Artificial Intelligence and Global Challenges: Insights from an Exploratory Survey of Public Opinion

Raquel Ribeiro[1*], Filipe Santos[1], Ana Teixeira de Melo[1,2], Philip Garnett[3], Andreia Sofia Teixeira[4], Leo Caves[5], Letícia Renault[1], and Paula Duarte Lopes[1,6]

[1]Centre for Social Studies, University of Coimbra, Coimbra, Portugal
[2]Independent researcher, Portugal
[3]School for Business and Society and the Institute for Safe Autonomy, University of York, UK
[4]BRAN Lab, Network Science Institute, Northeastern University London, UK
[5]LiLo Institute, Salreu, Portugal
[6]Faculty of Economics, University of Coimbra, Coimbra, Portugal
Email: raquelribeiro@ces.uc.pt (R.R.); filipesantos@ces.uc.pt (F.S.); anamelopsi@gmail.com (A.T.M.); philip.garnett@york.ac.uk (P.G.); sofia.teixeira@nulondon.ac.uk (A.S.T.); leo.caves@gmail.com (L.C.); lerenault@gmail.com (L.R.); pdl@fe.uc.pt (P.D.L.)
[*]Corresponding author

***Abstract*—The world is facing rapid, vast and profound societal transformations that challenge human confidence of persons and things. Developments in the field of Artificial Intelligence (AI) have been explored in relation to the need to tackle these complex challenges and to generate social good. However, misinformation and disinformation about AI (and generated by AI itself) have been identified as one of the major global risks for the future. This study is part of a broader research project analysing the potential of AI to support complex modes of thinking in the face of current global challenges, examining the potentialities, constraints, and risks. It aims to examine public opinion on AI, specifically representations of AI, its possible impacts, and the trustworthiness of institutions that regulate AI. To achieve this aim, an online survey comprising closed and open-ended questions was conducted within the three-phase model of social representations theory framework in 2024 (N=383). The results of the free association of words shows that AI is mainly associated with the "future", "robots", "technology" and "innovation". Two opposing positions on AI were found; (i) Supporters associate AI with potential benefits in line with technological optimism, such as automation, speed and efficiency; (ii) Critics stress the degradation of social and human values. These two groups also differ in terms of the likelihood that they would consider using AI and the level of trust they place in the information they obtain from AI use for different purposes, including academic tasks. The results point to the need to stimulate further public initiatives to discuss the potential impacts of AI in society as well as on the role of institutions in its regulation.**

***Keywords*—artificial intelligence, public opinion, positive and negative impacts, use and trust, regulation**

I. Introduction

The field of Artificial Intelligence (AI) has seen rapid development in recent years. Both the academic literature and everyday media discourses on AI are divided between those adhering to an optimistic stance and claiming its potential benefits, and those highlighting potential dangers and the implications for the organization of society and its practices, in a variety of domains, from work to education, to health management and policy-making [1].

With the aim of analyzing the potential of AI to support more complex modes of thinking in the face of current global challenges, an exploratory research project was developed [2] to assess the possibilities and limits of the interaction of a framework for the practice and promotion of Complex Thinking [3] with AI tools based on Large language models (LLMs) like ChatGPT, Gemini, or Claude. Given that the use of AI tools to scaffold more complex modes of thinking is dependent not just on the technical performance of such tools but also on how people interact with them and that these interactions may be shaped by how they perceive and represent them, the project also involved the development of an exploratory survey to capture public opinion regarding AI and the use of AI and, in particular, explore the dimensions that are associated with optimism vs. skepticism, adherence vs. refusal [4]. This paper describes the materials and methods of the survey conducted within the three-phase model of social representations theory framework [5, 6], and discusses the main results of the study, namely the societal implications regarding the acceptability, trust and knowledge of the use of AI tools in different domains (e.g., health, finance, higher education), as well as need for preparation and regulation. While restricted by sample limitations, these findings provide important implications for policy and practice.

II. Literature Review

Advances in AI have simplified the access, management, and interaction with large-scale information, potentially encouraging complex knowledge formation [7]. Such advancements have been explored for their potential to tackle complex challenges and to generate social good. In the words of Cowls and collaborators [8] "designed well, AI technologies can foster the delivery of socially good outcomes with unprecedented scale and efficiency" (p. 114).

LLMs from the field of machine learning, a subfield of AI, are statistical models generally based on artificial neural networks, of the associations between words (or, more broadly, tokens) built from large text collections, such as books, papers, web pages, and social media content [9]. A milestone in LLMs came in November 2022 with the public release of ChatGPT (Chat tool based on Generative Pre-trained Transformer LLM) developed by OpenAI. Designed to produce text in response to user prompts, ChatGPT outputs are widely regarded as approaching a quality close to text produced by a human. This tool, built initially on GPT v3.5, trained using the largest dataset to date and enhanced by human fine-tuning, crossed a threshold of acceptance/utility with users, and has (along with other similar tools) gained

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widespread popularity, offering new possibilities for human AI-Interaction [10]. This model's capabilities, including its ability to adapt to context, support an intuitive and natural form of interaction that feels conversational and human-like [10]. The developments in the field have led to a rapid expansion of the number of LLMs, which differ in training data, design, and applications, including models such as Claude, Gemini and Llama. Other tools, such as DALL-E, Dreamfusion, Codex, Midjourney, are capable of creatively working not only with text but converting user prompts into images, audio, video, code or vice-versa [11]. Gradually, these different functionalities are being incorporated into single "multi-modal" tools.

Advances in AI are promoting its application in several domains. For instance, in healthcare and medicine, AI can be used to assist with patient triage, medical diagnosis and treatment recommendations, and clinical research and development. In business and finance, AI can be used to develop customer service chatbots, market analysis, fraud detection and risk management. In law, it can be used to analyze legal data and guide research, review contracts and assist with document drafting. In education AI can be used to provide personalized learning experiences, online tutoring and assist teachers in study materials, test-taking strategies, and practice exams. Concerning media and entertainment, AI can be used to create content and assist with content curation (e.g., scripts, recommendations), and audience engagement through chatbots, social media, and interactive experiences. AI can also be used in autonomous systems, object detection, and decision support in military operations, and improving the efficiency in many areas of government (e.g., traffic management, public infrastructure, customer service activities) [1, 12, 13].

However, the growing realism of AI-generated content produced by LLM tools, has contributed to the spreading of malicious "deepfakes", and the growing sophistication of bots using these models. These developments have raised significant concerns, since it has become progressively more difficult, for the average user, to distinguish between human and machine generated content [14].

AI models pose different types of challenges and risks, namely in domains of security, safety, fairness, robustness, and energy consumption [15] but also on people's mental, cognitive and social functioning [16, 17]. Concerns have been raised about the implications of a widespread use of these tools, for example, in relation to teaching or academic production [18, 19, 20]. In teaching, AI use may compromise the acquisition of fundamental competencies like writing, or factual errors and cultural bias, if accuracy is not checked [19]. In academic production, although AI use can overcome disadvantages of non-native speakers by improving the overall quality of language and grammar, it may also be used to create fake papers that manipulate the publishing process (e.g., metrics of citation counts, impact factors) [18].

