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# SUMMARY

# Comparative Analysis between Classical Methods and Artificial Intelligence Approaches in Demand Forecasting

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## ABSTRACT

**Introduction**

Demand forecasting plays a critical role in inventory control, production planning, and overall supply chain performance. In an increasingly volatile economic environment, organizations are required to anticipate demand accurately in order to reduce logistics costs, improve service levels, and enhance operational efficiency. Traditionally, demand forecasting has relied on classical statistical methods due to their simplicity and transparency. However, recent advances in Artificial Intelligence (AI) and machine learning have introduced new forecasting paradigms capable of capturing complex and nonlinear demand patterns. This evolution raises important questions regarding the relative performance and practical relevance of classical versus AI-based forecasting approaches.

**Research Question**

The main research question addressed in this study is: *To what extent do AI-based forecasting methods outperform classical forecasting techniques in terms of accuracy and robustness, and under which demand conditions does each approach remain relevant for managerial decision-making?* Rather than opposing the two paradigms, this research aims to assess their complementarity in different operational contexts.

**Methodology**

A comparative experimental framework was adopted using a real monthly demand dataset covering a ten-month period for an industrial product. Four classical forecasting methods—Simple Moving Average (SMA), Weighted Moving Average (WMA), Simple Exponential Smoothing (SES), and Linear Regression—were implemented and compared with an AI-based method, namely the Light Gradient Boosting Machine (LightGBM). The models were evaluated using standardized performance



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indicators, including Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Mean Absolute Percentage Error (MAPE). All methods were applied under the same conditions to ensure objectivity and reproducibility of the comparison.

**Results**

The empirical results reveal an overall increasing demand trend. Among the classical methods, linear regression achieved the highest accuracy, outperforming smoothing-based techniques. However, the AI-based LightGBM model demonstrated superior forecasting performance, yielding the lowest error values across all evaluation metrics. This indicates its stronger ability to capture nonlinear trends and subtle fluctuations in demand patterns, particularly in dynamic environments.

**Discussion**

The findings confirm that AI-based models provide higher predictive accuracy, especially when demand exhibits variability and nonlinearity. Nevertheless, classical methods remain valuable due to their ease of implementation, transparency, and lower data requirements. From a managerial perspective, the results highlight that forecasting method selection should depend on demand stability, data availability, and organizational maturity. Rather than replacing traditional approaches, AI should be viewed as a complementary tool that enhances forecasting capabilities.

**Conclusion**

This study demonstrates that classical and AI-based forecasting methods serve different but complementary roles in demand forecasting. While AI models such as LightGBM offer superior adaptability and accuracy in uncertain environments, classical methods remain effective for stable and predictable contexts. The research advocates for hybrid forecasting strategies that combine interpretability and analytical rigor with the predictive power of AI, paving the way for more resilient and intelligent supply chain management.

**Keywords—** Demand forecasting; Artificial Intelligence; Classical forecasting methods; LightGBM; Supply chain management.

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ISSN: 2961-6611

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# Intelligent Steering Triplet: Towards Proactive Management through AI

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## ABSTRACT

**Introduction**

Organizational performance management traditionally relies on the Objective–Action Lever–Performance Indicator triplet, which structures the translation of strategic objectives into operational actions and measurable outcomes. While this framework has proven effective in stable environments, it shows significant limitations in contexts characterized by uncertainty, complexity, and rapid change, such as logistics-intensive and healthcare organizations. Classical steering systems remain largely reactive, retrospective, and weakly adaptive, limiting their ability to anticipate disruptions and support proactive decision-making.

**Research Question**

This study addresses the following research question: How can the classical Objective–Action Lever–Performance Indicator triplet be transformed into an intelligent, proactive, and adaptive management system capable of anticipating performance deviations and optimizing managerial decisions in real time?

**Methodology**

The paper proposes an intelligent steering triplet that integrates Artificial Intelligence (AI) into the traditional management loop. The methodology is conceptual and design-oriented, grounded in an extensive review of the literature on performance management, steering systems, and AI-driven decision support. The proposed model enriches the classical triplet with predictive and adaptive capabilities by embedding AI-based forecasting and optimization mechanisms. The intelligent triplet



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operates as a self-learning loop in which historical and real-time data feed predictive models, performance indicators are forecasted, and action levers are dynamically adjusted to maintain alignment with strategic objectives. A practical application in a hospital logistics context is used to illustrate the relevance and operational feasibility of the approach.

**Results**

The results show that integrating AI into the steering triplet fundamentally transforms the nature of performance management. The intelligent triplet enables the prediction of key performance indicators, early detection of potential deviations, and real-time optimization of action levers. In the hospital logistics application, the model demonstrates improved responsiveness, better anticipation of supply risks, and enhanced decision-making efficiency compared to classical reactive approaches. The system shifts performance evaluation from an ex-post logic to an ex-ante, predictive perspective.

**Discussion**

The findings highlight that the intelligent steering triplet overcomes major limitations of traditional management systems, particularly in complex and dynamic environments. By automating learning and adaptation, the model supports managers in handling uncertainty and interdependencies between objectives, levers, and indicators. However, the discussion also emphasizes critical conditions for successful implementation, including data quality, analytical capabilities, organizational maturity, and the need to maintain human oversight to avoid excessive reliance on automated recommendations.

**Conclusion**

This study contributes to performance management research by proposing an integrated intelligent steering triplet that combines classical management principles with AI-driven prediction and adaptation. The model provides a foundation for proactive, flexible, and predictive management without relying on complex formal multicriteria methods. Future research may extend the model to other sectors, integrate multicriteria decision-making approaches, and develop intelligent dashboards to further enhance managerial decision support.

Keywords— Intelligent steering triplet; Artificial intelligence; Performance management; Decision support; Predictive management; Hospital logistics.

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ISSN: 2961-6611

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# Operational Efficiency in the Pharmaceutical Supply Chain: Evaluation of Key Inventory Management Indicators

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**ABSTRACT**

The article explores how using inventory Key Performance Indicators (KPIs) can strengthen the operational efficiency and resilience of the pharmaceutical supply chain in the central pharmacy of CHU Mohammed VI in Oujda, Morocco. Ensuring continuous availability of medicines and medical devices is shown as a key condition for quality of care, and the COVID-19 crisis revealed important weaknesses such as stockouts and supply delays. Inventory management is positioned as a strategic lever to avoid both shortages and overstocking, which generates waste and immobilizes financial resources.

