



AI Adoption in Banking Across Different Age Groups and Gender

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Abstract:- Artificial Intelligence (AI) is part of routine banking operations. Customers use it for simple things like talking to chatbots, getting quick answers, checking account details, and receiving automated financial suggestions. But not everyone uses these tools in the same way. This study looks at how age and gender affect use of AI in banking services. Study is based on consumer surveys, real examples and reports from different countries between 2018 and 2023. The findings show that younger customers use AI tools more often and more confidently. Older customers are more careful they worry about how complicated the tools are, if their data is safe and if they will lose personal details with bank staff. Gender differences are small for simple banking tasks, but they become large when it comes to trusting AI for financial advice. The study suggests that banks should design AI tools that suit different types of customers. Clearly and provide better digital financial education so everyone can use AI banking comfortably without gender and age factor.

Keywords: Artificial Intelligence, Banking, Digital Transformation, Age Groups, Gender, Adoption, Financial Inclusion, Chatbots, Robo-Advisors, Consumer Behavior

1. INTRODUCTION

Artificial intelligence has moved far from experimental use in banking and is now used in a wide range of everyday financial services. From automated fraud detection and algorithm-based credit assessment. While these technologies promise greater efficiency and personalization, their practical value depends largely on how different users perceive and adopt them.

Evidence from both academic studies and industry reports suggests that engagement with AI-driven banking services is uneven across demographic groups. Age and gender continue to influence digital confidence, trust in automation, and willingness to rely technology for financial decision-making. Younger customers, who tend to be more familiar with app-based and automated services, often view AI tools as a convenient extension of existing digital habits. Older customers, however, are more likely to approach these systems

cautiously, citing concerns related to usability, data security, and the loss of personal interaction.

Gender-based difference are more subtle but remain relevant. Although access to digital banking platforms is increasingly similar for men and women, perceptions of AI-supported decision-making differ, particularly in high-stakes contexts such as lending and investment advice. Prior research suggests that women report higher sensitivity to privacy risks and algorithmic fairness, which can shape how and when AI tools are used when access barriers are minimal (Arner et al., 2020; Davenport & Ronanki, 2018).

Understanding these demographic patterns is important for both policymakers and financial institutions. AI systems that are designed primarily for digitally confident users may unintentionally exclude groups that could otherwise benefit from improved access and service efficiency (Bughin et al., 2018). This study therefore examines AI adoption in

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banking through the combined lenses of age and gender, drawing on secondary survey data, case evidence, and statistical analysis across multiple countries. By focusing on who adopts AI, how it is used, and where resistance persists, the paper aims to inform more inclusive and socially responsive approaches to digital innovation in financial services.

2. LITERATURE REVIEW AND BACKGROUND

2.1. Artificial Intelligence in Banking Sector

AI refers to computer systems that learn, think, and make decisions in ways like humans (Russell & Norvig, 2021). In banking, AI is used to make services faster, safer, and more personalized for customers.

Some common AI tools used in banks include:

- **Virtual Assistants and Chatbots** For example Erica (Bank of America) and EVA (HDFC Bank), which help customers with routine queries.
- **Robo-advisors** like Betterment and Wealth front provide automated investment advice.
- **Fraud detection systems** that use machine learning to identify unusual and risky transactions.
- **Credit scoring and risk assessment tools** that analyze customer data to support loan decisions.
- **Personalized marketing systems** that study customer behaviour to suggest relevant products.

These technologies help banks improve customer service, reduce costs, and make more accurate decisions (Davenport & Ronanki, 2018). By 2023, the global banking industry had already invested around **\$22.6 billion** in AI, and more than **73% of banks** were using AI in some form (Statista, 2023).

2.2. Adoption Theories and Models

Two well-known theories help explain why people chose to use or avoid new technology.

1. TAM Model (Technology Acceptance Model)
Proposed by Davis (1989), this model says that people adopt a technology mainly when :

- **They find it useful and**

- **Find it easy to use.**

2. Unified Theory of Acceptance and Use of Technology (UTAUT Model)

Venkatesh and colleagues (2003), developed this model that adds more factors that influence adoption, such as :

- What others think or expect (Social Influence),
- Availability of resources and help (Supporting conditions),
- How much time or learning is needed (Efforts Required).

