

E-Leadership and Innovation in Algerian SMEs: Enhancing Competitiveness in the Digital Era

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Abstract:

In Algeria, the rapid evolution of information and communication technologies necessitates innovative leadership approaches within small and medium-sized enterprises (SMEs). This study investigates the role of e-leadership in fostering innovation, addressing the research gap concerning its impact in the Algerian context. Utilizing a quantitative approach, the study surveyed 40 participants representing diverse sectors such as technology, e-commerce, and healthcare. Findings demonstrate a strong positive relationship between e-leadership and innovation, particularly in process innovation. The study emphasizes the importance of targeted training, digital infrastructure investment, and strategic policies to enhance competitiveness and adaptability.

Keywords: E-Leadership, Innovation, SMEs, Digital Transformation, Algeria

JEL Classification: M15, O31, L26, D83, M10.

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) in Algeria have witnessed a significant transformation in their organizational strategies, driven by the rapid development of information and communication technologies (ICTs) and the accompanying surge in information and knowledge flow. This transformation has necessitated the adoption of innovative and novel mechanisms aimed at effectively managing and leveraging this vast influx of information to enhance competitive excellence and foster innovation within these enterprises. In this context, e-leadership emerges as a key factor in effectively employing modern technologies and integrating them with human resources to achieve institutional innovation goals.

Activating the role of human resources within institutions, especially under e-leadership, is a cornerstone for achieving greater organizational effectiveness. E-leadership plays a pivotal role in facilitating access to information and enabling faster and more accurate decision-making. It offers Algerian SMEs the opportunity to leverage innovation as a tool for improving processes and developing products or services, thereby enhancing their competitiveness in local and international markets.

On the other hand, Algerian institutions face multiple challenges regarding their readiness to adopt e-leadership effectively. This leadership style requires the availability of advanced technological infrastructure and qualified human resources equipped with skills compatible with digital transformations. Moreover, e-leadership is seen as a means of fostering an interactive work environment that supports innovation and establishes an organizational culture that motivates employees toward creativity and development.

- Study Problem:

Amidst rapid economic and technological changes, modern organizations are gravitating toward knowledge- and information-based work patterns as essential means to support innovation and enhance performance. With the growing importance of information technology, e-leadership has emerged as a critical tool for achieving integration between technology and human skills, thereby increasing innovation opportunities

within organizations. This study addresses the key problem of understanding how e-leadership contributes to supporting and enhancing innovation in Algerian SMEs, emphasizing the need for advanced strategies to help these organizations adapt to changing market demands.

- Research Questions:

This study seeks to answer the main question concerning the relationship between e-leadership and its role in enhancing innovation within Algerian SMEs. The sub-questions are as follows:

- Do the decisions made by e-leaders significantly impact the level of innovation within an organization?
- What is the relationship between e-trust skills and institutional innovation levels?

- Research Hypotheses:

Based on previous literature, the study hypotheses are structured as follows:

Main Hypothesis: There is a statistically significant relationship between e-leadership and enhancing innovation in Algerian SMEs.

This hypothesis is divided into three sub-hypotheses:

1. E-leadership plays a role in enhancing product innovation within SMEs.
2. E-leadership contributes to improving operational innovation within SMEs.
3. E-leadership positively impacts marketing innovation within SMEs.

Objectives of the Study:

The study aims to achieve the following:

1. Analyze the role of e-leadership in enhancing innovation within Algerian SMEs through the utilization of digital technologies and human resources in knowledge and creativity management.
2. Understand the impact of e-leadership on organizational performance and how to guide this leadership toward supporting a creative work environment.

3. Identify the relationship between e-leader skills and institutional innovation levels, focusing on the impact of e-trust and the ability to make effective and innovative decisions.

4. Examine the influence of e-leadership on organizational efficiency and flexibility, enabling SMEs to adapt to market requirements and competitive environmental challenges.

5. Investigate the role of e-leadership in fostering a culture of creative and participatory work, improving interactions between leaders and employees to promote self-discipline and increase productivity.

6. Provide practical recommendations to promote e-leadership as a tool for stimulating innovation in SMEs through strategies to enhance digital infrastructure and develop employee skills.