Other ethical issues have also been raised [12, 21], for example, regarding data privacy and security, intellectual property and authorship, bias and fairness, transparency and accountability, misuse and even abuse, misinformation, influence on human decision-making, amongst others. Some of the identified challenges have to do with LLMs limitations [22], like: lack of 'common sense' and inability to make decisions based on it; limited understanding of context (although this is an area of significant advance); bias in training data; difficulty understanding complex questions and reasoning; lack of creativity; difficulty in understanding emotions and in abstracting concepts, leading to inaccurate responses. It also has difficulty in dealing with ambiguity and maintaining context of a conversation [12].

The recent encyclical letter "Magnifica Humanitas" by Pope Leo XIV [23], stresses the risks associated with the over-reliance on AI learning processes that "lack the affective, relational and spiritual perspective through which human beings grow in wisdom" and the need "to disarm" AI, i.e. freeing technology from monopolistic control that surrenders the task of redefining the boundaries of human possibilities in the hands of a few.

Numerous factors influencing the acceptance and adoption of AI have been identified, including perceived usefulness, performance and effort expectancy, experience, facilitating conditions, attitudes, fairness, trust, or cultural factors [19, 24]. Acceptance and adoption of AI are also influenced by media discourses, which tend to present more often sensationalist headlines concerning the perils and systemic dangers, than useful and explanatory information [25]. However, since media production is also increasingly made with AI tools, "this might lead to more political-philosophical questions on how the AI influenced society will perpetuate itself in a steady flow" [26, p. 2861].

Public perceptions of AI encompass a range of views, reflecting diverse perspectives and facets, ranging from optimism, admiration, and confidence to skepticism, apprehension, and doubt, concerning technological progress, technology developers, and the far-reaching implications and consequences for humanity's future. Optimism is based on the promises of improvement of daily life and human abilities, including household chores and repetitive tasks. Concerns arise mainly from issues such as autonomy, unintended consequences, and how these developments might increase economic disparities, and worsen human relations [27]. Evaluations and expectations differ considerably between domains of application, like media, health, law or finances [28], and across countries [29].

A survey of the US public's perceptions and beliefs about the governance of AI suggested preferences for a bottom-up, human centered approach to the development and regulation of AI, and found that different levels of social trust determine the willingness to accept governance from various stakeholders, namely governments, technology corporations, or individual citizens [30].

Perceived trust in social structures and agencies can be associated with polarized emotions. Hughes [31], develops an analysis of the role of emotions in the construction of imagined sociotechnical futures to conclude that, although their capacity to affect change is not evident, they are powerful in shaping collective representations and alternative worlds. The perceptions held not only by practitioners and policymakers, but also by the general public will shape societal engagement of individuals and communities with AI, AI acceptance and use, the spread and tone of discourses about AI, and the capacity of having a role in AI regulation or seeking institutional oversight upon particular institutions for such role [30].

III. Materials and Methods

To capture public opinion regarding AI and AI use, a study [4] was carried out following the three-phase model of social representations theory framework [5], extensively used to apprehend complex sociopolitical phenomena [e.g., 6, 32]. According to this framework, first we should identify the elements of a social representation that are shared, i.e. the shared common view about a given social issue. Then we should look for the dimensions on which individuals take different positions, and finally to examine how such positions are anchored in different social realities.

A. Instrument and Procedure

The study was carried out through a survey composed of closed and open-ended questions, involving several domains (see [4] for a full description of the instrument). The first page presented the survey, guaranteed the anonymity and confidentiality of the collected information, and requested written informed consent for participation. Then, a first set of questions intended to capture the representations and positions on AI, which included a free association task with the question: "When you hear the expression 'Artificial Intelligence' or 'AI'", what words or expressions immediately come to mind?" followed by seven-point scales on binary adjectives (e.g., 1 = Bad; 7 = Good) and questions on assessment of information, worry, concern, compelled to use, and preparation to use AI tools, adapted from [32].

A second set of questions intended to examine the opinions about the possible impacts of AI in the future of humanity (see Table 2) included several bipolar 7-point scale questions (e.g., 1 = Increase social inequalities; 7 = Decrease social inequalities) and an open question to "Describe how do you imagine the future 5 years from now and the role of Artificial Intelligence in that future".

To examine opinions about the use of AI, namely acceptability, trust and knowledge, several questions were presented: a) Two sets of questions examined the level of acceptability of different uses (e.g., Disease screening and diagnosis), and the possibility of use and trust in the information produced on different domains (e.g., To help with a professional problem); b) Two sets of questions evaluated the level of knowledge and experience (1 = I've never heard about it; 2 = I have heard about it, but I have never used it; 3 = I have used it sometimes; 4 = I have used it quite a lot or many times) about several AI tools (e.g., Chat GPT; Claude); c) Payment (yes vs. no) for a subscription for using AI tools; d) Purposes for which used AI (e.g., work, education, health); and e) The open question "Of the things you have done using Artificial Intelligence, tell us about the one that you consider to be the most interesting".

The perceived need for preparation/specialized education and regulation was evaluated through 7-point scales (1= Not at all necessary, 7 = Totally necessary; 1 = No need for regulation, 7 = There is a need for regulation). Participants were also asked about their level of trust (1 = No trust; 7 = Full trust) on different institutions (e.g., European political institutions, Tech companies) to regulate AI as well as in people in general/self-regulation.

Subsequently, the questionnaire included several questions to explore the psychosocial dimensions associated with representations and opinions about AI. These concerned several domains, like: a) the emotions elicited by AI as well as the assessment of threat vs. opportunity for different targets (e.g., the younger generations; poor and developing countries); b) the salience of the theme, evaluated by the frequency of talk about AI (1 = Very rarely; 7 = Every day), and the domains of conversation accessed by an open question asking to describe the most interesting conversation; c) the expertise in the use of AI, electronics and the internet in general (1 = Inexperienced user/ without knowledge; 7 = Advanced/highly specialized user); and d) Sociodemographic characterization (e.g., gender, age, education, occupational situation, financial situation, nationality, access to equipment).

The construction of the instrument involved a first stage of elaboration and selection of relevant questions according to literature review. The survey was administered in two languages (English and Portuguese). Subsequently, to assess understanding of the instructions, questions and answer options and test their sequence, pre-tests were carried out in both versions. Before data collection, the final version was submitted and received approval by the ethics review board of the Centre for Social Studies (REF 90/24).

Data collection took place between August 6 to October 21, 2024, through a non-probabilistic sampling. The survey was fully administered online using the Limesurvey tool [33]. A snowball strategy was used to disseminate the survey as well as collaboration requests via emails to various institutions (e.g., universities, municipal and parish councils, non-profit associations of different natures).

