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The impact of organizational learning on sustainable competitive advantage about the mediating role of cultural intelligence and artificial intelligence adoption

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Abstract

In today's competitive banking sector, artificial intelligence (AI) and cultural intelligence (CQ) play crucial roles in enhancing organizational learning and achieving sustainable competitive advantage (SCA). This study investigates the impact of organizational learning on SCA, considering the mediating roles of AI adoption and CQ in Mehr Iran Banks, Sari. This applied, analytical-survey research employs structural equation modeling (SEM) using SPSS 25 and Smart PLS. Using simple random sampling, 169 employees were selected from a population of 300. Data were collected via four structured questionnaires through library and field studies. Findings confirm that organizational learning significantly enhances SCA, with AI adoption and CQ acting as mediators. Moreover, AI and CQ improve decision-making speed and service quality, enabling banks to adapt to dynamic market conditions.

Keywords: Organizational learning, sustainable competitive advantage, artificial intelligence adoption, cultural intelligence

1- Introduction

Companies must continuously evolve to maintain their market position in today's dynamic and competitive business environment. Globalization, technological advancements, and resource constraints have forced organizations to adopt more open and collaborative strategies to achieve sustainable competitive advantage. One of the key drivers of this advantage is organizational learning, which enables companies to adapt, innovate, and respond effectively to environmental changes.

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Organizational learning can be categorized into two primary forms: exploratory and exploitative. Exploratory learning focuses on discovering, experimenting, and creating new knowledge, while exploitative learning involves refining, implementing, and improving existing knowledge. Both forms contribute to an organization's ability to remain competitive by balancing innovation and efficiency (Nozari et al., 2022; Nozari & Abdi, 2024)). Competitive advantage, particularly when sustainable, provides organizations long-term success by differentiating them from competitors. Sustainable competitive advantage should be complex to imitate, unique, continuous, and applicable across various business scenarios to be effective. The absence of such an advantage can result in long-term business failures, making it a critical factor in an organization’s strategy.

One of the major challenges companies face is adapting to constant shifts in customer preferences, technological disruptions, and market dynamics. Organizations that continuously learn and integrate new knowledge into their operations can better navigate these complexities. This adaptability is particularly vital in the banking industry, where competition is intense and customer expectations are ever-changing. Banks must constantly enhance their services, optimize processes, and leverage technology to improve efficiency and customer satisfaction (Movahed et al., 2024).

Integrating artificial intelligence (AI) and cultural intelligence (CQ) is a growing area of interest in organizational learning. AI enhances decision-making, automates processes, and improves operational efficiency, while CQ enables organizations to function effectively in diverse cultural settings. Cultural intelligence, the ability to understand, adapt, and function in multicultural environments**,** plays a crucial role in leadership and business strategy. AI adoption and CQ can significantly influence service quality, innovation, and market adaptability in the banking sector.

This study explores the relationship between organizational learning and sustainable competitive advantage in Mehr Iran Banks in Sari, considering the mediating roles of AI adoption and cultural intelligence. The research aims to determine how these factors interact and contribute to long-term competitiveness in the banking industry.

2- **Literature review**

Organizational learning has been widely recognized as a fundamental driver of competitive advantage. It is the process by which organizations acquire, interpret, and respond to knowledge to enhance their capabilities. Learning organizations are better equipped to adapt to changes, improve decision-making, and foster innovation. Two primary forms of learning—exploratory and exploitative learning—play a crucial role in shaping an organization's strategic direction. Exploratory learning focuses on experimentation and innovation, while exploitative learning refines and improves existing processes. A balance between the two is essential for achieving long-term sustainability and maintaining a competitive edge (Nozari et al., 2024).

Sustainable competitive advantage refers to an organization's ability to outperform its competitors over time. It is based on unique capabilities, resources, and strategies that are difficult to replicate**.** Studies have shown that firms with strong learning cultures can develop a sustained advantage by leveraging knowledge, fostering innovation, and continuously improving performance (movahed et al., 2024)**.**

The integration of artificial intelligence (AI) has transformed how organizations acquire, process, and utilize knowledge (Nozari et al., 2022). AI technologies, such as machine learning, predictive analytics, and natural language processing, enhance decision-making by analyzing vast amounts of data and identifying patterns that would otherwise go unnoticed. In banking, AI-driven automation streamlines operations, improves customer service, and enables risk assessment and fraud detection (Fallah et al., 2021).

AI also plays a critical role in organizational learning by facilitating data-driven insights**.** Organizations that effectively adopt AI can enhance their learning processes, reduce errors, and develop innovative solutions**.** AI adoption is particularly relevant in the banking sector, where it can personalize financial services, optimize investment decisions, and improve operational efficiency (Nozari et al., 2024).

