

Age-Based Adoption of AI Tools and Applications

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Abstract

What kind of AI applications do people in different age groups primarily use? With this information, AI development can be directed to meet the needs of various demographics. This research aims to determine the direction AI development should take by discovering how different age groups engage with AI tools. Through a survey of 122 people on Amazon Mechanical Turk, this study identifies key areas where AI is used, focusing on respondents' ages, professions, and usage goals. Significant findings include that 25-34-year-olds prefer virtual assistants like Siri and Alexa (22 participants), while 35-44-year-olds show a higher reliance on chatbots (19 participants). Additionally, translation tools are more popular than chatbots among younger respondents, with 25 participants aged 25-34 regularly engaging with them. These findings suggest that AI development should consider both convenience for younger participants and productivity-enhancing tools for older professionals to maximize adoption and accessibility across demographics.

1. Introduction

The purpose of this research is to explore how different age groups adopt and engage with various AI tools such as chatbots, virtual assistants, smart speakers, and translation tools. Understanding these preferences is crucial for guiding future AI development, ensuring that tools are tailored to meet the needs of different demographics.

This study uses categorical and boolean survey data to analyze usage patterns, focusing on the preferences of 122 participants. By identifying the AI tools favored by different age groups and understanding the reasons behind these preferences, this paper provides actionable insights for product development and resource allocation.

Incorporating insights from the Technology Acceptance Model (TAM), this paper also explores the psychological factors driving adoption, such as perceived usefulness (PU) and perceived ease of use (PEOU). It aims to understand not only what tools are used but also why people choose to use them based on their needs and expectations.

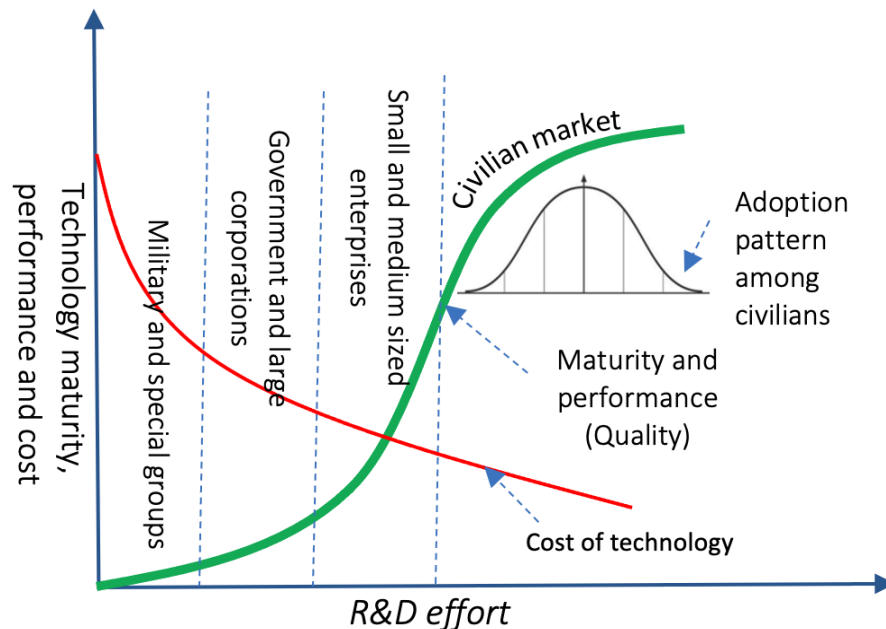
2. Background

The adoption of technologies follows distinct patterns, often influenced by user needs and behaviors. The Technology Acceptance Model (TAM) explains these patterns through two key factors: perceived usefulness (PU) and perceived ease of use (PEOU). TAM suggests that adoption increases when technology aligns with users' goals and is easy to integrate into daily routines.

Extensions like TAM2 and TAM3 introduce factors such as social influence, voluntariness, and trust, which are also relevant for AI adoption.

This study applies TAM to explore how different age groups engage with AI tools. Younger users lean toward convenience-oriented apps like translation tools, while older users prefer productivity tools like chatbots. Note this is a personal theory and is not empirically confirmed.

Below is a theoretical model, proposing how technology adoption progresses across sectors. This model suggests adoption begins with specialized groups and expands to civilians as technology matures and costs decrease.



This graph illustrates how R&D efforts push technology from high-cost, specialized use cases to widespread civilian adoption, following an S-curve pattern.

3. Dataset

This study uses a survey dataset of 122 participants collected via Amazon Mechanical Turk. The dataset contains categorical and boolean variables capturing the following attributes:

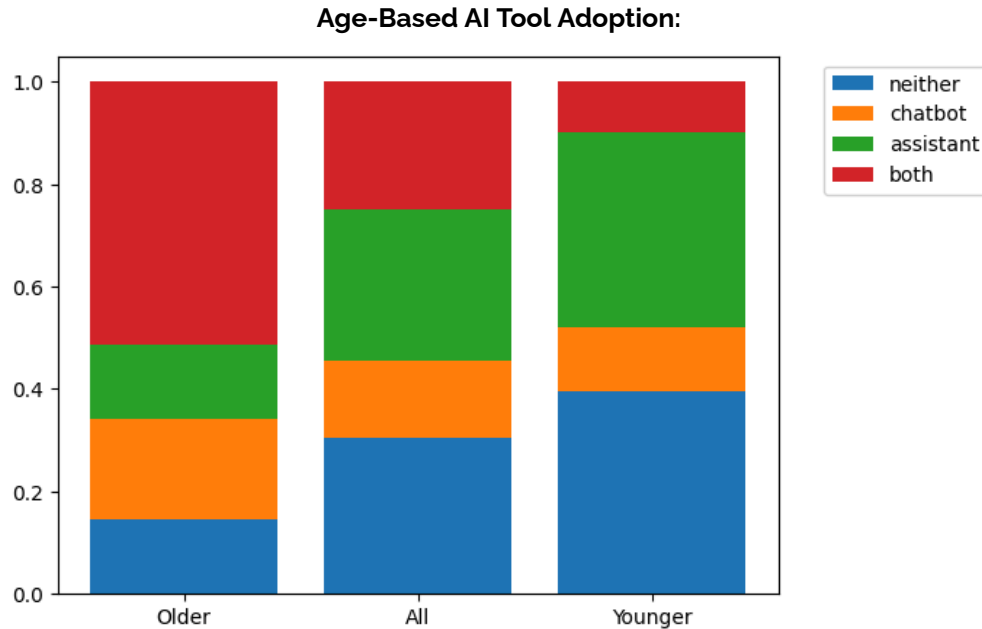
Demographic Information: Age groups (18-24, 25-34, 35-44, 45-54, 55-64, 65+)

