

The influence of AI literacy, the level of education, job security, and an individual's country of birth on the attitude toward Artificial Intelligence

Author: Colin Wouters
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT,

This study investigates how AI is perceived by individuals with different levels of AI literacy, job security, education and with a different cultural background. The aim is to learn more about the influence of these factors on the attitude toward the opportunities and threats of AI. With AI becoming more and more relevant in our daily lives, understanding these attitudes is essential for its development and integration. 146 participants filled out the survey consisting of 35 questions. Findings indicate that (1) a higher AI literacy is often associated with a more positive attitude toward the opportunities and threats of AI while (2) job insecurity can lead to a more negative attitude toward the threats of AI. In contrast to the expectations (3) the level of education had no effect on this attitude, and (4) neither did the country of birth. These results suggest that increasing an individual's knowledge and understanding of AI, can lead to a more positive view toward AI technology. On the other hand, a person can feel more threatened by the development of AI due to low job security. These findings can contribute to AI adoption strategies in companies or other organisations to ensure a positive attitude.

Graduation Committee members:

Matthias de Visser

Johannes Dahlke

Keywords

Attitude toward AI, AI literacy, job security, level of education, country of birth.

1. INTRODUCTION

Artificial Intelligence (AI) has rapidly evolved over the last decade, and it is slowly becoming an important component of everyday life. It can be defined as a technology that enables machines or computer systems to simulate and execute tasks that normally require human intelligence such as learning, reasoning, and decision-making. AI nowadays influences multiple sectors, including healthcare, security, and politics (Morandín-Ahuérma, 2022). With the arrival of tools like Google's Gemini and OpenAI's ChatGPT, AI has become accessible to any individual, giving them the opportunity to use technology in ways that was previously unthinkable.

Despite the worldwide usage of AI, public attitude toward the development differs throughout society. Research into public perceptions of AI has grown significance as the innovation becomes universal. This created a discussion that has increased sharply since 2009, with a more optimistic perspective rather than pessimistic, due to scholars highlighting AI's potential to solve complex problems. However, one cannot miss the uprising concerns about the ethical and social implications. In 2018, the European Union presented the first European strategy for AI, addressing opportunities and challenges, with its goal to promote AI in the European Union countries while considering human and ethical implications (European Commission, 2018). The Commission's White Paper (European Commission, 2020) stated the many opportunities that AI can bring, and the importance of the development of top-class cyber security. However, Vesnic-Alujevic, Nascimento and Pólvora (2020) makes a critical review of the consequences of AI in Society (Lozano et al., 2021).

Study has shown that factors such as data literacy, demographic characteristics, previous experiences with AI can influence the perspective toward AI (Bozkurt and Gursoy, 2023; Kaya et al. 2022). Results concluded that, for example, females perceive AI as a greater threat compared to males, and the age of an individual influences the attitude toward AI as well (Bozkurt and Gursoy, 2023). Other factors that can influence the public perception toward AI are spirituality, and data literacy, and next to this, studies have given us insights into the relationship between the country a person lives in, and the perception of AI. The study concluded that the culture of the country of birth can also influence the attitude (Barnes et al., 2024, Yigitcanlar et al., 2023).

Despite these insights, there are still some gaps in the existing research. Studies focus mainly on highly educated individuals, leaving gaps in understanding the perception of lower educated individuals (Bozkurt and Gursoy, 2023). Lower educated individuals may have less familiarity with AI technologies. Better access to information about AI can result in a different attitude, since an individual is better aware of the potential opportunities and risks (Neil et al., 2020; Hick and Ziefle, 2022). Next to this, even though different countries were studied to see whether a cultural difference influences the attitude toward AI, there is a lack of evidence that the culture differences between countries in Europe have an impact on this. Furthermore, the job losses are often referred to as a reason why individuals see AI as

a threat (Rainie et al., 2022), however, it has not been tested yet whether this job security influences the perception toward AI. Another knowledge gap for this matter, is the influence data literacy has on the perspective. Known is that data literacy does influence it (Neil et al., 2020), but whether it shifts people to a more positive attitude or more negative, is not studied yet.

While many people view the innovation of AI as a positive development, it can cause anxiety and fear among others (Bostrom, 2014). AI can increase inequality when a specific level of education or technical skills is needed to benefit from the opportunities. The misuse of AI systems can lead to ethical and security issues and shake public trust in AI (Ford, 2021).

The mix of both positive, and negative views on AI, highlights the need for a deep understanding of the different perspectives on AI, and the identification of potential factors that can influence individuals' perceptions of benefits of, and threats posed by AI (Bozkurt and Gursoy, 2023; Yeh et al., 2021). Apart from this, the identification of the factors that cause different perceptions, is essential for the shaping of policies that ensure an ethical design of AI practices, since these policies will be based on the threats mentioned (Bozkurt and Gursoy, 2023).

This study helps us better understand the potential impacts of AI on society and facilitate the utilization of AI as a positive force. By studying the public's attitude toward AI and the factors influencing this attitude, findings will broaden our knowledge of how AI is perceived and accepted by different individuals in this society. Results will show whether AI literacy, the level of education, the country of birth, and the job security influence an individual's attitude toward AI. Adjusting the interactions of individuals with AI can result in less anxiety and fear, and more understanding of the opportunities and threats.

2. LITERATURE REVIEW

Artificial Intelligence has been a topic of discussion for the effects it has on society, explained by theories of technological determinism and social constructionism (Heilbroner, 2003; Smith and Marx, 1994). The technological determinism theory explains that technology plays a primary role in societal/cultural change. However, the social construction theory argues that technology is also socially constructed and shaped by societal values, beliefs, and norms, suggesting that technology also emerges through social interactions and negotiations (Bozkurt and Gursoy, 2023). This deviation is significant in the context of AI, since it can be seen as an important factor of development or as a potential threat.