B. Participants

The survey received responses from 383 individuals, and 248 met the inclusion criteria for the present study (answering at least 80% of the questions of all the questions). More than half of the respondents were female (65.3%, 32.7% male and 2.0% non-binary) with a mean age of 47.96 years (*SD* = 11.95). The majority resided in Portugal (87.5%) at the time of the survey while 12.5% lived in other countries (e.g., 2.8% in UK, 2.8% in the USA, 2% in Brazil, and 1.2% in Italy). The majority (75.9%) had a higher education degree, of which 36.3% a BA, 19.4% a Masters, and 20.2% a PhD, and worked for an employer with a permanent contract (77.0%). For a full sociodemographic characterization of the study sample see [4].

C. Data Analysis

Descriptive statistics were calculated for closed item questions; missing answers needed for multivariate analysis were replaced by group means. Variables were composed from the results of principal component factor analysis (PCA) with varimax rotation and internal consistency analysis, measured by Cronbach's alpha (e.g., positive emotions, negative emotions, threat).

To identify groups of respondents differing on their opinion about AI, we performed a hierarchical cluster analysis using Ward's method to measure the squared Euclidean distance for the variables listed in Table 1. The decision on the number of clusters was taken from the resulting dendrogram. The inclusion of the subjects in each cluster was obtained with the application of the non-hierarchical K-Means procedure.

To assess the differences between clusters on the different

dimensions in analysis (e.g., impacts, use), several t-test analyses were performed, with the cluster membership as the independent variable. Chi-square tests were also performed in order to check whether cluster membership was independent from socio-demographic variables.

The words evoked were recorded in a data file applying the reduction rules generally used in free task associations [32], which also aggregated some obvious synonyms. The evoked terms were analyzed and the frequency of their association to the different clusters was compared by means of the Chi-square statistic. All statistical analyses were performed using the IBM SPSS Statistics software (v. 29).

IV. Results and Discussion

A. Representations and Positions concerning AI

Overall, on average, participants in the survey tend to consider AI as useful, accessible, sustainable, good, pleasant, and beautiful, highlighting a slightly positive attitude. However, participants also tend to consider AI more dishonest than honest (see Table 1). Following this trend, participants tend to view AI as a matter of concern but feel slightly compelled to use it. They perceive themselves somewhat informed about AI, albeit unprepared.

In terms of the free association task, globally, 1027 words or expressions were collected of which 426 were unique, with a frequency of occurrence varying from 1 (316 terms) to 44 ("future"). Besides "future", the most frequent words (evoked by at least 10% of participants) also included the terms "robots" (40), "technology" (35), "innovation" (32), "fear" (30) and "computer" (25).

Table 1. Differences in positioning in relation to AI. Means based on clusters, standard deviations in parentheses.

Poles of the 7-point scales	Critics (n=117)	Supporters (n=131)	Total (N=248)	*t* Sig.	Cohen's *d*
Bad-Good	3.37 (1.14)	5.31 (1.00)	4.39 (1.44)	-14.21 ***	1.07
Unsustainable-Sustainable	3.51 (1.41)	5.37 (1.11)	4.50 (1.57)	-11.45 ***	1.26
Negative-Positive	3.28 (1.14)	5.33 (1.05)	4.37 (1.50)	-14.74 ***	1.09
Ugly-Beautiful	3.45 (1.17)	4.97 (1.16)	4.26 (1.39)	-10.26 ***	1.17
Unpleasant-Pleasant	3.32 (1.13)	5.18 (0.98)	4.30 (1.41)	-13.95 ***	1.05
Dishonest-Honest	2.88 (1.12)	4.60 (1.20)	3.79 (1.44)	-11.63 ***	1.16
Useless-Useful	4.50 (1.31)	6.26 (0.77)	5.43 (1.38)	-12.64 ***	1.06
Inaccessible-Accessible	4.26 (1.40)	5.61 (1.08)	4.97 (1.41)	-8.54 ***	1.24
Unfair-Fair	3.11 (1.06)	4.72 (1.20)	3.96 (1.39)	-11.13 ***	1.14
Not Informed-Very Informed	3.50 (1.51)	4.68 (1.30)	4.13 (1.52)	-6.59 ***	1.40
Nothing worried-Very Worried	5.61 (1.37)	4.76 (1.43)	5.16 (1.46)	4.77 ***	1.40
It doesn't concern me at all-It concerns me a lot	4.97 (1.61)	5.78 (1.08)	5.40 (1.42)	-4.60 ***	1.36
Not at all compelled-Very compelled	2.97 (1.59)	5.50 (1.27)	4.31 (1.91)	-13.81 ***	1.43
Not at all prepared-Totally prepared	2.67 (1.43)	4.73 (1.31)	3.76 (1.71)	-11.86 ***	1.37

*: $p \leq 0.05$; **: $p \leq 0.01$; ***: $p \leq 0.001$

To identify groups of respondents differing in their opinion about AI, we performed a hierarchical cluster analysis using Ward's method. The dendrogram produced suggested the presence of two clusters. Table 1 presents the number of respondents classified in each cluster, obtained through the application of k-means clustering (k = 2), as well as the means and standard deviations for each variable.

Results in Table 1 show two opposing positions regarding AI: Critics vs. Supporters. Although both consider AI as useful and accessible, and something that concerns and worries them, they differ on the degree, being the first more pessimistic. Supporters tend to consider AI sustainable, positive, good, being compelled, informed and prepared to deal with it. Contrariwise, the Critics' cluster tends to consider AI dishonest, negative, unpleasant, ugly and unsustainable.

Figure 1 displays the words evoked by each cluster. While some of the associated words are similar, the Critics' cluster includes more negative terms like "fear", "danger", "falsehood". The Supporters' cluster mostly associates AI with notions of "innovation", "speed", "help".

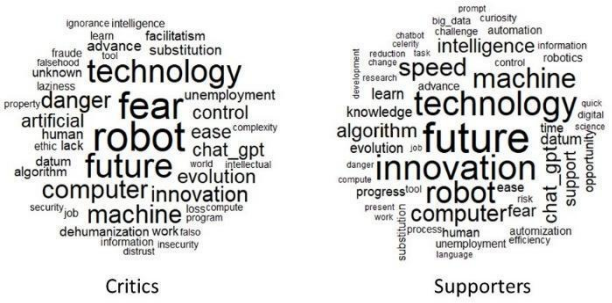

Fig. 1. Word cloud of the terms associated with AI by cluster.

B. Impacts of AI in the Future of Humanity

The two opposing positions attribute different possible impacts of AI in the future of humanity (see Table 2). Critics consider that AI impacts will be negative in all areas, contributing to making the world worse, particularly for the quality of human relations, a dimension to which Supporters also attribute a negative impact, although to a lesser extent. Supporters believe that AI will have a slight positive impact in making the world better, especially in terms of positive impacts on work and employment, in the quality of public decision-making, and the quality and reliability of information. It is in these three dimensions that the largest differences in opinion between Critics and Supporters can be found. Optimism versus pessimism extends to other areas, albeit to a lesser extent, such as the quality of education, social inequalities, and discrimination, as well as democracy and freedom of decision. The smallest differences occur in topics like "harm collective security" or the "end of humanity". This can be understood in the sense that there are imagined possibilities that are perceived to have more direct and evident impacts on individuals' quality of life, while topics like the "end of humanity" tends to be projected further away from imagined lived experiences.

