

# ATTITUDES OF CROATIAN CITIZENS TOWARD AI-BASED BODY AUGMENTATION: GENERATIONAL RESPONSES TO TRANSHUMANIST WORLDVIEWS

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## ABSTRACT

Artificial intelligence (AI) represents a key enabling force of transhumanism in contemporary visions of Homo sapiens technologicus, aimed at overcoming biological limitations of the human body. Young people, socialized in technologically saturated environments shaped by rapid technoscientific change, constitute a sociologically relevant group for examining transformations in perceptions of the body and human agency. This study empirically examines attitudes of citizens of the Republic of Croatia toward willingness to engage in AI-supported body augmentation across functional, health-related, physical-performance, and existential dimensions, with particular emphasis on generational differences. The findings show that most respondents express resistance to technological body enhancement, especially regarding cognitive control, contactless everyday functionalities, and cryonics. At the same time, a considerable proportion of respondents across all dimensions express ambivalent or undecided attitudes. Statistically significant generational differences in views on neural device control, health-preservation technologies, and physical augmentation indicate that younger generations are more inclined to perceive the body as open to technological intervention, while older generations adhere more strongly to notions of biological authenticity. The pronounced indecision among younger respondents suggests that transhumanist ideas, once confined to science fiction imaginaries, are increasingly entering everyday social consciousness without achieving full normative stabilization. By empirically identifying indecision as a distinctive generational feature, this study contributes to a sociological and interdisciplinary understanding of transhumanism as an ideological movement intertwined with AI and points to early stages of sociocultural adaptation toward transhumanist worldviews.

## KEY WORDS

artificial intelligence, body augmentation, transhumanism, youth, Croatia

## CLASSIFICATION

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## INTRODUCTION

The development of artificial intelligence (AI) in recent years, particularly following the commercialisation of generative models, has significantly transformed everyday life on a global scale [1; pp.309-310]. Although AI concepts and systems have been in development for decades, their transition from a primarily specialised and technological domain to broad societal integration is most often associated with the period after 2020, marked by the rapid popularisation of generative systems such as the ChatGPT family of models [2].

The expanded application of AI tools across various sectors of social functioning has generated intense debate, polarising between pessimistic perspectives, focused on the restructuring or disappearance of certain professions and the disruption of existing social services [3] and optimistic positions that emphasise the technology's potential to extend human capacities and, in doing so, achieve overall enhancement of social systems and processes [4; p.4].

In public discussions on social media and in other media outlets, attention is drawn to statements made by prominent technology entrepreneurs who attribute to AI the capacity for radical anthropological and socioeconomic transformations. In 2024, Elon Musk claimed that the majority of existing forms of work would gradually disappear and that the most valuable jobs would primarily be those oriented toward collaboration with AI. On platform X, he further projected the possibility that AI systems might soon surpass any individual, and subsequently exceed the collective cognitive capacities of humanity by 2029 [5]. Similarly, Sam Altman publicly raised the question of posthuman digitalisation of consciousness, speculating about the post-mortem use of scanned brains as a digital resource for future AI systems. Although often framed within the context of technological speculation, such statements reflect broader cultural narratives of technological progressivism and conceptual re-examination of the boundaries of the human, whilst simultaneously functioning as mechanisms of social preparation and sensitisation regarding related topics and practices.

These topics are particularly relevant in the context of transhumanism, whose developmental objectives rely on four technological domains unified under the acronym GRIN: genetic engineering, robotics, AI, and nanotechnology [6; p.12]. The transhumanist worldview proceeds from the premise that technological interventions can systematically transcend the biological limitations of the body and consciousness, thereby opening up space for the expansion of cognitive, physical, and existential dimensions of human existence, and consequently for the redefinition of identity. Such visions are articulated more concretely in the concept of *Homo sapiens technologicus* as a posthuman subject who does not merely apply technology instrumentally, but integrates it into their own corporeality and mental processes in order to extend human potentials [7; p.2]. Within this framework, it is understandable that technological actors such as Goertzel emphasise how AI is becoming a key generator of developments in nanotechnology, brain-computer interfaces, and other technologies that render transhumanist ambitions increasingly operable [8]. In other words, AI emerges as a central infrastructural tool in the operationalisation of transhumanist objectives.

Although transhumanism is not (yet) a ubiquitous topic amongst the broader population, its fundamental premises resonate with sociocultural patterns of postmodernity characterised by an orientation toward efficiency, the cult of youth, the minimisation of suffering, and the understanding of ageing and death as biological 'errors' that technological progress can mitigate or potentially eliminate [9-12]. Such a cultural matrix prepares the ground for the dissemination of concepts of bodily and cognitive augmentation into the population, indicating a symbolic space in which technological transformations of human corporeality are increasingly perceived not as radical, but rather as a continuation of the long-standing project of optimising human life.

Insight into these tendencies raises questions regarding the socio-anthropological consequences of the development of AI within transhumanist worldviews. Generational differences are particularly relevant in this context, as Millennials and members of Generation Z are socialised in digitally mediated environments and reflect broader societal trends of accepting and integrating technology into everyday life and potentially into their own corporeality.

Following the introduction, the paper outlines key concepts and technologies aligned with transhumanist objectives, after which the research methodology is presented. The analysis and interpretation of results combine descriptive and inferential statistics. The discussion situates the findings within existing empirical research and relevant theoretical frameworks, highlighting the study's contribution to understanding generational patterns in the acceptance of AI-based bodily augmentation and the broader implications for and human identity and social reality.

