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THE FUTURE OF ARTIFICIAL INTELLIGENCE: FEAR, HOPE OR INDIFFERENCE?

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Abstract: *The article explores how youth perceive the risks of artificial intelligence (AI), based on a survey of 410 university students from Poland, Spain, and Ukraine. The study confirms non-random responses with acceptable internal consistency for categorical variables and complex constructs. The authors built three latent profiles of participants with pragmatic, skeptical, and cautious attitudes towards AI. The scenario approach revealed that respondents are cautious about the use of AI but generally support its implementation under conditions of flexible state regulation. Youth do not see AI as a threat to social equality or the labor market but expect state support through retraining and basic income for laid-off workers. At the same time, there are both optimistic and skeptical scenarios about the future of AI, which depend on the level of awareness and cultural characteristics of the respondents.*

Keywords: *artificial intelligence, dominant scenario, latent profile, risk, threat.*

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INTRODUCTION

Industry 4.0 and 5.0 have caused dynamic and fast-paced development of information and computer technologies in various spheres of society. This has led not only to the acceleration in computer capabilities but also to a decrease in computer price and an increase in accessibility to all population segments. In addition, the use of artificial intelligence (AI) to solve various economic and business problems is becoming widespread. For example, the market for AI-based software in 2016 amounted to $8 billion (Lohr, 2016). By June 20, 2024, however, the AI market was already equal to $184 billion, which is 23 times more than in 2016 (Statista, 2024). At the same time, Statista (2024) predicted its growth to $826 billion in 2030, which is 103.25 times more than in 2016 and 4.5 times more than in 2024. Frank Gens, the chief analyst of IDC research company, said that everyone is now headed for the moment when AI is everywhere (Lohr, 2016). This confirms the spectacular growth of the AI market.

Although artificial intelligence has been known since 1956, when John McCarthy coined the term during the Dartmouth Seminar, some professionals consider the beginning of its active and powerful phase to be 2022-2024, when scalable language models such as ChatGPT were developed and implemented (Marr, 2023). Given this activity, concerns are being raised over any risks from AI for humanity. However, many remain convinced that this problem is far-fetched. For example, 97% of business owners are optimistic about the use of AI in their operations and believe that it will contribute to their development, but 43% of them are concerned about becoming too dependent on AI (Haan & Watts, 2023). In addition, 77% of employees are concerned that AI could lead to job losses (Haan & Watts, 2023). According to McKinsey, there is a risk of displacement of 400 million workers due to artificial intelligence (Manyika & Sneader, 2018). Also, Jeffrey Hinton, the "godfather of artificial intelligence", warns about the existence of risks from AI, namely technological unemployment, abuse by malicious actors, as well as existential risks, when progress in AI can lead to human extinction (Jacobson et al., 2023).

Automation and the introduction of AI have already affected the existence of certain professions. For example, robotization has replaced workers in automotive and electronic production. The introduction of electronic self-service counters has reduced the number of cashiers in stores and banks. More and more companies prefer to use chatbots instead of maintaining fully functional call centres. Autonomous vehicles are being introduced in cargo transportation. AI is also affecting such professions as financial analysts, medical diagnosticians, and content writers.

AI has been actively used to solve military problems, which, on the one hand, has increased their efficiency and reduced the cost of their implementation. On the other hand, this has serious negative consequences for the civilian population, moral principles, and the international community. We are talking about the risks of making decisions to destroy targets without human intervention, the use of cyber weapons to hack critical infrastructure, escalation of conflicts through diplomatic fakes and disinformation, erroneous military actions as a result of errors in neural network algorithms, etc.

It should also be noted that the use of AI for cybercrime has increased. For example, diplomatic accounts, fake identities, and voice fraud are used to imitate influential people, politicians, and businessmen. This technology can also be used to create "dead souls" at

enterprises to receive monetary rewards. AI algorithms can also influence the functioning of cryptocurrency exchanges by manipulating prices.

Thus, we can assume that there are risks from the use of AI. Today, it is difficult to predict what its impacts will be in 20-30 years and how they will be felt by ordinary users. Taking all this into account, the study focuses on the category of young people aged 18-23 who are potentially at risk of being exposed to AI in the future. Why was this group chosen? Today, young people are at the beginning of their future careers. Perhaps their choices now will affect their future, where there are potential threats from AI due to job loss, change of specialty, wrong decision-making, cyber threats, etc. Therefore, in this study, the authors tried to answer the scientific question of how young people perceive the risks of AI. Is it fear, hope, or indifference?

LITERATURE REVIEW

The driving force behind the development of the modern economy is digital transformation (Jarzębowski et al., 2024). Their impact is felt by countries regardless of the level of welfare (Kuzior et al., 2022). As a result, a digital gap is formed, which causes inequality in the competitiveness of countries and even violates national security (Kolupaieva & Tiesheva, 2023; Zámek & Zakharkina, 2024). That is why the development of technological innovations is a key aspect of long-term state and business strategies (Gondauri et al., 2024; Strielkowski et al., 2022). Digital transformation encompasses the adoption of technologies such as artificial intelligence, the Internet of Things, and big data, which are key to improving operational efficiency, reducing costs, and ensuring business sustainability in various industries (Tutak & Brodny, 2024; Sarker, 2022; Zhou, 2024). Bibliometric and network analysis of scientific publications revealed growing trends in research on AI and its use in various fields over the past few years (Bilan et al., 2022). At the same time, the greatest attention is paid to the legal, educational, economic and ethical aspects of AI (Prieto-Gutierrez et al., 2023).

There is a fairly close connection between the level of digitalization and the business ecosystem, as a result of which conditions favourable for technological growth are formed (Mursalov et al., 2023). They provide the technological basis for the development of AI, which in turn enhances the capabilities of additive technologies, allowing them to reduce costs, increase flexibility and maintain high-quality products (Melnyk et al., 2023). The possibilities of AI are promising, especially in accumulating new knowledge (Bencsik, 2021). It can predict economic crises, natural disasters, social conflicts, and bankruptcy of companies to counteract these threats quickly and effectively (Cherep et al., 2024; Letkovsky et al., 2023). AI is actively integrated into smart banking technologies: introduction of robot advisors (Piotrowski & Orzeszko, 2023), fraud recognition (Kozhushko, 2023), modelling of financial markets (Hrytsenko et al., 2024), cryptocurrency forecasting (Máté et al., 2024), management decision-making (Haddad, 2021), etc. The introduction of intelligent tutors, virtual assistants, automated grading systems, chatbots to support students, etc., makes AI attractive for improving online education (Louw et al., 2024; Skrynnyk et al., 2022). Its application in logistics enables information alignment and supply flexibility and also improves the digital awareness of users involved in supply chains (Aliane et al., 2023; Angammana & Jayawardena, 2022; Pereira & Shafique, 2024).

AI has not overlooked agriculture. For example, chatbots and chat rooms for management decision-making in farms are gaining practical significance (Ekanayake & Saputhanthri, 2020). Also, predictive models based on AI are more productive for big data compared to other methods (Kolková & Ključnikov, 2022). Combining robotic automated processes with AI increases labor productivity, lowers production costs, and improves business efficiency (Orlandić et al., 2024). Artificial intelligence can significantly increase the resilience of the capital chain of enterprises, especially in times of crisis (Li, 2023). Also, the practices of applying AI in realizing the benefits of implementing Green HRM are positive (Abid et al., 2024). AI can automate administrative tasks, provide fast data processing for decision-making, and detect and prevent corruption risks to promote transparency and accountability of public institutions (Androniceanu, 2023).

The intensive use of non-renewable resources and broken technological cycles lead to the destruction of the planet's ecosystems. However, the AI introduction in the transition to renewable resources and closed cycles can ensure the sustainability of economic activity and help the successful transformation of the traditional economy into a digital one (Melnyk et al., 2019). AI can significantly reduce risk in construction by predicting potential hazards and helping to avoid emergencies through real-time data analysis. At the same time, over-reliance on AI can lead to neglect of human judgment and unexpected failures if such systems give inaccurate predictions or become unavailable (Aneke & Oboho, 2024; Elkrghli & Almansour, 2024).

Federspiel et al. (2023) identify that there are three biggest threats from AI: the increased ability to control and manipulate people, the enhancement and dehumanization of lethal weapons, and the obsolescence of human labor. Hutter & Hutter (2021) believe that two states of AI impact can now be considered – the uncontrolled replacement of AI in decision-making processes, administrative processes and the main processes of production and service provision, as well as the dismissal of people through full automation. Both conditions can lead to unemployment, lower wages, increased social inequality, and changes in policies and standards in favor of pure materialism. Of course, humans want to retain the leading role and mediate between the biological and technological species (Tugui et al., 2022). But increasingly, AI affects what we do and how we interact with each other (Tai, 2020). The success of language models such as ChatGPT is so significant that in the process of communicating with it, one can get the impression that communication is happening with a real person. But Tredinnick & Laybats (2023) believe that this kind of experience shows more how to be a person than technological capabilities. Certainly, one can agree with the authors on this aspect, but AI can also produce other risks and threats.

Different economic, social and political conditions create the basis for a “brain drain” in many countries, forcing the government to implement AI to solve the problem of labor shortage (Iuga & Socol, 2024). On the one hand, it reduces costs for companies and solves the staffing problem, but on the other hand, it can worsen the situation when robots make wrong decisions due to errors in their algorithms. Cramarenco et al. (2023) note that AI affects the professional skills and well-being of workers, generating the risk of job loss through downskilling. Although, conditions for retraining and acquisition of new qualifications may be formed at the same time. The transition to remote work due to the pandemic has led to the introduction of advanced technologies for communication. Their use decreased the communication level

between team members and deteriorated the psychological climate in companies (Capolupo et al., 2022).

Nowadays, the global system for combating cyber threats is rather unstable, which is a consequence of the different levels of countries' digitization, and creates a favorable background for the growing use of AI for cybercrime (Kuzmenko et al., 2023). It is especially relevant in the fields of health care, telemedicine and insurance medicine (Dobrovolska et al., 2024; Pakhnenko & Pudło, 2023). In these areas, AI carries threats, first of all, related to ethics and data privacy, as well as increased diagnostic costs (Sheliemina, 2024). This kind of cyber threat can cause serious business disruptions as well (Havryliuk et al., 2023). The use of AI for botnet attacks has expanded the capabilities of criminals, ranging from infrastructure attacks to identity theft and financial fraud (Djenna et al., 2023). In addition, with the help of AI, cybercriminals can generate more convincing phishing attacks and tailor malware to the weaknesses of specific systems, which significantly increases security threats.

Thus, we can see the benefits of AI for various aspects of society's life, but we also cannot overlook and neglect the risks associated with it. That is why this study aims to find out whether young people perceive AI as a threat, or whether they believe that we will still be able to find a balance between machines and humans.

DATA

This study was based on data obtained from a survey conducted among students of higher education institutions. The sample consisted of 410 respondents, of which 38.54% were students from Ukraine, 34.63% from Poland, and 26.83% from Spain. The data is balanced, as the standard deviation is 4.87%, which is acceptable and allows for analysis both in general and with regard to individual groups limited by the country of respondents.

Students were asked three sets of questions. The first set was aimed at studying the respondents' personal experiences and attitudes toward artificial intelligence in everyday life. The questions covered such aspects as the professional orientation of the respondents, the frequency of using AI in everyday tasks, the level of trust in AI-based systems, personal attitude to the integration of AI into all spheres of life, assessment of the current level of AI development, and the respondents' opinions on whether the development of AI could pose a threat to humanity.

