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AI in strategic business planning: Empirical evidence on decision-making and competitive outcomes

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Abstract
Artificial Intelligence (AI) has become a cornerstone of modern strategic business planning, offering organizations powerful tools to enhance decision-making and achieve superior competitive outcomes. By enabling the analysis of large-scale data sets, AI facilitates predictive insights, trend identification, and scenario planning that extend beyond the capabilities of traditional approaches. Empirical evidence highlights that firms adopting AI in strategy formulation demonstrate greater agility, reduced decision-making biases, and improved alignment of resources with long-term objectives. AI-driven systems not only enhance operational efficiency but also empower managers with real-time, evidence-based insights that foster resilience in volatile and uncertain markets. Moreover, the integration of AI into domains such as supply chain optimization, customer engagement, and innovation planning has been shown to strengthen firms' adaptability and financial performance. However, successful implementation requires attention to organizational readiness, cultural adaptation, and ethical considerations, including transparency and accountability. Collectively, these findings suggest that AI is not a mere support tool but a transformative force reshaping strategic planning and redefining competitive advantage in the digital era.

Keywords: Artificial intelligence, strategic business planning, decision-making, competitive advantage, empirical evidence

Introduction
Artificial Intelligence (AI) has rapidly emerged as a transformative force in strategic business planning, reshaping the way organizations formulate strategies, make decisions, and achieve competitive outcomes. The integration of AI technologies into corporate planning processes enables firms to move beyond traditional analytical models toward data-driven, predictive, and adaptive approaches. By leveraging machine learning algorithms, natural language processing, and advanced analytics, businesses are now able to process vast amounts of structured and unstructured data, identify patterns, forecast trends, and optimize resource allocation with unprecedented accuracy. Empirical evidence increasingly demonstrates that AI adoption in strategic decision-making enhances organizational agility, reduces uncertainty, and strengthens competitive positioning in dynamic markets. For instance, AI-driven simulations and scenario analyses allow executives to anticipate risks, assess multiple strategic options, and select pathways that align with long-term business objectives. Moreover, AI augments managerial cognition by providing real-time insights that support evidence-based decisions, thereby reducing the biases and limitations inherent in human judgment. This technology-driven shift is particularly evident in areas such as supply chain management, market entry strategies, customer engagement, and innovation planning, where AI enables firms to align operations more closely with evolving consumer demands and industry disruptions. Furthermore, empirical studies reveal that organizations embedding AI into strategic frameworks often achieve superior financial performance, innovation capability, and operational efficiency compared to their counterparts relying on conventional planning tools. However, successful integration requires more than technological adoption; it demands organizational readiness, cultural acceptance, and ethical considerations regarding transparency, accountability, and data privacy. As businesses increasingly operate in volatile, uncertain, complex, and ambiguous (VUCA) environments, AI serves as a critical enabler of resilience and competitive advantage. Thus, the empirical evidence underscores that AI in strategic business planning is not merely an operational enhancement but a paradigm shift

that redefines decision-making, reshapes competitive dynamics, and sets the foundation for sustainable growth in the digital era.

Research Design

A research design can be described as the overall plan or blueprint that guides the process of collecting, analyzing, and interpreting data. It ensures that the research questions are addressed effectively and that the findings are scientifically valid. In the present study on the role of artificial intelligence in strategic business planning, the research design has been carefully structured to provide clarity, logical flow, and reliability. By identifying the nature of the study and specifying the type of research involved, this section aims to highlight the rationale behind the chosen methodological path.

The research design acts as the foundation of the entire investigation. Without a clear design, the study risks becoming fragmented or inconsistent. Since the topic involves both technological innovation (artificial intelligence) and organizational strategy (business planning), a well-articulated design becomes essential to connect these two domains. Furthermore, because strategic planning and AI are dynamic fields, the design must be robust enough to address current realities while also capturing insights that remain relevant in the near future.

Sample Size

The study selected a sample size of 400 respondents, which is considered sufficient for statistical analysis and hypothesis testing in social science research. Determining an appropriate sample size is critical because too small a sample may not provide adequate statistical power, while an excessively large sample may be inefficient and unnecessary.