Public attitudes toward AI are complex and it can be influenced by different factors. The attitude can be explained by seeing AI as a threat or as an opportunity, however, the perception can also be differentiated by looking at AI as a positive innovation rather than negative (Bozkurt and Gursoy, 2023; Hick and Ziefle, 2022). Different scales have been used in studies, although in this study the individuals will be differentiated between seeing AI as an opportunity or as a threat. People that see AI more as an opportunity often see the potential in various sectors such as finance, commerce, law, healthcare, medicine education, hospitality, and the environmental conservation for improving

processes and outcomes (Xie et al., 2022). An example for the healthcare sector can be the deep learning networks and machine learning algorithms that can use data from medical records, clinical registries, and medical journals to anticipate potential outcomes for patients (Witkowski, 2024). Many experts have suggested that AI will improve the health care with, for example, reducing diagnostic errors or improving treatment protocols. The positive influence of AI on businesses and society are known globally. AI provides intelligent tools for handling societal challenges, and it improves productivity and efficiency (Bughin et al., 2018; Sirmacek et al., 2023). Furthermore, AI can improve education by for example teaching, tutoring and grading systems personalized to the need and wants of each individual student (Grassini, 2023; Yeh et al., 2021). According to studies, most of the people see AI as an opportunity rather than a threat, although these general perceptions can differ per country (Bozkurt and Gursoy, 2023).

Although the benefits of AI are often brought up in media and studies, the threatening aspects of AI are being discussed as well. This contrast is analyzed in a study by Fast and Horvitz (2017), that also focuses on the concerns about AI, which have been grown in recent years. AI's potential to displace jobs and undermine control is a topic illustrated in movies like 'Terminator' or 'Ex Machina'. The loss of jobs is mentioned as one of the main reasons why people see AI as a threat in the USA, with concerns about digital privacy named as a strong factor as well (Rainie et al., 2021). The idea that the innovations could lead to a reduction in employment through automation, is considered as a serious possibility by many (Brynjolfsson and McAfee, 2014). Next to this, the idea of AI advancing to a level where it can control humans and even eliminate humanity, is concerning people as well, with the aforementioned movies contributing to this fear (Bullock et al., 2022). These concerns are likely to have an impact on future strategies on AI development.

How the public perceives this rapid development of AI is depending on multiple factors. Demographic factors, like age, gender and income, can influence the perception (Bozkurt and Gursoy, 2023), however, other factors like spirituality or data literacy are also important to consider. Research has been done concerning this, resulting in interesting conclusions. Evidence was obtained about spirituality as being a key predictor of scepticism towards nanotechnology, human gene editing (HGE), and artificial intelligence, however, religiosity consistently predicted HGE scepticism only (Neil et al. 2020; Veckalov et al. 2023). Data literacy has a significant impact on the attitude towards AI as well. Many individuals that are opposed to the development of AI, will change their mind positively when they receive more information about AI (Neil et al. 2020). Another finding suggests that people with more AI knowledge perceive AI to be riskier, however, they are less vulnerable to AI threats due to the gained consciousness due to knowledge and experience (Yigitcanlar et al. 2022). Thus, data literacy is seen as an important influence of the public perception. Research on the attitude towards AI by society is viewed from different perspectives. The influence of contextual and cultural differences, like power distance, collectivism, short-term orientation, and indulgence, have been studied by Yigitcanlar et al. (2023), resulting in a difference between Australians and Hong Kongers. High power distance and collectivism in Hong Kong negatively impact the perceived usefulness of technology, for example. Another study suggested that the public perception may vary even within a country. The public opinion differed between the 3 largest cities in Australia, and it states that the variances could be even bigger in the international context. The

culture, and the way the state uses AI are underlying factors for these differences (Yigitcanlar, 2022).

Despite the growing interest on AI perceptions, gaps remain regarding the impact of AI literacy, education, job security, the country of birth, and data literacy. Studies tend to select a sample of higher educated individuals for their research. Thus, there is not enough evidence of whether the level of education is influencing the public perception on AI (Bozkurt and Gursoy, 2023). Furthermore, job losses is often mentioned as reason for people to fear AI due to automation (Anderson and Rainie, 2018; Rainie et al., 2022). However, there is insufficient evidence stating that the job security influences an individual's opinion towards AI. Next to this, the impact of the country of birth is studied, however, it has not been studied sufficiently in Europe. Research done in Australia and Hong Kong suggests a difference in attitude toward AI, however, there is not sufficient evidence to state that there is a significant difference in the public perception due to the country of birth when looking at European countries (Yigitcanlar, 2022; Yigitcanlar et al., 2023). Lastly, data literacy results in different attitudes towards AI according to studies (Neil et al., 2020; Yigitcanlar, 2022). However, there is no evidence suggesting whether more knowledge about AI results in a more positive attitude towards AI or rather negative. Thus, the impact of data literacy on the public perception will also be studied. Understanding how these factors interact is important when considering the responsible development and adoption of AI.

2.1 Hypotheses

2.1.1 AI literacy

AI literacy can be explained as 'the capability to accurately identify, effectively utilize, and critically assess AI-related products while adhering to ethical standards' (Ng et al., 2021). Multiple studies have investigated AI literacy, however, the majority of these were focused on the development of AI literacy, rather than the influence of AI literacy on digital technology acceptance (Schiavo et al., 2024). Schiavo et al. (2024) suggested that a solid understanding of how AI functions and how to use it, will enhance the acceptance of the innovation. When individuals know more about AI, they tend to view it as more useful and easier, and, next to this, it can lead to less anxiety. Another study indicated that many people will change their initial opinions and preconceptions about AI when provided with further information, examples and questions (Selwyn et al., 2020). Further research suggested that university educators need to provide more teaching and learning about AI to improve students' attitudes toward AI and future AI use (Katsantonis and Katsantonis, 2024), indicating that more teaching and learning will lead to a more positive perception. Therefore, considering that AI literacy can make AI technology seem less intimidating and more accessible (Long and Magerko, 2020; Ng et al., 2021), the expectancy is that AI literacy will lead to a more positive attitude toward the opportunities and threats of AI.

H1a: Higher AI literacy leads to a more positive attitude toward the opportunities of AI.

H1b: Higher AI literacy leads to a more positive attitude toward the possible threats of AI.

