Ethical and security dilemmas in the application of AI in a financial institution environment - customer perspective

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Abstract: The rise of artificial intelligence (AI) in the financial sector creates new opportunities for increasing the efficiency of customer service but also raises serious ethical and security dilemmas. The study aims to explore the effects of the use of AI-based systems on the customer experience, with particular attention to transparency, data protection, discrimination risks and liability issues. The research focuses on customer perceptions: how they perceive AI-driven customer interactions, how much they trust these systems and what concerns they have regarding the use of the technology. The empirical basis of the study is a questionnaire survey conducted among domestic financial institution customers. The results may contribute to the more ethical and secure development of AI applications in the financial sector, as well as to the fine-tuning of regulatory and sustainability frameworks.

Keywords: MI, Etichs, Security, Customer perceptions, MTO

1. Introduction

The spread of artificial intelligence is changing the operation of financial institutions at a rapid pace. Not only from an IT point of view, but also from a human point of view. The EU AI Act and the General Data Protection Regulation (GDPR) regulations have set strict rules for financial institutions regarding the use of AI. Observing and complying with them is not an easy task, but it is not insurmountable. However, the question arises as to what risks artificial intelligence carries or what efficiency can be achieved with its application (Mucsinyi, 2025). In addition to the IT opportunities, the introduction of AI tools

can also generate human risks, concerns and benefits. Just observe the change in the customer experience, for example, at a financial institution where a voicebot operated by AI already answers phone calls. Here, we can no longer observe only a kind of triage operation that prioritizes the requests, but also divides them into categories and flags them. He tries to solve the customer's request or problem, or refers them to an expert administrator. This is a very serious step forward for customer services. A financial institution that has contracts with millions of customers and maintains millions of accounts in all kinds of business lines also has a significant number of customer contacts on call centers. These calls must be handled, and according to the legislation and recommendations, the customer must be directed to an administrator within a reasonable time. The ever-increasing number of customers, the increasingly sophisticated service, and the problems related to electronic administration induce more and more phone calls. The financial institution must provide the workforce necessary for the management of these services. You can hire trainees, student workers, disabled workers or outsource a campaign, but training and retaining employees with the right skills is a big task. Therefore, the introduction of a voicebot or chatbot can definitely be considered an effective solution. With the help of this, customers can get a solution to their problems and requests sooner, thus improving the customer experience.

Although the Hungarian legal environment does not currently require the mandatory inclusion of customer experience developments in financial institutions' sustainability reports or other data services, the presentation of social impacts is becoming more and more prominent in ESG (Environmental, Social, Governance) frameworks. Customer experience – as an indicator of the accessibility, fairness and digital inclusion of services – can indirectly contribute to the assessment of social sustainability. This is particularly relevant in the case of AI-based customer interactions, where the decisions of algorithms can affect customer trust, quality of service and potential discrimination risks. Transparent complaint handling practices, customer service developments and ethical audits of digital services are all elements that, although not mandatory, are becoming increasingly expected within the framework of responsible financial institution operation. Therefore, we have reason to expect that the development of customer experiences will soon appear in a regulation or recommendation in the sustainability reports of financial institutions, thus companies will become more innovative and achieve sustainable growth (Lockard et al, 2025).

For these reasons, the question arises as to what kind of opinion the customers of financial institutions form about the use of artificial intelligence. What ethical and security questions do the operation of customer services, triage, chatbots and voicebots raise, and what do customers think about it? The questionnaire on which the study is based seeks answers to these questions.

2. Literature review

According to media appearances on the internet, artificial intelligence is now appearing in the operation of financial institutions in a number of processes. It can be customer service, credit scoring or fraud prevention, just to name a few. Researchers and professionals like to dissect these topics.

For example, a study by Lülök and Sebestyén (2025) highlights that the prognosis, personalized financial advice and predictive analytics will be the next step in the application of artificial intelligence.