The second set of questions examined respondents' views on potential threats associated with the development of artificial intelligence and their attitudes toward the consequences of its introduction into the professional sphere and public life. The participants were asked to assess the most likely threats from AI, the professions that, in their opinion, are at the greatest risk of automation, their personal vision of the risk of losing their jobs due to the introduction of AI in their future profession, and their general attitude to whether automation will contribute to an increase in unemployment in the next 20-30 years. Particular attention was paid to the social implications, such as the possibility of deepening social inequality due to the development of AI, as well as professional skills that can help to preserve jobs in the face of rapid technological progress. The block also touched upon moral and ethical issues: whether AI is capable of making moral decisions on its own, whether respondents are willing to entrust robots with decision-making in critical situations, and whether they think AI can surpass human

intelligence and creativity in the future. The study also covered assumptions about the possibility of robots developing self-awareness, the risks of "machine revolt" similar to science fiction, and the threat of cybercrime.

The third set of questions was aimed at studying respondents' attitudes toward responsibility, regulation, and social support in connection with the development of artificial intelligence. In particular, respondents were asked who, in their opinion, should be responsible for possible negative consequences of AI use and whether they consider it necessary to control the development of AI at the legislative level. The role of governments in regulating the development and use of AI was raised, as well as the feasibility of retraining programs to prevent mass unemployment caused by automation. In addition, the views on the introduction of a universal basic income to support those who will lose their jobs due to automation and the assessment of humanity's readiness for the ethical challenges associated with the development and implementation of AI technologies were considered.

METHODOLOGY

The research methodology included three main stages and one preliminary stage, which involved bringing the data to the form required for further calculations and analysis.

The purpose of the first stage was to analyze the existence and strength of the relationship between two categorical variables, in our case, questions with answers, which allowed us to select the key ones for the formation of latent profiles. The Chi-squared test and Cramer's V coefficient were used for the analysis. The Chi-squared test helps to determine whether there is a statistically significant relationship between two variables and to answer the question of whether the survey results are random. The test was conducted by calculating the classic Chi-square value and p-value (Pearson, 1900). The Cramer's V coefficient helps determine the strength of the relationship between categorical variables. It was also calculated using the classical formula (Cramér, 1999). Also, Cronbach's alpha coefficient was used to assess the reliability (internal consistency) of the set of questions (Chen et al., 2024). It helps to determine the extent to which responses to different questions are consistent with each other, that is, whether they measure the same characteristic or construct. To apply this coefficient, the answers were re-indexed to a scale from 1 to 3. "3" was given to those answers that characterize full acceptance of AI and trust in it in all aspects of its manifestation; "2" to those that symbolize a cautious or balanced attitude towards AI and potential trust in it in some aspects; "1" to those that characterize distrust, rejection, and skepticism towards AI.

The second stage of the research methodology was devoted to Latent Class Analysis (LCA), which allows us to identify hidden (latent) groups based on similarities in respondents' answers. Such classes best explain their variability and help to understand what types of respondents exist in the sample and what common features or behavioral patterns unite them. LCA is effective for categorical data, which formed the basis of this study. It was carried out using the following algorithm:

1. First, One-Hot Encoding of input variables was performed, which converts each categorical variable X_i (question with answers) into binary vectors $(0, \dots, 1, \dots 0)$ of indicator variables $X_i^{(k)}$, where k corresponds to the number of categories for X_i, and a unit in the vector indicates a category correspondence.

2. Next, an optimal number of latent classes was determined using the Akaike information criterion (AIC) and Bayesian information criterion (BIC) (Akaike, 1974; Schwarz, 1978). As a result, the number of latent classes for which the AIC and BIC are minimal was chosen.

3. A latent class model was built. First, the probability that a respondent belonging to latent class c, has certain X answers was determined:

$$P(X|L=c) = \prod_{i=1}^{m} P(X_i|L=c), \quad (1)$$

where $P(X_i|L=c)$ is the probability of each answer X_i provided that the respondent belongs to the latent class c, where $c = \overline{1,C}$, and C is the total number of latent classes that need to be identified; L is a latent variable that indicates whether the i^{th} respondent belongs to one of the latent classes; X is a set of answers for the class c, where $X = (X_1, X_2, \dots, X_m)$.

Next, we determined the probability V of all observed data X for a certain number of latent classes C:

$$V = \prod_{j=1}^{n} \sum_{c=1}^{C} P(L=c) P(X_j|L=c), \quad (2)$$

where $P(L=c)$ is the probability of belonging to class c, and $P\left(X_j|L=c\right)$ is the probability of specific answers X_j for class c.

Next, the optimization was performed using an EM algorithm to estimate the parameters $P(L=c)$ та $P(X_i|L=c)$.

4. After setting up the LCA model, the probabilities of respondents' answers belonging to each class were determined:

$$P\left(L=c|X_j\right) = \frac{P(L=c)P(X_j|L=c)}{\sum_{k=1}^{C} P(L=k)P(X_j|L=k)}. \quad (3)$$

5. For each latent class, the average values of the answers of respondents belonging to it were calculated. Thus, a latent profile was formed for each class, which reflects which answers are typical for it.

At the third stage, scenario models were built based on the respondents' answers, which describe how events may develop depending on the respondents' views. Subsequently, they can be used to create forecasts, justify strategies, develop recommendations, and make management decisions. The scenario approach involved the following steps.

1. To create profiles of different scenarios, categorical answers were recoded into numerical values in the same way as for Cronbach's alpha coefficient calculation.

2. Five key areas of the scenario study were selected: attitudes toward AI, risks and threats associated with the development of AI, risks of unemployment and social inequality due to AI, regulation of AI, and expectations of AI capabilities in the future. For each key area, three baseline scenarios were formed, for which indicators were calculated using formulas (4)-(6):

$$A_i = \sum_{j=1}^{3} \gamma(x_{ij}, 3)\,;\; C_i = \sum_{j=1}^{3} \gamma(x_{ij}, 2)\,;\; D_i = \sum_{j=1}^{3} \gamma(x_{ij}, 1), \quad (4)\text{-}(6)$$

where A_i, C_i, D_i is the number of answers of the i^{th} respondent with a value of 3, which reflects acceptance and trust (A), 2 – caution (C), and 1 – skepticism and distrust (D); x_{ij} is each answer for the i^{th} respondent to the j^{th} question; $\gamma(a, b) = 1$, if $a = b$, and 0, if $a \neq b$.

3. For each i^{th} respondent a vector of indicators was built $v_i = (A_i, C_i, D_i)$, which reflects its attitude to AI in the form of scenario indicators.

4. Respondents were grouped by scenarios using the classic k-means clustering method. The results were stored as scenario clusters for each respondent.

5. For each respondent, the dominant scenario was determined, i.e. the scenario with the maximum value among the indicators A_i, C_i, D_i:

$$S_i^d = arg \max_{X \in \{A_i, C_i, D_i\}} X. \quad (7)$$

6. For each scenario, the total number of respondents was determined based on the dominant scenario identified for them.

The proposed methodology was implemented using the Python programming language.

EMPIRICAL RESULTS

At the first stage of the proposed methodology, the implementation of the Chi-square test allowed us to build 253 pairs of combinations of survey questions, of which 135 pairs were statistically significant, i.e., those with a $p - value \leq 0.05$. That is, respondents in most cases did not answer questions randomly and a certain relationship can be traced between them. The calculation of Kramer's coefficient allowed us to select those pairs of questions for which the relationship is the closest, although its value varies between weak and medium. Table 1 shows the final results for both calculations.

Table 1 includes those pairs of questions for which Cramer's V exceeds 0.2, which indicates a weak or closer to average relationship. Although we did not get high enough values of Cramer's V to indicate a strong relationship between pairs of questions, the result is acceptable in a data set with only categorical values. Let's analyze the pairs with the closest relationship, which are highlighted in grey.

The results show that the frequency of AI use is characterized by cross-country differences, i.e. students from different countries have different access to and awareness of technologies (Q1-Q2, Table 1). The respondents also showed different opinions on the legislative control of AI, which is influenced by the specifics of technology regulation in different countries (Q1-Q13, Table 1). The correlation between questions Q2 and Q3 (Table 1) shows that respondents who use AI more often in their daily lives show more trust in it than those who do not use such software. Pairing Q4 and Q6 (Table 1) indicates that those who believe that AI can be a threat to human development are also concerned about its impact on the labor market in the future. This category of respondents is also concerned about the growth of social inequality that technology may cause (Q4-Q7, Table 1) and is more supportive of the need for legislative control (Q4-Q13, Table 1).

Table 1. Results of the Chi-squared test and Cramer's V [Source: calculated by the authors]

Var 1	Var 2	Chi-squared	P-value	Cramer's V	Var 1	Var 2	Chi-squared	P-value	Cramer's V
Q1*/**	Q2	67.3852	0.0000	0.2645	Q7	Q13	60.1861	0.0000	0.2040
Q1	Q16	56.8154	0.0000	0.2439	Q7	Q14	69.6161	0.0000	0.2220
Q1	Q4	43.0885	0.0000	0.2126	Q8	Q10	61.6686	0.0000	0.2069
Q1	Q13	57.6858	0.0000	0.2510	Q8	Q11	105.3618	0.0000	0.2799
Q2	Q3	113.3108	0.0000	0.2827	Q9	Q11	61.2926	0.0000	0.2061
Q3	Q17	73.3709	0.0000	0.2287	Q9	Q19	38.8926	0.0000	0.2002
Q4	Q6	104.4343	0.0000	0.2785	Q10	Q11	77.7532	0.0000	0.2364
Q4	Q7	95.5618	0.0000	0.2652	Q11	Q19	51.6585	0.0000	0.2359
Q4	Q12	74.9488	0.0000	0.2262	Q12	Q14	72.4855	0.0000	0.2217
Q4	Q13	87.5270	0.0000	0.2526	Q12	Q15	88.9311	0.0000	0.2500
Q4	Q14	81.8145	0.0000	0.2433	Q13	Q14	216.6449	0.0000	0.4109
Q4	Q15	62.1806	0.0000	0.2079	Q13	Q15	63.3105	0.0000	0.2101
Q4	Q18	69.1126	0.0000	0.2210	Q13	Q18	75.5729	0.0000	0.2326
Q5	Q6	73.6447	0.0000	0.2238	Q14	Q15	81.4872	0.0000	0.2427
Q6	Q7	65.4824	0.0000	0.2142	Q15	Q18	60.9923	0.0000	0.2056
Q7	Q12	71.4638	0.0000	0.2198	X	X	X	X	X

Note. * The grey color corresponds to question pairs with a Cramer's V of approximately 0.3, equivalent to an average connection. **Q1 – In which country do you study? Q2 – How often do you use AI in your everyday life? Q3 – Do you trust AI systems used in everyday life? Q4 – Do you think that the development of AI poses a threat to humanity? Q5 – How do you assess the risk of job loss for yourself due to the AI implementation in your future profession? Q6 – Do you think automation and AI will increase unemployment in the next 20-30 years? Q7 – Are you concerned about the possibility that the development of AI could lead to a deepening of social inequality? Q8 – Do you think AI will be able to make moral decisions on its own? Q9 – Do you think AI can surpass human intelligence in the next 20-30 years or later? Q10 – In your opinion, will AI be able to surpass human creativity in the future? Q11 – Do you think robots could become self-aware in the future? Q12 – Do you believe there is a risk associated with using AI in cyber fraud, such as manipulating images to impersonate individuals? Q13 – Is it necessary to control the development of AI at the legislative level? Q14 – How would you rate the role of governments in regulating the development and use of AI? Q15 – Do you think governments should implement reskilling programs to prevent mass unemployment due to automation? Q16 – How do you evaluate the level of development of modern AI? Q17 – How do you feel about integrating AI into all areas of human life? Q18 – Do you think humanity is sufficiently prepared for the ethical challenges associated with the development of AI? Q19 – Do you think there is a risk of machine rebellion as described in movies or books?