- The Significance of the Study

The importance of this study is highlighted in the following points:

1. Highlighting E-Leadership as a Gateway to Enhancing Organizational Innovation:

The study demonstrates how e-leadership can be an effective means of fostering creativity and developing products or services, thereby contributing to the competitive capacity of small and medium-sized enterprises (SMEs) in Algeria.

2. Supporting Digital Transformation in Algerian Organizations:

By emphasizing the adoption of e-leadership, the study contributes to digital transformation efforts, helping organizations leverage technology to achieve organizational efficiency and respond to market changes.

3. Showcasing the Value of Human Resources in a Digital Environment:

The study focuses on the pivotal role of human resources in implementing e-leadership strategies, emphasizing that employees are the cornerstone of innovation under modern leadership that integrates technology.

4. Enriching Literature on Innovation Management in the Algerian Context:

This study enriches the body of knowledge on innovation leadership within SMEs in Algeria, particularly regarding the importance of e-leadership in the Algerian workplace environment.

5. Guiding Policymakers Toward Innovation-Supportive Strategies:

The study provides practical recommendations for policymakers to develop strategies that promote digital transformation and innovation in SMEs, supporting economic growth and enhancing national competitiveness.

6. Providing a Practical Framework for Technological Competence Development in Organizations:

The study offers a practical framework for developing technological capabilities among leaders and employees in SMEs, promoting integration between technology and creative performance.

In sum, this study presents a comprehensive vision of how e-leadership can be employed as a tool to enhance innovation within Algerian SMEs, opening new horizons for improving organizational performance and achieving sustainable growth..

- Literature Review

• E-Leadership

E-leadership has emerged as a pivotal concept in contemporary organizational studies, characterized by its integration of digital tools and human resources to drive innovation. Scholars such as Ahmed (2004) and Antar et al. (2018) highlight its transformative potential in enhancing decision-making and fostering a culture of creativity. However, existing research rarely addresses its implementation in the unique socio-economic conditions of Algeria. This study aims to fill this gap by exploring e-leadership's impact on SMEs in Algeria.

• Innovation

Joseph Schumpeter (2003) defines innovation as the "creative destruction" of old practices through novel approaches. Innovation

encompasses product, process, marketing, and organizational dimensions (OECD, 2005). Despite Algeria's efforts to support innovation, limited studies analyze its connection with leadership styles in SMEs. This study bridges this gap by examining e-leadership's role in promoting innovation across sectors.

2. Theoretical Part of The Study

2.1 Definition of E-Leadership

From the review of existing studies, no single, unified definition of e-leadership was found. However, the literature provides various perspectives on the concept of e-leadership, which can be summarized as follows:

Modern organizational studies indicate that in the era of the internet and information technology, leadership styles have shifted from traditional to electronic, giving rise to a new type of leader capable of leveraging technological advancements as part of the organization's competitive advantage. E-leadership is characterized by its focus on the human dimension while employing technology. Its features can be summarized as follows (Antar et al., 2018, p. 112):

1. Customer-Focused Leadership:

This leader uses electronic tools to provide high-quality services, leveraging the internet to access better information and deliver faster responses to clients. This strengthens the leader's role as a vital link between the organization and its customers, making the customer a central focus in the competitive digital environment.

2. Knowledge Worker and Remote Employee Leadership:

This type of leadership prioritizes employees, whether they work on-site or remotely. The e-leader establishes unique relationships with them, aiming to utilize their knowledge and expertise effectively, with the ability to share this knowledge quickly within and beyond the organization.

3. Competitive Leadership:

E-leaders excel in competing in challenging business environments. The internet facilitates services for companies of all sizes, helping to level the competitive playing field among small, medium, and large enterprises without requiring substantial investments.

4. Leadership with Adaptable E-Characteristics:

These leaders adapt flexibly to digital business environments, aligning strategies with technological transformations and managing the organization in ways that reflect a high level of compatibility with modern electronic settings.

5. Self-Leadership:

This is a defining trait of e-leadership. It requires the ability to make instant decisions that align with the demands of the digital era, distinguishing the e-leader from traditional leaders who typically require more time to gather information and make decisions.

