

From Startups to Smart Enterprises: How Artificial Intelligence is Reshaping Digital Entrepreneur

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Received date: 19/10/2025 ;

Revised date: 04/11/2025 ;

Publication date: 31/12/2025

Summary: The global economy is undergoing a radical transformation due to the development of artificial intelligence (AI), which has become a fundamental element in reshaping digital entrepreneurship. This development has changed the nature of startups' operations, paving the way for the emergence of "smart enterprises" based on data and predictive analytics to enhance innovation and improve decisions. This study aims to analyze the role of AI in reshaping digital entrepreneurship by examining the use of its tools in various stages of entrepreneurial activity, from creativity and operational management to smart marketing and building competitive advantage. The study adopted a descriptive-analytical approach and drew on recent research (2020–2025) to develop a framework that clarifies the relationship between AI and digital innovation. The results showed that AI enables organizations to transform into intelligent entities capable of self-learning, market forecasting, and improving entrepreneurial performance. The study concludes that building smart enterprises requires a strong digital infrastructure, an innovative culture, and supportive policies, emphasizing that integrating AI into entrepreneurial strategies is a fundamental pillar of growth and sustainability.

Keywords: Artificial intelligence, digital entrepreneurship, startups, smart enterprises, digital transformation, technological innovation.

Jel Classification Codes : L25 ; O33

I- Introduction :

The world today is witnessing an unprecedented wave of technological transformations affecting various aspects of economic and social life. Smart technologies, most notably artificial intelligence (AI), have become one of the most prominent drivers of growth and innovation in the 21st century. AI has gone beyond being merely a technical support tool to becoming a strategic element in shaping new economic and organizational models, placing it at the heart of the major transformations taking place in digital entrepreneurship globally.

Startups are one of the most important aspects of the contemporary digital economy, representing a fertile environment for embodying innovative ideas and transforming them into viable projects. With the development of AI tools, these enterprises have begun to witness a fundamental shift in their working methods, operating models, and decision-making patterns, moving from a reliance on software and automation to a new phase based on intelligent data analysis, machine learning, and predictive market forecasting. Hence, the concept of "smart enterprises" has emerged, relying on AI as a fundamental lever for guiding innovation and improving corporate performance.

This transformation has reshaped the relationship between entrepreneurship and technology, making AI not just a tool for increasing productivity, but also a driver for building a sustainable competitive advantage, thanks to its ability to predict market trends, analyze consumer behavior, and customize services to customer needs in real time. In contrast, startups face multiple challenges related to a lack of digital competencies, the difficulty of integrating AI into their organizational structures, and weak technical funding. This makes understanding the dynamics of this transformation both a scientific and practical necessity.

This study contributes to analyzing the structural role of AI in reshaping the features of digital entrepreneurship by monitoring its impact on entrepreneurial innovation and the transformation of startups into smart enterprises capable of adapting to the changes in the global digital economy. It also aims to identify the theoretical and applied frameworks that explain this transformation and present a conceptual model that clarifies the relationship between AI, digital innovation, and smart entrepreneurial performance. Accordingly, the main question this paper seeks to answer is:

How does AI contribute to reshaping entrepreneurial business models and transforming startups into smart enterprises capable of competing in an accelerating digital environment?

Study Objective

This study aims to analyze the pivotal role of artificial intelligence in reshaping the digital entrepreneurship environment by revealing how smart technologies contribute to improving the performance of emerging enterprises, transforming them into smart organizations capable of self-learning and interacting with market variables.

The study also seeks to build a conceptual framework that clarifies the relationship between artificial intelligence, digital innovation, and smart transformation in entrepreneurial organizations,

highlighting the impact of this transformation on growth and competitive sustainability in the contemporary digital economy.

I.1-Study Importance

The importance of this study stems from its addressing a modern and rapidly evolving topic: the interaction of artificial intelligence with the digital entrepreneurship ecosystem. This field still requires in-depth academic analysis, especially in the Arab context.