The study is a retrospective observational and analytical analysis based on 2023 data, relying on the HOSIX hospital information system and Excel files covering more than one hundred therapeutic batches, including Average Monthly Consumption, stock levels, and expiry dates. Quantitative and qualitative variables are analyzed together, and five KPIs are used: expiration rate, stockout rate, satisfaction of care units, delivery compliance, and inventory reliability (gap between physical and system stock).

The results highlight a paradox: overstocking of some products, especially devices and solutions, increases expiration risk, while vital medicines in areas such as anesthesia and infectiology face recurrent stockouts, leading to therapeutic alternatives and operational tension. Supplier failures and unsuccessful tenders appear as major causes of unavailability, and inconsistencies between HOSIX data and physical inventory show weaknesses in traceability and real-time data capture.

The article insists on three improvement levers: moving toward partnership-based, long-term purchasing for vital drugs, adopting differentiated inventory policies (high safety stocks for critical items and more agile flows for standard high-consumption products), and improving data reliability to support effective, KPI-driven digital management. It concludes that regular, rigorous monitoring of these KPIs, combined with proactive risk management and better coordination among stakeholders, is essential to secure medicine availability and continuity of care at CHU Oujda.

*Keywords*— **Pharmaceutical supply chain, Inventory management, Operational efficiency, Key Performance indicators**


ISSN: 2961-6611

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# The Use of Management Information Systems (MIS) in Moroccan Private Small and Medium-Sized Enterprises

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ABSTRACT

The present study investigates the use of a management information system, Boti, within Moroccan private enterprises, with the aim of identifying potential organizational changes associated with its implementation. To achieve this objective, a questionnaire was administered to 130 administrators and professors from four private academic institutions. The findings revealed that participants generally did not resist the change, as they effectively used the application to manage their administrative and instructional tasks, which they perceived as easy to handle. Moreover, Boti was employed to support various organizational and instructional functions, such as marking students' attendance, sharing course materials, and planning schedules. The majority of respondents also reported that the application enhanced workflow coordination and facilitated communication between employees and students. Nevertheless, participants encountered certain challenges, including insufficient training, difficulties managing some features, and technical problems.

***Keywords*— Management, innovation, small and medium enterprises, Morocco, technology**

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# Artificial Intelligence and Entrepreneurial Burnout: A Case Study of Tunisian Startups

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Abstract

Despite all the advantages offered by the use of artificial intelligence, the drawbacks must be taken into account. Drawing on the theory of conservation of resources and the job requirements and resources model, this study aims to examine the impact of AI on entrepreneurial burnout. Entrepreneurs undertake several tasks simultaneously without being able to complete them due to emergencies and unforeseen events. They feel tense and stressed because of the relatively precarious working conditions. They are subjected to stressful circumstances. Faced with this increasing stress among entrepreneurs, the issue of entrepreneurial burnout arises. This phenomenon depletes their resources on the one hand and disrupts, threatens, and impairs their mental and emotional well-being on the other. Burnout can also impact their work engagement. In most cases, it is felt when the entrepreneur does not feel professionally fulfilled.

Based on 11 interviews with innovative novice entrepreneurs in Tunisia, empirical results show that AI does not have a positive impact on burnout. On the contrary, according to the interviewees, AI helps reduce burnout among entrepreneurs by addressing these three components: emotional exhaustion, depersonalization, and reduced personal accomplishment. For them, thanks to creative solutions, artificial intelligence offers enormous potential for mitigating the managerial and cognitive constraints that lead to burnout.

Keywords: Artificial Intelligence; Entrepreneurial Burnout; Startup; Qualitative Research


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**ABSTRACT**
**Introduction**
University entrepreneurship has emerged as a strategic instrument for economic diversification, innovation, and youth employability, particularly in developing and emerging economies. In Algeria, where a large proportion of the population is under 30 years old, universities are increasingly expected to play a central role in fostering entrepreneurial skills and transforming academic knowledge into viable economic projects. In this context, University Incubators and Entrepreneurship Development Centers (EDCs) have been introduced as key institutional mechanisms designed to support students and graduates in the creation of start-ups and innovative ventures aligned with national development objectives.
**Research Question**
This study aims to examine the actual role of University Incubators and Entrepreneurship Development Centers in the training of entrepreneurs in Algeria. It seeks to answer the following questions: To what extent do these structures contribute to the development of entrepreneurial competencies? What is their impact on start-up creation and sustainability? What institutional, financial, and cultural constraints limit their effectiveness within the Algerian higher education system?
**Methodology**
The research adopts a descriptive and analytical approach based on qualitative and quantitative data collected from official institutional reports, university documents, and scientific publications available up to November 2024. The main data sources include reports from the Ministry of Higher Education and Scientific Research, national start-up platforms, and internal documentation from university incubators and EDCs. The analysis focuses on two dimensions: (1) the quantitative evolution of incubation structures, including their number, geographic distribution, and supported projects; and (2) the qualitative impact of incubation on entrepreneurial training, mentoring practices, access to funding, and integration into the socio-economic environment.
**Results**
The findings reveal a significant institutional acceleration in the development of university entrepreneurship in Algeria. By November 2024, 107 Entrepreneurship Development Centers were operational within higher education institutions, alongside a rapid increase in the number of university incubators. Approximately 60% of start-ups emerging from university incubation programs survive beyond their third year, a rate that exceeds that of enterprises created outside structured support mechanisms. These results demonstrate the positive contribution of academic incubation to improving project viability and strengthening entrepreneurial skills.
**Discussion**
Despite these encouraging outcomes, several structural challenges persist. Limited access to seed funding, weak public–private partnerships, governance issues, and insufficient professionalization of incubation teams constrain the full potential of these structures. Additionally, cultural barriers related to risk aversion and the social stigma of entrepreneurial failure continue to discourage initiative. These findings highlight the need for stronger coordination between universities, industry, and financial actors to ensure ecosystem coherence and sustainability.
**Conclusion**
University Incubators and Entrepreneurship Development Centers constitute a powerful lever for entrepreneurial training and innovation in Algeria. While their impact is already measurable, achieving the national objective of 20,000 start-ups by 2029 requires structural consolidation, sustainable financing mechanisms, professional governance, and the promotion of an entrepreneurial culture. Strengthening these



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dimensions will enable universities to fully assume their role as engines of innovation and inclusive economic growth.
**Keywords—** University entrepreneurship; University incubators; Start-ups; Entrepreneurial ecosystem; Innovation; Algeria

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# Entrepreneurial Orientation and Organizational Performance: An Exploratory Study of Tunisian SME Leaders

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**Abstract**

In an increasingly complex, changing, and unpredictable environment, entrepreneurial orientation is emerging as a crucial strategic lever for small and medium-sized enterprises (SMEs), particularly in developing countries. This research examines how SME leaders perceive and implement entrepreneurial orientation, and to what extent it influences organizational performance. To this end, a qualitative study was conducted with 21 Tunisian SME leaders, using semi-structured interviews to gather contextualized data. Thematic analysis of the interviews highlights three main findings. First, an entrepreneurial mindset is often seen not only as a fundamental driver of entrepreneurship and innovation, but also as a major asset for seizing new opportunities. Furthermore, it fosters overall business growth. Finally, an entrepreneurial orientation contributes significantly to improving perceived performance, particularly in terms of effectiveness, efficiency, sustainability, and innovation.

