabolites or markers are found in an athlete's body. Athletes sometimes invoke a physician's error to convince the hearing body that the substance has been found due to no fault of theirs and invoke Article 10.5. The case law shows how strictly the exception in Article 10.5 has been applied. It has been noted that other than in the most exceptional cases, for the purposes of determining whether a no-fault defence succeeds, 'the fault of an adviser such as a physician must be attributed to the player *even if the player is not personally at fault*: *otherwise, the fight against doping in sport would be seriously undermined*.'[504]

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[503] Olivier Niggli and Julien Sieveking, 'Selected Case Law Rendered Under the World Anti-Doping Code' <https://www.wada-ama.org/en/resources/case-law/selected-case-law-rendered-under-world-anti-doping-code> accessed 2 June 2023.

[504] *ITF v Koubek* (18 January 2005) [ITF Independent Anti-Doping Tribunal].

In another case, the CAS stated: 'It would put an end to any meaningful fight against doping if an athlete was able to shift his/her responsibility…and avoid being sanctioned because the athlete himself/herself did not know of that substance.'[505] This narrow application of Article 10.5 demonstrates how strictly the WADA and IOC want to guard against abuse. Athletes must convince the hearing body that they did everything in their power in the context of the medical treatment to avoid a positive doping result.

Another case demonstrates that the applicable criterion is no longer reasonableness of the athlete's conduct, but rather is 'utmost caution', which can be met only in the most exceptional cases.[506] This was demonstrated in yet another case where Article 10.5 was applied, because 'the respondent (athlete) was totally ignorant of the anti-doping rules and being a minor aged about 14 years of age and in class 8 she lacked the experience and was not capable of understanding and managing her own affairs…the parents and guardian are illiterate…'. The panel also took into account that the athlete had not participated in any international events.[507] On the other hand, where the athlete was 30 years old, a frequent participant in elite competitions, had access to a qualified sports medicine practitioners and received anti-doping education on an annual basis, the hearing body refused to reduce the period of ineligibility based on a plea of no fault.[508]

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[505] *Torri Edwards v. International Association of Athletics Federations & USA Track & Field* (21 August 2004) [Arbitration CAS ad hoc Division (OG Athens) 04/003].

[506] *Koubek* (n 548).

[507] *WADA v. Kavita Chaudhry and Anr*. (10 February 2011) Appeal No. ADAP/01/2011 [Anti-Doping Panel India].

[508] *World Anti-Doping Agency v Lebogang Phaluala and South African Institute For Drug-Free*

Second: with respect to intentional ingestion of prohibited substances, hearing bodies require a high degree of evidence to establish that there was no intention to enhance performance. The independence Anti-Doping Tribunal of the ITF has previously held: 'It does not matter whether the prohibited substance actually enhanced the player's performance or not…issue relates to the player's state of mind when he ingested the prohibited substance.'[509] This emphasis on the player's state of mind is important, as it shows that what is sought to be punished is the moral culpability for *wanting to cheat* or indulge in unfair play for personal benefit.

This study and the cases therein demonstrate that the idea of fair play is of utmost importance in sport, given the application of the standard of strict liability, which leaves no room for excuses. Equally, the existence of the possibility of lack of intention as well as the requirement of a 'high degree' of evidence to establish such lack of intention underscore that while an athlete who never intended to cheat that is, compromise fair play should not be penalised, the room to make that argument should be narrow.

In *Fédération Nationale des Syndicats Sportifs (FNASS) and Others v France* 2018 in the European Court of Human Rights,[510] the Court considered whether rules requiring certain sports professionals to notify their whereabouts every day of the year so that unannounced anti-doping tests could be conducted were violative of the applicants' Article 8 right to private life. There are several points of note: first, it held that even though these rules were an interference with

[509] *Koubek* (n 458).

[510] *Fédération Nationale des Syndicats Sportifs (FNASS) and Others v. France* (2018) Application no. 48151/11 and 77769/13. ["FNASS"]

applicants' Article 8 right to private life, the interference pursued the dual aim of protecting athletes' health and ensuring that sporting competitions were fair and ethical. Second, the Court emphasised that these were 'near-universal values', a fact reflected in the preamble to the UNESCO Convention and were in accordance with the aims referred to in Article 8(2) in the context of "protection of health or morals".[511] Third**,** the Court accepted the argument that ethical concerns regarding fair play constitute 'a decisive argument for the necessity of the interference resulting from the impugned whereabouts requirement'[512] and *crucially, that equality of opportunity as well as fair play are fundamental to the fight against doping*.[513]

This case demonstrates that the use of enhancement is so contrary to the values of a field that rewards effort and prioritises fair play among competing rivals, that the need to prevent the use of enhancement trumps even privacy rights. Moreover, it shows, contrary to the various applicable provisions and cases discussed above, that indeed, there *is* an equality argument at play when it comes to regulating enhancement.

In paragraph 166, the Court makes clear:

> 166. The Court observes that the need to tackle doping has always been recognised in the sporting world, and refers in this regard to the *international instruments cited above, which mention fair play and equality of opportunity as being fundamental to the fight against doping*. The Court considers that what the Government describe as "morals", in the context of *efforts to ensure equal and meaningful competition in sports, is also linked to the legitimate aim of "protection of the rights and freedoms of others"*. The use of doping agents in order to *gain an advantage over other athletes unfairly eliminates competitors of the same level who do not have recourse*

[511] *FNASS* [132].

[512] *FNASS* [177].

[513] *FNASS* [132 and 166].

> *to them*, is a dangerous incitement to amateur athletes, and in particular young people, to follow suit in order to enhance their performance, and deprives spectators of the fair competition which they are entitled to expect. (emphasis supplied)

None of the instruments cited by the Court (including the WADA Code and UNESCO Convention) leading up to this paragraph state 'equality of opportunity'. It is something that the Court has equated with 'fair play' or 'fairness', which it reads as falling under 'the protection of morals' and 'rights and freedoms of others'.[514] The Court also prefers to avoid the use of any specific equality provision in its reasoning. It is unclear what the implication of this is, as a mere reference to the equality of opportunity, alongside fair play, by a regional Court cannot impute the equality argument to the overall framework for the regulation of doping in sport.

However, the Court doesn't *merely* refer to equality of opportunity; it specifically refers to the advantage gained over competitors who cannot access them, too: 'in order to gain an advantage over other athletes unfairly eliminates competitors of the same level who do not have recourse to them'. This reasoning draws the regulation of doping closer to the regulation of technological aids and sports equipment, where access is highlighted within the provisions themselves. I turn to this now.

B. The regulation of the use of technology by disabled athletes

In the case of sports competition between disabled athletes, equipment can make a considerable difference and even determine the winner. It is in view of this that

[514] According to Article 8(2) of ECHR 'There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society …. for the protection of health or morals, or for the protection of the rights and freedoms of others.'

the International Paralympic Committee (IPC) introduced a policy on sport equipment in 2011, with the objective of eliminating advantage gained through the use of superior equipment.[515] Section 1 emphasises that the use of sport equipment should be fair and governed by clear rules. The Policy identifies four fundamental principles regarding the use of equipment, in Section 3. These are safety (of equipment), fairness, universality, and physical prowess. The latter three are relevant to this thesis.

First, the fairness principle (section 3.1.2) stipulates that equipment needs to be regulated in sports rules in sufficient detail. Second, the universality principle (Section 3.1.3) stipulates that the *cost and large-scale availability* of the principal components of equipment should be considered to guarantee access to a sufficiently large number of athletes in the sport. And finally, physical prowess (Section 3.1.4) stipulates that the critical endeavour sought in sport is human performance, not the impact of technology and equipment. Section 3.2 of the IPC Policy clearly states: 'Equipment that results in sport performance not primarily being generated by the athlete's own physical prowess but being generated by automated, computer aided, or robotic devices is prohibited...' It draws a linkage between the performance arising from the body *as is*, and that arising from elements attached to the body

There is a clear emphasis on preserving both limbs of the definition of sport: in eliminating sports performance through equipment and *not generated by the athlete's own physical prowess,* the IPC policy seeks to maintain the focus on

[515] International Paralympic Committee, 'Policy on Sport Equipment' (2011), <https://www.paralympic.org/sites/default/files/document/120203164107739_Sec_ii_Chapter_3.10_IPC_Sport_Equipment_Policy.pdf> accessed 20 July 2024. ["IPC Policy"]

rewarding the outcome of what arises from the athlete's (presumably) naturally given body and the effort exerted from it. More importantly, through the universality principle, the IPC policy crucially spotlights equitable access to equipment to maintain healthy and fair competition between contenders. This is a clear reference to socio-economic equality between athletes.

These concerns are reflected in more detail in the Word Para Athletics Rules and Regulations of 2022. According to Regulation 7, the IPC Policy on Sport Equipment applies to all Word Para Athletics Competitions, and the principles in the IPC apply to *inter alia* the development of sports specific prosthetic devices. As per Regulation 7.2.1.3, technology or equipment that is not commercially available to all athletes (with some exceptions) will be considered contrary to the IPC policy, as will technology or equipment that contains materials or devices that give the athlete an overall competitive edge over an athlete not using such technology according to Regulation 7.2.1.4. At the same time, Regulation 7.2.2 clarifies that provisions have been adopted to enable the use of certain technology and equipment by Para athletes.

The World Para Athletics Rules add more details, stating what would amount to an unfair advantage, in Rules 6.2 with respect to shoes, in Rules 6.3 & 6.4 with respect to spikes and in Rule 6.5 with respect to sole thickness. The focus on ensuring that these only do their bare minimum job can be found in the statement in Rule 6.2 'the primary purpose of shoes for competition is to give protection and stability to the feet and a firm grip on the ground. They must not give athletes any unfair assistance or advantage'. This demonstrates the detailed extent to which fairness is sought to be preserved in para-athletics.

While these rules appear to be *prima facie* clear and intuitive, in individual cases, their application helps spotlight the ambiguous line between assistance (or 'treatment') and enhancement, and the limits on using technological aids in sport.[516] It is this concern that came to the fore in Oscar Pistorius' case.

The Oscar Pistorius case

Widely perceived as extraordinary at the time due to his ability to compete in able-bodied competitions despite being an amputee, Pistorius eventually came under the scanner for the use of a prosthetic limb. It was difficult to precisely state whether Pistorius' prosthetic limb was the equivalent of a non-disabled athlete's legs. The International Association of Athletics Federation mandated a biomechanical study of his prosthetics and held that the use of a prosthetic device by Pistorius constituted a violation of Rule 144(2)(e)[517] as it provided him an advantage over competing athletes. Pistorius appealed this decision to the Appeals Division of the Court of Arbitration for Sport (CAS).

The decision of CAS[518] in this case is important in two respects: first, it clarified what kind of an advantage would result in a violation of Rule 144(2)(e); and second, it dealt with discrimination claims related to the use of technology by disabled athletes. Together, this provides a helpful answer to when one crosses over from remedying a disadvantage (treatment) to providing an advantage (enhancement) which was the subject of discussion in Chapter One and plays an

[516] Gregor Wolbring, 'Oscar Pistorius and the Future Nature of Olympic, Paralympic and Other Sports' (2008) 5 SCRIPT-ed 139.

[517] It prohibits 'Use of any technical device that incorporates springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device.'

[518] *Oscar Pistorius v. International Association of Athletics Federations* CAS 2008/A/1480 (Court of Arbitration for Sport Appeals Division). ["Oscar Pistorius decision"]

important role in the variable degree spectrum approach to defining enhancement proposed therein. Further, it also highlights how equality arguments may be dealt with in the enhancement context.

First: the Appeals division clarified that it would not be enough if there was *an* advantage, rather a violation of the rule would follow from an *overall net advantage* over the other athletes. Based on the evidence available, it held that the fact that Mr Pistorius does not have to use as much vertical force with each step as the able-bodies runners do, can be a disadvantage as much as an advantage, as this force can get distributed to the muscles and tendons of the leg and provide the athlete more power and that the vertical bounce creates more speed. It could not be proved that Mr Pistorius uses less metabolic energy *overall* than able-bodied runners, due to the prosthetics.

The Appeals Division thus allowed the appeal, holding that the evidence could not show that the *Cheetah Flex-Foot* prosthetic not only provided the appellant *an* advantage, but also an *overall net* advantage, over the other athletes. It observed 'of course, athletes should not be forced to compete against persons who use powered aids such as motors, wheels, springs (as in 'pogo sticks', for example), or other active propulsive devices…'. However, according to the Appeals Division, the *Cheetah Flex-Foot* could not be classified as contravening Rule 144.2(e) without convincing scientific proof that it provides an *overall net advantage* over other athletes. Nonetheless, the Panel did not exclude the possibility that with advancements in scientific knowledge, the IAAF might be able to prove that Pistorius' prosthetic limb, the Cheetah Flex-Foot, provides him an overall net advantage over other athletes.[519]

[519] *Oscar Pistorius decision* [p. 14].

This provides a very helpful lesson for the treatment/enhancement distinction in general: it is difficult to lay down a clear line, because even though an intervention may improve a certain ability, even to an extent that is above that of the average person, due to the combination of other bodily functions that it is inevitably tied up with, it may still not provide an *overall* benefit such that it crosses over into the enhancement range.

Second: Mr. Pistorius had argued that the IAAF Decision was in breach of its obligation of non-discrimination, because it did not search for an appropriate accommodation, as required by law, before finding him ineligible in all IAAF sanctioned events. He argued that the IAAF had denied him his fundamental human rights, including equal access to Olympic principles and values. It is interesting that an equality (or discrimination) argument was used by someone who wanted to use an enhancement, rather than by someone who was losing out due to the use of enhancement. The decision of the Panel with respect to this argument nonetheless provides some guidance.

The Panel stated that the Convention on the Rights of Persons with Disabilities (the Convention) was not engaged in the circumstances of this appeal. Citing Article 30.5 of the Convention, the Panel stated that the Contracting State was only obligated to encourage participation of persons with disabilities in mainstream sporting activities at all levels with a view to enabling them to participate on an *equal basis* to sporting activities. It noted (at paragraph 28):

> …if the Panel finds that Mr Pistorius' *Cheetah Flex-Foot* prostheses provide no advantage to Mr Pistorius, he will be able to compete on an equal basis with other athletes. If the Panel concludes that Mr Pistorius does gain an advantage, the Convention would not assist his case.

On this basis, the Panel rejected Mr Pistorius' submission based on unlawful discrimination.

The regulation of the use of technology in sport makes a distinct contribution, as it confirms the fact that the use of technology by itself is not a form of enhancement unless it crosses the species typical level, which was argued in chapter 1. Further, it demonstrates that the right to equality, insofar as it seeks to ensure parity between individuals in competition, can be invoked by individuals in order to access enhancements which function as treatments, bringing the individual on par with the competitors. However, this argument would not succeed if such access were sought in order to surpass the abilities of the competitors.

Finally, I turn to analysing the regulation of sex categories and the testosterone levels in female athletes in sport. This is with a view to understanding how sport and its regulatory framework views pre-existing or natural advantages, and whether it equates them with enhancements in terms of regulatory control.