The importance of the study is evident in the following aspects:

I.2-Scientific Importance:

The study contributes to enriching the current literature on smart entrepreneurship and clarifies the theoretical dimensions of the relationship between technology and entrepreneurial innovation, paving the way for new research in the digital economy.

I.3-Practical Importance:

The study provides an applied vision on how to integrate artificial intelligence into entrepreneurial business models, helping decision-makers and entrepreneurs adopt effective digital transformation strategies.

I.4-Developmental significance:

The research results contribute to supporting the transition to a knowledge-based economy in Arab countries by highlighting the opportunities artificial intelligence offers to enhance innovation, competitiveness, and sustainability.

I.5-Research Divisions

The study is divided into five main interconnected axes covering the theoretical and practical aspects of the subject:

- The Conceptual Framework for Digital Entrepreneurship and Artificial Intelligence.
- The Transformation from Startups to Smart Enterprises.
- The Role of Artificial Intelligence in Developing Entrepreneurial Processes.
- The Impact of Artificial Intelligence on the Performance and Competitive Advantage of Smart Enterprises.
- Results, Recommendations, and Future Research Prospects.

II-The Theoretical Framework of the Concept of Artificial Intelligence and Digital Entrepreneurship:

II.1-The Concept of Artificial Intelligence and Its Contemporary Development

Artificial Intelligence (AI) represents one of the most prominent technological revolutions that has reshaped the structure of the global economy. It refers to the ability of computer systems to simulate

human behavior in learning, understanding, analysis, and decision-making (Russell & Norvig, 2021).

The concept has expanded with developments in the fields of machine learning and deep learning, transforming AI from a mere branch of computer science to a strategic pillar of the digital economy (Brynjolfsson & McAfee, 2023).

AI has become an essential tool in managing big data, analyzing behavioral patterns, and developing intelligent applications that enable organizations to make accurate and rapid decisions, enhancing their competitiveness. Nguyen et al. (2024) argue that the intelligent use of AI enables entrepreneurial organizations to enhance their operational efficiency, reduce costs, and accelerate the innovation cycle.

In the Arab context, Al-Assaf (2022) argues that artificial intelligence represents the core of digital transformation in Arab startups, through the development of smart solutions capable of understanding local market needs and anticipating growth opportunities in light of limited resources.

II.2-Digital Entrepreneurship: From Innovation to Corporate Intelligence

Digital entrepreneurship is defined as entrepreneurial activity that relies on digital technology as a primary platform for innovation, production, and distribution (Nambisan, 2017). With the emergence of the digital economy, startups have become more capable of entering markets with limited resources, relying on digital technologies such as e-commerce, blockchain, and artificial intelligence.

Giones and Brem (2021) argue that digital entrepreneurship is no longer limited to developing digital products, but rather encompasses the complete redesign of business models through the use of big data and intelligent analytics to enhance added value. Digital entrepreneurship has also become synonymous with concepts such as open innovation and autonomous operations.

In the Arab context, Al-Shammari's study (2023) indicates that integrating AI technologies into entrepreneurial projects represents an opportunity to overcome traditional obstacles such as weak financing and difficulty accessing markets, by improving the entrepreneurial decision-making process based on predictive data analysis.

II.3-From Startups to Smart Enterprises

A startup is defined as "an emerging economic entity that relies on innovation and digital technologies to find new solutions to market problems and seeks, through a scalable business model, to achieve rapid growth within a high-risk and uncertain environment" (Blank & Dorf, 2020).

In Algerian law, a startup is defined as any newly established enterprise founded on an innovative

or technological idea, aiming to develop new products or services with high added value, capable of rapid growth and expansion in local and international markets. The law requires these enterprises to rely on modern technology or innovative economic models, to be no more than eight years old from the date of their establishment, and to be registered on the digital platform of the Ministry of Knowledge Economy and Startups. This definition constitutes the official legal framework that sets the basic criteria and conditions for classifying enterprises as "startups" in Algeria, with the aim of encouraging innovation and technological entrepreneurship within the national economy (Executive Decree No. 20-254 of September 15, 2020). A smart enterprise is defined as "an organization that uses artificial intelligence, big data analytics, and the Internet of Things to integrate digital knowledge into all its operations, enabling it to make self-learning decisions, improve performance, and increase competitiveness in a dynamic environment" (Deloitte, 2023).