## **THEORETICAL FRAMEWORK**

As a movement, philosophy, paradigm, concept, or idea [12, 13], transhumanism articulates a specific relationship to science, technology, and nature [14; pp.279-292]. It is grounded in the assumption that human existence can be systematically improved through the application of technoscientific achievements, whereby life is increasingly interpreted through reductionist models that emphasise the digitalisation and informatization of human experience. This perspective is consistent with the idea of dataism, according to which biological and social processes can be understood and optimised as sets of quantifiable data [15]. In parallel, the development of biotechnologies opens up space for a bioeconomy shaped by regenerative, nano-, and personalised medicine, transforming the notion of life into a form of biocapital that can be managed and invested in. This logic is materialised in practices such as the cryogenic storage of umbilical cord blood rich in haematopoietic stem cells, which has developed in North American societies as a form of bio-insurance: a practice in which the body is understood as a resource whose future value can be capitalised upon [16].

Furthermore, supported by scientific and technological advances, particularly AI, transhumanism conceives of the human body as a machine susceptible to various modifications, replacements, or the implantation of different components [17]. In this Cartesian spirit several theoretical-practical, as well as fundamentally consequential, characteristics of such an approach to the human body can be identified. First, it entails a reorganisation of relationships toward biomedical research and various health-related industries, which are becoming increasingly privatised. In this context, the liberal-capitalist ethos guiding these developments is readily apparent. Second, the understanding of health and corporeality is expanded, and health becomes a quasi-unattainable state, given that perfect health does not exist. Health is now subject to constant monitoring, diagnosis, and risk identification at the cellular level. The mere detection of the presence or absence of disease is no longer the ultimate criterion of health status; instead, the criterion increasingly becomes what an individual seeks to enhance. From this follows the proliferation of tools aimed at achieving a state that goes beyond health as such. Third, the organisation of the healthcare system itself, particularly in terms of research orientation, has been transformed. Medicine is becoming technobiomedicine, as it grows ever more specialised and increasingly intertwined with innovative technological possibilities aimed at longevity. Biomedical research thus turns into bioengineering, with the goal of enhancing the human being beyond therapeutic necessity. Fourth, the doctor-patient relationship is changing due to the development of chatbots and social networks. This new relationship gives rise to the long-standing phenomenon of so-called biocitizenship [18], centred on individualised health and oriented toward personal and identity-related aspirations. From this emerge transhumanist notions of morphological freedom, as well as the emphasis on pseudo-virtual representations of the self. Fifth, the diffusion of this new understanding of

corporeality and individuality is shaped by the spirit of consumerism. The body thus becomes a site of infinite identity possibilities. Both body and identity undergo metamorphoses, facilitated by broader transhumanist operations of invasive and non-invasive aesthetic surgery, which symptomatically support the “struggle” against wrinkles and signs of ageing, reinforcing the cult of the slim and youthful body as a form of capital in consumer society [11].

In light of the above, it becomes evident that the development of AI is not merely a reflection of the digital revolution, but also an operational partner of transhumanism in the realisation of a posthuman vision of humanity and society. This is further illustrated by the overview of emerging technologies, with selected examples examined in the present study.

The Thync device<sup>1</sup> represents a commercial neuromodulation and neurostimulation device whose primary purpose is the regulation of emotions and mental states by emitting electrical impulses through the surface of the skin, thereby influencing the state of the nervous system and levels of arousal [19; p.122]. It is a wearable device placed on the head to manage and regulate emotions, although it should be noted that there is still insufficient evidence regarding its effectiveness.

The possibility of directly linking the brain to an electronic device prompted Elon Musk, in March 2017, to announce Neuralink, a name that is itself highly indicative. It combines “Neural” (referring to neuronal systems) with “Link” (referring to external electronic tools). Neuralink thus became a company developing an interface that connects the brain to a computer. The system involves a surgically implanted device that enables individuals with neurological and motor impairments to regain sensory and motor functions [20]. Users can control a computer or smartphone directly through brain signals. Unlike Stephen Hawking, who relied on eye and facial movements, Neuralink aims to enable a far more advanced form of communication, directly from the brain [21]. The broader goal is also to enhance neural and cognitive capacities beyond typical human levels. Along similar lines, Mindflex was introduced as a “wearable brain” designed to improve concentration or to play video games using thought. The device was launched by Mattel in 2009. Users wear a headband equipped with EEG sensors that register levels of concentration and focus. A study conducted in China in 2025 showed that the experimental group of students using Mindflex for neurofeedback training demonstrated significant improvements in attention, with a large effect size, compared to the control group [22].

A particularly notable example is the Eyeborg project, which involves an ocular prosthesis that Rob Spence, a Canadian filmmaker, had fitted following an accident. Although his artificial eye is not connected to the brain or optic nerve, it contains a camera that, at the time, could record for up to 30 minutes [19; pp.102-103]. The device includes a red LED light that illuminates during recording, clearly signalling to others that they are being filmed. According to Spence, such technological achievements alter the way we think about privacy, in contrast to devices like Google Glass, which could record continuously and covertly without anyone noticing [23]. A similar prosthesis was developed by Neil Harbisson, who was born with achromatopsia but can perceive colours through a cybernetic eye that converts them into musical notes, allowing him to experience colour via sound [24].

The ultimate culmination of these efforts arguably lies in cryonics as a tool for achieving immortality, which involves freezing the body, or in some cases only the head, at approximately  $-150\text{ }^{\circ}\text{C}$  immediately after death, with the aim and expectation that future biomedical developments could restore the individual to life while preserving their identity [25]. Beyond the absence of scientific evidence supporting the success of cryonic procedures, Umeh identifies several ethical and social challenges, including autonomy and informed consent, respect for human dignity, economic and social justice, religious and spiritual concerns, effectiveness, and the impossibility of empirical verification [26].

