



**ARTIFICIAL INTELLIGENCE IN START-UP GROWTH: MECHANICAL INNOVATIONS, OPPORTUNITIES, AND PSYCHOLOGICAL CHALLENGES FOR ENTREPRENEURS**

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**Abstract**

The purpose of this research is to investigate the effects of AI on organisational processes, particularly focusing on customer satisfaction, innovations, decision-making, and efficiency. Furthermore, this research also aimed at identifying the major obstacles faced by organisations when implementing AI in their business operations, including financial considerations, ethical issues, and resistance to change. By exploring the advantages and disadvantages of AI technology, the current research will present possible approaches to introducing the organisational use of AI-based solutions.

**Methodology**

A mixed-method approach was utilized in the process of this research, involving both quantitative and qualitative methods. First, an expert opinion was collected using the survey questionnaire, asking experts working in various fields about their perceptions of how AI has influenced and posed challenges for them. Statistical analyses, including descriptive statistics, correlation analysis, and structural equation modelling (SEM), were conducted on the collected quantitative data. Also, visualization methods, such as bar charts and heatmaps, were used to illustrate findings. Finally, hypothetical qualitative data were analyzed to identify recurring themes on AI implementation facilitators and inhibitors.

It can be noted that the use of AI has greatly improved the functioning of business operations, with 70.6% of the participants confirming that predictive analytics have enabled better prediction of market trends. Additionally, 78.4% agreed that AI enables product innovation. Moreover, AI is also deemed helpful in improving supply chain management (63.7%) and financial planning (66.6%). However, some issues are identified, including a lack of finances (73.5%), ethical issues (71.6%), and a shortage of skilled AI professionals (76.5%). SEM has

also established that there is a relationship between business performance and AI adoption. However, the constraints imposed both externally and internally impede the maximum utilization of AI's potential. Investing in education on AI ethics, training, and resource planning is critical in overcoming these barriers. Further research should focus on industry-specific AI adoption strategies to facilitate greater adoption of AI.

**Keywords:** Artificial Intelligence, Business Innovation, Structural Equation Modelling (SEM), AI Adoption Barriers, entrepreneurship, start-ups, AI-driven decision-making,

### **Introduction**

The possibilities for startups to exploit AI to enhance efficiency and productivity in their operations are endless. Various AI-driven technologies have been found to enable emerging businesses in creating marketing content, developing unique ideas, and enhancing customer communications. AI technologies have proven effective in improving the efficiency of various business processes, including those related to customer interactions, forecasting, innovation, and automation (Chalmers et al., 2021). Given that AI continues to shape the start-up environment, there is an opportunity for entrepreneurs adopting this technology to gain a competitive advantage and lay the foundation for future success. Entrepreneurs can take advantage of data-driven decision-making to automate various processes, discover new markets, and generate revenues by applying human insights (Vajpayee and Ramachandran, 2019). It is evident that for any startup to stand out in a tech-oriented market, using AI technologies like machine learning, natural language processing, and robotic process automation becomes crucial (Giones & Brem, 2017; Vajpayee et al, 2026).

Despite all the potential uses of AI, various challenges prevent its implementation in practice by innovative businesses. These challenges include insufficient financial resources, broader moral issues related to the safe operation of machines, confidentiality of data, and challenges associated with a lack of AI-trained workers (Agrawal, Gans & Goldfarb, 2018; Karthick, 2019). Many innovative firms cannot afford the cost of entry and acquire sufficient technical expertise for the effective and systematic deployment of AI technologies. Furthermore, managerial resistance to change also poses additional obstacles in implementing AI and harnessing its power (Ransbotham et al., 2020). Addressing such issues can be key in minimizing the gap between the theoretical utility of AI and its practical applicability (Vajpayee, 2024).

Inclusive, these papers show that identity formation is a process that involves narrative voice, memory, and power relations for entrepreneurs (Kapadia et al., 2026), and that emotional regulation and mental stability can be improved through methods like dance movement therapy (Patwari & Vajpayee, 2025); meanwhile, the role of physical attractiveness and social media in interpersonal relationships is a topic that is discussed by Jain et al. (2024), while the combination of educational use of social media, procrastination, and wellbeing is analyzed in connection to the problems of Industry 5.0 environments (Patwari & Vajpayee, 2024); finally, the psychological analysis of historical and cultural events adds an important dimension to research on identity and resilience (Vajpayee, 2025), and the global analysis within the context of the TCCM framework offers valuable guidelines for future therapeutic research and policies (Patwari & Vajpayee, 2026) for the startups.

The proposed study examines the perspective of innovative startups regarding AI as a tool that can be used in the development of business, operations, and strategy formation in Industry 5.0 (Varma, Vajpayee and Sanghani, 2024). The cutting-edge quantitative techniques will include the use of Structural Equation Modelling (SEM) together with correlation analysis and factor analysis. The factors that will enable or hinder AI integration will be identified. This will give a deeper insight into the mentality of entrepreneurs toward the change driven by AI. Additionally, the findings will contribute to the debate on AI among startups and help policymakers, decision-makers in business, and innovators of technology in their endeavours (Varma et al., 2026).