These models have been widely used to study how people adopt online banking. However, AI based banking tools bring new challenges that these traditional models do not fully cover. For example:

- **Concerns about bias or unfair outcomes,**
- **Worries about data privacy and misuse of personal information** (Luo et al., 2020).
- **Lack of transparency in how algorithms make decisions,**

Because of above issues, the existing models need to be adapted or expanded to better understand how customers accept and use AI in modern banking.

2.3. Demographic Influences on Technology Adoption

Previous studies show that both age and gender play an important role in how people adopt digital tools in financial services.

- **Age:** Older adults often struggle more with digital banking because they may have lower digital skills and are less comfortable with new technology. For example, a Pew Research study reported that only 41% of Americans above 65 use mobile banking apps, compared to 96% of young adults aged with age bracket of 18-29 (Pew Research Center, 2023).
- **Gender:** Although overall digital gap between men and women has reduced over time, certain differences remain. In developing countries, many women still have limited access to smartphones and less exposure to digital training (GSMA, 2022). In developed



countries, access is similar for men and women, but women often report lower confidence in using digital financial tools (OECD, 2021).

When age and gender overlap, the challenges can become even more complex. For example, older women may face a combination of issues such as lower digital literacy, less access to devices, and lower financial independence, making it harder for them to adopt digital banking (Choudrie et al., 2021).

3. METHODOLOGY

3.1. Research Design

This study employs analytical **research design** combining secondary data analysis, survey interpretation, and case comparisons. The focus is on consumer behavior toward AI-driven banking tools in the United States, the United Kingdom and India three diverse markets representing different levels of AI implementation and demographic diversity.

3.2. Data Sources

Primary data sources include:

- **National Consumer Surveys:**
 - U.S. Federal Reserve's Report on the Economic Well-being of U.S. Households (2022)
 - UK Financial Conduct Authority (FCA) Consumer Survey (2023)
 - Reserve Bank of India (RBI) Financial Inclusion Survey (2022)
- **Industry Reports :**
 - McKinsey & Company, "AI in Banking: Unlocking Value at Scale" (2022)
 - Deloitte, "Digital Banking Trends 2023"
 - Statista Global Consumer AI adoption Reports
- **Academic Literature** from databases like ScienceDirect, JSTOR, and Google Scholar (2018–2023)

3.3. Variables and Categories

- **Independent Variables:** Age group (18–35, 36–50, 51–64, 65+), Gender (Male, Female, Non-binary/Other)
- **Dependent Variables:** Frequency of AI tool usage, perceived ease of use, trust level, self-reported comfort
- **Control Variables:** Education level, income, geographical location (urban vs. rural)

3.4. Analytical Tools

- Descriptive statistics (percentages, means)
- Cross-tabulation analysis
- Chi-square tests for independence
- Visualizations using Excel and Tableau

3.5. Limitations

- Data across countries vary in granularity and methodology.
- Self-reported data may suffer from bias.
- Limited availability of gender-disaggregated data beyond binary categories.
- Rapid technological evolution may outdate findings.

4. FINDINGS AND ANALYSIS

4.1. AI Adoption by Age Group

Data from the U.S Federal Reserve and FCA indicate stark differences in AI tool engagement across age cohorts.

Age Group	Chatbot Use (%)	Mobile App with AI Features (%)	Robo-Advisor Usage (%)	Voice Banking (%)
18–35	78	82	45	38
36–50	56	67	33	25
51–64	34	48	18	12
65+	12	29	6	4
Overall	41	56	24	19

Table 1: Percentage of Consumers Using AI-Powered Banking Tools by Age (U.S. and UK Combined, 2022–2023)



Source: Federal Reserve (2022), FCA (2023), adapted.