## RESEARCH DESIGN

The research objective of this study was to empirically examine the attitudes of citizens of the Republic of Croatia toward their willingness to engage in technological augmentation of their own bodies with the assistance of AI, across five analytical dimensions encompassing functional, health-related, physical, cognitive, and existential aspects associated with transhumanist visions of the future human, that is, the concept of the posthuman being. Particular emphasis was placed on generational patterns in attitudes toward AI-based body augmentation, with the aim of assessing the extent to which respondents' age is associated with acceptance, rejection, or ambivalent orientations toward transhumanism.

Based on this objective, the following research questions were formulated:

**RQ1:** What are respondents' attitudes toward different forms of AI-based augmentation of their own bodies?

**RQ2:** Is there an association between respondents' attitudes toward AI-based body augmentation and their age?

The analysis of the first research question provides insight into general patterns of acceptance, rejection, and indecision regarding technological body augmentation across the five analytical dimensions, while the second research question focuses on identifying age-related patterns in these attitudes. This analytical framework contributes to a deeper understanding of societal perceptions of transhumanist ideas within the Croatian sociocultural context, while simultaneously illuminating generational patterns of adaptation to accelerated technological change. In this way, the contribution of the study extends beyond declarative attitudes to encompass levels of potential practical and symbolic readiness of different generations for the technological transformation of the human body and society.

The research instrument measuring respondents' attitudes toward transhumanism consisted of five statements assessing willingness to engage in different forms of AI-supported body augmentation, measured using a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For the purposes of statistical analysis, the scale categories were recoded into three groups by merging strong and partial disagreement (1); retaining originality of the neutral category of undecided respondents (2); merging partial and strong agreement (3). The statements covered several domains of AI application, including neural control of devices via thought, health preservation and disease prevention, contactless performance of everyday functions such as payment and identification, enhancement of physical strength and endurance, and cryogenic body preservation with the expectation of potential future revival.

The original age variable, consisting of five categories, was recoded into two analytical groups: younger respondents (15 to 34 years) and older respondents (35 to 55 and above).

This age operationalization is grounded in contemporary Croatian youth research, which consistently indicates a gradual upward shift in the upper age boundary of youth [27-29]. Sociological and interdisciplinary approaches to youth in Croatia commonly define the lower boundary of youth at age 15, while the upper boundary varies, extending beyond 25 years in many studies and reaching up to 30 or even 34 years in others [27]. Later studies confirm this trend and attribute the prolongation of youth to broader social and economic changes, including extended education, delayed labor market entry, prolonged co-residence with parents, and postponed parenthood [28, 29]. Consequently, contemporary sociological perspectives increasingly conceptualize youth as a stretched life phase that frequently includes individuals up to 34 years of age, reflecting transformed life-course transitions into adulthood.

This age classification follows a sociocultural approach: the younger group represents a generation socialized within digitally mediated environments, while older respondents are

characterized by more established value systems and more traditional understandings of the body and technology. Within this framework, current youth research also critically revisits the assumption that younger generations are inherently carriers of progressive social ideas, including openness toward biotechnological and transhumanist futures [30].

Statistical analysis included descriptive frequency analysis with graphical representations of response distributions for each statement, as well as a chi-square test of independence conducted at a significance level of  $p > 0,05$  to research associations between age groups and attitudes toward AI-supported body augmentation.

## ANALYSIS

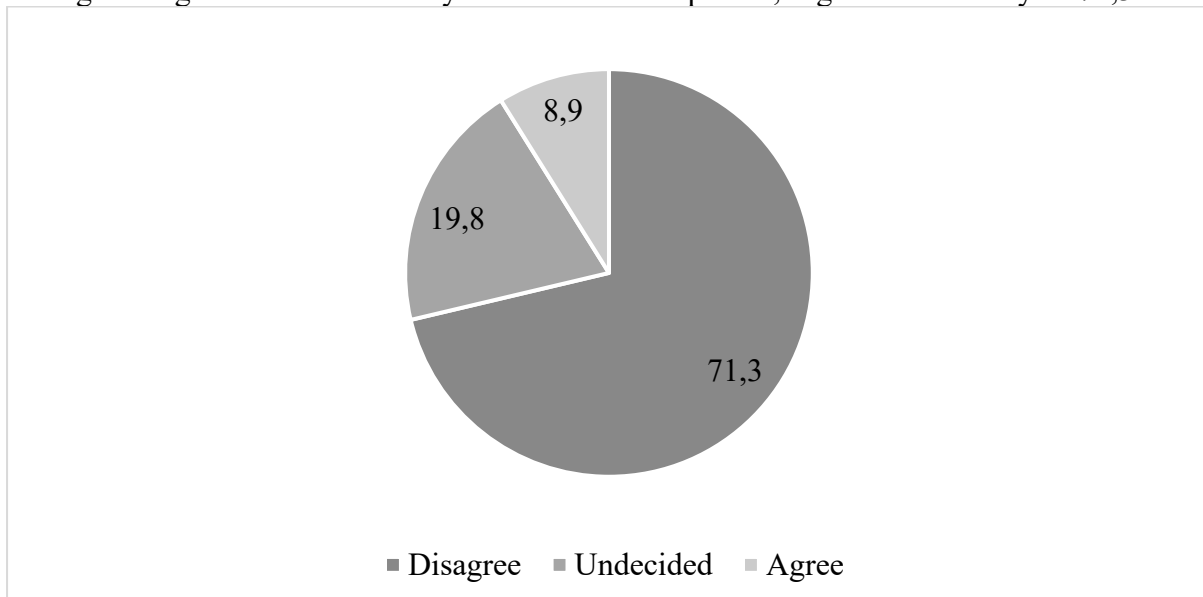
This section presents the results of the statistical analysis conducted to address the stated research questions. The analysis was carried out in two complementary stages. In the first stage, descriptive statistics were applied alongside graphical representations of response distributions, providing an overview of general patterns of acceptance, rejection, and ambivalence toward various forms of AI-based body augmentation among respondents.