A smart enterprise is also defined as "an economic entity that employs advanced digital technologies such as artificial intelligence, blockchain, and cloud computing to improve production, management, and decision-making processes in an interactive and self-learning manner, enhancing their flexibility and sustainability in a changing digital environment" (Al-Zahrani, 2024).

The transformation from startups to smart enterprises represents a qualitative stage in the development of digital entrepreneurship. This transformation is not limited to adopting technology, but rather includes building an integrated, intelligent system capable of self-learning and dynamically interacting with environmental changes (Lee et al., 2023).

Smart enterprises are characterized by their ability to:

- Use artificial intelligence to analyze markets and predict future trends;
- Build automated operating systems based on machine learning algorithms;
- Developing personalized customer experiences through behavioral intelligence and cognitive analytics (Cascio & Montealegre, 2022).

Elmassri (2024) notes that startups that adopt AI early on achieve rapid growth and greater sustainability compared to those that continue to rely on traditional digital tools. In the Arab world, government initiatives, such as the National Artificial Intelligence Strategy in the UAE and Saudi Arabia, have paved the way for the emergence of smart entrepreneurial environments based on innovation and advanced digital transformation (Al-Jaafari, 2023).

II.4-Integration between AI and entrepreneurship:

Contemporary entrepreneurial thought is moving toward building a smart business model that integrates AI into all stages of entrepreneurial activity: from opportunity exploration, through product design, to after-sales service. Duan et al. (2021) assert that this integration generates a new form of knowledge entrepreneurship, which relies on data as a strategic resource equivalent to physical capital.

Transitioning to this model requires entrepreneurs to develop digital and analytical competencies

capable of handling artificial intelligence, in addition to the need for a digital infrastructure that facilitates machine learning processes and supports organizational transformation.

According to a study by Saebi and Foss (2022), the success of entrepreneurial organizations in the smart age depends on their ability to transform the knowledge generated by artificial intelligence into strategic decisions and sustainable innovations.

III- Artificial intelligence as a lever for entrepreneurial innovation and the transition to smart enterprises :

III.1-Artificial intelligence as a driver of entrepreneurial innovation

In the contemporary digital economy, innovation has become closely linked to the ability to generate knowledge, analyze data, and leverage it to create new solutions. Artificial intelligence (AI) is the most effective tool in supporting this transformation, due to its analytical and predictive capabilities that contribute to redefining the concept of entrepreneurial innovation (Lichtenthaler, 2022).

Chatterjee et al. (2023) argue that AI enables entrepreneurial organizations to shift from traditional trial-and-error-based innovation to data-driven innovation, which relies on analyzing consumer behavioral trends and anticipating their needs before they appear in the market. This type of innovation enhances resource efficiency and increases the speed of response to environmental changes.

From another perspective, Haddad (2023) explained that AI in the Arab world has helped many entrepreneurial projects improve business models and customize products and services to suit local consumer culture, helping them gain a sustainable competitive advantage in regional markets.

Duan et al. also point out that AI has helped many entrepreneurial projects in the Arab world improve business models and customize products and services to suit local consumer culture, helping them gain a sustainable competitive advantage in regional markets. They concluded that AI systems contribute to reducing innovation risks by virtually testing new ideas using intelligent simulations, which reduces costs and increases the likelihood of success of entrepreneurial projects.

III.2-Digital Transformation and the Transition to Smart Enterprises

Digital transformation today represents a prerequisite for the sustainability of entrepreneurial organizations. With the use of AI, transformation is no longer merely a digitization of processes, but rather a cognitive and structural transformation that reshapes the ways of thinking and managing within organizations (Vial, 2019).