Cultural intelligence (CQ) is an emerging concept in organizational research, particularly in the context of globalization. It is defined as the ability to understand, adapt to, and interact effectively in diverse cultural settings**.** CQ is particularly relevant for multinational organizations and service-oriented industries, such as banking, where employees frequently engage with customers from different cultural backgrounds (Mohammadi et al., 2025).

CQ has been linked to enhanced leadership, better teamwork, and improved decision-making in culturally diverse environments**.** Organizations with a high level of cultural intelligence can navigate global markets more effectively, build stronger customer relationships, and create inclusive workplaces. In the banking sector, CQ enables employees to tailor financial services to diverse customer needs, improving customer satisfaction and retention (Aliahamadi et al., 2016)**.**

While organizational learning is a key driver of competitive advantage, the extent to which it influences long-term success depends on how effectively organizations leverage AI and cultural intelligence**.** Studies suggest that AI adoption enhances learning by automating knowledge acquisition and analysis**,** while CQ strengthens an organization's adaptability in multicultural environments**.** Together, these factors create a more resilient and innovative organization capable of responding to market shifts and customer demands (Lotfi et al., 2016)**.**

AI adoption improves efficiency in the banking sector, while CQ enhances customer engagement. Banks integrating these elements into their learning strategies are better positioned to achieve and sustain competitive advantage**.** This study explores how organizational learning, with the mediating roles of AI adoption and CQ, contributes to sustainable competitive advantage in Mehr Iran Banks in Sari**.**

By understanding these relationships, this research provides valuable insights into how banks can enhance their learning processes, optimize technology adoption, and leverage cultural intelligence to strengthen their market position**.**

3- Research Hypotheses

Based on the literature review and previous studies, this research formulates the following hypotheses to examine the impact of organizational learning on sustainable competitive advantage,

considering the mediating roles of artificial intelligence adoption and cultural intelligence in Mehr Iran Banks in Sari:

H1: Organizational learning significantly affects sustainable competitive advantage in Mehr Iran Banks in Sari.

H2: Organizational learning significantly affects sustainable competitive advantage, considering the mediating role of artificial intelligence adoption in Mehr Iran Banks in Sari.

H3: Organizational learning significantly affects sustainable competitive advantage, considering the mediating role of cultural intelligence in Mehr Iran Banks in Sari.

These hypotheses aim to assess how organizational learning enhances competitive advantage directly and through adopting artificial intelligence and cultural intelligence as mediators. The findings will contribute to understanding the role of learning-driven strategies in strengthening the banking sector's ability to maintain a sustainable competitive edge.

4- Research Method

This study is applied in nature and follows an analytical-survey approach. The research methodology is regression-based, aiming to examine the impact of organizational learning on sustainable competitive advantage**,** with the mediating roles of artificial intelligence adoption and cultural intelligence in Mehr Iran Banks in Sari.

The statistical population consists of 300 employees from Mehr Iran Banks in Sari. Based on Morgan and Krejcie's sampling table**,** 169 employees were selected using simple random sampling**.**

The study utilizes library research for theoretical background and field surveys for empirical data collection. The primary data collection tool is four structured questionnaires, each measuring different research variables.

Measurement Instruments

1. **Organizational Learning Questionnaire** – 15 items, developed by Neefe (2001).
2. **Sustainable Competitive Advantage Questionnaire** – 16 items, designed by Hill & Jones (2010).
3. **Artificial Intelligence Adoption Questionnaire** – 10 items, adapted from Chen et al. (2022).
4. **Cultural Intelligence Questionnaire** – 20 items, developed by Ang & Earley (2004).

Reliability and Validity

- **Content validity** was confirmed through expert review.
- **Reliability** was assessed using **Cronbach's alpha and composite reliability**, with all values exceeding **0.7**, confirming internal consistency.

Data Analysis

- **Descriptive statistics** were used for demographic analysis via **SPSS 25**.
- **Inferential analysis** was conducted using **structural equation modeling (SEM)** with **Smart PLS 4**.
- Model fitness was evaluated through **Cronbach's alpha, AVE (convergent validity), Fornell-Larcker criteria (discriminant validity), and GOF index**.

This methodology ensures a **robust, data-driven approach** to evaluating how **organizational learning influences competitive advantage through AI adoption and cultural intelligence** in the banking sector.

