

**Committee:** Economic and Social Council

**Issue:** Examining the Social and Economic Effects of Human Augmentation

**Student Officer:** George Alexander Bakalis

**Position:** President

## **PERSONAL INTRODUCTION**

I would like to welcome you all to the 5<sup>th</sup> Annual Deutsche Schule Thessaloniki – DST Model United Nations Conference. My name is George Alexander Bakalis and I have the honor to serve as the President of the Economic and Social Council. My passion for politics runs deep, especially when it comes to issues concerning human rights, the working class, and current affairs. I've been participating in Model United Nations conferences since 2018, during which time I've met some incredible people, grown as a person, and made some of my most cherished memories. I sincerely believe this is the true goal of Model United Nations, and therefore I consider it my duty to help you achieve the same experience and receive the same gifts as I have.

The purpose of this study guide is to accurately summarize the topic at hand and provide you with a solid foundation for your research during your preparation prior to the conference. However, it is not a source for you to plagiarize. I very strongly encourage you to use additional sources and come up with original points and arguments, as this would allow us to have a truly fruitful and progressive debate. If you have any questions, do not hesitate to contact me via email at [gbakalis17@gmail.com](mailto:gbakalis17@gmail.com). I wish you all the best of luck with your research, and I am beyond excited to meet you all during the conference!

Best,

George Bakalis

## TOPIC INTRODUCTION

Human augmentation, for decades, has mostly been regarded as the subject of science fiction. Many books, TV shows and films of the genre have depicted this in some form, whether it would be a character with cybernetic limbs, a super soldier or a supervillain with enhanced mental capabilities. In reality, if we were to use the broadest possible definition, humanity has been practicing human augmentation for millennia. Everyday items and activities, such as prescription glasses, hearing aids or even our clothes, are common examples of mankind attempting to fight back against its natural limitations and achieve a higher level of performance.

However, these forms of human augmentation are still achieved within the confines of human biological capability. They are focused on repairing or remedying a natural human weakness, such as vision problems or deafness. Depictions of augmented humans in media go beyond that threshold, granting these characters superhuman abilities. Of course, as the genre suggests, this is merely fiction, made with the purpose of entertainment. Yet, as with any field of science, human augmentation is rapidly and steadily evolving. This means that advancements in robotics, medicine and biomedical engineering have allowed us to grow closer to making these fantasies a reality than ever before.

Enhancing the human body is a process that can be done in many different ways and can achieve many different goals. Experts have divided the human body, and by extension, the aspects which can be enhanced, into three different categories: Sensory Augmentation, Augmented Action and Augmented Cognition. The first two are the most widespread and are most commonly seen in the form of visual or hearing aids and prosthetics for amputees. Augmented Cognition, however, is seemingly still completely out of our reach.

Unfortunately, progress in the field of human augmentation comes with numerous caveats that must be addressed. Many pieces of media, especially in the science fiction genre, have warned against the social and economic effects of enhancing human ability. Such practices will, for a very long time, only be at the disposal of the higher echelon of society, and would further deepen the chasm between the upper, middle, and lower classes. Additionally, a new form of ableism directed towards un-enhanced individuals is more than likely to occur, as more and more people join the in group of augmented humans. Finally, the market for augmentation services would skyrocket, creating a new form of capitol. These are all matters that will be addressed in our committee.

## DEFINITION OF KEY TERMS

### Human Augmentation

“The field of human augmentation (sometimes referred to as “Human 2.0”) focuses on creating cognitive and physical improvements as an integral part of the human body.”<sup>1</sup>

### Biomedical engineering

“The application of engineering principles, practices, and technologies to the fields of medicine and biology especially in solving problems and improving care (as in the design of medical devices and diagnostic equipment or the creation of biomaterials and pharmaceuticals”<sup>2</sup>

### Gene Editing

The process of manipulating a living organism’s genetic composition through altering its DNA sequence.

### In vitro fertilization (IVF)

A complex series of procedures used to help with fertility or prevent genetic problems and assist with the conception of a child. During IVF, mature eggs are collected from ovaries and fertilized by sperm in a lab. Then the fertilized egg or eggs are transferred to a uterus, at which point the pregnancy continues normally.<sup>3</sup>

### Designer Baby

“A Designer Baby is a baby whose genes have been chosen by its parents and doctors so that it has particular characteristics.”<sup>4</sup>

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<sup>1</sup>Gartner\_Inc. “Definition of Human Augmentation - Gartner Information Technology Glossary.” Gartner, <https://www.gartner.com/en/information-technology/glossary/human-augmentation>.

<sup>2</sup> “Biomedical Engineering Definition & Meaning.” Merriam-Webster, Merriam-Webster, <https://www.merriam-webster.com/dictionary/biomedical%20engineering>.

<sup>3</sup> “In Vitro Fertilization (IVF).” Mayo Clinic, Mayo Foundation for Medical Education and Research, 10 Sept. 2021, [https://www.mayoclinic.org/tests-procedures/in-vitro-fertilization/about/pac-20384716#:~:text=In%20vitro%20fertilization%20\(IVF\)%20is,by%20sperm%20in%20a%20lab](https://www.mayoclinic.org/tests-procedures/in-vitro-fertilization/about/pac-20384716#:~:text=In%20vitro%20fertilization%20(IVF)%20is,by%20sperm%20in%20a%20lab).