Students who believe in the ability of AI to make independent moral decisions that affect human health and life are more likely to admit that AI can achieve self-awareness and pose a threat in the future (Q8-Q11, Table 1). In other words, respondents do not dismiss the risk that AI decision-making processes may lead to AI becoming equal to human consciousness. The high correlation between pairs Q13-Q14 (Table 1) indicates that respondents who consider the introduction of legislative control of AI to be an important task also have a more positive assessment of the role of governments in regulating this issue. This indicates that respondents tend to rely on the state to resolve issues related to the development of computer technologies. The connection between questions Q12-Q15 (Table 1) may indicate a broader understanding of the risks of AI, both in terms of its use for criminal purposes and economic consequences.

Respondents who are concerned about AI risks are also more likely to support active government intervention to mitigate the negative consequences.

Also, it was determined that Cronbach's reliability coefficient is equal to 0.672 for the set of questions selected due to applying the Chi-squared test and calculating the Kramer coefficient. According to generally accepted recommendations, values between 0.6 and 0.7 are considered satisfactory, confirming our instrument's internal consistency. Although we tried to optimize the scale, in particular, revising the questions, changing the wording and clarifying the instructions for the respondents did not lead to a significant increase in the coefficient. This may be due to the high complexity of the measured construct, which includes various aspects that are difficult to accurately measure with a single instrument. Since in our context, the value of 0.672 is acceptable, we consider it sufficient for the analysis.

In the second stage, "latent profiles" of respondents with similar sets of answers were formed. Their number was justified using the calculated Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) (Figure 1). It turned out that the lowest BIC value is achieved for three latent classes, and the lowest AIC value is achieved for five. It was decided to form three "latent profiles" based on the results of the BIS, as such models provide better interpretability, long-term reliability, cost-effectiveness, and sustainability.

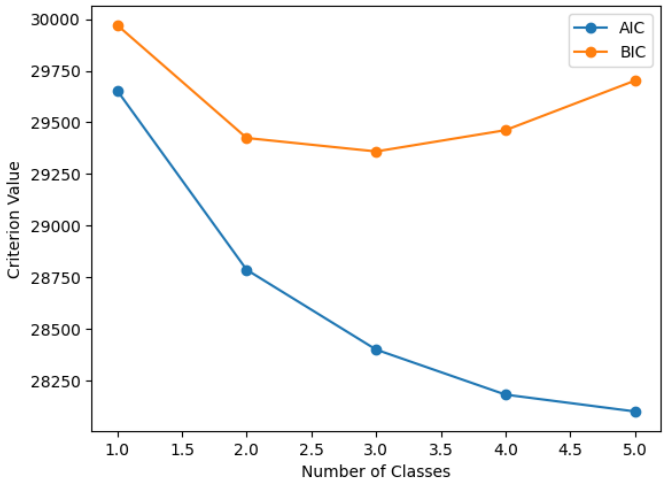


Figure 1. Determining the number of latent classes using criteria AIC and BIC.
[Source: calculated by the authors]

As a result, the following distribution of respondents by the three latent profiles was obtained (Figure 2).

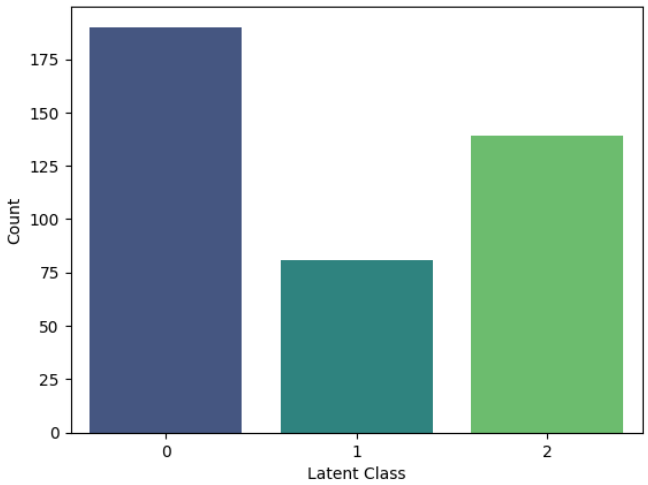


Figure 2. Distribution of respondents by latent classes. [Source: calculated by the authors]

Class 0 includes 46.3415% of respondents, class 2 - 33.9024%, and class 1 - 19.7561%. The result of the distribution is relatively standard. Its standard deviation is 10.8609%. This indicates that the answers are distributed significantly around the mean value with significant variations. The distribution shows skewness with a higher concentration in the 0^{th} class, indicating a large group of respondents who are likely to have similar answers. At the same time, the standard deviation indicates a significant variation in the respondents' answers, which means that although the majority is in the same class, there are still significant fluctuations between classes, indicating a polarization of views.

The latent profile of class 0 (Figure 3) demonstrates answers with a probability of approximately 0.5 or higher. It can be identified as a balanced and pragmatic view of AI. This group was formed mainly by students from Ukraine and Poland. The probability of falling into this profile is close to the average, i.e., 0.4474 and 0.4053, respectively. In general, we can say that respondents of this class, on the one hand, recognize the potential and capabilities of AI, and on the other hand, are wary of possible negative consequences and social threats that may arise from its implementation and development.

Figure 3. Probabilistic characterization of the 0th latent profile. [Source: calculated by the authors]

The majority of respondents demonstrated a high level of cautious attitude toward AI in everyday life (0.9105), which may indicate a high level of awareness of the risks of its use. This category also understands that although the development of technology is quite high (0.5632), it can have unpredictable or even dangerous consequences (0.6211). On the other hand, they believe that the level of impact of AI development on humanity is exaggerated (0.8053). Respondents showed a significant level of concern about cyber threats from AI (0.5053), but they do not consider it a major threat that could lead to deepening social inequality (0.5789). Moreover, they are not convinced of the possibility of a "machine uprising," which indicates a pragmatic approach to the future of AI (0.5526). Respondents believe that AI will probably not be able to surpass human creativity or intelligence because they are unique (0.5737), but can be useful in certain areas. The answers to the questions about whether AI can surpass human intelligence (0.5947), achieve self-awareness (0.6316), or make moral decisions (0.4842) show uncertainty and caution in the respondents' views. They tend to believe that it is possible but unlikely or difficult to predict.

Regarding risks in the professional sphere, only 49.4737% estimate their job loss due to AI and automation at the average level, which indicates a slight concern, although they are aware of possible changes in the future. A sufficient number of respondents believe that an increase in unemployment in the future due to AI is possible but temporary (0.6684). They support the idea of retraining and adapting the workforce to new conditions but believe that this should be an initiative of the employees themselves (0.5632). Respondents noted that we are partially prepared for the ethical challenges associated with AI, so there is a need for relevant discussions and legislative regulation (0.7895). At the same time, government control over the development and implementation of AI technologies should still be balanced (0.7211). Also, there should be no excessive restrictions at the legislative level so as not to hinder the scientific and technological process (0.7000).

This latent profile characterizes a group of people who understand the benefits and potential of AI, but they demonstrate a pragmatic view of the likelihood of threats from AI self-awareness, decision-making, or insurgency. Respondents in this class are aware of potential risks from cyber threats, social inequality, or ethical behavior but do not overestimate them.

They support reasonable government control over the development of technology and adaptation to changes in the labor market. All of this indicates that respondents want AI to become a useful tool for humanity, but subject to certain ethical standards and legal restrictions.

Figure 4 shows the latent profile of the 1st class, which reflects the most significant answers to the question (probability approximately equal to or greater than 0.5). Its respondents are characterized by a rather skeptical view of AI risks with elements of caution and trust. This group is the smallest of all, with students from Ukraine forming the majority (0.6420).

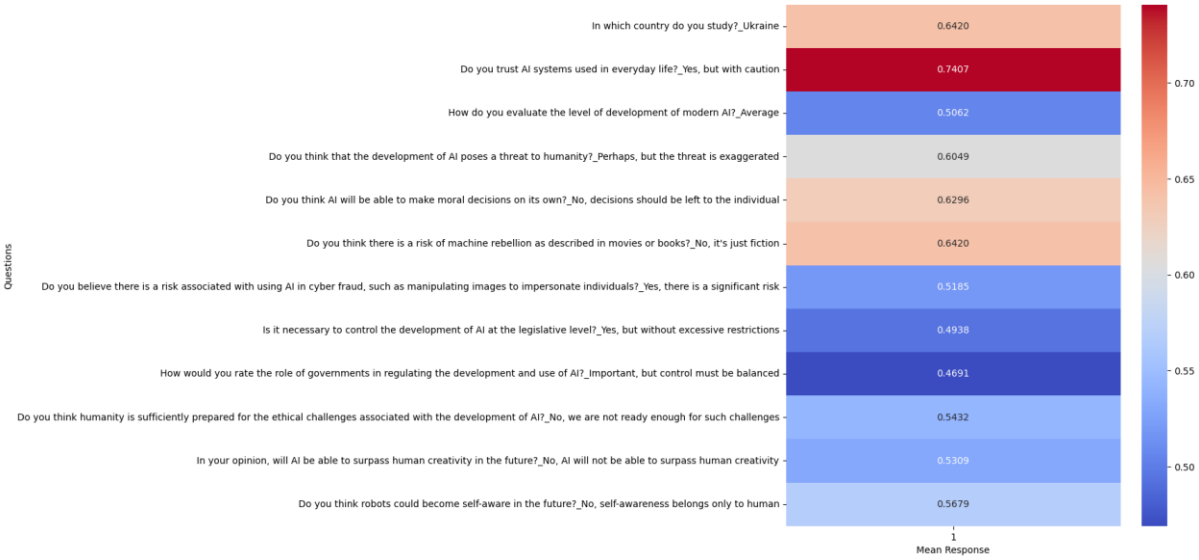


Figure 4. Probabilistic characterization of the 1st latent profile. [Source: calculated by the authors]

Most respondents are cautious about using AI in everyday life (0.7407). This indicates that they are aware of the potential risks and the need to control the use of AI for ordinary users. This behavior is also confirmed by the answer to the question about the possibility of moral decision-making by AI. Students chose the option that only humans should reserve this right (0.6296). The respondents of this group assess the level of modern AI development as average (0.5062). This result may indicate that respondents perceive technological development as incapable of affecting their lives, so it cannot be dangerous enough for humanity. Accordingly, 60.4938% believe that the threats posed by AI to humanity are exaggerated. That is, respondents are cautious about AI and do not see serious risks to society.

The respondents of this latent class demonstrated a skeptical attitude toward the ideas of "machine revolt" (0.6420) and robots gaining self-awareness (0.5679). They consider such scenarios to be fantastic and unlikely, which reflects a lack of confidence in the possibility of a real machine revolt or AI reaching the level of human self-awareness. Respondents' skepticism is also manifested in the fact that AI will not be able to surpass human creativity (0.5309). They are convinced that AI cannot compete with humans in creative aspects due to limitations in algorithms.