According to Deloitte, banks that effectively use AI in the software development lifecycle could save up to $1.1 million per engineer by 2028, as AI helps speed up development processes, reduces human error, and thus brings products to market faster. This way, the financial institution can react much faster to its environment and customer needs (Lockard et al, 2025). The application of AI models in qualitative data processing opens up a new perspective in interview analysis, but also raises ethical and reliability issues (Sterczl & Csiszárik-Kocsir, 2025).

Artificial intelligence can already be linked to devices such as a 3D printer (Israr & Borsos, 2024), and even the gondola should not limit the possibilities.

I examined the theoretical background of artificial intelligence along different aspects. I broke down the aspects separately for easier transparency.

2.1 Ethical dilemmas

The appearance and highly efficient operation of ChatGPT has sparked a competitive battle. In addition to ChatGPT, many well-known companies' own creations have already been released (Amazon, Elon Musk, TikTok) and several Chinese versions. According to the almost obligatory criticism, the use of such solutions can lead to a serious decline in human abilities. The user uses his brain and the ability to read less and less often, and he wants to get information as quickly as possible (Hornyák, 2025). In this chapter, I will mention the ethical dilemmas that arise in connection with the application of AI solutions.

- Transparency and decision-making responsibility

If an AI system makes a decision (e.g. credit assessment), who takes responsibility for a possible error? In the questionnaire serving as the basis for the research, I also asked a question about this, the results of which are presented in the results chapter. Based on the articles on the internet, it can be said that several researchers and professionals are already dealing with these questions. According to Dr. Anna Molnár's (2025) article, for example, the development of artificial intelligence is very urgent to rethink transparency, data protection and legal regulations, especially from the point of view of ethical and social responsibility.

Transparency is a key issue in the use of AI, as we do not always know how the AI solution has achieved its result and what steps it has taken. Although there are already solutions, such as GPT-5, which describes what data it examines in various steps before displaying it, we cannot be sure what the result actually contains.

- Privacy and handling of personal data

AI systems process huge amounts of customer data. In the current digital age, data protection, transparency and fair behaviour are key (Müller & Kerényi, 2019). – How can this be ensured in an ethical manner? This is an extremely complex task that requires close cooperation from the social parties.

- Discrimination and prejudice

Algorithms can learn from distorted data patterns, which can lead to discriminatory decisions (e.g., based on ethnicity, gender, or geography). This is also an important question, and several studies deal with it. Based on this, it can be stated that it is essential to take ethical aspects and social justice into account when developing artificial intelligence applications (Mike, 2024).

2.2 Security challenges

The use of artificial intelligence not only creates new opportunities for financial institutions but also poses a number of security risks. The complexity and autonomy of AI systems pose challenges that go beyond traditional IT security issues. Cybersecurity threats, the rise of data manipulation and deepfake technologies, as well as the partial loss of human control, are all factors that affect social stability and the rule of law at a strategic level. The aim of this chapter is to present the security dilemmas that accompany the introduction and operation of AI systems, with special regard to cybersecurity, the authenticity of information and the risks arising from autonomous decision-making.

- Cybersecurity

AI systems can open up new attack surfaces, especially when it comes to automated decision-making. Regardless, several studies state that AI can play a key role in protecting systems, but only if it is used within the right regulatory and ethical frameworks (Bagó, 2023).

- Data Manipulation and Deepfake Threats

In the financial sector, the credibility of information is particularly sensitive, but it is important not only here, but also in other sectors. Deepfake technology and automated content production allow manipulation to be faster, more targeted and more difficult to detect. This is not only a technical but also a strategic challenge, especially in terms of national security and social stability (Benke, 2023).

- System independence and loss of control

If an AI system is too complex or self-contained, it can be difficult to take back control. According to the latest Hungarian studies, the autonomy of AI creates new types of risks, especially in the area of decision-making and responsibility. The application of AI in public administration can also result in significant efficiency gains, but at the same time it poses serious challenges in terms of human control, transparency and the rule of law (Rideg 2023).