2.1.2 Job Security

When examining the potential threats of AI, many individuals name job losses as one of the most relevant (Anderson and Rainie, 2018; Rainie et al., 2022). However, studies question whether this will result in long term job losses, or just simply job shifting (George, 2024). Hunt et al. (2022) stated that studies that raise concerns about massive job losses lack analysis, due to subjective judgements or the use of proxies for AI effects. The impact of job security on the people's perception towards AI may

therefore be wrongfully influenced. However, despite the discussion about whether the stress about job losses is justifiable, the fear of losing your job due to the innovation of AI will lead to anxiety and fear (Anderson and Rainie, 2018; Rainie et al., 2022). According to Vu and Lim (2022) it is the perceived threat of job loss that affects the attitude toward AI technologies. The fear of losing their job makes them fear the development of AI, which causes a more negative attitude. This fear also creates anxiety for individuals, which is called "Job replacement anxiety" (Wand and Wang, 2022). This term refers to the fear of the negative effects of AI on business life, which can be a consequence of "sociotechnical blindness", that refers to the anxiety arising from a lack of understanding of the dependence of AI on humans. Thus, this study suggests that sociotechnical blindness, in combination with a lower perceived job security, can lead to job replacement anxiety, which leads to a negative attitude toward AI. Other research found that individuals' anxieties about job losses induced by the development of AI technology did not significantly predict positive or negative attitudes toward AI (Kaya et al., 2024), even though studies indicate that technology employees may find it challenging to keep up with job requirements and may consequently experience reduced well-being (Synard and Gazzola, 2018). Another study also reported that people may suffer from job insecurity and anxiety due to the speed of technological change (Ereback and Turgut, 2021). However, since the majority of the sample, of the study done by Kaya et al. (2024), were university students or civil servants, this may have limited the predictive power of job replacement anxiety on the attitude toward AI. Therefore, in line with the other studies, and considering the limitations of the study done by Kaya et al., lower job security is predicted to influence the attitude toward the opportunities and threats of AI in a negative way.

H2a: Lower job security is associated with a more negative attitude towards the opportunities of AI.

H2b: Lower job security is associated with a more negative attitude towards the threats of AI.

2.1.3 Level of Education

Based on literature, there is overwhelming evidence that university students' attitude toward AI are quite positive (Katsantonis and Katsantonis, 2024). However, there is little evidence that the attitude toward AI changes with the level of education. AI plays an important role in higher education, and students are often stimulated to work with it (Stöhr et al. 2024). As aforementioned, according to research (Selwyn et al., 2020), many people will change their initial opinions on the attitude toward AI when provided with more information, examples and questions, and Schiavo et al. (2024) suggests that it will enhance the acceptance toward AI. An enhanced acceptance leads to a more positive attitude. This would indicate that since higher educated individuals have been provided with more information on AI, this leads to a higher AI literacy. As explained before, this higher AI literacy can influence the attitude toward AI positively. This could be a factor influencing the attitude, although this is not proven. A large scale investigation showed that most people exhibit a positive attitude toward robots and AI, and that higher education levels were associated with more positive attitudes toward AI (European Commission and Directorate-General, 2017). However, other research showed only minimal correlation between positive attitudes toward AI and education level (Kaya et al., 2024). This study suggested that the narrow educational range may have limited the prediction of attitudes toward AI from the education level, since other studies had found that having a higher level of education increased the chances of having positive attitudes toward AI in general (Gnambas and Appel, 2019; Zhang and Dafoe, 2019). Since a wider range of

educational levels is used in this study, a higher level of education is expected to result in a more positive attitude toward the opportunities and threats of AI.

H3a: Higher level of education is associated with a more positive attitude toward the opportunities of AI

H3b: Higher level of education is associated with a more positive attitude toward the threats of AI.

2.1.4 Country of birth

Various experts have studied the impact of culture on the perception of AI (e.g. Bames et al., 2024, Yigitcanlar et al., 2023). Study suggested that the cultural identity of an individual does influence the attitude toward AI. "Individualists may be more prone to view AI as external to the self and interpret AI features to infringe upon their uniqueness, autonomy, and privacy. In contrast, collectivists may be more prone to view AI as an extension of the self and interpret AI features to facilitate conforming to consensus, respond to their environment, and protect privacy." (Bames et al. 2024). This does not provide enough evidence to prove that the cultural differences within Europe are strong enough to have an impact on the attitude. However, Yigitcanlar (2022; 2023) has studied the difference in attitude towards AI between different countries, and even between cities. There was a significant difference in public perception between the three biggest cities in Australia (Yigitcanlar, 2022), which would predict a difference between European countries as well. Bames et al. (2024) explains that culture influences the impact AI can have on an individual, and on the decision-making process of this individual. A culture that is more focused on collectivism, has more influence on this relationship for an individual, since this person is more likely to share the same view as other people in that culture. In a culture that is more focused on individualism, people are more likely to have a different perception (Bames, 2024). A survey done by Ipsos (2022) studied the global attitudes toward AI, focusing on the country's GDP per capita. Findings show a difference in attitude per country, with people living in wealthier economies that have a less positive attitude. Countries within Europe also showed different attitudes. Thus, due to previous studies that proved that the public perception significantly differs between various countries and even cities, the attitude toward the opportunities and threats of AI is expected to be influenced by the country of birth of an individual.

H4a: There is a relationship between an individual's country of birth and their attitude toward the opportunities of AI.

H4b: There is a relationship between an individual's country of birth and their attitude toward the threats of AI.

3. METHODOLOGY

3.1 Research Design

This study aims to investigate the people's attitude towards AI and attempts to reveal how this attitude differs according to an individuals' literacy regarding AI, level of education, country of birth, and job security. A quantitative methodology in the form of a survey is used to investigate this matter. The survey will consist of 35 questions intended to gather data about the respondent's demographic information, information regarding the factors that will be investigated, and lastly the survey will contain a set of questions testing the attitude toward the opportunities and possible threats of AI.