Nevertheless, respondents demonstrated a certain level of concern about the potential of AI to commit cybercrime (51.8519% consider this risk to be significant). This is most likely due to the current level of cyber threats and the awareness of the growing danger of such risks in the future. Respondents in this group support balanced state regulation of the development

and use of AI technologies (0.4691), although opinions are not unambiguous, which indicates a difference in views on this issue. They also believe that it is necessary to form legal mechanisms to control the activities of AI developers, although they also demonstrate their balance, as they choose the option of control without excessive restrictions (0.4938). 54.3210% doubt that humanity is sufficiently prepared for the ethical challenges posed by AI. This may indicate that they are aware of the need to develop and implement ethical standards for the use of AI.

In general, this latent profile demonstrates a skeptical attitude toward AI threats, albeit with elements of personal caution. Respondents believe that the risks of AI's impact on humanity are overestimated, as the level of its development is not sufficient for this. Also, AI will not acquire self-awareness and creativity, and make decisions instead of humans, and its use will not lead to a robot uprising. It should be noted that the respondents in this group do not perceive professional risks in the future. They consider them low for themselves (41.9753%). In this regard, they are more inclined to believe that AI will create new jobs (37.0370%) or that it will lead to unemployment for a short period of time (32.0988%). The respondents' views on legal and governmental control and regulation are fairly balanced.

The results of the Class 2 latent profile are shown in Figure 5, which includes responses with a probability of approximately 0.50 or higher. Respondents in this class are characterized by a cautious attitude toward AI and a high level of risk anxiety. With a probability of 53.9568%, this behavior is typical of Spanish students and with a probability of 30.9353% - of Polish students (not included in Figure 5).

In everyday life, respondents of this class trust AI with caution (0.7986). They also warn about the negative consequences of integrating AI into various spheres of life (0.6691). This means that they recognize the high potential of the technology and rate the development of AI at a high level (0.5755), but feel the need to introduce stricter controls and restrictions to prevent its abuse. Respondents believe that the development of AI can be a real threat to humanity (0.5108). Although this value is not very high, which indicates some uncertainty, there are a sufficient number of people who consider this risk to be significant.

Figure 5. Probabilistic characterization of the 2nd latent profile. [Source: calculated by the authors]

This group includes respondents who are moderately confident that AI will deepen social inequality (0.4532) and those who do not consider AI to be a major threat to social inequality compared to other aspects (0.4532). At the same time, the probabilities of forming these points of view are the same. This suggests that respondents recognize potential future threats of AI to their social well-being, although this is likely to depend on a number of reasons other than AI.

More worrisome is the issue of automation and its impact on the labor market. Respondents believe that this could become a serious problem in the coming decades, particularly for low-skilled workers (0.5971). At the same time, they assess the risk of losing their jobs as a medium, which shows that they are aware of the real challenges, but without strong anxiety (0.5180). Students agree that in the future retraining of workers is necessary to prevent mass unemployment due to automation (0.6547), which indicates the importance of developing IT specialties at all levels of the educational process.

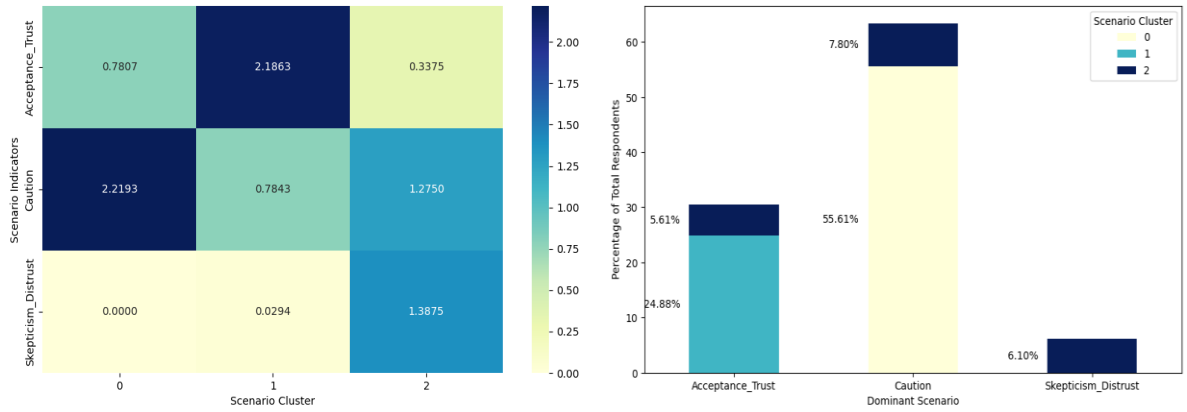
Respondents believe it is likely that AI may surpass human intelligence in the future, although this is not a convincing majority (0.5252). This indicates a sufficient cluster of people who fear that AI can replace humans in various spheres of life. Students also give a high rating to the risk of AI being used for cybercrime (e.g., image manipulation for deception) (0.7986), indicating that they recognize the existence of significant threats to personal security and privacy.

Respondents in this latent group strongly support the idea of strict control over AI development at the legislative level (0.7986), which only confirms previous findings about their concern about potential negative consequences and cautious attitude towards AI in everyday life. They prefer strong government control over the development and use of AI (0.5467), which indicates the need for clear laws and standards. It should be noted that the opinion of this group may have been influenced by the cultural characteristics of their country (Spain), which is characterized by a high level of the rule of law. The respondents are quite categorical on the issue that humanity is not ready for the ethical challenges associated with the development of AI (0.4892), although this group is not the overwhelming majority. This fact further emphasizes the need for further discussions and initiatives by governments to address ethical issues.

The second latent profile characterizes a group of people with a cautious attitude to AI development and a high level of concern about professional, social, and ethical risks. They rate them quite highly and, accordingly, consider it necessary to introduce strict control at the legislative level, regulate these issues by the state, and create conditions for retraining employees in the context of total automation.

Based on the results of the survey, the third stage involved a scenario approach that allowed for an in-depth analysis in five key areas. As a result, scenarios for the first area were formed, which demonstrate respondents' attitudes toward AI and their readiness to implement it in various spheres of life (Figure 6a). It was found that the "Cautious Attitude" scenario prevails today, i.e., the majority of respondents (63.4146%, Figure 6b) admit the possibility of using AI in certain areas, but subject to restrictions that will not allow crossing the line and replacing humans in solving key tasks. The scenario "Acceptance of AI and high trust" is accepted by 30.4878% (Figure 6b) of respondents. That is, they have a positive attitude toward AI integration and a high level of trust in its use in everyday life. Perhaps this is the asset that will promote new technologies in the future. A total of 6.0976% (Figure 6b) of participants formed

the “Skepticism and distrust” scenario, who see real threats from AI and therefore do not use the relevant programs at all or use them occasionally.



a) b)

Figure 6. “Attitudes toward AI” scenarios: a) Scenario Profiles Heatmap; b) Distribution of Respondents by Dominant Scenarios and Scenario Clusters. [Source: calculated by the authors]

According to each of the scenarios, the distribution of respondents by the use of AI applications was determined (Figure 7). Thus, it can be seen that respondents in the “AI Acceptance and High Trust” scenario use such applications more than participants in other scenarios. At the same time, a small percentage fell into the category of those who do not use any AI applications, which indicates either the insincerity of some respondents or that they trust such programs completely, although they do not use them themselves, or use programs that are not on the given list. The respondents in the “Skepticism and distrust” scenario fully met expectations and still use such programs the least. It should be noted that the leadership belongs to programs such as ChatGPT or AI-based recommendation systems, such as Netflix, You Tube, Spotify.

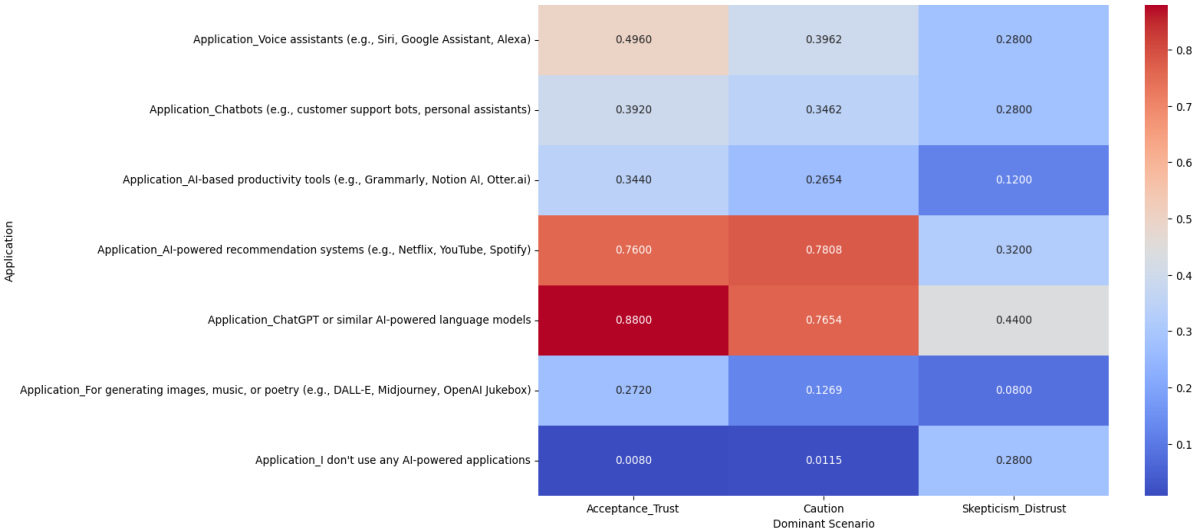


Figure 7. Distribution of respondents by the use of AI applications depending on the dominant scenario. [Source: calculated by the authors]

The next group of scenarios is aimed at identifying the risks and threats associated with the development of AI (Figure 8a).

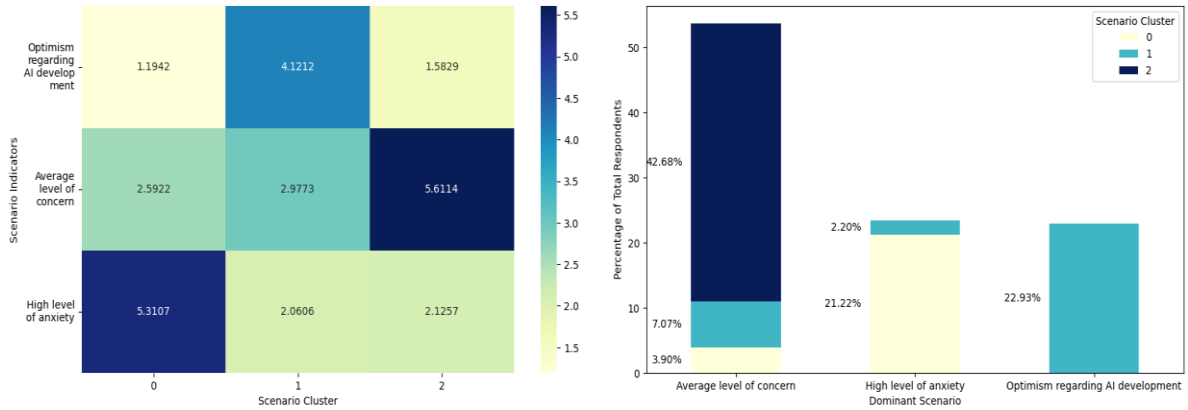


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Figure 8. "Risks and Threats Related to AI Development" scenarios: a) Scenario Profiles Heatmap; b) Distribution of Respondents by Dominant Scenarios and Scenario Clusters.
[Source: calculated by the authors]

It was found that about half of the respondents (53.6585%, Figure 8b) adhere to the "Average level of concern" scenario, i.e., they are concerned about some aspects of AI application and believe that threats should be controlled, but there is no need to stop AI development. The scenarios "High level of anxiety" and "Optimism regarding AI development" have approximately the same number of supporters - 23.4146% and 22.9268%, respectively (Figure 8b). That is, some respondents consider AI a potential threat to society and are fatalistic in this aspect. They expect negative consequences for the labor market, deepening social inequality, increasing cyber threats, etc. On the other hand, some respondents see the risks as insignificant or minimal and emphasize the opportunities of AI that will only bring significant benefits to society.

