

Analysis of the United Arab Emirates' position in the global map of innovation and digitization, and the success of "Silicon Oasis" in the Kingdom

تحليل موقع الامارات العربية في خارطة الابتكار والرقمنة العالمية _واحة
السيليكون عنوان النجاح بالمملكة_

*Bouzidi Houda

Selatnia Nadjiba

Abbes Laghrour University Khenchela (Algeria)

docteur.houda27@gmail.com

selatnia.nadjiba@univ-khenchela.dz

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Abstract:

The article discusses the importance of science and innovation in improving people's lives and promoting economic prosperity. It points to progress in diverse fields such as agriculture, manufacturing, transportation, energy, environmental sustainability, communications, and technology. It focuses on the concept of "science oases" as institutions that translate scientific results into practical innovations through collaboration between the public and private sectors and higher education institutions. It presents the United Arab Emirates as a successful model in this field, highlighting the importance of synergistic cooperation between various stakeholders to enhance innovation environments. The article aims to explore how scientific findings are transformed into practical innovations and their impact on economic and social development. It also seeks to provide insights and best practices that other countries can benefit from to enhance their innovative capabilities and achieve sustainable economic growth. The title of the article refers to analyzing the UAE's position on the global innovation and digitalization map, focusing on "Silicon Oasis" as a model for success in the region.

Keywords: Innovation, Technopoles, Competitiveness, Digitalization.

JEL classification codes : O30,L86

1. Introduction.

Innovation has become a driving force for economic growth and sustainable development in both developed and developing countries. Innovation is considered a creative activity that contributes to the development of products, marketing methods, and new or significantly improved organizational patterns, and their use to create the desired societal impact and economic and social transformation. In the global innovation economy, the demand for intellectual property is increasing at an accelerating pace, becoming more complex. However, artificial intelligence is capable of revolutionizing intellectual property office services worldwide, and Silicon Oasis in the United Arab Emirates is working to attract innovative investments, which will help the country face the challenges posed by the increasing demand for technology applications.

1.1.Research Problem:

In an era characterized by rapid change and increasing global challenges, science and innovation emerge as key drivers of human progress and economic prosperity. The global arena is witnessing radical transformations in various sectors, from agriculture to advanced technology, making the need for innovation more urgent than ever. In this context, the importance of "Science Oases" emerges as unique models that combine scientific research and practical application, thereby stimulating comprehensive development. The problem of this study revolves around the following main question: **How has the United Arab Emirates managed to develop and implement a successful model for innovation and digitization, and what are the lessons learned that can be applied on a broader scale?**

2.1. Research Importance:

This study seeks to shed light on the role of innovation in shaping the future of modern economies, with a particular focus on the experience of the United Arab Emirates as a leading model in the region. By exploring the concept of "Silicon Oasis" and other Emirati initiatives, we aim to understand the mechanisms that enable countries to transform scientific ideas into tangible reality that benefits society as a whole.

The importance of this study lies in its comprehensive analysis of the UAE model in innovation and digitization, contributing to the

enrichment of scientific literature on knowledge-based economic development. The study highlights the vital role of "Science Oases" in transforming scientific results into practical innovations, and illustrates mechanisms for effective collaboration between the public and private sectors and higher education institutions. It also provides valuable insights for decision-makers and investors on how to enhance national competitiveness through innovation, and highlights opportunities for sustainable economic growth. The study also contributes to understanding the social impact of innovation on quality of life, and presents a model that can be used in formulating national policies and enhancing international cooperation. Finally, it helps in foreseeing the future of innovation and technology, making it of great value to researchers, practitioners, and society as a whole in their quest for comprehensive and sustainable development.

3.1. Study Objectives:

This research comes at a time when countries are racing to enhance their innovative capabilities and consolidate their position in the global digital economy. Therefore, studying the UAE model is not only important for understanding its successes but also extends to providing valuable lessons and practical insights that other countries can benefit from in their pursuit of sustainable development and technological progress.

- Analyze the United Arab Emirates model in innovation and digitalization
- Explore mechanisms of cooperation between sectors
- Assess the impact of innovation initiatives on development
- Identify challenges and ways to overcome them
- Explore the possibility of replicating the UAE model
- Provide recommendations for decision-makers

By achieving these objectives, the study seeks to provide a comprehensive and integrated vision of the role of innovation in sustainable technological development, focusing on the UAE experience as a model that can be utilized globally.