Countries	Respondents	%
Netherlands	56	38.4
Spain	20	13.7
Belgium	19	13.0
France	12	8.2
Germany	5	3.4
Liechtenstein	4	2.7
Philippines	4	2.7
Switzerland	4	2.7
Cyprus	2	1.4
Finland	2	1.4
India	2	1.4
USA	2	1.4
Other	14	9.8

Table 2. Country of birth

3.2 Selection and Sampling

The data is collected via the online survey that will be spread via social media networks, including Instagram, Whatsapp, and LinkedIn. Furthermore, the survey will be spread through personalized emails to selected participants. The snowball sampling method was applied by encouraging participants to share the survey with their network. The sample consists of individuals with different levels of education, different nationalities, and different views on their job security. The sample size for this study is 146 participants, and the demographic data can be found in table 1. Most of the respondents are under 25 years old (70,55%), and a majority has a bachelor's degree as their highest completed education. Table

2 shows an overview of the nationalities of the respondents. From the 27 countries, most of the respondents grew up in the Netherlands (38.4%), followed by Spain (13.7%) and Belgium (13%).

3.3 Measurement

The survey is designed to gather information about certain factors influencing the attitude towards AI. It will therefore include questions regarding the level of education, the country an individual is born and raised in, and the view on their job security, as well as questions to get a clear understanding of their perceptions toward AI, and questions to gain understanding about the individual's AI literacy. Additionally, the survey will explore demographic variables that can influence the dependent variable.

3.3.1 Attitude toward AI

To gain understanding about the individual's perception of AI, a questionnaire consisting of 8 questions with a 5-point Likert scale is used (Bozkurt and Gursoy, 2023). Findings from exhaustive literature review concerning the attitude toward AI

Variables	Variables frequency	%	
Age	Under 25	103	70,55
	26-35	23	15,75
	36-45	8	5,48
	45-60	8	5,48
	60 and over	4	2,74
Gender	Male	89	60,96
	Female	57	39,04
	Other	0	0
Education	Up to Secondary School	19	13,01
	Post-Secondary Vocational Education	13	8,90
	Bachelor	78	53,42
	Master	33	22,60
	PhD	3	2,05

Table 1. Demographic variables

were used to construct these questions. Both exploratory Factor Analysis and Confirmatory Factor Analysis were employed by Gursoy and Bozkurt (2023) to assess the validity and reliability of the measures. Their study confirmed the two factor structure measuring AI as both a threat and an opportunity. The questionnaire consists of 4 questions regarding the opportunities of AI, and 4 regarding the possible threats of AI. The effect of the variables on the attitude toward the opportunities of AI and the possible threats of AI is tested.

3.3.2 AI literacy

The AI Literacy of the respondents is tested using the AI Literacy Scale (AILS) developed by Carolus and colleagues (2023). This scale was used in multiple studies regarding AI literacy and the attitude toward AI (Schiavo et al., 2024; Wang et al., 2022; Ng et al., 2021). The questionnaire is made of 18 questions divided into four constructs aimed at measuring the different parts of AI literacy: Use & Apply AI, Know & Understand AI, Detect AI, and AI Ethics. These questions were once again answered using a 5-point Likert scale. The effect of AI literacy on the attitude toward the opportunities and threats of AI was measured using a regression model.

3.3.3 Job Security

To test the relationship between job security and the attitude toward the opportunities and threats of AI, first the job security needs to be tested. To investigate the job security of the participants, the Job Security Scale (De Witte, 2000) is used, consisting of 5 questions to be answered using a 5-point Likert scale. This is a scale that has been used widely and is validated in various contexts. The answers to the questions will give an average between 1 and 5, which will estimate the perspective of the respondent on their job security. An average of 1 suggests a very confident view on the job security, while an average of 5 indicates a very uncertain one. Participants who do not have a job, can choose 'N.A.'. To test the effect of job security on the attitude toward the opportunities and threats of AI, a regression analysis will be used. The findings will provide evidence to either support or decline the hypothesis made above.

3.3.4 Level of education and country of birth

To analyse the relationship between the level of education and the attitude toward AI, an ANOVA analysis will be used. The test will provide information on whether the level of education influences an individual's perception of the opportunities and possible threats of AI. The same is done for the country the respondent grew up in. The ANOVA analysis provides insights on the differences in attitude toward AI for the different countries.

3.4 Control Variables

Previous studies investigated the influence of certain demographic variables on the attitude toward AI (Bozkurt and Gursoy, 2023; Grassini and Ree, 2023) and have provided evidence that the age and gender of an individual have a significant effect on the attitude. Research has shown that individuals between the ages of 26-35 see AI as offering significantly more potential opportunities compared to other age groups (Bozkurt and Gursoy, 2023). Furthermore, male respondents generally perceive AI as more useful and generally

Variable	Mean	Standard deviation
Job Security	2.05	0.71
AI Literacy	3.61	0.60
Attitude towards opportunities	3.56	0.83
Attitude towards threats	3.05	0.93

Table 3. Descriptive statistics

more favourable than females. (Grassini and Ree, 2023). As seen in table 1, 70.55% of all the participants are in the age group of under 25 years old, with a good division of gender. The influence of the control variables is therefore small.

4. RESULTS

The goal of this research is to understand public opinion of AI and to analyse how these opinions differ based on concern for job security, level of education, country of birth and overall literacy in AI. By recognizing how these factors influence, the study aims to provide a better understanding of the perception and acceptance of AI among people within various demographic and socio-economic backgrounds.