Table 2. Possible impacts of AI in the future of humanity. Means based on clusters, standard deviations in parentheses

Pole 1 of the 7-point scales	Critics (n=117)	Supporters (n=131)	Total (N=248)	*t* Sig.	Cohen's *d*
1= Make the world worst	3.05 (1.20)	4.72 (1.22)	3.93 (1.47)	-10.86 ***	-1.38
1= Decrease the quality and reliability of the information	2.94 (1.55)	4.64 (1.28)	3.84 (1.65)	-9.36 ***	-1.20
1= Increase social inequalities	2.87 (1.57)	4.48 (1.60)	3.72 (1.77)	-7.98 ***	-1.01
1= Increase discrimination and prejudice	2.72 (1.23)	4.04 (1.26)	3.42 (1.40)	-8.32 ***	-1.06
1= Have negative impacts in work and employment	2.66 (1.48)	4.70 (1.53)	3.74 (1.82)	-10.64 ***	-1.35
1= Decrease the quality of education and teaching-learning	2.87 (1.57)	4.48 (1.60)	3.72 (1.77)	-7.98 ***	-1.01
1= Weaken democracy	2.72 (1.23)	4.04 (1.26)	3.42 (1.40)	-8.32 ****	-1.06
1= Harm collective security	2.83 (1.53)	4.21 (1.36)	3.56 (1.60)	-7.47 ***	-0.96
1= Worsen the quality of public decision making	2.83 (1.37)	4.70 (1.37)	3.82 (1.66)	-10.69 ***	-1.36
1= Worsen the quality of human relations	2.30 (1.32)	3.68 (1.40)	3.03 (1.53)	-7.93 ***	-1.01
1= Decrease the freedom of decision by citizens	2.65 (1.33)	4.05 (1.39)	3.39 (1.52)	-8.07 ***	-1.03
1= Bring humanity to its end	3.33 (1.15)	4.33 (1.41)	3.86 (1.38)	-6.04 ***	-0.77

*: $p \leq 0.05$; **: $p \leq 0.01$; ***: $p \leq 0.001$

Imagined futures, evaluated through the open question "Please describe how you imagine the future 5 years from now and the role of Artificial Intelligence in that future", show a high prevalence of AI, as taking part of daily lives. But if Supporters see themselves as riding the wave, Critics fear to be hit by it like a tsunami, evidencing the role of the affective dimension described by Hughes [31].

> I think it will be embedded in everything we do and I hope it helps with more mechanical tasks (Supporters, 070)
>
> There is no way to put the genie back into the bottle so I'll ride this wave (Supporters, 093)
>
> …for the general population it will be an extension of social media and tech toys, a gimmick that few will appreciate its real value and potential, and possibly becoming a danger because of how easy it can be used by people with ill-intentions (Critics, 544)
>
> I do not see a general preparation (...) I think it will be fully advanced in a not very distant future, and it will hit us all like a tsunami (Critics, 335)

C. Use of AI tools

1) Acceptability and Trust

When asked about the level of acceptability of different uses for AI, the majority of the uses presented in the survey (see Table 3) were considered unacceptable, even by Supporters, including automatisation processes in teaching and news production. An exception was made for the use of AI in disease screening and diagnosis, and to solve environmental problems related to climate change - an approach both parties find acceptable, though to varying degrees.

Supporters also considered that it was acceptable to use AI for monitoring people for public security purposes, for financial decision-making, and had an ambivalent position for the use of AI for determination of risk profiles by insurance companies and banks. Less acceptable uses were related to the media, like rendering AI videos or images, and data collection for advertising, perhaps because these are the uses of AI that are closely related to the experiences of respondents.

These results contrast with reality, given that many of these applications are already underway (e.g., AI teaching assistants, automated journalism), but citizens have not been involved in the decision-making process about their use, nor are they informed or consulted even when decisions affect them personally [34, 35].

Table 3. Acceptability of use of AI (1 = Totally unacceptable; 7 = Totally acceptable). Means based on clusters, standard deviations in parentheses.

	Critics (n=117)	Supporters (n=131)	Total (N=248)	*t* Sig.	Cohen's *d*
Disease screening and diagnosis	5.50 (1.86)	5.92 (1.55)	5.72 (1.71)	-1.95 *t*	-0.25
Military uses for offensive purposes	2.23 (1.72)	3.05 (2.05)	2.66 (1.94)	-3.46 ***	-0.44
Monitoring people for public security purposes	3.09 (1.97)	4.38 (2.04)	3.77 (2.10)	-5.08 ***	-0.65
Automatisation of Teaching	2.14 (1.49)	3.63 (1.84)	2.93 (1.84)	-7.04 ***	-0.88
Decision-making and sentencing in courts	2.01 (1.52)	2.72 (1.80)	2.39 (1.71)	-3.38 ***	-0.43
Determination of risk profiles by insurance companies and banks	2.91 (1.76)	4.01 (1.83)	3.49 (1.88)	-4.82 ***	-0.61
In the manipulation of images, videos and sounds to be publicly shared	1.59 (1.09)	2.00 (1.46)	1.81 (1.31)	-2.50 *	-0.31
Personal data collection and processing for the personalization of contents and advertising for commercial purposes	2.07 (1.52)	2.67 (1.94)	2.39 (1.78)	-2.74 **	-0.34
Automated production of news	1.80 (1.22)	2.65 (1.74)	2.25 (1.57)	-4.48 ***	-0.56
To solve environmental problems related to climate change	4.90 (2.06)	5.61 (1.72)	5.27 (1.92)	-2.93 **	-0.38
Financial decision-making	2.99 (1.68)	4.19 (1.76)	3.62 (1.82)	-5.48 ***	-0.70

*: $p \leq 0.05$; **: $p \leq 0.01$; ***: $p \leq 0.001$

As shown in Figures 2 and 3, Supporters and Critics also have different positions in terms of the likelihood that they would consider using AI and the level of trust they place in the information they obtain from AI ($p < .001$). While Critics would not consider using AI for any of the proposed activities or trusting the information of AI, Supporters are open to using it for certain tasks, even without fully trusting the resulting information. However, overall respondents are less inclined

to use AI, and trust the information obtained, for community or personal problems, financial or health advice. The only use that Critics and Supporters disregard to the same extent ($p > .050$) is social companionship, in line with the results found by Philipsen et collaborators [36].