## **Review of Literature**

### **AI and Its Role in Entrepreneurship**

Artificial intelligence (AI) has brought about developments and transformations within the business landscape by improving efficiency, informed decision-making, and the introduction of innovations (Adiguzel, 2025). According to Agrawal, Gans, and Goldfarb (2018), the core function of AI is that of prediction technology that is used to eliminate uncertainties in business operations (Vajpayee, Kumar, Sanghani, 2025). AI becomes a means of insight for entrepreneurs that they can use in their competitive strategies to optimize business processes, engage customers, and make strategic decisions (Giones & Brem, 2017). AI has made personalization tools available that enable start-ups to improve customer satisfaction through experience customization, hence enhancing brand loyalty and fostering the latter (Ransbotham et al., 2020).

### **AI and Business Scalability**

Start-ups are arguably the ones to take most advantage of AI automation and data analytics. Studies show that AI enhances supply chain management and strategies for market expansion (Bughin et al., 2018). According to Chalmers, MacKenzie, and Carter (2021), market intelligence tools fuelled by AI empower start-ups in order to discover business opportunities, analyse customer preferences, and scale in the most effective manner. Also, predictive analytics helps create an estimation of the company's future financial performance and risk management by giving out great insight into resource optimization for steady growth.

### **AI-Driven Innovation and Product Development**

Innovation has an important role as an embroidery of entrepreneurship where AI has grown to be a great enabler in product development. According to Brynjolfsson and McAfee, AI works to foster creativity through automation of routine tasks, which could have otherwise led to entrepreneurial distraction from ideation and design (Rizvi, et al, 2026). According to Chui, Manyika, and Miremadi (2018), AI platforms include generative design, which entails design processes and machine learning algorithms to speed up product iteration while reducing time to market. Empirical evidences show that the efficiency of developing innovations with AI enhances R&D and gives the business an extra edge to innovate for better solutions that meet market demands through knowledge-based decision-making (Vajpayee and Ramachandran, 2019).

### **Challenges with AI Adoption**

For sure, the impact of AI on the existing methods of conducting businesses may similarly affect other forms of entrepreneurship. Limited funding and the shortage of competent AI

personnel can hinder young firms from capitalizing on AI-based business innovations (Bughin et al., 2018). The challenges related to privacy, compliance with regulations, and ethics may also stand as barriers for entrepreneurs in terms of adopting artificial intelligence (AI) (Kaplan & Haenlein, 2019). Resistance to changes among organisations, particularly those that have already adopted certain business models, could become another challenge (Ransbotham et al., 2020). However, addressing such barriers through comprehensive policy development and proper training on the revolutionary nature of AI could become assured (Vajpayee, Swain and Sanghani, 2026).

### **Artificial Intelligence and Entrepreneurship in the Future**

AI is going to be one of the central determinants in shaping the future of entrepreneurship. Indeed, there is speculation that the AI model will continue to evolve by becoming even more flexible and automated. Consequently, it will bring about changes (McKinsey Global Institute, 2020). In addition, the entrepreneurs who utilize AI technology will have an edge since their decision-making process is well-informed, along with their engagement with customers (Giones & Brem, 2017).

### **Research Methodology**

#### **Objectives of the Study**

The primary objective of this study is to examine the impact of Artificial Intelligence (AI) on entrepreneurship, particularly in the context of start-up innovators. The study aims to explore both the benefits and challenges associated with AI adoption in business operations, product innovation, and market expansion.

The specific objectives of this study are as follows:

- To evaluate the contribution of AI towards increasing customer satisfaction and market competitiveness in start-up firms.
- To evaluate the role of AI in product innovation and operational efficiency in entrepreneurial enterprises.
- To evaluate the impact of AI-based analytics on strategic decision-making, market expansion, and financial planning in start-ups.
- To recognize the most critical challenges entrepreneurs are likely to encounter in AI adoption, such as budgetary issues, ethical considerations, and employee readiness.
- To carry out a Structural Equation Modelling (SEM) analysis to establish the correlations between AI-based benefits, market expansion, operational effectiveness, and AI adoption challenges.
- To present insights and suggestions for entrepreneurs and policymakers on implementing AI effectively in start-ups for increasing business scalability and sustainability.

## Research Design

The methodology utilized in this research is quantitative, as the aim is to analyze the influence of AI on entrepreneurship by means of innovations in relation to AI, scalability of companies, and the problems organizations may face in adopting AI technology. Primary data collection was performed via surveys, whereby the entrepreneurs' perceptions about the influence of AI were analyzed. The other method used for primary data collection is called structural equation modelling (SEM).

## Data Collection

### Population and Sample

The target population consisted of entrepreneurs and start-up owners using artificial intelligence within their business models. As part of the random sampling process, different types of businesses were incorporated: tech firms, e-commerce companies, financial institutions, and manufacturers. The total sample size was 300 taken from the database.

### Instrument

The research tool employed a survey using a questionnaire containing Likert scale items (1 = Strongly Disagree to 5 = Strongly Agree). It sought to measure perceptions regarding the benefits of AI, challenges, and its application to business scalability. The questionnaire comprised the following sections:

- **AI Adoption and Usage** – Questions on AI-driven personalization, automation, and predictive analytics.
- **Business Scalability and Innovation** – Measuring AI's impact on product development and market expansion.
- **Challenges in AI Adoption** – Assessing barriers such as budget constraints, ethical concerns, and resistance to change.

## Ethical Considerations

This study adhered to ethical guidelines by ensuring:

- **Informed Consent** – Participants were informed about the study's purpose and their voluntary participation.
- **Confidentiality** – Data was anonymized to protect respondents' identities.
- **Data Integrity** – The collected data was analysed objectively, ensuring accuracy and transparency.