Each of the identified scenarios of perceived risks and threats is characterized by the following distribution of respondents (Figure 9).

Figure 9. Average risk perception by AI threats across dominant scenarios.
[Source: calculated by the authors]

Figure 9 shows that respondents in the "High level of anxiety" scenario have the highest level of anxiety about all types of threats. They are especially worried about losing their jobs due to automation, criminal acts involving AI, and the devaluation of creative professions. Optimistic students are less likely to believe that AI poses a threat to humanity, but they are also concerned about the growth of cybercrime and potential risks in the labor market. Although this category of respondents is more favorable to AI, they are concerned about the development of digital cretinism, which may result from the excessive use of AI in the process of solving everyday tasks. Students in the "Average level of concern" scenario demonstrate a balanced attitude toward risk perception, although they also identify threats of job loss and cybercrime as critical to humanity.

The scenarios of Figure 10a describe the perception of the risks of unemployment and social inequality due to AI. In this area, most respondents believe that society will still be able to adapt to the changes initiated by AI, including through the adoption of appropriate retraining programs by the state and the introduction of a universal basic income to support workers who have lost their jobs due to automation (53.1707%, Figure 10b). The "Trust in AI" and "Risk concerns" scenarios are characterized by approximately the same number of respondents - 23.9024% and 22.9268%, respectively (Figure 10b). That is, some respondents believe that the introduction of AI will not lead to significant problems in the labor market and that its use will improve the quality and productivity of labor and will not affect social inequality. Students whose answers correspond to the "Risk concerns" scenario tend to believe that automation will significantly increase unemployment, especially in some professions, including creative ones. They are also most concerned about the possible growth of social inequality and the concentration of technology in the hands of a small group.

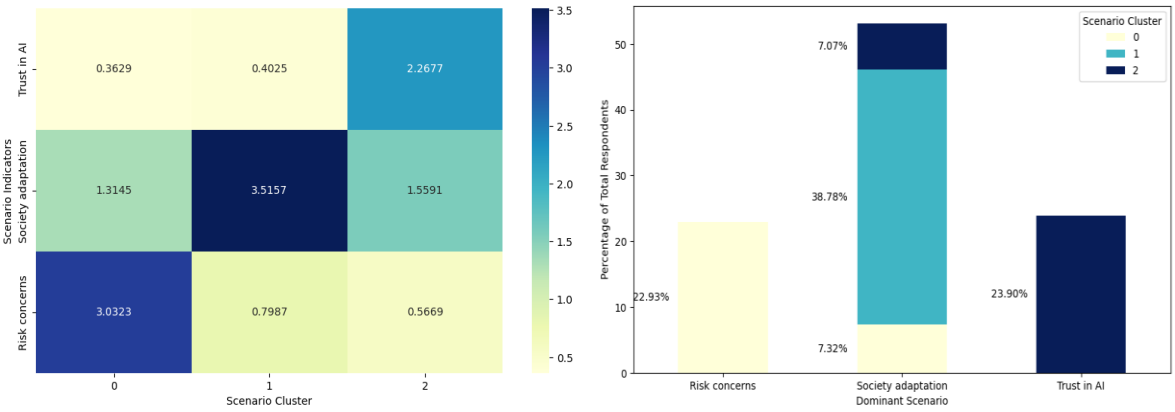

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Figure 10. "Risks of unemployment and social inequality due to AI" scenarios: a) Scenario Profiles Heatmap; b) Distribution of Respondents by Dominant Scenarios and Scenario Clusters.
[Source: calculated by the authors]

According to each scenario, the distribution of perceived risks to professions due to AI was determined (Figure 11). Thus, according to respondents, office workers, programmers, and creative industry workers were the most vulnerable. These professions are considered the most risky in each of the three scenarios. Healthcare workers and teachers will be less affected by the introduction of AI.

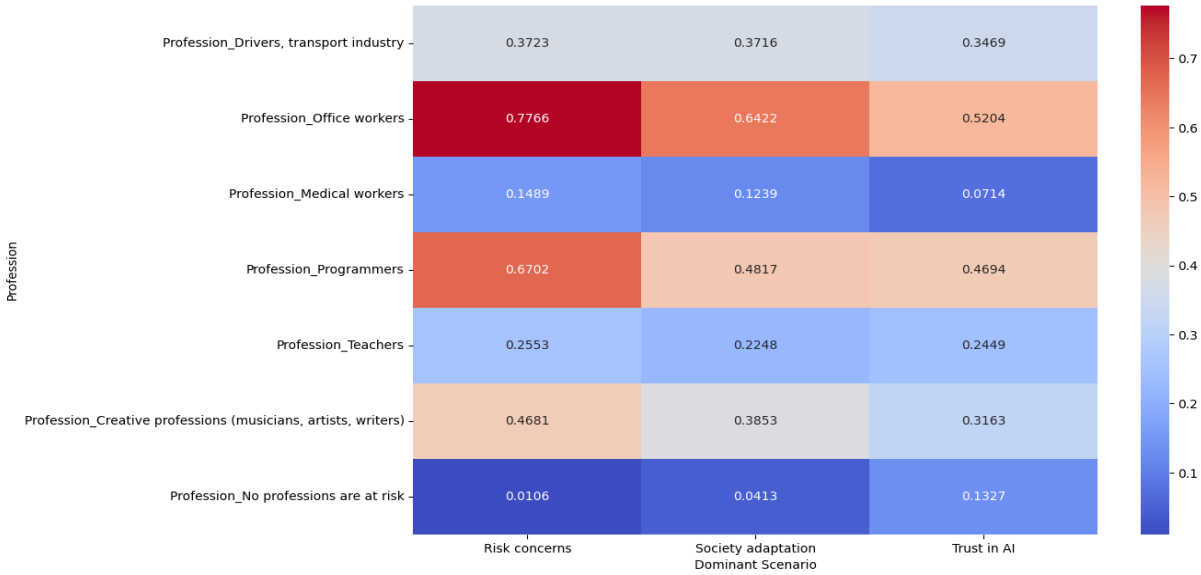

Figure 11. Average risk perception by profession across dominant scenarios.
[Source: calculated by the authors]

What professional skills will be most important for keeping a job in the AI era? Respondents who answered the "Trust in AI" scenario prioritized the ability to adapt and learn new skills, critical thinking and problem solving, creative and innovative thinking, and interpersonal communication (Figure 12). Respondents in the "Risk concerns" scenario also

favored these four skills, although they still consider creative and innovative thinking to be the most important (Figure 12). The social adaptation scenario demonstrates the greatest balance, which is manifested in approximately the same frequency for all analyzed types of skills needed in the future (Figure 12).

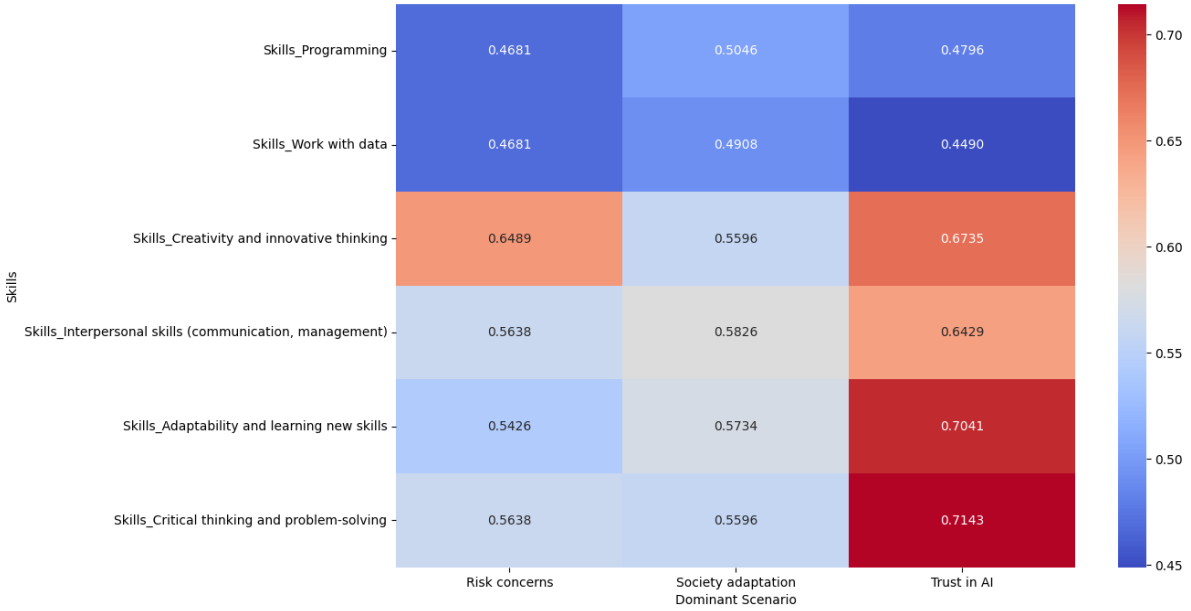

Figure 12. Professional skills preferences across dominant scenarios. [Source: calculated by the authors]

Figure 13a shows a heat map of scenarios related to AI regulation. 60.7317% of respondents support the “Flexible regulation” scenario (Figure 13b). That is, they are not in favor of strict measures in general, but they favor a gradual approach to restrictions and adaptation of legislation to new conditions. They also believe that the state should be involved in control, but the responsibility should be placed more on AI developers and corporations that implement it (Figure 14). 27.8049% believe that the introduction of AI requires stricter legislative measures and governmental actions (Figure 13b). At the same time, they are the most likely to believe that there should be increased responsibility on the part of AI developers and corporations (Figure 14). The “Rejection of regulation” scenario has only 11.4634% of supporters (Figure 13b). Respondents support minimal government intervention and believe that AI development should be regulated exclusively by the innovation environment. They also place more responsibility on users of AI-based applications (Figure 14).