C. The regulation of sex categories

The reason given for creating a separate category for biological females in every sport that requires physical effort (sports like Chess, which involve no physical exertion dimension, being the exception) is that biological males have higher testosterone levels due to which they have an overall advantage in terms of muscle mass, strength, and aerobic capacity.

The IAAF's Eligibility Regulations for Female Classification (Athletes with Differences of Sex Development) 2018 ('DSD Regulations') were targeted at

preserving this categorisation. They applied to athletes who are biologically female or have intersex characteristics (due to differences of sex development), but have naturally occurring testosterone levels above 5 nanomole/L, which crosses over into the male range, *and* who experience a 'material androgenising effect', that is, the testosterone has a biological impact on their bodies.

The Regulations required affected female athletes to reduce their testosterone levels to within the normal female range (that is, below 5 nanomole/L) by using medication. Further, they required maintenance of this reduced level for at least six months in order to be eligible to compete in the female category in eight 'restricted events' at international competitions. The restricted events include 400m, 800m and 1500m races. However, the IAAF's DSD Regulations became the centre of a dispute concerning Caster Semenya at the Court of Arbitration for Sport, which brought to the fore the regulatory view that natural advantages specifically with respect to testosterone in women would be treated as enhancements.

The Caster Semenya case

Caster Semenya, double Olympic 800m champion from South Africa, filed a request for arbitration with the CAS against the IAAF requesting *inter alia* that the DSD Regulations be declared unlawful.

Ms Semenya argued DSD Regulations were discriminatory as they only targeted female athletes, and were not necessary to preserve fair competition

within the female category. As noted in paragraph 52 and 53 of the Award,[520] she argued:

> …success in elite competitive sport is the product of both genetic and environmental factors….*the significant role that genetics plays in determining sporting performance means that sport is inherently not fair*. The world celebrates the genetic differences that make athletes such as Usain Bolt, Michael Phelps and Serena Williams great. DSD are a form of genetic difference that should be celebrated in the same way...there is no qualitative difference between DSD and other genetic variations that make athletes particularly tall or strong, or which provide unusual haemoglobin concentration, unusually large skeletal muscles etc. It is illogical and unnecessary to regulate one genetic trait while celebrating the others. (emphasis added)

On the other hand, the IAAF submitted (rather, asserted, at paragraph 563) that all but one of the many different factors that contribute to sport performance – including training, coaching, nutrition and medical support, as well as many genetic variations – are equally available to men and women. The sole factor that is available only to men is exposure to adult male testosterone levels. It is this exposure that produces the physical advantages that males have over females in sport performance.

On the basis of the scientific evidence available to it, the Panel accepted the above submission made by IAAF. The Panel decided (at paragraph 535) that there is indeed a qualitative difference between DSD and other kinds of variations among athletes. The Panel accepted that the preponderance of the evidence is that female athletes with DSD such as 5-ARD have high levels of circulating testosterone in the male range and this does result in a significantly enhanced sport performance ability, including by action in the body to increase muscle mass and size, and levels of circulating haemoglobin. It also found that increased

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[520] *Mokgadi Caster Semenya v International Association of Athletics Federations* CAS 2018/O/5794 (Court of Arbitration for Sport). [“Caster Semenya CAS decision”]

muscle mass and size, and levels of circulating haemoglobin in turn have a direct impact on athletic performance. Therefore, on evidence, the majority of the Panel accepted that the IAAF had demonstrated that the degree of performance advantage caused by elevated testosterone levels is so great as to require athletes who lack that advantage to be protected against having to compete against athletes who possess it.

The Panel noted at paragraph 460 that the case involves, on the one hand, the right of every athlete to compete in sport, to have their legal sex and gender identity respected, and to be free from any form of discrimination. On the other hand, is the right of female athletes, who are 'relevantly biologically disadvantaged' vis-à-vis male athletes, to be able to compete against other female athletes and not against male athletes 'and to achieve the benefits of athletic success, such as positions on the podium and consequential commercial advantages'. The Panel explicitly stressed that 'This right of competition is often described (although not so easily defined) as the right to compete on a 'level playing field'. It concluded that DSD Regulations are discriminatory (in that they apply only to female athletes) but such discrimination is a necessary, reasonable and proportionate means of achieving the legitimate objective of ensuring fair competition in female athletics.

Caster Semenya then appealed to the Swiss Federal Supreme Court, which examined whether the CAS decision violated fundamental and widely recognised principles of public order. It held that that was not the case.[521] It found satisfactory

[521] *Mokgadi Caster Semenya and others v International Association of Athletics Federations and Athletics South Africa* (25 August 2020) [Federal Supreme Court of Switzerland]; Press Release of the Swiss Federal Supreme Court in English (Judgment reported in French): <https://www.bger.ch/files/live/sites/bger/files/pdf/en/4A_248_2019_yyyy_mm_dd_T_e_18_18_10.pdf> accessed 30 May 2023.

CAS's reasoning that since, on evidence, women with the '46 XY DSD' gene variant have a testosterone level comparable to men, which gives them an insurmountable competitive advantage, there was no violation of the prohibition of discrimination. It noted 'fairness in sport is a legitimate concern and forms a central principle of sporting competition' and that '…it is one of the pillars on which competition is based. The European Court of Human Rights also attaches particular importance to the aspect of fair competition'. In doing so, it also referred to the decision in FNASS at the ECtHR, discussed above.

There are two ways to look at the decisions of the CAS as well as the Swiss Federal Supreme Court. The first is that in deciding as they did, the CAS Panel as well as the Swiss Federal Supreme Court confirmed once again the core of competitive sport: that victory should be determined by effort and not by the existence of any pre-existing advantage, including natural advantage, which can be eliminated, and that athletes must start, *as far as possible,* from a level-playing field. In defense of these decisions, it may be said that it is not possible to undo the distinctive limb measurements of Michael Phelps that give him a competitive edge in swimming.

The second way to look at it, and the view that I take, is that these decisions are incorrect and unjustified. Sport is not, and indeed, cannot be a perfect level playing field as individuals are born with different physical attributes, though they may choose to work equally hard to use their given physical attributes. The rules of sport try to *level* the playing field *to the extent possible* by *inter alia* disallowing further advantages that are gained unnaturally. This also aligns with the definitional framework for enhancement I proposed in

the first chapter, wherein an enhancement is a biochemical *intervention* in the body that enhances its performance. This excludes naturally existing characteristics of the body that are above the average human level.

It is on this count that the lack of regulation of other natural advantages makes sense too. For instance, Finnish cross-country skier Eero Mäntyranta's genetic mutation that boosts his red blood cell count by 25-50% does not evoke any regulatory response. Similarly, Michael Phelps has benefitted from abnormally large feet and hypermobile ankles that effectively act as flippers, and an unusually long arm span with relatively short legs that reduce drag.

Caster Semenya then filed before the ECtHR against Switzerland.[522] The Court recognised that discrimination based on sex characteristics falls under the protection against sex discrimination under Article 14 of the European Convention on Human Rights.[523] However, it refrained from reaching a definite conclusion that the DSD Regulations amounted to discrimination. In deciding in favour of Semenya 4-3, its decision was based instead on the absence of procedural and institutional safeguards, and it emphasised Switzerland's obligation to address horizontal discrimination. It held that the Swiss Federal Supreme Court did not satisfy Switzerland's obligation to ensure the mechanisms necessary to remedy discriminatory treatment, covered by the Article 14 prohibition of discrimination, against sportspersons committed by sports federations.[524]

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[522] Sara Spary, 'Caster Semenya Appeals to European Court of Human Rights over "discriminatory" Testosterone Limit' *CNN* (26 February 2021) <https://www.cnn.com/2021/02/26/sport/caster-semenya-appeal-scli-intl-spt/index.html> accessed 2 June 2023.

[523] *Semenya v Switzerland* (2023) Application no. 10934/21 [158]. ["Semenya ECtHR"]
[524] *Semenya ECtHR* [195].

The Court stressed that any differentiation in treatment based on sex should be justified by very weighty reasons. According to the Court, the scientific evidence supporting the exclusion of women with increased testosterone levels under the pretext of promoting 'fairness' was insufficient.[525] Unfortunately, the Court refused to issue a ruling on Article 8, which *inter alia* protects the right to bodily integrity. However, it did point out that the Swiss Federal Supreme Court as well as the CAS failed to give due weightage to the severity of the side effects that the hormone treatment can cause. The DSD Regulations, according to the ECtHR, did not offer a 'real choice' to the athletes. If they did not take the prescribed hormone treatment, they lost the ability to practice their chosen profession.[526]

This case could now be further appealed in the Grand Chamber of the ECtHR.[527] Meanwhile, World Athletics has decided to keep in place its current version of the DSD Regulations, which still means that Semenya and other affected sportswomen will not be able to compete on the track yet.

World Athletics, IAAF, or CAS are not infallible, and their reasoning is not insurmountable: as more scientific evidence comes forward, it is possible that this decision loses its grounding merely on scientific basis. Afterall, if the benefit of male range testosterone is not as substantial as the IAAF or CAS held it to be, it

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[525] *Semenya ECtHR* [179-184; 200-201].

[526] *Semenya ECtHR* [185-190].

[527] 'The European Court of Human Rights in the Caster Semenya Case: Opening a New Door for Protecting the Rights of Persons with Variations of Sex Characteristics and Human Rights in Sports' (*Opinio Juris*, 4 August 2023) <https://opiniojuris.org/2023/08/04/the-european-court-of-human-rights-in-the-caster-semenya-case-opening-a-new-door-for-protecting-the-rights-of-persons-with-variations-of-sex-characteristics-and-human-rights-in-sports/> accessed 24 August 2024.

is unnecessary, unreasonable and disproportionate to mandate that an athlete undergo medical treatment to change what is naturally occurring in their body.

Indeed, it has been argued that the DSD Regulations are based on inadequate science. Even though testosterone levels are elevated in the blood of a female athlete with differences of sex development, the receptors for testosterone do not respond to the hormone in the usual way. This is why individuals with differences of sex development have typical external female physical characteristics.[528] Testosterone can have some impact on how the body works, but it is difficult to quantify the impact. The difference that testosterone makes between males and females in all events is estimated to be up to 12%, but Semenya's best time is only 2% faster than her competitors. It is not possible to determine how much of this is due to her testosterone, and how much due to other factors about her as an athlete, or her psychology.[529]

This is why World Medical Association has advised doctors not to administer testosterone-lowering interventions, and have described the DSD Regulation as 'contrary to international medical ethics and human rights standard'.[530] Indeed, our bodies are complex and poorly understood, and standards are often designed keeping in view the Caucasian standards which does not suit Black women in particular.

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[528] 'WMA - The World Medical Association-WMA Urges Physicians Not to Implement IAAF Rules on Classifying Women Athletes' <https://www.wma.net/news-post/wma-urges-physicians-not-to-implement-iaaf-rules-on-classifying-women-athletes/> accessed 21 September 2024.

[529] Julian Savulescu, 'Ten Ethical Flaws in the Caster Semenya Decision on Intersex in Sport' (*The Conversation*, 9 May 2019) <http://theconversation.com/ten-ethical-flaws-in-the-caster-semenya-

[530] 'WMA - The World Medical Association-WMA Urges Physicians Not to Implement IAAF Rules on Classifying Women Athletes' (n 525).

I had the opportunity to speak to Semenya about this, where she noted:

> Is it the women who point other women out and say she's doing phenomenally so something must be wrong with her? No, it's the men
> And black women's bodies are more policed than others - they are the ones with differing testosterone levels. Sports is not fair, if it was, we would never see anyone extraordinary. We cannot control nature. Nature provides genetic differences that we cannot control…tallness in basketball, ratios in swimming…
> Plus my testosterone doesn't bring me nearly close to the men's timing.[531]

The fact that new evidence can change athletes' careers is demonstrated by the story of Dutee Chand, an Indian sprinter in the 100m and 200m category, who was suspended by the IAAF in 2014 due to hyperandrogenism (which caused higher levels of testosterone). She brought arbitration proceedings before CAS, and in 2015, the CAS suspended the IAAF's decision as well as the DSD Regulations applicable then and ordered the IAAF to present clearer scientific evidence.[532] The IAAF went on to find new scientific evidence which said that testosterone plays a particularly important role in middle distance running events. As a result, the new IAAF DSD Regulations apply to 400m, 800m and 1500m events.[533]

There is a separate discussion to be had when it comes to transgender athletes. It is helpful to discuss Lia Thomas in that regard.

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[531] Interview with Caster Semenya, Olympic Athlete (Oxford, England, 6 November 2023).

[532] *Dutee Chand v. Athletics Federation of India & The International Association of Athletics*

[533] World Athletics, IAAF Publishes briefing notes and Q&A on Female Eligibility Regulations <https://www.worldathletics.org/news/press-release/questions-answers-iaaf-female-eligibility-reg>

Lia Thomas

Lia Thomas, a transwoman competing in University of Pennsylvania's women's swimming team, became the subject of debate about what is fair in elite sports competitions. She first competed in University of Pennsylvania's men's swimming team but in her freshman season in 2018, she realised she was a woman, not a man. She started hormone-replacement therapy in accordance with the guidelines of the National Collegiate Athletic Association, which regulates student athletics in the United States. She reported that she felt her body change—fat was redistributed around her body, and her aerobic capacity fell. The controversy began when, in the context of Thomas winning at several inter-University competitions, a group of parents of Penn swimmers anonymously sent a letter to the NCAA arguing that Thomas' participation in the women's category compromises the integrity of women's sports.[534]

Indeed, hormone-replacement therapy may not counteract all the competitive advantages one might have due to testosterone driven puberty. It may not reduce lean body mass, limb measurements or width of the pelvis. The question therefore remains whether transwomen retain a significant metabolic and physiological advantage over cisgender women despite hormone replacement therapy. The Federation Internationale De Natation, which is the international federation recognised by the International Olympic Committee for administering international competitions in water sports, has recently voted that it will only allow athletes who have transitioned before the age of 12 to take part in any of the elite international swimming competitions. According to its statement, this policy

[534] Louisa Thomas, 'The Trans Swimmer Who Won Too Much' [2022] *The New Yorker* <https://www.newyorker.com/sports/sporting-scene/how-one-swimmer-became-the-focus-of-a-debate-about-trans-athletes> accessed 10 August 2022.

is based on the 'performance gap' that emerges between biological males and females during puberty. It has also suggested an open competition where transwomen may compete.[535]

There are no easy answers. Requiring someone to change their body as a precondition to participation in sport goes contrary to the ideals of dignity and privacy, which is a strong reason to treat naturally endowed advantages differently from advantages *gained* through biochemical intervention. Further, the assumed advantage that the trans-athlete has is not assessed against the disadvantages of stigma and mental health deterioration that they inevitably experience.

The United Nations Human Rights Council has called the DSD Regulations discriminatory and said that they contravene human rights 'including the right to equality and non-discrimination […] and full respect for the dignity, bodily integrity and bodily autonomy of the person'.[536] This demonstrates yet another way in which the right to equality is relevant to the regulation of enhancement.

I finally turn to drawing out concrete lessons from the regulation of enhancements, both chemical and technological, as well as the regulation of naturally endowed advantages, and consider the extent to which this framework can contribute to a broader framework for the regulation of enhancement.