<sup>4</sup> Cambridge Dictionary. “Designer Baby Definition.” Cambridge Dictionary, 2021, [www.dictionary.cambridge.org/dictionary/english/designer-baby](http://www.dictionary.cambridge.org/dictionary/english/designer-baby).

## Robotics

“The field of science that deals with the design, construction, operation, and application of robots.”<sup>5</sup>

## Artificial Intelligence (AI)

Artificial intelligence is the ability of a computer to simulate higher brain functions of human intelligence, such as reasoning, generalization and learning from experience (machine learning).

## Neurodivergent

Neurodivergent refers to a person whose cognitive function differs from what might be considered “normal”. Examples of neurodivergences are Autism, Attention Deficit Hyperactivity Disorder (ADHD) and dyslexia.

## Neurotypical

A person who is not neurodivergent.

## Autism

“Autism spectrum disorder (ASD or simply Autism) is a developmental disability caused by differences in the brain. Some people with ASD have a known difference, such as a genetic condition. Other causes are not yet known. People with ASD may behave, communicate, interact, and learn in ways that are different from most other people. There is often nothing about how they look that sets them apart from other people. The abilities of people with ASD can vary significantly. For example, some people with ASD may have advanced conversation skills whereas others may be nonverbal.”<sup>6</sup>

## ADHD

“Attention Deficit Hyperactivity Disorder is one of the most common neurodevelopmental disorders of childhood. It is usually first diagnosed in childhood and often lasts into adulthood. People with ADHD may have trouble

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<sup>5</sup> Simpson, John A. *The Oxford English Dictionary*. Clarendon Press, 1991.

<sup>6</sup> “What Is Autism Spectrum Disorder?” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 31 Mar. 2022, <https://www.cdc.gov/ncbddd/autism/facts.html>.

paying attention, controlling impulsive behaviors (may act without thinking about what the result will be), or be overly active.”<sup>7</sup>

### **Human Immunodeficiency Virus (HIV)**

A sexually transmitted infection that causes Acquired Immunodeficiency Syndrome. It can also be spread through blood transfusion, during pregnancy or breastfeeding and improper sterilization of medical equipment such as needles.

### **Acquired Immunodeficiency syndrome (AIDS)**

A chronic, potentially life-threatening condition caused by the human immunodeficiency virus. By damaging your immune system, HIV interferes with your body's ability to fight infection and disease.

### **Ableism**

Discrimination, prejudice, and hate directed against people with both physical and mental disabilities.

### **Monopolization**

“A company being in complete control of something, preventing others from holding any shares or influence”<sup>8</sup>

### **Exoskeleton**

An external robotic structure meant to support human movement and activity.

### **Heads Up Display (HUD)**

A Heads Up Display (HUD) is a display of instrument readings in an aircraft or vehicle that can be seen without lowering the eyes, typically through being projected on to the windscreen or visor.

### **Medical/Clinical data**

“Any matter of data collected from an individual who was or is a patient or client of a hospital, nursing home, medical center, clinic, health or nursing home operated by a state agency or political subdivision government entity. This includes

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<sup>7</sup> “What Is ADHD?” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 23 Sept. 2021, <https://www.cdc.gov/ncbddd/adhd/facts.html>.

<sup>8</sup> “Monopolization.” *Cambridge Dictionary*, Cambridge Dictionary, <https://dictionary.cambridge.org/dictionary/english/monopolization>.

business and financial records, data provided by private health care facilities, and data provided by or about relatives of the individual.”<sup>9</sup>

### **Eugenics**

An unethical medical practice which aims to increase traits that are regarded as desirable and eliminate disability through the process of “planned breeding”, meaning preventing individuals possessing undesirable characteristics or suffering from disorders are not allowed to reproduce.

### **Bioethics**

The sector of medical and biological research dealing with the ethics of practices in the field.

## **BACKGROUND INFORMATION**

### **The human body as a platform**

The human body, despite millions of years of evolution in its favor, is still incredibly limited and often affected by natural weakness. Blindness, physical disability and arrhythmia are only a few examples of conditions that affect millions of people and prevent them from participating normally in society. This is why, for centuries, we have developed various means to alleviate these weaknesses. In fact, some have become so ingrained in our lives that we do not even realize the fact that they, too, are a form of human augmentation. Scientists in this field are constantly working towards advancing these methods, aiming towards inventions that will be able to assist those with even the most severe conditions, such as amputees or people suffering from paralysis. Researchers have divided the elements of the human body that can be augmented into four categories: Physical, Sensory, Social and Psychological performance.

#### **Physical performance**

Physical performance concerns “the capability to affect the physical environment and move within it”.<sup>10</sup> This includes components such as

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<sup>9</sup> “Medical Data Definition.” *Law Insider*, Law Insider, <https://www.lawinsider.com/dictionary/medical-data>.

