
Attitudes toward artificial intelligence among digital generation representatives: Implications for management in the era of Industry 4.0

Postawy wobec sztucznej inteligencji wśród przedstawicieli pokolenia cyfrowego – implikacje dla zarządzania w warunkach Przemysłu 4.0

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Abstract:

Research objectives and hypothesis/research questions

The study aims to identify patterns of AI usage among young adults, examine the relationship between usage intensity and user attitudes, and identify distinct user segments. Hypotheses were formulated assuming a positive relationship between AI usage intensity and positive attitudes toward artificial intelligence. The study had a quantitative and exploratory character.

Research methods

The study was conducted on a purposive sample of 120 respondents (mean age = 23.3) using a self-developed, single-item online questionnaire. The analysis included descriptive statistics, Pearson correlation, linear regression, and cluster analysis (k-means), incorporating both behavioral and affective variables.

Main results

The results indicate moderately positive attitudes toward AI alongside varying levels of usage. A significant positive relationship was found between AI usage frequency and user attitudes. Cluster analysis identified three distinct segments: enthusiasts, passive supporters, and sceptics. The findings confirm the ambivalent and heterogeneous nature of attitudes toward AI.

Implications for theory and practice

The study contributes to the literature by integrating behavioral, attitudinal, and segmentation perspectives on AI use among digital generation representatives. From a managerial standpoint, the results highlight the need for differentiated AI implementation strategies, development of digital competencies, and consideration of the emotional dimension of human – AI interaction.

Keywords:

artificial intelligence, digital generation, attitudes toward technology, Industry 4.0, AI users

Abstrakt:**Cel badań i hipotezy/pytania badawcze**

Celem badania była identyfikacja wzorców korzystania z narzędzi AI wśród młodych dorosłych, analiza związku między intensywnością korzystania z AI a postawami wobec tej technologii oraz wyodrębnienie segmentów użytkowników. Sformułowano hipotezy zakładające istnienie dodatniego związku pomiędzy intensywnością korzystania z AI a pozytywnym nastawieniem wobec sztucznej inteligencji. Badanie miało charakter ilościowy i eksploracyjny.

Metody badawcze

Badanie przeprowadzono na próbie celowej 120 respondentów (średnia wieku 23,3) z wykorzystaniem autorskiego kwestionariusza online z pojedynczymi itemami. Zastosowano analizę statystyk opisowych, korelacji Pearsona, regresji liniowej oraz analizę skupień (*k*-średnich), uwzględniając zmienne behawioralne i afektywne.

Główne wyniki

Wyniki wskazują na umiarkowanie pozytywne nastawienie wobec AI z jednoczesnym zróżnicowanym poziomem jej wykorzystania. Stwierdzono istotną dodatnią zależność między częstotliwością korzystania z AI a poziomem sympatii wobec niej. Analiza skupień pozwoliła wyodrębnić trzy segmenty użytkowników: entuzjastów, biernych zwolenników oraz sceptyków. Wyniki potwierdzają ambiwalentny charakter postaw wobec AI oraz ich wewnętrzne zróżnicowanie.

Implikacje dla teorii i praktyki

Badanie wnosi wkład do literatury przez integrację analizy zachowań, postaw oraz segmentacji użytkowników AI należących do pokolenia cyfrowego. Z perspektywy praktycznej wyniki wskazują na konieczność różnicowania strategii wdrażania AI w organizacjach, rozwijania kompetencji cyfrowych oraz uwzględniania emocjonalnego wymiaru relacji człowiek – technologia.

Słowa kluczowe:

sztuczna inteligencja, pokolenie cyfrowe, postawy wobec technologii, Przemysł 4.0, użytkownicy AI

Introduction

Artificial intelligence (AI) constitutes a foundational pillar of Industry 4.0, fundamentally reshaping organizational processes and human-technology interactions. Despite its rapid diffusion, the literature consistently emphasizes the inherently ambivalent nature of user attitudes toward AI. While individuals acknowledge the functional benefits and growing indispensability of AI tools, they simultaneously express concerns related to autonomy, opacity, and broader societal implications, like reliance on digital socialising or digital inequities (Glikson, Woolley, 2020; Medina-Molina, Pérez-Macías, Rey-Tienda et al., 2025; OECD, 2025). Although

about 51% of Gen Z individuals in the U.S. use generative AI on at least a weekly basis, sentiment toward the technology has become more negative over the past year. Feelings such as frustration have increased, while enthusiasm and optimism have declined. Notably, even frequent users – who typically view AI more favourably – have not shown a shift toward more positive attitudes, according to a recent survey by the Walton Family Foundation, GSV Ventures, and Gallup (2026).