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[535] ABC News, 'FINA Decision on Transgender Athletes May Have Ripple Effects on Other Sports' Governing Bodies' (*ABC News*) <https://abcnews.go.com/International/fina-decision-transgender-athletes-ripple-effects-sports-governing/story?id=85532366> accessed 11 August 2022.

[536] UN Human Rights Committee, Elimination of discrimination against women and girls in sport (Resolution 40/5) March 2019 <https://ap.ohchr.org/documents/dpage_e.aspx?si=A/HRC/40/L.10/

III. LESSONS TO BE LEARNT FROM THE REGULATION OF ENHANCEMENT IN SPORT

This section consolidates the lessons to be learnt from the regulatory framework that governs competition in elite sport. These are: first, the regulation of doping and use of technology in sport affirms the link between effort and merit; second, the regulation of use of technology and references to equality of opportunity highlight the importance of socio-economic status of the competitor; third, the regulation of naturally occurring elevated testosterone levels in biologically female athletes stands out as a deviation from the lack of regulation of natural advantages; and fourth, the regulations are rooted in 'fairness' rather than equality.

I argue that these lessons affirm the argument made in Chapter Three for considering the use of enhancements in competitive scenarios as an equality concern. To summarise, the argument was: first, enhancements take away from the merit of the competitor. Second, even if they do not reduce merit, enhancements reduce effort and therefore reduce the deservingness of the victory or other positive outcome. Third, access to enhancements, which are positional goods, is dependent on existing wealth. This means that the use of enhancements further entrenches socio-economic inequality. These lessons also highlight the importance of a definitional framework such as the one proposed in Chapter One, and the validity of the conclusion in Chapter Four about the inability of equality in IHRL to remedy unfairness in competitive scenarios.

I will now elaborate on each lesson and how it affirms this argument.

A. The regulation of doping and use of technology in sport affirms the link between effort and merit

The rules and the cases demonstrate that the central issue with the use of doping or using particular kinds of technology by disabled athletes is that it results in an advantage, by delinking the athlete's result or their merit in achieving that result, from the effort they put in.

Other advantages may exist vis-à-vis competitors, such as genetic advantages (which allow high metabolism and lean mass) or geographical advantages (such as having grown up in mountainous regions and therefore having higher oxygenation capacity), but the presumption in these rules and cases is that these are not *gained* intentionally and through *unfair* means.

Section 3.1.4 on physical prowess in the IPC Policy stipulates that the critical endeavour in sport is human performance and not the impact of technology and equipment. It seeks to maintain the focus on rewarding the outcome of what arises from the athlete's *given* body. Further, the cases on doping from CAS and independent Courts, as well as *FNASS v France* at the ECtHR, underline that advantage gained in competition using means external to the body are non-negotiable.

In other words, that the result should be owed to an athlete's effort is affirmed. Further, it is affirmed that even if enhancements do not reduce merit, they reduce effort and therefore reduce the deservingness of the victory.

B. The regulation of use of technology and references to equality of opportunity highlight the importance of the socio-economic status of the competitors.

The rules and cases demonstrate that the socio-economic realities of the competitors is a factor to be considered. For instance, the IPC Policy on sport equipment stipulates the universality principle in Section 3.1.3. According to this, the cost and large-scale availability of the principal components of equipment should be considered to guarantee access to a sufficiently large number of athletes in the sport. According to Regulation 7 of Word Para Athletics Rules and Regulations of 2022, the IPC Policy on Sport Equipment applies to all Word Para Athletics Competitions, and the principles in the IPC apply to inter alia the development of sports specific prosthetic devices. Crucially, as per Regulation 7.2.1.3, technology or equipment that is not commercially available to all athletes (with some exceptions) will be considered contrary to the IPC policy.

In *FNASS,* ECtHR considered that what the Government describe as ‘morals’, in the context of efforts to ensure equal and meaningful competition in sports, is also linked to the legitimate aim of ‘protection of the rights and freedoms of others’. It held that the use of doping agents in order to gain an advantage over other athletes unfairly eliminates competitors of the same level who do not have recourse to them. In observing this, it shows a clear concern for the socio-economic differences between who do and do not have recourse to enhancements or doping substances.

This demonstrates that at least one element of the regulation is that when competitors enter the field, their socio-economic access to enhancement should not deter victory. This is not only because sports values the exposition of ability, which is a combination of effort applied to the body *as is,* but also because, and in elite international competitions in particular, winning carries substantial financial

and social rewards. Some authors have touched upon this. For instance, Lesley Jacobs writes that pre-existing inequalities 'infect the fairness of competitive processes'. Due to this, there is a need to regulate competitive processes with a sensitivity to remedies for these inequalities.[537] He emphasises that in addition to such 'background fairness', and 'procedural fairness' (according to which the governing rules of the competition should be fair), there must be stakes fairness. As per his understanding of 'stakes fairness', the outcome or effect of a competition, that is, distribution of advantage such as prizes and prestige should be fair.[538]

This affirms that access to enhancements (whether technological enhancements or biochemical substances), which are positional goods, is dependent on existing wealth. This means that the use of enhancements further entrenches socio-economic inequality.

However, this raises the obvious question of why enhancements in particular are problematic on socio-economic access grounds, whereas other socio-economic advantages including access to a sophisticated sports medicine, superior training ground or coach, are unregulated. Indeed, McNamee *et al* argue that 'background fairness' is difficult to achieve in Paralympic sport given the disadvantages in non-welfare countries (a term which they do not define). In addition to the non-availability of sophisticated sport-specific equipment, appropriate medical care is lacking, which may complicate the ergonomic athlete-equipment optimisation (such as the stump-socket alignment due to misshaping of

[537] Lesley A Jacobs, *Pursuing Equal Opportunities: The Theory and Practice of Egalitarian Justice* (Cambridge University Press 2003) <https://www.cambridge.org/core/books/pursuing-equal-opportunities/BDDC286DEAAC139959FF27640977B3E3> accessed 19 May 2022.

[538] McNamee, Parnell and Vanlandewijck (n 233).

the amputated leg). McNamee *et al* thus observe that even if procedural fairness were assured, 'the distortive effect of technology access predictably prevents athletes from developing economies compete fairly with their richer counterparts'. As they observe, the ethical considerations become hostage to economic and commercial ones. A good example may be Formula 1 racing, where companies seek to achieve market dominance for their products partly by sponsoring individual athletes, resulting in non-universal access to such equipment.[539]

Thus, while IPC's equipment policy is an important step in allocating success based primarily on physical prowess, it is a meritocratic norm that would benefit all sport in general.[540] It is essential that in the case of Paralympic sport, where technology is all but ineliminable, attention to procedural fairness must be augmented with a concern for outcomes-based fairness, *but especially also to background fairness.* Merely subscribing to procedural fairness would not account for the full set of fairness-related considerations in sport. Furthermore, even in able-bodied sport, the lack of concern for socio-economic access to ways in which performance can be improved using the body *as is*, deserves a re-check.

C. The DSD Regulations demonstrate the imperative role for a definition of enhancement.

Regulation in sport is riddled with some inconsistencies. This is because while it bans doping to emphasise the link between effort and merit or result, it allows athletes to benefit from *some* naturally endowed advantages (but not others, such as elevated testosterone due to differences of sex development in female athletes) and access to methods such as superior training. This inconsistency demonstrates

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[539] ibid.

[540] ibid.

the role that a definition of enhancement with a clear cut off point for what amounts to enhancement, such as that proposed in Chapter One, can serve regulation.

Caster Semenya's case shows that athletes may be born with genetic differences that give them an edge in competition. The Finnish skier Eero Maentyranta enjoys a genetic mutation due to which he naturally had 40-50% more red blood cells than an average person and Black Africans generally do better at short distance events because of their biologically superior muscle type and bone structure.[541] Yet, it is only Semenya who is not allowed to capitalise on her natural advantages.

In order to defend why *all* natural genetic advantages should not be treated as enhancements, I advance three arguments. First, athletes did not make an active decision to opt for their natural advantages. Given this, mandating that individuals change their bodies, change what they were born with, impinges on the individual's dignity. Currently, the only natural advantage that is prohibited is male range testosterone levels in female athletes under the DSD Regulations. Regulating natural advantage inconsistently (as is the case at present, since other forms of substantial genetic advantages are not outlawed) creates a distinct type of unfairness for the female athletes who are forced to undergo invasive procedures. The solution, however, is not to prohibit other natural advantages too, but rather to regulate more consistently.

Second, there is a lack of *intention* to use unfair means to win, but instead, the dedication to fully utilise their existing natural gifts. To recount what Usain

[541] Savulescu, Foddy and Clayton (n 280).

Bolt (who is naturally gifted being 6 feet 5 inches due to which it takes him 41 strides to run 100 m, while it takes most competitors 44 or 45)[542] said: 'I am lucky that I have a lot of natural talent, *but my success is all down to hard work*. I could run under 10sec now even if I didn't really train, but to win medals it's all about training on the track, working hard in the gym and improving my technique'.[543] 'I want people to understand that what they see on the track is because I work so hard to get there.'[544]

There may be other females with testosterone in the male range who choose not to forego a simple life to train for elite competition, and other individuals with abnormal level of red blood cells who work in banks. Both Caster Semenya and Eero Maentyranta not only lack the intention to use unfair means to win, but instead, they have dedicated themselves to excelling through the pursuit of sport, and train hard to put their natural gift to use.

Third, there is the practical concern that while we have methods to modify testosterone levels, we cannot halve someone's red blood cell count, or indeed, a 7-foot tall basketball player's height. On the other hand, it is possible to *prevent* individuals from introducing external chemicals in their body to gain enhancement.

Equally, there are also differences between improvements in performance gained through superior training or gear, and enhancement. To begin with, it is a

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[542] University of Melbourne, 'Which Types of Muscle Fibres Are You Made of? – Scientific Scribbles' (n 474).

[543] Marc Chacksfield, 'Usain Bolt Interview: Inside the Mind of a Superhuman' (*Shortlist*, 17 July 2011) <https://www.shortlist.com/news/usain-bolt-interview> accessed 2 December 2022.

[544] Aitkenhead (n 476).

misnomer that *any* equipment, irrespective of the degree of improvement it renders, can be used. In fact, existing regulation within each sport explicitly militates against equipment that may provide competitive advantage. For instance, double-strung rackets are banned by the international tennis federation,[545] and so is the use of carbon fibre bats by the international cricket federation.[546] Similarly, FINA banned Speedos LZR swimsuit after a scientific evaluation, as it reduced drag in the water by 38% compared to an ordinary LYCRA suit. Although Speedo argued that the suit only improved the management of existing forces rather than generating new ones, these suits were disallowed after the Beijing Olympics.[547] While it is true that a change in rules is often too late, this nonetheless shows that there is no dissimilarity in the treatment of enhancement and equipment that enhances performance. In fact, in the case of para-athletics, the focus on regulating equipment and technology is evident, as discussed in the previous section.

The argument for advantage gained through superior training and/or nutrition is more complex. Savulescu *et al* write that there is no difference between well-resourced athletes elevating their blood count by altitude training, by using a hypoxic air machine, or by taking EPO, and yet only the last is illegal.[548] This is unpersuasive.

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[545] Craig L Carr, 'Fairness and Performance Enhancement in Sport' (2008) 35 Journal of the Philosophy of Sport 193.

[546] 'High-Tech Bats to Be Made Illegal' (8 May 2008) <http://news.bbc.co.uk/sport1/hi/cricket/7387456.stm> accessed 15 August 2022.

[547] ABC News, 'Full Body Swimsuit Now Banned for Professional Swimmers' (*ABC News*) <https://abcnews.go.com/Politics/full-body-swimsuit-now-banned-professional-swimmers/story?id=9437780> accessed 15 August 2022.

[548] Savulescu, Foddy and Clayton (n 280).

First, even well-resourced athletes cannot gain an advantage *simply* by landing at a high altitude. They must then exert themselves, in fact more significantly than what is required at sea level, in order to train their bodies to produce more red blood cells. This is as opposed to taking EPO, which results in a higher red blood cell count (and therefore higher oxygen in the blood) without action, and thereby improves performance. Furthermore, training methods such as high altitude training are well-known and well-practiced around the world, but cannot uniformly create the same difference in performance as the injection of an enhancement would. The same goes for superior nutrition. While it is true that it can make a difference in sporting performance by providing the body with the right fuel, it is not nearly the same as an enhancement which can achieve biochemical improvements in the body's functioning without additional effort.

Second, as Agar argues, there are insuperable practical obstacles to excluding from competition other ways in which elite athletes are able to improve performance. For instance, if we banned training at high altitudes, we would effectively ban from competition many residents of the Andes.[549] Therefore, *even if* there is no clear distinction between using superior training methods and using enhancements, there are good practical reasons for drawing such a distinction in regulation.

To conclude this argument, the inconsistencies in the regulation of enhancement in sport can be remedied by employing a definition of enhancement with a clear cut off point for what amounts to enhancement, such as that proposed in Chapter One.

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[549] Agar (n 483).

D. The regulations are largely rooted in 'fairness' as a value rather than equality

There is a clear theme of lack of recourse to the right to equality in both regulatory instruments as well as cases, which affirms the conclusion reached in Chapter Four about the inability of equality in IHRL to remedy unfairness in competitive scenarios due to the use of enhancements.

For instance, in *FNASS v France 2018*, the ECtHR mentions 'equality of opportunity' and yet avoids application of an equality provision. Instead, 'fairness' is preferred. Further, for the regulation of sport equipment, Section 1 of the IPC's policy on sport equipment emphasises that the use of sport equipment should be fair and governed by clear rules. The fairness principle (in section 3.1.2) stipulates that equipment needs to be regulated in sports rules in sufficient detail. The Word Para Athletics Rules add more details, stating what would amount to an unfair advantage, in Rules 6.2 with respect to shoes, in Rules 6.3 & 6.4 with respect to spikes and in Rule 6.5 with respect to sole thickness. The focus on ensuring that these only do their bare minimum job can be found in the statement in Rule 6.2 'the primary purpose of shoes for competition is to give protection and stability to the feet and a firm grip on the ground. They must not give athletes any unfair assistance or advantage'.

E. The need to consider countervailing considerations

That the equality or fairness consideration in a competitive scenario concerning the use of HET may well conflict with other values comes through in *FNASS v. France* (discussed above). These concerns can include considerations such as liberty from State interference, privacy, and autonomy. In *FNASS v France*, the ECtHR considered the requirement for athletes to notify their

whereabouts so that unannounced anti-doping tests could be conducted in the context of various competing considerations: on the one hand, the right to private life under Article 8, and on the other hand, protecting health, and ensuring sporting competitions were fair. In balancing these, the Court accepted the argument that ethical concerns regarding fair play constitute 'a decisive argument for the necessity of the interference resulting from the impugned whereabouts requirement'[550]. As noted above, this case demonstrated that the use of enhancement is so contrary to the values of a field that rewards effort and prioritises fair play among competing rivals, that the need to prevent the use of enhancement trumped even privacy rights.