<sup>10</sup> *Human Augmentation – the Dawn of a New Paradigm* - Gov.uk. Government of the United Kingdom of Great Britain and Northern Ireland,

strength, dexterity and speed. It is what is most commonly associated with the term “human augmentation”, as it involves things such as prosthetic limbs, fingers or even simply walking canes. As is evident, technologies enhancing physical performance have mostly been aimed towards physically disabled people and attempted to restore their corporeal abilities. However, many have experimented with the effects an additional limb might have to physical performance.

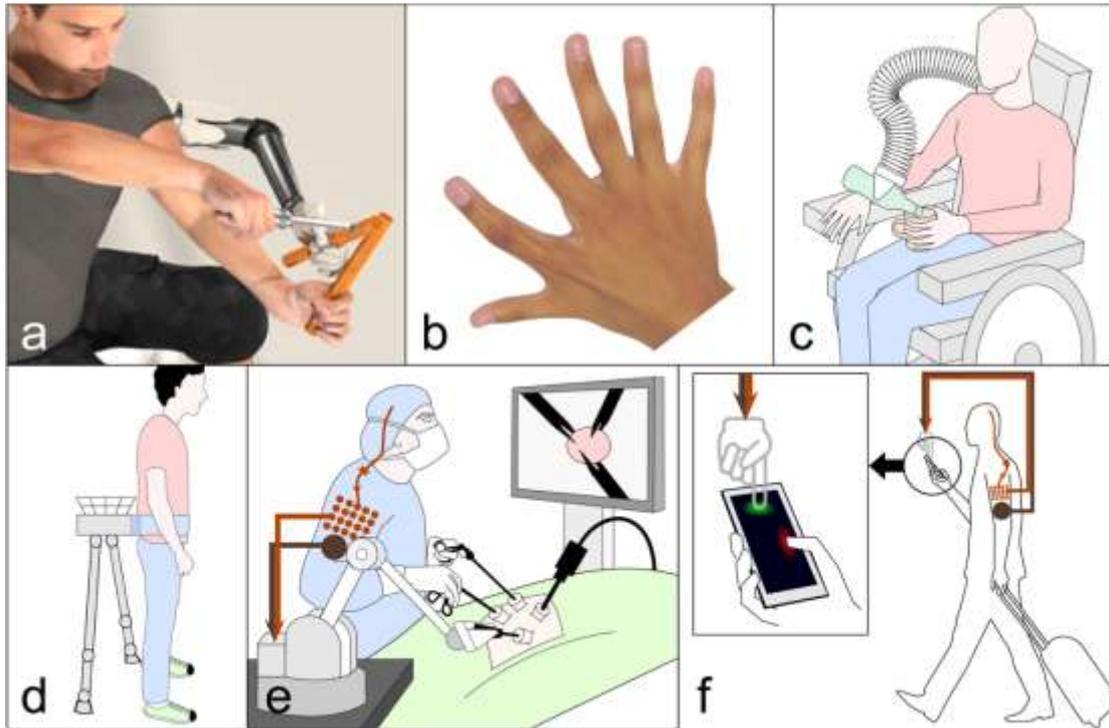


Figure 1: Physical augmentation concepts and natural augmentation.<sup>11</sup>  
Sensory performance

Sensory performance concerns “multisensory information processing for enhancement of the abilities to perceive external stimuli”<sup>12</sup>. As mentioned above, very common examples of such enhancement are prescription glasses and contacts, that aim to assist visually impaired people. However, sensory augmentation continues to go beyond just assisting someone’s sensory abilities but are now aiming to improve them beyond our natural limitations. An example is night vision goggles commonly used by militaries. Where a human without access to such gear would struggle orienting themselves in the

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/986301/Human\\_Augmentation\\_SIP\\_access2.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/986301/Human_Augmentation_SIP_access2.pdf).

<sup>11</sup> Eden, Jonathan, et al. “Principles of Human Movement Augmentation and the Challenges in Making It a Reality.” *Nature News*, Nature Publishing Group, 15 Mar. 2022, <https://www.nature.com/articles/s41467-022-28725-7>.

<sup>12</sup> Ibid 10

dark, soldiers equipped with night vision goggles can freely navigate any dark space, without the fear of accident or ambush. Even international conglomerate companies have tried the waters around sensory augmentation, such as Google releasing the Google Glass, a pair of “smart glasses” equipped with a HUD, to an open beta in 2014.

### **Psychological performance**

Psychological performance concerns one’s higher brain functions, such as emotion, motivation and, most importantly, cognition. The latter is defined as “the mental action or process of acquiring knowledge and understanding through thought, experience and the senses”<sup>13</sup> and includes further functions such as attention, memory and decision making. This element of the human platform is still very abstract, especially when it comes to technologies that can be used to augment it. However, there are currently some methods of enhancing one’s psychological performance, namely antidepressants and medicine used to treat various mental disorders. While still in very early development, researchers believe that the use of AI, working in conjunction with a person’s own cognition, can help people improve their decision making skills minimize their biases.<sup>14</sup> Finally, enhancing human cognition can also assist those suffering from conditions such as dementia, amnesia or ADHD.