2.3 Regulatory and compliance issues

The study by the National Bank of Hungary highlights that regulation often lags behind technological development, and the compliance assurance function plays a key role in maintaining ethical operation.

And the legal study of the University of Miskolc emphasizes the importance of data protection and social risks, especially in relation to generative AI systems.

The Artificial Intelligence Act is the first comprehensive, binding piece of legislation on artificial intelligence, adopted by the European Parliament in March 2024. It aims to ensure security and compliance with fundamental rights, while stimulating innovation and reinforcing Europe's leadership in AI (European Parliament, 2024).

In May 2020, the Hungarian government finalized Hungary's Artificial Intelligence Strategy, which covers the period 2020-2030. The aim of the public document is to put Hungary at the forefront of AI development, focusing on education, research and development, industrial applications and data management. The coordinating organization of the strategy is the AI Coalition, which brings together state actors, universities and tech companies into a bunch (Government of Hungary, 2020).

The Hungarian government has submitted a bill for the autumn parliamentary session starting on 22 September 2025, which includes, among other things, the establishment of the Artificial Intelligence Office. The main goal of the office will be the transposition and implementation of the European Union's AI Act in Hungary. Although the specific tasks of the Office are not yet known, according to the legislative plan, the Office could start operating in January 2026 based on a sufficient number of votes. (Lengyel, 2025).

Decree No. 1301/2024 (IX.30.) Government Decree provides for the implementation of the EU AI Act 2024 in Hungary. It establishes the Hungarian Artificial Intelligence Council, which issues guidelines and positions (Government of Hungary, 2024).

The background study of the Hungarian Parliament provides a comprehensive analysis of the technological types, benefits, dangers and international regulatory trends of AI, and highlights that there is no separate AI law in Hungary yet, but adaptation to the EU regulation is in progress (Szalay, 2023).

Hungary is actively striving to keep pace with European AI regulation and to build its own institutional framework for its application in Hungary. This has already been formulated in several studies by Hungarian experts (Domokos & Sajtos, 2024) The adoption of the AI Act not only creates legal compliance, but also an opportunity for the country to become a competitive player in the field of AI developments. The strategy papers, the planned office and council, and the legislative preparations all show Hungary's long-term commitment to the safe, ethical and innovative use of AI. In addition, it can be said that there is a great need for the use of AI to take place within a regular framework. We are talking about a technology that dances on very thin ice. We know that AI devices often hallucinate and are wrong. Critical thinking is required to use it in the right way. Young people are at the greatest risk, as they are not always able to decide whether the information they receive is correct or even real. AI tools are known to be based on probabilistic data, and this may be the fault. However, the error must be recognized. It is important to emphasize that the Adatbias characteristic of AI also refers to the importance of critical thinking, as AI learns from data that may already contain bias.

3. Material and method

As part of the research, I conducted a questionnaire survey in Google Forms, which was based on a series of 20 questions, which included both open and closed questions, Likert scale questions. The questionnaire was sent to people over the age of 18 via social media platforms and email as a personal address. Using the snowball method, I asked for the questionnaire to be forwarded. The questionnaire was also published on the social media platforms of various start-up companies dealing with artificial intelligence.

For the analysis, I used Microsoft Excel reports and charts and statistical methods.