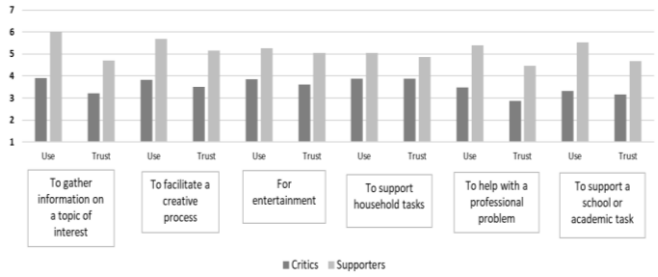

Fig. 2. Use consideration of AI and trust in AI information by cluster (Possibility of Use: 1 = Never; 7 = Always; Trust in the Information: 1 = No trust; 7 = Total trust).

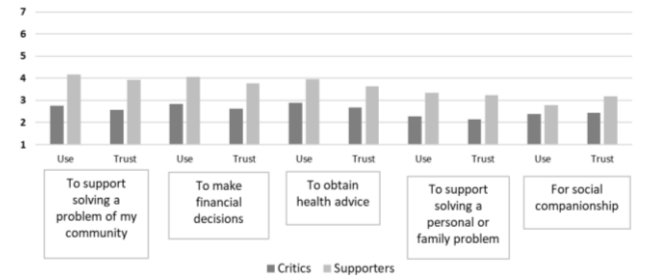

Fig. 3. Use consideration of AI and trust in AI information by cluster (Possibility of Use: 1 = Never; 7 = Always; Trust in the Information: 1 = No trust; 7 = Total trust).

Compared with the answers on acceptability described in Table 3, the questions on eventual uses and trust of AI (Figures 2 and 3) are more likely to elicit answers that are direct, individualized, and relate to potentially negative consequences. For example, AI is relatively trustworthy for entertainment or to facilitate creative processes, but less so in helping solve personal problems or to obtain health or financial advice. In agreement with Brauner and collaborators [28], the results highlight that to achieve widespread adoption of AI technology, it is necessary to take into account perceptions and risk assessments at both the individual and societal levels.

In fact, if information quality may be less important for entertainment or to facilitate a creative process, it is crucial when researching a topic of interest, and even more so for professional and academic tasks and for solving problems in different domains. While the use of AI may still be limited because the advancements are recent, the consideration of using these tools - even with low confidence in their results - supports the ethical concerns raised [12, 21]. Recent studies do suggest a growing confidence and use of AI tools in several domains, namely into news production [37], higher education [38], and large corporations [39]. It is determinant to assess how confidence is being achieved, whether it is based on rigorous verification of results or conformity to descriptive norms (herd mentality).

2) Knowledge

Concerning knowledge about AI, of the presented AI tools, the most known and used is ChatGPT, with 54.2% of Supporters saying that they "have used it sometimes" and 53.8% of Critics selecting the option "I have heard about it, but I have never used it". Co-pilot and Gemini are also known mainly by Supporters, but used by less than 40% and 23% of Supporters, respectively.

Results concerning the actual experience of use of AI tools show that the large majority (87.8%) of Supporters has already used generative AI tools, while only 43.6% of Critics admits to have done so, $\chi^2(1) = 52.52$, $p < .001$. Work purposes are mentioned by almost half of the participants (45.2%), by 23.9% of the Critics and 64.1% of Supporters (see Table 4), followed by leisure, education, and problem solving. Only a small minority used AI for health advice or as social companions, which is in line with the levels of acceptability and trustworthiness.

Table 4. Use of tools for different purposes.

	Critics (n=117)	**Supporters (n=131)**	**Total (N=248)**
Work	23.9%	64.1%	45.2%
Leisure	16.2%	36.6%	27.0%
Education	8.5%	37.4%	23.8%
Problem solving	11.1%	32.8%	22.6%
Health advice	0.9%	10.7%	6.0%
Social companion	0.9%	2.3%	1.6%

In relation to the open question "Of the things you have done using Artificial Intelligence, tell us about the one that you consider to be the most interesting", only 31.6% of Critics answered compared to 58.8% of Supporters. The type of activities was also slightly different, with Critics mentioning more sporadic use and trivial activities (e.g., food recipes) while for some of the Supporters AI is already a tool of daily use, used to help in daily tasks and work problems.

> Virtual Assistants: manage schedules, answer questions both professionally and academically. Art and Music Creation: Image creation and musical composition. Data Analysis: Analyze visitor data to better understand visiting patterns and preferences. Translation and Accessibility: Machine translation and speech recognition tools. Academic Research: analysis of historical texts and documents, identifying patterns and connections that may not be evident at first glance. Educational Content Creation: developing personalized educational materials such as interactive quizzes and learning modules (Supporters, 487)
>
> I just did this one: I created an image for my birthday party invitation (Critics, 318)

It is not surprising that work issues are predominant, as AI applications in organizations and businesses are expected to generate added business value - such as increased revenue, reduced costs, and improved efficiency - alongside strategic opportunities to achieve a competitive advantage [40]. AI is also increasingly used in education by both teachers and educators - to draft lesson plans, create materials, and write student evaluations - and students, namely to search information, check grammar, and comply with research and writing tasks [41]. The application of AI in this context is rapidly evolving, impacting various aspects of pedagogical and learning processes.

3) Need for Preparation and Regulation

Both Critics and Supporters strongly agree, to the same level, that preparation and specialized education is needed to deal with AI and use AI tools (Critics: 6.29; Supporters: 6.37; $t(246) = -.513$, *ns*), and with the need to regulate the use of

AI (Critics: 6.61; Supporters: 6.51; t (246) = .695, *ns*).

However, Supporters trust more than Critics ($p < .01$) in institutions like the European political institutions, the national political institutions, public institutions, and ONGs to regulate AI (see Figure 4). Supporters also distrust less than Critics ($p < .05$) the tech companies, private enterprises, and people in general. These opinions suggest an alignment with the survey by David and collaborators [30], in the urgent need for regulation and acceptance of governmental involvement.

Distinctively, both studies suggest that the public is less willing to entrust corporations and tech companies with the regulation of AI. Cuéllar and Huq [42] have also shown that there are risks and benefits of (different kinds of) regulations and meta-regulation.

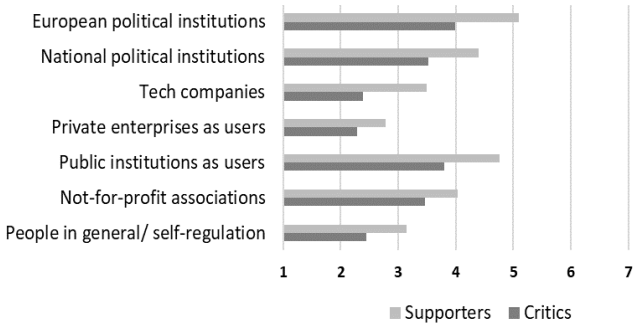

Fig. 4. Personal trust in institutions to regulate AI by cluster (1 = No trust; 7 = Full trust).