### **Social performance**

Social performance concerns “the ability to perceive oneself as part of a group and the readiness to act as part of the team.”<sup>15</sup> Similar to psychological performance, social performance is still very abstract, and research on the means of enhancing it are still very theoretical. It is however believed that enhancing social performance could improve one’s communication skills, as well as their ability to collaborate with their peers.

## **Means of human augmentation**

### **Robotics**

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<sup>13</sup> Ibid 10

<sup>14</sup> “What Is Human Augmentation? (with Examples and Technologies).” *AIMultiple*, <https://research.aimultiple.com/human-augmentation/>.

<sup>15</sup> Ibid 10

The field of robotics is rapidly evolving and has already created many devices that assist us in our day-to-day lives. These devices can be faster, stronger, and more precise. A great example is the da Vinci Surgical System, which is used in many hospitals around the world. This system is comprised of surgical instruments attached robotic apparatuses, as well as a 3D, high-definition vision system, allowing surgeons to perform operations with greater accuracy and a smaller chance of an error. Logically, the next step in advancing such technologies would be to incorporate them into the human body itself. Companies such as Sarcos Robotics and ReWalk Robotics are already pioneering the development of robotic prosthetics, not just for the medical field but also for industrial use.



**Figure 2: da Vinci Surgical System performing surgery on a grape, showcasing its steadiness and preciseness<sup>16</sup>**

### Medicine

While augmenting the human body has become synonymous with physical prosthetics, this is only one way in which humans can be augmented. The use of medicine to enhance one's abilities is another very common way humans can go beyond their natural limitations. As mentioned above, antidepressants and other medication aimed towards combatting mental disorders are an

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<sup>16</sup> EdwardHospital. "Da Vinci Surgical System: Surgery on a Grape." *YouTube*, YouTube, 11 Aug. 2010, <https://www.youtube.com/watch?v=KNHgeykDXFw>

example of medicine used to enhance someone's abilities, in this case their psychological performance. Another example, although inadvisable, is performance-enhancing drugs. Despite these being banned from most athletic competitions, which take measures such as drug tests to ensure that no competitors are under the influence, these drugs are still extremely common. While substances such as anabolic steroids have various medical applications, athletes often use them in doses much higher than the ones prescribed for medical reasons<sup>17</sup>. Research has concluded that extensive use of these substances is detrimental to the human body, and can cause high blood pressure, infertility, and drug dependence.<sup>4</sup> Developing enhancing medicine that will not have such effects on the human body is and will continue to be a high priority for human augmentation researchers.

### Genetics

Perhaps the most controversial form of human augmentation, genetics refers methods such as gene editing, in order to engineer enhanced humans before they are even born. This has shown some positive results during animal tests, such as Uruguay's Institute of Animal Reproduction creating the first glow-in-the-dark sheep in 2012. Additionally, advancements in gene editing have led to the advent of "designer babies", meaning that parents are now able to pick and choose which characteristics their baby will have before they're even born. However, such procedures are yet to be applied in a broader context.

### Positives of human augmentation

As is evident by the common use of such technologies in our day-to-day lives, human augmentation has various benefits for us. In the broadest application, a world populated by enhanced humans improves all aspects of human life, from school to work to personal life. Intense manual and mental tasks, such as construction work or scientific research can be carried out almost effortlessly, meaning that there is little to no fatigue from one's everyday routine. This all culminates into a general increase in quality of life.

Augmenting the human body also benefits one's life expectancy. Increased strength, reflexes and precision provided by prosthetic limbs reduces the risk of accident, either in the workplace or during leisure activities. Additionally,

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<sup>17</sup> "Understanding the Risks of Performance-Enhancing Drugs." *Mayo Clinic*, Mayo Foundation for Medical Education and Research, 4 Dec. 2020, <https://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/performance-enhancing-drugs/art-20046134>.

modifications to one's internal organs, such as pacemakers, provide higher resistance to disease or organ failure. Furthermore, through gene editing, humans can be born immune to certain diseases that are difficult to cure, such as cancer or AIDS, eliminating the need for expensive medicine or treatments later in their lives. Finally, enhancing human cognitions further protects from mental deterioration due to old age, therefore lowering the chance of one developing dementia, amnesia, or other such conditions.

Of course, a discussion on human augmentation cannot be had without mentioning the immense benefits to individuals with special needs. In a world built for able-bodied and neurotypical people, neurodivergent people and those who suffer from physical disabilities are consistently disadvantaged and marginalized. For example, a blind person has great difficulty in commuting, meaning that they may not be able to perform essential activities and must rely on others to acquire basic needs such as groceries, clothes, or medicine for them. Additionally, many people suffering from ADHD have long struggled to conform to traditional education systems, due to the fact that they have difficulty focusing in class or finding the motivation to complete assignments. Advancements in human augmentation will allow such groups to overcome these hurdles and achieve greater equality with their able-bodied peers.