Trust in AI has emerged as a critical determinant of successful implementation, yet it remains a complex and context-sensitive construct. Empirical research demonstrates that users often exhibit a dual stance – simultaneously engaging with AI systems while maintaining cognitive and emotional distance (Hoff, Bashir, 2015; Hancock, Billings, Schaefer et al., 2011; Nikolaidis, Hsu, Srinivasa, 2017). This tension has been conceptualized as the “AI paradox,” whereby limited trust constrains the effective adoption and realization of the technology’s full potential.

Within this context, Generation Z occupies a particularly salient position. Frequently characterized as “digital natives,” this cohort is assumed to display high levels of technological fluency and openness (Dimock, 2019; Deloitte, 2024). Recent data further indicate that younger cohorts report higher levels of comfort with AI compared to older generations. According to the EY AI Sentiment Index (EY, 2026), Generation Z and Millennials score substantially higher on AI acceptance than Generation X, Baby Boomers, and the Silent Generation, highlighting a clear generational gradient in attitudes toward the technology. However, emerging evidence challenges this homogenizing perspective, suggesting that attitudes toward AI among younger users are internally differentiated and contingent upon individual experiences and usage patterns (Baumann, Urman, Leicht-Deobald et al., 2025). At the same time, the rapid diffusion of generative AI technologies has prompted organizations to widely embed AI into products and services, often without fully accounting for user preferences. These results highlight that increased exposure to AI does not necessarily translate into higher acceptance, reinforcing the need for a more nuanced and empirically grounded understanding of how digital generation users perceive and engage with AI technologies.

1. Attitudes toward AI and their implications for management in Industry 4.0

The development of artificial intelligence constitutes a central pillar of the transformation associated with Industry 4.0, encompassing the digitalization of processes, automation of work, and integration of technological systems within organizations (Vial, 2019; Kshetri, Hughes, Slade et al., 2023). Although closely related, Industry 4.0 and digital transformation are not synonymous. As noted in the literature, digital transformation represents a broader paradigm, involving not only technological change but also organizational, cultural, and strategic reconfiguration,

whereas Industry 4.0 primarily focuses on technological innovation in industrial and production processes (Łukasiński, Romański, 2025, p. 30).

Within this framework, AI functions as a general-purpose technology that enhances decision-making, data analytics, and process optimization. In particular, the emergence of generative AI tools, such as large language models, has significantly expanded the scope of AI applications in both professional and educational contexts (Kasneci, Seßler, Küchemann et al., 2023). At the same time, the implementation of AI introduces critical managerial challenges, including managing organizational change, developing digital competencies, and shaping effective human-technology relationships.

User attitudes toward artificial intelligence constitute a critical determinant of both its adoption and the effectiveness of technological implementation. Prior research indicates that AI acceptance is driven by perceived usefulness, ease of use, social influence, and trust in technological systems (Davis, 1989; Venkatesh, Morris, Davis et al., 2003; Glikson, Woolley, 2020; Hoff, Bashir, 2015). At the same time, emerging studies emphasize the importance of AI-related anxiety, ethical concerns, and algorithm aversion in shaping users' attitudes toward artificial intelligence (Dietvorst, Simmons, Massey, 2015; Longoni, Bonezzi, Morewedge, 2019; Wang, Li, Liang et al., 2025). Consequently, human-AI interaction in digitally transformed environments is inherently dynamic, multidimensional, and often internally contradictory. As highlighted in recent empirical studies, technological development exhibits a paradoxical nature, wherein mutually dependent yet conflicting elements coexist, generating ambivalence and irritation among users (Medina-Molina, Pérez-Macías, Rey-Tienda et al., 2025, p. 2).

This phenomenon is particularly pronounced among representatives of the digital generation who, despite high levels of technological competence, often adopt a simultaneously critical stance toward AI. As a result, human-AI relationships encompass both trust and acceptance, as well as skepticism and caution. Polish studies also emphasize related challenges, including gaps between perceived benefits and actual digital competencies, engagement barriers, and the paradoxical characteristics of younger employees in organizational contexts (Łukasiński, Romański, 2025; Ślusarczyk, 2019; Żarczyńska-Dobiesz, Chomątowska, 2016).