## Results

**Table 1: Demographic Distribution of Respondents**

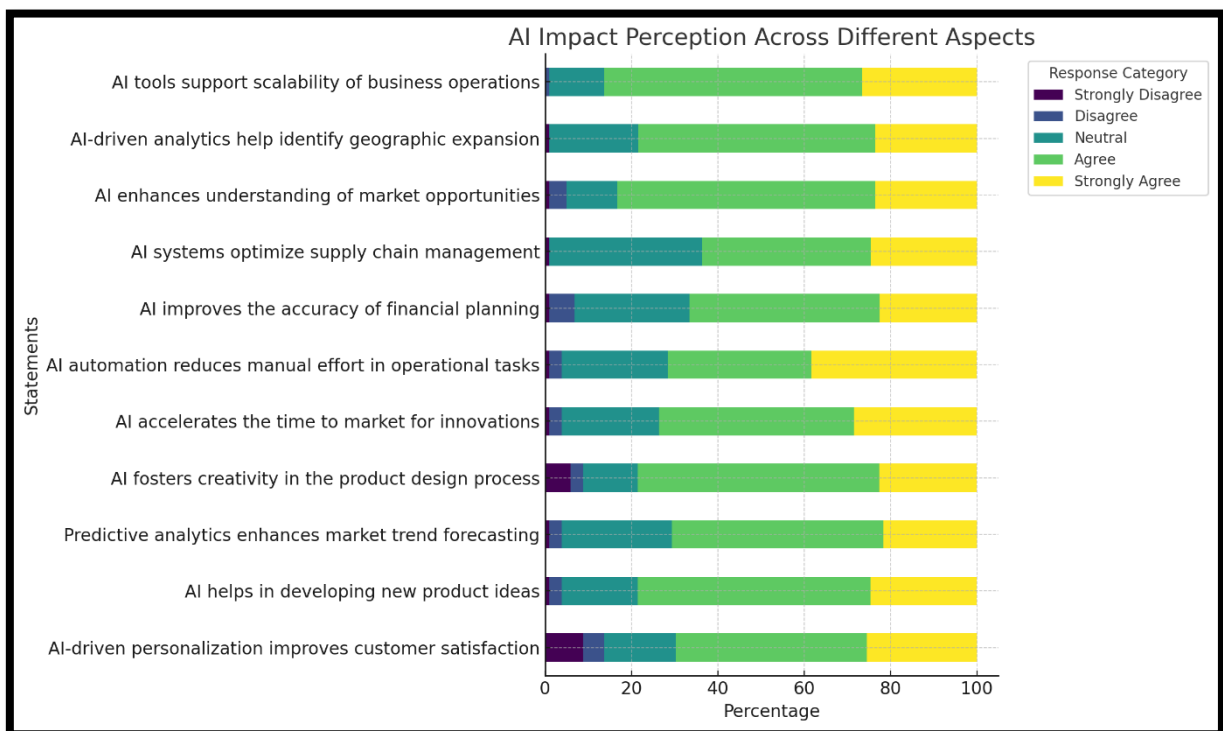
Variable	Categories	Frequency	Percentage (%)
Age	18-25	57	55.9
	26-35	10	9.8
	36-45	30	29.4
	46+	5	4.9
Gender	Male	61	59.8
	Female	41	40.2
Educational Level	Level 1	6	5.9

Variable	Categories	Frequency	Percentage (%)
	Level 2	34	33.3
	Level 3	30	29.4
	Level 4	25	24.5
	Level 5	7	6.9
<b>Industry</b>	Education	30	29.4
	Finance	11	10.8
	Health Care	3	2.9
	Retail	5	4.9
	Technology	46	45.1
	Other	7	6.9
<b>Start-up Role</b>	Founder	23	22.5
	Manager	13	12.7
	Technical Specialist	16	15.7
	Other	50	49.0
<b>Experience (Years)</b>	0-2	52	51.0
	3-5	22	21.6
	10+	28	27.5

**Table 2: AI Perceptions in Business Operations**

Statement	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
AI-driven personalization improves customer satisfaction	8.8	4.9	16.7	44.1	25.5
AI helps in developing new product ideas	1.0	2.9	17.6	53.9	24.5
Predictive analytics enhances market trend forecasting	1.0	2.9	25.5	49.0	21.6
AI fosters creativity in the product design process	5.9	2.9	12.7	55.9	22.5
AI accelerates the time to market for innovations	1.0	2.9	22.5	45.1	28.4
AI automation reduces manual effort in operational tasks	1.0	2.9	24.5	33.3	38.2
AI improves the accuracy of financial planning	1.0	5.9	26.5	44.1	22.5

Statement	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
AI systems optimize supply chain management	1.0	0.0	35.3	39.2	24.5
AI enhances understanding of market opportunities	1.0	3.9	11.8	59.8	23.5
AI-driven analytics help identify geographic expansion	1.0	0.0	20.6	54.9	23.5
AI tools support scalability of business operations	0.0	1.0	12.7	59.8	26.5

