

# Strategic Management through Artificial Intelligence and Data-Based Decision Making for Sustainable Growth

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**Abstract:** A fundamental transformation is occurring in strategic management because organizations have started to embrace the concepts of Artificial Intelligence (AI) and data-driven decision-making models to fulfill long-term sustainable growth. Conventional strategic systems commonly have recourse to the managerial intuition, periodic analysis and performance measures that are not dynamic and can hardly respond to evolving market environment requirements. AIs bring inability to analysis that is dynamic, predictive, and automated, which improves strategic planning, efficiency, competitive performance, and optimization of resources. By integrating machine learning, business analytics, natural language processing, and intelligent automation, organizations are able to recognize new opportunities, forecast risks, and optimize value chains and can align strategic initiatives to sustainability goals. The use of data-driven decisions helps companies transform massive amounts of structured and unstructured data into practical insights to promote transparency, precision, and responsiveness in strategies. In addition, AI is the driver of sustainable development, because it can enhance environmental forecasting, facilitate a model of the circular economy, socially accountable governance, and resilience over the long term. Although these benefits are evident, issues like the governance of data, ethical issues, interpretability, and complexity in integrating the technologies must be addressed so that deployment is done in a responsible and effective manner. All in all, this paper has revealed the increasing importance of AI-driven strategic management as a groundbreaking concept leading to innovation, competitiveness, and sustainable development in contemporary businesses.

**Keywords:** *Artificial Intelligence, Strategic Management, Data-Driven Decision Making, Sustainable Growth, Predictive Analytics, Business Intelligence, Machine Learning, Automation, Organizational Strategy*

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## I. INTRODUCTION

Over the past decades strategic management has changed a lot due to organizations attempting to traverse an ever-growing and competitive business sector that is influenced by globalization, digital

transformation, and changing stakeholder expectations. Conventionally, strategic management used to be very dependent on human impressions, previous experiences, un-dynamic tools of analysis and periodical evaluations to develop long term

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organizational plans. These methods however, were generally less nimble and predictive and thus failed to respond to the fast paced changes in the market, supply chain bursts, regulatory shifts, and technological breakthroughs. Artificial Intelligence (AI) has completely transformed this reality, allowing the use of complex analytical methods based on the real-time processing of the information, flexible modeling, and automatic decision-making. The AI-based systems enable the organizations to process large volumes of quantified and unquantified data such as customer behaviour, market forces, operational performance, environmental proficiencies and competitive indications at speeds and degrees of accuracy that human staff are unable to attain. The change can also help the firms to identify new opportunities, foresee threats that are likely to occur, streamline internal processes, and develop sturdier strategies that are in line with the long-term objectives. With the accelerating Fourth Industrial Revolution, AI is now a strategic intelligence enabler, delivering more profound insights, more predictive power as well as greater adaptability in areas of manufacturing and finance, healthcare, retail, and sustainable development sectors, among others.

However, the adoption of AI in the strategy management also boosts the alignment towards data-driven decision-making, where achieving organizational success is gradually becoming more and more reliant on the capacity to convert raw data into actionable insights. The current business environment is a data-rich ecosystem, enabled by digital platforms, IoT sensors, enterprise information systems, cloud computing, and social media interactions and produces scales and quantities of real-time information never witnessed before. Decision-making frameworks relying on machine learning models, predictive analytics, natural language processing, and optimization algorithms to help leaders make objective and evidence-based strategic decisions that would boost the capacity to be competitive and innovative. Sustainable growth can also be achieved with the help of these frameworks, as organizations can track the use of resources, optimize the supply chain, minimize environmental impact, and align their activities with the global sustainability frameworks, like the ESG guidelines and the UN Sustainable Development Goals. As consumers, regulators, and investors continue to demand that businesses be responsible, AI-driven sustainability intelligence

will assist businesses in monitoring carbon footprints, identifying and predicting environmental threats, and planning as well as strategizing on long-term environmental stewardship. Nevertheless, integration of AI in strategic management is not devoid of issues. Concerns about data privacy, algorithmic responsibility, and complexity of integration, labor force preparedness, and ethical issues have to be governed through attentive governance in order to implement responsibly. However, with the ongoing digital transformation that many organizations are undergoing, AI-enabled strategic management proves to be an essential route into increased decision accuracy, operational performance, innovation, and the attainment of sustainable competitive advantage in an ever-changing global market.