5- Hypotheses Analysis

This section presents the results of hypothesis testing using structural equation modeling (SEM) with Smart PLS 4. The evaluation includes the direct and indirect effects of organizational learning on sustainable competitive advantage, considering the mediating roles of artificial intelligence adoption and cultural intelligence.

Table 1 in the original document presents T-statistics for hypothesis testing. A T-value above 1.96 at a 95% confidence level indicates statistical significance.

Table 1: T-Statistics Results

Hypothesis	Path	T-Statistic	Result
H1	Organizational Learning → Sustainable Competitive Advantage	**14.56**	☑ Supported
H2	Organizational Learning → AI Adoption	**23.77**	☑ Supported
H3	AI Adoption → Sustainable Competitive Advantage	**15.81**	☑ Supported
H4	Organizational Learning → Cultural Intelligence	**14.55**	☑ Supported
H5	Cultural Intelligence → Sustainable Competitive Advantage	**10.58**	☑ Supported
H6	Organizational Learning → AI Adoption → Sustainable Competitive Advantage	**7.56**	☑ Supported
H7	Organizational Learning → Cultural Intelligence → Sustainable Competitive Advantage	**9.03**	☑ Supported

The results confirm that all paths are statistically significant. The highest T-value (23.77) is observed in the relationship between Organizational Learning and AI Adoption, highlighting the

strong influence of learning on AI integration. Additionally, the direct impact of Organizational Learning on Sustainable Competitive Advantage (14.56) is significant, confirming its fundamental role.

Table 2 in the original document visualizes the **structural equation model** with **path coefficients** (β values). These coefficients indicate the **strength of relationships** between variables.

Table 2: Standardized Coefficients Model

Path	Coefficient (β)	Strength
Organizational Learning → Sustainable Competitive Advantage	**0.48**	Moderate-High
Organizational Learning → AI Adoption	**0.69**	High
AI Adoption → Sustainable Competitive Advantage	**0.55**	High
Organizational Learning → Cultural Intelligence	**0.56**	Moderate-High
Cultural Intelligence → Sustainable Competitive Advantage	**0.51**	Moderate-High
Organizational Learning → AI Adoption → Sustainable Competitive Advantage	**0.31**	Moderate
Organizational Learning → Cultural Intelligence → Sustainable Competitive Advantage	**0.29**	Moderate

The most substantial relationship (β = 0.69) exists between Organizational Learning and AI Adoption, suggesting that learning culture significantly enhances AI acceptance in banking. The direct effect of Organizational Learning on Competitive Advantage (β = 0.48) remains strong, confirming that learning-based strategies are essential for long-term competitiveness.

Table 3 in the original document presents hypothesis results, including standardized coefficients, T-statistics, and P-values to confirm statistical significance.

Table 3: Hypothesis Testing Results

Hypothesis	Path	β Coefficient	T-Statistic	P-Value	Result
H1	Organizational Learning → Sustainable Competitive Advantage	**0.48**	**14.56**	**0**	☑ Supported
H2	Organizational Learning → AI Adoption	**0.69**	**23.77**	**0**	☑ Supported
H3	AI Adoption → Sustainable Competitive Advantage	**0.55**	**15.81**	**0**	☑ Supported
H4	Organizational Learning → Cultural Intelligence	**0.56**	**14.55**	**0**	☑ Supported
H5	Cultural Intelligence → Sustainable Competitive Advantage	**0.51**	**10.58**	**0**	☑ Supported
H6	Organizational Learning → AI Adoption → Sustainable Competitive Advantage	**0.31**	**7.56**	**0**	☑ Supported

H7	Organizational Learning → Cultural Intelligence → Sustainable Competitive Advantage	**0.29**	**9.03**	**0**	☑ Supported

All hypotheses are statistically significant ($P < 0.05$). The direct and indirect effects confirm that organizational learning improves competitive advantage through AI adoption and cultural intelligence**.** AI adoption exhibits a more substantial mediating role ($\beta = 0.31$) than cultural intelligence ($\beta = 0.29$), indicating its more decisive influence in enhancing competitiveness.

6- Conclusion

In today's dynamic and competitive business environment, organizational learning plays a fundamental role in shaping organizations' long-term success. This study examined the impact of organizational learning on sustainable competitive advantage**,** considering the mediating roles of artificial intelligence (AI) adoption and cultural intelligence (CQ) in Mehr Iran Banks in Sari**.** The results provide strong empirical evidence that learning-oriented organizations are better positioned to leverage advanced technologies and cultural adaptability to maintain a competitive edge.