4.1 Frequency distributions

The questions regarding the attitude toward AI gave a clear insight into the current sentiment. 15.1% of the respondents to this survey strongly agreed to the statement that the use of AI should be encouraged, while 34.9% agreed. 17 individuals disagreed, and 7 strongly disagreed, representing respectively 11.6%, and 4.8%. 33.6% of the participants were neutral. This means that the biggest group of individuals, 50% are agreeing to the statement, while only 16.4% disagree. This division is not much different for the statement: I think AI will make our lives easier. 4 (2.7%) respondents strongly disagree, and 10 (6.8%) disagree. A neutral position was taken by 35 participants (24%). 56 (38.4%) agreed and 41 (28.1%) strongly agreed. In total this means that 66.5% of the individuals are in favor of this statement, while only 9.5% are against it. 16 (10.9%) participants took a neutral position when asked whether they think AI will increase efficiency of our work. Nearly 80% of the participants are agreeing to this statement, with 72 (49%) agreeing and 45 (30.6%) strongly agreeing. Only 3 respondents strongly disagreed, and 10 disagreed, representing 2.1% and 6.8% of the participants. The statement, more robots should be encouraged in the workplace, was answered by quite some disagreement. 19 (13%) respondents strongly disagreed, and 28 (19.2%) disagreed. On the other hand, 39 participants agreed and 11 strongly agreed,

Education	Opportunities of AI		Threats of AI	
	Mean	SD	Mean	SD
Secondary School	3.38	0.91	3.03	0.99
MBO	3.67	1.06	3.13	1.03
Bachelor	3.54	0.85	3.11	0.92
Master	3.70	1.04	2.91	0.86
PhD	2.92	1.04	2.58	1.28
Country				
Netherlands	3.61	0.74	2.83	0.88
Spain	3.79	0.60	3.49	1.10
Belgium	3.22	1.14	3.11	1.01
France	3.40	1.15	2.98	0.99

Table 5. Descriptive statistics of levels of education and countries (n<6)

accounting for 26.7% and 7.5% of the total. This means 49, corresponding with 33.6% of the respondents were neutral for this case. Overall, there was a balanced view with 33.6% of the people agreeing, and 32.2% disagreeing.

The statements regarding challenges created by AI were started off with the statement: ‘I worry that AI will bring about the end of humanity’. Only 24.6% of the respondents expressed worry with 24 (16.4%) participants agreeing, and 12 (8.2%) strongly agreeing. The bigger part, 54.7%, disagreed to this statement, of which 30 strongly disagreed. Many respondents expressed concern about unemployment due to AI, with 54.1% agreeing or strongly agreeing that AI could lead to job losses, while 24% were not concerned. Regarding the potential for AI to increase societal inequalities, 45.9% agreed it could, while 21.3% disagreed. Finally, opinions on mass unemployment were more divided: 26.1% were concerned, 41.8% were unconcerned, and 32.2% remained neutral.

Furthermore, as seen in table 3, on a 5-point Likert scale, the average means of those statements measured AI as an opportunity was 3.56. This indicates that the participants have a relatively positive attitude toward the opportunities of AI. The standard deviation tells us that there is moderate variability between the outcomes of the participants. The mean of those

Table 4. Regression analysis for the variables AI literacy and Job security

	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Average attitude toward Benefits of AI	Average attitude toward threats of AI	Average attitude toward Benefits of AI	Average attitude toward threats of AI
Independent Variable	Average AI Literacy	Average AI Literacy	Average Job Security	Average Job Security
Intercept	0.709 (0.344) *	4.184 (0.460) ***	3.988 (0.243) ***	2.167 (0.262) ***
Coefficient	0.788 (0.094) ***	-0.315 (0.126) *	-0.187 (0.112) .	0.399 (0.121) **
Residual Std. Error	0.681	0.910	0.833	0.900
R-squared	0.328	0.042	0.025	0.090
Adjusted R-squared	0.324	0.035	0.016	0.082
F-statistic	70.38 on 1 and 144 DF	6.295 on 1 and 144 DF	2.774 on 1 and 110 DF	10.87 on 1 and 110 DF
p-value	4.12e-14 ***	0.0132 *	0.0986 .	0.0013 **

Significance codes: *** : p < 0.001, ** : p < 0.01, * : p < 0.05, . : < 0.1

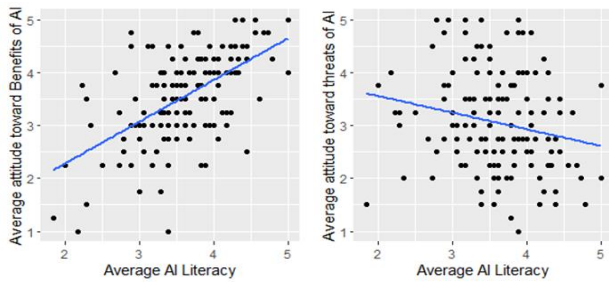


Figure 1 & 2. Relationships between AI literacy and attitude toward opportunities of AI (left) and threats of AI (right)

questions measuring the attitude toward the threats of AI was 3.05. This tells us that the respondents' attitude toward the threats of AI are close to neutral. However, the standard deviation of 0.93 suggest more variability in the answers, in comparison to the questions regarding the opportunities of AI.

4.2 Descriptive statistics

The descriptive statistics of the variables Job Security and AI literacy are also shown in table 3. The mean for job security is 2.05 with a standard deviation of 0.71. This means that the participants are in general confident about keeping their job. A standard deviation of 0.71 suggests a moderate variability in the perceptions. For AI literacy, a mean of 3.61 indicates that the participants have a relatively good understanding of AI. The standard deviation of 0.60 indicates low variability, which means that most of the respondents rate their literacy similarly. The descriptive statistics for the various levels of education is shown in table 5. The results are relatively close to each other apart from individuals with a PhD, however, only three respondents represent this group. The descriptive statistics of countries with more than 6 participants are also shown in table 5. Most of the attitudes are slightly positive, although most answers are more or less neutral.

4.3 AI literacy

Table 4 summarizes the findings of the regression analysis. Results of the analysis indicated a strong positive relationship between AI literacy and a favorable attitude toward the

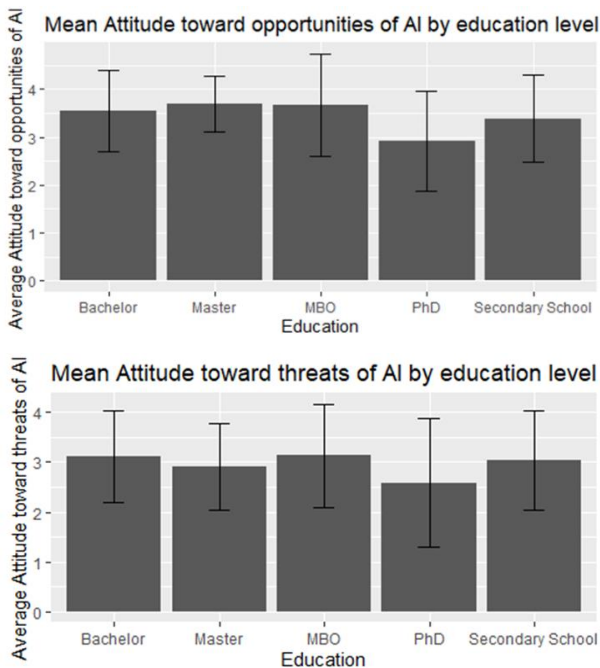


Figure 3 & 4. Bar charts of mean attitude toward opportunities/threats of AI by educational level