### II. RELEATED WORKS

The development of strategic management has largely been influenced by the progress in data analytics, computational intelligence and information systems in organization, giving a robust background to modern AI-based strategic models. Initial studies were mainly concerned with quantitative decision models, managerial economics and classical strategic theories that were more concerned with competitive positioning, resource allocation as well as long-term planning. Basic contributions to strategic decision-making have emphasized the applicability of rational models, environmental analysis, and risk analysis, but tended to use fixed data and post hoc analysis, which made it hard to predict in dynamic situations. As enterprise information systems grew, scholars started incorporating data-driven applications like statistical forecasting and decision support systems, business intelligence platforms into their strategic processes to increase responsiveness and accuracy in their organizations. Research conducted during this period showed that information-driven policies enhanced accuracy of decisions made by the managers, effectiveness of operations and differentiation in the market, especially in those that were volatile and the uncertainty and complexity burdened the conventional decision-making systems [1], [2]. The growth of the digital ecosystems, combined with the development of digital technologies, contributed to the viewpoint that the amount, rate, and diversity of organizational data required more dynamic strategic models that could perform continuous learning and real-time interpretation. This saw the development of

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analytics-based strategy frameworks that are capable of integrating structured datasets, market intelligence, and algorithmic processing to aid more nimble and evidence-based strategic planning [3], [4]. But constraints still remained because of the failure of the traditional analytical instruments to reflect the nonlinear relations, unstructured information and dynamically changing external indicators. Such restrictions introduce the context of the introduction of Artificial Intelligence as a disruptive technology that could improve the vision of strategy, predictive capacity, and changeability of organizations.

The advent of machine learning, natural language processing and predictive analytics into strategic management research were a turning point as it allowed a closer look and more detailed inferences of organizational complexities. Researchers discussed the ways in which AI may enhance human cognition by identifying any latent patterns, predicting market dynamics and enhancing decision making options that would be inaccessible through conventional means, such as manual analysis. Studies have shown that AI systems have enhanced the accuracy of strategic forecasting through the analysis of various data e.g. financial, customer behavior, supply chain trends, macroeconomic variables etc. which have enabled companies to predict disturbances and estimate growth possibilities better [5], [6]. Natural language processing technology also increased the field of strategic intelligence, as it mined the insights of unstructured sources of information such as news reports, social media posts, internal documents and regulatory reports and improved the process of environmental scanning which is a core part of strategic planning [7]. The research also emphasized the revolutionary effects of AI on competitive strategy, specifically, automated competitor analysis, market segmentation, and a customer value model. The tools enabled organizations to enhance their strategic positioning and resource allocation according to the high-frequency data streams, instead of periodic evaluation. Moreover, intelligent decision support system studies showed how AI can be used as a complement to managerial judgment by providing model-based scenario analysis and risk simulations, and decision support, when there is uncertainty [8], [9]. With the digitalization of industries, researchers started to focus on how AI can be used in providing key strategic flexibility, wherein organizations adjust dynamically to

evolving circumstances by real-time understanding and sustaining continuous learning cycles. This literature placed considerable emphasis on utilizing AI in conjunction with organizational operations, management framework, and inter-functional work to create a strategic value. However, scholars also observed issues pertaining to data quality, computational complexity, and algorithmic opaqueness and the necessity to have effective governance systems that should guarantee responsible and ethical AI uses in strategic decision-making processes [10], [11].