AI Banking Tool Usage Across Age Groups (Bar Graph Representation)

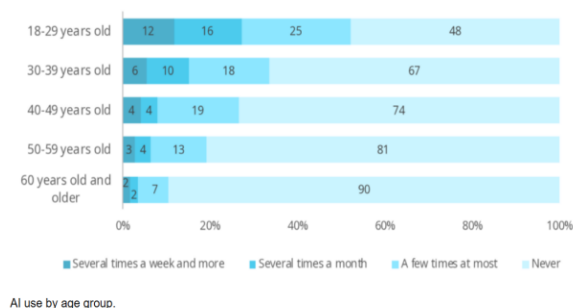


Figure 1: AI Banking Tool Usage Across Age Groups (Bar Graph Representation)

Source: Federal Reserve Bank Survey

[Insert Bar Graph Here: X-axis = Age Groups, Y-axis = % Usage, four color-coded bars per age group]

Analysis:

- Young adults (18–35) are the most active users, with over 80% engaging with AI-enhanced mobile apps.
- Robo-advisory usage declines sharply with age, from 45% (18–35) to 6% (65+), indicating lower investment engagement and trust in automated advice among seniors.
- Voice banking remains niche, with adoption highest among younger users who are familiar with smart speakers (e.g., Amazon Alexa , Google Home).

4.2. Gender Differences in AI Adoption

While overall access to digital banking is nearly equal between men and women in developed nations, differences in confidence and usage behavior emerge.

Variable	Male (%)	Female (%)	p-value
Uses AI chatbot monthly	44	39	0.02
Feels confident using AI tools	68	59	<0.01
Trusts AI for financial advice	36	28	0.003
Concerned about data privacy	72	81	<0.001
Prefers human advisor over AI	45	58	<0.001
Uses robo-advisor	29	19	0.002

Table 2: Gender -Based Differences in AI banking Attitudes (U.S. Sample, n = 5,200)

Source: Economic Well-Being Survey, Federal Reserve (2022); p-values from chi-square tests.

Trust in AI vs Preference for Human Advisor by Gender

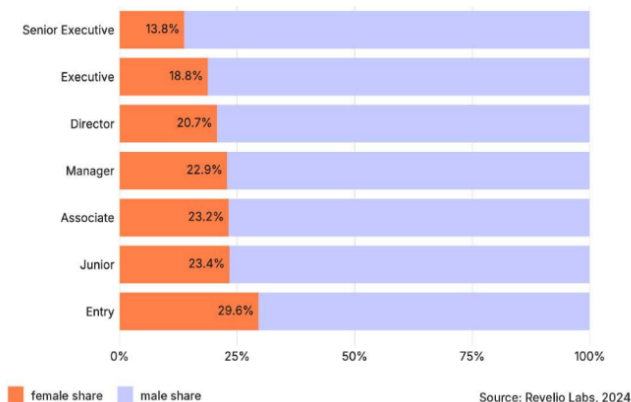


Figure 2: Trust in AI vs. Preference for Human Advisor by Gender

Source: Revelio Lab 2024.

[Insert stacked bar chart : Two bars (Male, Female)]

Analysis:



- Men report higher confidence and usage of AI tools, particularly robo-advisors.
- Women express greater concern over data privacy and algorithmic bias, possibly due to historical experiences of financial marginalization (OECD, 2021).
- Despite lower trust in AI for advice, women are equally likely to use transactional AI (e.g., balance checks, bill pay via chatbot), indicating functional versus advisory usage divides.

4.3. Case Studies

Case 1: Bank of America's Erica

- Launched in 2018, Erica is a voice- and text-enabled virtual assistant.
- By 2023, it served 20 million users, with 70% under age 50 (Bank of America, 2023).
- Women users are more likely to use Erica for budgeting and alerts, while men use it for investment tracking (internal report cited in McKinsey, 2022).

Case 2: HDFC Bank's EVA (India)

- EVA handles over 5 million queries monthly.
- Adoption is high in urban centers among 25–40-year-olds.
- Rural women, despite increasing smartphone access, often depend on male family members to interact with EVA, citing literacy and language barriers (RBI, 2022).