Additionally, the role of e-guidance in modern organizations can be noted. This "requires e-leaders to strive for achieving dynamic institutional goals, activating collaboration and motivation among individuals to accomplish institutional objectives, using advanced communication networks such as the internet to facilitate guidance and execution processes" (Ahmed, 2004, pp. 71-73).

2.1.1. Operational Definition of E-Leadership

In this study, e-leadership refers to a leader who possesses a combination of personal traits and technical skills that enable them to manage relationships with individuals effectively through electronic means. This leader is characterized by their ability to make quick, immediate decisions and by their expertise in handling electronic knowledge and communication tools. These abilities enhance the leader's effectiveness in interacting with individuals both within and outside the organization, contributing to institutional innovation.

2.2. Concept of Innovation

2.2.1. Linguistic Definition of Innovation

The word "innovation" originates from the verb "bakara," which means "to advance" or "to hasten." Terms like "bukoor" and "bakoor" denote speed in performing an action. As defined in Al-Mu'jam Al-Waseet (2005, p. 46), innovation refers to the act of creating something new or improved.

2.2.2. Technical Definition of Innovation

The term innovation derives from the Latin word Novus, meaning "new." The term "innovation" first appeared in 1927, denoting the process of

creating something entirely novel. Economist Joseph A. Schumpeter introduced the concept through his idea of "creative destruction," describing innovation as an "industrial mutation" that gradually replaces the old with the new (Joseph A. Schumpeter, 2003, p. 83).

The OECD (Organization for Economic Co-operation and Development) defines innovation as a combination of practical, technological, organizational, financial, and commercial approaches that enable institutions to introduce new or improved products to the market (OECD, 2005, p. 10).

2.3. Importance of Innovation

Innovation has become a benchmark for measuring the progress of nations and societies. It is considered a critical factor for achieving wealth and socio-economic development. Innovation is also a key indicator of an organization's advancement, especially in an environment characterized by rapid change and complexity. Such conditions pose significant challenges, which demand effective and innovative solutions. Innovation is essential for survival and growth in the face of factors like rapid technological change, evolving consumer preferences, and expanding knowledge bases (Mohammed Abdul Fattah Al-Sarraf, 2003, p. 38).

2.4. Types of Innovation

Economist Joseph A. Schumpeter, in his book *The Theory of Economic Development* (1912), classified innovation into five types (Thomas McCraw, 2007, p. 73):

1. Developing new products that meet future needs.
2. Discovering new production methods that reduce costs.
3. Exploring new sources of resources.
4. Identifying new markets for products.
5. Introducing new organizational methods.

The OECD further categorized innovation into four types (OECD, 2005, pp. 16-17):

1. **Product Innovation:** Significant creation or improvement of products in terms of technical specifications and components.
2. **Process Innovation:** Major improvements in production or distribution methods.

3. **Marketing Innovation:** Changes in product design, packaging, or market positioning.

4. **Organizational Innovation:** New methods in organizational structure or external relations.

Additionally, environmental innovation involves developing eco-friendly products or processes to minimize an organization's environmental impact, such as using recycled materials or low-emission production technologies.

2.5. Innovation Strategies

Innovative institutions adopt various strategies or combine them to foster innovation:

1. **Offensive Strategy:**

Requires an active research and development department and a high rate of innovation. This strategy is often associated with large and leading institutions.

2. **Defensive Strategy:**

Aims to reduce risks by developing innovations and ideas in areas not yet covered by leading institutions.

3. **Licensing Strategy:**

Relies on purchasing licenses from innovative institutions, providing a fast and cost-effective solution.

4. **Corporate Acquisition Strategy:**

Focuses on acquiring small innovative companies to enhance innovation within the organization.

2.6. Definitions of Small and Medium-Sized Enterprises (SMEs)

The text discusses the concept of SMEs based on definitions used in the United States, the European Union, and Algeria, highlighting their characteristics, importance, and role in the national economy.

1. Definitions of SMEs:

• United States:

Defined under the 1953 Act, SMEs are characterized by independent ownership and management, with criteria such as employee numbers and annual sales.

oServices and Retail: Annual sales range between \$1 million and \$5 million.

oWholesale Trade: Annual sales between \$5 million and \$15 million.

oIndustry: Up to 250 employees.