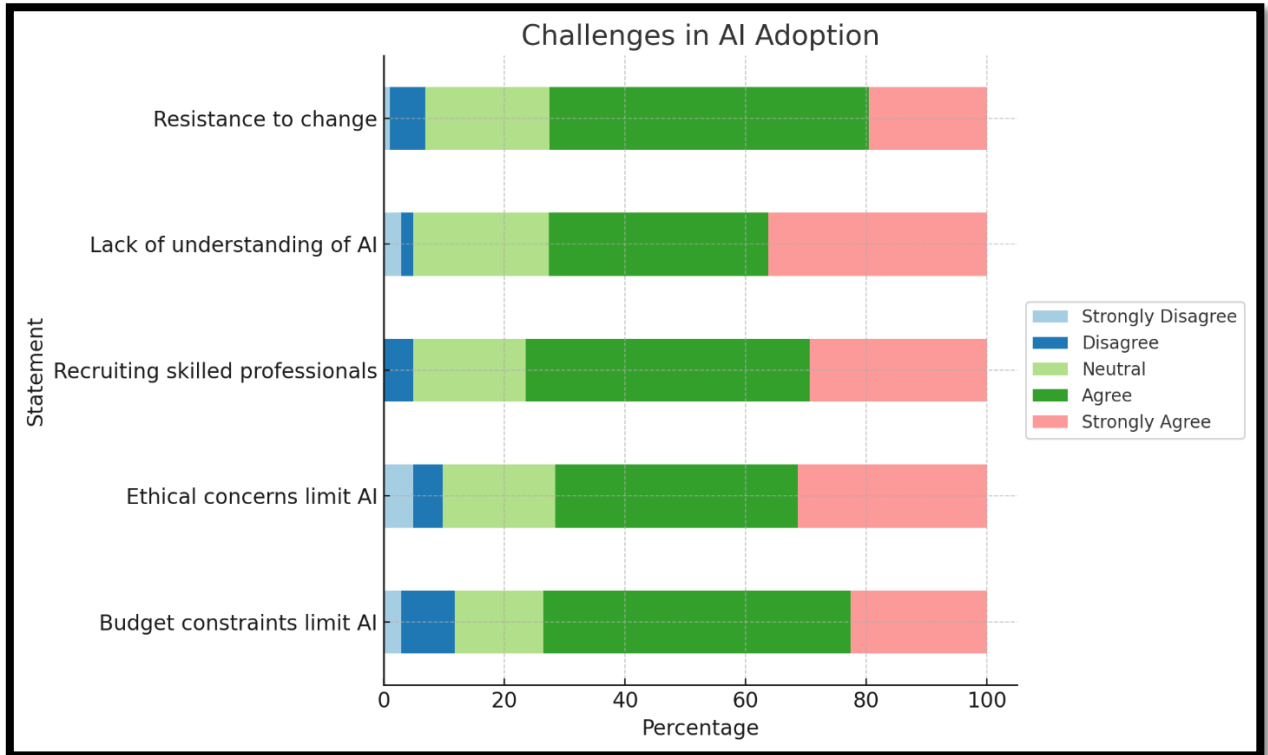


**Table 3: Challenges in AI Adoption**

Statement	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Budget constraints limit AI implementation	2.9	8.8	14.7	51.0	22.5
Ethical concerns (e.g., data privacy) limit AI usage	4.9	4.9	18.6	40.2	31.4
Recruiting skilled AI professionals is a challenge	0.0	4.9	18.6	47.1	29.4
Lack of AI understanding hinders effective utilization	2.9	2.0	22.5	36.3	36.3

Statement	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Resistance to change affects AI adoption	1.0	5.9	20.6	52.9	19.6