In this context, Lee et al. (2023) argue that AI represents the core of the transformation toward smart enterprises, as it enables organizations to develop self-learning systems capable of continuously improving performance without direct human intervention.

Smart enterprises are characterized by several key characteristics, including:

- Reliance on predictive data in decision-making;
- Integration between humans and machines in an interactive work environment;
- Organizational flexibility and the ability to adapt to market changes;
- Continuous learning through AI algorithms.

Recent studies have shown that organizations that have adopted artificial intelligence (AI) into their operational structures have experienced an increase of more than 35% in organizational performance efficiency and a reduction in operational errors compared to enterprises that still rely on traditional digital models (World Economic Forum, 2024).

In the Arab context, the shift toward smart enterprises is progressing at varying paces depending on the digital infrastructure and local legislation. According to the Arab Entrepreneurship Forum (2023) report, the UAE and Saudi Arabia are among the leading countries in integrating AI technologies into emerging business environments, through programs such as "smart labs" and "tech accelerators" that aim to support digital innovation and smart entrepreneurship.

III.3-Artificial Intelligence and Its Role in Building Entrepreneurial Competitive Advantage

Recent literature indicates that competitive advantage is no longer built solely on physical capital or human resources, but rather on the ability to exploit knowledge and data. In this context, AI is considered a strategic tool that enables entrepreneurial enterprises to transform data into added economic value (Porter & Heppelmann, 2022).

Davenport and Ronanki (2023) argue that AI applications such as predictive analytics, intelligent marketing, and automated customer service contribute to improving customer experience and raising the level of digital engagement, which positively impacts customer loyalty and sales growth. AI also enhances organizations' ability to predict market fluctuations and customize their competitive strategies based on accurate and immediate data.

On the other hand, Al-Taie (2023) asserts that entrepreneurial organizations in the Arab world need to develop their digital and administrative competencies in order to maximize the benefits of AI, as the limited availability of qualified human resources represents one of the most significant challenges facing smart transformation.

III.4-Future Challenges and Opportunities for Smart Transformation

Despite the vast opportunities AI offers for entrepreneurship, there are a number of technical, ethical, and regulatory challenges that could hinder this transformation.

The most prominent of these are:

- Lack of trust in automated decisions generated by algorithms;
- Lack of digital skills specialized in developing AI systems;
- Issues related to data privacy and security;
- Lack of legal frameworks regulating the use of AI in small and medium-sized enterprises.

Despite these challenges, future studies confirm that the future of entrepreneurship will be based on generative AI, which will enable enterprises to design new products, create personalized marketing

content, and analyze customer behavior in real time (Gartner, 2025).

Therefore, the future direction should be toward building an integrated smart entrepreneurial environment based on human-machine partnerships and collective innovation among entrepreneurs, programmers, and decision-makers.

IV-Artificial Intelligence and its Impact on Developing Entrepreneurial Business Models and Achieving Smart Sustainability

IV.1-Reengineering Business Models in Light of Artificial Intelligence

AI has radically transformed the philosophy of designing entrepreneurial business models. The focus is no longer solely on creating economic value, but rather on creating smart value based on in-depth data analysis and continuous interaction with customers (Zeng et al., 2023).

Osterwalder and Pigneur (2020) note that AI has created what are known as adaptive business models, models capable of automatically adjusting their operations in response to environmental and market changes.

Through applications such as predictive data analysis, automated service customization, and intelligent marketing, startups are better able to anticipate trends and develop innovative products more quickly and at a lower cost (Liu & Li, 2022).

AI has also contributed to improving supply chain operations and identifying vulnerabilities in real time, increasing the efficiency of small and medium-sized enterprises (SMEs) in the face of competition (PwC, 2024). In the Arab context, Mansour's study (2023) showed that many entrepreneurial projects in the Gulf and the Maghreb have begun to rely on artificial intelligence to analyze local consumer behavior, enabling them to achieve higher levels of customization and satisfaction, thus increasing the organization's market value.