• European Union (1996 Definition):

Defined by the number of employees and total annual sales.

oMicro-enterprises: Fewer than 10 employees.

oSmall enterprises: Fewer than 50 employees, with annual sales not exceeding €7 million.

oMedium-sized enterprises: Fewer than 250 employees, with annual sales up to €40 million.

• **Algeria:**

According to Law 17-02 of 2017, classification is based on employee numbers and annual sales.

oVery Small Enterprises: 1 to 9 employees.

oSmall Enterprises: 10 to 49 employees.

oMedium Enterprises: 50 to 250 employees.

2. Characteristics of SMEs:

• Flexibility in production and adaptability to market changes.

• Reduced need for highly specialized management, lowering operating costs.

• Ease of establishment with simple and flexible administrative processes.

• Diverse ownership forms, often individual or family-owned.

3. Importance of SMEs:

SMEs play a vital role in economic and social development, contributing to:

• Enhancing the flexibility of the national economy.

• Reducing economic disparities across regions.

• Creating job opportunities and reducing unemployment rates.

2.7. Innovation in Algerian SMEs:

Algeria promotes innovation through various mechanisms and measures aimed at encouraging entrepreneurship and supporting startups and SMEs. For example:

- The Guarantee Fund for SME Loans (FGAR) provides financial guarantees to encourage banks to finance high-risk innovative projects.

- Algeria organizes national innovation competitions to motivate young people and creative individuals to turn their ideas into practical projects.

To enhance scientific research and its connection with the industrial sector, Algeria seeks to improve the competitiveness of industrial enterprises by supporting innovative projects, particularly those relying on modern technology or contributing to sustainable development.

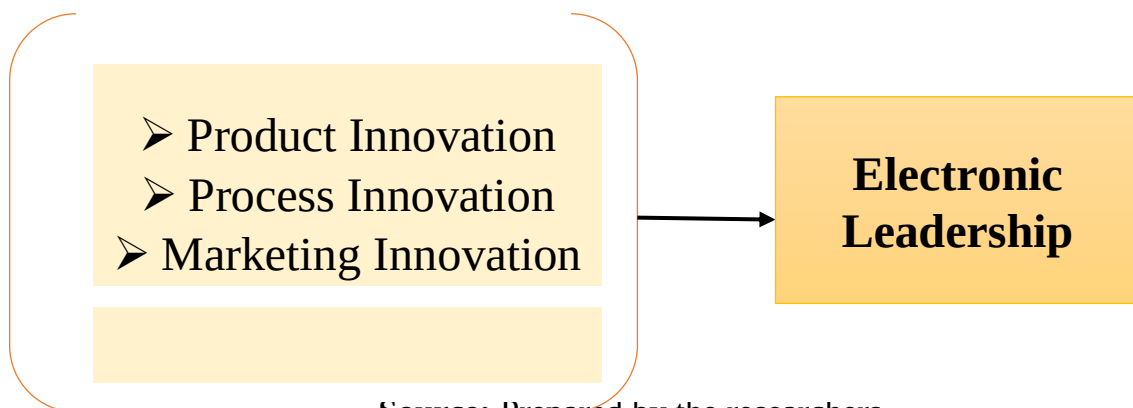
One prominent example is Ministerial Decision No. 1275, which supports innovative projects in academic institutions and enables them to develop value-added products and services. Known as the "Startup Certificate" initiative, this decision fosters collaboration between academia and the economic sector. It allows students and researchers to establish startups based on their research findings. The initiative links innovation with higher education and scientific research, positioning universities as hubs for technology and creativity.

Through these efforts, Algeria is nurturing a culture of innovation within institutions, thereby supporting the national economy, creating job opportunities, and achieving sustainable economic development.

3. Field Study

3.1. Conceptual Framework of the Study Second

Figure .1.Conceptual Framework of the Study



Source: Prepared by the researchers.

Caption: "Illustrates the relationship between e-leadership and innovation dimensions, including product, process, and marketing innovations."

