

# Size Matters: Examining the Frequency of AI Tool Usage Across Varying Business Scales

Celine Wu

Data Science and Artificial Intelligence, Academy of Games and Media, Breda University of Applied Sciences, Breda, The Netherlands

## Abstract

This study examines the relationship between company size and the frequency of AI tool usage, aiming to uncover variations in usage across small, medium, and large businesses. Using a cross-sectional survey, responses from 195 employees across different business sizes were collected and analyzed. The findings showed no statistically significant differences in AI usage frequency across company sizes, indicating that factors beyond company resources may play a more crucial role. This study suggests that fostering a supportive organizational culture may be more impactful for AI integration than company size alone, offering insights for businesses looking to optimize AI tool usage across diverse settings.

**Keywords:** AI adoption, business scale, technology usage, organizational culture, AI frequency

**Corresponding author:** Celine Wu *E-mail address:* 231265@buas.nl

## 1. Introduction

As of 2024, more than 70% of companies have implemented Artificial Intelligence (AI) tools in at least one business function [8]. This marks a major shift in the way businesses operate, with AI transforming industries around the world by automating tasks, optimizing processes, and generating insights from large amounts of data. As one of the fastest-growing technologies, AI helps companies enhance operational efficiency, improve decision-making processes, and increase revenue. AI has the potential to revolutionize areas like customer service, supply chain management, and more, making AI a cornerstone of innovation strategies in industries as diverse as finance, healthcare, retail, and manufacturing. However, while many companies have started to integrate AI, the frequency with which these tools are used in daily business operations can vary significantly, especially across companies of different sizes.

The adoption of AI is becoming increasingly popular not only among large corporations but also among small and medium-sized businesses (SMEs). To remain competitive in a rapidly evolving market, these SMEs are starting to use AI to perform tasks such as marketing automation, inventory management, and customer service. However, larger corporations are more likely to use AI tools consistently across multiple business functions, as they have greater access to resources. In contrast, SMEs may use AI tools less frequently due to constraints related to resource access and lower technology readiness [7]. Therefore, understanding how often AI tools are utilized across businesses of varying sizes is critical to identifying any potential disparities in AI adoption.

This study explores the extent to which company size influences the frequency of AI tool usage in everyday business activities. Investigating this relationship is important because it can shed light on whether businesses of different sizes can reap similar benefits from AI, or whether smaller businesses lag behind in fully integrating these technologies into their daily operations. Insights from this research can inform policy, investment, and training programs that aim to promote equitable AI adoption across all business sizes, addressing challenges like the digital divide, and ensuring smaller companies are not left behind in the AI revolution.

This study seeks to answer the following research question: How does the frequency of AI tool usage at work vary across businesses of different sizes?

By exploring this, the study aims to shed light on some of the patterns that can provide insight into the relationship between company size and AI integration, potentially revealing differences in how frequently companies use AI tools in their day-to-day operations.

To guide this research, the following hypotheses have been proposed:

- Null hypothesis:** There is no difference in the frequency of AI tool usage at work across businesses of varying sizes.
- Alternative hypothesis:** There is a difference in the frequency of AI tool usage at work across businesses of varying sizes.

Lastly, the paper will first review relevant literature on AI adoption, focusing on studies that have examined AI usage across different business contexts. This will be followed by a detailed methodology section, which will outline the data collection and analysis techniques employed in this research. Subsequently, the results will be presented, findings will be discussed in the context of the literature, and the paper will conclude with a summary of key insights and potential implications for business strategy and AI adoption.

## 2. Literature Review

### 2.1. AI Adoption Trends

AI is not only automating simple everyday tasks but is becoming increasingly involved in complex tasks as well. AI adoption has emerged as a pivotal element in enhancing operational efficiency, productivity, and decision-making processes within an organization. A study by Gao and Feng (2023) [6] based on firm-level data from China's manufacturing industry revealed that a 1% AI penetration leads to a 14.2% increase in total factor productivity. Furthermore, utilizing AI's capabilities for descriptive and diagnostic intelligence, organizations can improve their strategic planning processes and mitigate common cognitive biases, fostering a more informed decision-making environment [4]. These findings underscore the necessity for organizations to adopt AI to remain competitive in an increasingly digital marketplace.