The recent literature has widened the domain of the use of AI in strategic management to cover sustainability-oriented decision-making, resilience in the long term, and creation of responsible and environmentally conscious strategies. The increased interest in climate risks, ESG compliance, and sustainable development by researchers in the world has led to the need to investigate the potential of AI and data analytics to facilitate sustainable strategic planning. Research indicates that AI complements environmental predictions by interpreting climatic data, resource utilization behaviors, and ecological risk factors so that organizations can implement proactive approaches to sustainability that are consistent with international regulatory standards, as well as corporate social responsibilities objectives [12]. The role of AI in ensuring sustainable operations, including energy management, switching models to circular economy, reducing waste, and monitoring carbon footprint have been discussed, and the studies have shown significant benefits in resource efficiency and environmental performance [13]. Moreover, AI-enhanced lifecycle research and optimization of supply chain studies suggest that smart systems can contribute greatly to the increase in transparency, traceability, and low compliance regarding sustainability across value chains, which promotes the long-term strategic growth. The use of AI with sustainability analytics has also been associated with enhanced stakeholder involvement since organizations utilize smart tools to share ESG indicators, simulate sustainability, and increase accountability. Researchers have also dwelled upon the aspect of organizational transformation, stating that it requires digital preparedness as well as an ethical AI architecture and workforce re-skilling to maximize the benefits of AI-based strategic management [14], [15]. This research flow sheds light on the potential opportunities and challenges in ensuring sustainable

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growth via AI and as such, the need to balance technological innovation by ethical considerations, data controls and strategic alignment is essential. Overall, the body of research shows a tangible sequence between old models of analytics and modern AI-driven strategic systems, which have a huge potential of optimization of decision making, innovation and sustainable organizational growth within an ever-evolving internationally-focused world.

## III. METHODOLOGY

### 3.1 Research Design

The current study takes a systematic analytical framework which combines the modeling of Artificial Intelligence with decision-making processes based on the accumulation of data to investigate the ways organizations can attain sustainable development by utilizing technology as a means to manage the operations. The research design is based on quantitative and qualitative methods of analysis and involves the usage of multi-source organizational data (financial records, operational metrics, customer analytics, the environment performance indicators, and market intelligence) to create a powerful AI-based strategic assessment model. As strategic management incorporates complicated interplays between the internal strengths, external environmental conditions, and the sustainability goals of the organization over time, the approach uses a hybrid AI system, which can process heterogeneous data and find nonlinear patterns that drive the strategic results. The study is a series of steps which include data collection, preprocessing, feature building, model development, testing and interpretation. The stages are always guided by the standard AI and management research principles to maintain a level of accuracy, replicability and theoretical applicability. To assess the role of AI in optimizing strategic forecasting, positioning decisions, and sustainability-based decision-making, machine learning algorithms and predictive analytics, and decision-optimization models are employed. Further, they include decision-support simulations that evaluate the long-term strategic implications with dynamic environmental conditions, making sure that the proposed approach is a real-life organizational situation [15], [16].

### 3.2 Data Sources and Organizational Context

The research makes use of secondary data through corporate repositories, the open -source business intelligence sites, sustainability reporting reports

disclosure and industry digital dashboards. The primary dataset to the analysis is comprised of strategic indicators such as financial ratios, demand dynamics, supply chain dynamics, customer interactions measures, competitiveness in the market rating, and sustainability performance ratings. Other textual data comprise annual reports, regulatory reports, stakeholder reviews and social sentiment platforms are also provided to reinforce the environmental scanning and contextual reading. All the datasets are before processing to models using preprocessing methods or techniques that include normalization, imputation, removal of noises, tokenization (when working with text data), and scaling features to make the datasets compatible regardless of the format they are from. The organizational environment is centered around industries that are rapidly shifting towards digitalization, such as manufacturing, retail, financial, and environmentally-conscious industries, in which AI-driven strategic intelligence is imperative in terms of optimality in operations and sustainable utilization of resources. The multidimensional design thus indicates the integration of quantitative and qualitative data analytics in its methodological design to ensure organization adaptability, resilience and an alignment to sustainability [17], [18].