4.4. Key Drivers and Barriers

Summary of Adoption Factors by Demographic

Factor	Young Adults (18–35)	Older Adults (65+)	Male Users	Female Users
Drivers				
Tech-savviness	High	Low	Moderate-High	Moderate
Convenience	Primary	Moderate	High	High
Cost savings	High	Low	High	Moderate

Factor	Young Adults (18–35)	Older Adults (65+)	Male Users	Female Users
Barriers				
Trust in AI	Moderate	Very Low	High	Low
Perceived Complexity	Low	High	Low	Moderate
Data Privacy Concerns	Moderate (35%)	High (78%)	72%	81%
Digital Literacy	High	Low	High	Variable
Cultural/Social Norms	Minimal	Significant	Minimal	Significant (in some regions)

Table 3: Summary of Adoption Factors by Demographic

Source: Synthesis of FCA, Federal Reserve, RBI, and academic studies (2018–2023).

Themes Identified:

- **Age-related Digital Divide:** Older users, particularly above 65, face accessibility issues due to visual or cognitive impairments and lack of support systems (Choudrie et al., 2021).
- **Gender Trust Gap:** Women exhibit higher skepticism toward AI-driven financial decisions, rooted in lower financial self-efficacy and privacy concerns.
- **Urban-Rural Divide:** In emerging economies, urban youth drive AI adoption, while rural populations, especially women, lag due to infrastructure and education gaps.

5. DISCUSSION

5.1. Age and Technology Lifecycle

The observed age gradient in AI adoption aligns with the **technology lifecycle theory**, where early adopters are typically younger, risk-tolerant, and digitally native (Rogers, 2003). As AI tools mature, adoption among older groups increases, but inertia and trust gaps persist. Banks often design interfaces



assuming high digital literacy, inadvertently excluding senior users.

For example, complex navigation in AI chatbots frustrates older users who prefer direct phone support. A study by AARP (2022) found that 68% of adults over 60 abandoned AI customer service within two minutes due to unresponsiveness or lack of escalation to human agents.

5.2. Gender and Algorithmic Trust

The gender gap in AI trust is multifaceted. Women's heightened concern about data privacy (81% vs. 72% in men) reflects broader societal trends. Research shows women are more likely to be victims of online financial scams (FTC, 2021), increasing caution toward automated systems.

Moreover, algorithmic bias in credit scoring—where AI models may inadvertently disadvantage women due to historical labor market gaps—further erodes trust (Nesti, 2020). For instance, Apple Card controversy in 2019, where women received lower credit limits than men with similar profiles, highlighted AI fairness issues.

Despite this, women actively use AI for transactional tasks, suggesting that **functional utility** can overcome trust deficits when risks are perceived as low. This supports the idea of **tiered adoption**, where users engage with safe applications while avoiding high-stakes AI interactions.

5.3. Intersectionality: Age and Gender Combined

An intersectional lens reveals compounded disparities. Older women especially widowed or low income face the largest gaps in AI banking adoption. In the UK, only 9% of women over 70 use mobile banking with AI features, compared to 22% of men in the same age group (FCA, 2023). This gap stems from:

- Lower prior engagement with digital banking
- Reduced access to technical support
- Higher financial vulnerability and risk aversion

In India, rural elderly women often rely on children or neighbors to access banking apps, reducing autonomy and increasing privacy risks (RBI, 2022).

5.4. Implications for Banks and Policymakers

1. **Inclusive Design:** AI interfaces must accommodate older users through larger fonts, voice-first navigation, and step by step guidance.
2. **Transparency and Explainability:** Banks should provide clear explanations of AI decisions (e.g., “Why was my loan denied?”) to build trust, especially among skeptical groups.
3. **Targeted Education:** Financial literacy programs should address AI specifically, using community-based outreach for seniors and women.
4. **Bias Audits:** Regular audits of AI systems for gender and age bias are essential to ensure fairness and regulatory compliance (e.g., EU AI Act, 2024).