Against this backdrop, it becomes essential to empirically examine how diverse and potentially ambivalent attitudes toward AI translate into actual usage patterns and whether distinct user segments can be identified within the digital generation. This need is further supported by both international and national evidence. Accordingly, Tables 1 and 2 present a synthesis of selected studies on generational attitudes toward AI, based on publications indexed in Scopus and Web of Science and complemented by recent empirical reports. The review suggests that the digital generation should not be treated as a homogeneous group, as its members differ in usage intensity, emotional attitudes, and readiness to adopt AI in work and educational settings.

Table 1. Attitudes toward emerging technologies – generational perspective (selected international studies)

Authors/year	Scope	Generation/group	Implications for the present study
Vial (2019)	Digital transformation of organizations	Organizations in general	Digital technologies create disruptions and require strategic organizational responses
Kshetri, Hughes, Slade et al. (2023)	Generative AI, ChatGPT, organizations, education	Users in general	Generative AI creates both opportunities and risks for practice, policy, education, and management
Kasneci, Seßler, Küchemann et al. (2023)	ChatGPT/LLM in education	Students, teachers	LLMs support personalization and learning but require new competencies and critical awareness
Glikson, Woolley (2020)	Trust in AI	Technology users	Trust in AI depends on system representation and perceived intelligence
Hoff, Bashir (2015)	Trust in automation	Users of automated systems	Trust is dynamic and depends on experience, system characteristics, and context of use (dispositional, situational, and learned trust)
Hancock, Billings, Schaefer et al. (2011)	Trust in human–robot interaction	HRI users	Trust depends on characteristics of the human, the robot, and the interaction environment
Medina-Molina, Pérez-Macías, Rey-Tienda et al. (2025)	Ethical aspects of AI	Young users	Interest in AI coexists with ethical and social concerns
Koteczki, Balassa (2025)	AI acceptance in education	Gen Z/students	AI adoption can be explained by TAM/UTAUT models; segmentation reveals intra-generational differences and 4 clusters
Wang, Li, Liang et al. (2025)	AI anxiety	Younger vs older individuals	Older age may be associated with higher levels of AI-related anxiety
Nakavachara (2026)	AI and employee well-being	Employees, group differences	AI use may differentially affect well-being, satisfaction, and workplace safety
Barbu (2025)	AI-generated reviews	Generational cohorts	Younger cohorts are more open to AI-generated content, while older cohorts tend to be more skeptical
OECD (2025)	Experiences with generative AI	Age groups	Younger users perceive higher usefulness, while older users show more skepticism

cont. tab. 1

Authors/year	Scope	Generation/ group	Implications for the present study
Gallup (2026)	AI usage and skepticism in Gen Z	Gen Z (14-29)	Around half of Gen Z uses generative AI regularly, while skepticism is also increasing
EY (2026)	AI among older adults	Ages 60-85	Older individuals are less familiar with AI but often express curiosity and willingness to learn
Deloitte (2024)	AI usage across generations	Gen Z, Millennials, older cohorts	Younger cohorts use AI more frequently but differ in trust and usage patterns

Source: own elaboration based on a literature review

The analysis of selected Polish literature indicates that attitudes toward artificial intelligence – and, more broadly, digital technologies – are both ambivalent and generationally differentiated. At the same time, there are also noticeable studies on integrating behavioural patterns, user attitudes, and segmentation approaches, particularly in the context of education and human resource management.

Table 2. Attitudes toward emerging technologies – generational perspective (selected polish studies)

Authors/source	Research context	Sample/ generation	Method	Key attitudinal dimensions	Main findings
Wrocław University of Science and Technology Report (2025)	Attitudes of Poles toward AI	Multiple generations	Quantitative study	Knowledge, usefulness, uncertainty	High awareness of AI but low level of understanding; ambivalent attitudes
K + Research (2025)	Generational attitudes toward AI	Various cohorts	Survey	Curiosity vs uncertainty	Attitudes vary depending on age and digital competencies
GoMobi (2025)	Attitudes toward AI in CEE	Young adults	Survey	Competencies, usage	High adoption of AI, but significant knowledge gaps
Dewalska-Opietek, Szejniuk (2024)	Attitudes toward AI	Students (Gen Z)	Focus group interviews (FGI)	Emotions, trust, risk	Ambivalent attitudes: perceived usefulness combined with caution
Matlach (2024)	AI in education	Students	Survey	Acceptance, ethics	High acceptance of AI, alongside a need for regulation