3.2. Description of the Study Sample

The field study was conducted on a sample of 40 participants representing startup founders, managers, and key employees across various sectors in Algeria, including technology, e-commerce, and healthcare. This small but diverse sample was chosen to explore the relationship between e-leadership and innovation in startups. Participants were surveyed using a structured questionnaire with Likert-scale items ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

- Sample Justification

The study surveyed 40 participants, including startup founders, managers, and key employees from technology, e-commerce, and healthcare sectors. This diverse sample was chosen to ensure comprehensive insights into e-leadership across industries. Key employees are defined as individuals holding roles crucial for strategic decision-making and innovation initiatives within their organizations. The diversity of the sample highlights e-leadership's broad applicability and relevance across Algeria's dynamic economic landscape.

3.3. Statistical Analysis Tools Used

The research employed SPSS Version 26 for data analysis due to its robust capabilities in handling correlation and regression analyses. Descriptive statistics summarized demographic characteristics, while reliability tests ensured internal consistency (Cronbach's $\alpha > 0.8$). The regression analysis evaluated the impact of e-leadership on product, process, and marketing innovation.

3.5. Results and Discussion

3.6. Demographic Information

Table 1: Gender Distribution

Gender	Frequency	Percentage
Male	28	70%
Female	12	30%

Observation: The majority of participants (70%) were male, reflecting a gender imbalance in leadership roles within startups.

Table 2: Age Distribution

Age Group	Frequency	Percentage
18–30 years	22	55%
31–40 years	14	35%
41 years and above	4	10%

Observation: Most participants (55%) were aged 18–30, indicating a youthful demographic in the startup ecosystem.

Table 3: Education Level

Education Level	Frequency	Percentage
Secondary or lower	5	12.5%
University Degree	30	75%
Professional Certification	5	12.5%

Observation: A significant proportion of participants (75%) hold university degrees, showcasing the educational qualifications typical of startup leadership.

Table 4: Employment Role

Role	Frequency	Percentage
Founder/Co-founder	15	37.5%
Manager	12	30%
Employee	13	32.5%

Observation: Founders and co-founders made up the largest group (37.5%), reflecting their crucial role in driving innovation.

Table 5: Industry Type

Industry	Frequency	Percentage
Technology	10	25%
E-commerce	8	20%
Healthcare	7	17.5%
Fintech	6	15%
Other	9	22.5%

3.7. Reliability Analysis

Cronbach's alpha was calculated for e-leadership and the three innovation dimensions.

Table 6: Cronbach's Alpha for Reliability Testing

Variable	Number of Items	Cronbach's Alpha	Reliability Level
E-Leadership	6	0.921	Excellent
Product Innovation	5	0.875	Very Good
Process Innovation	5	0.862	Very Good
Marketing Innovation	5	0.889	Very Good

Observation: All variables demonstrated high reliability, with alpha values exceeding 0.8.

3.8. Descriptive Analysis

Table 7: Mean and Standard Deviation of Variables

Variable	Mean	Standard Deviation	Level of Innovation
E-Leadership	4.20	0.72	High
Product Innovation	4.05	0.78	High
Process Innovation	4.12	0.81	High
Marketing Innovation	3.95	0.85	Moderate

Observation: E-leadership scored the highest mean (4.20), indicating its strong presence among participants.

3.9. Hypothesis Testing

Main Hypothesis: There is a statistically significant relationship between e-leadership and fostering innovation in startups.

Table 8: Correlation Analysis

Innovation Dimension	Correlation Coefficient (r)	Significance (p-value)
Product Innovation	0.782	0.000
Process Innovation	0.815	0.000
Marketing Innovation	0.742	0.000

Observation: E-leadership positively correlates with all innovation dimensions, with the strongest correlation observed for process innovation ($r = 0.815$, $p < 0.05$).