The choice of 400 respondents was guided by several considerations. First, according to sampling theory, larger sample sizes tend to reduce sampling error and increase the precision of estimates. A sample size of 400 provides a balance between accuracy and feasibility, ensuring that the findings are reliable while remaining manageable within the time and resource constraints of the study.

Second, the use of statistical techniques such as regression, correlation, and ANOVA requires a minimum number of cases to ensure valid results. For example, regression analysis typically requires at least 10-15 respondents per independent variable to achieve stable estimates. With a sample size of 400, the study can confidently include multiple independent variables while maintaining statistical robustness. Similarly, ANOVA requires adequate group sizes to detect significant differences, which the chosen sample size supports.

Data Collection Methods

Data for the present study on the role of artificial intelligence in strategic business planning was collected through a structured questionnaire comprising 30 questions.

The survey was administered primarily via online platforms such as Google Forms and email, a choice made to ensure efficiency, accessibility, and wide coverage of the target population, which included managers, executives, and professionals across diverse industries. Online distribution provided key advantages: it enabled access to a geographically dispersed population, minimized logistical costs associated with printing and physical distribution, and offered respondents the convenience of completing the survey at their own pace. Moreover, the online method facilitated automatic recording and coding of responses, significantly reducing the risk of manual entry errors. Data was directly exported into spreadsheets and prepared for analysis in SPSS. To further enhance participation, links were also circulated through professional networking platforms like LinkedIn.

Data Analysis Tools

The choice of appropriate data analysis tools is central to empirical research, as it determines the accuracy and depth of insights derived. In this study on the role of artificial intelligence in strategic business planning, data collected through a structured questionnaire is quantitative and large in scale. To analyze this systematically, the Statistical Package for the Social Sciences (SPSS) was employed as the primary tool. SPSS is widely recognized for its ability to manage large datasets, apply advanced statistical techniques, and generate clear outputs for hypothesis testing.

The analysis combined descriptive and inferential methods. Descriptive analysis computed frequencies, percentages, means, and standard deviations to summarize respondents' demographics and AI adoption patterns, establishing a baseline for further interpretation. Inferential methods included:

- **t-tests:** To assess differences between two groups, such as junior vs. senior managers, in their perceptions of AI's role in strategic planning.
- **Correlation analysis:** To examine the strength and direction of relationships between AI adoption and outcomes such as forecasting accuracy or decision-making efficiency.
- **Regression analysis:** To test the predictive power of independent variables like AI adoption and organizational size on strategic outcomes.
- **ANOVA:** To determine differences in perceptions across industries, organizational sizes, or managerial levels, with post-hoc tests used where necessary.

By integrating these tools, the study ensured a comprehensive approach: descriptive statistics provided context, while inferential techniques confirmed the significance of observed patterns. This multi-layered analysis produced robust, reliable insights into how AI influences strategic business planning.

Results and Discussion

Mean and Standard Deviation

Question No.	Statement (short form)	Mean	Standard Deviation
Q7	Awareness of AI	3.67	1.12
Q8	Adoption of AI in planning	3.43	1.09
Q9	Increase of AI adoption (last 3 years)	3.56	1.05
Q10	Investment in AI tools	3.44	1.07
Q11	AI enhances accuracy of decisions	3.65	1.02
Q12	AI reduces human bias	3.50	1.10
Q13	AI trusted for sensitive data	3.30	1.14
Q14	AI as enabler, not threat	3.60	1.08
Q15	Employees' positive attitude towards AI	3.51	1.11
Q16	AI improves forecasting accuracy	3.63	1.04
Q17	AI enhances decision-making speed	3.61	1.06
Q18	AI improves resource allocation	3.52	1.13
Q19	AI identifies new market opportunities	3.61	1.09
Q20	AI improves competitiveness	3.58	1.08
Q21	AI supports innovation and creativity	3.56	1.07
Q22	AI reduces strategic risks	3.50	1.12
Q23	Reliance on AI for long-term planning	3.46	1.10
Q24	AI improves collaboration and communication	3.53	1.09
Q25	AI contributes to cost-effectiveness	3.57	1.05
Q26	Cost of AI is a major challenge	3.51	1.13
Q27	Lack of expertise is a barrier	3.54	1.11
Q28	Employees resist AI adoption	3.44	1.15
Q29	Data privacy/security concerns hinder AI	3.55	1.09
Q30	Optimism about long-term impact of AI	3.70	1.03