IV.2-Artificial Intelligence as a Tool for Achieving Corporate Sustainability

The concept of sustainability is no longer limited to environmental or social aspects. Rather, it has become an integrated, intelligent concept that encompasses a balance between economic, technological, and cognitive performance (Lopez et al., 2023). AI contributes to achieving sustainability across three main levels:

- Economic sustainability: by reducing operational costs and improving resource allocation through intelligent data analysis.
- Environmental sustainability: by improving energy efficiency and reducing waste in supply and production chains (Nguyen et al., 2025).
- Cognitive sustainability: by developing continuous learning systems within organizations that enable them to keep pace with technological innovations and update their organizational knowledge.
- The Organization for Economic Co-operation and Development (OECD, 2024) confirms that artificial intelligence (AI) has become a key component of both green and digital

transformation policies, enabling organizations to combine profitability with responsible innovation.

At the Arab level, the UAE's experience in launching initiatives such as "AI for Sustainability" represents a pioneering model for integrating AI into sustainable development strategies and environmental entrepreneurship (UAE Ministry of Economy, 2024).

IV.3-Artificial Intelligence and the Dynamics of Value Added in Entrepreneurial Projects

Recent research shows that value added in smart entrepreneurial projects is no longer created solely through products and services, but also through the data and knowledge generated by smart systems (Kraus et al., 2022). Every analysis or digital interaction generates new knowledge that can be invested in developing more effective business models.

Chen et al. (2023) argue that organizations with advanced analytical capabilities are able to transform data into a strategic asset, thereby achieving double-digit growth in entrepreneurial performance compared to organizations that rely solely on human expertise.

In the Arab world, artificial intelligence has contributed to enhancing digital entrepreneurial value in sectors such as e-commerce, financial services, and smart waste management, enabling startups to offer innovative solutions based on local data and consumer behavior.

This is highlighted in the World Bank's 2024 report, which confirmed that artificial intelligence has increased the economic value of startups in the Middle East by nearly 30% over the past five years.

IV.4-Regulatory and Ethical Challenges in Designing Smart Business Models

Despite the tremendous potential of AI in transforming business models, the smart transformation raises complex regulatory and ethical issues. On the one hand, questions are being raised about the transparency of algorithms and the accountability of automated decisions. On the other hand, there are growing concerns about algorithmic discrimination and privacy violations (Crawford, 2021).

The legal environment in many developing countries is still not fully prepared to regulate the use of AI in small and medium-sized enterprises (SMEs), posing challenges for entrepreneurs seeking to integrate it into their operations.

Therefore, recent studies recommend the development of flexible regulatory frameworks that ensure the responsible use of AI and achieve a balance between innovation and legal oversight (European Commission, 2024).

V-The Transformation from Startups to Smart Enterprises – Stages, Mechanisms, and Challenges

The transformation towards smart enterprises represents an advanced stage of digital maturity that entrepreneurial organizations reach when they successfully integrate AI technologies into their strategic and organizational structures. This transformation does not occur suddenly, but rather is a gradual process that includes three interconnected stages: technical transformation, administrative

transformation, and cultural and cognitive transformation within the organization.

V.1-The Technical Transformation Stage

This stage involves modernizing startups' digital infrastructure by adopting data-driven management systems and applying artificial intelligence algorithms in specific areas such as consumer behavior analysis, marketing automation, and resource management. A study (Lee et al., 2023) indicates that 68% of startups that adopted AI solutions in their early stages recorded an improvement in operational efficiency of more than 25%.

This stage represents the technical foundation that enables the organization to later transition to smarter management, relying on machine learning and the use of predictive analytics in decision-making.

V.2-The Administrative and Organizational Transformation Stage

In this stage, the organization shifts from relying on traditional management to an intelligent management system based on predictive analysis and autonomous systems capable of learning. Artificial intelligence is becoming an integral part of the decision-making process in the fields of finance, risk management, and digital marketing.