2. The Essence of Innovation

The definitions of innovation vary according to schools of thought, researchers' perspectives, and their orientations. Innovation has been defined based on various considerations. Among the definitions of innovation based on specific personality traits, whether mental or emotional, is that of Simpson, who defined innovation as the

individual's ability to break free from ordinary thinking patterns and adopt a new approach to thinking.

2.1. The Concept of Innovation:

The concept of innovation has captured the attention of academics and researchers in all educational conferences, both in the Arab world and globally. Innovation has become one of the ways to develop education through discussing renewed ideas and pioneering initiatives, and through recommendations produced by many workshops that bring together global experts and are organized by them. We will discuss its concept.

2.2. Linguistic Definition:

Innovation is defined as a means to find new solutions to the challenges we face. It is also defined as any new thought, behavior, or thing because it differs qualitatively from existing forms. It is also the observation and generation of new ideas through the availability of diverse perspectives and the coordination of necessary actions to implement these ideas and translate them into innovations.

In the Arabic language dictionary, innovation (Ibtikar) is derived from the verb "bakara," the noun "bakr," and the plural "abkar." To innovate something means to take possession of its first fruits, and "bakurah" is the first of something. Innovation [b k r] (verbal noun of innovate) is announced as a new innovation: about an invention, creation. "The international exhibition is teeming with new innovations." He has the ability to innovate meanings: to create unfamiliar and unconventional meanings. (Masoud, 1992)

Innovation is a word translated from English "Innovation," and its linguistic meaning is to present something new; an idea, method, or otherwise. (Oxford Learner's , 2008)

2.3. Terminological Definition:

Joseph Schumpeter is considered one of the first researchers in innovation, with his efforts dating back to 1912. He distinguished between invention and innovation, stating that invention is the conception of something new, while innovation is bringing this conception into implementation and practice and achieving gains from it. He sees it as a vital driver of economic growth and believes it occurs through entrepreneurship, i.e., innovating a service or product by the business owner or through routine research and development activities. He does not consider every renewal an innovation unless it causes a significant change in the product's characteristics, costs, and use. (Blackwell, 2008)

Spearman (1931) defined the innovative mind as the mind that can reach new and original solutions to problems that no one else has preceded, meaning it is the mind that can produce the new and original. The innovative person is the one who precedes others in his society in presenting, adopting, and testing new ideas. (Delphine Manceau, 2011)

Innovation is the creation of new and creative ideas, and then their application and practice. He concluded by expanding the concept of innovation to start from the idea, then its application to move into the realm of production and practice, and finally its transition to the market to enter the realm of competition.

3. Analysis of the United Arab Emirates' Position on the Global Competitiveness Map.

The United Arab Emirates (UAE) is considered one of the most important countries that possess successful technological zones by various standards, translating its successes into the volume of investments it has attracted, especially concerning innovation, and the diversity of these zones in terms of industries and services. The continuous and ongoing success of these areas has led to the creation of a new ecosystem that keeps pace with local, regional, and international economic changes, which has allowed the country to occupy a prestigious position in the global economic arena.

3.1. Economic Freedom Index

Based on **Economic Freedom Index** April 2024, in recent years the United Arab Emirates has consistently ranked highly in the Index of Economic Freedom. As of the 2023 index, the UAE was ranked as follows:

- Overall Score: 71.1 out of 100
- Global Rank: 33rd out of 184 countries
- Regional Rank: 3rd in the Middle East and North Africa region

The UAE's economy was classified as "Mostly Free" according to the index's categories.