**Table 1. Strategic Data Variables and Analytical Indicators**

Analytical Variable	Description	Data Source	Analytical Purpose
Financial Performance Metrics	Revenue, margin, ROI, cost ratios	Internal financial systems	Evaluate growth potential & investment efficiency
Market Dynamics Indicators	Customer demand, competitor movement, pricing trends	Market intelligence dashboards	Support forecasting & competitive strategy
Operational Efficiency Data	Cycle time, defect rate, throughput	ERP & supply chain systems	Optimize internal process decisions

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	ut, capacity utilization		
Sustainability Indicators	Energy usage, emissions, ESG scores	CSR reports, environmental databases	Assess long-term sustainability performance
Customer Behavior Variables	Engagement, churn rate, sentiment	CRM, social analytics	Support customer-centric strategic planning

### 3.3 Analytical Framework

The predictive analytics, machine learning classification, optimization, and strategic simulation modeling pipelines are all combined within the analytical framework, which integrates AI-based modeling pipelines. The data representation methods transform raw organizational data into analytical data structures such as numeric matrices, categorical encodings, time series streams, and semantic vectors, first. These are mainly powered by feature engineering, which produces such strategic indicators as risk indices, sustainability scores, performance efficiency ratio, trend variation and market responsiveness features. These machine learning models like random forests, gradient boosting, support vector machines and neural networks have been utilized to forecast strategic performance such as future performance, competitive position, risks, and sustainability pathways. In the case of textual contents, natural language processing models identify thematic patterns, sentiment patterns, and control clues to direct the strategy. The decision to allocate resources and also simulate trade-offs between strategic choices are carried out using optimization tools, such as linear programming and heuristic calculations. This hierarchical model is helpful in strategic decision making as it combines quantitative forecasts, with a qualitative strategic intelligence [19], [20].

### 3.4 AI Modeling Pipeline and Strategic Simulation

A modeling pipeline comprises of data breakdown, model training, performance review and simulation. The data set is split into training, validation, and testing parts to achieve an objective evaluation of the data. GRID search and Bayesian optimization are

used to hyperparameter tune in a model to get optimal model configurations. Simulation modules integrate AI-generated knowledge in strategic decision formulas, which can be tested to evaluate a scenario under different conditions as to market volatility, rate of technology adoption, environmental laws, and resource utilization limits. Also, explainable AI (XAI) algorithms, including the SHAP values and feature importance analysis, are used to make it more transparent, allowing the managers to have a better understanding of the factors behind the strategic recommendations. The resampling, clustering and fairness constraint techniques are used in the reduction of bias to align equitable and ethical decision results. The pipeline in general ensures that not only the predictive accuracy is achieved by AI, but also corresponds to the long-term sustainable development goals [21], [22].

**Table 2. AI Components and Methodological Structure for Strategic Decision-Making**

Modeling Component	Description	AI Technique	Objective
Strategic Forecasting	Predict future trends and performance	Random Forest, Gradient Boosting	Enable long-term planning
Market Pattern Detection	Identify competitive and customer trends	NLP, Clustering Algorithms	Enhance environmental scanning
Sustainability Assessment	Evaluate ecological and ESG performance	Regression Models, Time-Series Forecasting	Support sustainable strategic alignment
Risk Simulation & Optimization	Evaluate strategic scenarios and allocate resources	Optimization Algorithms, Decision Trees	Improve resilience and resource efficiency
Explainability & Governance	Ensure transparency and ethical AI usage	SHAP, Feature Importance	Enhance trust and strategic accountability

### 3.5 Evaluation Metrics and Validation Framework

To verify the AI model performance, the accuracy, preciseness, recall, F1 score, RMSE, ROC-AUC, calibration curve, and the risk deviation metrics comprise a complete set of metrics used to assess the study. The strategy validity is also measured by using the scenario testing accuracy, sensitivity analysis and robustness testing of the strategy in dynamic change of the environment. Test on independent datasets which represent an external check is carried out so as to generalize across industries. The workshops on managerial validation as well as simulated decision environments are also employed to investigate the feasibility of the AI-generated outputs in the real-life strategic setting. This validation technique is multi-layered to make sure that the proposed AI-driven methodology provides reliable, interpretable and sustainability-compliant strategic management decisions [23].