Zeng et al. (2022) confirms that enterprises that have adopted "smart management" strategies have been able to accelerate internal innovation by 40% compared to those that rely on manual or semi-digital management methods.

This transformation also enables the promotion of the concept of "smart entrepreneurship," a modern management model that relies on human-machine collaboration in strategic decision-making.

V.3-The Cultural and Cognitive Transformation Stage

The transformation toward a "smart enterprise" is not complete without a change in the organization's organizational and cognitive culture. Human resources are at the core of smart transformation, as employees must be prepared to embrace analytical thinking, technological creativity, and the ability to interact with smart systems.

Al-Mutairi's study (2024) indicates that the failure of a number of organizations to achieve smart transformation is due to the absence of a culture of innovation and digital knowledge, rather than a lack of technology. This highlights the importance of building a corporate culture capable of embracing change and adapting to the requirements of artificial intelligence.

V.4-Challenges Facing the Transformation to Smart Enterprises

Despite the numerous advantages offered by artificial intelligence, the transformation to smart enterprises faces multiple challenges, which can be classified into three main areas:

- **Technical challenges:** These relate to weak digital infrastructure and the difficulty of integrating AI systems into legacy structures.
- **Human challenges:** These include the lack of digital skills and specialized personnel capable of handling AI technologies.
- **Legislative and ethical challenges:** These relate to privacy, data protection, and overreliance on automated systems in decision-making (Rahman & Abdullah, 2023).
- To address these challenges, recent literature emphasizes the need to develop national digital policies that encourage innovation and provide financial and technical support to startups seeking smart transformation (OECD, 2024).

V.5-Towards an Integrated Model for Smart Enterprises

From the above, it is clear that the transformation to smart enterprises does not depend solely on technology, but rather on the integration of three main dimensions: technology, management, and corporate culture.

The success of this transformation requires a clear strategic vision, led by entrepreneurial leadership that possesses technological awareness and the ability to direct innovation toward achieving added value and sustainability.

VI-International and Arab Experiences in the Transformation to Smart Enterprises

Artificial intelligence (AI) is now a central component of economic innovation and entrepreneurship policies globally. Governments and private institutions now consider it a key driver for building a knowledge economy and enhancing corporate competitiveness, both in developed countries and emerging economies seeking to achieve comprehensive digital transformation.

VI.1-The Global Experience – From Digital Leadership to Smart Leadership

- **The South Korean Experience**

South Korea is one of the most prominent models that has successfully integrated AI into the entrepreneurship ecosystem. Through its National Artificial Intelligence Strategy (AI National Strategy 2022), the country has developed an integrated plan to support smart startups through digital incubators and funding for AI-based projects.

A study (Kim & Park, 2023) showed that 72% of South Korean startups that received government support in the field of artificial intelligence were able to double their productivity and improve their competitiveness in global markets within three years.

- **Singapore's Experience**

Singapore adopted the "Smart Nation" strategy in 2019, which aims to build a digital economy based on artificial intelligence and the Internet of Things.

Reports (World Bank, 2024) show that this strategy has contributed to creating an ideal environment for smart entrepreneurship, as startups have benefited from innovation funding

programs (AI Startups Accelerator) and educational systems that support the development of advanced digital skills.

This trend has also led to a 58% increase in the number of startups adopting artificial intelligence technologies between 2020 and 2024.

- **The United States' Experience**

In the United States, the private sector is leading the shift toward smart enterprises through extensive investment in cloud AI and big data analytics.

McKinsey (2024) indicates that American startups that integrate artificial intelligence into their operating models achieve growth rates that exceed traditional enterprises by 40% annually.

Enterprises such as OpenAI, DataRobot, and UiPath have become symbols of the new model of smart entrepreneurship, representing AI not only as a production tool, but also as a management and strategic approach.