### 2.2. Influence of Company Size

Multiple studies have shown that the scope and frequency of use of AI tools often depend on the size of the organization. Larger companies tend to have more resources, allowing them to effectively integrate artificial intelligence into various business functions. In contrast, SMEs face unique challenges, including limited financial and technological resources, as well as legal considerations, which may limit their ability to adopt AI tools [3]. This statement is supported by research done by Tominc et al. (2024) [9], which utilized a comprehensive survey and statistical analysis to validate the differences in AI adoption between SMEs and large companies. Key findings demonstrated that SMEs have a lower AI adoption rate compared to large companies.

2.3. Factors Affecting AI Adoption

Various factors, including technology readiness, significantly influence AI adoption across different company sizes; companies with more advanced digital infrastructure and skilled personnel are better positioned to implement AI effectively [2]. Additionally, organizational culture and leadership support are crucial for overcoming the cultural and structural barriers that hinder widespread AI adoption. While AI holds significant potential, many companies struggle to scale beyond small pilot projects because they fail to align their organizational mindset and processes with the requirements for broad AI integration [1]. Research by Banholzer et al. (2020) [5] indicates that organizations with a strong innovation culture are more likely to successfully deploy generative AI, using it to drive growth, improve workflows, and maintain a competitive edge by quickly adapting to new technologies.

2.4. Gaps in the Literature

Despite the growing recognition of AI's transformative potential, significant gaps remain in research specifically examining the relationship between the frequency of use of AI tools and company size. While existing research shows that larger companies tend to have higher AI adoption rates because they have more resources, less attention has been paid to how frequently these tools are used in day-to-day business operations. Much of the literature focuses on the initial adoption of AI technologies and ignores the nuances of usage frequency that provide greater insight into integrating AI into business practices. Moreover, there is limited research on the unique challenges faced by SMEs in continuing to use AI tools. Understanding these differences is critical to addressing the digital divide in AI adoption and enabling SMEs to effectively leverage AI technology to remain competitive. Therefore, this study aims to fill this gap by investigating the frequency of use of AI tools among companies of different sizes and identifying the underlying factors that contribute to these differences.

In summary, this literature review highlights significant progress in the application of AI in various business settings, with a particular focus on the role of business size in influencing the extent and frequency of use of AI tools. Larger organizations typically benefit from more resources and better infrastructure, leading to increased adoption and more consistent use of AI tools. In contrast, SMEs face many challenges that can prevent the effective integration of AI into daily operations, resulting in less use of these technologies. However, the existing literature makes it difficult to comprehensively investigate the frequency of AI tool adoption and the factors that contribute to differences among companies of different sizes. This study addresses these gaps by providing practical insights into how company size affects the frequency of adoption of AI tools, ultimately leading to better adoption of AI in business settings, with the goal of promoting understanding. By identifying barriers and enablers to AI integration, this research can inform policy and practice and promote more equitable access to AI technologies for companies of all sizes.

3. Methodology

This study employs a quantitative research design to investigate the relationship between company size and the frequency of AI tool usage in daily operations. The research aims to identify patterns and disparities in AI adoption across small, medium, and large enterprises.

A cross-sectional survey design was selected for this research, allowing for the collection of data at a single point in time. This design provides a snapshot of AI usage among employees globally, enabling the analysis of how different company sizes influence AI tool integration.

The target population for this study consists of employees from companies that both use AI tools and those that do not. By including employees from both types of companies, a more comprehensive

understanding of how company size might influence the frequency of AI usage is achieved.

For this research, two sampling methods were employed: purposive sampling and convenience sampling.

3.1. Purposive Sampling

This method was used to specifically target employees working in SMEs. The objective was to gather insights from employees whose experience with AI usage (or lack thereof) was directly relevant to the study's focus on company size.

3.2. Convenience Sampling

This method was used to recruit participants who were easily accessible and willing to participate in the survey. It allowed efficient data collection from a diverse range of employees. However, it is important to note that while convenience sampling offers ease of access, it may also introduce potential limitations regarding the representativeness of the sample.

The primary data collection method involved online surveys distributed using Qualtrics, an online platform for survey distribution and response collection. The survey consisted of custom-developed, close-ended questions measured using a Likert scale and multiple-choice answers to gather the necessary data for this study. To maximize reach and diversity of responses, the survey was also distributed through various channels, including email, social media, and professional networks, over a period of four weeks. Approximately 200 responses were collected using these data collection methods.

This study examines two primary variables: company size and frequency of AI tool usage.

3.3. Independent Variable: Company Size

The independent variable in this study is company size, categorized based on the number of employees. The categorization is as follows:

- Small Enterprises: Businesses with 1 to 49 employees.
- Medium Enterprises: Businesses with 50 to 250 employees.
- Large Enterprises: Businesses with more than 250 employees.