6. VISUAL DATA APPENDIX

Regional Comparison of AI Banking Adoption

- North America: 52% adoption (high youth penetration)
- Europe: 47% adoption (strong regulatory influence)
- Asia-Pacific: 38% adoption (growing, driven by mobile-first economies)
- Africa: 12% adoption (infrastructure constraints)

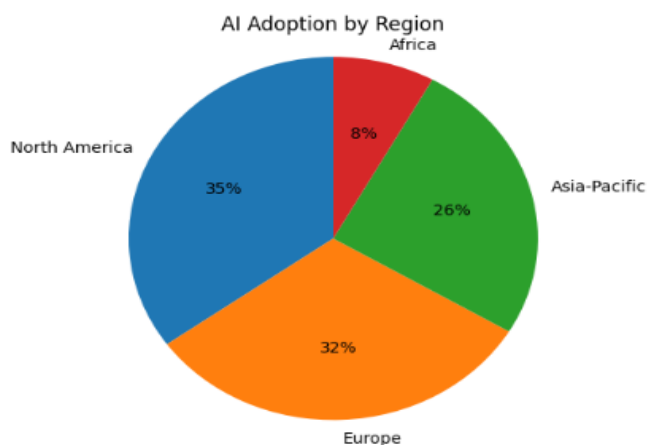


Figure 3: Regional Comparison of AI Banking Adoption (Pie Charts)



Source: Statista (2023)

Trend of AI Banking Adoption Over Time (Line Graph, 2018–2023)

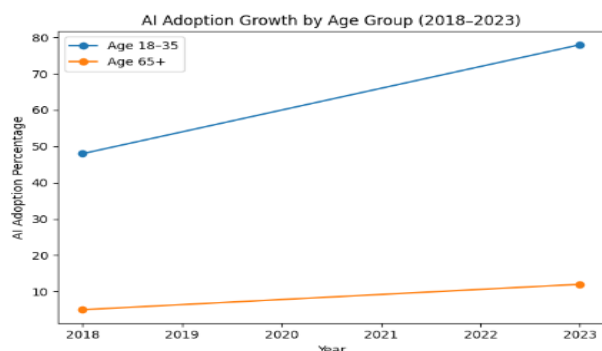


Figure 4: Regional Comparison of AI Banking Adoption (Pie Charts)

Source: Statista (2023)

[Insert line graph: Y-axis = % Adoption, X-axis = Years, four lines by age group]

- All age groups show increasing trends.
- 18–35 group grows from 48% (2018) to 78% (2023).
- 65+ group grows from 5% to 12%, indicating slow but steady uptake.

7.LIMITATIONS AND FUTURE RESEARCH

1. **Selection Bias** – The reliance on English-language, peer reviewed sources may omit relevant grey literature (industry white papers, regulator reports) that could provide additional insights, especially from emerging economies.
2. **Temporal scope** – AI technology evolves rapidly; studies from the early 2010s may reflect outdated AI capabilities (e.g., rule-based chatbots) and therefore bias the synthesis toward less sophisticated implementations.

3. **Operational Definitions** – “AI adoption” is operationalized variously (intention, self-report, usage logs), limiting comparability across studies.
4. **Statistical Heterogeneity** – Effect sizes reported (e.g., beta coefficients) are not standardized, precluding a meta-analytic aggregation.
5. **Demographic Simplification** – As noted, age and gender are treated dichotomously in many primary studies, obscuring intersectional effects (e.g., race × gender × age).

Looking ahead, future studies should examine how culture, income levels, education and other social factors further influence AI adoption, especially in fast growing or emerging markets.

8. CONCLUSION

This paper shows that age and gender play a major role in how people use and view AI-based financial services. Younger customers generally use AI because it is convenient and feels modern. In contrast, older adults remain careful, mainly because they struggle with usability, trust and comfort with automated systems. There are also clear gender patterns. Men tend to use advanced AI tools like robo-advisors more often because they higher trust in AI based financial decisions. Women on the other hand are usually more concerned about data privacy and often prefer talking to a human for important financial matters.

AI in banking cannot follow a one size fits all approach. Banks needs to design AI tools that are inclusive, easy to understand, and tailored to different user groups. Policymakers also have an important role they should promote transparency, strengthen digital literacy programs, and ensure that AI systems follow ethical and fair standards.

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