The ECtHR has time and time again shown its familiarity with the balancing of rights, a process by which competing human rights claims, which are in conflict, are weighed and prioritised according to the nature and scope of the conflicting rights, the severity of the interference, and the legitimate aim sought by the limitation.[551] The example of *FNASS v France* demonstrates Courts' ability to carry out this balancing exercise in the context of enhancements and equality too. Further, it shows that rights cannot be merely compared in isolation, and need to be examined in the societal and individual context in which they arise, so that any limitation of rights is tailored only to the specific circumstances. Indeed, in the event that an autonomy-based argument (which in the scheme of ECHR, would fall within an Article 8 analysis as in *FNASS*) was to be made by an individual, to the effect that it is their right to choose what to do with their body, a

[550] *FNASS* [177].
[551] Samantha Besson, 'Human Rights in Relation: A Critical Reading of the ECtHR's Approach to Conflicts of Rights' in Stijn Smet and Eva Brems (eds), *When Human Rights Clash at the European Court of Human Rights: Conflict or Harmony?* (Oxford University Press 2017) <https://doi.org/10.1093/oso/9780198795957.003.0002> accessed 4 May 2025.

similar balancing exercise as in *FNASS v France* would ensue. Most notably, it would, as is usual, pay due regard to the particular facts of the case, but there is nothing to suggest that the analysis should go differently than that in *FNASS* where a competitive scenario with rewards is being considered.

I now turn to discussing the fields to which the lessons derived here may be applicable.

CAVEATS IN APPLICATION TO OTHER FIELDS

The regulation of doping, sports equipment, and sex categories in sport is indeed ripe with lessons for the regulation of enhancement more generally. However, the lessons learnt from this sphere cannot be applied to another sphere of human activity without being alive to the following factors.

First, by virtue of being a competition, sport is also zero sum. This means that one wins *at the cost of another*. It is understood that this victory may be an end in itself, but is tied up with rewards such as reputation, sponsorships, other economic benefits, and sometimes even a political career. All of these rewards increase in value and degree as the scale of the competition advances. Therefore, these lessons may not be applicable to a field or circumstance which is non zero-sum.

For instance, if a neurosurgeon chooses to take an enhancement in order to more efficiently perform a surgery, it may not be problematic in a similar sense as in sport, since the goal is to have a successful surgery rather than to link it to the neurosurgeon's talents. Similarly, many individuals may be climbing Mt. Everest for their own personal goals. If some of them choose to take EPO in order to be

successful, there would be no equality related concern as the success of one climber is not at the cost of the others, though there achievement may not be recognised as significantly as that of another climber who did not take EPO.

Second, sport, especially of the highest level, involves significant commercial and national interests. The broadcast revenue from the Olympics has been increasing consistently. According to the data provided by the International Olympic Committee,[552] the broadcast revenue for London 2012 Olympics was 2,569 million USD, increasing to 2,868 million USD for the Rio 2016 Olympics, and 3,107 million USD (or 3.1 billion USD) for Tokyo 2020 Olympics. 3.05 billion unique viewers tuned into coverage of the Olympics on various platforms.[553] This makes the games highly attractive for advertisers as well as sponsors. Further, success in sport at an international level carries emotional meaning for nations and is often a source of pride.[554]

In turn, this means that international sport events like the Olympics have the requisite incentive as well as finances to closely monitor athletes and collect data. This relates directly to why it is currently the only field that has a developed framework for the regulation of enhancements. In a game of street cricket, the two

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[552] 'IOC Awards Exclusive 2026-2032 Olympic Games Media Rights in Europe to European Broadcasting Union and Warner Bros. Discovery' (*International Olympic Committee*, 16 January 2023) <https://olympics.com/ioc/news/ioc-awards-exclusive-2026-2032-olympic-games-media-rights-in-europe> accessed 2 June 2023.

[553] 'Olympic Games Tokyo 2020 Watched by More than 3 Billion People - Olympic News' (*International Olympic Committee*, 6 September 2022) <https://olympics.com/ioc/news/olympic-games-tokyo-2020-watched-by-more-than-3-billion-people> accessed 2 June 2023.

[554] '"Sport Is a Way for Wales to Stand out": Why Welsh Pride Is a World Cup Advantage' *FOX Sports* <https://www.foxsports.com/stories/soccer/sport-is-a-way-for-wales-to-stand-out-why-welsh-pride-is-a-world-cup-advantage> accessed 2 June 2023; 'Analysis | Do the Olympics Promote Nationalism — and International Conflict? Here's the Research.' *Washington Post* (26 July 2021) <https://www.washingtonpost.com/politics/2021/07/26/do-olympics-promote-nationalism-international-conflict-heres-research/> accessed 10 April 2023.

teams may use significantly different bats and one may win due to the superiority of its bat alone. Yet, this would not cause the law to regulate a game of street cricket as despite being a competitive scenario, the stakes are too low.

It is evident that elite sport is uniquely placed to both suffer economic and notional harms from the use of enhancements, while also enjoying the ability to regulate them. This should be borne in mind when applying lessons drawn from it.

CONCLUSION

This Chapter aimed to draw insights from the regulation of enhancements in sports in order to design appropriate *sui generis* rules to address unfairness in competitive scenarios arising from the use of enhancements. **Section I** offered an account of sport, where I argued that sport is a space for fair competition and rewarding effort. I used international instruments that regulate sport as well as the statements made by several elite athletes to make this claim. **Section II** then analysed the regulatory framework with respect to **(A)** doping, **(B)** the use of technology such as bionic limbs, and **(C)** natural 'abnormal' testosterone levels in female athletes. Each of these three sections revealed how sport problematises the use of unfair means in competition, and the solutions it has devised to address the problem.

The regulatory framework for doping demonstrated the degree of importance accorded to discouraging, preventing, and punishing doping in sport. Additionally, the cases reflected the enormity of value placed fair play, to the extent that it outweighs other values such as the privacy and autonomy of sportspersons.

The regulation of the use of technology in sport showed that the International Paralympic Committee's (IPC) policy on sport equipment aims to eliminate advantage gained through the use of superior equipment. Further, a discussion of the case concerning Oscar Pistorius showed that the use of technology by itself is not a form of enhancement unless it crosses the species typical level, which affirms the principle underlying the definition proposed in Chapter One. Further, it demonstrates that the right to equality, insofar as it seeks to ensure parity between individuals in competition, can be invoked by individuals in order to access enhancements which function as treatments, bringing the individual on par with the competitors. However, this argument would not succeed if such access were sought in order to surpass the abilities of the competitors.

The regulation of sex categories in sport entailed a discussion on the DSD Regulations, which require affected female athletes to reduce their testosterone levels to within the normal female range (that is, below 5 nanomole/L) by injecting hormones. This, in turn, entailed a discussion of the case concerning Caster Semenya, an elite South African athlete with intersex characteristics. This section discussed the decisions of the CAS Panel, the Swiss Federal Supreme Court, as well as the ECtHR in this case, and noted the tension between discrimination against female athletes (as the Regulations only apply to them) and the need to ensure a 'level playing field'.

Section III then consolidated the insights gained from the regulatory framework in sport by drawing insights from the discussion in Section II. These insights also affirmed the arguments made in earlier chapters, as follows: first, the

regulation of doping and the use of technology in sport highlighted the link between effort and merit. This affirmed the argument made in Chapter Three that enhancements take away from the merit of the competitor. Even if they do not reduce merit, enhancements reduce effort and therefore reduce the deservingness of the victory or other positive outcome.

The second insight was that the regulation of the use of technology and references to equality of opportunity highlight the importance of socio-economic status of the competitor. This affirmed another limb of the argument made in Chapter Three that access to enhancements, which are positional goods, is dependent on existing wealth and the use of enhancements further entrenches socio-economic inequality.

The third insight was that the regulation of naturally occurring elevated testosterone levels in biologically female athletes stands out as a deviation from the lack of regulation of natural advantages. This suggested that a definition such as the variable-degree spectrum definition proposed in Chapter One would serve regulation by marking the regulatory line between natural advantages (abnormal testosterone levels) and elective enhancement (steroids) clear.

The fourth insight was that the regulations are not derived from the well of equality law. This affirmed the validity of the conclusion in Chapter Four about the inability of the content of equality in IHRL to remedy unfairness in competitive scenarios.

Finally, **Section IV** made note of the factors that make elite sport unique, and which need to be borne in mind before applying the lessons learnt from this sphere to another. These factors were that first, sport is zero-sum, which means

one competitor wins at the cost of another; and second, that elite sport is uniquely placed to both suffer economic and notional harms from the use of enhancements, while also enjoying the ability to regulate them. This highlights the relevance of the existence of significant stakes in the competition as a precursor to regulatory impetus, as well as the availability of resources to implement the regulatory action.

The next chapter consolidates the equality-informed model to regulating enhancement, and then applies it to the use of cognitive enhancements in the education context. I now turn to this.

CHAPTER SIX

REGULATING THE USE OF ENHANCEMENTS IN COMPETITIVE SCENARIOS USING THE EQUALITY INFORMED MODEL

INTRODUCTION

This thesis set out to cast light on the equality harms of the use of HET and the ensuing regulatory concerns. Though the thesis described and engaged with four equality harms at length, it is ultimately focussed at providing a robust framework for regulating the most immediate of these harms: unfairness in competitive scenarios.

Each of the foregoing Chapters served as a building block towards devising and testing the regulatory framework that will be consolidated in this Chapter. In Chapter Two, I argued that new technology may precipitate *sui generis* regulatory intervention when it results in harms that cannot be addressed by existing generic laws. Chapter Three noted that while existing laws can be applicable to certain harms of HET on a case-to-case basis, they fail to capture the harm of unfairness in competitive scenarios. Chapter Four explored equality law in international human rights law as a further source of generic law which can preclude *sui generis* regulatory intervention. I found that IHRL too is deficient in its ability to address the concern with unfairness in competitive scenarios.

Having thus concluded that existing law is insufficient to address the unfairness in competitive scenarios arising from the use of enhancements, and that *sui generis* regulation is needed, this Chapter proposes and tests the equality-informed regulatory model.

It proceeds as follows: **Section I** summarises the equality-informed model for the regulation of the use of enhancements in competitive scenarios. It consists of two phases, each entailing a unique line of enquiry. **Section II** then sketches three hypotheticals set within University context. Education serves as a viable context to test the equality-informed model for regulating enhancement and to crystallise how it can work in practice, as it lacks targeted regulation for cognitive enhancement despite reported use across universities. Section II tests the first phase of the regulatory model. **Section III** tests the second phase of the regulatory model, derives results, and makes a concrete regulatory suggestion for private ordering. **Section IV** argues that even though equality cannot serve as a regulatory norm for HET at present, it has potential as a source of future law.

I. SUMMARISING THE EQUALITY-INFORMED MODEL FOR THE REGULATION OF ENHANCEMENTS IN COMPETITIVE SCENARIOS

In Chapter Three I argued why there is a need to regulate enhancements in competitive scenarios. To summarise, it is because enhancements take away from the merit of the competitor as they reduce effort, and therefore reduce the deservingness of the socio-economic benefits awarded. Further, access to enhancements, which are positional goods, is dependent on existing wealth. This means that the use of enhancements to win in competitive scenarios further entrenches socio-economic inequality.

In order for such a scenario to arise, three conditions must be fulfilled: the existence of competition between at least two competitors; the use of positional enhancements by at least one competitor; and socio-economic rewards for the winner of the competition (due to which there is a risk of further entrenchment of socio-economic inequality, if the competitor with greater means uses positional enhancement to win the competition). This inspires the design of the **first phase** of the model, which is dedicated to answering whether there is a *prima facie* case for regulation. In order to do so, it asks the following: (1) whether the situation or context in question is competitive; (2) whether the winner receives socio-economic benefits; (3) whether the enhancements used by competitors are positional; (4) and where the enhancement falls within the variable degree spectrum definition.

The fourth question in the first phase of the model taps into the benefits of the 'variable-degree spectrum' definition of HET proposed in Chapter One, which accounts for the qualitative differences in diverse forms of HET. The model can determine, with the help of the definition, how invasive, significant and effective the enhancement is and thereby how much effort it displaces on the part of the competitor.

If the finding of the first phase is that there *is* a *prima facie* case for regulation, the **second phase** entails a delicate and balanced consideration of various factors: timing the regulatory intervention; stakeholders who should be involved in the process; regard for distributive justice; and the form that the regulatory intervention should take and the institution that creates it. These factors help determine the particulars of the regulatory intervention.

The following is a representation of the model in the format of a flow chart:

PHASE ONE: IS THERE A *PRIMA FACIE* CASE FOR REGULATION?

STEP 1 → IS THE CONTEXT COMPETITIVE?

NO YES

(end)

STEP 2 → DOES THE WINNER RECEIVE SOCIO-ECONOMIC BENEFITS?

NO YES

(end)

STEP 3 → IS THE ENHANCEMENT POSTIONAL?

NO YES

(end)

STEP 4 → WHERE DOES THE ENHANCEMENT FALL IN THE VARIABLE-DEGREE SPECTRUM DEFINITION?

DEGREE I DEGREE II DEGREE III

IS THERE, THEREFORE, A *PRIMA FACIE* CASE FOR REGULATION?

DEGREE I	DEGREE II	DEGREE III
NO	YES	YES
(end)	(move on to Phase Two)	

PHASE TWO: WHAT SHOULD THE REGULATORY FRAMEWORK LOOK LIKE, KEEPING IN MIND THE REGULATORY FACTORS:

Timing Stakeholder involvement Distributive justice Form and institution

I now turn to applying this model to a set of hypotheticals set in a University context.

II. THE USE OF ENHANCEMENTS IN EDUCATIONAL INSTITUTIONS

Consider this hypothetical:

Mary and Lily are neck-to-neck competitors at an esteemed law University in the UK. The person who secures rank 1 typically gets an offer to join Marvel

Chambers, where compensation is in the country's top 5% of all starting compensation packages. Unfortunately, the material to be studied and memorised for the examinations runs into several hundred pages. Mary and Lily are always looking for ways to improve their focus and memory. Lily belongs to a low-income family that has been living on benefits. She received financial support to pay her fees but works part-time to support her living expenses. Mary belongs to a wealthy family and has studied in privately funded schools.

The UK prides itself on being a country that promotes equality and seeks to eradicate discrimination. The University too prides itself on admitting individuals irrespective of their financial background and seeks to make financial assistance available to as many lower-income category students as possible. It has a code of ethics for the examinations, which prohibits students from cheating through plagiarism or making someone else write their take-home exams but does not mention the use of coffee, smart drugs, or brain chips.

Scenario 1 (‘Coffee hypothetical’): Coffee is a popular drink among students at the University. It is sold in the University food hall, cafés in the city, and is available at supermarkets. Lily and Mary regularly consume coffee to improve their attention when they are studying. While Lily prefers to buy ground coffee from the supermarket and drink it before she heads out to class, Mary exercises great financial freedom due to a generous allowance from her wealthy parents and drinks barista-prepared coffee at her favourite café near the library. Mary comes out on top of the class at the final exams and receives an offer from Marvel Chambers.