Key Findings

1. **Organizational learning directly enhances sustainable competitive advantage** ($\beta = 0.48$, $T = 14.56$). This confirms that continuous learning and knowledge-sharing within an organization strengthen its ability to compete effectively in the banking sector.
2. **AI adoption serves as a strong mediator** between organizational learning and competitive advantage ($\beta = 0.31$, $T = 7.56$). This indicates that organizations that embrace AI technologies can significantly **enhance decision-making, operational efficiency, and customer service**, leading to improved competitiveness.
3. **Cultural intelligence also mediates the relationship between organizational learning and competitive advantage** ($\beta = 0.29$, $T = 9.03$). This suggests that cross-cultural adaptability and effective communication play a critical role in organizational success, especially in service-driven industries like banking.
4. **Among the two mediators, AI adoption has a slightly stronger impact** on sustainable competitive advantage compared to cultural intelligence. This underscores the growing importance of digital transformation in gaining a competitive edge.

Practical Implications

- **For Banking Institutions:** To remain competitive, banks must **invest in AI-driven solutions** that enhance automation, customer insights, and risk management. Additionally, **cultural intelligence training** can improve employee adaptability, fostering better customer relations in diverse market conditions.
- **For Organizational Leaders:** Leadership should prioritize **organizational learning initiatives**, such as **continuous training, knowledge-sharing platforms, and AI skill development** to ensure a culture of innovation and adaptability.

- **For Policymakers & Researchers:** Future policies should focus on **integrating AI and cultural intelligence strategies into banking frameworks** to enhance digital readiness and cross-cultural competence.

Limitations and Future Research

While this study provides valuable insights, it is limited to Mehr Iran Banks in Sari, which may affect the generalizability of the findings. Future research could explore:

1. Comparative studies across different banking institutions or industries.
2. Longitudinal studies to assess the long-term effects of AI adoption and cultural intelligence.
3. Additional mediating variables such as innovation capability or dynamic capabilities**.**

This study highlights the strategic importance of organizational learning in fostering sustainable competitive advantage. By effectively integrating AI adoption and cultural intelligence**,** banking institutions can enhance service quality, improve operational efficiency, and sustain market leadership**.** The findings reinforce the need for a learning-driven, technology-enabled, and culturally intelligent approach to ensure long-term competitiveness in the financial sector**.**

References:

Aliahmadi, A., Jafari-Eskandari, M., Mozafari, A., & Nozari, H. (2016). Comparing linear regression and artificial neural networks to forecast total productivity growth in Iran. International Journal of Information, Business and Management, 8(1), 93.

Fallah, M., Sadeghi, M. E., & Nozari, H. (2021). Quantitative analysis of the applied parts of Internet of Things technology in Iran: an opportunity for economic leapfrogging through technological development. Science and technology policy Letters, 11(4), 45-61.

Lotfi, F. H. Z., Najafi, S. E., & Nozari, H. (Eds.). (2016). Data envelopment analysis and effective performance assessment. IGI Global.

Mohammadi, H., Ghazanfari, M., Nozari, H., & Shafiezad, O. (2015). Combining the theory of constraints with system dynamics: A general model (case study of the subsidized milk industry). International journal of management science and engineering management, 10(2), 102-108.

Movahed, A. B., Movahed, A. B., & Nozari, H. (2024). Smart Life and Sustainability. ISciHub.

Movahed, A. B., Movahed, A. B., Nozari, H., & Rahmaty, M. (2024). Security Criteria in Financial Systems in Industry 6.0. In Advanced Businesses in Industry 6.0 (pp. 62-74). IGI Global.

Nozari, H., & Abdi, H. (2024). Greedy Man Optimization Algorithm (GMOA): A Novel Approach to Problem Solving with Resistant Parasites. Journal of Industrial and Systems Engineering, 16(3), 106-117.

Nozari, H., & Aliahmadi, A. (2022). Lean supply chain based on IoT and blockchain: Quantitative analysis of critical success factors (CSF). Journal of Industrial and Systems Engineering, 14(3), 149-167.

Nozari, H., & Nahr, J. G. (2022). The impact of blockchain technology and the internet of things on the agile and sustainable supply chain. International Journal of Innovation in Engineering, 2(2), 33-41.

Nozari, H., Abdi, H., Szmelter-Jarosz, A., & Motevalli, S. H. (2024). Design of dual-channel supply chain network based on the internet of things under uncertainty. Mathematical and Computational Applications, 29(6).

Nozari, H., Szmelter-Jarosz, A., & Rahmaty, M. (2024). Smart Marketing Based on Artificial Intelligence of Things (AIoT) and Blockchain and Evaluating Critical Success Factors. In Smart and Sustainable Interactive Marketing (pp. 68-82). IGI Global.