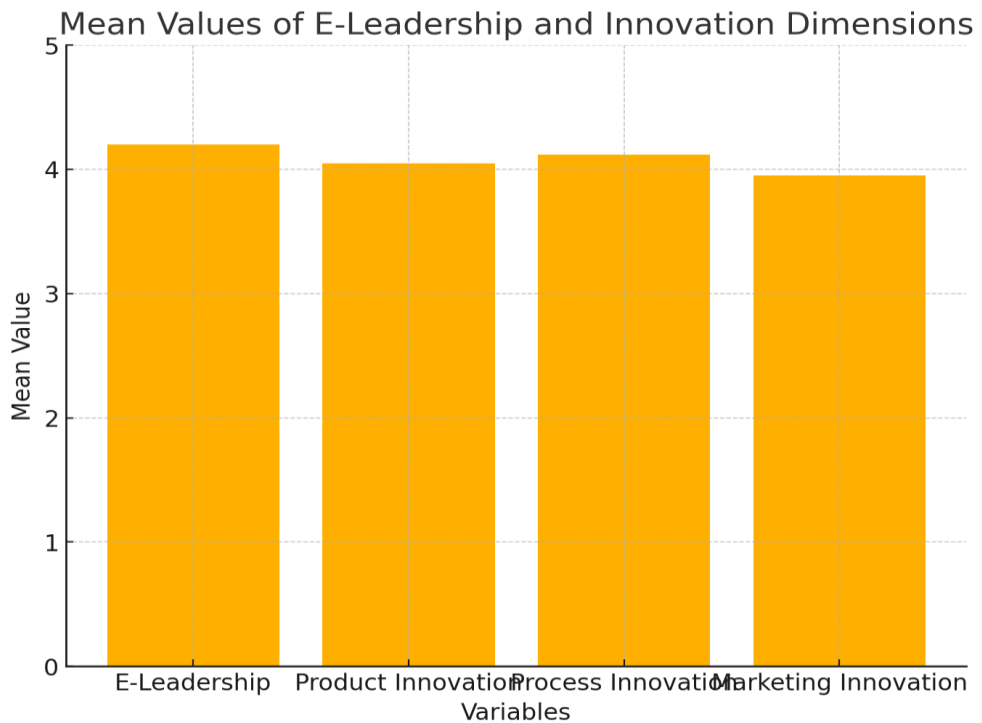
- Regression Analysis

Table 9: Regression Results

Independent Variable	Dependent Variable	β Coefficient	t- Value	Significance (p-value)
E-Leadership	Product Innovation	0.765	5.96	0.000
E-Leadership	Process Innovation	0.810	6.32	0.000
E-Leadership	Marketing Innovation	0.720	5.45	0.000

-Graphics for Visualization

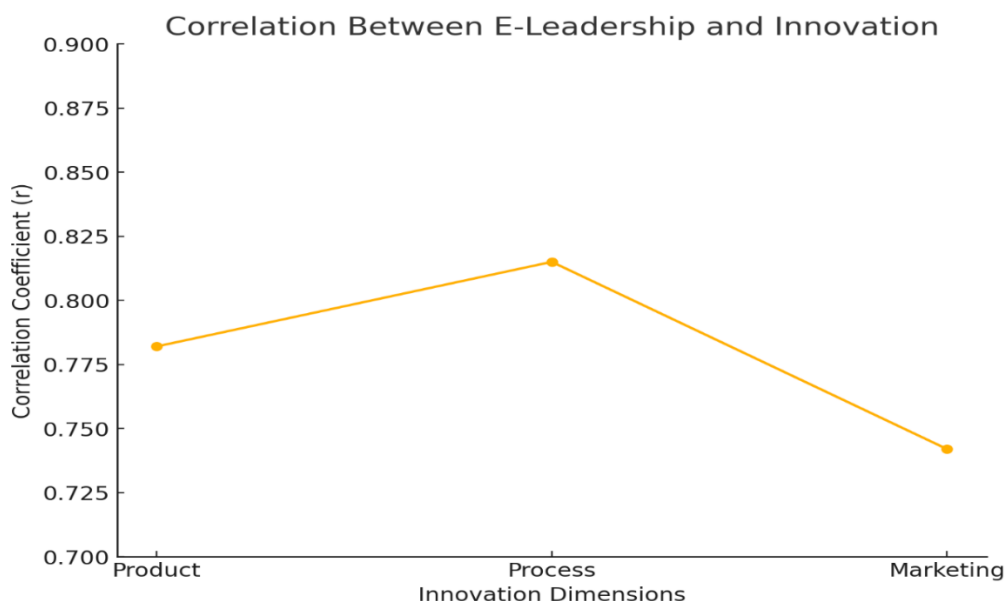
Figure 2: Mean Values of Innovation Dimensions



Source: Prepared by the researchers.