**Keywords:** Entrepreneurial Orientation; SMEs; Organizational Performance; Qualitative Study.

# Transparency and Liquidity: Determinants of Market Efficiency in the Tunisian Financial Market

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**Abstract—**

The efficiency of financial markets is paramount for optimal resource allocation and investor welfare, fundamentally defined by the rapid and accurate integration of available information into asset prices. A crucial prerequisite for this efficiency is transparency, which ensures the equitable distribution of financial and non-financial data among all participants. However, in emerging economies like Tunisia, the relationship between corporate integrity manifested through transparency and market mechanics remains under-explored. While theoretical frameworks suggest that high transparency should mitigate information asymmetry and enhance market functioning, empirical evidence in this context remains limited. Accordingly, this study addresses the following research question: What is the impact of corporate integrity on market efficiency? To investigate these dynamics, we conduct a quantitative panel data analysis on a sample of 38 listed firms on the Tunisian Stock Exchange over the period 2020– 2023. The study utilizes a multiple regression model with the Market Efficiency Coefficient as the dependent variable, calculated using the variance ratio method. The primary independent variable is a comprehensive Integrity Disclosure Index (IDI), constructed by analyzing annual reports for the presence of specific keywords such as "transparency", "IFRS standards", "audit", and "governance". Control variables include firm-level metrics such as Liquidity (trading volume to capitalization), Growth, and Price-to-Book ratio, alongside macroeconomic indicators like Inflation. The empirical findings reveal a divergence from initial theoretical expectations. Contrary to the hypothesis that transparency automatically yields efficiency, the regression analysis indicates that Integrity has a positive but statistically insignificant effect on the Market Efficiency Coefficient (MEC). Instead, market efficiency in Tunisia is primarily driven by other factors. Firm Growth exhibits a significant positive effect, suggesting that expanding firms contribute more to informational efficiency. Conversely, Volatility is identified as a highly significant determinant that negatively impacts efficiency, indicating that high price fluctuations hinder the market's ability to self-correct. While Liquidity showed positive associations in the data, the study concludes that growth and volatility are the dominant drivers. These results suggest that in emerging markets, integrity improves governance and investor confidence but may not be sufficient on its own to correct pricing inefficiencies. The structural asymmetry revealed here implies that "structural frictions" such as limited analyst



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coverage, thin trading volumes, or delayed information dissemination may dampen the expected benefits of transparency initiatives.
The study concludes that enhancing corporate transparency is necessary but insufficient. The findings underscore a strategic imperative for policymakers to go beyond simple disclosure requirements. To truly enhance the quality and stability of the financial system, regulators must focus on strengthening market microstructure and improving enforcement mechanisms. Future strategies should integrate these structural improvements with integrity initiatives to ensure that transparency translates into tangible market efficiency.

**Keywords—**Corporate Transparency, Integrity, Market Efficiency, Liquidity, Volatility, Emerging Markets.



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# The Hierarchical Relationship as a Balance Between Authority, Trust, and Collaboration

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**ABSTRACT**
This paper explores in depth the pivotal role of the leader–employee relationship as a foundational element of organizational performance, stability, and long-term sustainability. In contemporary organizations characterized by complexity, uncertainty, and continuous transformation, leadership can no longer be reduced to hierarchical authority or formal power. Instead, it emerges as a relational and interactive process in which authority, collaboration, trust, and professional rigor must coexist in a balanced manner. The quality of the relationship between leaders and employees directly influences motivation, engagement, innovation, and collective effectiveness.

The central research question guiding this study is as follows: How can organizations establish and maintain an optimal balance between managerial authority and relational collaboration in order to enhance employee commitment and overall organizational performance? This question is particularly relevant in contexts where excessive control may generate resistance and disengagement, while excessive flexibility may weaken structure, discipline, and accountability.

Methodologically, this research adopts a qualitative and conceptual approach based on an extensive review of the literature in leadership theory, human resource management, organizational behavior, and entrepreneurship. The analysis mobilizes classical and contemporary theoretical contributions addressing leadership roles, ethical leadership, managerial competencies, and relational dynamics. Particular attention is given to the typology of employees and the necessity for leaders to adapt their managerial practices to diverse behavioral profiles. The study also integrates an analytical reflection on trust, communication, motivation, and recognition as central mechanisms structuring the leader–employee relationship.

The findings of this conceptual analysis reveal that effective leadership is grounded in a dynamic equilibrium between authority and collaboration. Authority remains essential for providing direction, ensuring coordination, and maintaining professional standards. However, when authority is exercised in a rigid or authoritarian manner, it may lead to conflict, disengagement, and relational crises. Conversely, collaboration, based on dialogue, support, and mutual respect, strengthens trust and fosters employee empowerment, but requires clear boundaries to preserve organizational coherence. Leaders who demonstrate key qualities such as openness, fairness, authenticity, emotional intelligence, and adaptability are better positioned to mobilize collective energies and sustain performance.

The discussion highlights that the leader–employee relationship constitutes a strategic lever for organizational success when it is built on mutual trust, transparent communication, shared objectives, and ethical conduct. This relationship generates not only economic value, but also social and symbolic capital, reinforcing cohesion, commitment, and resilience within organizations.

In conclusion, this paper argues that employees should be regarded as strategic partners rather than mere executants. By combining authority with collaboration in a thoughtful and ethical manner, leaders can create a work environment conducive to sustainable performance, innovation, and long-term organizational development.



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***Keywords*— Leadership; Leader–Employee Relationship; Authority; Collaboration; Organizational Performance**

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# Governance and Corporate Social Responsibility in SMEs: Towards Strategic Convergence for Sustainable Performance

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**Introduction:**

SMEs, as essential drivers of the African economy, face complex challenges in integrating sustainable development. CSR emerges as a crucial strategy to reconcile economic performance, social equity, and environmental preservation. However, without appropriate governance and a solid strategic vision, its implementation remains incomplete.

**Research Question :**
How can CSR, governance, and strategic capabilities be articulated to promote sustainable performance in SMEs ?