4. Outcomes

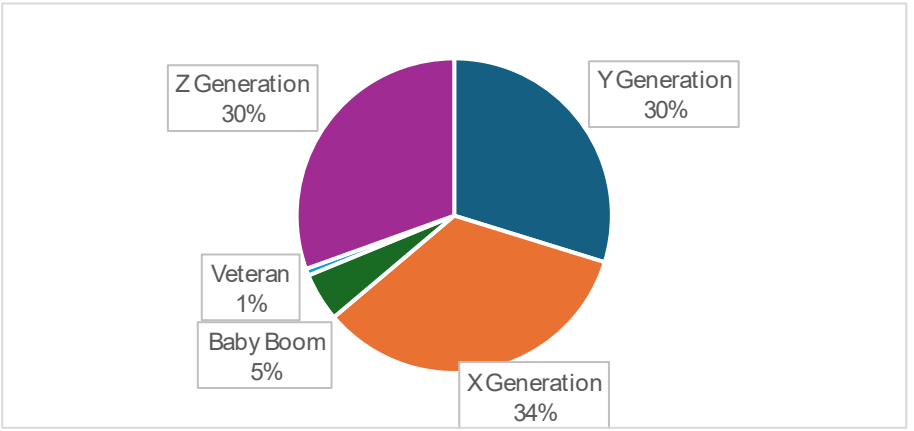
The questionnaire consisting of 20 questions received 254 responses in one month. In terms of demographics, 68.1% of respondents were women, 30.5% were men and 1.4% did not want to answer this question.

The classifications of generations have an interdisciplinary origin: they mix demographic, sociological, psychological and technological theories, using several official generational theories (Erdélyi, 2023).

Generation Name	Year of birth interval	Features at a glance
Veteran generation	1945 and before	War and post-war generation, respectful of tradition
Baby Boom generation	1946–1964	Stability, welfare society, loyalty
Generation X	1965–1980	Technological transition, individualism
Millennials	1981–1996	Digital revolution, flexibility, self-realization
Generation Z	1997–2012	Digital natives, visual culture
Generation Alpha	After 2013	They grow up with AI and smart devices

The distribution of respondents shows the following picture:

Figure 1: Distribution by generations



(Source: Author's own research, 2025, n = 254)

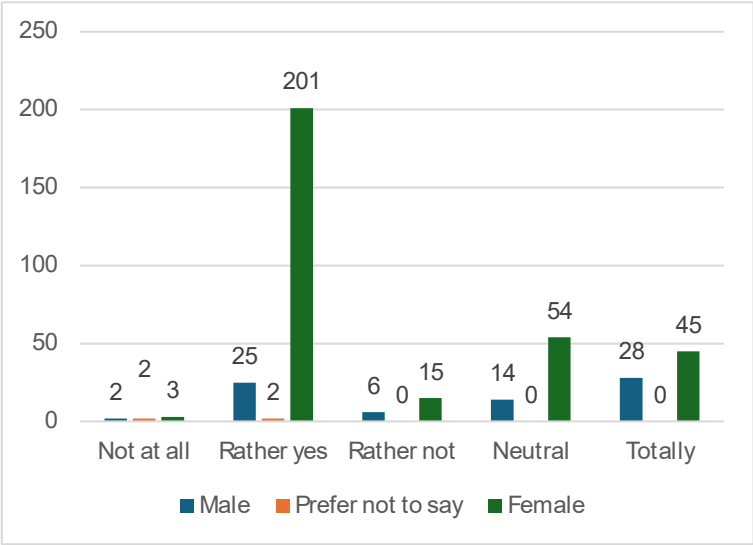
The distribution of the respondents' educational attainment shows that those with secondary and tertiary education completed the questionnaire the most. The reason for this may be that I used a lot of technical terms in the questionnaire, and it

became clear from some of the feedback that a simpler wording is recommended for further research (1 elementary, 82 intermediate, 166 advanced and 5 Phd).

The next step is to present the empirical data obtained during the research.

In terms of confidence in AI, the breakdown is as follows. It is clear that female respondents are much more confident in the use of digital technologies.