cont. tab. 2

Authors/source	Research context	Sample/generation	Method	Key attitudinal dimensions	Main findings
Freund (2025)	AI in public management	Young adults	Survey	Usefulness, risks	Pragmatic attitudes with awareness of potential risks
Stadnicka, Ingram (2023)	Digital technologies in organizations	Young employees	Qualitative analysis	Competencies, adaptation	Attitudes depend on the level of user competencies
Tomczyk (2025)	AI in research work	Young researchers	Empirical analysis	Usefulness, efficiency	AI enhances productivity but requires conscious use
Leńko-Szymańska (2026)	Digital competencies	Students	Quantitative study	Competencies, attitudes	Familiarity with technology does not imply informed or reflective use
Kowalska, Kosińska (2025)	ChatGPT, smart learning	Gen Z / students	Quantitative study	Competencies, attitudes	Gen Z uses AI autonomously and purposefully; perceived usefulness and enjoyment are key
Ławińska, Korbombel (2025)	AI study	Gen Z	Quantitative study	Current and emerging research directions	Scopus-based analysis shows a growing research stream linking AI, Gen Z, and management

Source: own elaboration based on a literature review

A review of recent international and Polish studies reveals a high degree of consistency in findings on attitudes toward artificial intelligence. Across both streams, attitudes are characterized by ambivalence, reflecting the coexistence of perceived usefulness and concerns about AI applications. Despite growing interest in AI across organizational and educational contexts, existing research continues to emphasize functional aspects, such as usefulness, efficiency, and adoption (Kshetri, Hughes, Slade et al., 2023; Kasneci, Seßler, Küchemann et al., 2023), alongside determinants of acceptance, including trust and perceived risks (Glikson, Woolley, 2020; Hoff, Bashir, 2015). Less attention has been paid to the complex, multidimensional nature of user attitudes, particularly their ambivalence and intra-group variability. This gap is especially salient in the case of the digital generation, which does not constitute a homogeneous group in terms of AI usage and attitudes (Baumann, Urman, Leicht-Deobald et al., 2025; Medina-Molina, Pérez-Macías, Rey-Tienda et al., 2025).

Existing studies rarely combine usage intensity with emotional attitudes and segmentation analysis, limiting the understanding of how AI is adopted in practice. From a management perspective in Industry 4.0, this issue remains important. The effectiveness of AI implementation depends not only on technological availability but also on user attitudes, acceptance, and readiness to engage with new tools. Therefore, identifying patterns of AI usage and user segments offers valuable contributions to both theory and managerial practice.

2. Proposed research model

In response to the identified research context, this study undertakes an empirical examination of AI usage patterns among young digitally socialized users, focusing on the relationship between AI usage intensity and user attitudes, as well as the identification of differentiated user profiles based on behavioural and attitudinal characteristics.

Accordingly, the following research questions were formulated: RQ1. How is AI usage intensity related to attitudes toward artificial intelligence among young users? RQ2. To what extent can differentiated user profiles be identified based on AI usage intensity and attitudes toward artificial intelligence? Additionally, the study explored the most frequently used AI tools among respondents.

Based on the literature review and theoretical assumptions derived from technology acceptance research, the following hypotheses were proposed:

H1. More intensive AI use is associated with more positive attitudes toward artificial intelligence.

H2. Young AI users do not constitute a homogeneous group and can be differentiated into distinct user segments based on AI usage intensity and attitudes toward AI.

The proposed research model assumes that the way young adults use artificial intelligence tools – particularly in terms of usage frequency and technological preferences – influences the formation of attitudes toward AI. These attitudes are conceptualized as multidimensional, encompassing both behavioural and affective components. It is further assumed that variation in usage intensity and attitudes enables the identification of distinct user segments, reflecting different patterns of AI adoption in practice.

3. Methodology

The study was conducted using a self – developed online questionnaire administered to a purposive sample of 120 respondents representing the digital generation. Participants provided responses on Likert scales regarding their attitudes toward

AI, frequency of use, preferred tools, and experiences with technology. The study relied on single-item indicators for selected constructs, including attitude toward AI and AI use intensity. Consequently, internal consistency reliability coefficients such as Cronbach's alpha could not be computed. This limitation is acknowledged, and the findings are interpreted as exploratory.

The average age of respondents was 23.3 years (median = 23), indicating a relatively homogeneous sample, with only a small proportion (3%) above the age of 35. The sample included 92 female (76.7%), 27 men (22.5%), and one respondent who did not report gender. Gender was used as a control variable; however, due to sample imbalance, its effects should be interpreted with caution. No missing data were identified for key variables (AI attitudes, usage, age). Data collection took place in April 2025.

