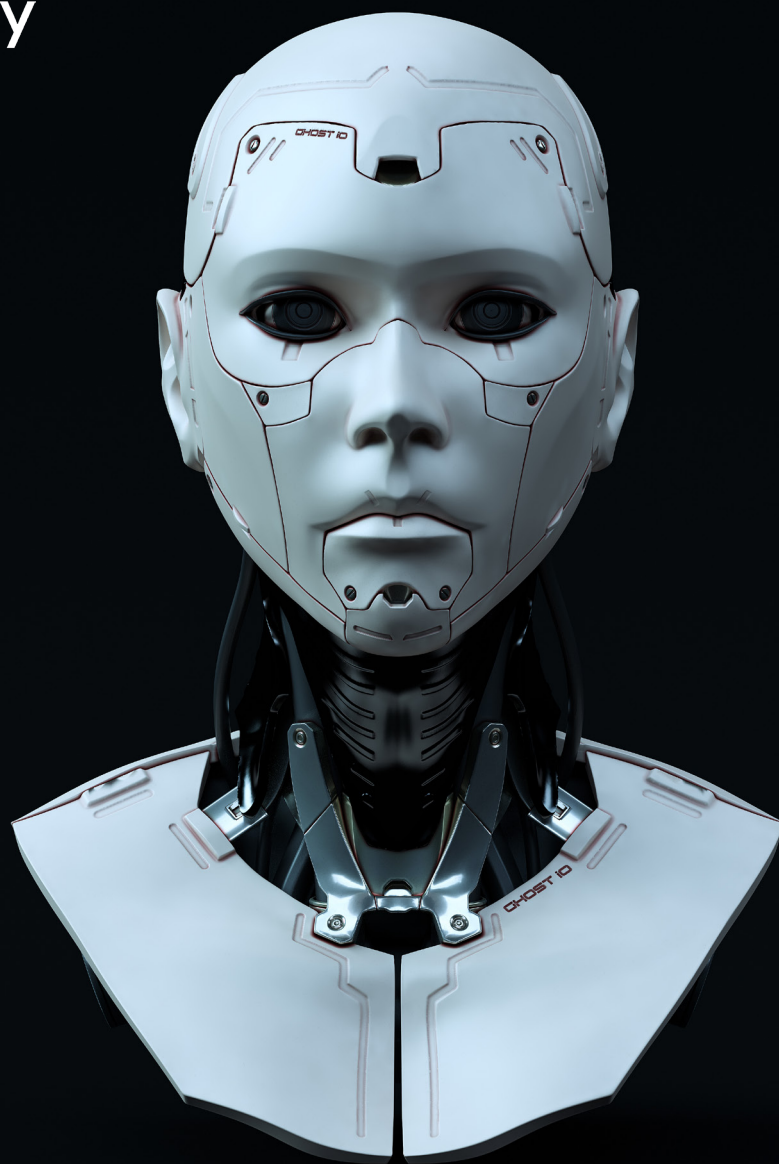


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The Future of Human Augmentation 2020

Opportunity or Dangerous Dream?

A Kaspersky Report

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Introduction

Since the dawn of time, humanity has sought to 'augment' the bodies we were given to allow us to go further, faster and higher than our natural abilities allow. From bows and arrows to improve the range of our hunting, to glasses to restore our vision, to pacemakers to keep our hearts pumping – we have found ways to use the technology open to us to enhance ourselves – and often even save our lives.

In the digital era, 'human augmentation' has taken on a whole new dimension. Sci-fi movies such as Terminator, Universal Soldier or RoboCop, might conjure up images of a part-organic, part-cyborg future, but what is the reality?

At Kaspersky, we are exploring the huge potential of human augmentation to make a positive contribution to our collective future, while also evaluating the challenges that humanity may encounter on that journey. This is because, to enjoy the fruits of human augmentation fully, devices will require robust security.

We want to spark debate around the ethics and security of human augmentation, understand how people feel about it and debunk any myths around the topic.

To gain a sense of how people across Europe and North Africa perceive human augmentation, Kaspersky partnered with research group Opinium to interview more than 14,000 people in 16 countries.