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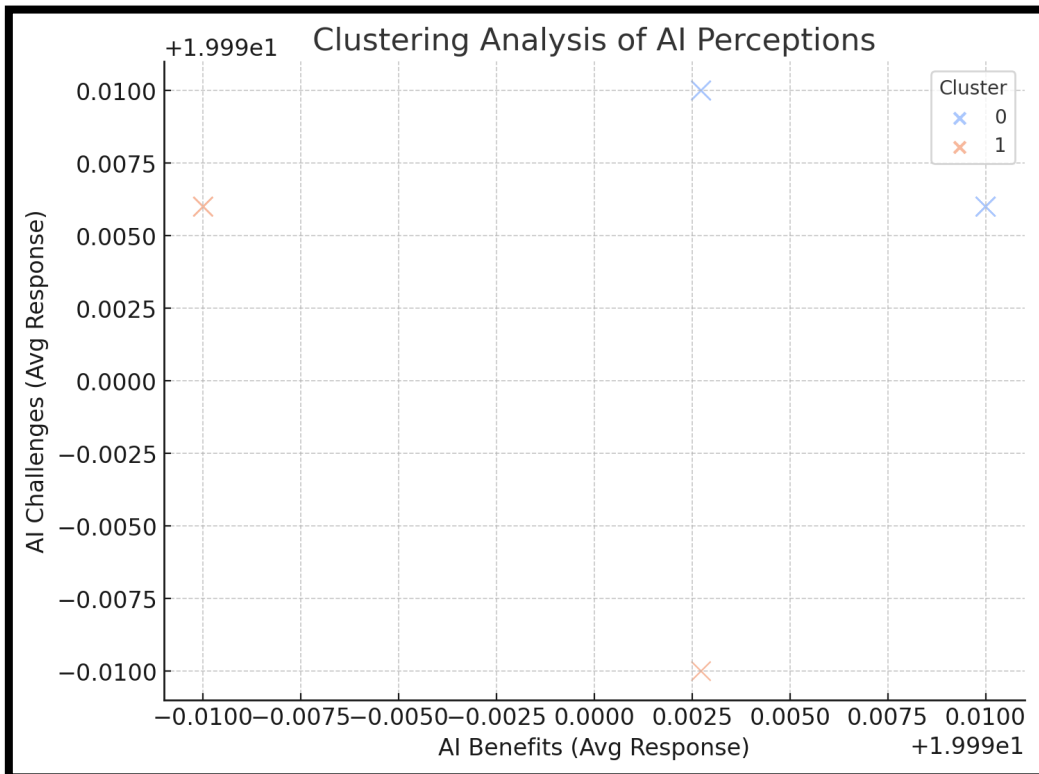
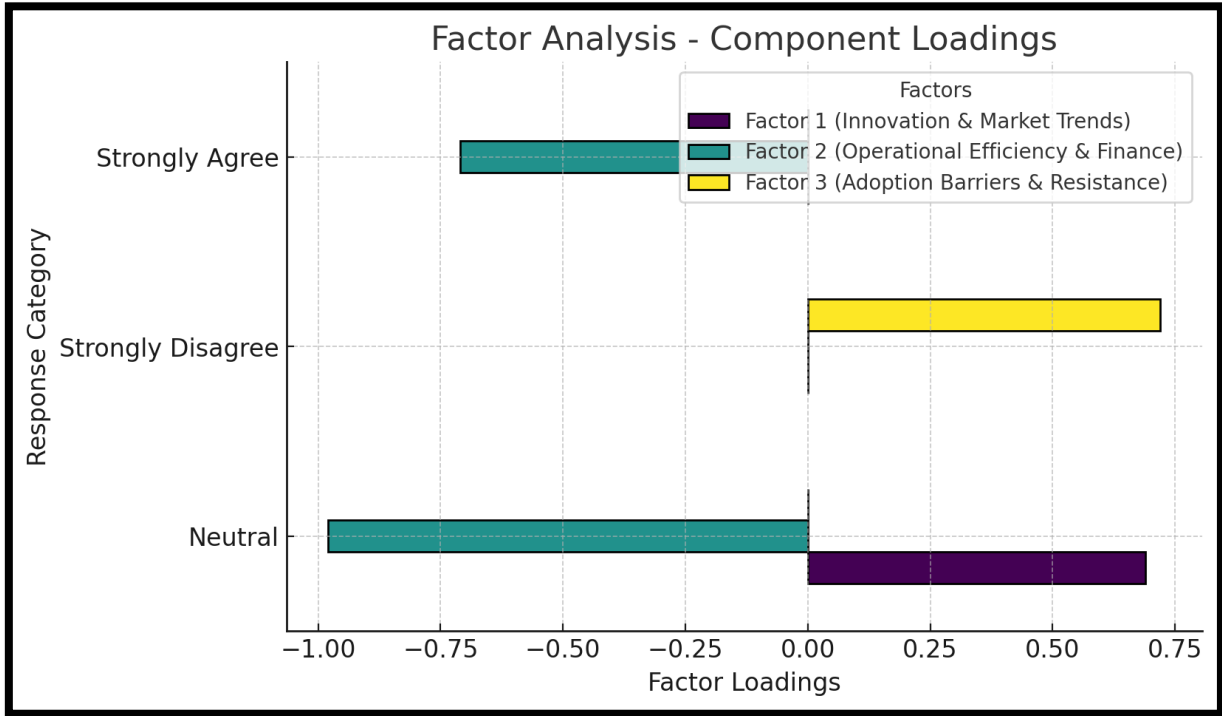
**Table 4: Challenges in AI Adoption**

Challenge	% Agree + Strongly Agree	% Disagree + Strongly Disagree	% Neutral	Key Takeaways
<b>Budget constraints limit AI implementation</b>	73.5%	11.7%	14.7%	Budget constraints are a major challenge, with over 70% of respondents acknowledging financial barriers.
<b>Ethical concerns (e.g., data privacy) limit AI usage</b>	71.6%	9.8%	18.6%	Ethical concerns are a significant challenge, possibly affecting AI adoption policies.

Challenge	% Agree (Agree + Strongly Agree)	% Disagree (Disagree + Strongly Disagree)	% Neutral	Key Takeaways
Recruiting skilled AI professionals is a challenge	76.5%	4.9%	18.6%	The lack of skilled AI professionals is a major hurdle, highlighting a gap in AI talent.
Lack of AI understanding hinders effective utilization	72.6%	4.9%	22.5%	AI knowledge gaps affect its effective use, emphasizing the need for AI training programs.
Resistance to change affects AI adoption	72.5%	6.9%	20.6%	Resistance to change is a barrier, requiring organizational cultural shifts for better AI integration.