Caption: "Displays the mean scores of innovation dimensions (product, process, marketing) as influenced by e-leadership."

Figure 3: Correlation Strength Between Variables



4. Conclusion

The study provides compelling evidence that **e-leadership plays a critical role in driving innovation** within startups, particularly in the Algerian context. By analyzing the relationship between e-leadership and various types of innovation (product, process, and marketing), the study highlights the transformative potential of digital leadership in dynamic and competitive startup ecosystems.

Key Findings:

1. E-leadership and Innovation Correlation:

The statistical analyses reveal a strong positive correlation between e-leadership and innovation dimensions, with process innovation showing the strongest relationship ($r = 0.815$). This underscores e-leadership's ability to streamline operations and inspire organizational adaptability.

2. High Level of E-leadership and Innovation Practices:

Descriptive statistics indicate a high level of e-leadership among participants (mean = 4.20) and consistent innovation levels across product (mean = 4.05), process (mean = 4.12), and marketing dimensions (mean = 3.95). These results reflect startups' reliance on digital capabilities for sustained growth and creativity.

3. Demographic Observations:

The dominance of university-educated, young professionals (55% aged 18–30, 75% holding degrees) demonstrates a forward-thinking workforce conducive to innovation. However, the gender imbalance (70% male participants) indicates potential gaps in inclusivity within startup leadership.

4. Statistical Validation:

The high reliability of the survey instrument (Cronbach's $\alpha > 0.8$ for all variables) ensures the robustness of findings. Regression analysis further confirms the statistically significant impact of e-leadership on innovation ($p < 0.05$ for all dimensions).

Implications for Practice and Research:

- Practical Insights:**

E-leadership equips startups with the agility and vision needed to innovate in rapidly evolving industries like technology, e-commerce, and healthcare. Startup leaders are encouraged to integrate e-leadership practices to foster organizational creativity and competitiveness.

- **Strategic Recommendations:**

Initiatives like targeted training programs for e-leadership development and investments in digital tools can enhance leadership effectiveness. Furthermore, promoting diversity in leadership roles could address demographic imbalances and harness diverse perspectives.

- **Future Research Directions:**

While this study focuses on product, process, and marketing innovation, exploring other innovation dimensions such as organizational or social innovation could enrich the understanding of e-leadership's broader impacts.

In conclusion, the study reinforces the notion that **e-leadership is not merely a facilitator but a catalyst for innovation** in startups. By leveraging digital tools and fostering a culture of innovation, Algerian startups can position themselves as pioneers in the global marketplace.

- **References:**

- Al-Mu'jam Al-Waseet (2005). *Al-Mu'jam Al-Waseet* (2nd ed.). Cairo: Arabic Language Academy.
- Ahmed, M. (2004). *Leadership in the Digital Era*. Cairo: Dar Al-Nahda Al-Arabiya.
- Antar, A., et al. (2018). *Organizational Leadership in the Digital Age*. Amman: Dar Al-Manar.
- Joseph A. Schumpeter (2003). *Capitalism, Socialism and Democracy*. New York: Harper & Brothers.
- McCraw, T. (2007). *Prophet of Innovation: Joseph Schumpeter and Creative Destruction*. Cambridge, MA: Harvard University Press.
- Mohammed Abdul Fattah Al-Sarraf (2003). *Innovation and Development in Small Enterprises*. Amman: Dar Al-Fikr.
- OECD (Organization for Economic Co-operation and Development). (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3rd ed.). Paris: OECD Publishing.

- Algerian Law 17-02 (2017). *Law on the Definition and Organization of Small and Medium Enterprises*. Official Gazette of Algeria.
- Ministerial Decision No. 1275. (2022). *Promoting Startups in Algerian Universities*. Ministry of Higher Education and Scientific Research, Algeria.