4. Results

The analysis began with descriptive statistics to characterize the dataset. The following table presents key measures for the main quantitative variables: declared level of sympathy toward AI (measured on a 0-5 scale, where 0 indicates "strong dislike" and 5 "strong liking") and frequency of AI usage (measured on a 0-5 scale, where 0 indicates "no use" and 5 represents "five or more hours per week").

Table 3. Descriptive statistics for quantitative variables

Variable	N	Mean	Standard Deviation	Min	Median	Max
Level of sympathy toward AI (0-5)	120	3.64	0.94	1	4	5
Frequency of AI use (0-5)	120	2.65	1.21	1	2	5

Source: own elaboration

The descriptive statistics indicate that the mean level of sympathy toward AI is 3.64 (median = 4), suggesting a generally moderately positive attitude. Half of the respondents reported a score of 4 or higher, although the full range of responses (1-5) reflects notable variability. The standard deviation (0.94) indicates moderate dispersion around the mean.

The average frequency of AI use is 2.65 (median = 2), corresponding to approximately 2-3 hours per week for a typical respondent. However, the range of responses (1-5) and a higher standard deviation (1.21) point to substantial variation, from sporadic to intensive users. Figure 1 presents the distribution of both variables using histograms.

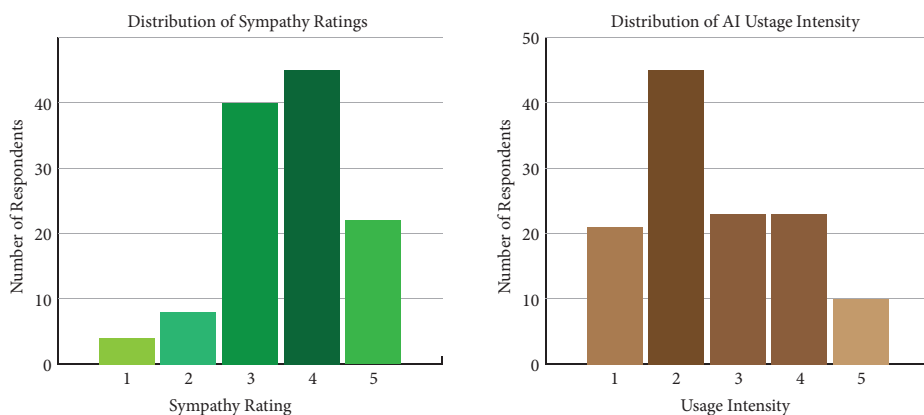


Fig. 1. Distribution of sympathy ratings and AI usage intensity

Source: own elaboration

As illustrated in Figure 1, respondents' attitudes toward AI are predominantly skewed toward higher values, indicating generally positive sentiment. In contrast, the distribution of AI usage intensity suggests a division into two subgroups, reflecting less frequent and more intensive users (measured in weekly hours).

Correlations between selected variables

The next step involved examining relationships between key quantitative variables describing attitudes toward AI. In particular, the analysis aimed to determine whether more positive attitudes are associated with higher levels of AI usage, and whether demographic factors (age, gender) influence these relationships.

Pearson correlation analysis revealed a significant positive relationship between sympathy toward AI and frequency of use ($r \approx 0.32$, $p < 0.01$), indicating a moderate association. This suggests that individuals who use AI more frequently tend to exhibit more favourable attitudes toward the technology.

In contrast, age was not significantly related to either attitudes ($r \approx -0.05$) or usage intensity ($r \approx 0.01$). A small gender difference was observed, with men reporting slightly higher levels of sympathy ($M \approx 3.89$ vs. 3.58) and usage ($M \approx 3.0$ vs. 2.55). However, the point-biserial correlation between gender and AI attitudes was weak ($r \approx 0.18$) and not statistically significant. The substantial gender imbalance in the sample further limits interpretation.

Overall, the primary relationship identified concerns the link between attitudes and usage: more positive perceptions of AI are associated with greater engagement. No meaningful associations were found for age or gender. Figure 2 illustrates this relationship.