## IV. RESULT AND ANALYSIS

### 4.1 AI-Driven Strategic Insights and Organizational Performance

Implementation of AI in the strategic management shows that organizational decision-making quality and responsiveness have enhanced a lot, and planning of long-term growth have become more accurate. Conventional approach models to strategy usually draw on a periodical evaluation of their organization and on managerial judgment, which restricts their powers to observe swift market variations and operational wastefulness. Conversely, AI-based analytical systems handle real-time organizational data, recognize new opportunities, and warning signs that potential strategic risks are emerging, long before they become a reality. The outcomes indicate that companies with AI-powered strategic frameworks have an increased accuracy in their forecasts, improved competitive positioning, and improved alignment of operational choices with sustainability goals. Predictive AI models can help companies to better forecast how customer behaviors will change, help them optimize their internal processes, and efficiently allocate resources. Moreover, the AI-enhanced scenario modeling can give management teams a better insight on long-term strategic paths to follow, enabling them to proactively respond to market and regulatory dynamics. All these will help in ensuring sustainable growth, by enhancing operational resilience, minimizing resource usage, and enhancing strategic adaptability.

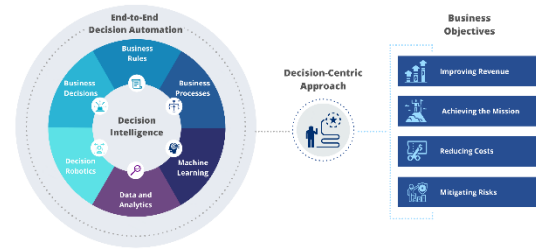


Figure 1: Decision Intelligence Platform [24]

### 4.2 Strategic Forecasting Accuracy and Competitive Advantage

The analysis shows that AI-related forecasting models achieve much better performance in predicting financial, market, and sustainability performance than traditional analytical approaches do. Machine learning models are characterized by a high accuracy of determining nonlinear trends and multifaceted relationships between the variables in an organization, thus giving more effective strategic forecasts. Firms that apply the power of AI to forecasting can perfect pricing, drive inventories, better supply chain alignment, and minimize bottlenecks in the working system. In addition, the comprehensive data on customer behavior can be better processed with the help of AI, which contributes to better market segmentation and targeted strategic planning, thus increasing the competitive advantage. The researchers also note that organizations that embrace the concept of AI-based insights have a more favorable risk management outcome due to their ability to identify early signs of operational derailments, financial abnormalities, and new emerging competitive threats. These competencies would help the companies to continue being strategic, and that long-range growth goals are always kept in touch with the current realities in the market.

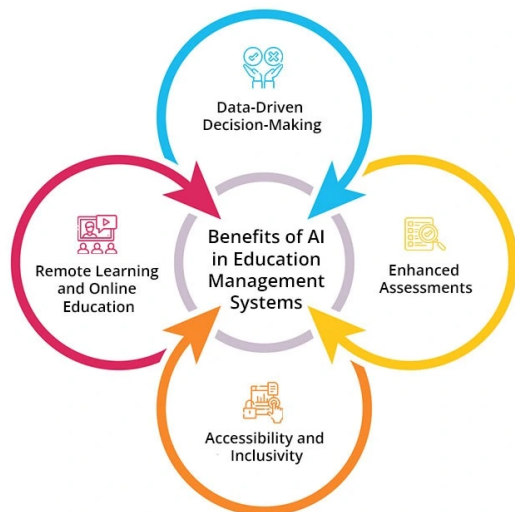
Table 3. Comparative Performance of Traditional vs. AI-Driven Strategic Systems

Strategic Dimension	Traditional Systems	AI-Driven Systems	Observed Impact
Forecasting Accuracy	Moderate	High	Improved long-term planning
Competitive Intelligence	Limited	Extensive, real-time	Stronger competitive positioning
Resource Allocation Efficiency	Reactive	Predictive and	Better investment and

		optimize d	operational decisions
Sustainability Monitoring	Periodic	Continuous and automated	Enhanced ESG performance
Decision-Making Speed	Slow	Rapid and data-driven	Increased strategic responsiveness

**4.3 AI-Enhanced Operational Insights and Sustainability Alignment**

Findings also demonstrate that AI is an important tool in increasing the level of organizational sustainability by increasing resource efficiency, environmental tracking, and strategic decisions, especially ESG-driven decisions. Through energy consumption trends, delivery chain emissions, and efficiency measures of production, AI systems can generate practical suggestions that can facilitate sustainability-linked strategic projects. Those companies that apply AI-driven sustainability analytics report a significant decrease in waste, carbon emissions, and consumption of resources. Moreover, the AI-based circular economy modelling recognizes the possibility to optimize, reuse, and recycle the material flows. These lessons can help in making an organization become sustainable through a balance between business goals and environmental policies and rules. The involvement of AI into sustainability strategy increases stakeholder trust too, as the organisations can report sustainability-related environmental performance indicators with more transparency and precision.