Scenario 2 (‘Ritalin hypothetical’): There is a black market for cognitive enhancement drugs in the University. It is possible to buy Ritalin (a controlled drug prescribed to individuals with ADHD) without a prescription. A pack of 30 pills costs £200. Given her student loans, Lily cannot afford this. Mary, however, uses her generous allowance from her wealthy parents to use Ritalin. This enables her to outperform Lily and receive an offer from Marvel Chambers.

Scenario 3 (‘Brain chip hypothetical’): A new product, called a ‘brain chip’ has been launched in the biotechnological devices market.[555] It allows individuals to expand their memory and store information. It costs £85,000[556] and can be used for a lifetime. Mary borrows from her wealthy parents and gets the chip implanted. This enables her to outperform Lily and receive an offer from Marvel Chambers.

I now answer the questions posed by the model in the context of the above scenarios.

STEP 1: Is the scenario described competitive?

In all three hypotheticals, Mary and Lily are competing to achieve the same outcome: a job at Marvel Chambers. The answer to this question is therefore ‘yes’, which takes us to step 2.

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[555] Sumeet Walia and Taimur Ahmed, ‘An Electronic Chip That Makes “Memories” Is a Step towards Creating Bionic Brains’ (*The Conversation*, 16 July 2019) <http://theconversation.com/an-electronic-chip-that-makes-memories-is-a-step-towards-creating-bionic-brains-119741> accessed 3 July 2024.

[556] New Telegraph and Telegraph-Admin, ‘Tech Startup To Launch $100,000 Neural Implant In Humans - New Telegraph’ (27 June 2024) <https://newtelegraphng.com/tech-startup-to-launch-100000-neural-implant-in-humans/, https://newtelegraphng.com/tech-startup-to-launch-100000-neural-implant-in-humans/> accessed 3 July 2024.

STEP 2: Does the winner receive socio-economic benefits?

As discussed in Chapter Two, education directly translates to higher socioeconomic power. To summarise briefly, the gap between median earnings for people with a high school diploma and those with a college degree was $17,411 for men and $12,887 for women in 1979; by 2012 it had risen to $34,969 and $23,280. While this data is specific to US, the available data for 21 other economies, including Sweden, Norway, Spain, France, Germany, Netherlands, Japan, Canada, UK shows substantial rewards in the labour market for cognitive skills gained through college education.[557]

Indeed, education is recognized as a powerful lever to pull children out of poverty and empower them.[558] Getting a college degree is one aspect, but competition with one's peers within the degree cohort can also similarly result in important socio-economic outcomes. Students compete for limited jobs no matter which discipline or stage of education they belong to.

The answer to this question in the context of each of the hypotheticals is therefore 'yes'. This takes us to step 3.

Step 3: Is the enhancement positional?

As discussed in Chapter Three, positional goods are goods whose value to their possessor depends, at least in part, on how much they possess in comparison to others. This means that what makes them positional, or advantageous, is that others don't have them or have less of them.

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[557] Autor (n 156).

[558] Kishore Singh and UN Human Rights Council Special Rapporteur on the Right to Education, 'Report of the Special Rapporteur on the Right to Education, Kishore Singh: Addendum' Paragraph 46 <https://digitallibrary.un.org/record/799263> accessed 3 July 2024.

In the Ritalin hypothetical, the price of the smart drug is noted to be £200 for 30 pills. An average University student in the UK spends £1000-1300 on living costs per month. This includes £700-900 for accommodation; £250-350 on groceries and eating out; and the rest on public transportation and bills. An average student would not have the ability to pay £200 for a smart drug. Similarly, the estimated cost of implanting a brain chip, noted to be £85,000 in the hypothetical is almost equivalent to the cost of getting an entire degree in the UK.[559] On the other hand, coffee is now readily available and affordable for most students – whether consumed in the more expensive forms such as barista-made drinks in cafés or the relatively cheap forms such as home-made coffee using powders available in the supermarket. While the former would cost £4 per consumption, the latter can cost as little as £0.20 per consumption.

Thus, both cognitive enhancers and brain chips are positional goods, meaning that they 'confer substantial advantages on their possessors relative to others within the context of social competition for scarce and valued positions and other desired goods'.[560] Using enhancements to assist with a competitive exam directly disadvantages every other competitor, and this disadvantage is particularly significant when career or financial success is at stake.[561] Only a few wealthy students, such as Mary, will have the ability to purchase and use these goods.

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[559] 'Cost of Studying in the UK | Study UK' <https://study-uk.britishcouncil.org/moving-uk/cost-studying> accessed 3 July 2024.

[560] Reinhard Merkel and others, *Intervening in the Brain. Changing Psyche and Society*, vol 29 (2007).

[561] Goodman (n 267) 149.

This means that the analysis for the 'coffee hypothetical' ends here, while the analysis for the 'Ritalin hypothetical' and 'brain chip hypothetical' moves on to Step 4.

Step 4: Where does the enhancement fall on the variable-degree spectrum?

Revisiting the variable degree spectrum approach proposed in Chapter One:

The 'variable-degree spectrum' model lays out the whole spectrum of improvement, treatment and enhancement, and separates it into degrees such as:

Non-enhancements:

c. Systems, practices, and non-integrated objects that improve functioning (**improvement**)
    - Education, meditation, binoculars

d. Therapeutic bodily intervention that improves functioning up to species-typical functioning (**treatment**)
    - Supplements like calcium, vitamin B12
    - Pacemakers
    - Genetic intervention that eliminates Hunter disease

Degree I Enhancements: Non-therapeutic bodily intervention that improves functioning up to species-typical level

c. Temporarily
    - Coffee

- Nutritious diet

d. Permanently

- Growth hormones taken during adolescence

Degree II Enhancements or superhuman enhancements: Therapeutic or non-therapeutic bodily intervention that improves functioning beyond species-typical but below species-maximum level

- A disabled athlete's bionic limbs that allow her to run faster than an able-bodied athlete
- Muscle implant that allows an athlete to run as fast as Usain Bolt

Degree III Enhancements or posthuman enhancements: Therapeutic or non-therapeutic bodily-intervention that improves functioning beyond species-maximum

- Tiger Woods' 20/15 vision after eye-surgery
- Genetic intervention that bestows X-ray vision
- Brain chips that expand memory, processing ability

Although we already know that there is no *prima facie* case for regulation in the coffee hypothetical, I nonetheless consider it at this stage for demonstrative purposes. As per this definition, **coffee** is a degree I enhancement as it is a non-

therapeutic intervention that *temporarily* improves attention or focus up to the species-typical level. Coffee, due to the caffeine it contains, is proven to facilitate several aspects of cognitive activity.[562] It can enhance the ability to concentrate and focus attention, short-term term-memory, and problem-solving, among others.[563] Nonetheless, these effects are neither pervasive nor permanent. Typically, the effects of the caffeine remain until 6 hours after consumption, and it clears out from the bloodstream within 10-12 hours.[564]

Smart drugs like Ritalin or Modafinil are degree II enhancements because they improve attention, focus or other cognitive capacity beyond species-typical but below species maximum level. They work by introducing chemicals in the body that increase two neurotransmitters—dopamine (linked to pleasure systems and alertness) and norepinephrine (linked to attention) in the brain. In a healthy person, these increase energy and concentration.[565] Students and professionals who have used these stimulants report significantly improved focus and concentration,[566] beyond what is species-typical. One consumer described Adderall as a career transformer: 'I'm talking about being able to take on twice the responsibility, work twice as fast, write more effectively, manage better, be

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[562] J Snel, *Coffee, Caffeine and Good Thinking* (2002).

[563] Michael J Glade, 'Caffeine—Not Just a Stimulant' (2010) 26 Nutrition 932.

[564] Institute of Medicine (US) Committee on Military Nutrition Research, 'Pharmacology of Caffeine', *Caffeine for the Sustainment of Mental Task Performance: Formulations for Military Operations* (National Academies Press (US) 2001) <https://www.ncbi.nlm.nih.gov/books/NBK223808/> accessed 3 July 2024.

[565] Kelline Linton, 'Scholastic Steroids: Is Generation Rx Cognitively Cheating?' (2012) 39 Pepperdine Law Review 1002 <https://digitalcommons.pepperdine.edu/plr/vol39/iss4/5>.

[566] James Pavisian, 'The Case for Human Ingenuity: How Adderall Has Sullied the Game Note' (2008) 48 Washburn Law Journal 175; Talbot (n 265).

more attentive, devise better and more creative strategies.'[567] One medical student said it was impossible to juggle both academics and a social life without stimulant use—'The only people who get through the (med school) program I'm in either use stimulants or have no social life whatsoever. There is no other way.'[568]

Provigil is another smart drug. It boosts dopamine levels and blocks dopamine transporters within the brain, which keeps individuals awake and alert. It has been described as a pill that promotes vigilance, and 'is a nap in the form of a pill' which can leave its users refreshed and alert despite hours or even days of wakefulness.[569] One psychologist, who works at Cambridge University and writes about the ethics of cognitive enhancement, stated that her first Provigil session allowed her to intensely 'work at her computer for hours straight.'[570] One study demonstrated that test subjects who took Provigil were able to concentrate on a specific task 'for as long as fifty-four consecutive hours.'[571]

By releasing or boosting dopamine or norepinephrine in the brain, smart drugs eliminate the effort to keep oneself awake, alert, or even motivated. In turn, they improve focus, attention span, processing power, and other cognitive functions. These effects are significantly more profound than those of caffeine.[572] They also tend to last longer (one study concluded that methylphenidate – found

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[567] Carey (n 266).

[568] Linton (n 562) 1004.

[569] Andrew Pollack, 'A Biotech Outcast Awakens' *The New York Times* (20 October 2002) <https://www.nytimes.com/2002/10/20/business/a-biotech-outcast-awakens.html> accessed 3 July 2024; Baranski and others (n 269).

[570] 'They're Bulking up Mentally' (*Los Angeles Times*, 20 December 2007) <https://www.latimes.com/archives/la-xpm-2007-dec-20-sci-braindoping20-story.html> accessed 3 July 2024.

[571] Henry T Greely, 'Disabilities, Enhancements, and the Meanings of Sports' (13 February 2004) <https://papers.ssrn.com/abstract=503202> accessed 3 July 2024.

in Modafinil – had positive effects on self-reported fatigue as well as on declarative memory 24 hours after learning).[573] Nonetheless, these effects wear off and therefore are neither pervasive nor permanent. In that sense, they are not beyond the species-maximum level as there can be a human being gifted with the capacity to work as much on an everyday basis.

A **brain chip** is a degree III enhancement that improves cognitive capacity beyond the species maximum level. It is a device that is implanted into a person's brain and works like an electrode to read the electrical signals that the brain cells are sending each other. In a neurologically impaired individual, the communication between the brain cells corresponding to various parts of the body may be broken down—for example, due to an injury to the spine. In such a scenario, the brain chip would be able to receive the signals being transmitted, but not received by another brain or nerve cell. In turn, these signals can be translated into action.[574]

Whilst these products are being developed with the primary treatment function in mind, the same technology will evolve for an enhancement function. This is not science fiction—clinical trials are being held by several companies and one has already successfully implanted it in a human.[575] In the future, it is envisaged that these brain chips can also be used by perfectly healthy individuals

[572] RD Huestis, LE Arnold and DJ Smeltzer, 'Caffeine versus Methylphenidate and D-Amphetamine in Minimal Brain Dysfunction: A Double-Blind Comparison' (1975) 132 The American Journal of Psychiatry 868.

[573] Dimitris Repantis and others, 'Cognitive Enhancement Effects of Stimulants: A Randomized Controlled Trial Testing Methylphenidate, Modafinil, and Caffeine' (2021) 238 Psychopharmacology 441.

[574] Capitol Technology University 11301 Springfield Road Laurel and Md 20708 888.522.7486, 'Neuralink's Brain Chip: How It Works and What It Means | Capitol Technology University' <https://www.captechu.edu/blog/neuralinks-brain-chip-how-it-works-and-what-it-means> accessed 3 July 2024.

(demonstrating the treatment-enhancement distinction). Elon Musk, who is a co-founder of the company Neuralink which develops one such brain chip has claimed publicly that the long-term goal is human/AI symbiosis.[576] Other companies that compete with Neuralink for this market include Sychron and Paradromics.[577] The latter has released its therapeutic in the market for $100,000.[578]

Brain chips can potentially usurp a given function of the brain. Here, the need for memorising study material through repetition, revision and active recall is eliminated. Of course, the effort required to write the exam and pull disparate parts of information together is still in play, but the reduction is more significant and therefore more morally relevant than the reduction in effort caused by cognitive enhancement drugs. The law already engages in treating harms by degree: for instance, someone's arm brushing against mine whilst going past may attract no penalty but striking me with force would. Further, the effects are pervasive and permanent as the chip would remain embedded in the brain forever (or until removed using surgery). It is difficult to imagine a living human having the same abilities that a brain chip can impart. For this reason, they are placed in the beyond 'species maximum' category.

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[575] Simmone Shah, 'How Implanted Brain Chips Like Neuralink Could Change Our Lives' (*TIME*, 30 January 2024) <https://time.com/6590258/nueralink-brain-implant-chip-first-human/> accessed 3 July 2024.

[576] Michelle Mark, 'Elon Musk's Neuralink Brain Implant to Ultimately Help Humans Merge with AI Is Sparking Debate over Safety and Ethics' (*Business Insider*) <https://www.businessinsider.com/neuralink> accessed 3 July 2024.

[577] 'Top Neuralink Alternatives, Competitors' <https://www.cbinsights.com/company/neuralink/alternatives-competitors> accessed 3 July 2024.

[578] Maria Gomez De Sicart Garratt Cristy, 'Neuralink Competitor Paradromics Gears up to Test Its Brain Implant on Humans' (*CNBC*, 21 June 2024) <https://www.cnbc.com/2024/06/21/paradromics-gears-up-to-test-its-brain-implant-on-humans.html> accessed 3 July 2024.

Having ascertained which degree of the variable-degree-spectrum definition each of the enhancements fall in, we move on to asking, '**is there, therefore, a *prima facie* case for regulation?'.** I answer this question for each hypothetical now.

i. Coffee hypothetical

Since coffee is not a positional enhancement, it has already been concluded that there isn't a *prima facie* case for regulation in this scenario.

- **Smart drugs**

Being Degree II enhancements with relatively longer and more impactful effects on cognitive activity, there is a *prima facie* case for regulation.

- **Brain chip**

Brain chips are degree III enhancements which can improve the capacity of the brain beyond the species maximum by eliminating the need for the usual cognitive activities, such as repetition, revision and active recall. The effects are pervasive and permanent as the chip would remain embedded in the brain forever (or until removed using surgery). Therefore, there is a *prima facie* case for regulation.

In this manner, phase one of the equality-informed model for regulating enhancement in competitive scenarios has helped reason and determine which enhancements *prima facie* merit a regulatory response when being used by students in the context of University education. The question that now arises is what the appropriate regulatory intervention should look like. Phase two of the model helps answer this, to which I turn now.