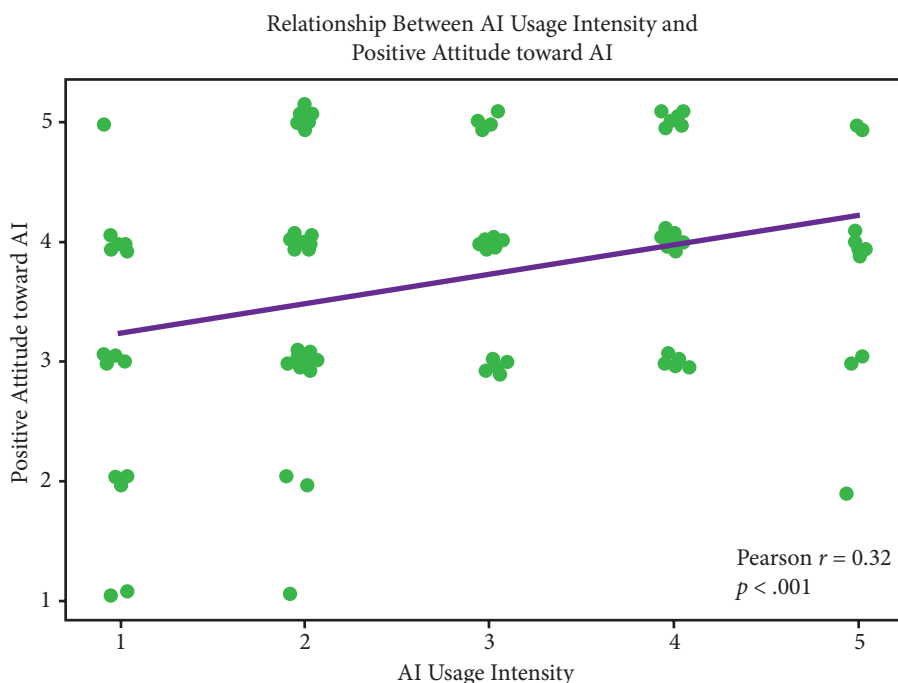


Fig. 2. Relationship between attitudes toward AI and usage intensity

Source: own elaboration

AI tool selection by respondents

The vast majority of respondents identified ChatGPT as their primary AI tool. In total, 114 respondents (95% of the sample) reported using ChatGPT, including those who combined it with other tools (e.g., TalkAI). Other AI solutions were used only sporadically. Despite the availability of numerous AI applications, ChatGPT clearly dominates as the most widely used tool among respondents.

Regression analysis

To further examine the relationships while controlling for multiple variables, a linear regression analysis was conducted. The model specified sympathy toward AI (0-5) as the dependent variable, with AI usage frequency (0-5), age, and gender as independent variables. The aim was to assess whether usage intensity remains a significant predictor of attitudes when controlling for demographic factors, and to determine the extent to which age and gender contribute to variations in AI-related perceptions.

The regression model was statistically significant ($F(3,115) = 4.79; p = 0.0035$), although its explanatory power was modest ($R^2 \approx 0.11$), indicating that the included variables account for approximately 11% of the variance in AI attitudes. AI usage frequency emerged as a significant predictor of positive attitudes toward AI ($B = 0.23, p = 0.001$). This suggests that, holding age and gender constant, a one-unit increase in AI usage is associated with a 0.23 – point increase in sympathy toward AI. Age was not a significant predictor ($p \approx 0.46$), and its effect was negligible. Similarly, gender did not have a statistically significant impact ($p \approx 0.27$), despite a slight tendency for men to report higher sympathy levels. These findings indicate that demographic factors play a limited role in shaping attitudes within the analyzed sample.

The relatively low explained variance suggests that attitudes toward AI are likely shaped by additional organizational, psychological and social factors not included in the present study, such as access to AI, trust in AI, perceived usefulness, digital literacy, ethical concerns, or AI-related anxiety. Therefore, the findings should be interpreted with caution and treated as exploratory.

Cluster analysis (segmentation of AI attitudes)

The next stage involved cluster analysis to identify segments of respondents with similar attitudes toward AI. The analysis focused on two key dimensions: attitudinal orientation (sympathy) and actual usage behaviour. Using the *k*-means algorithm, respondents were grouped based on these variables into clusters reflecting distinct patterns of AI engagement. Figure 3 presents the resulting clusters.

