

Determinants of Adoption of Artificial Intelligence for Business Sustainability: A Study of Small Businesses in Jaffna

Inthu, M
School of Business
SLIIT Northern Uni
jeyarajasingami@gmail.com

Jeyaramanan, S
School of Business
SLIIT Northern Uni
JeyaramananS@NorthernUni.com

Nimalathanan, B
School of Business
SLIIT Northern Uni
NimalathananB@NorthernUni.com

Abstract— This study aims to examine the Determinants of the adoption of Artificial Intelligence for Business Sustainability in small businesses in Jaffna. In that context, a deductive approach is employed by the researcher, and data from 72 small businesses in Jaffna. The purposive sampling was used by the researchers. In that context, the data were collected for a business that has potential for digital innovation. As the researcher employed a purposive sampling method, it is ensured that participants who could meaningfully respond to AI-related questions were selected, given the region's varied levels of technological awareness. The closed-ended, structured Likert Scale questionnaire was used by the researcher to collect the data. Awareness of AI adoption, Digital Skills, technological infrastructure, and perceived economic benefits are considered independent variables of the study, while business sustainability is considered a dependent variable of the study. The researcher used the SPSS package to analyze the data and the Kolmogorov–Smirnov test, reliability test, correlation analysis, Variance Inflation Test run by the researchers. Among the predictors, the perceived economic benefits ($B = 0.395$, $p = 0.001$) have a statistically positive relationship with business sustainability. Followed by Awareness of AI Adoption, which has a statistically positive relationship with business sustainability ($B = 0.312$, $p = 0.004$). Furthermore, Digital skills ($B = 0.271$, $p = 0.015$) and technological infrastructure ($B = 0.219$, $p = 0.037$) also have statistically significant positive effects, highlighting the importance of digital capacity. Additionally, perceived economic benefits have a statistically positive relationship with sustainable business practices.

Keywords—AI Adoption, Digital skills, Infrastructure, sustainability, small business.

I INTRODUCTION

In the digital era, the role of artificial intelligence (AI) has become increasingly important as it enhances business innovation, efficiency, and sustainability [1].

In this global landscape, many business organizations incorporate AI-driven solutions to enhance productivity, customer engagement, and strategic decision-making in their business activities [2]. Especially large firms often lead this transformation and reap more benefits from AI adoption [3]. However, the AI adoption in small businesses, especially in emerging markets like Sri Lanka, remains underexplored.

In Sri Lanka's Northern Province, the Jaffna district represents a unique case where small businesses form the backbone of the local economy but face persistent structural challenges, including limited access to capital, digital infrastructure, and technical expertise. Specifically, the small business operations in Jaffna have operated in a socio-economic context still recovering from decades of conflict [4]. In that context, adopting digital inclusion and technological adoption will give more benefits for their future sustainability [5]. Small and medium businesses operate as the backbone of the local economy, adopting AI to create a more stable financial situation [6]. However, many small businesses adopted traditional methods that created big challenges during the COVID-19 pandemic and the fuel crisis [7]. Therefore, facing challenges to adopt new technologies for their innovation needs to be analyzed.

As we are moving to a digitalized environment, adopting AI is important in a business context for several reasons, such as optimizing inventory, predicting customer demand, automating basic processes, and improving financial planning. In that context, a study on the Jaffna market to understand how to adapt this AI technology into the business activity is bridging the innovation gap. In that context, it highlights the research problem as to what extent AI adoption contributes to the financial sustainability of small businesses in resource-constrained environments like Jaffna. The findings of the study are beneficial for actionable insights for policymakers, development agencies, and entrepreneurs. Also, it aims to create a business environment with equitable digital transformation for the growth of small enterprises in emerging economies.

II LITERATURE REVIEW

The Technology – Organization – Environmental framework is used by the researcher. Awareness of AI adoption and

perceived economic benefits represent the technological context, while the organizational context is represented by digital skills and technological infrastructure. When focusing on the empirical evidence study based on non-state small businesses, it reported that AI adaptation enhanced the sustainability of the businesses. To prove these results, the researchers collected the data from 30,572 firm-year observations from 2010 to 2022 through a two-way fixed-effects model [8]. The study is based on South-East, Nigeria, and reported that AI adoption enhances the operational efficiency of the business [9]. The study on the Chinese market indicated that AI adoption increases organizational agility, which increases sustainable business practices [10]. The study on Iraqi firms found that Knowledge regarding AI and technological infrastructure positively influences business sustainability.