In the second stage, a chi-square test of independence was employed at a confidence level of  $p > 0,05$  in order to explore whether an association exists between respondents' age and their attitudes toward transhumanism, operationalized through their stated willingness to engage in AI-supported body augmentation. This two-stage analytical design enables both descriptive and inferential insights, thereby ensuring a comprehensive response to the research objectives.

## DESCRIPTIVE ANALYSIS

This subsection presents the frequency distributions of responses for each statement across the five analytical dimensions of AI-based body augmentation. Figures are used to facilitate a clear comparison of levels of acceptance, rejection, and indecision toward transhumanist technologies among respondents. These descriptive findings provide the empirical foundation for identifying overarching attitudinal patterns and serve as the basis for addressing the first research question **RQ1**.

The possibility of augmenting one's own body with AI technologies that enable device control through thought is met with a very low level of acceptance, Figure 1. As many as 71,3% of

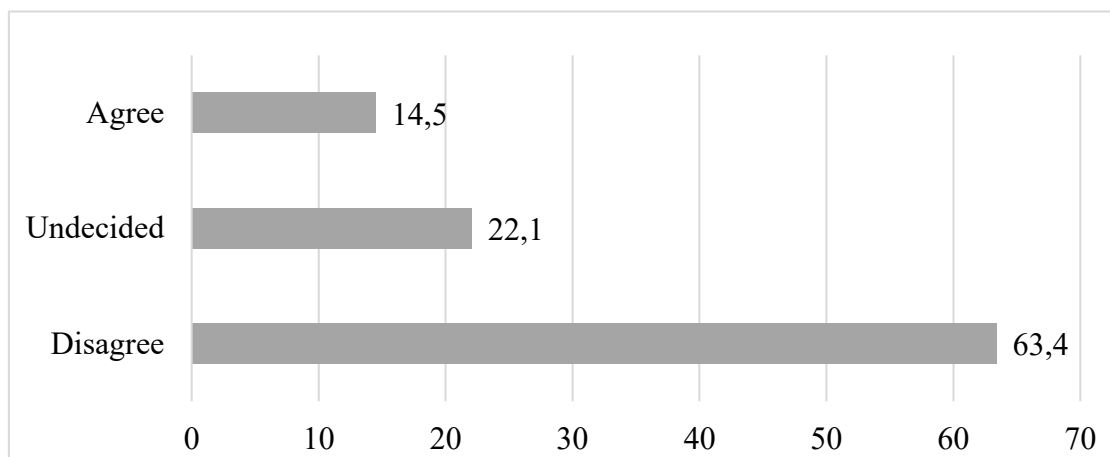


**Figure 1.** Respondents' willingness to augment their own bodies with AI to control devices with their own thoughts ( $N = 500$ ). Numbers denote percentages.

respondents reject this type of intervention, while only 8,9% report a willingness to consider its use. These findings can be interpreted in light of contrasting technological imaginaries: on the one hand, optimistic scenarios emphasize the therapeutic potential of such technologies in treating neurological disorders and enhancing sensory and motor functions, but on the other hand, critical perspectives highlight risks related to privacy violations, imposed control, and the erosion of personal autonomy [31; p.72].

At the same time, the relatively high proportion of undecided respondents (19,8%) is particularly indicative when considered alongside projections that the global market for neural interfaces and brain-computer interface (BCI) technologies is expected to grow by 10% to 17% by 2030 [32]. Such dynamics may contribute to the gradual normalization of these technologies which, in line with transhumanist worldviews, carry the potential to transform human nature, identity, and fundamental social values [30]. Taken together, the findings suggest that respondents' attitudes reflect a simultaneous perception of technological risk and a notable degree of ambivalence toward this form of intervention.

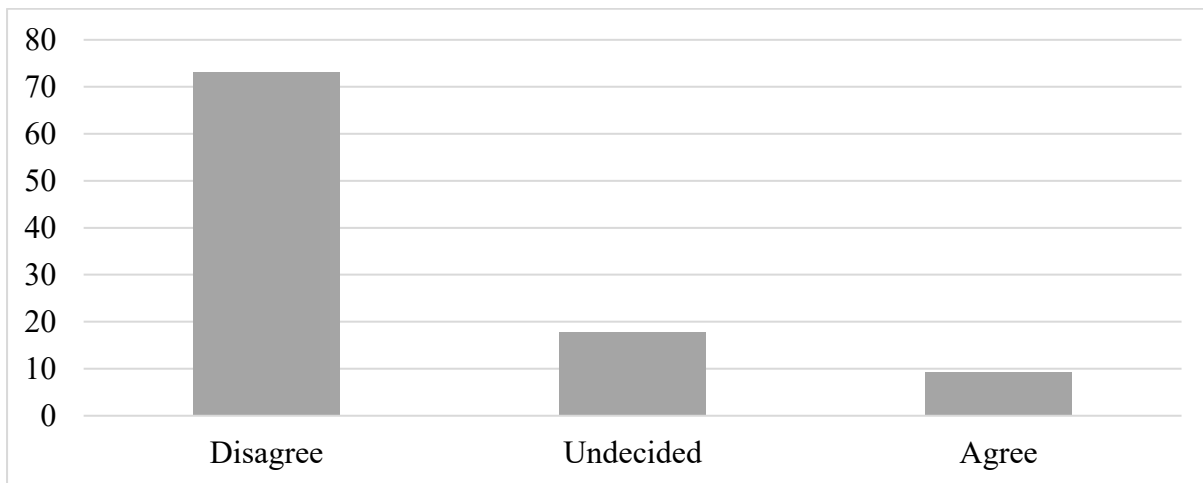
AI augmentation aimed at adapting bodily characteristics for health-related purposes encounters a somewhat lower, yet still pronounced, level of resistance, Figure 2: 63,4% of respondents do not support such an intervention, while 14,5% express a willingness to accept it. Although the health domain is generally considered the most socially acceptable context for biotechnological innovation, the findings indicate that even the argument of health enhancement is insufficient to persuade the majority of respondents. At the same time, the proportion of undecided respondents (22,1%), the highest among all analysed items, points to a potentially open space for attitudinal change in the direction of greater acceptance.