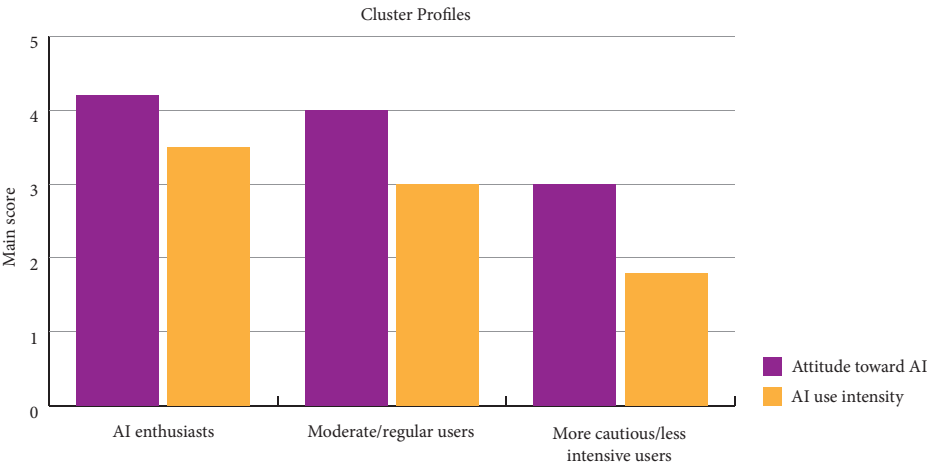


Fig. 3. Basic types of attitudes toward AI
Source: own elaboration

Cluster analysis identified three distinct user profiles: AI enthusiasts, passive supporters, and AI skeptics, which can be described as follows:

- Cluster 1: High sympathy, high usage (AI enthusiasts) – this group consists of users with strongly positive attitudes toward AI who actively and frequently use AI tools. They combine high acceptance with intensive engagement and represent approximately 20-30% of the sample;
- Cluster 2: High sympathy, low usage (moderate / regular users, passive supporters) – these respondents express positive attitudes toward AI but use it infrequently. Despite their favourable perceptions, their engagement remains limited, likely due to contextual barriers, such as lack of need, time, or access. This is the largest segment (approximately 40%+), indicating a gap between acceptance and actual use;
- Cluster 3: Low sympathy, low usage (AI sceptics) – this smaller group (around 10%) includes individuals with negative or neutral attitudes who rarely or never use AI. Their profile reflects scepticism or lack of interest in the technology.

Overall, the clusters reflect two key dimensions: attitudinal orientation and usage intensity. While enthusiasts and sceptics align with the expected positive relationship between attitudes and use, the presence of passive supporters highlights deviations from this pattern, explaining why the correlation between these variables is moderate rather than strong. The identified clusters suggest that even within digitally socialized cohorts, attitudes toward AI remain differentiated and cannot be reduced to a uniform “digital native” profile.

The findings indicate that young AI users do not constitute a homogeneous group but differ in both usage intensity and attitudes toward the technology (Koteczki, Balassa, 2025). The identified segments – from enthusiasts to more distanced users – align with the ambivalent nature of AI attitudes reported in the literature, characterized by the coexistence of adoption and skepticism (Glikson, Woolley, 2020; Medina-Molina, Pérez-Macías, Rey-Tienda et al., 2025). Notably, increased usage does not eliminate uncertainty; rather, it may coexist with cognitive and emotional ambivalence.

5. Conclusions

Respondents belonged predominantly to younger digitally socialized cohorts. The results demonstrate that attitudes toward AI among young adults are heterogeneous, despite an overall positive orientation. At the same time, the level of actual AI use remains moderate, indicating a gap between declared acceptance and practical engagement.

A significant positive relationship between usage frequency and attitudes confirms the role of user experience as a key driver of perception, while demographic

variables (age, gender) do not exert a meaningful influence within the digital generation. The identification of three user segments – enthusiasts, moderate users, and sceptics – highlights the need for differentiated management approaches to AI implementation.

Importantly, positive attitudes do not necessarily translate into active use, which may hinder effective digital transformation. Although the findings are consistent with global trends of increasing AI adoption, they also point to relatively lower usage intensity in the analyzed sample, underscoring the importance of contextual factors.

6. Discussion

The present study explored attitudes toward artificial intelligence among representatives of the so-called digital generation, with particular emphasis placed on AI usage intensity, demographic variables, and differentiated user profiles. The findings indicate that AI usage intensity was the strongest factor associated with positive attitudes toward artificial intelligence, whereas age and gender demonstrated limited explanatory value within the analysed sample. Respondents who reported more frequent interaction with AI tools also tended to express greater sympathy toward artificial intelligence. This finding is consistent with assumptions derived from the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis et al., 2003), according to which positive experiences with technology and perceived usefulness are associated with stronger acceptance and more intensive use. The obtained results suggest that familiarity and regular engagement with AI technologies may contribute to greater emotional acceptance and reduced resistance toward such tools.