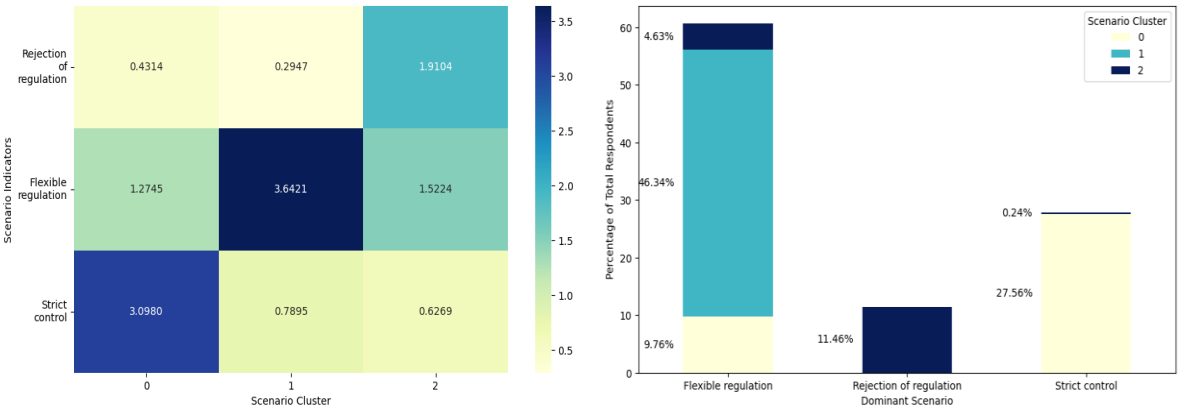

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Figure 13. "AI regulation" scenarios: a) Scenario Profiles Heatmap; b) Distribution of Respondents by Dominant Scenarios and Scenario Clusters. [Source: calculated by the authors]

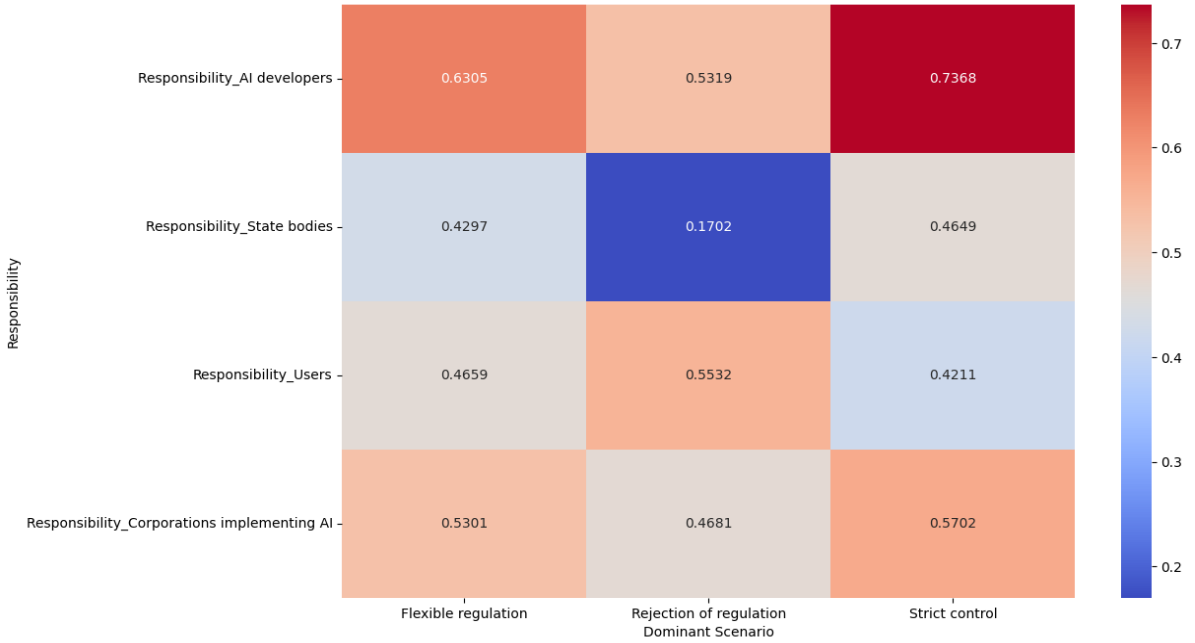

Figure 14. Distribution of respondents' answers regarding responsibility for AI based on the dominant scenario. [Source: calculated by the authors]

The last group of scenarios focuses on expectations about the development and capabilities of AI in the future (Figure 15a). Supporters of the "AI will surpass humans" scenario were the smallest among all (18.5365%, Figure 15b). They believe that AI will be able to surpass human intelligence and even become self-aware in the future, will be able to make moral decisions, and will succeed in creative professions. Almost the same number of respondents support the scenario "Limited capabilities of AI" (40.9756%, Figure 15b) and "AI will not surpass humans" (40.4878%, Figure 15b). That is, some respondents believe that AI will not be able to surpass human capabilities in the near future and will remain a tool of choice. The other part is not so categorical and is of the opinion that AI will be able to enhance human capabilities in the process of performing everyday tasks. Still, also in certain areas, it will be able to replace humans, albeit with certain limitations.

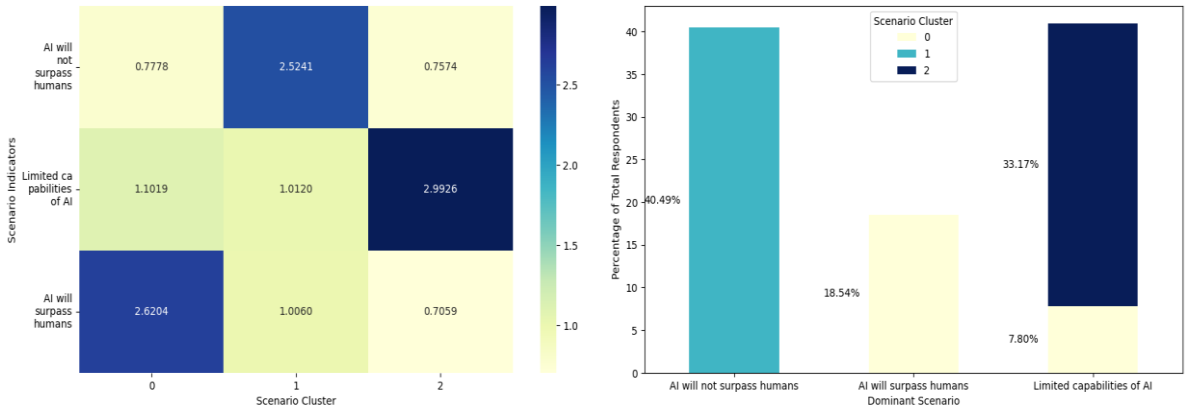

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Figure 15. "Expectations for AI capabilities in the future" scenarios: a) Scenario Profiles Heatmap; b) Distribution of Respondents by Dominant Scenarios and Scenario Clusters.
[Source: calculated by the authors]

DISCUSSION

Nowadays, digital transformations are a continuous process that cannot be stopped because they are irrevocably changing our world. However, their speed can slow down under the influence of various human needs and circumstances. Thus, the COVID-19 pandemic has significantly affected the development of the digital transformation of small and medium-sized enterprises in the manufacturing sector, but Bednářová et al. (2023) note their slowdown in some spheres. Kuzior et al. (2023) believe that today the need for a reliable cyber security system prevails over the active development and implementation of technologies, which may indicate a gradual slowing down of this process over time. Despite this, AI has already filled various niches and continues to actively enter everyday life. This study focused on the potential risks that may arise because of robotics and the use of AI. Like the majority of respondents in the conducted research, we should accept these risks as an integral part of intelligent automation. But still, it is necessary to increase attention to measures to regulate IT issues and avoid complications from this kind of threat. The opinions of many experts correlate with the conclusions of this article.

Dotsenko et al. (2024) believe that a comprehensive approach is needed, which should cover the development of security infrastructure, ethical and legal regulation. The obsolescence of the legal framework can become a restraining factor not only for the development of digital transformations but also for a secure environment for users (Maatallah, 2024). Therefore, the improvement of legislative initiatives in the field of AI should be among the top tasks for the governments of countries. Fülöp et al. (2023) believe that state regulatory bodies should be more actively involved in ethical legislation in the field of AI. The transfer of technologies is accompanied by significant risks, which require the development of an algorithm for their management in a scientific and educational environment to overcome barriers and stimulate the internationalization of technological exchange (Novikova et al., 2022). Informational transparency and openness of AI development companies in the context of digitalization can play a significant role in reducing AI risks (Lyeonov et al., 2023). Business managers must be

ready for modern technological challenges, which require a new style of management and leadership (Benchea & Ilie, 2023). Also, the synergy between knowledge management and AI can ensure the correctness of management decisions to achieve the company's strategic goals (Kuzior et al., 2024).

The organizations' adaptation to digital technologies is crucial, which will contribute to the improvement of personnel management processes, attracting talent and increasing the efficiency of companies' activities (Prokopenko et al., 2023). Bian & Wang (2024) confirmed the existence of a relationship between employee motivation, their moral norms and moral cognition and the use of AI in decision-making processes. Therefore, companies should pay attention to the development of an ethics code to regulate these issues. Businesses that actively use AI need new approaches related to compensation, corporate culture, training and identity, which can reduce risks from AI in the future (Nuñez & Bolognesi, 2024). Measures are needed to overcome the inequality between "worker-worker" and "worker-robot", which will help reduce social tension over time (Ostapenko et al., 2024). In addition, user self-efficiency is a vital aspect to consider when using AI-based programs (Höller et al., 2023). It should not be forgotten that public awareness of AI risks can prevent many dangers for users (Wojciechowski & Korjonen-Kuusipuro, 2023; Moravec et al., 2024). Therefore, governments should create conditions for investing funds in educational activities to train specialists in such areas as cyber security, data protection, AI, etc. (Koibichuk & Dotsenko, 2023).

Thus, a comprehensive approach, which will include measures of legal regulation, ethical norms, improvement of educational programs, creation of new management approaches, and transparency in the activities of AI development companies, are the considered steps that must be taken now to prevent risks and threats that may arise from AI.

CONCLUSIONS

The rapid development of technology has influenced the introduction of AI in various spheres of life. In addition to positive effects, this has led to the emergence of risks associated with its use. The current state of affairs makes us wonder what will happen in the future: will robots be able to replace humans? Can they become conscious? Will automation lead to a deepening of social inequality? The authors tried to find answers to these and other questions among young people and assess their perception of AI risks.

The first stage of the methodology, based on the survey data of students from three countries, allowed us to assess the non-randomness of the answers to the questions, which was confirmed by the Chi-squared test. The assessment of the strength of the connection between pairs of questions revealed that the respondents' affiliation with the respective country, the frequency of their use of AI in everyday life, their level of trust in technology, their perception of threats from AI in general, its impact on unemployment, social inequality in the future, robots' self-awareness, cyber threats, and the need for legal regulation and government control are important.

Determining latent profiles at the second stage allowed us to identify three groups of respondents whose formation was influenced by their geographical location. Respondents from Poland and Ukraine are most likely to be members of the zero profile, which is more characterized by pragmatism in perceiving threats from AI's self-awareness, decision-making,

or insurgency. They are aware of certain types of AI risks but do not overestimate them. Students in this group support flexible government control that does not limit the development of AI. The first, least numerous, latent profile was formed by skeptics, which includes mostly Ukrainian students. They demonstrated a rather skeptical attitude toward threats from AI. Respondents in this class do not believe that AI's capabilities will allow it to surpass humans in various fields, as they consider the development of technology to be insufficient for this. Despite all this, they are also cautious about the use of AI and concerned about cybersecurity. The probability of falling into the second profile for Spanish students is quite high. This group is characterized by a cautious attitude to AI development, a high level of concern about professional, social, and ethical risks, and a commitment to strict control to regulate these issues.