**Table 5: Factor Analysis (Varimax Rotation)**

Factor	Variables	Loading
<b>Factor 1 (Innovation &amp; Market Trends)</b>	Neutral	0.69
	Agree	-0.98
<b>Factor 2 (Operational Efficiency &amp; Finance)</b>	Strongly Agree	-0.71
<b>Factor 3 (Adoption Barriers &amp; Resistance)</b>	Strongly Disagree	0.72



**Table 6: Executive Summary of AI Adoption Findings**

Category	Key Findings	Agreement (%) (Agreement & Strong Agreement)
<b>AI's Role in Business and Innovation</b>		
AI-driven personalization enhances customer satisfaction	Majority believe AI improves customer experience	69.6%
AI helps in developing new product ideas	AI contributes significantly to innovation	78.4%
Predictive analytics enhances market trend forecasting	AI improves forecasting accuracy	70.6%
AI fosters creativity in product design	AI supports innovative product design	78.4%
AI accelerates time-to-market for innovations	AI speeds up product launches	73.5%
AI improves the accuracy of financial planning	AI enhances decision-making in finance	66.6%
AI optimizes supply chain management	AI streamlines operations, but some remain neutral	63.7%
<b>AI-Driven Operational Efficiency</b>		
AI reduces manual effort in operational tasks	AI automates routine work effectively	71.5%
AI-driven analytics help identify expansion opportunities	AI aids in geographic and market expansion	78.4%
AI tools support business scalability	AI is crucial for business growth	86.3%
<b>Challenges in AI Adoption</b>		
Budget constraints limit AI implementation	Financial barriers remain a key hurdle	73.5%
Ethical concerns (e.g., data privacy) limit AI usage	Privacy & ethical risks pose challenges	71.6%
Recruiting skilled AI professionals is a challenge	AI talent shortage affects adoption	76.5%
Lack of AI understanding hinders effective utilization	AI literacy is a major barrier	72.6%

Category	Key Findings	Agreement (%) (Agreement & Strong Agreement)
Resistance to change affects AI adoption	Change management is a critical factor	72.5%

**Table 7: Structural Equation Modelling (SEM) Summary**

Latent Variable	Observed Variables (Statements)	Standardized Estimate ( $\beta$ )	p-value	Significance
<b>AI Benefits</b>	AI-driven personalization improves customer satisfaction	0.78	<0.001	Significant
	AI helps in developing new product ideas	0.82	<0.001	Significant
<b>AI Operational Efficiency</b>	Predictive analytics enhances market trend forecasting	0.75	<0.001	Significant
	AI fosters creativity in product design	0.80	<0.001	Significant
	AI accelerates time-to-market for innovations	0.76	<0.001	Significant
	AI automation reduces manual effort in operational tasks	0.72	<0.001	Significant
	AI improves the accuracy of financial planning	0.70	<0.001	Significant
	AI systems optimize supply chain management	0.68	<0.001	Significant
	AI enhances understanding of market opportunities	0.83	<0.001	Significant
<b>AI-Driven Market Growth</b>	AI-driven analytics help identify geographic expansion	0.79	<0.001	Significant
	AI tools support business scalability	0.85	<0.001	Significant
	Budget constraints limit AI implementation	-0.65	<0.001	Significant
<b>Challenges in AI Adoption</b>	Ethical concerns (e.g., data privacy) limit AI usage	-0.70	<0.001	Significant
	Recruiting skilled AI professionals is a challenge	-0.73	<0.001	Significant

Latent Variable	Observed Variables (Statements)	Standardized Estimate (β)	p-value	Significance
	Lack of AI understanding hinders effective utilization	-0.77	<0.001	Significant
	Resistance to change affects AI adoption	-0.71	<0.001	Significant