Figure 2: Gender distribution of confidence in AI



(Source: Author's own research, 2025, n = 254)

Figure 3: Correlation matrix of emotional responses

	Doubt	**Curiosity**	**Confidence**	**Neutral**	**Rejection**
Doubt	1	0,019	0,008	0,032	-0,076
Curiosity	0,019	1	0,034	0,012	-0,059
Confidence	0,008	0,034	1	0,021	-0,042
Neutral	0,032	0,012	0,021	1	-0,063
Rejection	-0,076	-0,059	-0,042	-0,063	1

(Source: Author's own research, 2025, n = 254)

For the correlation matrix, the questionnaire What feelings do you feel when you have to communicate with an AI system during banking? I provided the answers

to your question with binary code. After that, I created the matrix using the Data Analysis function of Microsoft Excel, and then the heat map with conditional formatting.

In the interpretation of the matrix, it can be said that the correlation values are very weak, typically ranging between 0.0 and 0.03. Rejection shows a weak negative relationship with all other emotions, especially Doubt (r = –0.076), which may indicate that those who reject AI do not necessarily doubt it – rather, they reject it outright. There is a slight positive relationship between Curiosity and Trust (r = 0.034), which is weaker than expected, but it may still indicate that curiosity is not always associated with trust.

Main observations:

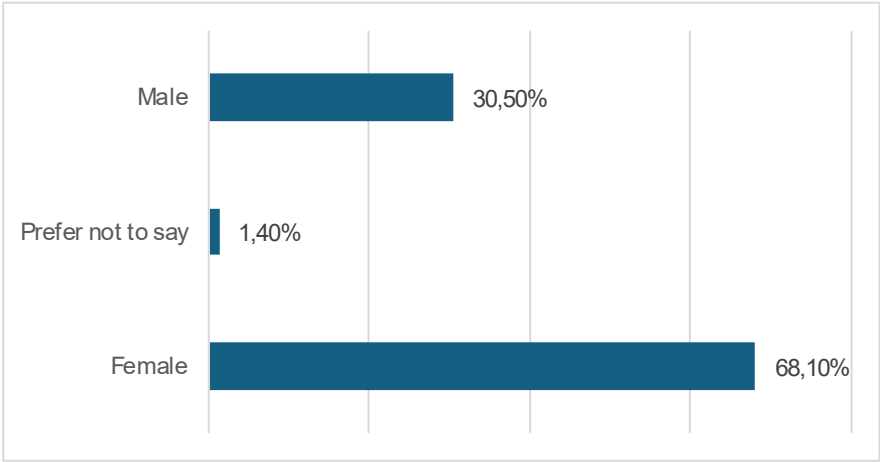
- A weak negative relationship between rejection and doubt can be observed (r = –0.076). This suggests that respondents who reject AI do not necessarily doubt the technology – rather, they strongly reject its application. This attitude does not stem from uncertainty, but from deeper distrust or value-based resistance.
- There is a slight positive relationship between curiosity and trust (r = 0.034), which, although weak, still indicates that interest in technology goes hand in hand with trust to some extent. At the same time, a low value suggests that curiosity doesn't guarantee trust – interested customers may still be cautious or critical.
- Neutral attitude has a weak relationship with all dimensions (e.g., neutral ↔ trust: r = 0.021), which indicates that neutrality is not closely associated with either positive or negative emotional responses. This group may be the most influential through communication and education.
- Rejection has a negative correlation with all other dimensions, especially curiosity (r = –0.059) and neutrality (r = –0.063). This confirms that the rejection attitude is strongly separate from other forms of emotional response and can be interpreted as an independent, closed emotional position.

The color-coded heatmap display of the matrix (green – positive, red – negative, yellow – neutral) helps interpretation, especially in a presentation environment. Through visual highlighting, it becomes immediately apparent that the emotion of rejection is related in the opposite direction to almost all other attitudes.

The weak correlations between emotional attitudes suggest that AI-related customer perception does not move on a linear scale but is much more segmented and complex. This confirms that customer types require a differentiated approach to AI development – especially in the areas of ethical communication, data protection and trust building.

In the area of confidentiality in cybersecurity issues, the following analysis can be observed in terms of gender ratio.