The third stage of the research allowed us to create scenarios for five key issues. It was found that respondents are cautious about the use of AI and are ready for its implementation in various spheres of life. Regarding various types of risks and threats posed by AI, respondents have a balanced strategy: they are concerned about some types of risks, support flexible control, and believe that there is no need to stop the development of AI. Students are inclined to believe that AI will not be a major threat to social inequality in the future and that the labor market will be able to adapt to the changes initiated by AI. Still, respondents hope for protection from the state through the adoption of appropriate retraining programs and the introduction of a universal basic income to support workers laid off due to AI. The dominant scenario regarding AI regulation was support for flexible state regulation measures that reduce risks for users and do not reduce the level of innovation in technology. As for the future development of AI and risks, two scenarios prevail. Students are of the opinion that AI will never replace humans, will not gain consciousness, and will not lead to catastrophic events such as robot uprisings, etc. The other group of respondents gives AI a certain chance to surpass human abilities, but this can happen in certain areas and with certain restrictions. In general, the scenarios suggest that young people mostly have certain expectations for AI in the future, although they are still cautious about it. There are also groups of skeptics and those who are afraid of the risks posed by AI, but this is most likely due to a lack of awareness of these issues, limited use of such programs, and the cultural and legal peculiarities of the countries to which the respondents belonged.

This research can play a significant role in the development of future strategies and policies by government agencies, international associations, AI development companies, universities, and NGOs. The fact that there is a certain level of distrust and cautiousness about AI among young people suggests that they feel some anxiety about the future. Therefore, this opinion should be taken into account to prevent situations that will lead to the complete replacement of humans by artificial intelligence and robots in various spheres of life or even to a machine uprising. By understanding how students perceive AI and understand the potential risks associated with it, universities can adapt their curricula by adding relevant courses on AI ethics, risk management, and legal frameworks. The results of the study can be used by the government to improve state policies and strategies to develop appropriate restrictions on the use of AI and its introduction into society. Taking into account the opinion of young people, AI development companies can improve policies for the responsible use of AI by software users with a focus on introducing more active security measures, limiting learning algorithms, increasing the price of paid content, etc. International and non-governmental organizations can

use the results of the study to form youth initiatives and organize public discussions on AI risks. In addition to the above, this study has the potential to be expanded to include respondents of different age groups and countries, which will allow for further consideration of the opinions of a larger number of people.

FUNDING

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REFERENCES

Abid, U., Faisal, M.N., Al-Esmael B., & Farooq, Z.H. (2024). Exploring the moderating role of technological competence and artificial intelligence in green HRM. *Polish Journal of Management Studies, 29*(2), 7–22. https://doi.org/10.17512/pjms.2024.29.2.01

Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, *19*(6), 716–723. https//doi.org/10.1109/TAC.1974.1100705

Aliane, N., Gharbi, H., & Semlali, Y. (2023). The role of artificial intelligence, digital capabilities and digital awareness on supply chain management: moderating role of organizational readiness and digital organizational culture. *Transformations in Business & Economics*, *22*(3), 832–852.

Androniceanu, A. (2023). The new trends of digital transformation and artificial intelligence in public administration. *Administratie si Management Public*, *40*, 147–155. https://doi.org/10.24818/amp/2023.40-09

Aneke, A., & Oboho, E. (2024). Enhancing operational efficiency in Nigerian oil exploration: The impact of real-time monitoring technologies on non-productive time. *Journal of Sustainable Development of Transport and Logistics*, *9*(2), 43–52. https://doi.org/10.14254/jsdtl.2024.9-2.4

Angammana, J. S. K., & Jayawardena, M. (2022). Influence of artificial intelligence on warehouse performance: The case study of the Colombo area, Sri Lanka. *Journal of Sustainable Development of Transport and Logistics*, *7*(2), 80–110. https://doi.org/10.14254/jsdtl.2022.7-2.6

Bednářová, M., Tesařová, M., & Šimberová, I. (2023). The evolution of digital transformation in SMEs in the manufacturing industry in the different blocks of the BM Canvas since the beginning of the pandemic. *Business, Management and Economics Engineering*, *21*(1), 48–62. https://doi.org/10.3846/bmee.2023.17607

Benchea, L., & Ilie, A. G. (2023). Preparing for a new world of work: leadership styles reconfigured in the digital age. *European Journal of Interdisciplinary Studies*, *15*(1), 135–143. http://doi.org/10.24818/ejis.2023.10

Bencsik, A. (2021). The sixth generation of knowledge management – the headway of artificial intelligence. *Journal of International Studies, 14*(2), 84–101. https://doi.org/10.14254/2071-8330.2021/14-2/6

Bian, X., & Wang, B. (2024). Exploring the influence of artificial intelligence usage on ethical decision making among public sector employees: insights into moral identity and service motivation. *Business Ethics and Leadership, 8*(3), 133–150. https://doi.org/10.61093/bel.8(3).133-150.2024

Bilan, S., Šuleř, P., Skrynnyk, O., Krajňáková, E., & Vasilyeva, T. (2022). Systematic bibliometric review of artificial intelligence technology in organizational management, development, change and culture. *Business: Theory and Practice, 23*(1), 1–13. https://doi.org/10.3846/btp.2022.13204

Capolupo, N., Palumbo, R., & Adinolfi, P. (2022). All that glitters is not gold. Exploring virtual team adoption in the COVID-19 era. *International Journal of Entrepreneurial Knowledge*, *10*(1), 46–64. https://doi.org/10.37335/ijek.v10i1.148

Chen, M., Yamaoka, Y., Sartamorn, S., & Oe, H. (2024). A study on how to enhance the well-being of young professionals confronting internal overcompetition in China: prospect of reducing the stress of Nei Juan. *Health Economics and Management Review, 5*(1), 15–31. https://doi.org/10.61093/hem.2024.1-02

Cherep, A., Voronkova, V., & Cherep, O. (2024). Innovative European practices of digitalization as a key factor in ensuring socio-economic security in the context of global challenges. *Socio-Economic Relations in the Digital Society*, *3*(53), 1–9. https://doi.org/10.55643/ser.3.53.2024.566

Cramarenco, R. E., Burcă-Voicu, M. I., & Dabija, D. C. (2023). The impact of artificial intelligence (AI) on employees' skills and well-being in global labor markets: A systematic review. *Oeconomia Copernicana*, *14*(3), 731–767. https://doi.org/10.24136/oc.2023.022

Cramér, H. (1999). *Mathematical methods of statistics* (Vol. 26). Princeton University Press.

Djenna, A., Barka, E., Benchikh, A., & Khadir, K. (2023). Unmasking cybercrime with artificial-intelligence-driven cybersecurity analytics. *Sensors*, *23*(14), 6302. https://doi.org/10.3390/s23146302

Dobrovolska, O., Ortmanns, W., Dotsenko, T., Lustenko, V., & Savchenko, D. (2024). Health security and cybersecurity: analysis of interdependencies. *Health Economics and Management Review*, *5*(2), 84–103. https://doi.org/10.61093/hem.2024.2-06

Dotsenko, T., Jarzębowski, S., Chepel, K., Blyznyukov, A., & Melnyk, M. (2024). The role of IT companies' business leadership in driving digital progress in local communities. *Business Ethics and Leadership*, *8*(3), 199–218. https://doi.org/10.61093/bel.8(3).199-218.2024

Ekanayake, J., & Saputhanthri, L. (2020). E-AGRO: intelligent chat-bot. IoT and artificial intelligence to enhance farming industry. *AGRIS on-line Papers in Economics and Informatics*, *12*(1), 15–21. http://doi.org/10.7160/aol.2020.120102

Elkrghli, S., & Almansour, B.Y. (2024). An empirical investigation of risk management factors in private construction projects in Benghazi city. *Montenegrin Journal of Economics*, *20*(2), 195–207. http://doi.org/10.14254/1800-5845/2024.20-2.16

Federspiel, F., Mitchell, R., Asokan, A., Umana, C., & McCoy, D. (2023). Threats by artificial intelligence to human health and human existence. *BMJ Global Health*, *8*, e010435. https://doi.org/10.1136/bmjgh-2022-010435

Fülöp, M. T., Topor, D. I., Ionescu, C. A., Cifuentes-Faura, J., & Măgdaș, N. (2023). Ethical concerns associated with artificial intelligence in the accounting profession: a curse or a blessing?. *Journal of Business Economics and Management*, *24*(2), 387–404. https://doi.org/10.3846/jbem.2023.19251

Gondauri, D., Mikautadze, E., Enukidze, N., & Batiashvili, M. (2024). The impact of R&D investments, including AI, on economic growth and the country's capacity to improve its credit rating. *SocioEconomic Challenges*, *8*(3), 159–168. https://doi.org/10.61093/sec.8(3).159-168.2024

Haan, K., & Watts, R. (2023, April 23). How businesses are using artificial intelligence in 2024. *Forbes* [online]. Retrieved on January 15, 2024, from https://www.forbes.com/advisor/business/software/ai-in-business/

Haan, K., & Watts, R. (2023, July 20). Over 75% of consumers are concerned about misinformation from artificial intelligence. *Forbes* [online]. Retrieved on January 15, 2024, from https://www.forbes.com/advisor/business/artificial-intelligence-consumer-sentiment/

Haddad, H. (2021). The effect of artificial intelligence on the AIS excellence in Jordanian banks. *Montenegrin Journal of Economics*, *17*(4), 155–166. https://doi.org/10.14254/1800-5845/2021.17-4.14

Havryliuk, O., Yakushev, O., Petchenko, M., Zachosova, N., Bielialov, T., & Kozlovska, S. (2023). Cyber security and artificial intelligence in the context of ensuring business security in wartime. *Financial and Credit Activity Problems of Theory and Practice*, *6*(53), 451–459. https://doi.org/10.55643/fcaptp.6.53.2023.4130

Höller, S., Dilger, T., Spiess, T., Ploder, C., & Bernsteiner, R. (2023). Awareness of unethical artificial intelligence and its mitigation measures. *European Journal of Interdisciplinary Studies*, *15*(2), 67–89. https://doi.org/10.24818/ejis.2023.17

Hrytsenko, L., Pakhnenko, O., Kuzior, A., & Kozhushko, I. (2024). Smart technologies in banking. *Financial Markets, Institutions and Risks*, *8*(1), 81–93. https://doi.org/10.61093/fmir.8(1).81-93.2024

Hutter, R., & Hutter, M. (2021). Chances and risks of artificial intelligence – a concept of developing and exploiting machine intelligence for future societies. *Applied System Innovation*, *4*(2), 37. https://doi.org/10.3390/asi4020037

Iuga, I. C., & Socol, A. (2024). Government artificial intelligence readiness and brain drain: influencing factors and spatial effects in the European Union member states. *Journal of Business Economics and Management*, *25*(2), 268–296. https://doi.org/10.3846/jbem.2024.21136

Jacobson, D., Silva-Braga, B., Frost, N., & Hinton, G. (2023, March 25). *Godfather of artificial intelligence' talks impact and potential of new AI*. CBS Saturday Morning, Season 12, Episode 12. CBS News. Retrieved on January 21, 2024, from https://www.cbsnews.com/video/godfather-of-artificial-intelligence-talks-impact-and-potential-of-new-ai/

Jarzębowski, S., Bozhenko, V., Didorenko, K., Tkachenko, O., Blyznyukov, A., Melnyk, M., & Cieslik, J. (2024). The impact of digitalisation on the competitiveness of European countries. *SocioEconomic Challenges, 8*(3), 238–261. https://doi.org/10.61093/sec.8(3).238-261.2024