**Methodology:**
This study is based on an innovative conceptual framework, analyzing the synergies between CSR, governance, and strategic capabilities. The approach, qualitative and conceptual in nature, aims to propose an operational mechanism enabling SMEs to transform their constraints into lasting competitive advantages.

**Results:**
We propose an exclusive tripartite model articulating three interdependent axes:

1. CSR, a source of legitimacy;
2. Governance, structuring decision-making ;
3. Strategic capabilities, ensuring implementation.

The model illustrates the feedback loops between these poles and their impact on sustainable performance.
Our analyses reveal that:

- Formal governance facilitates CSR integration;
- Strategic capabilities enable adaptation to external changes.

**Discussions:**
Alignment and harmonization of the three poles optimize sustainable performance, triggering a virtuous cycle of learning and innovation.
Identified obstacles include:

- Tension between short-term profitability and responsible investments ;
- Centralization of power ;



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- Lack of qualified personnel.

**Conclusion:**

The tripartite model fills a theoretical gap by offering a holistic view of sustainability levers for SMEs.

Managerial implications : establishing participatory governance, strengthening internal competencies, considering CSR as a strategic investment.

Policy recommandations : targeted training programs, fiscal incentives, platforms for sharing best practices.

Research perspectives : empirical validation of the model, impact of digitalization, analysis of managerial profiles in CSR adoption.

**Keywords:**

SME; CSR; governance; strategic capabilities; sustainable performance; tripartite model

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# Behaving Entrepreneurially, Remaining Resilient: Evidence from an Exploratory Study

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**ABSTRACT**

## Introduction

Nowadays, entrepreneurs operate in complex and uncertain environments, where psychological resilience plays a key role. Although entrepreneurial resilience has gained increasing attention, research focusing on individual and behavioral antecedents remains limited [1]. Prior studies have mainly examined individual entrepreneurial orientation, including risk taking, innovativeness, and proactiveness [2], in relation to entrepreneurial intention and success, while largely overlooking its link to resilience at the individual level [3], [4].

## Research Question

To what extent does individual entrepreneurial orientation contribute to entrepreneurial resilience at the individual level?

## Methodology

This study applies PLS-SEM to data from 120 university students collected during the 2024/2025 academic year. A Likert scale was utilized to assess entrepreneurial resilience. [5], while the individual entrepreneurial orientation was measured using a validated scale [2], along with control variables such as gender and education level.

## Results

TABLE 1: SUMMARY OF STRUCTURAL MODEL RESULTS

| Structural Relationship | $\beta$ (O) | *t*- value | *p*-value |
|---|---|---|---|
| Innovativeness → Entrepreneurial Resilience | 0.213 | 2.033 | 0.042 |
| Proactiveness→ Entrepreneurial Resilience | 0.237 | 2.028 | 0.043 |
| Risk Taking → Entrepreneurial Resilience | 0.297 | 3.197 | 0.001 |

The results in Table 1 further indicate that the three dimensions of individual entrepreneurial orientation have a positive and significant influence on entrepreneurial resilience. This finding suggests that these dimensions can serve as essential behavioral resources for individuals coping with adversity. Moreover, despite the model's moderate explanatory power ($R^2 = 0.389$), it provides compelling evidence that entrepreneurial orientation plays a crucial role in fostering resilience.

## Discussion

The results show a positive relationship between individual entrepreneurial orientation and entrepreneurial resilience. While the model explains this link only moderately, it still points to its relevance and suggests that other psychological factors deserve attention.

## Conclusion

This study highlights the relevance of individual entrepreneurial orientation in understanding entrepreneurial resilience and encourages further research in more complex settings.



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***Keywords***— **Individual entrepreneurial orientation - entrepreneurial resilience - entrepreneurial behavior - PLS-SEM- Gen Z**

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# Relational Drivers of Franchisee Entrepreneurial Performance: A Relational Governance Perspective in Franchise Networks

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**ABSTRACT**

**Introduction**
Franchise systems represent hybrid organizational forms where entrepreneurial initiative must coexist with contractual discipline. While contractual governance ensures brand consistency, it often restricts innovation and local responsiveness among franchisees. To address these limitations, relational governance, based on trust, commitment, cooperation, and value alignment, offers a more adaptive framework for encouraging entrepreneurial behavior. Despite growing theoretical attention, empirical validation remains limited, especially in emerging economies characterized by institutional uncertainty. This study aims to fill this gap by examining how relational quality, relational congruence, and cooperation influence franchisee entrepreneurial performance within the Tunisian context.

**Research Question**
The research investigates: *How do relational governance mechanisms affect franchisee entrepreneurial performance?* More specifically, it explores whether affective (trust, commitment, satisfaction), cognitive (identification, internalization), and behavioral (cooperation) dimensions of relational governance enhance innovation, competitiveness, and financial performance among franchisees.

**Methodology**
Grounded in Relational Governance Theory and informed by the Resource-Based View (RBV) and Agency Theory, this quantitative study collected data from 124 franchise units operating in Tunisia. A structured questionnaire was administered to franchise owners and co-owners across multiple sectors. The reliability and validity of constructs were verified using SPSS 23. Regression analyses tested the relationships among relational variables and entrepreneurial outcomes, ensuring robustness through Cronbach's alpha, KMO, and AVE measures.

**Results**
Findings reveal that relational quality partially predicts entrepreneurial performance. Commitment and satisfaction significantly enhance innovation and competitiveness, while trust alone shows no direct effect. Cooperation, through information sharing and joint problem-solving, stimulates entrepreneurial learning but remains constrained by rigid governance and standardization. Relational congruence exerts the strongest influence: franchisees who identify with and internalize franchisor values achieve superior innovation, cohesion, and financial performance, whereas compliance-oriented behavior is not significantly related to outcomes.

**Discussion**
These results reveal a core governance paradox: excessive contractual control preserves brand integrity but limits franchisee entrepreneurship. Entrepreneurial performance depends less on formal monitoring and more on relational alignment, cooperative learning, and guided autonomy. Trust becomes effective when enacted


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through collaboration and joint decision-making, while relational congruence functions as a dynamic capability that transforms social capital into competitive advantage. The study thus reframes franchising as a relational ecosystem in which affective, cognitive, and behavioral ties drive innovation and resilience.