VI.2-Arab Experiences—Towards Smart Entrepreneurship in the Context of Digital Transformation

- **The UAE Experience**

The UAE is considered one of the pioneering Arab countries in adopting artificial intelligence within the entrepreneurship ecosystem. In 2017, it launched the National Artificial Intelligence Strategy 2031, which aims to make the country a global hub for smart technologies.

This strategy contributed to the establishment of the UAE Council for Artificial Intelligence and digital entrepreneurship support programs such as Hub71 in Abu Dhabi and Dubai Future Accelerators.

A study (Almarri & Hasan, 2023) indicates that more than 60% of Emirati startups now rely on AI applications in marketing, customer service, and financial analysis, making them a regional model for the shift toward smart businesses.

- **The Saudi Experience**

In Saudi Arabia, the Saudi Data and Artificial Intelligence Authority (SDAIA) launched the "Artificial Intelligence and Entrepreneurship" program, which aims to enable startups to leverage AI to develop innovative business models.

According to the Saudi Vision 2030 (2024) report, this program has contributed to a 35% increase in the number of smart enterprises over three years, with significant growth in the technology, financial, and digital business sectors.

- **The Egyptian Experience**

In Egypt, the government is moving towards integrating AI into supporting the university innovation system and university entrepreneurship. The Egyptian Center for Artificial Intelligence and Digital Entrepreneurship was launched in 2022 to support student projects and startups.

A study (Hassan & Abdelkader, 2024) showed that this trend helped create a new generation of technology startups focused on smart solutions to societal problems (such as waste management and renewable energy).

VI.3-A Comparative Analysis of International and Arab Experiences

By comparing these experiences, several key indicators can be drawn:

Comparative Dimension	Developed Countries (Korea, Singapore, United States)	Arab Countries (UAE, Saudi Arabia, Egypt)
Strategic Focus	Building integrated innovation ecosystems based on research and development	Developing digital infrastructure and enhancing technical skills
Government Support	Large-scale funding programs targeting smart enterprises	Regulatory incentives and investment facilitations
Cultural and Institutional Transformation	Deeply rooted digital innovation culture	Digital transformation culture in the process of consolidation
AI Integration Rate	Exceeds 70% in technological sectors	Ranges between 30% and 50% depending on the sector

The source : Prepared by the author

The analysis reveals that global experiences focus on investing in research and development and advanced technical education, while Arab experiences focus on creating a legislative environment and digital infrastructure. However, both paths are directed toward the same goal: building a smart and sustainable entrepreneurial ecosystem

VII- Conclusion:

This study demonstrates that artificial intelligence is no longer a complementary technological option in the contemporary business environment, but rather a comprehensive transformative force that is reshaping the concepts of entrepreneurship, management, production, and economic interaction. The transition from "startups" to "smart enterprises" represents not merely an evolution in business tools, but rather a structural shift in the philosophy of entrepreneurship itself, based on the integration of human analytical and creative capabilities with the computational and predictive power of artificial intelligence.

The study demonstrated that artificial intelligence is reshaping the features of digital entrepreneurship across three fundamental, interconnected dimensions:

- **The technological dimension:** It has contributed to the development of digital systems capable of analyzing big data, self-learning, and accurately predicting market trends.

- The organizational and administrative dimension: This enabled the creation of smart organizational structures based on knowledge management and predictive analysis, increasing the speed of response to changes and reducing operational risks.
- The cultural and cognitive dimension: This was evident in the consolidation of a culture of innovation and digital resilience within institutions, and in motivating human resources to acquire analytical skills and interact with smart systems.

Through a comparative analysis of international and Arab experiences, it becomes clear that the countries that have succeeded in building smart entrepreneurial systems are those that combined investment in technology, education, and digital governance. While Asian experiences (Korea and Singapore) were distinguished by their focus on applied research and technical education, Arab countries (the UAE, Saudi Arabia, and Egypt) sought to build a digital legislative environment and national innovation centers. This reflects the varying stages but points to a common trend toward a knowledge economy.