Inferential Analysis

t-Test Results (group comparisons)

t-Test Result 1: Gender and Perception of AI Adoption

Variable	Group	N	Mean	Std. Deviation	t-value	p-value (Sig.)
Perception of AI Adoption	Male	164	3.45	1.02	-2.12	0.035*
	Female	199	3.68	0.97		

The analysis shows that female respondents reported a higher mean score (M = 3.68) compared to male respondents (M = 3.45) in terms of their perception of AI adoption in strategic planning. The difference between groups is statistically significant at p = 0.035, indicating that gender plays a role in shaping attitudes toward AI. This suggests that women in managerial and professional roles may be more receptive to or optimistic about integrating AI into organizational processes than men. One possible explanation could be that female managers view AI as a tool for empowerment and support in decision-making, while male managers may be more cautious or traditional in their approach. The relatively small difference in mean values, however, indicates that while gender differences exist, overall perceptions are moderately positive across both groups. This finding highlights the need for gender-inclusive AI adoption strategies in organizations.

t-Test Result 2: Managerial Level and AI Enhancing Decision-Making Accuracy

Variable	Group	N	Mean	Std. Deviation	t-value	p-value (Sig.)
AI improves decision accuracy	Junior/Mid Managers	211	3.52	1.05	-2.45	0.015*
	Senior Executives	189	3.81	0.96		

The results indicate that senior executives reported a higher mean score (M = 3.81) compared to junior and middle managers (M = 3.52) regarding the perception that AI enhances decision-making accuracy. The difference is statistically significant (p = 0.015), confirming that managerial level influences how AI is evaluated within strategic planning. Senior executives may have greater exposure to advanced AI tools and their outcomes, leading to stronger confidence in AI-driven decision support. Junior and mid-level managers, on the other hand, may interact with AI more indirectly or in limited roles, which could explain their lower level of agreement. This variation also reflects differences in access to resources and responsibilities at higher managerial levels. The result highlights that organizations must ensure that all managerial levels receive adequate training and exposure to AI systems so that confidence in AI's contribution to decision accuracy is widespread and not limited to top leadership.

t-Test Result 3: Organization Size and Investment in AI

Variable	Group	N	Mean	Std. Deviation	t-value	p-value (Sig.)
Investment in AI tools	SMEs (<250)	183	3.32	1.08	-3.10	0.002**
	Large Firms	217	3.74	0.94		

The findings show that large organizations reported a significantly higher mean score (M = 3.74) compared to small and medium enterprises (M = 3.32) when asked about investment in AI tools and technologies. The difference is statistically significant (p = 0.002), demonstrating that organizational size plays a decisive role in determining the scale of AI investment. Larger firms typically have greater financial resources, stronger technological infrastructure, and more access to expertise, enabling them to commit more heavily to AI adoption. Smaller firms, however, often face resource constraints and may prioritize immediate operational costs over long-term AI investment. This disparity reinforces the structural challenges SMEs encounter in adopting cutting-edge technologies. The results suggest that while enthusiasm for AI exists across organizations of all sizes, actual implementation is more feasible in larger firms. Policymakers and industry leaders may need to consider support mechanisms for smaller firms to bridge this investment gap.

t-Test Result 4: Experience and Optimism about Long-Term AI Impact

Variable	Group	N	Mean	Std. Deviation	t-value	p-value (Sig.)
Optimism on long-term AI impact	<10 years exp.	190	3.62	1.07	-1.87	0.062
	≥ 10 years exp.	210	3.78	1.01		

The comparison between respondents with less than 10 years of experience (M = 3.62) and those with 10 or more years (M = 3.78) shows that the more experienced group expressed slightly greater optimism regarding the long-term impact of AI. However, the difference is not statistically significant (p = 0.062), suggesting that both groups share broadly similar levels of optimism. This finding indicates that professional experience may influence perspectives, but not strongly enough to create a marked divide in attitudes. Experienced professionals may have a broader understanding of technological shifts and strategic trends, which contributes to their higher optimism, while younger employees may be more cautious due to limited exposure to the long-term effects of AI integration. Despite the lack of significance, the overall trend of optimism across both groups highlights a generally positive outlook toward AI's role in organizational success, reinforcing the belief that AI will remain integral to future strategy.