**Conclusion**

The study contributes theoretically by integrating relational governance, RBV, and agency perspectives to explain entrepreneurial behavior in hybrid systems. It highlights relational quality and congruence as strategic relational capabilities that sustain innovation and adaptability. Managerially, franchisors should design governance models that strike a balance between standardization and empowerment, fostering transparent communication, co-learning, and shared innovation. Franchisees should strengthen their relational commitment and internalize the franchisor's values to maximize performance. Despite its cross-sectional and single-country limitations, the research provides a foundation for future longitudinal and cross-national analyses of relational dynamics in franchising. Overall, it reaffirms that sustainable franchise success relies less on contractual control than on relational alignment and mutual learning—key drivers of entrepreneurial performance in uncertain and competitive environments.

***Keywords***—Relational governance, Hybrid organizational form, Developing-country context, Franchisee entrepreneurial performance, Franchisee autonomy.

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# The Key Role of Managerial Capabilities in AI Adoption: The Case of Companies Operating in Tunisia

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*Abstract*—**The integration of Artificial Intelligence (AI) represents a major strategic challenge for companies, a challenge that is strongly conditioned by the managerial capabilities of their leaders. In Tunisia, mastery of these competencies has become an essential issue for developing effective and context-appropriate AI integration strategies. The objective of this research is to examine the impact of managerial capabilities on AI adoption in companies operating in Tunisia. A questionnaire was distributed to a representative sample of executives and senior managers from various economic sectors, selected using a probabilistic sampling method to ensure representativeness. The results highlight that general digital maturity is a necessary but insufficient condition for AI adoption. For Tunisian decision-makers, the challenge is no longer merely to "digitize," but to transform leadership in order to manage complexity and risk. The study suggests moving beyond conservative visions and strengthening AI-specific training to overcome execution constraints.**

***Keywords—Companies Operating in Tunisia- Artificial Intelligence (AI)- Digital Transformation- Managerial Capabilities.***

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# Sustainable Consumption Behavioral intention and its Impact on Quality of Life, Environmental Well-Being, and Future Generations

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**ABSTRACT**

**Introduction** Sustainable consumption is a major global concern due to increasing environmental degradation and threats to human well-being [1]. Consequently, the Theory of Planned Behavior (TPB) is widely used to explain sustainable consumption behaviors [1]. However, limited research has examined how sustainable consumption behavioral intention (SCBI) translates cognitive and social determinants into broader behavior outcomes [4]. Prior studies show that sustainable consumption also encompasses quality of life, environmental well-being, and future generations [5].

**Research Question:** Does sustainable consumption behavioral intention mediate the relationships between environmental knowledge, subjective norms, and personal norms, and quality of life well-being, care for environmental well-being, and care for future generations in the Tunisian context?

**Methodology:** The study adopts a positivist, quantitative approach. Data were collected from 350 Tunisian respondents via an online questionnaire using validated measurement scales for environmental knowledge, social norms, and sustainable consumption behavior [2], [3]. Partial least squares structural equation modeling (PLS-SEM) was employed to test complex relationships and mediation effects [6].

**Results:** Mediation analysis confirms that SCBI significantly transmits the effects of environmental knowledge and subjective norms to all three outcomes [2], [3]. However, the mediating role of SCBI in the relationships involving personal norms is not supported.

**Discussion:** These findings highlight SCBI as a central mechanism linking cognitive and social determinants to sustainable outcomes, in line with TPB assumptions [1]. The stronger influence of environmental knowledge and subjective norms suggests that education and social influence play a more effective role than moral obligation alone in encouraging sustainable consumption behavior in Tunisia. This supports existing evidence on the intention–behavior gap [3], [4].

**Conclusion:** This study contributes to sustainable consumption research by validating the mediating role of sustainable consumption behavioral intention within an extended TPB framework. It underscores the importance of knowledge-based and norm-driven interventions in promoting quality of life, environmental well-being, and care for future generations, particularly in developing country contexts such as Tunisia [5].

***Keywords*— Sustainable consumption behavioural intention, Theory of Planned Behaviour, environmental knowledge, Indirect Effect, environmental well-being, intergenerational responsibility.**

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# The Effect of Digital Marketing Tools on the Marketing Performance of Tunisian Companies: The Mediating Role of Digital Marketing Capabilities.

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**ABSTRACT**

- **Introduction**

The increasing use of digital technologies has profoundly transformed marketing practices, particularly among small and medium-sized enterprises. In Tunisia, firms are increasingly relying on digital marketing tools—such as social media, online advertising, websites, and analytics platforms—to strengthen their market presence and enhance customer engagement. However, despite similar levels of investment in digital tools, firms experience heterogeneous marketing performance outcomes. This disparity suggests that the mere adoption of digital marketing tools is insufficient to generate superior performance, thereby highlighting the importance of internal capabilities. Drawing on Resource-Based Theory (RBT), this study argues that digital marketing tools create value only when firms possess digital marketing capabilities that enable them to deploy, integrate, and exploit these tools effectively.

- **Research Question**

This research seeks to answer the following question: *To what extent does the use of digital marketing tools influence the marketing performance of Tunisian companies, and how do digital marketing capabilities mediate this relationship?*

- **Methodology**

A quantitative research design was adopted to empirically test the proposed conceptual model. Data were collected through a structured questionnaire administered to managers of 100 Tunisian companies using digital marketing tools. The questionnaire measured four main constructs: the use of digital marketing tools, digital marketing capabilities (technical competencies, analytical capability, digital strategy, and organizational culture), and marketing performance. All items were assessed using a five-point Likert scale. Data analysis was conducted using SPSS software and included descriptive statistics, reliability analysis using Cronbach's alpha, correlation analysis, multiple regression, and mediation analysis to examine both direct and indirect effects among the variables.

- **Results**

The empirical results reveal that the use of digital marketing tools has a positive and significant effect on marketing performance. Digital marketing tools explain 42% of the variance in marketing performance, indicating a substantial but incomplete explanatory power. Furthermore, the findings show a strong positive relationship between digital marketing tools and digital marketing capabilities, as well as between digital marketing capabilities and marketing performance. Mediation analysis confirms that digital marketing capabilities partially mediate the relationship between digital marketing tools and marketing performance, with nearly half of the total effect occurring through this indirect pathway.

- **Conclusion**





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This study concludes that digital marketing tools contribute significantly to marketing performance only when supported by strong digital marketing capabilities. By highlighting the mediating role of these capabilities, the research underscores the strategic importance of internal competencies in leveraging digital technologies for competitive advantage. The findings offer valuable insights for both scholars and practitioners and open avenues for future research involving larger samples and the integration of additional organizational and environmental factors to enhance the explanatory power of digital marketing performance models.