This classification is commonly used in research and aligns with industry standards, enabling a structured analysis of how company size influences AI tool usage.

3.4. Dependent Variable: Frequency of AI Tool Usage

The dependent variable is the frequency of AI tool usage, which will be measured through self-reported responses in the survey. Participants will indicate their usage frequency using an ordinal scale with the following options:

- No, I do not use them at work.
- Rarely.
- Yes, I have used them occasionally for work.
- Yes, I use them regularly for my work.

This measurement approach captures varying levels of engagement with AI tools among employees, providing insights into the relationship between company size and AI adoption frequency.

In this study, a combination of descriptive statistics and inferential statistics was utilized to analyze the data collected from the online surveys. Descriptive statistics were used to summarize the basic features of the data, providing an overview of the distribution of responses regarding the frequency of AI tool usage among different company sizes. Measures such as means and standard deviations were calculated to understand central tendencies and variability, which shows a clearer picture of how AI usage differs across small, medium, and large enterprises.

For the inferential statistics, Welch's ANOVA was chosen as the primary statistical method to investigate the potential relationships between company size and AI tool usage. This choice was made due

to Welch's ANOVA's effectiveness in comparing means across three or more independent groups, which aligns with the study's design. Unlike traditional one-way ANOVA, Welch's ANOVA does not assume that the variances of the groups are equal, making it more robust in situations where the assumptions of normality and homogeneity of variances are violated. Given that the data in this study has unequal sample sizes, Welch's ANOVA was the optimal choice. Therefore, it provides a more reliable assessment of the differences in AI usage frequency across the categorized company sizes.

### 3.5. Sample Size and Power Analysis

A Power analysis was conducted to ensure that the study was properly powered to detect a meaningful difference in the frequency of AI usage across company sizes. This analysis, was set at an alpha level of 0.05 and targeted 80% power with a medium effect size. The results suggested that approximately 157 participants per group would be necessary.

Figure 1 shows the relationship between sample size per group and statistical power. The curve shows that as the sample size increases, the statistical power also increases, which improves the likelihood of detecting a true effect if one exists. The red dashed line represents the commonly accepted power threshold of 80%.

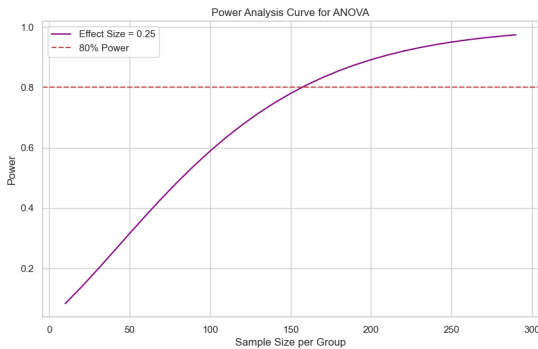


Figure 1. Power Analysis Curve for ANOVA.

Due to limitations in available participants, the actual sample size achieved was 195 total participants across all groups (small, medium, and large companies). While this sample size is below the ideal level per group, it provides reasonable insights into usage patterns. However, the study's power may be somewhat reduced, increasing the risk of a Type II error (failing to detect a true difference if one exists). Consequently, findings should be interpreted with caution, given the sample size constraints.

Data analysis was conducted using Python, utilizing libraries such as pandas for data manipulation, NumPy for numerical operations, and SciPy for statistical analysis. This approach allowed for efficient handling of the dataset and facilitated the execution of Welch's ANOVA, enhancing the overall robustness of the findings.

### 3.6. Limitations and Ethical Considerations

This study faces several potential limitations that may impact the validity and generalizability of its findings. The reliance on convenience sampling could introduce bias, as participants may not represent the broader population of companies, potentially skewing results. Additionally, the self-reported nature of the survey may lead to inaccuracies due to social desirability or recall bias, affecting the reliability of the data on AI tool usage. The study's focus on frequency may also overlook qualitative aspects of AI adoption, such as the context and perceived impact of these tools. Furthermore, differences in perceptions among employees from varying company sizes could influence responses, limiting the depth of insights gained from the analysis. Acknowledging these limitations is essential for understanding the scope of the study's findings and for guiding future research.