Finally, an increase in one's physical and mental ability thanks to human augmentation is likely to result in higher productivity within the workplace. This is because it will allow us to complete more intense tasks faster and with less effort, thereby increasing efficiency in production and research. This will undoubtedly be beneficial for the economy, as production lines will become more dynamic and economical

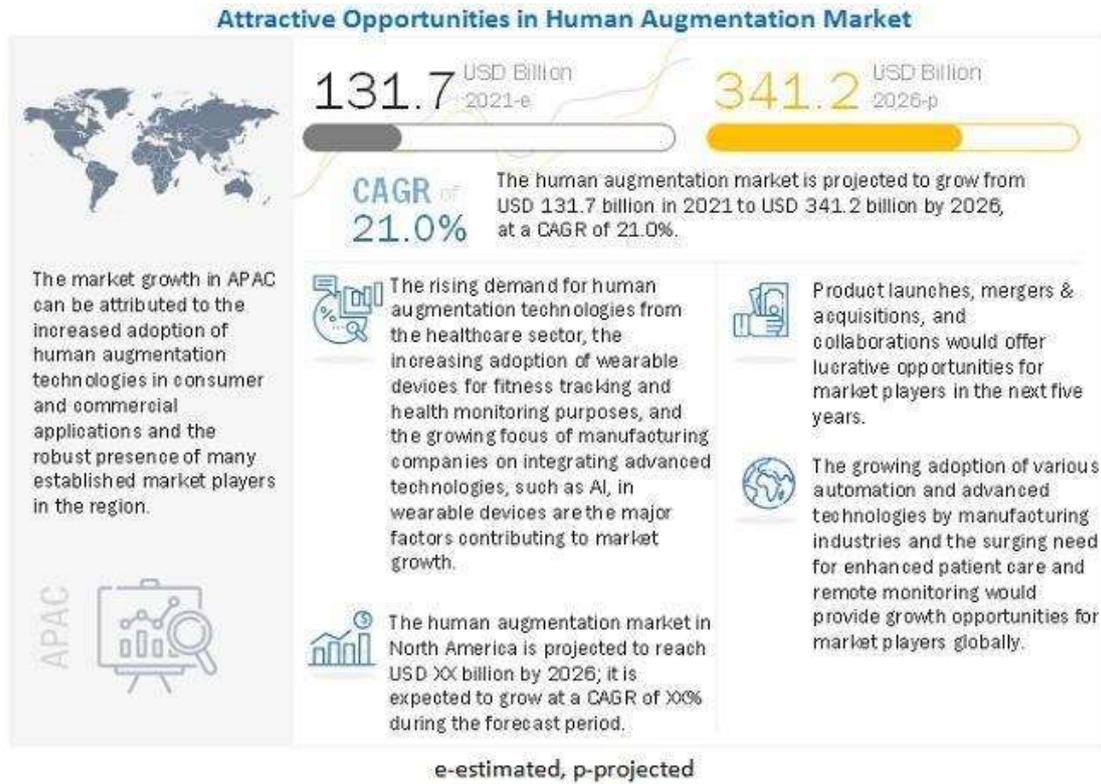
## **Economic issues**

### **A booming new market**

As is common with such phenomenal breakthroughs, the value of the global human augmentation market is expected to over double by 2026, from 131.7 billion USD in 2021 to 341.2 billion USD<sup>18</sup>. This is due to the rapidly growing demand of such technologies in the medical sector, as well as the significant rise in automation.

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<sup>18</sup> "Human Augmentation Market." *Market Research Firm*, <https://www.marketsandmarkets.com/PressReleases/human-augmentation.asp#:~:text=The%20presence%20of%20technologically%20advanced,market%20growth%20in%20Asia%20Pacific>.



**Figure 3: Expected growth of the human augmentation market<sup>19</sup>**

In order to conceptualize the possible trends, the human augmentation market will follow, we can compare it to a similar market: cosmetic surgery. Ever since 1997, there has been over 147% increase in the total number of cosmetic procedures<sup>20</sup>. Interestingly, the COVID-19 pandemic also seems to have increased demand for such procedures, according to the American Academy of Facial Plastic and Reconstructive Surgery<sup>21</sup>. Ultimately, the global cosmetic surgery market remains steady, and is expected to be worth 58.78 billion USD by 2028<sup>22</sup>. This means that, evidently, the promise of bettering oneself is appealing to a substantial portion of the population. It is therefore very likely that, when human augmentation becomes mainstream, demand for it will rise and remain high for an extended period of time.

<sup>19</sup> "Human Augmentation Market." *Market Research Firm*, <https://www.marketsandmarkets.com/Market-Reports/human-augmentation-market-177215310.html>.

<sup>20</sup> "The Obsession with Perfection." *WordPress.org Login | WordPress.org English*, <https://login.wordpress.org/>.