III. APPROPRIATE REGULATORY INTERVENTION

Phase two of the model requires a consideration of the various regulatory factors, including timing, stakeholder involvement, the concern for distributive justice, and the form of the regulatory intervention as well as the institution enforcing it. Having concluded in the previous section that there is a *prima facie* case for regulatory intervention when it comes to the use of smart drugs and brain chips, I now discuss what the regulatory intervention may look like. Upon consideration of the regulatory factors, I argue that private ordering within the University is the most effective regulatory intervention.

A. Regulatory factors

i. Timing the regulatory intervention

A look at the timing of regulatory intervention in previous technologies indicated that regulation was attempted early where the technology involved commercial exploitation of shared public resources or scarce resources. In other cases, regulation tended to be post-facto. Contrasting the regulation of radio and spectrum with that of the telephone demonstrated this. Whereas with radio there was a limited supply of spectrum and as a result a regulatory intervention at the approval stage, with telephone the same scarcity was not an issue, resulting in regulation post commercial exploitation. [579]

It also stood out that regulators are motivated to intervene at an early stage if there are public safety or security concerns. While prior approval of pharmaceutical products and medical devices has been a vital part of their

[579] Black and Murray (n 99) 2–3.

commercial development cycle, the internet received no early regulatory oversight due to a lack of obvious safety concerns.[580]

Thus, unless there is a concern regarding the exploitation of scare common resources or risks to public health and safety, governments prefer to defer regulation for as long as possible. In other words, unless the harms are evident, it might seem counterproductive to limit innovation. Yet, some form of early regulation, even if it is bare-bones and subject to evolution as the harms become more evident, is better than harms spinning out of control by the time that regulation arrives, as in the case of the internet. The advantage of early regulation would be the lower costs of influencing the sociotechnical practices which are still relatively flexible.[581]

In the present scenario involving undergraduate students using various forms of enhancements in order to secure academic advantage, there is neither a concern regarding the exploitation of scarce common resources, nor a clear risk to public health and safety. Thus, the safest approach is to have bare-bones regulatory intervention that may not be at the level of the government.

ii. Stakeholder involvement

Stakeholder involvement and participation through dialogue and deliberation is crucial when it comes to the regulation of technology. This is because a few may have a monopoly on the information that regulators are using to make decisions,

[580] Black and Murray (n 99).

[581] Huber (n 97).

and the powerful players may urge rules that benefit the industry at the expense of 'possibly as-yet-unknown others'.[582]

This suggests that in the present scenario, any bare-bone regulation would benefit from engagement with individuals who may be affected, including students, Professors, and healthcare individuals.

iii. Distributive justice

In Chapter Two, I argued that the economic data taken together with the concrete examples of how technology contributes to and exacerbates inequality justify why distributive justice should be treated as an important factor in designing the regulation of technology. This is particularly the case for technology that has the potential to adversely impact socio-economic relations.

To summarise briefly, between 1995 and 2021, the top 1% in the world captured 38% of the global increase in wealth, while the bottom 50% captured a frightening 2%.[583] Since 1995, the share of global wealth possessed by billionaires has risen from 1% to over 3%, which was exacerbated by the COVID pandemic. Contemporary global inequalities are close to early 20th century levels, at the peak of Western imperialism, and accumulated wealth, much of it inherited, is returning to relative levels not seen since before the First World War. [584]

This growing inequality is owed significantly to technology. Manufacturing has experienced a decline due to substitution of humans by technology. As opposed to the trends in declining manufacturing jobs and

[582] Moses (n 110).

[583] Chancel and others (n 147) 3.

[584] Rotman (n 154).

declining earnings of individuals without college degrees, the more educated workers performing non-routine cognitive tasks have improved their earnings because automation technology complements their skills.[585] However, it is not just that automation decelerates opportunities for those without a college degree; rather, technology-driven economy amplifies the talent and rewards of a small group of successful individuals.[586]

Given this, there is dramatic growth in the wage premium associated with higher education and cognitive ability.[587] In the context of growing income inequality, this means that education is no longer 'the great equalizer', because educational attainment is highly persistent within families. Studies in the USA and UK show that the admission criteria used by elite universities closely follow social class, as do objective indicators such as SAT scores.[588] This should not be too surprising given that some start their SAT test prep as early as the age of 12, with access to personal tutors and specialised college consultants.[589] Furthermore, access to and accomplishment within universities are critically affected by social circumstances and background, making it much harder for those from modest backgrounds and uneducated parents to compete with their more affluent peers.[590] Thus education is a field where the use of any technology that can further exacerbate socio-economic inequality should be taken seriously.

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[585] Guo (n 171).

[586] Rotman (n 154).

[587] Autor (n 156).

[588] Guinier (n 160); Pearlstein (n 160).

[589] Zimdars (n 161).

[590] Harel Ben-Shahar (n 159).

It is possible to incorporate the concern for distributive justice in the design, deployment, and distribution of technology. Cozzens writes that at the level of programs or policies, the task can be carried out by targeting innovation activities to disadvantaged groups, by using public procurement to direct innovation toward their needs, or by setting regulatory conditions that protect them.[591]

In the present context of a University, enhancement technology deserves urgent regulatory attention in order to arrest the growing concern with the generational wealth gap. The discussion of distributive justice as a factor in the regulation of enhancements at the University level tilts the balance in favour of active regulatory action rather than waiting for greater harms to manifest.

iv. Form, institutions, and enforcement

From the discussion in Chapter Two, it emerged that there is a good case for new technology should be regulated through soft law such as principles, or private ordering. These may replace governmentally designed regulations for new technology in the short term or assist such government regulations in the long term. It was also discussed in Chapter Two that a mix of regulatory strategies can help by triggering different obligations upon the regulate, as well as by resulting in a more rounded approach to enforcement. Further, in the case of self-regulation or private ordering, there is the benefit of greater flexibility and ability to adapt based on the behaviour and motivations of the persons being regulated.

[591] Cozzens (n 195) 93.

Simultaneously, private ordering doesn't preclude the need for eventual overarching legal frameworks devised by the government.

Since the present scenario concerns Universities which have existing disciplinary and other internal frameworks, private ordering or self-regulation stands out as a preferable approach, especially as part of a regulatory mix. I now elaborate the form that private ordering can take in Mary and Lily's University to regulate the use of smart drugs and brain chips.

B. Private ordering

Private ordering has a lengthy historical precedent.[592] Two general sets of conditions give rise to the need for private ordering: First, when the unavailability of state-sponsored mechanisms such as Courts results in a need for private rules and private forms of enforcement. Second, and more relevantly, where state-sponsored enforcement mechanisms are available, but private rules and enforcement are preferable due to the nature of the parties, commitments, and other circumstances.[593] Reducing the public cost of regulation is another reason for the preference given to private ordering in many circumstances.[594]

Private ordering can take the form where (a) rules are originated by private actors but put into force by sovereign governments, (b) rules are originated and put into force by private actors as a result of governmental delegation (for

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[592] Gillian K Hadfield, 'Privatizing Commercial Law' (18 April 2001) 40, 41 <https://papers.ssrn.com/abstract=267246> accessed 3 July 2024.

[593] Barak D Richman, 'Firms, Courts, and Reputation Mechanisms: Towards a Positive Theory of Private Ordering' (19 July 2004) <https://papers.ssrn.com/abstract=565464> accessed 27 June 2024.

[594] Steven Schwarcz, 'Private Ordering' (2002) 97 Northwestern University Law Review 319; Hadfield (n 590).

example, credit rating institution Moody's in the United States), and (c) rules are adopted by private actors without government sanction or enforcement.[595]

Sport is a good example where private actors generally develop and enforce the rules of professional leagues. These rules govern the game and how the teams and players interact, subject to additional regulation under criminal law and other overarching legal regimes.[596] Examples include FIFA (Fédération Internationale de Football Association or International Federation of Association Football), the International Olympic Committee, the World Anti-Doping Agency, and the Board of Cricket Control in India (BCCI) which controls and governs the mammoth revenue-generating Indian Premier League (IPL).

The upsides of private ordering in contexts like education and sport are many. First, decision-makers in these private institutions usually include persons who have been directly involved in the arena for many years. As a result, they know the intricate internal rules and norms of behaviour which aid the rule-setting process. For instance, the Word Anti-Doping Agency's governance structure is composed of a Foundation Board (which is the Agency's highest policy-making body), the Executive Committee (to which the Board delegates the management and running of the Agency), five permanent special committees, three standing committees, ten expert advisory groups and eleven working groups. Approximately one-third of the Foundation Board comprises active or former international-level athletes. Additionally, a minimum of one seat is reserved for an

[595] Schwarcz (n 592) 324.

[596] Richman (n 591) 213.

athlete representation in all the Standing Committees. [597] In 2023, the WADA Athlete Council was created, which is comprised of and chosen entirely by athletes.[598] Second, private ordering can afford quicker consultations with stakeholders and feedback mechanisms.

Third, internal disciplinary or penalty mechanisms can keep the machinery running without state interference or cost to the state. Fourth, the institution can make informed decisions about the stakes in the competition as well as its resource-capacity for regulating the use of enhancement. This is important because analysis in Chapter Five showed that elite sport is uniquely placed to both suffer economic and notional harms from the use of enhancements, while also enjoying the ability to regulate them. This highlighted the relevance of the existence of significant stakes in the competition as a precursor to regulatory impetus, as well as the availability of resources to implement the regulatory action.

Thus, at the level of an institution of higher learning such as a University, private ordering to regulate enhancements in competitive scenarios may translate to one or many of the following:

- An internal committee comprised of the Head of the institution (whether Headmaster, Principal, Dean, or Vice Chancellor), teachers/Professors, healthcare in-charge, and student representatives who can provide

[597] 'Governance' (*World Anti Doping Agency*) <https://www.wada-ama.org/en/who-we-are/governance> accessed 3 July 2024.

[598] 'Athlete Council' (*World Anti Doping Agency*) <https://www.wada-ama.org/en/athletes-support-personnel/athlete-engagement/athlete-council> accessed 3 July 2024.

important inputs on the kinds of enhancements available to students (whether legally or on the black market)

- Student contracts that incorporate a clause prohibiting the use of enhancements and require consent in the case of randomised drug testing.
- Orientations for first-year students about the unfairness of using enhancements, and regular reminders thereafter.
- Randomised drug testing, reasonably administered in accordance with the description provided in the student contract. Notably, the resource capacity of the private institution is relevant here. A chess Olympiad may be better placed to carry out checks and levy fines than a high school.
- Transcript asterisking[599] which can indicate that the grade is a result of cognitive enhancement using smart drugs.
- Suspension for using degree III enhancements such as brain chips.
- Consultations with other educational institutions about best practices.

Such regulatory form skips investment and effort from the government, which does not have sufficient incentive to regulate since neither public resource nor public health & safety are at issue. It incorporates the feedback and ideas of various stakeholders and ensures participation and deliberation. It taps into existing University structures, whilst also incorporating the concern for distributive justice. Tapping into existing structures, which is also the logic behind the success of self-regulation in some contexts, means that gathering information about non-compliant behaviour and being alert to new methods of avoiding the rules or concealing non-compliance or 'invisible' black market activity, is easier. Further, the range of enforcement mechanisms and compliance-seeking strategies

[599] Linton (n 563) 1043.

highlighted above accord with the pyramid of responsive regulation devised by Ayres and Braithwaite.[600]

Indeed, despite the widespread, frequent, and growing use of enhancements across educational institutions, Universities' policies do not reflect this at the moment. According to a comprehensive literature review of academic integrity articles by Macfarlane et al,[601] academic misconduct and cheating are still understood in terms of traditional methods of cheating such as plagiarism, inappropriate assistance with coursework, and fraudulent activities during exams, with no reference to CEDs.[602] One exception is Duke University, where the 'unauthorised use of prescription medication to enhance academic performance' is a form of cheating.[603] One may argue that this prohibition or regulation would be ineffective because it will not eradicate the practice of using enhancements. However, even while prohibition is usually ineffective, it is not a sufficient reason

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[600] Ayres, Braithwaite and Wilks (n 118).

[601] Bruce Macfarlane, Jingjing Zhang and Annie Pun, 'Academic Integrity: A Review of the Literature' (2014) 39 Studies in Higher Education 339.

[602] Aikins (n 17).

[603] 'Academic Dishonesty' (*Duke University)* <https://asianmideast.duke.edu/academic-dishonesty> accessed 1 August 2024.

Cheating is the act of wrongfully using or attempting to use unauthorized materials, information, study aids, or the ideas or work of another in order to gain an unfair advantage. It includes, but is not limited to:

- plagiarism on any assignment;
- giving unauthorized aid to another student or receiving unauthorized aid from another person on tests, quizzes, assignments or examinations;
- using or consulting unauthorized materials or using unauthorized equipment or devices on tests, quizzes, assignments or examinations;
- altering or falsifying any information on tests, quizzes, assignments or examinations;
- using any material portion of a paper or project to fulfill the requirements of more than one course unless the student has received prior faculty permission to do so;
- working on any examination, test, quiz or assignment outside of the time constraints imposed;
- **the unauthorized use of prescription medication to enhance academic performance;**
- submitting an altered examination or assignment to an instructor for re-grading; or
- failing to adhere to an instructor's specific directions with respect to the terms of academic integrity or academic honesty.

to not introduce it. For example, we prohibit murder even though we are ineffective at eradicating it.[604]

The final thing to note is that the use of enhancements even in such contexts needs to remain subject to and combined with other overarching laws, including important elements of public law. Of these, discrimination is the most important for our purpose. This is briefly addressed below.

C. Discrimination

As discussed in Chapter Three, Article 26 ICCPR protection against discrimination (which provides an open list of grounds and can include discrimination on an economic basis) can be triggered upon the violation of access to a substantive right on an equal basis. Indeed, the right to education is one of the substantive rights enumerated in the bill of rights.[605] This means that a state's failure to ensure equal access to educational opportunities based on a person's socio-economic status can result in the violation of Article 26. Further, in the 2022 UNGA Report of the Special Rapporteur on the right to education, Farida Shaheed notes 'Removing direct and indirect discrimination in education as well as de jure and de facto barriers are now well-established States obligations' and further that it is 'the requirement for States to go beyond prohibiting discrimination by ensuring that the principle of equal opportunity fully translates into a concrete reality.'[606]

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[604] Fox Swindells, 'Economic Inequality and Human Enhancement Technology' (2014) 7 Humana Mente 217.

[605] ICESCR, Art. 13.

[606] Singh and Education (n 556) Paragraph 46.

Judicial decisions in the field of education in many countries already reflect this. In 1997, the Constitutional Court of Colombia ruled that by excluding pupils on an economic basis, schools had violated their right to education.[607] Similarly, Indian jurisprudence emphasises the State's obligations relating to the right to education and the equality of educational opportunities. The Supreme Court has held: '…equality of opportunity for education and advancement across the nation is part of our founding faith and constitutional creed.'[608]

Access to education on an equal basis does not just mean gaining entry to an educational institution; it also translates to equal access to opportunities *during* education. This means that if a class of pupils are disadvantaged vis-à-vis another class of pupils on the basis of their socio-economic status, the protection for indirect discrimination can be triggered. For example, in the hypothetical above, if Lily and other classmates who are socio-economically incapable of buying smart drugs/brain chips lose out on employment opportunities whilst Mary and other socio-economically privileged classmates gain employment opportunities due to their consumption of smart drugs/brain chips, a case for indirect discrimination based on socio-economic status will be made out. Simultaneously, on a policy and legislative level, the need for socio-economic status as a ground of discrimination is increased.