The study adheres to ethical guidelines to ensure participant rights and research integrity. Informed consent was obtained digitally, ensuring participants understood the study's purpose and their voluntary participation. Anonymity was maintained by not collecting personally identifiable information, with responses aggregated to prevent individual identification. Data protection measures are implemented to secure the collected information, accessible only to the research team and used solely for research purposes. By prioritizing these ethical considerations, the study upholds high standards of integrity and transparency throughout the research process.

## 4. Results

A total of 195 responses were collected from companies across various sizes. However, only 185 responses were used in the final analysis. Responses with incomplete information were removed, as well as respondents who indicated "I do not know" for the company size variable. Excluding these responses ensured that only valid and interpretable data were included in the analysis.

### 4.1. Company Size Distribution

The distribution of company sizes in the dataset is as follows:

- Small businesses: 87 participants (47.03%)
- Medium businesses: 72 participants (38.92%)
- Large businesses: 26 participants (14.05%)

This dataset consists predominantly of participants from small and medium businesses, with fewer participants from large companies. This distribution reflects a reasonable spread across different company sizes, though small businesses represent the largest portion of the sample in the dataset.

### 4.2. AI Tool Usage Frequency

Participants reported how frequently they used AI tools in their work. Responses were recorded using a Likert scale, and the frequency distribution of AI tool usage across participants is as follows:

- No, I do not use them at work: 35 participants (18.92%)
- Rarely: 35 participants (18.92%)
- Yes, I have used them occasionally for work: 68 participants (36.76%)
- Yes, I use them regularly for my work: 47 participants (25.41%)

The most common response was "Yes, I have used them occasionally for work," with a total of 68 respondents, followed by 47 respondents who reported using AI tools regularly for work. These results suggest that a big portion of respondents use AI tools with some frequency in their work, although a notable segment reported no AI usage.

Figure 2 provides a further breakdown of these responses by company size, illustrating how AI usage frequency varies across small, medium, and large companies.

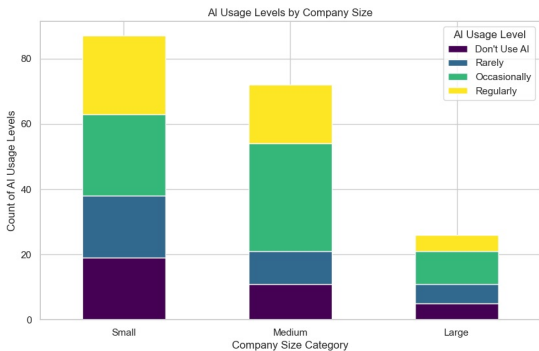


Figure 2. AI Usage by Company Size



Each categorical response was assigned a numerical value, with "No, I don't use them at work" as 1 up to "Yes, I use them regularly for my work" as 4. Assigning numerical values to the responses allows the computation of descriptive statistics such as mean and standard deviation. The overall mean AI tool usage frequency was 2.68, with a standard deviation of 1.06. Due to the limited range of responses (1 to 4) on the Likert scale, quartiles (Q1 and Q3), as well as minimum and maximum, are not reported.

Table 1 presents the mean AI tool usage across different company sizes.

Company Size	Mean AI Usage
Small	2.62
Medium	2.81
Large	2.58

Table 1. Mean AI Tool Usage by Company Size

4.2.1. Small Businesses

The mean frequency of 2.62 suggests that employees of small businesses occasionally use AI tools. This moderate usage of AI may be attributed to resource constraints or lower implementation rates of advanced technologies in comparison to larger firms.

4.2.2. Medium Businesses

With a mean frequency of 2.81, employees of medium businesses reported a higher AI usage compared to small businesses. This could suggest that medium-sized companies have more resources to invest in AI technologies.

4.2.3. Large Businesses

The mean frequency of 2.58 indicates that employees of large businesses also use AI tools occasionally, similar to small businesses. The mean is slightly lower than that of small and medium-sized businesses, which indicates that employees of large companies use AI less. This may be due to the fact that the sample size for large businesses was significantly smaller compared to the sample sizes of small and medium businesses; however, this may also reflect that larger businesses have a wider range of operational complexities which can affect the integration of AI tools.

4.3. Inferential Statistics

To examine the potential difference in AI tool usage across small, medium, and large businesses, Welch's ANOVA was used. This statistical test was chosen due to the unequal sample sizes among the groups.