At the same time, the findings indicate that demographic variables played a relatively minor role in shaping attitudes toward AI. Neither age nor gender significantly contributed to the regression model predicting AI attitudes. Although men demonstrated a slightly higher mean level of sympathy toward AI, these differences were not statistically robust in the multivariate analysis. This may suggest that within relatively homogeneous and digitally socialized cohorts, behavioural engagement with technology is more important than basic demographic characteristics. Such findings partially support recent criticism of overly generalized assumptions concerning “digital natives” and technologically homogeneous younger generations (Bennett, Maton, Kervin, 2008). Despite belonging predominantly to the Generation Z age cohort, respondents did not demonstrate uniform attitudes toward artificial intelligence.

The cluster analysis additionally revealed differentiated patterns of AI engagement and emotional orientation toward artificial intelligence. The existence of these clusters

suggests that attitudes toward AI within younger digitally socialized populations are not homogeneous. This finding may support contemporary approaches emphasizing that digital orientation should be understood as a differentiated social and behavioural characteristic rather than an automatic consequence of age cohort membership.

Although the regression model reached statistical significance, its explanatory power remained relatively modest ($R^2 \approx 0.11$). This suggests that attitudes toward AI are likely influenced by additional psychological, organizational, and contextual variables not included in the present study. Previous research indicates that factors, such as trust in AI, perceived usefulness, digital literacy, social influence, organizational support for technology adoption, and AI-related anxiety may significantly shape both technology acceptance and behavioural engagement with AI tools. Fear of automation, algorithm aversion, and perceived reliability as well as ethical concerns, may also contribute to explaining individual differences in AI acceptance and usage intensity (Jobin, Ienca, Vayena, 2019). Future studies should therefore incorporate broader psychosocial and organizational dimensions to develop more comprehensive explanatory models.

7. Study limitations

The study also has several methodological limitations that should be acknowledged. First, the research relied primarily on single-item indicators rather than validated multi-item psychometric scales. Consequently, internal consistency reliability measures such as Cronbach's alpha could not be computed. Although the use of single-item indicators is acceptable in exploratory studies and emerging research contexts, it limits the precision and psychometric robustness of measurement. Second, the sample was relatively homogeneous in terms of age and was characterized by a noticeable gender imbalance, which may reduce the generalizability of the findings. Third, the study employed a cross-sectional design, which prevents causal interpretation of the observed relationships. Therefore, the findings should be interpreted cautiously and treated as exploratory rather than confirmatory.

8. Contribution of the study

Despite these limitations, the study contributes to the growing literature on artificial intelligence acceptance among younger digitally socialized users. The findings highlight the importance of actual behavioural engagement with AI technologies as a factor associated with positive attitudes toward artificial intelligence. At the same time, the results demonstrate that digitally socialized generations should not be treated as internally homogeneous groups characterized by universally positive orientations toward emerging technologies.

9. Implications for management in the era of Industry 4.0

The findings indicate that the effectiveness of AI implementation in organizations depends not only on technological availability but, more importantly, on user attitudes and patterns of use. The identified heterogeneity – ranging from AI enthusiasts to more distanced users – suggests the need to move beyond regular implementation strategies toward a segmentation-based approach, accounting for varying levels of acceptance and competencies among employees.

First, organizations should prioritize the development of digital competencies and AI literacy, extending beyond operational skills to include critical and reflective engagement with technology. High levels of AI use accompanied by cognitive gaps may lead to inefficient or uncritical application of AI tools.

Second, the results highlight the importance of experience-based adoption. More frequent use of AI is associated with more positive attitudes, suggesting that organizations should support implementation through experimentation, pilot projects, and so-called *quick wins*, which foster trust through direct user experience.

Third, the emotional dimension of human-AI interaction should be explicitly addressed. The ambivalence of user attitudes – manifested in the coexistence of acceptance and concern – requires transparent communication, targeted education, and deliberate trust-building, particularly in contexts involving automation and decision-making.

Finally, in the context of Industry 4.0, technology management should be understood as an integral component of organizational change management. This includes not only the deployment of tools but also the shaping of user attitudes, organizational culture, and effective models of human-AI collaboration.

From a practical standpoint, the findings are particularly relevant for management in Industry 4.0 contexts. Effective AI implementation requires recognizing user diversity and tailoring strategies to different employee segments. Organizations should invest in digital competencies and AI literacy, fostering informed and critical engagement with technology while avoiding both unreflective acceptance and excessive skepticism.

In conclusion, the findings demonstrate that attitudes toward artificial intelligence among the digital generation are diverse and ambivalent, with important implications for the design and implementation of AI-driven solutions. A deeper understanding of these attitudes can support more effective utilization of AI in the context of ongoing digital transformation.

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