What emerges is a complex study that reveals widely contrasting views on what people would enhance, which elements augmentation should be allowed to improve, ethics, security, and government involvement in the form of future regulation.

This research forms a critical part of Kaspersky's exploration of human augmentation going forward, as we ask the difficult question: Is human augmentation an opportunity for humanity or a dangerous dream?



92%

of people would change a physical aspect of themselves if they could

63%

would consider augmenting our bodies with technology to improve them – either permanently or temporarily

81%

of Italians would consider human augmentation, 18% above the survey average

53%

of those in favour of augmentation believe it will improve quality of life and 40% would use augmentation to improve their overall physical health

69%

fear human augmentation will be accessible only to the rich

88%

worry their augmented bodies could be hacked by cybercriminals

39%

of people think human augmentation will be dangerous for society

48%

of men feel it's 'completely' or 'mostly' acceptable to augment a body with technology, compared to 38% of women



Executive summary

Augmentation, and all it encapsulates, is a burgeoning area of technology. It is also one that remains an underexplored – or even sensationalised – topic in the media. So far, its potential and the benefits to society have been little understood.

How do we define 'human augmentation'? Up until now, our view of augmentation has meant tools that help us function better in our daily lives – pacemakers for heart rhythm, glasses for vision and hearing aids to combat deafness. However, with human augmentation going forward, we are really looking at human enhancement with the aid of technology.

We're not even talking about the future; we have already seen the first steps to human augmentation. The biohacking community is already super active. In many cities, there are communities who are meeting up and working on changing their human biology.

Our study finds that, while the vast majority of people would like to improve a physical aspect of their person, far less are open to actually doing it.

Countries in southern Europe – such as Spain, Portugal, Italy and Greece, are far more open to the potential of human augmentation than many of their northern neighbours.

Everywhere without exception, those who agree with human augmentation place overall physical health as their priority and cite augmentation's potential to improve life as the key reason to support it.

Perhaps unsurprisingly, we observe more support for augmentation that will improve physical health and eyesight as people get older, while for younger people, appearance and sporting ability are key considerations.

At Kaspersky, we want to understand how people perceive human augmentation, its potential benefits and the challenges it presents. What is clear is that we need to learn from history; whenever there is new technology, there come new challenges.

Marco Preuss, Director of Global Research & Analysis Team, Kaspersky

The global understanding of 'human augmentation'

People around the world are already familiar with existing forms of human augmentation, such as the use of pacemakers to regulate heart rhythm, a hearing aid to improve audibility, or glasses to improve vision.

Worldwide, our study finds that people are more likely to be in favour of existing human augmentation than potential future augmentation. For example, for two thirds (65%) of people who say augmentation is unacceptable but that pacemakers are acceptable, the chief reason is because they are important for living a full and healthy life.

Overall, our study finds that across the world, people want augmentation to work for the good of humanity and society, to improve life and to reduce suffering.

Nearly half of men (48%) believe it is 'completely' or 'mostly' acceptable for humans to augment their bodies using technology, compared to 38% of women.

Of those who say augmentation is acceptable, women (44%) are more likely than men (35%) to say that people should choose to improve their bodies however they like.

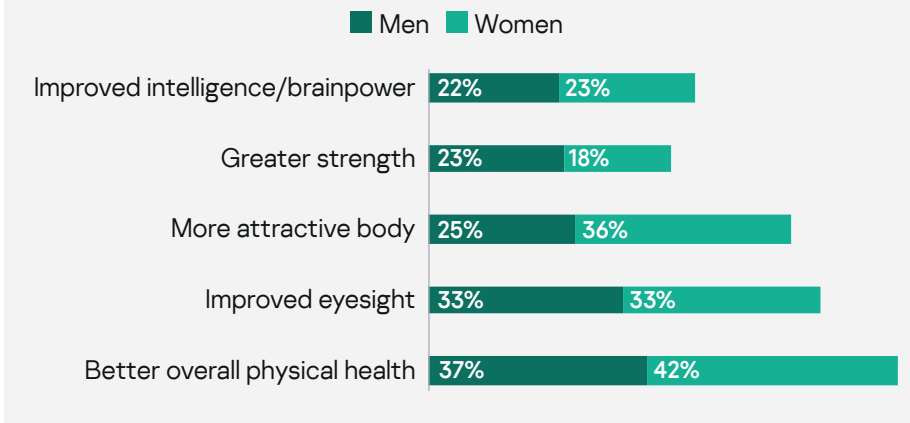
For Professor Julian Savulescu from the Oxford Uehiro Centre for Practical Ethics at Oxford University, humans are already honed for technological augmentation, thanks to our interaction with mobile devices:

"With human augmentation, we'll need a few pioneers and some success stories," he explains. "Once it's proven to work, people will vote with their feet."

Reasons for Human Augmentation Being Acceptable % of those who believe it is acceptable



Physical attributes people most want to improve



“My main concern with human augmentation is the biohacking community itself. We will see vendors producing kits to augment health elements, whether it’s eyesight, strength, or something else, and we will see a lot of copycats trying to copy that kind of technology, which is not licensed or tested. We might find a black market for body enhancement kits because it’s unregulated.”

David Jacoby
Kaspersky

When asked what physical attributes people in 16 markets most wanted to improve, overall physical health (40%) was the number one choice for augmentation, followed by improved eyesight (33%). Being able to augment a more attractive body was a consideration for more than a third (36%) of women and just a quarter (25%) of men, while men were more likely to opt for greater strength (23%) than women (18%).

Of those who would consider human augmentation, just over one in ten men (11%) would like to enhance their genitals compared to only two percent of women. Four in ten (40%) of women who would consider augmentation would opt for a more attractive body compared to just 27% of men.

The desire to improve overall physical health and eyesight increases with age; for example, just a third (33%) of 18–34-year-olds would improve their physical health compared to 45% of those aged over 55. On the other hand, people aged 18–34 (38%) are twice as likely as the over-55s (19%) to want a more attractive body. We observe similar preferences among the young for enhanced sporting prowess and having a more attractive face.

Body focus: How people feel about augmentation

Given the opportunity, the vast majority (92%) of people say they would improve a physical aspect of themselves if they could. Just under two thirds (63%) of people would consider augmenting their body – either permanently or temporarily. Italians are the most likely to consider augmentation (81%) and UK adults are the least likely to (33%).

According to Kaspersky’s Marco Preuss, there are both dangers and opportunities to consider when enhancing the body with human augmentation.

“As with other technology, we’ll see early adopters who are willing to compromise their security for the perceived benefits of augmentation,” Preuss comments.

So, what are the perceived benefits of human augmentation?

Across the board, by far the biggest perceived benefit by those who agree with human augmentation was its potential to improve the quality of life (53%). Nearly four in ten (39%) of those in favour of human augmentation say they think it would help reduce suffering.

Zoltan Istvan, author and founder of the Transhumanist Party, also warns that people will need to keep up with Artificial Intelligence in order to compete for work in the not too distant future. “The biggest issue of the debate is really what would you do in order to remain employed? I think that’s where the augmentation debate is going to be most dramatic,” he says.

Cost: Is human augmentation the preserve of the wealthy?

Almost seven in ten (69%) of people worldwide think it likely that only rich people will be able to enjoy access to human augmentation technology. The most sceptical are people in the UK, where more than three quarters (78%) believe it likely that human augmentation technology will be limited to the rich, compared to the least sceptical nations of Spain (57%) and Denmark (62%).