**Figure 2.** Respondents' willingness to augment their own bodies with AI for health preservation and disease prevention ( $N = 500$ ). Numbers on the right to bars denote percentages.

When it comes to augmenting the body with AI technologies for the performance of everyday functions such as opening doors, making payments, or identification, a high proportion of respondents (73,1%) reject such an intervention, while only 9,3% express a positive attitude toward it, Figure 3. The share of undecided respondents (17,7%), although somewhat lower than in other types of technological applications, still points to the presence of considerable uncertainty rather than clearly articulated resistance.

Despite assumptions that functional and practical applications might be more acceptable due to their immediate usefulness in everyday life, the results indicate precisely the opposite: respondents overwhelmingly reject them. These findings correspond with the results of a study by Brstilo Lovrić and Zujčić [12], in which a similar technology recorded one of the lowest levels of acceptance among students in the city of Zagreb. In that study, 9,6% of students stated that they would implant a chip in their own body for the purposes of self-identification or opening

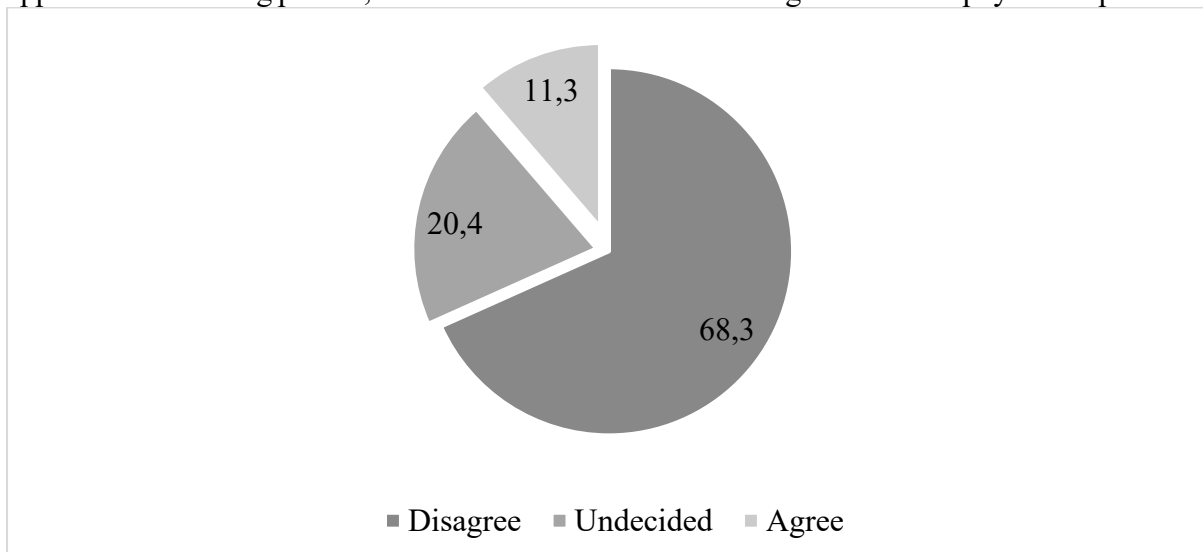


**Figure 3.** Respondents' willingness to augment their own bodies with AI for contactless performance of everyday activities ( $N = 500$ ). Axis ordinate denotes percentages.

doors. The only practice that achieved a lower level of agreement than the one described was the use of a biomedical intervention on a child's embryo aimed at enhancing characteristics such as eye colour or height, with which 9,2% of respondents agreed.

The obtained finding can be interpreted as an expression of a strong prioritisation of the protection of everyday autonomy and privacy, suggesting that individuals are more sensitive to technologies that potentially undermine immediate control over their identity, intentions, and personal actions than to those that alter bodily or health-related functions. This pattern is further supported by Gurtner's argument concerning people's reluctance to allow systems access to their intentions and inner thoughts [33]. This indicates that the perceived "invasiveness" of technology in the sphere of personal autonomy emerges as a stronger source of uncertainty than body-oriented applications, further confirming that the experience of control over one's own behaviour and identity represents a key factor in potential resistance to transhumanist interventions.