The transition to the "smart enterprise" model represents a necessary response to the challenges of the 21st century, characterized by rapid change, market complexity, and increasing global competitiveness. Recent empirical evidence has shown that organizations that have adopted AI into their operations achieve growth rates between 25% and 40% higher than their counterparts that continued to operate within the traditional model (McKinsey, 2024; OECD, 2024).

Therefore, smart transformation is no longer a technological luxury; it has become a strategic choice for survival and sustainability, especially in developing economies seeking to integrate into the global digital economy. This transformation represents a real opportunity for the Arab world to bridge the development gap by investing in AI to enhance entrepreneurial innovation, support smart operations, and stimulate sustainable green growth.

VIII-Practical Recommendations and Proposed Policy Actions

Based on the results of the analysis and theoretical conclusions, a set of practical recommendations can be presented for decision-makers, entrepreneurial institutions, and researchers:

- At the strategic and national level:
 - ✓ Adopt integrated national policies for artificial intelligence and smart entrepreneurship, similar to the successful strategies in Korea and the UAE, linking them to the Sustainable Development Goals (SDGs).
 - ✓ Establish smart innovation funds dedicated to early-stage startups to encourage projects based on predictive analytics and big data.
 - ✓ Strengthen digital infrastructure by expanding 5G networks and providing national cloud computing platforms that allow startups to access AI tools at affordable prices.
- At the university and research center level:
 - ✓ Integrate AI and entrepreneurship courses into university curricula to prepare entrepreneurs with a mix of technical and managerial competencies.
 - ✓ Support research partnerships between universities and startups to develop applied solutions in areas such as smart marketing, predictive management, and sustainable energy.
 - ✓ Encourage scientific publishing in specialized journals that combine technology and entrepreneurship, to create an Arab knowledge base on smart transformation.
- At the level of entrepreneurial institutions and startups:

- ✓ Develop clear digital transformation strategies that integrate artificial intelligence into core processes such as human resources management, supply chains, and marketing.
- ✓ Invest in human resource training to ensure employees are able to interact with intelligent systems and interpret their results.
- ✓ Adopt flexible and open business models for innovation that allow interaction with external digital environments and global technology partners.
- ✓ Foster a culture of trust in intelligent systems within the organization, and adopt a "human-in-the-loop" approach to achieve a balance between machines and the human mind.
- At the legislative and ethical level:
 - ✓ Develop a legal and ethical framework for the use of artificial intelligence in entrepreneurship, ensuring transparency, data protection, and preventing algorithmic bias.
 - ✓ Establish accreditation standards for smart enterprises to assess their digital readiness and level of integration of smart technologies.
- At the regional and international levels:
 - ✓ Enhancing Arab-international cooperation in the fields of innovation and artificial intelligence, through the establishment of an "Arab Smart Entrepreneurship Network" to exchange expertise and best practices.
 - ✓ Benefiting from leading global experiences through exchange programs and joint incubation plans between Arab countries and international institutions.

IX-Future Research Prospects

The topic of artificial intelligence and smart entrepreneurship opens up broad horizons for scientific research in various fields, including:

- Studying the impact of artificial intelligence on promoting social innovation and green entrepreneurship.
- Analyzing the relationship between digital leadership and smart transformation for startups in the Arab world.
- Designing quantitative models using tools such as Smart PLS or AMOS to measure the direct and indirect impact of artificial intelligence on entrepreneurial performance.
- Researching the ethical and psychological dimensions associated with adopting artificial intelligence in the entrepreneurial environment (such as trust, responsibility, and transparency).
- Exploring the impact of generative AI on entrepreneurial creativity and the creation of commercial and marketing content

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How to cite this article by the APA method:

Adel Gherbi, (2025), From Startups to Smart Enterprises: How Artificial Intelligence is Reshaping Digital Entrepreneur, Economic Development Review, Volume 10 (Number 02), Algeria: University of Eloued, pp. 225-241