Koibichuk, V., & Dotsenko, T. (2023). Content and meaning of financial cyber security: a bibliometric analysis. *Financial Markets, Institutions and Risks, 7*(1), 145–153. https://doi.org/10.21272/fmir.7(1).145-153.2023

Kolková, A., & Ključnikov, A. (2022). Demand forecasting: AI-based, statistical and hybrid models vs practice-based models – the case of SMEs and large enterprises. *Economics and Sociology*, *15*(4), 39–62. https://doi.org/10.14254/2071-789X.2022/15-4/2

Kolupaieva, I., & Tiesheva, L. (2023). Asymmetry and convergence in the development of digital technologies in the EU countries. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 687–716. https://doi.org/10.24136/eq.2023.022

Kozhushko, I. (2023). Transformation of financial services industry in conditions of digitalization of economy. *Financial Markets, Institutions and Risks, 7*(4), 189–200. https://doi.org/10.61093/fmir.7(4).189-200.2023

Kuzior, A., Samoilikova, A., Valúch, M., & Bácsné Bába, E. (2024). Impact of university-industry R&D collaboration on innovation transfer and startup performance. *Journal of International Studies, 17*(3), 164–181. https://doi.org/10.14254/2071-8330.2024/17-3/9

Kuzior, A., Vasylieva, T., Kuzmenko, O., Koibichuk, V., & Brożek, P. (2022). Global digital convergence: impact of cybersecurity, business transparency, economic transformation, and AML efficiency. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(4), 195. https://doi.org/10.3390/joitmc8040195

Kuzior, A., Yarovenko, H., Brożek, P., Sidelnyk, N., Boyko, A., & Vasilyeva, T. (2023). Company c system: Assessment, risks and expectations. *Production Engineering Archives, 29*(4), 379–392. https://doi.org/10.30657/pea.2023.29.43

Kuzmenko, O., Yarovenko, H., & Perkhun, L. (2023). Assessing the maturity of the current global system for combating financial and cyber fraud. *Statistics in Transition new series, 24*(1), 229–258. https://doi.org/10.59170/stattrans-2023-013

Letkovsky, S., Jencova, S., Vasanicova, P., Gavura, S., & Bacik, R. (2023). Predicting bankruptcy using artificial intelligence: the case of the engineering industry. *Economics and Sociology*, *16*(4), 178–190. https://doi.org/10.14254/2071-789X.2023/16-4/8

Li, R. (2023). Research on the impact of AI application on capital chain resilience. *Engineering Economics*, *34*(5), 536–553. https://doi.org/10.5755/j01.ee.34.5.33167

Lohr, S. (2016, October 17). IBM is counting on its bet on Watson, and paying big money for it. *The New York Times* [online]. Retrieved on January 20, 2024, from https://www.nytimes.com/2016/10/17/technology/ibm-is-counting-on-its-bet-on-watson-and-paying-big-money-for-it.html?emc=edit_th_20161017&nl=todaysheadlines&nlid=62816440

Louw, H., Mynhardt, H., & Lubbe, S. (2024). A self-determined learning approach: enhancing workplace adaptability for overcoming inequality. *Business Ethics and Leadership, 8*(3), 290–304. https://doi.org/10.61093/bel.8(3).290-304.2024

Lyeonov, S., Zakharkin, O., & Okhrimchuk, Y. (2023). Information openness as a factor of business leadership in today's digital environment. In W. Strielkowski (Ed.), *Leadership, entrepreneurship and sustainable development post COVID-19: NILBEC 2022* (pp. 257–300). Springer Proceedings in Business and Economics. https://doi.org/10.1007/978-3-031-28131-0_20

Maatallah, M. (2024). The role of digital transformation in enhancing financial inclusion: unveiling the economic and social challenges from residents' perspective. *SocioEconomic Challenges, 8*(3), 93–107. https://doi.org/10.61093/sec.8(3).93-107.2024

Manyika, J., & Sneader, K. (2018, June 1). AI, automation, and the future of work: Ten things to solve for. *McKinsey & Company* [online]. Retrieved on January 17, 2024, from https://www.mckinsey.com/featured-insights/future-of-work/ai-automation-and-the-future-of-work-ten-things-to-solve-for

Marr, B. (2023, March 20). Beyond the hype: what you really need to know about AI in 2023. *Forbes* [online]. Retrieved on January 16, 2024, from https://www.forbes.com/sites/bernardmarr/2023/03/20/beyond-the-hype-what-you-really-need-to-know-about-ai-in-2023/

Máté, D., Raza, H., Ahmad, I., & Kovács, S. (2024). Next step for bitcoin: Confluence of technical indicators and machine learning. *Journal of International Studies, 17*(3), 68–94. https://doi.org/10.14254/2071-8330.2023/17-3/4

Melnyk, L., Derykolenko, O., Kubatko, O., & Matsenko, O. (2019). Business models of reproduction cycles for digital economy. *CEUR Workshop Proceedings, 2393*, 269–276. Retrieved from https://ceur-ws.org/Vol-2393/paper_247.pdf

Melnyk, L., Kalinichenko, L., Kubatko, O., Dobrowolski, Z., & Babczuk, A. (2023). Restructuring the economic systems on the way to an additive economy. *Problems and Perspectives in Management, 21*(3), 230–243. https://doi.org/10.21511/ppm.21(3).2023.18

Moravec, V., Hynek, N., Gavurova, B., & Kubak, M. (2024). Everyday artificial intelligence unveiled: Societal awareness of technological transformation. *Oeconomia Copernicana, 15*(2), 367–406. https://doi.org/10.24136/oc.2961

Mursalov, M., Yarovenko, H., & Vasilyeva, T. (2023). Entrepreneurial ecosystem and digitalization: Relationship and synergy of development. In W. Strielkowski (Ed.), *Leadership, entrepreneurship and sustainable development post COVID-19: NILBEC 2022* (pp. 109–127). Springer Proceedings in Business and Economics. https://doi.org/10.1007/978-3-031-28131-0_9

Novikova, I., Stepanova, A., Zhylinska, O., & Samoilikova, A. (2022). Technology transfer risk management in the conditions of scientific internationalisation. *Financial and Credit Activity Problems of Theory and Practice, 4*(45), 308–321. https://doi.org/10.55643/fcaptp.4.45.2022.3808

Nuñez, J. G., & Bolognesi, M. (2024). Exploring team collaboration in the new metaverse (the 3D-AI Internet). *SocioEconomic Challenges, 8*(2), 314–341. https://doi.org/10.61093/sec.8(2).314-341.2024

Orlandić, M., Đukić, T., & Mladenović, M. (2024). Upcoming digital transformation and artificial intelligence trends in the public sector. *Administratie si Management Public, 42*, 45–59. https://doi.org/10.24818/amp/2024.42-03

Ostapenko, L., Pasternak, V., Kropyvnytskyi, M., Chystokletov, L., & Khytra, O. (2024). Artificial intelligence in labour relations: a threat to human rights or new opportunities?. *Financial and Credit Activity Problems of Theory and Practice, 4*(57), 531–545. https://doi.org/10.55643/fcaptp.4.57.2024.4421

Pakhnenko, O., & Pudło, T. (2023). HealthTech in ensuring the resilience of communities in the post-pandemic period. *Health Economics and Management Review, 4*(2), 31–39. https://doi.org/10.21272/hem.2023.2-03

Pearson, K. (1900). X. On the criterion that a given system of deviations from the probable in the case of a correlated system of variables is such that it can be reasonably supposed to have arisen from random sampling. *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, *50*(302), 157-175.

Pereira, E. T., & Shafique, M. N. (2024). The role of artificial intelligence in supply chain agility: A perspective of humanitarian supply chain. *Engineering Economics*, *35*(1), 77–89. https://doi.org/10.5755/j01.ee.35.1.32928

Piotrowski, D., & Orzeszko, W. (2023). Artificial intelligence and customers' intention to use robo-advisory in banking services. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(4), 967–1007. https://doi.org/10.24136/eq.2023.031

Prieto-Gutierrez, J.-J., Segado-Boj, F., & Da Silva França, F. (2023). Artificial intelligence in social science: A study based on bibliometrics analysis. *Human Technology*, *19*(2), 149–162. https://doi.org/10.14254/1795-6889.2023.19-2.1

Prokopenko, O., Garafonova, O., & Zhosan, H. (2023). Digital tools in human resource management: How digitization affects personnel management. *Socio-Economic Relations in the Digital Society*, *4*(50), 84–94. https://doi.org/10.55643/ser.4.50.2023.540

Sarker, P. K. (2022). Macroeconomic effects of artificial intelligence on emerging economies: Insights from Bangladesh. *Economics, Management and Sustainability*, *7*(1), 59–69. https://doi.org/10.14254/jems.2022.7-1.5

Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, *6*(2), 461–464.

Sheliemina, N. (2024). The use of artificial intelligence in medical diagnostics: Opportunities, prospects and risks. *Health Economics and Management Review*, *5*(2), 104–124. https://doi.org/10.61093/hem.2024.2-07

Skrynnyk, O., Lyeonov, S., Lenska, S., Litvinchuk, S., Galaieva, L., & Radkevych, O. (2022). Artificial intelligence in solving educational problems. *Journal of Information Technology Management*, *14*, 132–146. https://doi.org/10.22059/JITM.2022.88893

Statista (2024, June 20). Artificial intelligence (AI) market size worldwide from 2020 to 2030 (in billion U.S. dollars). Retrieved on June 20, 2024, from https://www.statista.com/forecasts/1474143/global-ai-market-size

Strielkowski, W., Samoilikova, A., Smutka, L., Civín, L., & Lieonov, S. (2022). Dominant trends in intersectoral research on funding innovation in business companies: A bibliometric analysis approach. *Journal of Innovation and Knowledge, 7*(4), 100271. https://doi.org/10.1016/j.jik.2022.100271

Tai, M. C. T. (2020). The impact of artificial intelligence on human society and bioethics. *Tzu chi medical journal*, *32*(4), 339–343. https://doi.org/10.4103/tcmj.tcmj_71_20

Tredinnick, L., & Laybats, C. (2023). The dangers of generative artificial intelligence. *Business Information Review*, *40*(2), 46–48. https://doi.org/10.1177/02663821231183756

Tugui, A., Jeflea, F. V., Opariuc, C., Filipeanu, D., & Agheorghiesei, D. T. (2022). Societal transformations in Romanian society: humanity's interaction with artificial intelligence towards the technological singularity. *Transformations in Business & Economics*, *21*(2A), 435–461.

Tutak, M. & Brodny (2024), Technological progress in central and eastern Europe: Digitalization and business innovation leaders and outsiders. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(4), 100404. https://doi.org/10.1016/j.joitmc.2024.100404

Wojciechowski, A., & Korjonen-Kuusipuro, K. (2023). How artificial intelligence affects education?. *Human Technology*, *19*(3), 302–306. https://doi.org/10.14254/1795-6889.2023.19-3.0

Zámek, D., & Zakharkina, Z. (2024). Research trends in the impact of digitization and transparency on national security: Bibliometric analysis. *Financial Markets, Institutions and Risks*, *8*(1), 173–188. https://doi.org/10.61093/fmir.8(1).173-188.2024

Zhou, Y. (2024). The business leadership of the state-owned enterprises: Impact of the digital transformations. *Business Ethics and Leadership*, *8*(3), 253–289. https://doi.org/10.61093/bel.8(3).253-289.2024

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