Threats: criminals and hacking

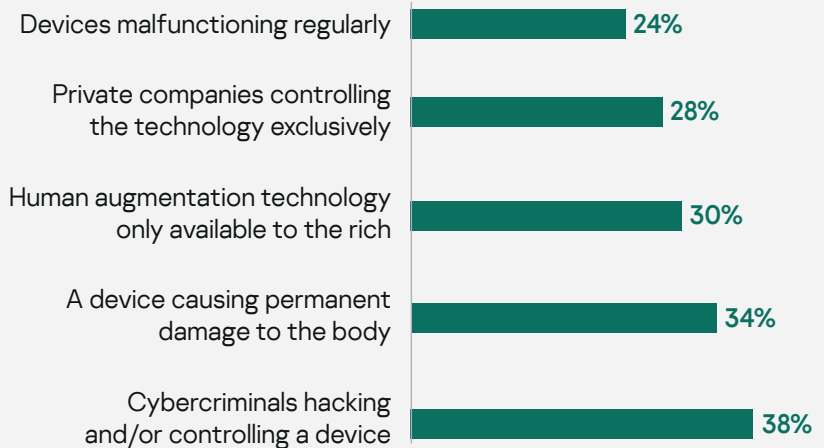
Overall, people are most likely to be excited by the idea of human augmentation (33%). Women (21%) are slightly more likely than men (15%) to be much more concerned than excited by augmentation.

However, 39% of people believe that human augmentation will be dangerous for society. This figure rises to more than half of adults in France (53%) and the UK (52%).

“There is a debate everywhere about the affordability of human augmentation. In the beginning, when human augmentation is new, this technology will be a luxury, then – as is often the way with emerging technology – it will become more affordable and accessible and enter the mainstream.”

David Jacoby
Kaspersky

The top five aspects of human augmentation that people are 'very concerned' about



A natural concern for everyone is security. The fear of criminals or hackers being able to access a device or to control it is a concern for almost nine in ten (88%) people interviewed. Greeks are the most concerned about criminal or hacker access (95%) and control (94%) over devices.

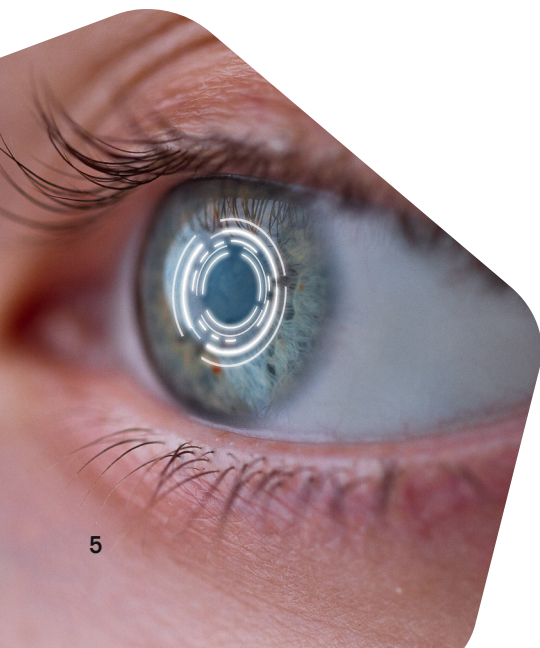
Devices malfunctioning (86%) and devices causing permanent damage to the body (85%) are also key concerns.

Given these concerns, how do people feel about government regulation of human augmentation? On average, nearly half (47%) believe governments should regulate, but this topic divides opinion.

The UK is most in favour of government regulation (77%), compared to just 17% in Greece.

Kaspersky's David Jacoby says governments must learn lessons from the explosion of the Internet of Things (IoT) market in recent years.

“We found ourselves all of a sudden in a world where so many devices were connected but there was no regulation or strategy around these.. Anyone can release any kind of product they want. Before we repeat history and have mass adoption of augmentation technology, we should stop and think about how we regulate this for the good of humanity,” he adds.



Security and Human Augmentation: The Expert View

Human augmentation has saved many lives and improved the experience of millions every day. We haven't yet seen a real, widespread security threat to, say, pacemakers, but we do need to go into the future with our eyes wide open to both the benefits – and potential challenges – of human augmentation.

Anything that is connected and that you can communicate with could get hacked. It is not even just a case of hacking; an individual could simply knock out a device.

Everything that becomes regulated by the government has the potential to end up on the black market in some form. There is already an enormous biohacking community that will tag along, and people will even biohack themselves.

“Letting the market decide the future direction of human augmentation is not the way. We’re already seeing an unravelling of potential because of the dominance of market forces. We need a global strategy to make sure we harness the potential of human augmentation for good.”