Table 1.The UAE’s ranks in the Economic Freedom Index

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Global Rank	25	25	8	10	9	15	22	22	22	20
Score	74.9	72.6	76.9	76.9	77.6	76.7	76.9	76.2	71.1	71.8
Region	2	2	1	1	1	1	1	1	1	1

Source: by authors According to Index of Economic Freedom by The Heritage Foundation:

<https://www.heritage.org/index/country/unitedarabemirates>

Based on the UAE's Economic Freedom Index performance from 2015 to 2024, here's a concise analysis:

- a) Consistency and Growth:
 - The UAE has maintained a strong position in the global rankings, particularly from 2017 onwards.
 - Despite some fluctuations, the UAE's scores have generally remained high, indicating a sustained commitment to economic freedom.
- b) Regional Leadership:
 - Since 2017, the UAE has consistently held the top position in the Middle East region.
 - This regional dominance reflects the UAE's strong economic policies and business-friendly environment.
- c) Key Trends:
 - Significant improvement: The UAE jumped from 25th place in 2016 to 8th in 2017, marking a substantial leap in global rankings.
 - Recent stability: From 2021 to 2024, the UAE has maintained a consistent global rank of 22nd.
 - Score variations: While scores have fluctuated, they've generally remained above 70, with a peak of 77.6 in 2019.
- d) Implications:
 - The UAE's performance demonstrates its commitment to fostering a competitive economic environment.
 - The consistent top regional ranking positions the UAE as a leader in economic freedom within the Middle East.
 - Recent score declines (2023-2024) may warrant attention to maintain the country's strong position.
- e) Future Outlook:
 - To sustain and improve its global ranking, the UAE may need to focus on areas that could boost its economic freedom score.

- Maintaining regional leadership while striving for higher global rankings could be a key strategy for the UAE's economic policy.

This analysis showcases the UAE's journey in the Economic Freedom Index, highlighting its growth, regional dominance, and areas for potential future focus.

The UAE's journey in the Economic Freedom Index showcases a story of growth, resilience, and regional dominance. With a steadfast commitment to economic development, innovation, and business-friendly policies, the UAE has solidified its position as a key player in the global economic landscape. Looking ahead continued focus on maintaining and enhancing economic freedom will be crucial for sustaining the UAE's growth trajectory and reinforcing its status as a beacon of prosperity in the Middle East and beyond.

3.2. Global Competitiveness Report:

The Global Competitiveness Report 4.0 is produced by the World Economic Forum, headquartered in Geneva, Switzerland. The report was first issued in 2018, replacing the previous annual Global Competitiveness Report.

Table 2.UAE's Rank in the Global Competitiveness Report: 2018-2024

Year	2018	2019	2020	2021	2022	2023	2024
Global Rank	27	25	16	16	16	16	7

Source: by authors According to Global Competitiveness Report by the World Economic Forum:

https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport

The UAE's performance in the Global Competitiveness Report highlights its commitment to enhancing competitiveness and fostering a conducive environment for economic growth and innovation. Here is a breakdown of the UAE's rank progression from 2018 to 2024:

a) Consistency and Growth:

Over the years 2018 to 2024, the UAE exhibited a remarkable pattern of consistency and growth in the Global Competitiveness Report. Starting from the 27th position in 2018, the country steadily improved its ranking, reaching the 7th position in 2024. This consistent upward trajectory demonstrates the UAE's commitment to enhancing competitiveness, fostering innovation, and creating a conducive environment for economic development.

b) Regional Leadership:

The UAE's performance in the Global Competitiveness Report positioned it as a leader in the Arab world. By securing the top spot in the region and maintaining advanced rankings globally, the UAE has emerged as a regional leader in competitiveness, setting an example for other countries in the Middle East and North Africa region to follow.

c) Key Trends:

Key trends observed in the UAE's journey in the Global Competitiveness Report include a focus on developing transportation infrastructure, strategic investments in preparation for major events like Expo 2020, and advancements in key competitiveness indicators. These trends underscore the country's proactive approach to enhancing its competitiveness on the global stage.

d) Implications:

The implications of the UAE's consistent rise in the Global Competitiveness Report are significant. By securing higher rankings and demonstrating sustained competitiveness, the UAE enhances its attractiveness for foreign investments, fosters economic growth, and strengthens its position as a global business hub. These implications have far-reaching effects on the country's economy and its role in the international arena.

e) Future Outlook:

Looking ahead, the future outlook for the UAE in the Global Competitiveness Report appears promising. With a track record of growth, innovation, and competitiveness, the UAE is well-positioned to continue its upward trajectory. By focusing on key pillars of competitiveness, investing in innovation and infrastructure, and adapting to emerging global trends, the UAE is poised to maintain its leadership position and further enhance its global competitiveness in the years to come.