<sup>21</sup> Jessica Bluemke Greiff There's no doubt that social media has forever changed how we view ourselves. Between the high-quality cameras in our phones and scrolling through perfectly cu, and Jessica Bluemke Greiff. "The Increasing Demand for Cosmetic Procedures." *Rush University System for Health*, <https://www.rush.edu/news/how-pandemic-may-have-increased-demand-cosmetic-procedures#:~:text=According%20to%20the%20American%20Academy,up%20by%2075%25%20from%202019.>

<sup>22</sup> "Cosmetic Surgery Market Size." *Cosmetic Surgery Market Size, Share, Growth | Report [2028]*, <https://www.fortunebusinessinsights.com/cosmetic-surgery-market-102628>.

### **Monopolization**

Advanced human augmentation technologies are largely still in development. This means that there is still room for a company to patent a breakthrough and possibly establish a monopoly on a certain augmentation product or procedure. This will halt competition, therefore slowing the speed of progress in the field and not allowing smaller companies to thrive. Additionally, if a single conglomerate has control over the entire market, they are free to set any standard they desire, possibly making human augmentation procedures and products even more expensive and therefore inaccessible to lower income individuals.

### **Societal issues**

Despite the glaring benefits of human augmentation, there are many caveats that must be addressed in order to ensure that adopting such technologies en masse will not do more harm than good.

#### **Accessibility**

As with any new or experimental technologies, human augmentation methods will very likely only be accessible to those who can afford them. While eventually, as science progresses, there will be more affordable ways to enhance oneself, it is very likely that in the time until this happens the chasm between the lower, middle, and upper classes will deepen. This is due to the fact that people with higher income or net worth will be able to afford to be augmented, whereas people with lower income will not. This means that by simply being richer one can also become more powerful physically and mentally. While this does affect everyone, it especially hurts the aforementioned disabled groups, who might not be able to afford such procedures, despite being the ones who need it the most.

#### **A new form of human: Ableism and Identity**

Human augmentation, at its core, is about modifying and enhancing human ability. This effectively creates a new form of human, one that is more physically and mentally able thanks to their augmentations. Among the ripple effects of this new form of human is the creation of a new societal divide, between augmented and non-augmented individuals. This, considering the possible widening of the class divide mentioned above, will very likely harbor ableism towards non-augmented folk. Augmented individuals, who will possess increased physical and mental abilities, might see themselves as

superior to their non-augmented peers, thereby creating discriminatory views against them. However, it is possible that the hostility between these two new societal groups will go both ways. Similar to the stigmatization of plastic surgery in recent years, augmented humans might be regarded as “not real humans”. Finally, it is possible that the creation of a whole new type of human will be detrimental to the identities of those who undergo augmentation, as they might see themselves as different, lesser or “not human”.

### **Surveillance and violation of privacy**

An issue that should be addressed regarding human augmentation is protecting the privacy of the subject. As will be mentioned below, any sort of human augmentation process is extremely invasive and therefore requires a lot of biometric data. Without appropriate legal framework, corporations responsible for manufacturing and applying enhancement methods will be able to use and sell the patient’s records as a commodity for non-medical purposes, such as to advertisers.

Human augmentation, at its core, revolves around making a permanent artificial adjustment to one’s body. If not addressed legally, companies might use these enhancements to spy and collect data on patients. For example, a company that specializes in robotics limbs will be able to install a location tracker or microphone, giving them the ability to surveil to a patient’s personal life without their knowledge, thereby violating their right to privacy.

### **Bioethics**

It is important that any breakthrough medical procedure is examined under the lens of bioethics before it is instated as common practice. In the case of human augmentation, there might not just be a new form of procedures, but a completely new field of medicine study. This is why we must take into consideration the ethics of developing and implementing such technologies.

#### **Human experimentation**

The issue of human experimentation is inseparable from the issue of human augmentation. It is very likely that, between testing prosthetics or medicine trials, there will be subjects who experience injury, sickness or even death. Therefore, in order to safely and humanely develop these technologies, there must be proper guidelines put in place.

### **Eugenics**

The discussion around the use of genetics for the purposes of human augmentation, as well as the possible hostility from augmented towards non-augmented folk, all culminates into the practice of eugenics. For years, certain groups promote the belief that the only cure to certain disabilities is to completely remove them from the gene pool. This is a method deemed criminal and barbaric by bioethics experts. An example of such practices is the autism advocacy group Autism Speaks, which support research in pre-natal screening and determining if an embryo is autistic before birth. This means that the embryo could be aborted which, if it is to become common practice, will effectively drive the autistic community to extinction.

Additionally, it is important to mention the importance of designer babies in the issue of eugenics. The ability to modify an embryo's genetic code in the early stages of development, while having some possible benefits, can also be used to eliminate disorders or conditions from the gene pool. Continuing the example of ASD, through pre-natal screening and gene editing, the disorder and the autistic community will disappear.

Without appropriate legal framework, such practices could become commonplace under the guise of human augmentation, thereby removing the right to life and freedom of millions of people who suffer from disabilities.

### **Consent**

While human augmentation, if done properly, is beneficial to the human body, it is an incredibly invasive and life altering process. This is why it is important to acquire the patient's consent before performing any such procedure. In the aforementioned Autism Speaks example, the broader autistic community have opposed them, because they aim to "cure autism", while disregarding the opinion of autistic people themselves, who believe that it is not a disability meant to be "cured" but instead overcome. Performing augmentation procedures without the consent of the patient would be a violation of their human right to freedom of choice.