Occupational Sectors: Technology, Finance, Healthcare, Education, Retail, etc.

AI Tool Usage: Virtual assistants, chatbots, translation tools, recommendation algorithms, and other AI tools.

Minimal preprocessing was required beyond removing incomplete responses. Below are two visualizations that highlight the main patterns observed in the dataset.

The figure below highlights the key patterns observed in AI tool adoption across age groups.



These results provide insight into which tools are most favored by different age groups, highlighting younger users' preference for convenience-oriented tools and older participants' inclination toward productivity-focused AI.

4. Methodology/Models

This study is based on survey data collected from 122 participants using Amazon Mechanical Turk. The dataset includes both categorical variables (e.g., age group, profession, type of AI tool used) and boolean responses (e.g., whether participants regularly use AI tools). The survey focused on four main categories of AI tools:

- Chatbots (e.g., customer service bots)
- Virtual assistants and smart speakers (e.g., Siri, Alexa)
- Translation tools (e.g., Google Translate)
- Other AI applications (e.g., recommendation systems)

The dataset captures participants' ages, primary professions, frequency of AI use, and reasons for using AI. This study did not involve any training or testing datasets and no significant preprocessing was required beyond data cleaning, such as removing incomplete responses.

The survey responses were analyzed through a combination of descriptive statistics and categorical analysis. Key metrics include:

- Usage frequency: The number of participants in each age group using a specific AI tool.
- Tool preference by profession: Identifying trends across industries (e.g., whether translators use AI translation tools more frequently).
- Behavioral patterns: Using the Technology Acceptance Model (TAM) to interpret the psychological factors influencing adoption.

Given that TAM emphasizes perceived usefulness and ease of use, these factors were mapped to the survey questions. For example:

- Usefulness: "How has AI improved your efficiency at work?"
- Ease of use: "How easy do you find it to interact with AI tools like virtual assistants?"

Simple correlation analyses were performed to identify relationships between age groups and tool preferences. Responses were segmented into age brackets (e.g., 18-24, 25-34, 35-44) to explore how adoption patterns shift across demographics.

5. Results and Discussion

Younger: virtual assistants over chatbots

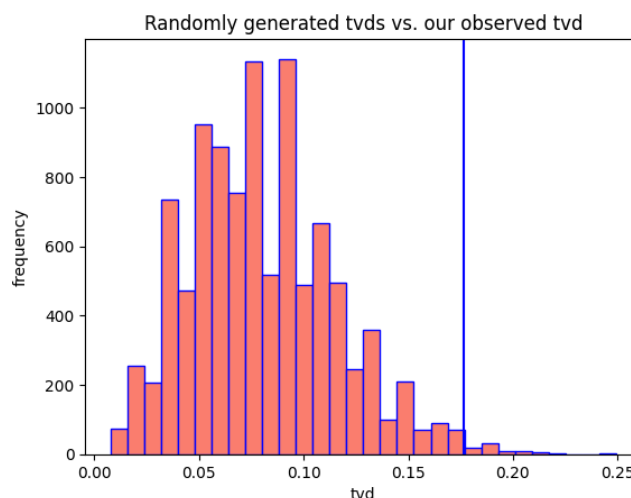
Older: chatbots over virtual assistants

Younger: translation over chatbots

The results of this study indicate key differences in AI tool usage across age groups:

- Younger Participants (18-34):
 - Strong preference for virtual assistants over chatbots.
 - Translation tools are more popular than chatbots.
- Older Participants (35+):
 - Higher reliance on chatbots compared to virtual assistants.

A statistical analysis was performed using Total Variation Distance (TVD) to measure the difference in usage patterns between younger participants and the overall population. Below is a histogram visualizing the distribution of simulated TVDs compared with the observed TVD.



The observed TVD of 0.18 between younger users and the overall population indicates a significant difference. With a p-value of 0.0089, this difference is statistically significant at the 1% level, suggesting meaningful variation in how different age groups engage with AI tools.

6. Conclusion

This study highlights the importance of tailoring AI tools to meet the needs of different demographic groups. Younger users prefer tools that enhance convenience, such as virtual assistants and translation apps, while older participants gravitate toward productivity tools like chatbots. These findings suggest that AI developers should focus on building solutions that align with the specific goals of their target users to maximize adoption.

Future research could explore larger datasets or incorporate longitudinal studies to understand how these preferences evolve over time. Additionally, integrating more psychological factors from TAM2 and TAM3 frameworks could offer deeper insights into the motivations behind AI adoption.

Acknowledgements

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References

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- Zaman, Rokon "Technology Adoption Life Cycle Redefined." *The Waves*, 6 Dec. 2023, [Technology Adoption Life Cycle Redefined](#).