The results of Welch's ANOVA are as follows:

- **F-statistics:** 0.50
- **P-value:** 0.9997

An F-statistic of 0.50 indicates that the ratio of variance between the groups to the variance within the groups is relatively low. This indicates that the differences in AI tool usage between the company sizes are minimal, which is also supported by the p-value. With a standard significance level of  $\alpha = 0.05$ , the p-value of 0.9997 suggests that there is no statistically significant difference in AI tool usage frequency between small, medium, and large businesses. A p-value closer to 1 indicates that the differences between groups are likely due to chance.

4.4. Confidence Intervals for Group Means

To provide further insight into the average AI usage frequency across company sizes, 95% confidence intervals were calculated for each group's mean. These intervals estimate the range within which the true mean AI usage frequency lies for each company size category:

- **Small Companies:** (2.38, 2.86)

- **Medium Companies:** (2.57, 3.04)
- **Large Companies:** (2.16, 2.99)

These overlapping confidence intervals suggest no statistically significant differences in AI usage frequency across company sizes, as they indicate that any observed differences may be due to chance rather than a true effect of company size, which is consistent with the ANOVA results.

5. Discussion

This study aimed to explore how the frequency of AI tool usage varies across different business sizes. The findings revealed that there are no statistically significant differences in the frequency of AI usage between small, medium, and large businesses. While mean AI usage varied by company size, all sizes reported occasional usage. Employees from medium-sized businesses reported a slightly higher amount of occasional use of AI tools. Therefore, the lack of significant differences challenges the assumption that larger businesses utilize AI tools more consistently due to resource advantages.

Moreover, this study challenges the findings of Venkateswarlu et al. (2022) [3], which implied that SMEs face unique challenges compared to larger companies that could hinder their ability to adopt AI tools. In contrast, the results show that AI usage is consistent across all business sizes, suggesting that resources alone may not be the decisive factor. Instead, it appears that organizational culture may play a more significant role in influencing AI adoption and more consistent usage across different companies. As mentioned in the study by Fountaine et al. (2019) [1], many companies struggle to unlock AI's full potential because they fail to align their organizational mindset and processes needed for broad AI integration.

These findings suggest that businesses may need to reassess their strategies regarding AI tool integration. Specifically, fostering a supportive environment with a strong innovation culture could potentially drive the usage of AI more effectively than solely increasing resource allocations.

Despite these insights, there are multiple limitations to consider for this study. First, the use of convenience sampling in this study could lead to sample bias, as the participants may not represent the broader population of companies across various industries. Consequently, this could limit the generalizability of the findings to all business sizes. Additionally, self-reported AI usage data may lead participants to overestimate or underestimate their actual usage, which could affect the accuracy of the data. Furthermore, there may be an imbalance in how well the findings represent different company sizes, with few large companies represented in the sample. This could skew insights about AI usage in larger companies compared to small and medium-sized businesses. Finally, this study focuses solely on company sizes as the main variable affecting AI tool usage, overlooking other potentially influential factors such as industry type, age, geographical location, and organizational readiness for digital transformations.

To improve the statistical strength of future studies, it is worth noting that the power analysis for this research indicated an ideal sample size of approximately 157 participants per group to achieve 80% power. This suggests that increasing sample sizes could yield more robust conclusions regarding potential differences in AI usage frequency across company sizes.

The lack of statistically significant differences in AI usage frequency across business sizes suggests that strategies aimed at promoting consistent and widespread AI use may not need to vary by company size. Instead, businesses of all sizes could focus on fostering a supportive culture and ensuring employees have the necessary resources to use AI tools regularly, which may help maximize the frequency of AI usage.

To enhance future research, studies should incorporate more variables that may influence the frequency of AI usage within companies, such as leadership support or specific industry contexts. By examining factors such as leadership attitudes towards innovation, employee

openness to technology, and how organizational culture impacts AI adoption, researchers can gain insight into non-technical factors that influence the usage of AI. Additionally, sectors such as finance, healthcare, and manufacturing face different technical and operational challenges that could affect AI integration. Investigating how the frequency of AI usage differs across sectors could help uncover patterns of integration, enabling the development of sector-specific strategies for more effective AI adoption. Lastly, including qualitative studies could offer different employee perspectives on specific barriers such as technical limitations and employee resistance, which quantitative methods may not fully capture.

In summary, this study revealed that there are no statistically significant differences in the frequency of AI tool usage among small, medium, and large businesses. This challenges the assumptions that resource advantages in larger businesses are the cause for the consistent use of AI tools and suggests that organizational culture and leadership could be more critical factors influencing AI adoption. Fostering an innovative environment could be more beneficial than merely increasing resources.