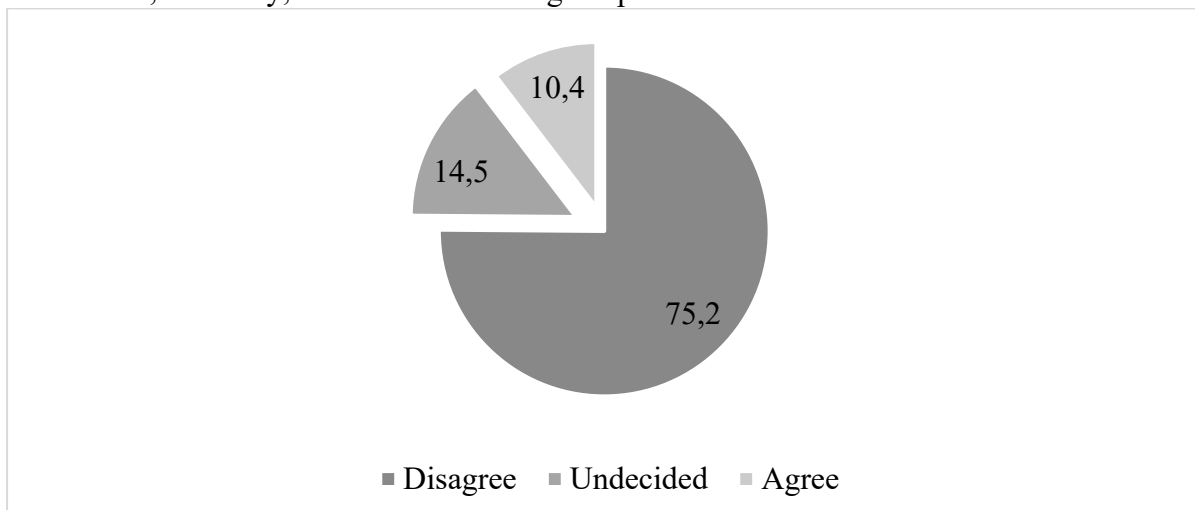
AI interventions aimed at increasing strength, resilience, and endurance are rejected by 68,3% of respondents, while 11,3% are willing to accept them, Figure 4. Although resistance again appears as a recurring pattern, a subtle shift is observable: the augmentation of physical capabilities



**Figure 4.** Respondents' willingness to augment their own bodies with AI to achieve enhanced physical abilities ( $N = 500$ ). Numbers denote percentages.

encounters somewhat less opposition than neural control. This may suggest that respondents more readily accept interventions perceived as “external” and functional, as opposed to those experienced as intrusive and transformative. The share of undecided respondents (20,4%) once again indicates that resistance is not fully consolidated, but rather permeated by uncertainty.

Cryogenic body preservation, as the most radical form of technological intervention accompanied by the belief that AI will enable future reanimation, encounters the strongest resistance among respondents: as many as 75,2% reject this possibility, Figure 5. Nevertheless, although willingness to accept such a technology is low (10,4%), this proportion is still higher than in some less extreme technological examples examined in this study. This apparent paradox suggests that highly radical technologies may mobilise a specific segment of the population that is open to transhumanist ideas and concepts of life extension. An additional 14,5% of undecided respondents indicates that there is a certain space for reconsidering the boundaries of life and death, as well as for trust in future technological progress. Such ambivalence is also reflected in international research. A US-based study among internet users shows that a high 48% consider cryopreservation an “exciting idea” they plan to explore further [34; p.6]. Similarly, a representative German study reports that 20,4% of respondents regard post-mortem body freezing as a conceivable option, with fear of death also highlighted as an important factor of acceptance [35; p.264]. Taken together, these findings suggest that even the most radical biotechnological practices open up space for new ways of understanding humanness, mortality, and future technological promises.



**Figure 5.** Respondents’ willingness to undergo long-term bodily cryopreservation based on the belief that future AI development could enable revival and life extension ( $N = 500$ ). Numbers denote percentages.

The following section presents an analysis conducted to address the second research question **RQ2**.

### **Relationship Between Respondents’ Age and Attitudes: Chi-square test**

This section explores the relationship between respondents’ age and their attitudes toward transhumanism, operationalized as willingness to engage in various forms of AI-supported body augmentation, in order to address the second research question. To facilitate insight into generational patterns in the acceptance of transhumanist ideas, the original five-category age variable was recoded into two groups: younger respondents (15-34 years) and older respondents (from 35 to 55 years and above). The chi-square test of independence was applied to assess the statistical association between age and each specific attitude, with results presented in Tables 1-3.

**Mind control.** The first statement, assessing willingness to augment the body with AI to control devices using one's own thoughts, revealed a statistically significant association with age ( $p < 0,05$ ), Table 1.

**Table 1.** Respondents' willingness to augment their own bodies with AI to control devices with their own thoughts with age: Chi-square test.

Age	<i>I would augment my own body with artificial intelligence that would enable me to control devices using my own thoughts.</i>							Chi-square
	NO	%	Undecided	%	YES	%	Total, %	
Younger respondents	29	52,7	18	32,7	8	14,5	19,5	$\chi^2(df = 2, N = 282) = 9,115$ $p = 0,010$
Older respondents	163	71,8	36	15,9	28	12,3	80,5	
Total	192	68,1	54	19,1	36	12,8	100	

The findings indicate that the majority of respondents reject the possibility of augmenting the body with AI; however, a clear generational pattern emerges in the distribution of attitudes. Among younger respondents, 52,7% reject such an intervention, 32,7% are undecided, and 14,5% are willing to accept it, whereas older respondents display a higher level of rejection (71,8%), a lower share of undecided individuals (15,9%), and a similar proportion of those willing to accept it (12,3%).