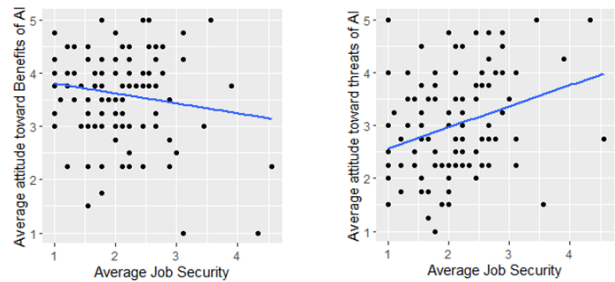


Figure 5 & 6. Relationships between job security and attitude toward opportunities of AI (left) and threats of AI (right)

opportunities of AI. The estimated coefficient (B) of 0.788 suggests that for each unit increase in AI literacy, the attitude toward the opportunities of AI increases by approximately 0.788. This regression is shown in figure 1. The standard error is calculated as 0.094, which is relatively small. This indicates a high precision of this analysis, indicating that there is a high confidence in the strength of the relationship. The value for R-squared (0.328) tells us that a relatively big part of the variability of the attitude toward the opportunities of AI is explained by AI literacy, indicating a reasonable fit.

Table 4 also provides insights into the relation between AI literacy and the attitude toward possible threats of AI. This regression is also shown in figure 2. The estimated coefficient for AI literacy is -0.315, with a standard error of 0.126. This indicates that as AI literacy increases for an individual, their attitude toward the possible threats of AI becomes slightly more positive. The small standard error (0.126) suggests a statistically significant relationship, however, the calculated R-squared (0.042) tells us only 4.2% of the variation in attitude toward the possible threats of AI is explained by AI literacy.

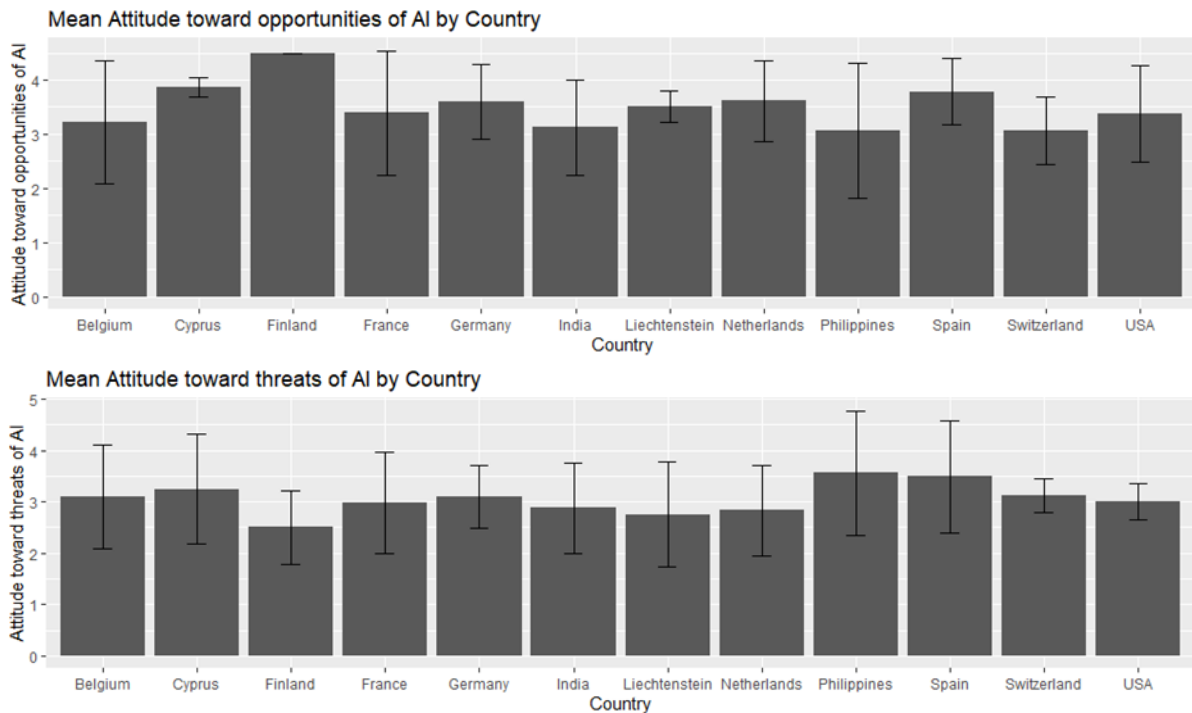
Hypothesis 1a suggested a positive relation between AI literacy and the attitude toward the opportunities of AI. This is in line with the findings of this study. Furthermore, hypothesis 1b suggested a negative effect of AI literacy on the attitude toward possible threats of AI, this is also in line with the findings of this study.

4.4 Job security

The findings of the regression analysis investigating the relation between Job Security and the attitude toward the opportunities of AI can be found in table 4, with the scatterplot shown in figure 3. The coefficient for Job security is -0.187, with a standard error of 0.112. The lower the amount for job security, the more confident an individual is about the future of their job. This relation means that the more confident a person is about their job, the more positive their attitude toward the opportunities is. However, the relationship is weak and only marginally significant, since the attitude only increases slightly, as indicated by the coefficient and standard error. Furthermore, R-squared (0.0246) suggests only 2.46% of the variation in attitudes toward the opportunities of AI, is explained by job security.