The UAE's journey in the Global Competitiveness Report from 2018 to 2024 reflects a consistent trajectory of growth, innovation, and competitiveness. The country's proactive initiatives, strategic investments, and focus on key pillars of competitiveness have propelled it to the forefront of the global economic stage. The substantial jump to the 7th position in 2024 signifies the UAE's dedication to excellence, economic prosperity, and sustainable development, positioning it as a prominent player in the global competitiveness landscape. (Dubai Economic Report 2024, 2024)

3.3.Innovation Index

The UAE excelled in innovation inputs, ranking 22nd globally, surpassing several leading countries. However, its innovation outputs ranked 55th, showing room for improvement.

The country's progress is attributed to its strong performance in human capital and research, infrastructure, business sophistication, and creative outputs. It achieved a good position in the new sub-index "Global Brand Value" and ranked first globally in the "Cost of redundancy dismissal" and "Tertiary inbound mobility" indices.

The UAE has consistently maintained its top position among Arab countries in the Global Innovation Index. It has consistently outperformed other Arab nations in terms of innovation inputs and outputs.

Table3.UAE's Rank in theInnovation Index 2015-2024

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rank	47th	45th	43rd	39th	36th	34th	33rd	31st	32nd	32nd

Source: by authorsAccording to: Global Innovation Index:

<https://www.globalinnovationindex.org/analysis-economy>

The analysis of the UAE's ranking in the Global Innovation Index from 2015 to 2024:

a) Consistency and Growth:

The UAE has shown a consistent upward trajectory in its Global Innovation Index ranking from 2015 to 2021, moving from 47th to 33rd. This 14-place improvement over six years indicates effective policy implementation and investment in innovation. However, the slight decline to 32nd in 2023 and 2024 suggests that the country may be facing challenges in maintaining this growth momentum. The consistency in ranking, particularly in the early years, reflects a strong commitment to fostering an innovative ecosystem.

b) Regional Leadership:

The UAE has positioned itself as a regional leader in innovation within the Gulf Cooperation Council (GCC) and the broader Middle East. Its continuous improvement in the index demonstrates its proactive approach in enhancing research, education, and infrastructure compared to neighboring countries. The UAE's strategic initiatives, such as the National Innovation Strategy, have set benchmarks for innovation across the region, making it a model for other nations aiming to enhance their innovation capabilities.

c) Key Trends:

Several key trends can be observed:

Investment in R&D: The UAE has significantly increased its investments in research and development, which has positively impacted its innovation output.

Education and Talent Development: Enhancements in educational frameworks and efforts to attract global talent have contributed to the country's innovation landscape.

Digital Transformation: The push towards digitalization and smart technologies has been a crucial element in improving the UAE's innovation standing.

Sustainability Initiatives: Growing focus on sustainable practices and green technologies reflects a shift towards innovative solutions that address global challenges.

d) **Implications:**

The implications of the UAE's ranking trends are multifaceted:

Economic Diversification: A strong innovation framework supports the UAE's goal of diversifying its economy beyond oil dependence.

Global Competitiveness: Improved rankings enhance the UAE's attractiveness to foreign investors and global businesses seeking innovative environments.

Social Development: Investment in innovation translates into better education, health, and quality of life for residents, fostering a more knowledgeable and skilled workforce.

e) **Future Outlook:**

Looking ahead, the UAE's future in the Global Innovation Index will depend on its ability to address current challenges:

Sustaining Growth: To maintain and improve its ranking, the UAE must continue to innovate and adapt to the rapidly changing global landscape.

Focus on Outputs: Strengthening innovation outputs, such as patents, startups, and technological advancements, will be crucial.

Collaboration and Partnerships: Building partnerships between government, academia, and the private sector can enhance research impact and foster a collaborative innovation ecosystem.

Adapting to Global Trends: Keeping pace with global trends in technology, sustainability, and digital transformation will be key to future success.

Overall, while the UAE has made impressive strides in innovation, continuous effort and strategic focus will be essential for maintaining its leadership position in the coming years. The UAE's leadership in

telecommunications and information technology, along with its experience in overcoming the Covid-19 pandemic, contributed to its success. The report also highlighted the role of Emirati small and medium enterprises in developing the innovation environment.