Professor Julian Savulescu
Oxford University

Country-by-Country Breakdown and Analysis

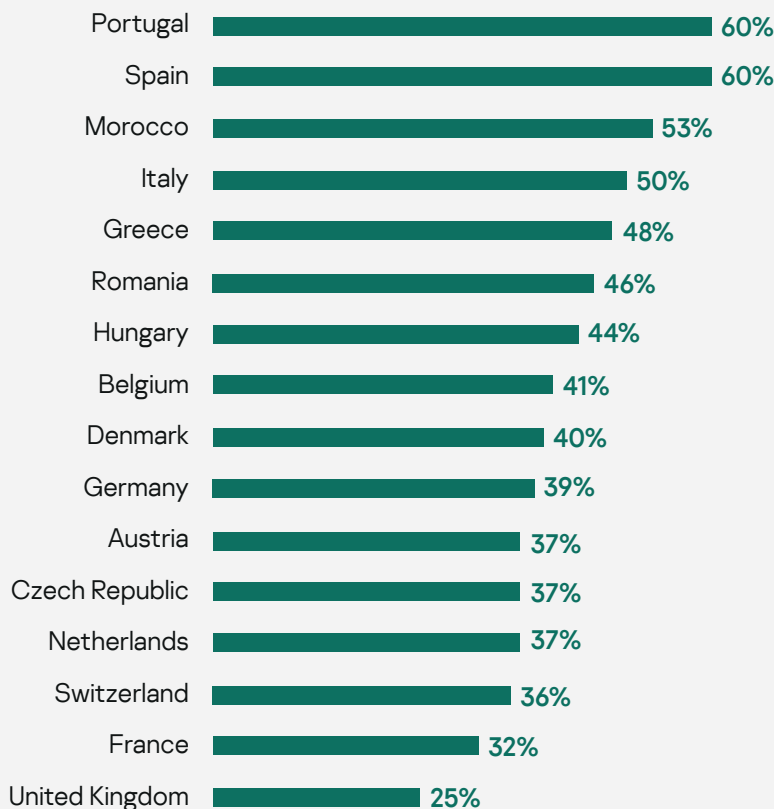
Can we draw any conclusions from country-by-country observations? After all, culture affects everything we do. Cultures will read the same data or email, for example, and interpret it in a different way because of their culture.

How people feel about human augmentation will evolve as solutions become part of our everyday – like hearing aids, pacemakers and glasses have already – so we can expect opinions to morph over time.

Currently, it appears that the countries of southern Europe – Spain, Portugal, Italy and Greece – along with Morocco across the Mediterranean, are the most open to the potential of human augmentation that many countries in the centre and north of Europe.

The people in the Iberian nations of Spain and Portugal are the most open to the prospect of human augmentation, with 60% of each country believing it is acceptable. Just nine percent of Spaniards are against the idea, compared to 36% of Britons and 30% of French adults.

Countries ranked: Is human augmentation acceptable?



Italians are the most open to human augmentation with more than eight in ten (81%) open to the idea. Hungarians (76%) and Moroccans (75%) are also highly supportive of human augmentation.

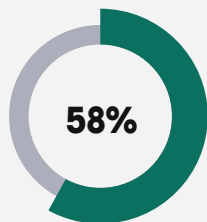
Greece is something of an outlier. Greeks are much more likely to believe in human augmentation because it could improve the quality of life (67% compared to the average of 53%). While being the most concerned (96%) of all countries about criminal or hacker activity, people in Greece are also the most opposed to government regulation.

For one of Europe's most technically advanced and wealthiest countries, the UK is perhaps surprisingly hesitant about human augmentation. Just one third (33%) of Britons would be open to human augmentation – the lowest of countries surveyed. A third (34%) of people in the UK believe human augmentation is 'unacceptable', more than three times the ratio of Spain, the most open country.

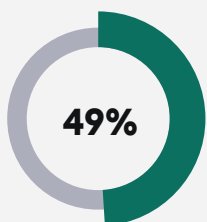
Across all countries, being able to improve overall physical health is the first choice, but in the UK having a more attractive body was second choice by just one percent. Similarly, having a better body was second choice in France by just two percentiles. Being able to have a better body was also the second choice in Belgium and Greece.