## MAJOR COUNTRIES AND ORGANISATIONS INVOLVED

### Japan

According to the International Federation of Robotics, Japan is currently the leading manufacturer of robots globally.<sup>23</sup> Their rapid advancement in the robotics sector is due to the country's rapidly decreasing labor force, thereby increasing demand for automated labor systems.

### South Korea

South Korea is one of the leading countries in the world with industrial robot usage<sup>24</sup>. Additionally, restrictions on robotics research, meaning that professionals in the field are drawn to it due to the increased freedom of innovation.

### Switzerland

Switzerland is currently regarded as one of the countries with the best medical technology. Additionally, Switzerland is known as "The Silicon Valley of Robotics", since universities and technology companies in the greater Zurich area belong among the world's leaders in information science, computer vision, sensor technology and artificial intelligence.<sup>25</sup>

### Germany

"Germany is widely recognised as a country with some of the best healthcare in the world. This country is also one of the most medically advanced in the world, thanks to a high proportion of the world's best medical technology universities."<sup>26</sup>

### United States of America

Similar to Japan, company purchase of robots in the United States has been strongly increasing, seeing a rise of 37% in just one year, from 2020 to 2021.<sup>27</sup> With the rapid advancement in the field of artificial intelligence and human augmentation, the public's consensus regarding enhancement technologies is mostly positive.

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<sup>23</sup> Ifr. "Japan Is World's Number One Robot Maker." *IFR International Federation of Robotics*, International Federation of Robotics, <https://ifr.org/ifr-press-releases/news/japan-is-worlds-number-one-robot-maker>.

<sup>24</sup> Sinha, Disha. "Top 10 Best Countries for Robotics Professionals in 2021." *Analytics Insight*, Analytics Insight, 2021, <https://www.analyticsinsight.net/top-10-best-countries-for-robotics-professionals-in-2021/>.

<sup>25</sup> "Robotics." *Greater Zurich Area*, <https://www.greaterzuricharea.com/en/robotics>.

<sup>26</sup> "FAQ: Which Country Has Best Medical Technology?" *Medical College*, Mallareddy Medical College For Women, 13 Oct. 2021, [https://mrmcw.org/medical/faq-which-country-has-best-medical-technology.html#Which\\_country\\_has\\_the\\_most\\_advanced\\_medical\\_technology](https://mrmcw.org/medical/faq-which-country-has-best-medical-technology.html#Which_country_has_the_most_advanced_medical_technology).

<sup>27</sup> Reuters. "America Is Hiring a Record Number of Robots." *CNN*, Cable News Network, 12 Nov. 2021, <https://edition.cnn.com/2021/11/12/tech/robot-automation/index.html>.

However, there are concerns regarding the autonomy of the patient, as well as the societal repercussions.

### **European Union**

Studies show citizens of many EU countries, and particularly in the south, are more open to the potential of human augmentation. Particularly, Mediterranean countries seem to accept human augmentation at rates almost double of their northern counterparts. For example, 60% of people in Spain accepting human augmentation, as opposed to only 32% in France.<sup>28</sup>

### **World Health Organization (WHO)**

As with any matter pertaining to human health and development, the World Health Organization is a key player in determining the legal and ethical aspects of human augmentation.

### **United Nations Educational, Scientific and Cultural Organization (UNESCO)**

The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to build peace through international cooperation in education, sciences and culture. UNESCO's programmes contribute to the achievement of the Sustainable Development Goals defined in the 2030 Agenda, adopted by the UN General Assembly in 2015.<sup>29</sup> They are a key player in determining the ethical boundaries around human augmentation research.

### **International bioethics committee**

A subsidiary of UNESCO, the International Bioethics Committee (IBC) is a body of 36 independent experts that follows progress in the life sciences and its applications in order to ensure respect for human dignity and freedom. It was created in 1993.<sup>30</sup>

### **International federation of robotics (IFR)**

Established in 1987, the IFR is a non-profit organization aiming “to promote research, development, use and international co-operation in the entire field of

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<sup>28</sup> “The Future of Human Augmentation 2020 - Media.kasperskydaily.com.” *Kaspersky Daily*, Kaspersky, <https://media.kasperskydaily.com/wp-content/uploads/sites/86/2020/09/17130024/Kaspersky-The-Future-of-Human-Augmentation-Report.pdf>.

<sup>29</sup> “UNESCO in Brief.” *UNESCO.org*, <https://www.unesco.org/en/brief>.

<sup>30</sup> “International Bioethics Committee (IBC).” *UNESCO*, UNESCO, 28 Mar. 2022, <https://en.unesco.org/themes/ethics-science-and-technology/ibc>.

robotics, to act as a focal point for organizations and governmental representatives in activities related to robotics.”<sup>31</sup>

### Sarcos Robotics

Founded in 1983, Sarcos Robotics is a pioneer in creating wearable prosthetic apparatuses, that aim to augment human ability and improve workplace conditions in both public and private sectors. This way, they hope to reduce risk of injury in industrial settings while also allowing for higher productivity.