Figure 4: Gender distribution of confidentiality on cybersecurity issues



(Source: Author's own research, 2025, n = 254)

According to the chart, female respondents are much more concerned about cybersecurity issues in AI applications. In the questionnaire, respondents had the opportunity to comment on this on a scale of 1 to 5. The values were assigned to the genders and then aggregated.

Word cloud

The word cloud below was formed from the answers received to the free word question of the questionnaire. In terms of the size of the words, the term "non-human" is outstanding, which suggests that a significant number of responses are not yet able to accept AI as the technology of the future. The question was about what proposals they would have for the ethical operation of AI in the banking sector.

Figure 5: Word cloud on AI proposals

(Source: Author's own research, 2025, n = 254)

Based on the cluster analysis of the free word answers of the questionnaire, three main types of customers can be distinguished according to their relationship to banking communication with AI: technology-friendly trust builders, those who need critical control, and distrustful rejecters.

The factor analysis was based on variables based on attitudes and emotions (e.g. trust, curiosity, rejection, data protection, need for human control, experiences with AI).

1. Digital Trust Builders

- Typical factor weights: high trust, curiosity, positive experience with AI systems, low rejection.
- Demographic characteristics: typically, from generations Y and Z, with higher education, digital banking is common
- Attitudes:
    - Accepting AI decisions without human intervention
    - They are open to new technologies
    - Less concerned about data security

2. Responsible supervisors

- Typical factor weights: high doubt, moderate curiosity, strong need for human review, medium trust
- Demographics: mainly Generation X, middle managers, frequent bank users
- Attitudes:
    - They accept AI, but only under human control
    - Transparency and auditability are important to them
    - Risk-sensitive

3. Technology skeptics

- Typical factor weights: high rejection, low trust and curiosity, and strong privacy concerns
- Demographics: typically, Baby Boom and Generation X, less frequent use of digital banking
- Attitudes:
    - They reject AI as a decision-maker
    - They are very concerned about discrimination and data management
    - They prefer a human administrator

In the cluster analysis, emotional attitudes (trust, curiosity, rejection, neutrality and doubt), responses to AI-related statements (data protection, human control, efficiency), and experience and preference were included with AI-based systems.

5. Conclusion

Based on the information obtained during the research and the available literature, I made a literature comparison. From this I have established the following.

Regarding the acceptance of AI, I used the TAM/UTAUT models as a basis, which determine whether someone accepts a certain technology along factors such as perceived utility or perceived ease of use. And according to the improved version, performance expectation, effort expectation, social influence and facilitating conditions. However, during the analysis of the questionnaire, we can observe that the emotional dimensions (Doubt, Curiosity, Trust, Neutral, Reject) do not follow each other in a straight, predictable order in the process of technology acceptance.

On the topic of transparency and responsibility, Molnár (2025) emphasizes the importance and urgency of these in his study, but respondents prefer human control.

Data protection: it can be seen that respondents are not interested in legal requirements and regulations, and in many cases they may not even be aware that they exist. Worry is more emotionally charged.

The EU AI Act and the National Bank of Hungary consider discrimination risks to be important, but respondents only feel this in general, but do not perceive it.

The use of AI in financial institutions is therefore not only a technological or legal issue, but also has emotional, trust, and social dimensions. Customers do not react in the same way: some are open, some are cautious, and some are dismissive. Based on the comparison with the literature, the research confirms international trends, but also brings new aspects, especially in the field of emotional attitudes and the dynamics of trust.

Topic	**Parallel**	**Variance**
Embracing AI	TAM/UTAUT models – attitudes influence acceptance	Emotional dimensions (e.g., rejection) do not fit linearly
Transparency and accountability	Anna Molnár (2025) – urges transparency	Respondents do not always require technical explanations, preferring human control
Data protection	The GDPR and AI Act emphasize data security	Respondents' concerns are often emotional, not legal or technical
Discrimination risks	EU AI Act and Hungarian National Bank studies highlight	Respondents do not always perceive it concretely, but rather it appears as a general fear

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