The role of equality law when it comes to regulating enhancements does not end at the possibility of a discrimination claim. The next section argues why equality law has potential as a source for a future law on regulating HET.

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[607] Decision C-376/10 of the Colombian Constitutional Court.

[608] *Dr. Pradeep Jain Etc v Union of India and Ors*. 1984 AIR 1420.

IV. THE POTENTIAL OF EQUALITY AS A SOURCE FOR FUTURE LAW

In this section, I argue that equality provisions have the potential to serve as a source for appropriate future law for four reasons: first, equality law has been a source for addressing claims involving elements of accommodation and discrimination, which can assist in the regulation of HET; second, Conventions such as CERD and CEDAW demonstrate that existing human rights law can serve as the origin for more niche and developed frameworks to regulate particular concerns; third, human rights treaties are living instruments and their interpretation ought to transform with the demands of the current world; and finally, in any case, socio-economic access in the matter of technology that can multiply opportunity or stultify social mobility is an important value to be recognised, and such recognition would be of distinctive value. I address each of these in turn.

A. Equality can assist in issues related to accommodation and discrimination

The discussion in Chapter Five has demonstrated that while equality doesn't feature in the regulatory framework for the use of enhancements by sportspersons, it has been referred to in the cases.

For instance, Mr. Oscar Pistorius had argued that the IAAF Decision disqualifying him from participation due to the use of a prosthetic limb was in breach of IAAF's obligation of non-discrimination. His argument was that the IAAF did not search for an appropriate accommodation, as required by law for a disabled person, before finding him ineligible in all IAAF sanctioned events. He argued that the IAAF had denied him his fundamental human rights, including

equal access to Olympic principles and values.[609] It is interesting that an equality (or discrimination) argument was used by someone who wanted to use an enhancement, rather than by someone who was losing out due to the use of enhancement. The decision of the Panel with respect to this argument nonetheless provides some guidance.

The Panel stated that the Convention on the Rights of Persons with Disabilities was not engaged in the circumstances of this appeal. Citing Article 30.5 of the Convention, the Panel stated that the Contracting State was only obligated to encourage participation of persons with disabilities in mainstream sporting activities at all levels with a view to enabling them to participate on an *equal basis* to sporting activities. It noted (at paragraph 28):

> 28…if the Panel finds that Mr Pistorius' *Cheetah Flex-Foot* prostheses provide no advantage to Mr Pistorius, he will be able to compete on an equal basis with other athletes. If the Panel concludes that Mr Pistorius does gain an advantage, the Convention would not assist his case.

On this basis, the Panel rejected Mr Pistorius' submission based on unlawful discrimination. This shows that it would be difficult to succeed using an equality argument in order to access enhancement such that it results in an advantage over others.

The second argument grounded in equality that stands out is Ms. Caster Semenya's before the CAS. Ms. Semenya argued that DSD Regulations were discriminatory as they only targeted female athletes and were not necessary to preserve fair competition within the female category. CAS concluded that DSD Regulations were in fact discriminatory (in that they apply only to female athletes)

[609] *Oscar Pistorius v. International Association of Athletics Federations* CAS 2008/A/1480 (Court of Arbitration for Sport Appeals Division).

but such discrimination was a necessary, reasonable and proportionate means of achieving the legitimate objective of ensuring fair competition in female athletics.

Again, this is different from the equality arguments considered in Chapter Four. Here, the equality argument doesn't pertain to enhancement, but rather to the fact that a certain regulation is applied to only a certain category of individuals. Nonetheless, it demonstrates the potential of equality in IHRL to feature in regulatory contexts and to guide decisions about whether naturally occurring differences should be treated as enhancements. The fact that the Court held that the DSD Regulations *are* discriminatory, irrespective of the fact that they found them to be necessary (which I disagree with, as argued above) is telling.

This demonstrates that even if the content of equality is deficient in its ability to address the unfairness arising from the use of enhancements in competitive scenarios, it is nonetheless of service in addressing other claims related to the use of enhancements, including in competitive contexts.

B. Recent Conventions demonstrate IHRL' ability to serve as a source for developing appropriate law

Several human rights instruments that owe their origin to the rights-conversation started by the international bill of rights (UDHR, ICCPR, ICESCR) incorporate significantly higher human rights standards due to the recognised need to address a specific concern. This includes CEDAW, CERD and CRPD. These, although limited to more specific contexts, go further than the equality provisions in the

three categories discussed in Chapter Four and mandate special measures to achieve substantive equality.[610]

CEDAW, for instance, aims to achieve *de jure* and *de facto* equality between women and men[611] within the convention itself, as opposed to in the General Comments in the case of ICCPR and ICESCR. The CEDAW Committee has interpreted *de facto* equality as 'substantive equality'.[612] This implies *inter alia* that signatory states must achieve distributive equality and bring the socio-economic status of women at par with men. General Comment 25 emphasises that states must undertake concrete policies and programmes to accelerate *de facto* equality between men and women. Further, the Preamble of CEDAW recognises the intersectionality of the problem and acknowledges that women are worse off when they are also poor. The positive obligations it imposes on the states are wide-ranging and include the obligation to address prevailing gender-based stereotypes.

CERD requires states to take, in the social, economic, cultural and other fields, special and concrete measures to ensure the adequate development and protection of certain racial groups or individuals belonging to them, for the

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[610] CERD, Art. 2 and 4; UN Committee on the Elimination of Racial Discrimination (CERD), General Recommendation no. 32, The meaning and scope of special measures in the International Convention on the Elimination of All Forms [of] Racial Discrimination, 24 September 2009, CERD/C/GC/32.

[611] UN Committee on the Elimination of all forms of Discrimination Against Women, General Recommendation No. 25, on Article 4, para. 1, of the Convention on the Elimination of All Forms of Discrimination against Women, on temporary special measures, UN Doc. No. HRI/GEN/1/Rev.7. (2004), p. 282.

[612] ibid.

purpose of guaranteeing them the full and equal enjoyment of human rights and fundamental freedoms.[613]

The development of human rights for disabled persons is another example of how a particular concern, here the concern for social justice for the disabled, can inspire the development of tailored human rights law that goes beyond the scope of existing equality provisions. CRPD has various provisions which go beyond the equality mandate of the international bill of rights. As an example, take Article 27, which requires states to recognise the '…right to the opportunity to gain a living by work freely chosen or accepted in a labour market and work environment that is open, inclusive and accessible to persons with disabilities'. Such economic independence is crucial to a life of dignity and status equality for the disabled.[614]

In this context, Neil Hibbert's argument that human rights are increasingly becoming the primary political mechanism for addressing injustice, as seen in the distribution of opportunities for disabled persons to be full members of a political society,[615] is persuasive. He cites Amartya Sen, who too has argued that akin to principles of social justice, human rights frequently function as 'inspiration for legislation' and help to illuminate the 'legislative route' towards greater inclusion.[616] While human rights apply in specific and concrete institutional settings, they nonetheless feed into the overall structure of opportunities,

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[613] CERD, art. 2(2).

[614] UN General Assembly, Convention on the Rights of Persons with Disabilities: Resolution adopted by the General Assembly, 24 January 2007, A/RES/61/106.

[615] Neil Hibbert, 'Human Rights and Social Justice' (2017) 6 Laws 7, 6.

[616] Sen Amartya, *The Idea of Justice* (1st Edition, Penguin 2010).

including human rights in educational institutions, discrimination at work,[617] and rights relating to poverty alleviation. These rights address barriers of exclusion in particular institutional settings, while also affecting the general condition of opportunity in society[618] and therefore, make a positive contribution to social justice.[619]

This suggests that equality in IHRL can be a well from which further norms can spring and develop. Indeed, the fact that neither non-discrimination nor the socio-economic rights exhaust the ambit of equality means that there is a margin from which more nuanced understandings can emerge. Few decades back, it would have been difficult to imagine a convention dedicated to the equal rights of women, the disabled, or racial minorities. Yet, we have conventions dedicated to the welfare of all of these groups today, and each of these conventions not only builds upon the guarantees in the international bill of rights, but also provides thoughtful detail and expression to how those guarantees are to be achieved. The same is possible for the welfare of socio-economic minorities that are likely to face disadvantage in competitive scenarios due to lack of access to technology.

C. Human rights treaties are living instruments

The major human rights treaties were drawn up in the 1960's – which was an era pre-dating technologies including personal computers, mobile phones, satellite technology, the internet, human genome, as well as AI. This explains why they do

[617] ICCPR, art. 24 and 26; ICESCR, art. 2-5; CEDAW, part 1-3.

[618] Hibbert (n 613) 6.

[619] World Health Organisation, 'Social Justice and Human Rights as a Framework for addressing social determinants of health: Final Report of the Task Group on Equity, Equality and Human Rights' 25 (2016) <https://www.euro.who.int/__data/assets/pdf_file/0006/334356/HR-task-report.pdf> accessed 21 November 2022.

not explicitly address the contemporary concerns that technology has created and are limited in their ability to resolve them.[620] However, it has been observed that human rights treaties are living documents. For example, the ECtHR has stated on many occasions that the ECHR is to be seen as 'a living instrument which must be interpreted in the light of present-day conditions'.[621]

Adam Wiśniewski has argued that the Strasbourg Court's approach to treat the ECHR as a living instrument has allowed it to address a number of specific challenges resulting from the Internet.[622] He highlights that the Court is dealing with issues arising out of technological progress while giving its judgements on the basis of the Convention which is more than 70 years old now.[623] For example, in *ML and WW v Germany*,[624] concerning the availability of the applicants' criminal trial on the internet, the ECtHR interpreted freedom of expression in the context of the internet. It held that the public's interest in uninhibited access to Internet archives outweighed the interest of individuals in being forgotten on the Internet. Crucially, despite the specificity of Internet-related cases, the Court had decided the cases by applying the same general principles developed in its case law under Article 8, with respect to protection of privacy, and Article 10, with respect to freedom of expression.[625]

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[620] Brownsword and Goodwin (n 95) 227.

[621] *Tyrer v United Kingdom* 2 EHRR 1 p. 31.

[622] Adam Wiśniewski, 'The European Court of Human Rights and Internet-Related Cases' (2021) 26 Białostockie Studia Prawnicze 109.

[623] *Hurbain v Belgium*, application no. 57292/16 (in French), pp 125–133.

[624] *M.L. and W.W. v Germany*, application nos. 60798/10 and 65599/10.

[625] Wiśniewski (n 620) 131.

It has also been argued, however, that existing human rights treaties are ill-suited to address novel technological issues. For instance, Bart van der Sloot has argued that the human rights framework is cannot address the challenges posed by Big Data. Since data is processed on an aggregated level, civil society groups are better equipped to file a complaint as opposed to individuals. The interests at stake are not individual, but collective and societal.[626] When it is not the case that the surveillance activity impacts concrete individual human rights, the human rights framework may simply not be the most appropriate instrument to turn to. According to van der Sloot, when Courts do so, they overstretch their competence and change the nature of the ECHR from a human rights instrument to a document resembling a constitution.[627]

In the context of fairness and discrimination in machine learning, Reuben Binns suggests that there are various difficulties in trying to fit what appears to be algorithmic discrimination in the neat box of 'discrimination' due to challenges such as finding a wrongful mental state. Some of these difficulties are internal to the philosophical accounts of discrimination, and others stem from the dis-analogy between human and algorithmic decision-makers. He notes that a more general set of egalitarian norms might provide a better footing for a theory of algorithmic fairness.[628] Brownsword and Morag make a similar point about the unsuitability of the human rights framework to address all the challenges arising

[626] Bart van der Sloot, 'Is the Human Rights Framework Still Fit for the Big Data Era? A Discussion of the ECtHR's Case Law on Privacy Violations Arising from Surveillance Activities' in Serge Gutwirth, Ronald Leenes and Paul De Hert (eds), *Data Protection on the Move: Current Developments in ICT and Privacy/Data Protection* (Springer Netherlands 2016) <https://doi.org/10.1007/978-94-017-7376-8_15> accessed 30 October 2023.

[627] ibid 24.

[628] Reuben Binns, 'Fairness in Machine Learning: Lessons from Political Philosophy' [2021] Proceedings of Machine Learning Research 81:149-159, 2018 Conference on Fairness, Accountability, and Transparency <http://arxiv.org/abs/1712.03586> accessed 9 December 2021.

out of technology. In the context of the *Evans* case, which concerned the right to be a genetic parent, they observe:

> …This does not appear in the human rights catalogue, however, and thus Ms Evans's claim concerning the existential question of procreation was forced into another frame. Notions of privacy cannot capture, for example, the existential agony of barrenness… *Evans* represents a fascinating and ultimately tragic case of rights functioning as legal entitlements in a strictly regulatory way in contrast to the emancipatory claim that Ms Evans was making both for herself and the embryos against the reduction of their claims to a balancing of personal autonomy that was determined by the location of consent as the boundary. [629]

It is appropriate to conclude that the existing framework of human rights law can deal with some challenges emerging from technology, yet not others. This begs the question of how human rights, and in particular the right to equality may apply to HET. Indeed, we know that the content of the right to equality has changed with the emergence of new social realities, whether or not that is technology: for example, the concepts of direct and indirect discrimination have emerged slowly,[630] and the grounds of discrimination have expanded.[631]

This shows that as society evolves, it not only interacts with human rights norms, but also has the potential to nudge its development in one way or another. At present, following the analysis in Chapter Four, the content of equality law in IHRL cannot address the concern with the use of HET in competitive contexts. However, that does not eliminate the possibility of a wider construction of equality provisions by a Court when faced with this challenge, especially due to

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[629] Brownsword and Goodwin (n 95) 242.

[630] Christa Tobler, *Indirect Discrimination: A Case Study Into the Development of the Legal Concept of Indirect Discrimination Under EC Law* (Intersentia nv 2005).

[631] Dianne Pothier, 'Connecting Grounds of Discrimination to Real People's Real Experiences' (2001) 13 Canadian Journal of Women and the Law 37.

the nature of human rights instruments as living instruments. Indeed, as Brownsword and Morag write:

> This ability of human rights to outrun established definitions – the way in which human rights 'contain the seeds of their own excess' – is what enables human rights to continue to adapt to new social, political and economic situations and thus prevent an established definition of a particular right from becoming itself a source of injustice.[632]

D. Symbolic valence of rights and recognition of a value serves an important purpose

Sen has argued that human rights law is a result of the codification of moral or ethical rights. In turn, it is also the medium and tool for the enforcement of these rights. Taking this a step further, I argue that the recognition of a right or ethical value even if it is not realisable yet, serves an important purpose.

Indeed, many scholars have emphasised or independently made a similar claim as Sen. Sandhya Pahuja has argued that human rights are moral claims that exist outside of, and prior to, a positive legal order, and at the same time legal rights enshrined in positive law. This dualism means that human rights are more than simply the rights laid down in the various human rights catalogues at the national, regional or international level. Thiss gives human rights their 'symbolic valence'[633] Samantha Besson has written that human rights are a *sub-set* of universal moral rights that protect fundamental human interests. She quotes from Joseph Raz,[634] that 'a human right exists *qua* moral *right* when an interest is a sufficient ground or reason to hold someone else (the duty-bearer) under a

[632] Brownsword and Goodwin (n 95) 230.