Recent studies showing a growing use of AI also evidence practices that are ethically questionable (e.g., not disclosing the use of AI tools), stressing the urgent need to develop ethical guidelines, transparency mechanisms, and organizational policies [37, 38]. The effective management of AI's ethical problems requires a proactive commitment from developers, researchers, and the wider AI community [12], as well as an interdependent framework in which citizens, corporations, and governments share governance responsibilities [30], but also awareness and demand from the broad society.

D. Anchoring of Positions on AI

The two groups differ on the self-assessment of expertise in using electronics, the internet, and AI tools. Critics perceived themselves as lacking the necessary knowledge to use AI tools and Supporters are somewhat ambivalent (Critics: 2.35; Supporters: 4.09, t (246) = -9.668, $p < .001$, d = -1.230). Nevertheless, Supporters' responses indicate that they claim to have more expertise in the use of electronics (Critics: 5.33; Supporters: 5.78, t (218.85) = -3.395, $p < .001$, d = -.438), and the internet (Critics: 5.46; Supporters: 5.92, t (217.69) = -3.427, $p < .001$, d = -.442). These values tend to be higher than those of the Critics.

However, and contrary to other studies showing socio-demographic differences in digital confidence [43], we have found no significant socio-demographic differences distinguishing the clusters of Critics and Supporters (for a full analysis of socio-demographic data see [4]). Support for AI is also independent from having access or ownership to equipment ($p >$. 05) devices such as computer, laptop, tablet, smartphone, and smartwatch. This may be due to the limitations of the small sample (N=248) and the relative homogeneity in terms of level of education and occupational situation, with underrepresentation of less educated and vulnerable social groups.

Although AI use is increasing all over the world, recent data show the widening of the digital divide between the rich countries of the global north and the poorest countries of the global south [44].

Our results suggest that, for a more widespread use of AI, rather than promoting access to equipment, it is necessary to promote opportunities for education and knowledge development, not only about AI as mentioned before, but in tech more broadly. This will be fundamental to reduce the social digital divide and the risk of escalating social inequalities [43, 45]. However, it is important not to forget that preventing the rise of inequalities also requires safeguarding that AI use does not replace or dominate human activities, which can otherwise hinder the development of fundamental competencies (e.g., complex problem solving, critical thinking, frustration tolerance), particularly in domains like education [19].

Positions on AI are also anchored in psychological dimensions. Not surprisingly, AI elicits positive and negative emotions to a different degree in Critics and Supporters. For Supporters, AI elicits mainly interest (M = 5.95, SD = 1.13), excitement (M = 5.31, SD = 1.18) and admiration (M = 5.20, SD = 1.46), for Critics it elicits mostly fear (M = 4.84, SD = 1.82). Moreover, Critics see AI mainly as a threat while Supporters see it as an opportunity (Critics: 3.04; Supporters: 4.95; t (246) = -11.66, $p < .001$, d = -1.48). However, both groups agree that for the older generations, AI is more a threat than an opportunity. This result has important implications since emotions can play an active role and contribute to the shaping of technological futures, particularly in contexts of uncertainty and ambivalence [31].

In terms of the salience of AI, Supporters tend to talk more frequently about AI than Critics (Critics: 2.78; Supporters: 3.93; t (246) = -6.185, $p < .001$, d = -.787). Themes of the conversations are also slightly different with Supporters mentioning the applications, and pros and cons, of AI on work, education and health while Critics stress the risks, the (potential for) malpractices and the negative consequences for the future of humankind. Therefore, it is necessary to promote a broad societal discussion that addresses both applications and concerns in order to guarantee inclusive design, risk mitigation, and sustainable and reliable development that benefits humanity.

> How it can help us do boring jobs (e.g., admin) faster (Supporters, 070)
> How helpful is it versus how dangerous it is (Supporters, 098)
> The possibility of AI being able to replace real human relationships, on the other hand the possibility of AI being able to play a leading role in healthcare, in diagnosing and preventing diseases and monitoring patients (Supporters, 659)
> In general, the content of the conversations established is related to the rapid evolution and dangers of these tools (...) despite considering some benefits in terms of health or even security (...) it seems that we have reached the era of "Big Brother." Evolving, yes, but without it leading to the social and moral decline of humanity... it's scary! (Critics, 060)

> The harms of AI and its misuse for fraudulent schemes (Critics, 490)
>
> Probably the possibility/grim reality of the human race handing control to machines, then being deemed surplus to requirements and being taken out of equation (Critics, 050)

Overall, findings suggest that the respondents' elicited emotions, representations and imagined futures are mainly drawn from a gap generated between those who have used AI tools and view themselves as more skilled and adapted to understanding the potential of AI, and those who have had less personal experience and, consequently, tend to express more cautious and wary opinions. However, the causal relationship was not possible to establish from the study.

Findings highlight important societal impacts that may arise from these opposing attitudes toward AI and that need to be addressed. It is crucial to consider not only the risks associated with an increase of the digital divide between the technologically skilled and unskilled groups, but also the risk of socio-political polarization opposing the groups employed in digitized labor markets that benefit from AI use and the ones resisting AI or being negatively affected by its use [46].

V. Conclusion

The world is facing rapid, vast and profound societal transformations, some of which may be driven, or at least accelerated, by the recent developments in the field of AI. In the introduction to a special issue in AI & Society, Manyika [47] poses the question "is it worth it? (AI)". Upon reflecting on the current developments, challenges and potential for impact, they conclude with a conditional "yes", to the extent that society manages to tackle four key issues, namely ensuring: powerful but safe AI, a focus on the greatest challenges, responsible development and governance, and the successful adaptation of society and its institutions. This study, based on an online survey, aimed at exploring public opinion regarding AI and the use of AI, since the attitudes, discourses and representations on AI are important determinants in the way societies cope with AI challenges. The study findings showed that AI is associated mainly with the future of innovation in technology, robotics and computers. Two opposing positions were found. Supporters associate AI with potential benefits in line with technological optimism, like automation, speed and efficiency. Critics tend to fear AI, associated with the degradation of social and human values (e.g. trust, ethics). Support for AI is associated with more intensive uses of technology in daily lives. The respondents that admitted more familiarity and self-perception of a high level of expertise with technology in general tended to be more enthusiastic about AI in the future. Projection of beneficial uses of AI tends to favor large wide-impacting global and societal issues (e.g. climate change, health care), or smaller, more individual and less consequential tasks (e.g., entertainment). However, as this is a domain where advancements occur every day, projections may also change radically.

Results also point towards some political implications of specialized education and regulation, which are considered essential by both Critics and Supporters. Findings stress the need to, on the one hand, adopt a reflexive approach regarding the use of AI, promoting a productive process of AI-supported critical thinking, particularly in education. And, on the other hand, to purposefully streamline the use of AI with clear roles and functions regarding research design and development and higher education teaching and learning.

The capacity of national, European, and transnational political institutions to effectively regulate AI and promote AI literacy will likely affect the possible impacts of AI in the future of humankind, but also on the trust in those institutions themselves. Guaranteeing the development of inclusive policies that ensure equitable and socially sustainable AI is also fundamental to prevent sociopolitical polarization [46] and its detrimental societal impacts.