***Keywords— Digital Marketing tools, Marketing Performance, Digital Marketing Capabilities, Resource-Based Theory, Tunisian companies.***

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# The Perception of Smart Home Technology: A Determinant of the Transition Toward the Smart City in Casablanca

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**ABSTRACT**

Over the past three decades, humanity has achieved considerable progress in terms of technological innovations. This transformation has significantly reshaped the urban landscape, offering territorial decision-makers a major opportunity to establish public policies and innovative strategies and benefit from these new solutions.

Emerging from the opportunities created by the use of Information and Communication Technologies, the concept of the "Smart City" appeared in the early 21st century, with the primary objective of ensuring the sustainable and efficient management of resources while improving the quality of urban life.

To achieve these goals, the concept relies on six essential pillars: smart governance, smart citizens, smart mobility, smart economy, smart environment, and smart living. This paper focuses on smart living and particularly the Smart Homes. It helps explore how new technologies are perceived by the residents of Casablanca, given that the city has been engaged since 2015 in its “smartization” project known as "Casablanca Smart City."

Considered as the technological fusion between housing and computing, the smart home can be defined as a residence equipped with ambient intelligence technology that anticipates and responds to the needs of its occupants, optimally managing their comfort and safety through actions upon the home and by establishing connections with the outside world [1]. Its purpose is to provide features related to comfort, security, and energy efficiency. Its rapid expansion has been driven by major advancements in artificial intelligence, the Internet of Things, and task automation.

However, beyond technical functionalities, the success of such systems depends on how individuals perceive and engage with them. This interplay between humans and technology raises relevant questions concerning perceptions and expectations toward these automated domestic environments.

In this context, this study aims to deeply explore the perception of smart home technology, considering the personal, social and environmental factors that shape how individuals view these complex systems. Through an analysis of existing research and emerging trends, we seek to sort out the determinants that influence how home automation is perceived by residents of Casablanca, addressing the following central research question: What factors influence the perception of smart homes among residents of Casablanca?

To model the relationships among these various factors, we first conducted an exploratory factor analysis to construct a conceptual model and propose the hypotheses. These hypotheses were verified through confirmatory factor analysis, and the relationships between variables were measured using a multiple linear regression model.

The results indicate that Behavioral Aspects, Usage, Perceived Control, and Perceived Security significantly influence residents’ perception of smart home technologies. The regression analysis reveals that Behavioral Aspects and Usage exert the strongest positive effects, while Perceived Control shows a marginal positive influence. In contrast, Perceived Security demonstrates a negligible and negative effect on perception. These findings suggest that users’ behavioral engagement and actual use are the primary drivers shaping perceptions of smart home technologies, whereas security concerns play a limited role. Overall, the results highlight the



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predominance of experiential and behavioral factors over perceived risks in residents' acceptance of smart home systems.

***Keywords*— Smart Home, Smart City, Casablanca.**

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# L'intelligence artificielle comme levier stratégique dans l'enseignement supérieur au Maroc : « étude sur l'adoption de ChatGPT par les étudiants. »

# Artificial intelligence as a strategic tool in Moroccan higher education : « A Case Study on Students' Adoption of ChatGPT. »

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## abstract :

This study examines the adoption of artificial intelligence (AI), specifically the ChatGPT tool, by Moroccan Master's and PhD students. With the growing integration of AI technologies in higher education, understanding the motivations and obstacles influencing the adoption of these tools is crucial. ChatGPT, an AI-based model, is used in various academic contexts to enhance productivity and personalize learning. However, in Morocco, ChatGPT adoption is not widespread, and students face various challenges in its use. This research relies on the Uses and Gratifications Theory (U&G) and the Intrinsic and Extrinsic Motivation Theory to explore factors influencing ChatGPT adoption in higher education. Through a quantitative survey, the results aim to provide recommendations to improve AI technology integration into Moroccan academic settings. The issue addressed in this article is the following: in a context where the integration of AI into Moroccan higher education remains limited, the central problem

consists in identifying which factors—motivations, expected gratifications, and perceived obstacles—influence the adoption of ChatGPT by Master's and Doctoral students.
This study highlights the motivations, gratifications, and barriers associated with the adoption of ChatGPT within the Moroccan higher education context. It offers valuable insights for researchers, academic decision-makers, and technology tool developers, while emphasizing the need for further research to broaden and deepen these findings.

**Keywords :** Artificial Intelligence, ChatGPT, Higher Education, Morocco, Uses and Gratifications Theory, Motivation.



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# VARIED EFFECTS of HUMAN and SOCIAL CAPITAL on ENTREPRENEURIAL OPPORTUNITY IDENTIFICATION: EVIDENCE from TUNISIAN MICRO-ENTREPRENEURS

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**ABSTRACT**

Entrepreneurship plays a central role in economic development, innovation, and job creation, particularly in emerging economies where micro-enterprises are the backbone of local growth. The ability of entrepreneurs to identify entrepreneurial opportunities is considered a foundational process in entrepreneurial action, with reference [5] conceptualizing opportunity recognition as the core of the entrepreneurial phenomenon. Although reference [5] conceptualizes opportunity recognition as a broader process that includes both opportunity identification and evaluation, the present study focuses specifically on opportunity identification as the observable dimension relevant for analyzing its determinants.

Although its importance is widely recognized, the determinants of opportunity identification remain insufficiently understood in contexts characterized by resource constraints, institutional limitations, and informal economic structures, such as Tunisia.

Both human capital and social capital have been identified as key factors shaping entrepreneurs' capacity to detect and evaluate opportunities. Human capital encompasses education, experience, managerial skills, and creativity, which enhance cognitive abilities and entrepreneurial judgment ([1], [2], [4]). Social capital, defined as the benefits derived from networks, trust, and interpersonal relationships, facilitates access to information, resource mobilization, and opportunity identification ([3].

Despite extensive research, empirical evidence on the combined effects of human and social capital on opportunity identification in Tunisian micro-enterprises, an emerging economy context, remains limited. These enterprises play a strategic socio-economic role but face significant informational and structural constraints.

Accordingly, this study addresses the following research question:

What is the influence of human and social capital on Tunisian micro-entrepreneurs' ability to identify entrepreneurial opportunities?

To address the research question this study employed a sample of 105 Tunisian micro-entrepreneurs, each managing between 1 and 9 workers. Human and social capital dimensions were measured using structured questionnaires, and Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to analyze the determinants of opportunity identification. PLS-SEM was particularly suitable given the small sample size and the presence of both qualitative and quantitative latent constructs.