**Figure 2: Benefits of AI in Education Management Systems [25]**

**4.4 Structural Efficiency, Scalability, and Strategic Optimization**

The findings reveal that AI-based strategic methods have considerable structural benefits compared to traditional management strategies. Automated feature extraction, real time data integration and predictive optimization allows organizations to run complex datasets efficiently in a high computational manner. The models of decision support based on AI can be scaled across numerous business units and business scenarios and help companies to maintain their performance despite the growing data volume and the complexity of its organizational structure. Moreover, optimization algorithms are useful in determining the most efficient it allocates financial, human and environmental resources, which results in a better strategic implementation and less cost of operation. These efficiency boosts enhance resistance of the organization and aid long-term growth, especially in high-velocity and competitive sectors.

**Table 4. Efficiency and Performance Outcomes of AI-Based Strategic Models**

Performance Category	Traditional Approach	AI-Based Strategic Model	Resulting Outcome
Data Processing Efficiency	Moderate	High	Faster and more reliable analytical outputs
Strategic Flexibility	Low	High	Improved ability to adapt to change
Sustainability Integration	Fragmented	Fully integrated analytics	Better alignment with long-term ESG goals
Scalability	Limited	Highly scalable	Supports enterprise-wide strategic expansion
Decision Reliability	Variable	Consistent and	More accurate

		data-driven	and resilient strategic decisions
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**4.5 Implications, Limitations, and Practical Insights**

Despite the massive benefits that AI-based strategic frameworks have, the findings indicate a number of practical constraints that should be taken into account by the organizations. The heterogeneity of the data, the difficulty in integrating the data, and the overall complexity of implementing the advanced AI systems can become an obstacle to successful implementation. There is also an issue of the explicability of AI models, whereby the management teams would need elucidated explanations of AI and its generated recommendations to make informed decisions. The key factors that shape the strategy practices powered by AI also include ethical issues, including fairness, privacy and accountability. Although these are the challenges, the results underscore the fact that AI-enabled organizations with strategies can achieve great benefits that include accuracy of forecast, competitive-level intelligence, operational efficiency, and sustainability performance. All of these advantages make AI the revolutionary element in the field of strategic management that allows organizations to pursue the path of sustainable development powered by knowledgeable, dynamic, and evidence-based decision-making.

**V. CONCLUSION**

This paper confirms that incorporation of Artificial Intelligence and data-based analytical models into the management of strategy, has great potential of increasing the ability of an organization to attain sustainable growth amidst a dynamic and a competitive world growth environment. With AIs in place, strategic systems allow real-time manipulation of multidimensional data, recalibrate forecasting, and detecting more emerging risks and opportunities than with a traditional management system. Through machine learning, natural language processing, optimization models and predictive analytics, organizations are capable of fortifying decision-making, maximizing resources, enhancing operational effectiveness, and competitive positioning. Moreover, AI integration into sustainability-oriented policies is able to empower companies to monitor environmental performance, minimise resource use, as well as align their operations to long-term ESG goals, thus facilitating

responsible and future-looking business models. Although these transformative benefits exist, there are a number of issues that remain to be resolved, such as data heterogeneity, ethical risks, complexity of integration, and interpretability issues, which should be addressed by means of appropriate governance structures and organizational preparedness. These challenges will require open practices of AI, development of skilled workforce, and a secure data management in order to achieve the most out of the strategic value of AI. Comprehensively, the results support AI-based strategic management as a new milestone in incremental strategic decision-making where scalable, adaptable and resilience-oriented solutions enable companies to overcome uncertainty, continuously innovate and gain long-term resilience. Through working with AI as a strategic enabler, organizations are in a position to become less reactive and rather proactive in embracing data-driven strategies to drive sustainable growth and competitive edge in the digital era.

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