[633] Sundhya Pahuja, 'Rights as Regulation: The Integration of Development and Human Rights', in Bronwen Morgan (ed.), *The Intersection of Rights and Regulation* (Aldershot: Ashgate, 2007), 168.

[634] J Raz, 'On the Nature of Rights' (1984) 93 Mind 194.

(categorical and exclusionary) duty to respect that interest against certain standard threats vis-à-vis the right-holder'.[635] Thus, human rights are moral interests that are recognised by the law as sufficiently important to generate duties.[636]

Due to its *legal* status, human rights law doesn't just arise from ethical, moral or political considerations, but also become a way of ensuring those considerations. Thus, human rights are not just the consequence of individuals' right to equality, but also a way of securing that equality. The human rights framework makes real the possibility of claiming one's political equality within the community.[637] Hannah Arendt wrote 'we are not born equal; we become equal as members of a group on the strength of our decision to guarantee ourselves mutually equal rights'.[638] Human rights are entitlements against public institutions, whether national, regional or international. It is through these legal duties on the part of public authorities that these interests are protected.[639]

While Sen agrees that human rights law embodies not only legal demands but also ethical demands,[640] he writes that enforcement through legislation is only *one* way in which the 'the ethical force of human rights' can be constructively deployed. For instance, even if economic and social rights cannot be realised

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[635] Besson, 'The Egalitarian Dimension of Human Rights' (n 414) 25.

[636] Joseph Raz, 'Human Rights in the Emerging World Order' (2010) 1 Transnational Legal Theory 31.

[637] Jean L Cohen, 'Rethinking Human Rights, Democracy, and Sovereignty in the Age of Globalization' (2008) 36 Political Theory 578.

[638] Hannah Arendt, 'The Decline of the Nation-State and the End of the Rights of Man', *The Origins of Totalitarianism* (Later Edition reprint, Penguin Classics 2017).

[639] Besson, 'The Egalitarian Dimension of Human Rights' (n 414) 37.

[640] Amartya Sen, 'Elements of a Theory of Human Rights' (2004) 32 Philosophy & Public Affairs 315.

because of inadequate institutionalisation, according to Sen, working for institutional expansion or reform can be part of the obligations generated by the *recognition* of these rights. Notably, 'current unrealizability of any accepted human right, which can be promoted through institutional or political change, does not, by itself, convert that claim into a non-right.'[641]

There is progress beyond recognition and towards codification when there is organised advocacy and active agitation urging compliance with these basic claims of all human beings. Equally, there is monitoring of violations of these rights and attempts to generate effective social pressure. Here, the example of monitoring and other activist support provided by organisations such as Human Rights Watch, Amnesty International, OXFAM and Médicins Sans Frontièrs becomes relevant.[642] Agents involved in such activism and agitation needn't themselves have a special legal status to be able to make a difference to political, social and administrative practice. They can do so through the use of existing laws, combined with seeking public disclosures and critical debates.

For example, the Pakistan Human Rights Commission is essentially an NGO (unlike its counterpart in India). Yet, Sen notes, it has been effective in identifying and resisting the violations of human rights, as well as in defending vulnerable persons including religious minorities and ill-treated women. Due to the importance of communication, advocacy, exposure and informed public

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[641] ibid.

[642] ibid 328, 343.

discussion, human rights can have influence without necessarily depending on coercive legislation,[643] ultimately leading to institutional expansion and reform.[644]

Finally, the presumption that recognised human rights must be wholly accomplishable is largely undefended. Even though it may not be feasible to realise many of the economic and social rights for all despite the best of efforts, they cannot be expelled from the domain of possible human rights. This view is also supported by Charles Beitz, who has argued that human rights play the role of a standard of aspiration for the reform of domestic institutions.[645] The objective, instead, is to work towards enhancing their realisation by working towards 'changing the prevailing circumstances to make the unrealised rights realizable, and ultimately, realized'. The status of these ethical claims should depend ultimately on whether they can survive in public reasoning: when they encounter unobstructed discussion and scrutiny, along with adequately wide informational availability.[646]

This takes on significant meaning in light of Article 28 of the Oviedo Convention, which provides that the 'fundamental questions raised by the developments of biology and medicine are the subject of appropriate public discussion in the light, in particular, of relevant medical, social, economic, ethical and legal implications…'.

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[643] ibid 345.

[644] ibid 348–349.

[645] Charles R Beitz, 'Human Rights as a Common Concern' (2001) 95 The American Political Science Review 269.

[646] Sen (n 638) 348–349.

Therefore, even if IHRL and equality provisions are not capable of addressing all the equality harms arising out of HET effectively at the moment, the very recognition of socio-economic inequality as a significant factor in the unfairness in competition created by the use of enhancements can serve as a starting point for public discussion and agitation. Indeed, if socio-economic equality and distributive justice were one of the central concerns when the body of human rights law first started developing and were deprioritised due to international politics and global events, current technological advancement at break-neck speed may be able to reverse the trend.

CONCLUSION

This Chapter proposed and tested the equality-informed regulatory model to address the unfairness in competitive scenarios arising from the use of enhancements, having concluded that existing law is insufficient to do so, and that *sui generis* regulation is needed.

Section I summarised the equality-informed model for the regulation of the use of enhancements in competitive scenarios. This model consists of two phases, each entailing a unique line of enquiry. The **first phase** of the model is dedicated to answering whether there is a *prima facie* case for regulation. It asks the following: (1) whether the situation or context in question is competitive; (2) whether the winner receives socio-economic benefits; (3) whether the enhancements used by competitors are positional; and (4) where the enhancement falls within the variable degree spectrum definition. If the finding of the first phase is that there *is* a *prima facie* case for regulation, the **second phase** entails a delicate and balanced consideration of various factors: timing the regulatory

intervention; stakeholders who should be involved in the process; regard for distributive justice; and the form that the regulatory intervention should take and the institution that creates it. These factors help determine the design of the regulatory intervention.

Section II sketched three hypotheticals set within University context, involving the use of three different forms of cognitive enhancements: coffee, smart drugs, and brain chips. Education serves as a viable context to test the equality-informed model for regulating enhancement and to crystallise how it can work in practice, as it lacks targeted regulation for cognitive enhancement despite reported use across universities. Section II tested the first phase of the regulatory model and concluded that there is *prima facie* need for regulation in the case of smart drugs and brain chips, though not in the case of coffee.

Section III tested the second phase of the regulatory model. Upon consideration of the regulatory factors, I argued that private ordering within the University is the most effective regulatory intervention. Such regulatory form skips investment and effort from the government, which does not have sufficient incentive to regulate since neither public resource nor public health & safety are at issue. It incorporates the feedback and ideas of various stakeholders and ensures participation and deliberation. It taps into existing University structures, whilst also incorporating the concern for distributive justice.

Finally, **Section IV** argued that even though equality cannot serve as a regulatory norm for HET at present, it has potential as a source of future law. This is because equality law has been a source for addressing claims involving elements of accommodation and discrimination, which can assist in the regulation

of HET; Conventions such as CERD and CEDAW demonstrate that existing human rights law can serve as the origin for more niche and developed frameworks to regulate particular concerns; human rights treaties are living instruments and their interpretation ought to transform with the demands of the current world; and finally, in any case, socio-economic access in the matter of technology that can multiply opportunity or stultify social mobility is an important value to be recognised, and such recognition would be of distinctive value.

The experience of internet regulation from 1955 to today serves as 'a warning which is applicable to all emerging technologies', as governments around the world failed to take early steps to regulate the internet structurally and therefore failed to limit its wide risks and impacts.[647] A more nuanced but practical approach, such as the one suggested in this Chapter, can help balance the concerns with the use of HET whilst also allowing ample room for innovation.

[647] Black and Murray (n 99) 6.

CONCLUSION

In this thesis, I sought to address the significant, but often overlooked or under theorised equality harms associated with HET and aimed to bring to light how technology can exacerbate socio-economic inequalities. An attempt to address these harms through existing law, especially equality provisions in IHRL exposed its limitations, as being focussed only on protecting against being treated as inferior, rather than ensuring a level playing field or equality of opportunity. This in turn cemented the need to design a *sui generis* regulatory framework for HET in competitive scenarios.

I proposed the two-phased equality-informed model for the regulation of the use of enhancements in competitive scenarios, which first seeks to answer whether there is a *prima facie* case for regulation, and then undertakes abalanced consideration of various factors to determine the design of the regulatory intervention.

In the process of accomplishing the above, the thesis made ancillary contributions. First, the link between the use of enhancements and distributive justice is an underexplored one. To that extent, this thesis provides an advance over the existing literature by considering enhancement in the wider socio-economic context of the technologically driven globalised world. Second, from the unsuccessful application of existing equality law in IHRL to equality issues raised by HET, it becomes clear that technology not only exacerbates inequality but also lays bare the existing gaps in equality and anti-discrimination law. This

was also confirmed by how sports law doesn't draw on equality law but prefers to use the principle of 'fairness'.

Third, the variable degree spectrum approach makes an importance advance in the literature on the definition of HET by highlighting the qualitative differences between different kinds of improvements of human functions, and the importance of tailored levels of regulatory oversight. While this thesis is limited to assessing only the equality harms of the use of HET, this definition may be adopted for the regulation of other harms arising from the use of HET. Finally, in the attempt to draw insights from sports law, it emerged that the treatment of female athletes with sex difference is an aberration to the usual approach in sports towards advantages, where natural advantages are treated differently from artificially gained advantages. This insight can serve the raging contemporary debates in sports law on the policing of female bodies.

It is appropriate now to offer some final comments on the direction that regulation may take with respect to HET. The vast majority of HET have not appeared overnight and suddenly. They are the result of the often slow but consistent developments in fields such as biotechnology, biochemistry, nanotechnology, computing etc. Further, most of their likely harms are not species-altering. Due to this, it is easy and relatively unalarming for them to go unnoticed. It is evident that while several existing laws can apply and govern their use, they may not be framed keeping HET in mind, resulting in a mismatch and failure to capture specific and unique harms.

The slow and relatively non-urgent impact of HET distinguishes it both from AI and particular technologies like gene editing and cloning that have severe

ramifications. However, it appears that regulation is driven by a combination of rapid development of the technology, species-altering ramifications, as well as undesirable experiments. This is why governments around the world are racing to regulate AI since ChatGPT was introduced in November 2022, which demonstrated the sudden and rapid development of this technology. Due to its ability to replace human beings in jobs such as content creation, and its effects on human society including the ability to spread misinformation, there is urgent interest in regulating it.[648] This has led to various consultations between governments, industry leaders, and consumers on creating new laws for AI.[649] This means that AI driven human enhancements, such as brain-computer interfaces, would come under greater regulatory scrutiny.

Gene editing and cloning demonstrate a similar urgency in regulatory oversight. For instance, in the case of genome editing, the first clinical trials of gene therapies that were aimed at treating rare genetic disorders caused by single-gene mutation were held in the 1990s.[650] Within a few years, in 1997, 'conscious of the accelerating developments in biology and medicine' and that 'misuse of biology and medicine may lead to acts endangering human dignity', the Oviedo Convention was adopted by the European community.[651] The Universal

[648] Reuters, 'Governments Race to Regulate AI Tools' *Reuters* (23 May 2023) <https://www.reuters.com/technology/governments-efforts-regulate-ai-tools-2023-04-12/> accessed 29 May 2023.

[649] The White House, 'FACT SHEET: Biden-Harris Administration Announces New Actions to Promote Responsible AI Innovation That Protects Americans' Rights and Safety' (*The White House*, 4 May 2023) <https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/04/fact-sheet-biden-harris-administration-announces-new-actions-to-promote-responsible-ai-innovation-that-protects-americans-rights-and-safety/> accessed 29 May 2023.

[650] National Human Genome Research Institute, 'Results from First Human Gene Therapy Clinical Trial' (1995) https://www.genome.gov/10000521/1995-release-first-human-gene- therapy-results/ accessed 19 November 2022.

[651] Oviedo Convention, Preamble.

Declaration on the Human Genome and Human Rights too was adopted at UNESCO's 29th General Conference in 1997, and endorsed by the UNGA the following year.[652] A recent policy survey of 106 countries found that 96 of them have legislation, regulations, guidelines or codes which specifically regulate the use of genome editing to modify early-stage human embryos or gametes. No country explicitly permits heritable human genome editing.[653]

Similarly, human cloning technology attracted significant legal debate in the aftermath of experiments such as the cloning of Dolly the sheep, and efforts have been made to enact an international ban.[654] In 2005, the United Nations General Assembly adopted a non-binding Declaration on Human Cloning which prohibited 'all forms of human cloning', and the UNESCO set up a working group in 2008 to investigate the possibility of a legally binding convention to ban human reproductive cloning.[655] Both the case of genome editing and cloning point to the fact that the regulatory interest is often dependent on significant, urgent and even *immediate* exposition of harm.

Given the slow and relatively non-urgent impact of HET as opposed to the rapid and often species-altering ramifications impact of technologies such as AI, gene editing, and cloning, it is easy for HET to escape regulatory oversight. In fact, it may even be encouraged on the count that it would be exciting to see what

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[652] UN Educational, Scientific and Cultural Organisation (UNESCO), *Universal Declaration on the Human Genome and Human Rights*, 11 November 1997 <https://www.refworld.org/docid/404226144.html> accessed 2 June 2023. ["UNESCO DHGHR"]

[653] Françoise Baylis and others, 'Human Germline and Heritable Genome Editing: The Global Policy Landscape' (2020) 3 The CRISPR Journal 365.

[654] HT Greely, 'Banning "Human Cloning": A Study in the Difficulties of Defining Science' (1998) 8 Southern California Interdisciplinary Law Journal 131, 136.

[655] Adèle Langlois, 'The Global Governance of Human Cloning: The Case of UNESCO' (2017) 3 Palgrave Communications 1.

the human body assisted by technology can do. Interestingly, the recently started Cybathlon or 'Cyborg Olympic Games' provide a platform for such performances. It may also be the case that the hope in the diffusion of enhancements keeps the regulators away.

However, it is important to remember that despite the hope for the eventual diffusion of HET, the *relative advantage* as a result of unequally accessible new innovation may be resilient. Even though technological improvement in the last few hundred years has improved the situations of both rich and poor alike, the present-day social justice concerns are still significant. [656] As Adam Swift writes elsewhere 'One can have more or better opportunities than one's parents without having any opportunity to move up in terms of social stratification. *The ladder is really an escalator.*'[657]

In conclusion, while HET offers promising advancements, the equality implications must be rigorously examined and addressed by regulators. It is now evident that without proactive regulatory measures, HET could deepen existing inequalities rather than alleviate them. The findings and recommendations of this thesis lay the groundwork for future research and policy development, ensuring that HET is harnessed for the benefit of all, rather than a privileged few.

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[656] Feeney (n 287) 12–13.

[657] Swift (n 288) 8.

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