### Ekso Bionics Holdings

Founded in 2005, Ekso Bionics’ main focus is developing exoskeleton technologies, in order to enhance the capabilities of industrial workers and assist those with paralysis in regaining their ability to move.

### ReWalk Robotics

Similar to Ekso Bionics, ReWalk Robotics are the developers of the ReWalk systems, exoskeletons aimed at assisting individuals with lower limb disability. They provide products aimed towards stroke rehabilitation and allowing patients with spinal cord injuries to walk.

## TIMELINE OF EVENTS

Date	Description of event
1983	Sarcos Robotics is founded
1993	Robert Campbell Aird undergoes operation to install the first bionic arm
May 2 <sup>nd</sup> 2001	The da Vinci surgery system is approved by the Food and Drugs Administration of the United States of America, becoming the first of its kind to be approved for general surgery
2005	Ekso Robotics Holdings is founded
October 2005	The Universal Declaration on Bioethics and Human Rights is adopted by UNESCO

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<sup>31</sup> Ifr. “International Federation of Robotics.” *IFR International Federation of Robotics*, <https://ifr.org/association>.

July 22 <sup>nd</sup> 2016	ReWalk system is approved by the Food and Drugs Administration of the United States of America
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## RELEVANT RESOLUTIONS, TREATIES AND EVENTS

### Universal Declaration on Bioethics and Human Rights<sup>32</sup>

Adopted by UNESCO in October of 2005, the Universal Declaration on Bioethics and Human Rights was the culmination of nearly 2 years of deliberations and negotiations. Among its aims is “to provide a universal framework of principles and procedures to guide States in the formulation of their legislation, policies or other instruments in the field of bioethics” and “to recognize the importance of freedom of scientific research and the benefits derived from scientific and technological developments, while stressing the need for such research and developments to occur within the framework of ethical principles set out in this Declaration and to respect human dignity, human rights and fundamental freedoms.”<sup>33</sup>

## PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Advanced human augmentation is still in the early stages of development, and therefore there have been no previous attempts to solve the issue. However, you may take inspiration from issues that are similar and indirectly affect this one, such as the issue of combatting ableism and supporting disabled individuals.

## POSSIBLE SOLUTIONS

The issue of human augmentation is one that spans many different fields, such as medicine, ethics, and law. Therefore, it must be tackled from various different angles.

### Developing these technologies safely

In order for the Economic and Social Council to foster innovation and progress in the field in order of human augmentation, it needs to establish a legal

<sup>32</sup> “Universal Declaration on Bioethics and Human Rights.” *UNESCO*, United Nations, [http://portal.unesco.org/en/ev.php-URL\\_ID=31058&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=31058&URL_DO=DO_TOPIC&URL_SECTION=201.html)

<sup>33</sup> “Universal Declaration on Bioethics and Human Rights.” *UNESCO*, [http://portal.unesco.org/en/ev.php-URL\\_ID=31058&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=31058&URL_DO=DO_TOPIC&URL_SECTION=201.html).

framework that regulates the development of such technologies. This means your resolution should tackle issues such as human experimentation and the patient's right to consent to an operation, always in accordance with the Universal Declaration on Bioethics and Human Rights. Additionally, in order to ensure safe development, there needs to be a focus on developing alternatives to human augmentation, such as digital simulations of experiments. Furthermore, this framework must also address and prevent surveillance of the patient through their augmentation, as well as their ability to commercialize their medical data outside of research, such as selling them to advertisers. Finally, there must be measures taken against unethical medical practices, such as eugenics.

### **Promoting equality between augmented and non-augmented individuals**

Discrimination between augmented and non-augmented folk is possibly one of the most pressing societal concerns when it comes to human augmentation. In order to achieve this, it is imperative to establish a legal framework that will classify hateful speech from one group to the other as hate speech and violence from one group to another as hate crimes. It would also be beneficial to limit where and how certain augmentations can be used, as to avoid any extreme violence against non-augmented folk. Finally, the education system must promote equality among these groups, both through appropriate lessons, as well as punishing any in-school bullying.

### **Setting priorities**

Human augmentation, as is evident by its long history, has almost always been aimed towards assisting disabled individuals to overcome their disabilities. These people are the ones who are to gain the most benefits from human augmentation, as it will allow them to reach equity with able bodied and neurotypical folk and avoid marginalization due to the societal hurdles placed in their way. This is why, as the field of human augmentation develops, its main priority should remain to help those with disabilities. In order to achieve this, ECOSOC must establish and support systems who will provide these technologies to those who need it the most, instead of prioritizing the highest bidder at the expense of someone whose life could be changed thanks to enhancement procedures.

### **Harboring appropriate market conditions**

In order to promote innovation and progress in the field of human augmentation, ECOSOC needs to help create the appropriate market conditions, namely creating competition between different corporations and preventing the monopolization of the market. This will be achieved through preventing corporations

from filing patents on entire procedures or formulas, preventing large-scale corporate buyouts and promoting smaller start-ups.

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