This attitudinal pattern indicates that younger generations, socialised in digital environments, show greater openness to reflecting on technological bodily augmentation, as reflected in their substantially higher share of undecided respondents (32,7% vs. 15,9%). This disparity suggests an ongoing process of cultural adaptation among younger individuals, in which the boundaries between the natural and the technological are being reassessed, potentially facilitating future acceptance of transhumanist ideas, while older respondents retain a more stable orientation toward biological authenticity. This pattern aligns with the findings of Oprea and Bare, who identify younger individuals as more likely to belong to the category of technological visionaries marked by openness to innovation and lower ethical concern, particularly regarding technologies such as brain-computer interfaces and implanted chips [36]. In comparison with the present results, younger respondents' openness is expressed less through explicit acceptance and more through pronounced indecision, indicating an early or exploratory stage of engagement with technological interventions in the human body.

**Health preservation and disease prevention.** The second statement, assessing willingness to augment the body with AI to enhance physical endurance and strength, showed a statistically significant association with age ( $p < 0,05$ ), Table 2.

The distribution of attitudes indicates that the majority of respondents, particularly older participants, reject the transhumanist idea of adapting the body for the purpose of health

**Table 2.** Respondents' willingness to augment their own bodies with AI for health preservation and disease prevention with age: Chi-square test.

Age	<i>I would augment my own body with artificial intelligence that would enable the adjustment of my bodily characteristics for the purpose of preserving health and preventing disease</i>							Chi-square
	NO	%	Undecided	%	YES	%	Total, %	
Younger respondents	29	53,7	13	24,1	12	22,2	19,2	$\chi^2(df = 2, N = 281) = 6,248$ $p = 0,044$
Older respondents	151	66,5	53	23,3	23	10,1	80,8	
Total	180	64,1	66	23,5	35	12,5	100	

preservation. Among younger respondents, 53,7% reject this possibility, 24,1% are undecided, and 22,2% would accept it. Among older respondents, rejection is even more pronounced (66,5%), accompanied by 23,3% of undecided respondents and only 10,1% who would accept such a technological intervention. These findings point to greater openness among younger respondents, most clearly reflected in the proportion of those oriented toward transhumanist ideas, which is twice as high among the young (22,2% compared to 10,1%). At the same time, the share of undecided younger respondents (24,1%) suggests an ongoing process of reflection on the possibilities and implications of health-related AI interventions, whereas older respondents maintain a more stable and cautious stance toward altering the body's biological functions. Overall, this statement further confirms a generational pattern in which younger individuals are more inclined to consider transhumanist ideas, while older individuals remain more strongly oriented toward preserving a traditional, biological understanding of the body.

This pattern is partially consistent with the findings of Stefański and Jach who report that a positive attitude toward technological enhancement is associated with a scientific worldview, trust in science, and evolutionary humanism, and negatively associated with the value of tradition [31]. Although the present study does not directly measure value orientations, generational differences in the acceptance of AI interventions can be interpreted within this framework. Younger respondents, socialised in contexts where scientific and technological discourse holds greater cultural legitimacy, show a markedly higher willingness to engage in technological health enhancement (22,2% vs. 10,1%). Conversely, older respondents predominantly express rejection, consistent with Stefański and Jach's findings on the negative relationship between the value of tradition and acceptance of technological enhancement. The substantial share of undecided younger respondents (24,1%) suggests an ongoing process of value negotiation, supporting the view that a scientific worldview facilitates, but does not guarantee, acceptance of technological intervention. Overall, these findings support the applicability of Stefański and Jach's value-based framework for interpreting attitudes toward technological enhancement.

**Above-average physical abilities.** The third statement about willingness to augment their own bodies with AI to achieve enhanced physical abilities readiness according to the age of the respondents ( $p < 0,05$ ), Table 3.

The distribution of attitudes toward the augmentation of physical abilities reveals a clear generational contrast. Among younger respondents, 45,5% reject the possibility of AI augmentation, while 40% are undecided and 14,5% would accept such an intervention. In generational terms, older respondents show substantially higher levels of rejection (71,4%), with 16,3% undecided and 12,3% willing to accept augmentation. The exceptionally high proportion of undecided younger respondents (40%) strongly reflects the pattern described by

**Table 3.** Respondents' willingness to augment their own bodies with AI to achieve enhanced physical abilities with age: Chi-square test.

Age	<i>I would augment my own body with artificial intelligence that would enable above-average physical abilities, such as increased resistance to fatigue or greater strength and endurance</i>							Chi-square
	NO	%	Undecided	%	YES	%	Total, %	
Younger respondents	25	45,5	22	40,0	8	14,5	19,5	$\chi^2(df = 2, N = 282) = 16,538$ $p = 0,001$
Older respondents	162	71,4	37	16,3	28	12,3	80,5	
Total	187	66,3	59	20,9	36	12,8	100	

Lukov: young people are not necessarily leaders of transhumanist progressivism, but rather selective in their acceptance of body-altering technologies [30]. Lukov argues that younger individuals tend to prefer interventions that are already socioculturally familiar and normalised, such as cyborgisation and life extension, while rejecting more radical interventions that challenge notions of naturalness. The present findings replicate this pattern of selectivity: younger respondents are neither strongly transhumanist nor firmly rejecting; instead, they display a high level of indecision, signalling an ongoing process of consideration of culturally newer and less normatively anchored concepts such as AI-based augmentation. Older respondents, with their markedly high level of rejection (71,4%), reflect more stable traditional orientations, likewise consistent with Lukov's assertion that sociocultural norms play a central role in shaping attitudes toward technological enhancement of the human body [30].

**Bodily cryopreservation and contactless performance of everyday activities.** No statistically significant association was found between age and willingness to adopt AI-based augmentation for everyday functions or cryogenic body preservation ( $p > 0,05$ ). Across both age groups, a general pattern of caution prevails, with the majority of younger respondents rejecting AI augmentation (63%) or cryonics (66,7%) and a minority remaining undecided or open, while older respondents show similar restraint, though with slightly higher openness to long-term life-extension technologies. Overall, the findings indicate that caution constitutes the dominant pattern in both age groups with generational variations in emphasis: younger respondents focus more on everyday AI applications, whereas older respondents show comparatively greater interest in technologies aimed at extending life.