The study's small sample size and relative homogeneity in terms of the level of education and type of occupation limits generalization and calls for caution in interpreting the results. Further studies, conducted with representative samples, with participatory and qualitative methodologies that are able to reach social groups with less technological literacy, are needed to capture a broader picture of the opinions regarding AI and the challenges that this technological revolution will pose to humankind.

Nonetheless, the findings highlight the relevance of deepening the assessment of the public's views and perceptions of AI, as it develops and pervades daily lives and the ways in which human beings relate to and connect to technology. Often lauded as a cutting-edge feature in state-of-the-art devices, or sometimes silently integrated into large-scale systems, AI seems to already have generated relevant social and cultural impacts.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

RR: Conceptualization, Methodology, Investigation, Data analysis, Visualisation, Supervision, Writing - Original Draft, and Revision. FS: Conceptualization, Methodology, Investigation, Writing - Original Draft, and Revision. ATM: Conceptualization, Methodology, Investigation, Writing- Review & Editing, Supervision, project administration. PG: Methodology, Writing- Review & Editing. AST: Methodology. LC: Methodology, Writing- Review & Editing. LR: Methodology, Writing- Review & Editing. PDL: Methodology.

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REFERENCES

[1] M. Carrasco, S. Mills, A. Whybrew, and A. Jura, *The Citizen's Perspective on the Use of AI in Government*, Boston Consulting Group, 2019.

[2] A. T. Melo, L. Renault, L.S.D. Caves, P. Garnett, P.D. Lopes, R. Ribeiro, and F. Santos, "An AI tool for scaffolding complex thinking: challenges and solutions in developing an LLM prompt protocol suite," *Cognition, Technology & Work*, vol. 27, pp. 651–693, July 2025. https://doi.org/10.1007/s10111-025-00817-6

[3] A. T. Melo, *Performing Complexity: Building Foundations for the Practice of Complex Thinking*. Cham: Springer, 2020.

[4] R. Ribeiro, F. Santos, A. T. Melo, P. Garnett, A. S. Teixeira, L. Caves, L. Renault, and P. D. Lopes, "Artificial Intelligence and Possible Futures: Insights from an Exploratory Survey" (Versão V1). Zenodo. https://doi.org/10.5281/zenodo.14561935

[5] W. Doise, D., Spini, and A. Clémence, "Human Rights Studied as Social Representations in a Cross-national Context," *European Journal of Social Psychology*, vol. 29, no. 1, pp. 1–29, 1999.

[6] R. Ribeiro, G. Poeschl, and A. C. Santos, "The different sides of the housing crisis in Portugal: A contribution to building inclusive, fair, and effective solutions," *Political Psychology*, vol. 46, pp. 1509–1532, 2025, https://doi.org/10.1111/pops.70025

[7] J. L. Heyman, S. R. Rick, G. Giacomelli, H. Wen, R. Laubacher, N. Taubenslag, M. Knicker, Y. Jeddi, P. Ragupathy, J. Curhan, and T. Malone, "Supermind ideator: How scaffolding human-AI collaboration can increase creativity," *CI 2024: Proceedings of the ACM Collective Intelligence Conference*, vol. 3, pp. 18–28, 2024, https://doi.org/10.1145/3643562.3672611

[8] J. Cowls, A. Tsamados, M. Taddeo, and L. Floridi, "A definition, benchmark and database of AI for social good initiatives," *Nature Machine Intelligence*, vol. 3, no. 2, pp. 111–115, 2021. https://doi.org/10.1038/s42256-021-00296-0

[9] OpenAI, *GPT-4 Technical Report*, 2023, https://cdn.openai.com/papers/gpt-4.pdf.

[10] K. I. Roumeliotis and N. D. Tselikas, "ChatGPT and Open-AI models: A preliminary review," *Future Internet*, vol. 15, no. 6, pp. 192, 2023, https://doi.org/10.3390/fi15060192

[11] R. Gozalo-Brizuela, and E. C. Garrido-Merchan, "ChatGPT is not all you need. A state of the art review of large generative AI models," *arXiv [cs.LG]. arXiv*, 2023, http://arxiv.org/abs/2301.04655

[12] P. P. Ray, "ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope," *Internet of Things and Cyber-Physical Systems*, vol. 3, pp. 121–154, 2023. https://doi.org/10.1016/j.iotcps.2023.04.003

[13] A. B. Rashid, A. K. Kausik, A.H. Sunny, A. Bappy, and M. Hassan, "Artificial intelligence in the military: An overview of the capabilities, applications, and challenges," *International Journal of Intelligent Systems*, vol. 2023, no. 8676366, 2023, https://doi.org/10.1155/2023/8676366

[14] Á. F. Gambín, A. Yazidi, A. Vasilakos, et al., "Deepfakes: Current and future trends," *Artificial Intelligence Review*, vol. 57, no. 3, pp. 1–32, 2024, https://doi.org/10.1007/s10462-023-10679-x

[15] A. M. Saghiri, S. M. Vahidipour, M. R. Jabbarpour, M. Sookhak, and A. Forestiero, "A survey of artificial intelligence challenges: Analyzing the definitions, relationships, and evolutions," *Applied Sciences*, vol. 12, no. 8, 4054, 2022, https://doi.org/10.3390/app12084054

[16] A. S. Teixeira, S. S. Shergill, and G. Laban, "Human–AI interactions reshape the self and our social networks," *Nature Machine Intelligence*, vol. 8, pp. 858–859, 2026, https://doi.org/10.1038/s42256-026-01248-2

[17] A. M. Novelli, S. Shergill, and A. S. Teixeira, "Tool or companion? Reframing conversational AI to prevent psychological harm" (Version 1). OSF. https://osf.io/preprints/psyarxiv/s6gpk

[18] A. Castellanos-Gomez, "Good practices for scientific article writing with ChatGPT and other artificial intelligence language models," *Nanomanufacturing*, vol. 3, pp. 135–138, 2023.