The results indicate that formal education has a significant but negative effect on opportunity identification, suggesting that, in Tunisia, education may not be sufficiently aligned with practical entrepreneurial needs. Entrepreneurial training does not show a significant effect, which may be due to training content that does not adequately reflect real-world entrepreneurial conditions. Managerial and sector-specific experience are also non-significant, possibly because heavy responsibilities and the prevalence of informal market structures limit the transformation of experience into entrepreneurial opportunities. Finally, creativity exhibits a negative





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effect, indicating that the implementation of novel ideas may be particularly challenging in an environment characterized by economic uncertainty, market volatility, and high innovation costs.
In contrast, social capital demonstrates a stronger influence. Network size positively affects opportunity identification, and the quality of relationships—particularly strong ties—has a significant positive impact. This aligns with the Tunisian context, where family and community-based relationships dominate and provide access to information, resources, and opportunities, whereas weak ties are less influential.
Overall, the findings indicate that social capital plays a more decisive role than human capital in facilitating opportunity identification among Tunisian micro-entrepreneurs. These results highlight the importance of leveraging personal networks and strong relationships in emerging economies, while also pointing to the limitations of formal education, training, and experience under resource-constrained conditions.

***Keywords*— Human capital, Social capital, Entrepreneurship, Opportunity identification, Tunisian micro-entrepreneurs**

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# HOW HUMAN, SOCIAL, and FINANCIAL CAPITAL SHAPE the EXPLOITATION of OPPORTUNITIES AMONG TUNISIAN MICRO-ENTREPRENEURS

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**ABSTRACT**

Entrepreneurship is a complex process involving multiple cognitive and behavioral stages, among which the exploitation of entrepreneurial opportunities is a decisive step for the creation and survival of new ventures. While extensive research has examined opportunity identification, far fewer studies have addressed the subsequent and equally critical phase: opportunity exploitation, defined as the transformation of an entrepreneurial idea into concrete action [1]. This gap is particularly pronounced in emerging economies, where limited resources make the exploitation phase especially challenging. Effective exploitation is closely linked to the entrepreneur's ability to mobilize human, social, and financial capital, three key forms of capital that shape the capacity to assemble resources, reduce uncertainty, and facilitate market entry.

Human capital has long been recognized as a key determinant of entrepreneurial success, with prior experience and managerial competencies shaping entrepreneurs' ability to act effectively on opportunities [5]. Early work by [4] conceptualized education, training, and experience as investments that enhance individuals' productivity and decision-making, while creativity is also highlighted as a critical component of human capital [3]. Similarly, social capital provides access to information, legitimacy, and resources, which are essential for economic performance. Financial capital plays a fundamental role as well, since access to funding influences the entrepreneur's capacity to invest in production, marketing, and operational activities. Recent studies indicate that financial and social capital jointly strengthen entrepreneurial initiatives, particularly among small and micro-enterprises [2].

Accordingly, this study addresses the following research question: What role do human, social, and financial capital play in Tunisian micro-entrepreneurs' ability to exploit entrepreneurial opportunities in an emerging economy? The study draws on a sample of 105 Tunisian micro-entrepreneurs, each managing between one and nine employees. These participants were selected because they are actively engaged in entrepreneurial activities, making them well suited for examining how human, social, and financial capital influence opportunity exploitation. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze these relationships.

The results highlight the distinct roles of human, social, and financial capital in opportunity exploitation among Tunisian micro-entrepreneurs. Within human capital, managerial experience positively influences opportunity exploitation by enabling entrepreneurs to leverage personal networks and access critical information. In contrast, education, entrepreneurial training, and sector-specific experience show limited or no effect, possibly due to a misalignment between formal education and market needs or a preference for security over engagement in uncertain ventures. Creativity does not significantly affect opportunity exploitation, as structural constraints in Tunisia—such as limited resources, bureaucratic hurdles, and market uncertainty—reduce entrepreneurs' ability to transform novel ideas into viable opportunities.

Regarding social capital, network size and weak ties do not significantly affect opportunity exploitation. In contrast, strong ties have a positive impact, reflecting the prominence of close family and community relationships in Tunisia, where entrepreneurs rely on trusted connections rather than extensive or distant networks. Finally, financial capital plays a crucial role by enabling entrepreneurs to mobilize resources, reduce risk, and effectively implement business ideas.

Overall, managerial experience, strong social ties, and financial capital emerge as key drivers of entrepreneurial opportunity exploitation, while education, entrepreneurial training, sector-specific experience,



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creativity, network size, and weak ties exhibit limited or no influence. These findings underscore that in emerging economies such as Tunisia, managerial experience, strong social ties, and financial capital are critical for entrepreneurial success.

***Keywords*— Human capital, Social capital, Financial capital, Opportunity exploitation, Entrepreneurship, Tunisian micro-entrepreneurs**

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# Financing Social Enterprises in Tunisia: The Role of Equity, Diversity, and Integrity (EDI)

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**Abstract—**
Social enterprises are becoming key players in sustainable development in Tunisia amid changing economic, social, and environmental conditions. Currently, social enterprises have limited sources of funding even though they are based upon the EDI principles. This study pursues two objectives: (1) to assess the extent to which EDI engagement influences access to finance for 30 Tunisian social enterprises, particularly Agricultural Development Groups (GDA) and Mutual Agricultural Service Companies (SMSA); and (2) to econometrically analyze the impact of EDI dimensions on the financial structure of a panel of 38 publicly listed firms over the period 2019–2024. The methodology combines a field survey conducted among social enterprises with four econometric models estimated using the Ordinary Least Squares (OLS) method for listed firms, successively incorporating Equity, Diversity, Integrity, and a composite EDI index. The results show that, despite their intrinsic alignment with EDI principles, social enterprises remain largely confined to self-financing due to limited access to credit, whereas listed companies adopting EDI-oriented strategies exhibit higher leverage levels. This finding suggests that EDI now functions as a positive signal for investors in a context of strengthened ESG standards. The study highlights a structural asymmetry: while EDI is valued by financial markets in favor of listed firms, it has not yet translated into inclusive financing mechanisms for social enterprises. These results point toward the potential development of a hybrid financing model in which listed companies could act as responsible investors supporting social innovation initiatives led by GDA and SMSA.

**Keywords—**EDI; Social Enterprises; Listed Firms; ESG; Financing.



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# The Mediating Role of Entrepreneurial Self-Efficacy: Digital Skills and Mentoring as Catalysts for Female Entrepreneurial Action in Tunisia

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**ABSTRACT**

**Introduction**
Women's entrepreneurship is increasingly recognized as a key driver of inclusive and sustainable growth, especially within the framework of the United Nations' Sustainable Development Goals (SDGs). Yet, in many emerging economies, women continue to face structural, cultural, and psychological barriers that restrict their entrepreneurial engagement. In Tunisia, female entrepreneurs represent a small share of total business owners and often manage smaller, less capitalized, and more vulnerable ventures. Mentoring and digitalization have been promoted as enablers of women's entrepreneurship, but their effectiveness depends largely on internal factors, particularly self-efficacy, the belief in one's capability to perform entrepreneurial tasks successfully.