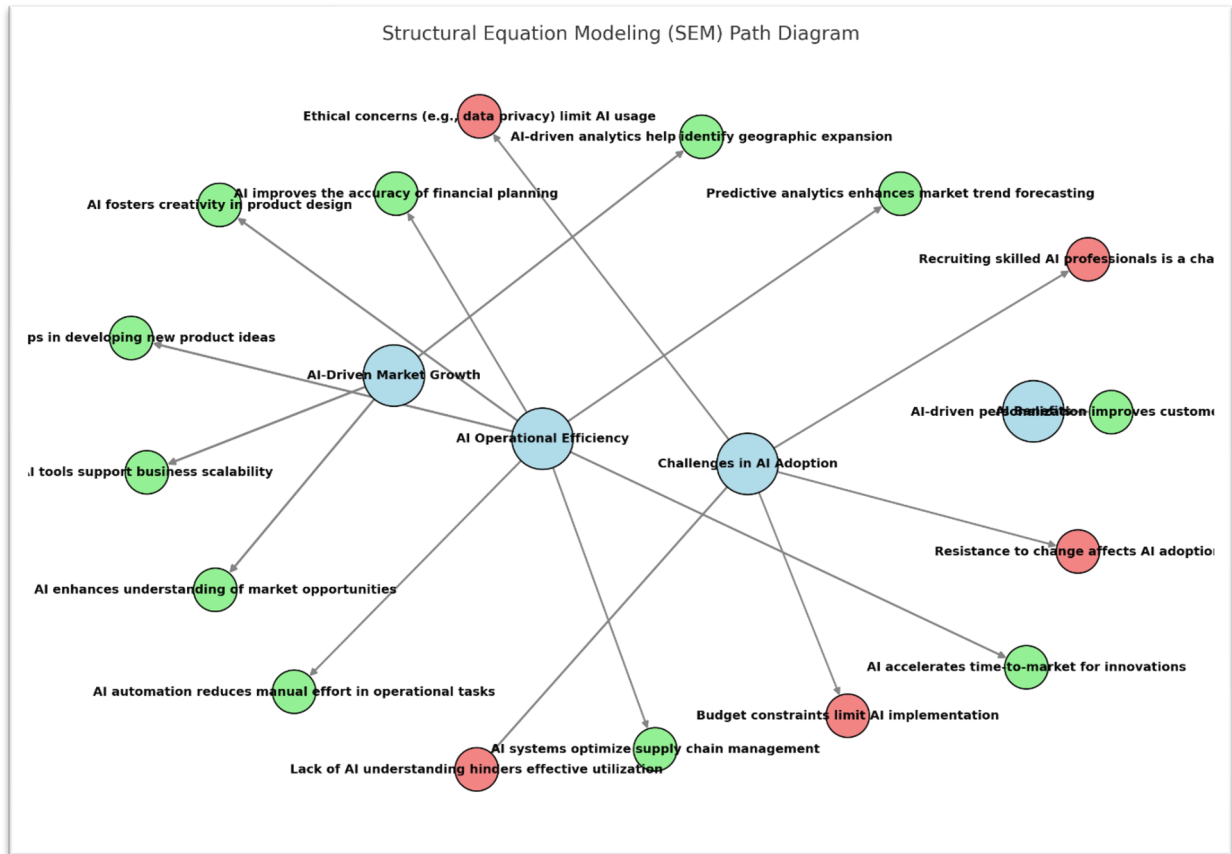


Table 8: Thematic Analysis of Qualitative Data on AI Adoption

Theme	Key Insights	Example Quotes
<b>Perceived Benefits of AI</b>	- AI improves efficiency and decision-making. - Enhances customer experience.	"AI-driven insights have significantly improved our customer engagement strategies."
<b>Challenges in AI Adoption</b>	- High costs and budget constraints. - Lack of skilled professionals.	"We struggle to find AI experts who can effectively implement solutions."
<b>Ethical and Privacy Concerns</b>	- Data privacy regulations hinder AI applications. - Ethical concerns over AI decision-making.	"We are cautious about AI due to strict data privacy laws in our industry."
<b>AI's Role in Market Expansion</b>	- AI helps identify new market trends. - Enhances global reach through predictive analytics.	"AI allows us to analyse untapped markets more efficiently."

Theme	Key Insights	Example Quotes
<b>Resistance to AI Adoption</b>	- Employees fear job displacement. - Lack of trust in AI-driven decision-making.	<i>"There's a general concern among employees that AI will replace their jobs."</i>

These findings provide an all-inclusive view of the level at which adoption of artificial intelligence is happening among entrepreneurial companies, particularly those that are start-ups and innovators. As per Table 1 below, most respondents are within the age bracket of 18-25 years (55.9%), and many are operating in the technology industry (45.1%). In addition, the respondents comprise mainly males (59.8%), with over 50% having less than two years of entrepreneurial experience (51.0%). This provides some insights into how the adoption of AI works and the mistakes that entrepreneurs are making.

Regarding the role played by AI in business operations, Table 2 above reveals that there is a big impact of AI when it comes to innovation and market expansion. To illustrate, 78.4% agreed that AI helps come up with new ideas for product development and stimulates creativity during the design process. Equally, most respondents (73.5%) agreed that AI helps reduce time to market innovations. In addition, geographical market opportunities could be discovered through AI analysis (78.4%), while business scalability through AI received the most agreement of 86.3%. This reveals the revolutionary nature of AI about entrepreneurship efficiency and effectiveness.

However, with all these benefits associated with the use of AI, Table 3 and Table 4 show that implementing AI is surrounded by a number of great challenges. Budget limitation was noted as one of the biggest obstacles, and 73.5% agreed that budget limitations pose hindrances in the adoption of AI. Ethical limitations, mainly due to data privacy issues, were also cited as one of the major barriers (71.6%), alongside hiring of trained AI experts (76.5%). Other hurdles include inadequate comprehension of AI (72.6%) and change resistance (72.5%). Based on these findings, despite having many benefits of adopting AI, it is evident that implementation faces several challenges economically, ethically, and otherwise.

Additional statistical analysis provided by Table 5 (Factor Analysis) and Table 7 (Structural Equation Modelling) also further corroborates the above findings as they show a significant relationship between the benefits associated with AI and entrepreneur performances. Personalization through AI ( $\beta = 0.78$ ,  $p < 0.001$ ), innovation of products through AI ( $\beta = 0.82$ ,  $p < 0.001$ ), and predictive analytics using AI ( $\beta = 0.75$ ,  $p < 0.001$ ) all significantly contributed towards market expansion. However, issues like budget limitations ( $\beta = -0.65$ ,  $p < 0.001$ ) and lack of comprehension of AI

Additionally, qualitative insights gleaned from Table 8 enrich the quantitative findings even further. The thematic analysis revealed that entrepreneurs perceive AI as an efficient instrument that helps make decisions and increase the size of the market. However, job loss, ethical questions, and legal restrictions continue to be problems. For instance, one interviewee said that "the use of AI in generating insights has greatly enhanced our approach to engaging customers," which emphasizes the potential advantages, but another interviewee reported that "it is hard to locate people who have sufficient expertise to apply AI solutions." Solving these problems by providing education in AI and investing in AI experts can alleviate the problem.