## DISCUSSION

The research results indicate that citizens of the Republic of Croatia generally adopt a reserved stance toward the augmentation of the body with AI. Across all analysed domains, the majority of respondents reject the possibility of technological intervention in their own bodies, with the most pronounced forms of resistance recorded in the areas of thought-based device control, the contactless performance of everyday functions, and cryonics. Willingness to engage in augmentation rarely exceeds 10%, while a substantial share of undecided respondents appears in all domains, pointing to attitudes that are not yet fully stabilised and to an ongoing process of their formation.

Age proved to be an important factor in differentiating attitudes. Younger respondents (15-34 years) more frequently express openness toward technological augmentation, albeit accompanied by pronounced ambivalence, whereas older respondents (35-55 and above) predominantly adopt a non-transhumanist orientation. The most pronounced age-related differences were observed in the domains of neural control, health-related AI interventions, and the augmentation of physical capabilities, in which younger respondents more often consider or accept the possibility of technological enhancement of the body.

This pattern is consistent with the findings of Oprea and Bare, who identify a profile of "technologically advanced visionaries", more frequently represented among younger individuals and characterised by a positive evaluation of the potential of technology to improve health and human capacities, as well as an interest in advanced applications such as brain-computer interfaces, alongside a lower salience of ethical concerns [36; p.9]. In this sense, the greater openness of younger respondents in the present study is not primarily manifested through high levels of acceptance, but rather through an elevated share of undecided respondents, indicating an early stage of cultural adaptation and a more intensive engagement with transhumanist ideas.

In domains involving either highly radical or highly routinised technological interventions, such as cryonics and contactless everyday functions, age differences are not statistically

significant, pointing to a broadly shared sceptical orientation toward the full integration of technology and the human body, regardless of generation.

In conclusion, the results point to a generational pattern in which younger generations, socialised within digitally mediated environments, display greater cognitive and value-based openness toward transhumanist possibilities, while older generations retain more stable conceptions of biological authenticity.

## **CONCLUSION**

The aim of this study was to empirically examine the attitudes of citizens of the Republic of Croatia toward AI as a tool for technological augmentation of the human body, with particular emphasis on generational patterns in the acceptance of transhumanist ideas. By analysing five dimensions of AI-supported bodily augmentation across cognitive, health-related, functional, physical, and existential aspects, the study offers a sociological and interdisciplinary insight into the ways in which contemporary technological imaginaries are reflected in social attitudes.

The results demonstrate that Croatian society is characterised by a cautious and reserved attitude toward AI-based body augmentation, regardless of the type of intervention. The majority of respondents reject the possibility of deep technological integration into their own corporeality, particularly in relation to thought-based control, contactless everyday functions, and cryonics.

At the same time, the high proportion of undecided respondents represents one of the most significant findings of the study. This indecision cannot be interpreted as mere value neutrality, but rather as an indicator of active reflection on the relationship between humanistic conceptions of the body and transhumanist objectives, a finding corroborated by qualitative research on transhumanist imaginaries in Croatia [37], which shows that hesitation toward AI-based body augmentation is grounded in articulated ethical, anthropological, and existential concerns rather than indifference. In this sense, transhumanism in the Croatian context does not emerge as an accepted or consolidated ideology, but as an open symbolic field in the making, within which the boundaries of the conceivable are still being negotiated.

Age-based analysis shows that respondents' attitudes diverge most strongly in domains that directly affect bodily and psychophysical integrity, such as thought-based control, health-related interventions, and the augmentation of physical capabilities. Although these findings do not point to universal acceptance of transhumanist ideas among younger respondents, a clear pattern of greater openness and more pronounced ambivalence is evident in comparison to older groups, which more frequently retain a stable non-transhumanist orientation grounded in notions of biological authenticity. Age is therefore not understood solely as a demographic variable, but as a sociocultural indicator of differing generational responses to technological possibilities.

The authors' interpretation is that younger generations, socialised within digitally mediated and technologically accelerated environments, do not embrace transhumanism unreservedly, but are more inclined to conceive of the body as a potentially open and augmentable project. Their indecision may signal the initiation of a longer-term process of sociocultural negotiation over the boundaries of the human. In this way, the generational pattern manifests not only in levels of acceptance of technological possibilities, but also in divergent ways of understanding the body, identity, and the future of humanity.

The scientific contribution of this study is evident on several levels. First, the research provides a rare empirical insight into attitudes toward transhumanism within the Croatian sociocultural context, which remains underrepresented in the existing literature. Second, by conceptualising indecision as an analytically relevant category, the study moves beyond a binary division between acceptance and rejection and highlights transitional forms of value orientation under conditions

of accelerated technological development. Third, by linking AI with transhumanism as an ideological project, the research contributes to understanding AI not merely as a technical tool, but as a sociocultural and anthropological factor of social change. The future trajectory of this adaptation will depend on the interaction between technological advancement, ethical debates, institutional regulation, and generational dynamics, thereby opening space for future longitudinal and comparative research on attitudes toward humans and society in and of the future.

## REMARK

<sup>1</sup>Although this device is frequently discussed across various platforms and conferences, it should be noted that there are still no scientifically proven or effective applications of this technology. At present, it certainly appears more akin to science fiction. However, the reality of contemporary technoscientific developments bears witness to the fact that science fiction often anticipates science itself and ultimately becomes validated through it.

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