The results of the regression analysis between job security and the attitude toward the possible threats of AI can also be found in table 4 and figure 4. The coefficient for job security (0.399) suggests that as an individual is more confident about keeping his or her job, the attitude towards the possible threats of AI becomes more positive. The standard error (0.121) indicates a statistically significant relationship. R Squared tells us that 9% of the variability of the attitude toward possible threats of AI is explained by job security.

The hypothesis 2a is in line with the results from the regression analysis, although the expected effect is relatively weak. Next to



Figures 7 & 8. Bar charts of mean attitude toward opportunities/threats of AI by country ($n > 2$)

this, hypothesis 2b is in line with the study as well, however, the relationship is stronger and therefore closer to the hypothesis.

4.5 Level of Education

Results of the ANOVA analysis between the level of education and the attitude toward the opportunities of AI did not indicate significant differences ($F(3, 141) = 0.993, p = 0.413$). The calculated values are shown in table 6. The sum of squares (2.73) indicates that only a small part of the variation in attitude was explained by the different levels of education.

The relationship between the level of education and the attitude toward the possible threats of AI is also investigated using an ANOVA analysis, these results are also shown in table 6. The findings did not show statistical significant differences ($F(4, 141) = 0.491, p = 0.742$), and the sum of squares (1.71) indicate that once again only a small part of the variability in the attitude was explained by the differences in education levels.

Variables	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Education ~ Opportunities					
Education	4	2.73	0.6817	0.993	0.413
Residuals	141	96.74	0.6861		
Education ~ Threats					
Education	4	1.71	0.4279	0.491	0.742
Residuals	141	122.79	0.8708		
Country ~ Opportunities					
Country	25	15.14	0.6056	0.862	0.656
Residuals	120	84.33	0.7028		
Country ~ Threats					
Country	25	17.84	0.7138	0.803	0.731
Residuals	120	106.66	0.8888		

Table 6. ANOVA analysis on the relationship between education/country of birth and attitude toward the opportunities and threats of AI

These findings are not in line with the hypotheses 3a and 3b, which suggested that there would be a significant difference in attitude between the levels of education, regarding both the opportunities of AI and the possible threats.

4.6 Country of birth

The effect of the country of birth on the attitude towards the opportunities and possible threats of AI were also tested using an ANOVA analysis. These results are shown in table 6. First of all, the findings suggest that there is no statistically significant difference in attitude toward the opportunities between the countries ($F(25, 120) = 0.862, p = 0.656$), since the p-value is well above 0.05. The sum of squares (15.14) indicates that only a small portion of the variability for the attitude is explained by the country of birth.

Furthermore, the effect of the country of birth on the attitude toward the possible threats of AI is also tested using ANOVA, with the findings shown in table 6. These results suggest that the country of birth does not have a statistically significant effect on the attitude toward the possible threats of AI either. The p-value (0.731) is again above 0.05, with a sum of squares (17.84) little above the sum of squares for the opportunities of AI, although still not a relevant portion of the variability.

The hypotheses concerning this variable, 4a and 4b, are not supported by the analyses. There is no statistically significant difference tested between the country of birth and the attitude toward the opportunities or possible threats of AI.

5. DISCUSSION

As previous studies have shown, the general attitude toward AI is positive. When we split it into the opportunities and threats of AI, a small difference is shown. People are optimistic about the opportunities AI offers, although they are a bit concerned about the possible threats of AI as well. These findings are in line with other studies (Bozkurt and Gursoy, 2023), and it suggests that people do realize the potential it has in development of the society. As the technological determinism predicts, the technology is the primary force in shaping human society, culture and behavior (Heilbroner, 2003), and this makes it essential to

adapt to the technology. However, as explained by social constructionism, the technology is partly shaped by the societal values, beliefs and norms (Smith and Marx, 1994). This study provides insights into the way the society looks at this technology and what influences this perception. The findings can be valuable in the shaping of future AI technology.

5.1 The effect of AI literacy

Results from this study show that there is a strong positive relationship between AI literacy and a favorable attitude toward the opportunities of AI. The data indicated a high precision of the analysis, and a relatively large part of the variability of the attitude toward the opportunities of AI was explained by AI literacy. In other words, people who have more knowledge about AI tend to look more positive at the opportunities AI might bring to the society. Furthermore, the data indicated a small effect of AI literacy on the attitude toward the possible threats of AI. This means that as AI literacy increases, an individual's attitude toward the threats of AI becomes slightly more positive, and it suggests that individuals with greater AI knowledge feel less threatened by AI. These results are in line with the hypotheses H1a and H1b, although a stronger effect of the AI literacy on the attitude toward the threats of AI was expected. These findings support previous studies (Schiavo et al., 2024; Selwyn et al., 2020; Katsantonis and Katsantonis, 2024). As Schiavo et al. (2024) suggested, a solid understanding of how AI functions and how to use it, will enhance the acceptance of the innovation. This acceptance can be seen as a positive view, and as stated before, essential as explained by technological determinism (Heilbroner, 2003). As technology is the primary force for change in society, adapting and getting to know this technology is important. This supports the suggestion of Katsantonis and Katsantonis (2024) to teach and learn more about AI, to create a more positive attitude.

5.1.1 Managerial implications

Companies that want to start using more AI in their organization, could use this information to create a more positive attitude toward this organizational change. Providing more information about AI to the employees will result in higher AI literacy for these individuals. As the results of this study suggest, the employees will have a more positive view toward the opportunities and are therefore more likely to embrace this organizational change. The acceptance and understanding of the organizational change can lead to higher productivity levels, and overall organizational effectiveness (Khaw et al., 2023).