The countries most excited - and concerned - by human augmentation

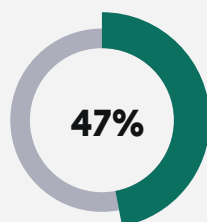
Most concerned



United Kingdom

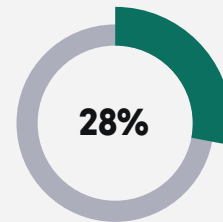


Netherlands

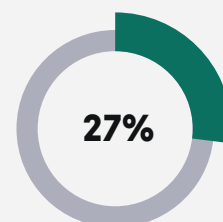


France

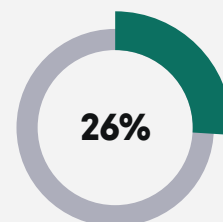
Most excited



Morocco



Italy



Spain

France, like its neighbour in the UK, appears not to be overly enthusiastic about human augmentation. For those in France who believe human augmentation is acceptable, just 39% say it would improve the quality of life, well below the survey average of 53%.

While we have seen that Italians are very open to human augmentation, more than half (52%) on adults in Italy think that it could be dangerous for society and this might help explain why Italians are far more open to government regulation of human augmentation (72%) than the survey average (47%).

Moroccans are the most optimistic (49%) for human augmentation's potential to level the playing field and encourage equality, while Brits (19%) and the Swiss (20%) are the least optimistic. Moroccans are also most likely to believe that human augmentation will make it easier for humans to express themselves creatively (58%), compared to just 18% of UK adults.

Conclusion

We're right at the very beginning of the modern human augmentation journey. Debates around the potential benefits and challenges will emerge and develop over the coming decades.

It's also important to remember that augmentation will go beyond human augmentation; the machines we interact with and rely on – for example, cars and planes, will also be augmented and enhanced by technology.

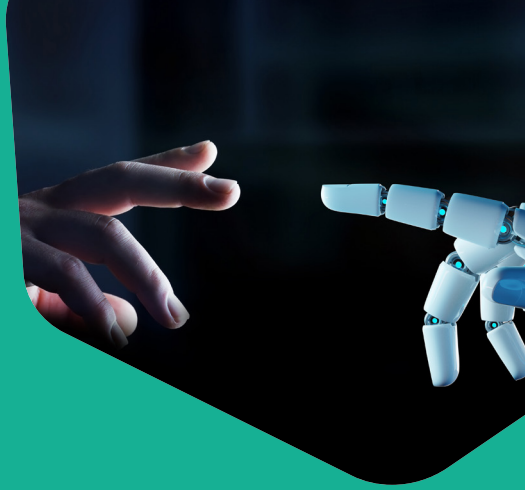
Zoltan Istvan highlights that there is a lot of money heading into human augmentation, and he believes that brain implants and neuro-prosthetics in particular will be a real game-changer. "There is no question in my mind that within five to seven years' you will walk into a major supermarket and be able to buy some type of headset that can already get you thinking in real-time in the cloud."

For Kaspersky's Marco Preuss, regulation is essential for human augmentation to advance in a safe way that will ultimately benefit society.

"Trust in government will vary from country to country, but regardless, regulation is necessary to avoid abuse" Preuss concludes. "It involves the body, so it is a risk to health, and as such perhaps should be regulated in the same way to medical technology and supplies. The average person does not have the technical expertise to fully estimate the various security risks, both immediate and long term. I also believe that regulation should be something that is considered from the first adoption of such technology, as well as security being factored in by design, rather than as an afterthought. However, we have already seen the first steps in human augmentation, yet no regulation so far."

Marco Preuss

Director of Global Research
& Analysis Team, Kaspersky



About the study

The fieldwork was conducted by Opinium Research between 9–27 July 2020. Opinium canvassed 14,500 adults in 16 countries, including Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Morocco, Netherlands, Portugal, Romania, Spain, Switzerland and the United Kingdom.

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