III METHODOLOGY

The researcher adopts the Quantitative research design to examine the relationship between the adoption of AI and the financial sustainability of small businesses in the Jaffna district. The Researchers collected the data from 72 small business owners by sending a structured survey instrument. In that context, the survey comprised a Likert scale to measure the variables such as awareness of AI adoption, digital skills, technological infrastructure, perceived economic benefits, and business sustainability. Awareness of AI adoption, digital skills, technological infrastructure, and perceived economic benefits are considered as independent variables of the study, while business sustainability is considered the dependent variable of the study. The researchers selected variables based on the existing literature and were reviewed by domain experts to ensure contextual relevance and clarity.

The researchers used purposive sampling. Because the study focused on AI adaptation. Because data should be collected from business that has potential for digital innovation. As the researcher employed a purposive sampling method, it is ensured that participants who could meaningfully respond to AI-related questions were selected, given the region's varied levels of technological awareness. However, there are some biases when using purposive sampling. Firstly, one key issue is that participants are based on the researcher's judgement, which can influence the results. Also, it reduces the generality of the study. Confirmation bias may also occur if participants are selected to support the researcher's assumptions

In terms of ethical considerations, all the participants participated voluntarily, and they had the right to withdraw from the study at any time. Also, via consent from the purpose of the study is communicated and ensured that the data will be used only for this study.

The Statistical Package for the Social Sciences

(SPSS) was used by researchers to perform the statistical analysis. In that context, reliability test, normality test, descriptive analysis, correlation analysis, Variance inflation test, and multiple regression analysis were performed. The key variable profile was summarized with the use of descriptive analysis. The internal consistency of the data was tested by Cronbach's alpha, while the relationship between variables was explored by correlation analysis. To validate the assumptions of the parametric test normality test was carried out by the researchers.

The predictive influence of awareness of AI adoption, digital skills, technological infrastructure, and economic benefits on business sustainability was determined by the multiple regression analysis. The multicollinearity issues associated with the model were tested by the Variance Inflation Factor (VIF), while the Durbin-Watson statistic was used to assess the autocorrelation.

IV RESULTS AND EVALUATION

TABLE 1: RESULTS AND EVALUATION

Construct	Cronbach's Alpha (α)
AI Adoption	0.812
Digital Skills	0.846
Technological Infrastructure	0.803
Perceived Economic Benefits	0.872
Business Sustainability	0.884
Overall Scale	0.915

Based on Table 1, the Cronbach's Alpha (α) value for all constructions is more than 0.8, evidence of strong internal consistency

TABLE 2: KOLMOGOROV-SMIRNOV

Variable	Kolmogorov-Smirnov (Sig.)
Awareness of AI Adoption	0.089
Digital Skills	0.112
Technological Infrastructure	0.098
Perceived Economic Benefits	0.073
Business Sustainability	0.094

The Above table indicates the test results of Kolmogorov-Smirnov. The results showcased that the P value was greater than 0.05, which indicates that there is no significant deviation from normality, which shows that the data is approximately normally distributed. Therefore, parametric tests such as regression and correlation are appropriate for further analysis.

TABLE 3: CORRELATION ANALYSIS

Independent Variable	Pearson Correlation (r)
----------------------	-------------------------

AI Adoption	0.631*
Digital Skills	0.594*
Technological Infrastructure	0.548*
Perceived Economic Benefits	0.665*

Based on Table 3 above, all independent variables have moderately positively correlated with business sustainability, which evidence that higher levels of AI-related readiness are associated with better sustainability outcomes.

TABLE 4: MODEL SUMMARY

Model Statistic	Value
R ²	0.718
Adjusted R ²	0.707
F-value	42.48
ANOVA Sig. (p-value)	0.000**

Based on the above table, the R² value of 0.718 indicates that 71.8% variance in business sustainability is explained by AI adoption, digital skills, technological infrastructure, and perceived economic benefits. P-value of F-statistics is below 0.05, which suggests the overall model is statistically significant.