While this research contributes to the understanding of AI usage in various business sizes, there are several limitations that must be acknowledged, which includes, but are not limited to, biases in convenience sampling and the focus on company size as the primary variable. Future studies should explore additional factors such as leadership support, industry contexts, and employee perspectives. This could help develop a more comprehensive understanding of AI adoption.

Ultimately, these findings encourage businesses to reconsider their strategies for AI tool integration and highlight the importance of cultivating a culture that embraces innovation.

## 6. Conclusion

This research aimed to find the relationship between company size and the frequency of AI tool usage to reveal insights into AI adoption across small, medium, and large businesses. The findings indicate that there are no statistically significant differences in the frequency of AI tool usage among varying business sizes. While employees of medium-sized businesses reported a slightly higher usage, all companies demonstrated an occasional reliance on AI tools. This challenges the assumption that larger companies use AI tools more frequently due to their resource advantages.

The results suggest that other factors beyond resource allocation play a more significant role in influencing the use of AI and its integration, such as organizational culture and leadership support. A supportive environment that fosters innovation and a proactive approach to AI adoption may be more helpful than simply increasing financial investments in the technology. This underscores the importance of aligning organizational practices and culture with the integration of AI technologies to unlock their full potential.

Despite these contributions, this study acknowledges a few limitations, including potential biases due to convenience sampling and a sole focus on company size as the primary variable affecting the frequency of AI usage. Future research should explore a broader range of influencing factors, such as industry-specific challenges, leadership attitudes, and employee perspectives.

Ultimately, this research highlights the need for businesses to reevaluate their strategies regarding AI tool integration. By prioritizing the cultivation of an innovative culture rather than blindly increasing financial investments, companies of all sizes can enhance their effectiveness in leveraging AI technologies. With the constant evolution of technologies and AI, embracing technological innovation will be essential to maintain a competitive edge and ensure that all businesses can effectively navigate this rapidly evolving change.

## 7. Disclosure

ChatGPT (OpenAI, 2024) was used exclusively to assist in enhancing clarity and refining language in this study. All interpretations, findings, and conclusions are solely those of the authors.

## References

- Atsmon, Y. (2023, January 11). *Artificial intelligence in strategy*. McKinsey & Company. <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/artificial-intelligence-in-strategy>
- Banholzer, M., Fletcher, B., LaBerge, L., & McClain, J. (2023, August 31). *Companies with innovative cultures have a big edge with generative AI*. McKinsey & Company. <https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/companies-with-innovative-cultures-have-a-big-edge-with-generative-ai>
- Fountaine, T., McCarthy, B., & Saleh, T. (2019, July–August). *Building the AI-powered organization: Technology isn't the biggest challenge. Culture is*. Harvard Business Review. <https://hbr.org/2019/07/building-the-ai-powered-organization>
- Gao, X., & Feng, H. (2023). AI-driven productivity gains: Artificial intelligence and firm productivity. *Sustainability*, 15(11), 8934. <https://doi.org/10.3390/su15118934>
- Jöhnik, J., Weißert, M., & Wyrski, K. (2021). Ready or not, AI comes—An interview study of organizational AI readiness factors. *Business & Information Systems Engineering*, 63(1), 5–20. <https://doi.org/10.1007/s12599-020-00676-7>
- McElheran, K., Li, J. F., Brynjolfsson, E., Kroff, Z., Dinlersoz, E., Foster, L., & Zolas, N. (2024). AI adoption in America: Who, what, and where. *Journal of Economics & Management Strategy*, 33(2), 375–415. <https://doi.org/10.1111/jems.12576>
- Singla, A., Sukharevsky, A., Yee, L., & Chui, M., with Hall, B. (2024, May 30). *The state of AI in early 2024: Gen AI adoption spikes and starts to generate value*. McKinsey & Company. <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai>
- Tominc, P., Oreški, D., Čančer, V., & Rožman, M. (2024). Statistically significant differences in AI support levels for project management between SMEs and large enterprises. *AI*, 5(1), 136–157. <https://doi.org/10.3390/ai5010008>
- Venkateswarlu, Y., Baskar, K., Wongchai, A., Gauri Shankar, V., Carranza, C. P. M., Gonzáles, J. L. A., & Murali Dharan, A. R. (2022). An efficient outlier detection with deep learning-based financial crisis prediction model in big data environment. *Computational Intelligence and Neuroscience*, 2022, Article 4948947. <https://doi.org/10.1155/2022/4948947>