[19] J. M. Romero-Rodríguez, M. Ramírez-Montoya, M. Buenestado-Fernández, and F. Lara-Lara, "Use of ChatGPT at university as a tool for complex thinking: Students' perceived usefulness," *Journal of New Approaches in Educational Research*, vol. 12, pp. 323–339, 2023, https://doi.org/10.7821/naer.2023.7.1458

[20] T. Susnjak, "CHATGPT: The end of online exam integrity?" arXiv:2212.09292, 2022, https://doi.org/10.48550/arXiv.2212.09292

[21] T. Y. Zhuo, Y. Huang, C. Chen, and Z. Xing, "Exploring AI ethics of ChatGPT: A diagnostic analysis," arXiv:2301.12867, 2023, https://doi.org/10.48550/arXiv.2301.12867

[22] V. Goar, N. Yadav, and P. S. Yadav, "Conversational AI for natural language processing: A review of ChatGPT," *International Journal on Recent and Innovation Trends in Computing and Communication*, vol. 11, no. 3S, pp. 109–117, 2023, https://doi.org/10.17762/ijritcc.v11i3s.6161

[23] Leo XIV, *Encyclical letter Magnifica Humanitas*, https://www.vatican.va/content/leo-xiv/en/encyclicals/documents/20260515-magnifica-humanitas.html#Artificial_intelligence

[24] S. Kelly, S. A. Kaye, and O. Oviedo-Trespalacios, "What factors contribute to the acceptance of artificial intelligence? A systematic review," *Telematics and Informatics*, vol. 77, no. 101925, 2023, https://doi.org/10.1016/j.tele.2022.101925

[25] J. Roe and M. Perkins, "'What they're not telling you about ChatGPT': Exploring the discourse of AI in UK news media headlines," *Humanities & Social Sciences Communications*, vol. 10, no. 1, pp. 1–9, 2023, https://doi.org/10.1057/s41599-023-02282-w

[26] M. Winkel, "Society in charge: the connection of artificial intelligence, responsibility, and ethics in German media discourse," *AI Ethics*, vol. 5, pp. 2839–2866, 2025, https://doi.org/10.1007/s43681-024-00604-5

[27] Pew Research Center, *AI and Human Enhancement: Americans' Openness Is Tempered by a Range of Concerns*, 2022, https://www.pewresearch.org/wp-content/uploads/sites/20/2022/03/PS_2022.03.17_AI-HE_REPORT.pdf

[28] P. Brauner, A. Hick, R. Philipsen, and M. Ziefle, "What does the public think about artificial intelligence?—A criticality map to understand bias in the public perception of AI," *Frontiers in Computer Science*, vol. 5, no. 1113903, 2023, https://doi.org/10.3389/fcomp.2023.1113903

[29] Ipsos, *Global Views on A.I. 2023*, 2023, https://www.ipsos.com/sites/default/files/ct/news/documents/2023-07/Ipsos%20Global%20AI%202023%20Report-WEB_0.pdf

[30] P. David, H. Choung, and J. S. Seberger, "Who is responsible? U.S. public perceptions of AI governance through the lenses of trust and ethics," *Public Understanding of Science*, vol. 33, no. 5, pp. 654–672, 2024, https://doi.org/10.1177/09636625231224592

[31] S. Hughes, "Hearts and minds: The technopolitical role of affect in sociotechnical imaginaries," *Social Studies of Science*, vol. 54, no. 6, pp. 907–930, 2024, https://doi.org/10.1177/03063127241257489

[32] R. Ribeiro and G. Poeschl, "Social representations of globalisation and the functioning of the metasystem in social comparison contexts: Evidence from two studies in Portugal," *Opinião Pública*, vol. 26, no. 1, pp. 193–221, 2020, https://doi.org/10.1590/1807-01912020261193

[33] LimeSurvey GmbH, *LimeSurvey: An open source survey tool*, 2021, http://www.limesurvey.org

[34] C. K. Y. Chan, and L.H.Y. Tsi, "Will generative AI replace teachers in higher education? A study of teacher and student perceptions," *Studies in Educational Evaluation*, vol. 83, no. 101395, 2024, https://doi.org/10.1016/j.stueduc.2024.101395

[35] A. L. Henestrosa, H. Greving, and J. Kimmerle, "Automated journalism: The effects of AI authorship and evaluative information on the perception of a science journalism article," *Computers in Human Behavior*, vol. 138, no. 107445, 2023, https://doi.org/10.1016/j.chb.2022.107445

[36] R. Philipsen, P. Brauner, H. Biermann, and M. Ziefle, "I am what I am – Roles for artificial intelligence from the users' perspective," *Artificial Intelligence and Social Computing. AHFE (2022) International Conference*, ed. Tareq Ahram, Jay Kalra and Waldemar Karwowski, vol. 28, 2022, http://doi.org/10.54941/ahfe1001453

[37] R. Baptista, P. Martins, C. Cruz, and C. Belim, "Between bits and news: Portuguese journalists' uses and perceptions of artificial intelligence," *Media and Communication*, vol. 14, no. 11358, 2026, https://doi.org/10.17645/mac.11358

[38] P.R. Costa, E.J. Silva, A. Figueira, and D. Noversa, "The impact of artificial intelligence in Portuguese higher education," *Communication and Applied Technologies. ICOMTA 2025. Smart Innovation, Systems and Technologies*, ed. P.C. López-López, M. Vernier, U. Freundt-Thurne, and D. B. Ibáñez, D.B., pp 447–461, vol. 458, 2026, https://doi.org/10.1007/978-3-032-09911-2_44

[39] McKinsey & Company, "The state of AI: How organizations are rewiring to capture value", 2025, https://www.mckinsey.com/capabilities/quantumblack/our-

insights/the-state-of-ai-how-organizations-are-rewiring-to-capture-value#/

[40] I.M. Enholm, E. Papagiannidis, P. Mikalef, and J. Krogstie, "Artificial intelligence and business value: a literature review," *Information Systems Frontiers*, vol. 24, pp. 1709–1734, 2022, https://doi.org/10.1007/s10796-021-10186-w

[41] E. Kasneci, K. Sessler, S. Küchemann, M. Bannert, et al., "ChatGPT for good? On opportunities and challenges of large language models for education," *Learning and Individual Differences*, vol. 103, no. 102274, 2023, https://doi.org/10.1016/j.lindif.2023.102274

[42] M.-F. Cuéllar and A. Z. Huq, "Artificially intelligent regulation," *Daedalus*, vol. 151, no. 2, pp. 335–347, 2022, https://doi.org/10.1162/daed_a_01920

[43] S.V. Bentley, C.K. Naughtin, M.J. McGrath et al., "The digital divide in action: how experiences of digital technology shape future relationships with artificial intelligence," *AI Ethics*, vol. 4, pp. 901–915, 2024, https://doi.org/10.1007/s43681-024-00452-3

[44] Microsoft AI Economy Institute, *Global AI Adoption in 2025 — A Widening Digital Divide*, 2026, https://www.microsoft.com/en-us/research/wp-content/uploads/2026/01/Microsoft-AI-Diffusion-Report-2025-H2.pdf

[45] C. Wang, S. C. Boerman, A. C. Kroon, et al., "The artificial intelligence divide: Who is the most vulnerable?" *New Media & Society*, vol. 27, no. 7, pp. 3867-3889, 2024, https://doi.org/10.1177/14614448241232345

[46] J. Jacobs, "The artificial intelligence shock and socio-political polarization," *Technological Forecasting and Social Change*, v. 199, no. 123006, pp. 1-15, 2024, https://doi.org/10.1016/j.techfore.2023.123006

[47] J. Manyika, "Getting AI right: Introductory notes on AI & society," *Daedalus*, vol. 151, no. 2, pp. 5–27, 2022. https://doi.org/10.1162/daed_e_01897

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