Result 5: Correlation Analysis (relationships between variables)

Variables	Awareness of AI	Perception of AI Benefits	AI Adoption Level	Decision-Making Accuracy	Strategic Competitiveness
Awareness of AI	1	0.52**	0.46**	0.39**	0.41**
Perception of AI Benefits	0.52**	1	0.61**	0.55**	0.58**
AI Adoption Level	0.46**	0.61**	1	0.63**	0.60**
Decision-Making Accuracy	0.39**	0.55**	0.63**	1	0.65**
Strategic Competitiveness	0.41**	0.58**	0.60**	0.65**	1

The correlation analysis reveals strong positive relationships among awareness, perception of AI benefits, adoption level, decision-making accuracy, and competitiveness. Awareness correlates positively with perception (r = 0.52, $p<0.01$) and adoption (r = 0.46, $p<0.01$), showing that knowledge fosters favorable attitudes and implementation. Perception of benefits strongly correlates with adoption (r = 0.61, $p<0.01$) and decision-making accuracy (r = 0.55, $p<0.01$), indicating that belief in AI's value drives support and enhances decision quality. The strongest relationship is between adoption and decision-making accuracy (r = 0.63, $p<0.01$), reinforcing AI's role in improving forecasting and reducing bias. Adoption also correlates with competitiveness (r = 0.60, $p<0.01$), while decision-making accuracy has the strongest link with competitiveness (r = 0.65, $p<0.01$). These results confirm AI adoption as central to strategic success.

Result 6: Regression Analysis (impact of AI on strategic business planning outcomes)

Predictor Variable	Beta (β)	t-value	p-value (Sig.)
Awareness of AI	0.18	3.21	0.001**
Perception of AI Benefits	0.25	4.56	0.000**
AI Adoption Level	0.36	6.12	0.000**
Decision-Making Accuracy	0.29	5.44	0.000**

Model Summary

R = 0.78, R^2 = 0.61, Adjusted R^2 = 0.60, F = 153.4, Sig. = 0.000

Note: $p<0.01$ indicates significance at the 1% level

The regression analysis demonstrates that AI adoption and related factors significantly predict organizational competitiveness, explaining 61 percent of the variance (R^2 = 0.61), a strong result for social science research. AI adoption level is the strongest predictor (β = 0.36, $p<0.01$), confirming that greater integration enhances competitive advantage. Decision-making accuracy also shows a substantial contribution (β = 0.29, $p<0.01$), emphasizing the importance of quality and speed in decisions. Perception of AI benefits (β = 0.25, $p<0.01$) reinforces that organizational

trust in AI strengthens its strategic value, while awareness of AI (β = 0.18, p<0.01) remains a significant foundation for adoption. Overall, competitiveness emerges from a combination of technical and human dimensions. These results imply organizations must pair investments in AI with awareness-building and cultural readiness to maximize benefits.

Result 7: ANOVA Results (variance across different groups)

Source of Variation	Sum of Squares	df	Mean Square	F-value	Sig. (p-value)
Between Groups	18.42	6	3.07	4.92	0.000**
Within Groups	246.31	393	0.63		
Total	264.73	399			

Post-hoc (Tukey HSD) Test

- IT industry mean score significantly higher than Manufacturing and Retail (p<0.01).
- Healthcare industry mean higher than Education (p<0.05).

Note: p<0.01 = highly significant; p<0.05 = significant

The ANOVA results (F = 4.92, p<0.01) indicate significant differences in perceptions of AI effectiveness across industries, confirming that sectoral context shapes views on AI's role in strategic planning. Post-hoc Tukey HSD analysis shows IT professionals reported significantly higher perceptions compared to manufacturing and retail, consistent with IT's status as an early adopter of AI. Healthcare respondents also expressed stronger perceptions than those in education, reflecting AI's growing use in diagnostics and predictive health management. Conversely, manufacturing, retail, and education recorded lower mean scores, likely due to limited resources or slower digital adoption. Low within-group variance (MS = 0.63) and higher between-group variance confirm systematic differences. These findings highlight the need for tailored policies and sector-specific strategies to support AI adoption in lagging industries.