5.2 The effect of job security

Previous studies suggested that the loss of jobs is seen as one of the most feared parts of the development of AI (Anderson and Rainie, 2018; Rainie et al., 2022), although debates about whether this fear is justifiable have raised (George, 2024; Hunt et al., 2022). However, research has provided evidence that this does not take away the perceived job insecurity for individuals (Erebak and Turgut, 2021; Synard and Gazzola, 2018). Kaya et al. (2024) studied this relationship, however, in contrast to the hypotheses, job security had no significant effect on the attitude toward AI for the participants. The hypotheses for this study predicted a negative effect on the attitude toward AI opportunities and threats as the job security decreases. The results indicated a weak effect of job security on the attitude towards opportunities of AI, with only a very small part of that variability explained by job security. On the other hand, it also suggested that the attitude toward the threats of AI become more positive with a higher job security. These results suggest that individuals with lower job security perceive AI as a greater threat. These results support studies regarding job replacement anxiety (Vu and Lim, 2022; Wang and Wang, 2022). This could mean that the sociotechnical blindness, in combination with a

lower perceived job insecurity, can lead to a negative attitude toward AI, due to job replacement anxiety. This is also in line with the studies done by George (2024) and Hunt (2022), suggesting that the job replacement anxiety might not be justified, because the anxiety is partly caused by the sociotechnical blindness.

5.2.1 Managerial implications

Based on these studies and results, the perceived job security is not the only factor influencing the attitude toward AI. The other factor that goes hand in hand with this, is sociotechnical blindness, which can be improved by getting a better understanding of the dependence of AI on humans. This means that as a manager of an organization where job replacement anxiety is an issue, providing more information about the dependence of AI on humans, could lead to less job replacement anxiety, which leads to a more positive attitude toward AI. Thus, mitigating the sociotechnical blindness of the employees leads to a more positive attitude toward AI.

5.3 Level of education

The effect of the level of education has been studied before, but the outcomes of these studies were varying. Higher educated individuals tend to have a positive attitude toward AI (Katsantonis and Katsantonis, 2024), although this does not tell us anything about the effect of the level of education on this attitude. A large scale investigation provided evidence for this effect, and suggested that higher education levels are associated with more positive attitudes toward AI (European Commission and Directorate-General, 2017). Another study, however, only showed minimal correlation between these variables (Kaya et al., 2024), although the range of educational level, with only three different levels, might have influenced this effect. For this study, a range of five different educational levels was used. Nevertheless, the results are not in line with the hypotheses made, thus suggesting that the level of education does not influence the attitude toward the opportunities or threats of AI. The hypothesis expected that the more frequent use of AI in higher education would lead to an increase in AI literacy and therefore a more positive attitude toward AI. The expected difference in AI literacy, however, may not be significant anymore. This can be the effect of the increasing use of AI in our daily life. Individuals from lower educational levels might have a relatively high AI literacy as well, due to the use of AI in multiple sectors or the increased availability of AI (Morandín-Ahuerma, 2022; OpenAI, 2024). This would mean that the AI literacy of a lower educated individual can be as high or even higher than a higher educated person. Furthermore, older, high educated participants, did not receive a significant amount of information about AI in their period of studying, since AI was not as developed yet. These arguments suggest that higher educated individuals do not necessarily have higher AI literacy, and therefore there the level of education does not have a significant effect on the attitude toward AI.

5.3.1 Managerial implications

These results provide interesting and useful information for organizations. Where a manager might think that a lower educated employee has a more negative attitude toward AI, and therefore needs more literacy on AI; This could be the other way around, where the higher educated individual has a relatively negative attitude toward AI, and is in need of more information and knowledge on AI. Especially when an organization is planning on using more AI in their business practices, it is therefore important for managers to consider the attitude toward AI of all employees, not only the lower educated ones.

5.4 Country of birth

In the past, studies have investigated the influence of countries and cultures on the attitude toward AI (Barnes et al., 2024; Yigitcanlar, 2022; Yigitcanlar et al., 2023; Ipsos, 2022). These studies show a significant difference in attitude toward AI for diverse cultures. Research done by Ipsos (2022) showed the difference in attitude toward AI for multiple countries, and it indicated that wealthier countries have a less positive attitude toward AI. However, the results of this study do not show significant differences between the various countries. Only a small proportion of the variability in the attitude toward AI is explained by the country of birth, which suggests that the minimal differences were the cause of different factors. The rejection of these hypotheses might be explained by a possible incomplete sample, since the countries were only represented by a small number of participants. Another explanation could be the lack of difference in culture between the countries studied. When we take the four countries with the most respondents, the Netherlands, Spain, Belgium and France, and compare the cultural differences as explained by Hofstede (2011), there are no big variances. This would indicate that the difference in culture needs to be significant to cause a difference in attitude toward AI.

5.4.1 Managerial implications

The results of this study can be used in addition to other studies concerning the influence of culture on the attitude toward AI, considering that only a significant difference in culture can cause a difference in the attitude toward AI. For companies this entails that employees from different nationalities do not necessarily have a different attitude toward AI. Therefore, these employees do not need a different approach when integrating AI in an organization.

5.5 Limitations and future research

Several limitations of this study can be identified. Looking at the sample that was used for the research, some points stand out. The age group 'under 25 years old' was significantly more represented than other age groups. This might have caused differences in the results compared to other studies where all age groups were represented significantly (Ereback and Turgut, 2021; Gnams and Appel, 2019; etc.). Future studies should focus on gathering more participants from various age groups, so the results are representative for all age groups.

Furthermore, looking again at the sample, most of the countries were represented by no more than five participants. The Netherlands, Spain, Belgium, and France were the exception to this. To find significant evidence for the attitude of a country, a bigger sample is needed. Yigitcanlar et al. (2023) compared Australia with Hong Kong and used a bigger sample for the two countries. That research did find significant differences in attitude toward AI. Future research should gather a substantial number of respondents from different countries. This could be done by either focusing on a couple of countries and comparing those or gathering a larger sample. Comparing two countries from Europe with a more distinct culture can also be interesting, since this difference in culture can cause a difference in attitude toward AI (Yigitcanlar et al., 2023). The culture of the countries that are compared in this study were too similar to each other to show differences.

Another limitation of this study is that the data was collected through a snowballing approach utilizing social networks. To expand the scope and generalizability of the findings, a different approach is recommended. For example, with the use of a selected sample.

Multiple studies have evaluated the relationship between the level of education and the attitude toward AI. However, the results of these tests differ. Future studies should examine this relationship with a representative sample on a larger scale to provide valuable information on the influence of the level of education.

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