An AI-Driven Decision Support Framework for Strategic Management in Data-Centric Organizations

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ABSTRACT: In the era of digital transformation, data-centric organizations increasingly rely on advanced analytics and artificial intelligence (AI) to gain competitive advantage and support strategic decision-making. Traditional decision support systems (DSS), while effective in handling structured data and routine decisions, often lack the adaptability, predictive power, and real-time intelligence required to address complex and dynamic strategic challenges. This study proposes an AI-driven decision support framework tailored for strategic management in data-centric organizations. The framework integrates machine learning, predictive analytics, natural language processing, and knowledge-based systems to enhance the quality, speed, and accuracy of strategic decisions.

The proposed framework emphasizes the transformation of raw organizational data into actionable strategic insights through automated data ingestion, intelligent processing, and continuous learning mechanisms. AI models are employed to analyze historical and real-time data, identify patterns, forecast future trends, and simulate alternative strategic scenarios. By embedding explainable AI (XAI) components, the framework ensures transparency and trust in decision outcomes, enabling managers to understand and justify AI-driven recommendations. Additionally, the framework supports collaborative decision-making by combining human expertise with AI-generated insights, fostering a hybrid intelligence approach.

The study adopts a conceptual and analytical methodology supported by a review of existing literature on AI-based decision support, strategic management, and data-driven organizations. The findings indicate that AI-driven DSS significantly enhance strategic agility, risk assessment, and resource allocation while reducing cognitive bias and uncertainty in managerial decisions. However, challenges such as data quality, ethical concerns, skill gaps, and organizational resistance are also identified.

The proposed framework contributes to both theory and practice by offering a structured model that aligns AI capabilities with strategic management objectives. It provides a roadmap for organizations seeking to leverage AI for long-term planning, competitive positioning, and sustainable growth. The study concludes that AI-driven decision support systems are no longer optional but essential for strategic management in data-centric organizations operating in volatile and data-intensive environments.

KEYWORDS: Artificial Intelligence, Decision Support Systems, Strategic Management, Data-Centric Organizations, Predictive Analytics, Machine Learning

I. INTRODUCTION

Strategic management in modern organizations has become increasingly complex due to rapid technological advancements, growing data volumes, and volatile market conditions. Data-centric organizations, in particular, generate and rely on vast amounts of structured and unstructured data to guide strategic planning and execution. Traditional decision-making approaches, largely dependent on human judgment and static analytical tools, are often insufficient to process such data effectively. Artificial intelligence offers transformative capabilities by enabling intelligent data analysis, predictive modeling, and automated reasoning. An AI-driven decision support framework can enhance strategic management by providing timely, accurate, and evidence-based insights, thereby improving organizational agility and competitive advantage.

II. LITERATURE REVIEW

Previous research highlights the evolution of decision support systems from rule-based and model-driven systems to intelligent, AI-enabled platforms. Studies show that machine learning and predictive analytics significantly improve forecasting accuracy and strategic planning outcomes. Researchers emphasize the role of AI in reducing managerial bias, enhancing scenario analysis, and enabling real-time decision-making. However, existing literature also points to limitations such as lack of explainability, data governance issues, and ethical concerns. While several studies explore AI applications in operational decision-making, limited research focuses on integrated AI-driven frameworks specifically designed for strategic management in data-centric organizations, indicating a clear research gap.

III. RESEARCH METHODOLOGY

This study adopts a conceptual research methodology supported by systematic literature analysis. Peer-reviewed journals, conference papers, and industry reports related to AI, decision support systems, and strategic management were analyzed. Based on identified gaps and best practices, an AI-driven decision support framework was designed. The framework architecture includes data acquisition, data processing, AI analytics, decision modeling, and strategic visualization layers. Comparative analysis was conducted to evaluate the proposed framework against traditional DSS models in terms of adaptability, intelligence, and strategic value.

IV. RESULTS AND DISCUSSION

The analysis reveals that AI-driven decision support systems significantly enhance strategic decision quality by enabling predictive insights, scenario simulations, and real-time monitoring. Organizations adopting the proposed framework benefit from improved strategic alignment, proactive risk management, and optimized resource utilization. The integration of explainable AI improves managerial trust and adoption. However, the results also highlight challenges related to data integration, model bias, ethical governance, and the need for upskilling decision-makers. Addressing these challenges is crucial for successful implementation.

V. CONCLUSION

The study concludes that AI-driven decision support frameworks play a critical role in strategic management for data-centric organizations. By integrating advanced AI techniques with strategic decision processes, organizations can transform data into a strategic asset. The proposed framework provides a holistic and scalable approach to enhance decision-making effectiveness, transparency, and agility. Future research may focus on empirical validation of the framework and exploration of industry-specific applications. Ultimately, AI-driven decision support systems represent a strategic imperative for organizations seeking sustainable competitive advantage in data-intensive environments.

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