Result 7: Hypotheses Testing

Hypothesis Code	Statement	Test Applied	Result	Decision on H_0
H_1	There is a significant level of awareness and adoption of AI in strategic business planning.	Descriptive & t-test	Mean awareness high; significant group differences	Rejected
H_2	Managers and employees differ significantly in perceptions and attitudes toward AI.	t-test	Senior executives more positive than juniors (p<0.05)	Rejected
H_3	AI adoption has no significant impact on forecasting, decision-making, or resource allocation.	Regression & Correlation	Strong positive effects on outcomes (p<0.01)	Rejected
H_4	Demographic and organizational factors do not influence AI effectiveness.	t-test & ANOVA	Gender, size, and industry show differences (p<0.05)	Rejected
H_5	There is no significant relationship between AI adoption and strategic business outcomes.	Correlation & Regression	Strong correlations (r = 0.60+) and predictive effects	Rejected
H_6	Challenges such as cost, expertise, and privacy do not significantly affect AI integration.	Descriptive & ANOVA	High agreement on barriers; significant group variation	Rejected

The first hypothesis (H_1) assessed awareness and adoption levels. Descriptive statistics showed high overall awareness, while t-tests revealed significant demographic differences, with females reporting greater awareness and adoption, leading to rejection of the null hypothesis.

The second hypothesis (H_2) examined managerial levels. Independent t-tests indicated senior executives viewed AI as more beneficial for decision accuracy than junior managers, confirming leadership's more favorable outlook and rejecting the null hypothesis.

The third hypothesis (H_3) tested AI's impact on forecasting, decision-making, and resource allocation. Regression analysis showed adoption (β = 0.36, p<0.01) as the strongest predictor of competitiveness, with strong correlations (r = 0.60-0.65). The null hypothesis was rejected.

The fourth hypothesis (H_4) explored demographic and organizational influences. ANOVA and t-tests confirmed significant differences by firm size, gender, and industry, with larger firms and IT/healthcare sectors showing stronger adoption.

The fifth hypothesis (H_5) confirmed strong positive correlations between AI adoption and outcomes, particularly decision accuracy (r = 0.63) and competitiveness (r = 0.60), reinforcing adoption as a key predictor of strategic advantage.

Finally, the sixth hypothesis (H_6) revealed that barriers such as cost, expertise, and privacy concerns significantly affect integration, particularly in smaller firms.

all six null hypotheses were rejected, confirming AI's positive role in strategic planning and the influence of demographic, organizational, and structural factors on adoption.

Conclusion

The findings of this study confirm that Artificial Intelligence plays a pivotal role in transforming strategic business planning by enhancing decision-making quality and strengthening competitive outcomes. Unlike traditional planning frameworks that depend largely on intuition and retrospective analysis, AI introduces predictive accuracy, real-time adaptability, and data-driven precision. The empirical evidence demonstrates that organizations leveraging AI report significant improvements in forecasting, efficiency of resource allocation, and responsiveness to market volatility. These outcomes highlight AI's potential not only as a tool for operational optimization but also as a strategic enabler that reshapes long-term planning and competitive positioning.

Importantly, the study underscores that AI's value lies in complementing human judgment rather than replacing it. While AI contributes computational power and predictive insights, human expertise remains indispensable for interpreting context, ensuring ethical responsibility, and aligning decisions with organizational values. This synergy between human and artificial intelligence creates more balanced and sustainable strategies.

The evidence also indicates that AI adoption provides a competitive edge by enabling customer-centric strategies, innovation in business models, and global adaptability. Firms that integrate AI strategically are more likely to sustain growth and resilience in uncertain markets. Ultimately, the study concludes that AI, when deployed responsibly and in alignment with organizational vision, elevates strategic planning into a proactive, adaptive, and future-ready process that secures long-term competitive advantage.

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