**Research Question**
Grounded in Social Cognitive Theory (Bandura, 1977), this study investigates how mentorship, digital, and entrepreneurial skills interact to influence women's entrepreneurial behavior. It specifically examines whether self-efficacy acts as a psychological mechanism mediating the relationship between these external resources and entrepreneurial action in the Tunisian context.

**Methodology**
The study employs a quantitative design using survey data from 311 Tunisian women entrepreneurs operating across diverse sectors and regions. Constructs were measured through validated multi-item scales drawn from entrepreneurship and psychology literature. The proposed model was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3, suitable for small samples and complex models. Reliability and validity were confirmed using Cronbach's alpha, composite reliability, and AVE indices above recommended thresholds. Control variables, access to finance, and education level were included to capture contextual effects.

**Results**
The results reveal that mentorship exerts a significant and direct positive influence on entrepreneurial behavior, whereas digital and entrepreneurial skills have no direct effect. Their impact occurs exclusively through *self-efficacy*, confirming its critical mediating role. *Self-efficacy* also partially mediates the effect of mentorship, demonstrating its function as a psychological bridge between external support and action. Among the control variables, access to finance has a positive and significant effect, while education shows a negative one, reflecting institutional and cultural characteristics of emerging economies.



ISSN: 2961-6611

**Discussion**

Findings reinforce the pivotal role of self-efficacy within Social Cognitive Theory, suggesting that external resources like mentoring and digital competencies are effective only when they strengthen belief in personal capability. Thus, women's entrepreneurial action depends less on resource possession and more on the psychological capital that enables action. The negative effect of education suggests that formal academic training may not always translate into higher entrepreneurial engagement, emphasizing the value of experiential learning and confidence-building approaches.

Conclusion

The study extends Social Cognitive Theory by empirically validating the mediating role of self-efficacy in shaping entrepreneurial behavior under institutional constraints. It positions self-efficacy as a form of psychological capital, transforming external resources into entrepreneurial outcomes. Practically, the results call for integrated development programs that combine mentoring, skills training, and confidence-building activities. Initiatives featuring exposure to successful role models, peer learning, and tailored financing can strengthen women's self-belief and entrepreneurial resilience. While cross-sectional data limit causal inference, future longitudinal and cross-national research should explore how digitalization and mentoring foster entrepreneurial confidence over time. Overall, this study deepens the understanding of how psychological empowerment converts women's potential into sustainable entrepreneurial action in emerging economies.

***Keywords***— women entrepreneurship; self-efficacy; mentoring; digital skills; entrepreneurial action (EA)

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# Foreign Direct Investment, Corruption, and Carbon Emissions: Evidence from Developing Economies

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**ABSTRACT**

The accelerated integration of developing economies into global markets has been accompanied by a substantial increase in foreign direct investment (FDI) inflows. Although FDI is commonly viewed as a key driver of economic growth, technological diffusion, and industrial upgrading, its environmental consequences remain the subject of ongoing debate. For many developing countries, attracting foreign capital often entails a delicate trade-off between economic expansion and environmental sustainability.

Against this backdrop, a critical question arises: does foreign direct investment contribute to environmental degradation in developing countries?

This study examines the long-run relationship between foreign direct investment, corruption, and environmental quality—proxied by $CO_2$ emissions—in a panel of 50 developing countries over the period 1996–2023. Employing a panel Autoregressive Distributed Lag (ARDL) framework, the analysis provides robust evidence that FDI inflows, trade openness, public expenditure, and per capita income significantly increase $CO_2$ emissions in the long run.

The long-run ARDL estimates reveal that environmental degradation in developing countries is jointly shaped by structural, economic, and institutional factors. In particular, the positive and statistically significant impact of FDI on $CO_2$ emissions suggests that foreign investments are predominantly concentrated in pollution-intensive and resource-dependent sectors. These results lend strong empirical support to the Pollution Haven Hypothesis, according to which multinational enterprises tend to relocate environmentally harmful activities to countries with relatively lax environmental regulations (Pizzuto, 1997; Cole et al., 2006; Baek & Koo, 2009).

Moreover, the findings indicate that countries characterized by weak environmental governance are more likely to attract pollution-intensive FDI. Corruption emerges as a critical mediating factor: higher levels of corruption—captured by the control of corruption index—are associated with increased environmental degradation, whereas stronger corruption control contributes to lower emissions. Short-run dynamics show limited immediate effects of FDI on emissions, while economic growth exerts a more pronounced short-term influence.

Overall, the study highlights the importance of coherent policy frameworks that simultaneously strengthen institutional quality, enhance environmental governance, and redirect foreign investment toward cleaner and more sustainable activities. Such policies are essential for ensuring that FDI contributes to sustainable development rather than exacerbating environmental degradation in developing countries.

***Keywords*— Developing countries, FDI, Corruption, $CO_2$ emissions, ARDL, Pollution Haven Hypothesis**

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# Naviguer l'ère de l'IA : Le rôle crucial des capacités numériques dans les entreprises opérant en Tunisie

# Navigating the AI Era: The Crucial Role of Digital Capabilities in Companies Operating in Tunisia

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*Abstract*—**Mastery of digital tools, understanding of artificial intelligence (AI) algorithms, and the ability to analyze and leverage data constitute key competencies for promoting the integration of AI. In Tunisia, despite the progressive digital transformation, many companies face challenges related to the adoption of these innovative technologies. Within this context, the research objective is to study the impact of digital capability on AI adoption among businesses operating in Tunisia. A representative sample of companies was established, including various sectors of activity, sizes, and levels of digital maturity. The analysis demonstrates that only a robust 'Digital Platform' serves as a significant and positive catalyst for AI adoption. In contrast, hypotheses regarding operational processes, employee experience, customer experience, and business models were rejected. This suggests that while Tunisian firms possess a certain degree of operational maturity, they are not yet 'AI-ready.' The impact of general digital capabilities is neutralized by barriers such as a shortage of advanced data science skills and incomplete data governance. Within this context, AI must be viewed as an infrastructural imperative. Management should prioritize consolidating technological platforms and bridging the data science skill gap before attempting a profound transformation of the business model.**

***Keywords*— Companies Operating in Tunisia- Artificial Intelligence (AI)- Digital Transformation- Digital Capabilities**

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