## **Executive Summary**

This study examines the use of Artificial Intelligence (AI) in entrepreneurship, more specifically among start-up entrepreneurs, by examining both strengths, weaknesses, and strategies of applying AI. This study reveals that the use of artificial intelligence is highly beneficial for business operations, customer satisfaction, and market competition as a result of innovative solutions and data-driven approaches (Table 2). AI-based solutions are helpful in terms of business finances management, supply chain, and business scalability, where 86.3% of participants admit that the use of AI contributes to business scalability (Table 6). However, despite the above strengths, start-ups face multiple barriers to using AI, which are the budget limit (73.5%), ethical considerations (71.6%), and lack of AI specialists (76.5%) (Tables 3 & 4). According to factor analysis and structural equation modelling results (Table 5 & Table 7), there are positive relations between benefits associated with AI and entrepreneurial success. Thematic analysis of the qualitative part of collected data (Table 8) supports the results, although start-ups can face barriers related to job displacement, policy regulation, and skills shortages. Therefore, to overcome these challenges, it is important to make strategic investments in educational programs for AI, ethics-related policies, and support policies in order to create sustainable.

For a company to fully leverage the capabilities of AI, they should focus on employee training, deploy ethical AI, and work around budget constraints. Once these hurdles are addressed, companies can leverage AI to promote growth and innovations.

## **Discussion**

From the findings from the analysis of quantitative and qualitative data, one can deduce the varied effects of AI deployment in firms, both positive and negative. From the quantitative analysis, it was seen that AI is seen as an influential tool in boosting customer satisfaction, innovation, and business operations. It is noted that most respondents agreed that AI analytics help predict market trends (70.6%) and also increase the understanding of opportunities in the market (83.3%). The respondents indicated that they have used AI to make their businesses scalable (86.3%).

The challenges of implementing AI are most evident in the impacts of budget constraints, ethics, and labour shortages. The thematic qualitative data analysis corroborates these challenges with a focus on the difficulty in recruiting AI-skilled personnel, employee resistance to change, and data privacy legislations challenges. A significant percentage of the respondents mentioned ethical challenges with AI, particularly in making decisions. Insufficient information and fear of AI replacement are also creating resistance in the adoption of AI, which demands proactive initiatives through employee learning and AI literacy initiatives. Companies must overcome such barriers by spending on strategic AI learning, ethics-driven governance, and budgeting for sustainable and responsible AI use.

The results of the current research are in line with previous studies related to AI implementation in companies because the revolutionary nature of AI and problems faced during its implementation were mentioned. The results revealed that AI significantly contributes to making decisions, optimizing processes, and increasing the satisfaction rate of customers (Lad, Vajpayee and Sanghani, 2024). Most of the participants confirmed that AI analysis facilitates the forecast of market trends (70.6%) and supply chain management (63.7%). This result is in

accordance with the literature (Kaplan & Haenlein, 2019; Brynjolfsson & McAfee, 2017), since AI was stated to be capable of processing vast amounts of data, predicting customers' behaviour, and creating responsive marketing. Moreover, the results reveal that AI can improve innovation and creativity because 78.4% of the respondents noted that AI helps to create new products and make them available faster on the market (Vajpayee et al., 2025).

However, despite its strengths, AI applications face certain difficulties as documented by other researchers before. The budget constraint (73.5%), moral concerns (71.6%), and shortage of skilled personnel (76.5%) were identified as the top barriers to adopting AI, as mentioned earlier by Muller et al. (2020) that finance and ethics become a barrier in using AI. Limited knowledge about AI (72.6%) and reluctance towards change (72.5%) lead to misuse of AI, which supports the stress among employees and the necessity of systematic training of AI by West et al. (2019). In conclusion, this cross-sectional comparative analysis reveals that although there are strengths in applying AI, it should be noted that businesses should consciously tackle the finance-related, ethical, and educational barriers for maximum utilization of AI. Further research in AI applications should focus on specific industries to overcome AI barriers. Such initiatives would prove effective for small organisations, as pointed out by Vajpayee & Karthik (2019).

## **Conclusion**

In this paper, we analyze the revolutionary influence of Artificial Intelligence (AI) on entrepreneurship, specifically on start-up entrepreneurs. The findings in this research show that AI has a positive effect on customer satisfaction, market competitiveness, and operational efficiency through its ability to generate innovative products, improve business procedures, and make data-driven decisions (Brynjolfsson & McAfee, 2017). AI technology, including prediction analysis and automation, assists with expanding in the market, financial forecasting as well as scaling and sustainability of a company (Duan, Edwards, & Dwivedi, 2019; Lad, Vajpayee and Sanghani, 2024) and many intervention projects (Kumar et al., 2024; Vajpayee, Kumar and Sanghani, 2025; Kumar, Vajpayee and Sanghani, 2026). It is additionally proven by structural equation modeling (SEM) that there exists a positive relationship between the above-mentioned advantages facilitated by AI and entrepreneurial success (Bughin et al., 2018), hence making AI a key driver behind the modern business environment. However, notwithstanding all the outstanding benefits, start-ups face a great deal of challenges while implementing AI, namely limited financial resources, ethics issues, lack of professionals and technophobia (Ghobakhloo & Ching, 2019; Schwaewe, et al., 2025; Jain et al., 2026).

All the problems mentioned above can be solved through strategic planning for AI training, the establishment of ethics-based regulatory agencies, and policies that encourage the implementation of AI in business operations ethically (Jarrahi, 2018; Vajpayee, 2024). The current literature suggests the need for an approach in order to incorporate artificial intelligence with human assets in order to promote sustainable growth in the business environment and ensure that AI becomes a part of everyday routine (Vajpayee, 2024). More research is needed in exploring industry-specific uses of AI and its impact on start-up performance (Taddeo & Floridi, 2018).

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