TABLE 5: MULTIPLE REGRESSION

Coefficients	Unstandardized Coefficients (B)	Sig.
(Constant)	1.245	0.003**
AI Adoption	0.312	0.004**
Digital Skills	0.271	0.015*
Technological Infrastructure	0.219	0.037*
Perceived Economic Benefits	0.395	0.001**

According to the above table, among the predictors, the perceived economic benefits (B = 0.395, p = 0.001) have a statistically positive relationship with business sustainability. Followed by Awareness of AI Adoption, which has a statistically positive relationship with business sustainability (B = 0.312, p = 0.004). Furthermore, Digital skills (B = 0.271, p = 0.015) and technological infrastructure (B = 0.219, p = 0.037) also have statistically significant positive effects, highlighting the importance of digital capacity, and Perceived Economic Benefits have a statistically positive relationship with sustainable business practices.

V CONCLUSION

The present study focuses on the adoption of Artificial Intelligence for the Sustainability of Small Businesses in Jaffna. Among the predictors, the perceived economic benefits (B = 0.395, p = 0.001) have a statistically positive relationship with business sustainability. Followed by Awareness of AI Adoption, which has a statistically positive relationship with business sustainability (B = 0.312, p = 0.004). Furthermore, Digital skills (B = 0.271, p = 0.015) and technological infrastructure (B = 0.219, p = 0.037) also have statistically significant positive effects, highlighting the importance of digital capacity. Additionally, perceived economic benefits have a statistically positive relationship with sustainable business practices. Based on this, it can be concluded that digital skills, infrastructure, and awareness can help businesses enhance efficiency and decision-making. The economic benefits perceived will result in encouraging more businesses to adopt AI for long-term growth.

REFERENCES

- [1] Perifanis and F. Kitsios, "Investigating the influence of artificial intelligence on business value in the digital era of strategy: A literature review," *Information*, vol. 14, no. 2, p. 85, 2023.
- [2] O. Badmus, S. A. Rajput, J. B. Arogundade, and M. Williams, "AI-driven business analytics and decision making," *World J. Adv. Res. Rev.*, vol. 24, no. 1, pp. 616–633, 2024.
- [3] S. L. Wamba-Taguimdje, S. F. Wamba, J. R. K. Kamdjoug, and C. E. T. Wanko, "Influence of artificial intelligence (AI) on firm performance: The business value of AI-based transformation projects," *Bus. Process Manag. J.*, vol. 26, no. 7, pp. 1893–1924, 2020.
- [4] H. M. T. R. Hearsh, M. J. C. Fernando, W. M. C. P. Wanninayake, and A. M. A. Ahamed, "Current challenges and opportunities for entrepreneurship and SME's development in post-conflict areas," *Journal name or publisher pending*, 2022.
- [5] M. Al-Emran and C. Griffy-Brown, "The role of technology adoption in sustainable development: Overview, opportunities, challenges, and future research agendas," *Technol. Soc.*, vol. 73, p. 102240, 2023.
- [6] F. Fajri, K. A. Perdana, D. U. Manurung, P. K. N. Dharmawan, and N. G. Dewi, "The role of early adoption of artificial intelligence in supporting the growth of micro and ultra-micro enterprises in Indonesia: Challenges and opportunities," *J. Akunt. Bisnis*, vol. 10, no. 2, pp. 133–143, 2025.
- [7] I. J. Akpan, E. A. P. Udoh, and B. Adebisi, "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic," *J. Small Bus. Entrep.*, vol. 34, no. 2, pp. 123–140, 2022.
- [8] T. R. L. Sooriyakumaran and T. L. Vannarajah, "Financial reporting practices and performance of small medium enterprises (SMEs) in Jaffna District of Sri Lanka," *Journal name or publisher pending*, 2023.
- [9] K. Zhong and L. Song, "Artificial intelligence adoption and corporate green innovation capability," *Finance Res. Lett.*, vol. 72, p. 106480, 2025.

- [10] N. O. P. Uzoamaka, O. M. Eneh, and I. O. Anyahara, "The impact of artificial intelligence on sustainability and operational efficiency of small and medium scale businesses in South-East, Nigeria," *Eur. J. Res. Reflect. Manag. Sci.*, vol. 13, no. 1, 2025.
- [11] A. N. Khan, "Artificial intelligence and sustainable performance: Role of organisational agility and environmental dynamism," *Technol. Anal. Strateg. Manag.*, vol. 37, no. 5, pp. 568–583, 2025