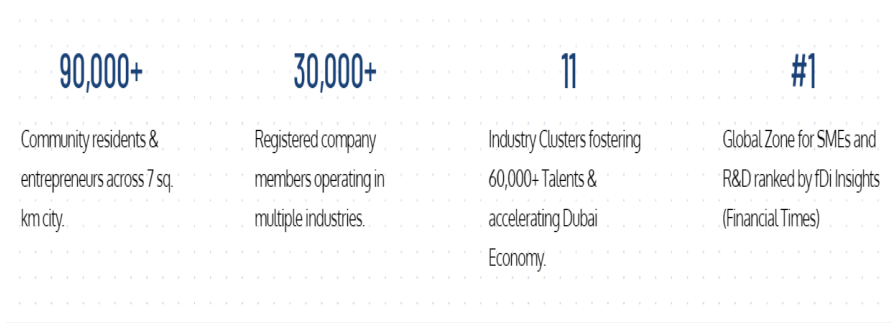
The Organization for Economic Cooperation and Development (OECD) praised the UAE's efforts in dealing with the Covid-19 crisis and its ability to limit its repercussions on economic and social life.

4. Dubai Silicon Oasis

Established in 2003, Dubai Silicon Oasis is a globally recognized free zone and an integrated technology park that allows people to live, work, study, and play.

Hosting modern technology-based industries and an urban master-planned community in an iconic location, DSO offers state-of-the-art infrastructure and in-house business services. Designed as a hi-tech ecosystem in Dubai, DSO offers a wide range of benefits.(Al Bayan, 2023)

Fig 1. Key Information about Dubai Silicon Oasis (DSO)



Source: UAE Federal Competitiveness and Statistics Authority:
<https://fcsa.gov.ae/en-us/Pages/Competitiveness/Reports-And-Studies.aspx>

The emirate's free zone model has attracted a larger share of trade and FDI than any other comparable programme in the world. It has served as a model for other free zone rollouts worldwide. The city's free zone model has shown the adaptability to serve Fortune 500 companies and small businesses that make up more than 94% of the

UAE's economy and 86% of the private sector workforce.(DSO , 2023)

In 2021, Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, issued a decree which resulted in the establishment of Dubai Integrated Economic Zones (DSO) Authority, an independent legal entity that governs Dubai Airport Free Zone, Dubai Silicon Oasis and Dubai Commerce City. Today, DSO boasts more than 5,000 firms covering 20 key economic sectors and employing 30,000 employees, and accounts for more than 5% of Dubai's GDP.(The Economic Impact of Expo 2030, 2023)

The market value of its net assets exceeding AED20.8 billion, DSO succeeded in reinforcing growth in earnings before interest, taxes, depreciation, and amortisation by 49.2 percent, alongside an 8.1 percent increase in total revenues. These figures underscore the role of DSO as a key contributor to Dubai's economy.(Dubai Silicon Oasis, 2023)

DSO aspires to solidify Dubai's position as a regional and global investment destination across diverse sectors. By aligning with the emirate's strategic priorities for integrated economic zones, DSO seeks to foster economic growth and pave the way towards an economic landscape characterised by diversity, multiple investment opportunities, and ease of conducting business.

Conclusion:

The United Arab Emirates' consistent performance at the top of the list of best countries in the region for ease of doing business is attributed to the continuous efforts of government teams and their federal and local institutions in digitalizing public sectors and supporting business owners and private sector companies of various sizes, specialties, and sectors. This is aimed at creating an attractive and stimulating business environment for investors, with ongoing support for innovators and idea bearers. The establishment of technology zones and science cities has gained worldwide recognition, with major global films being shot in Dubai Studio City* and large companies forming partnerships and subcontracting relationships with startups in Silicon Oasis. All this and more has led to the UAE becoming the leading technological community in the region today.

Results:

Ø UAE's excellence in ease of doing business: · The country maintains its position as the best in the region in this field. · This is due to the continuous efforts of the government and federal and local institutions.

Ø Success of the public sector digitalization strategy: · Adoption of a comprehensive approach to digitizing government services. · Improving the efficiency of procedures and facilitating transactions for companies and investors.

Ø Effective support for the business sector: · Providing support to business owners and companies of various sizes and specialties. · Creating an attractive and stimulating business environment for investors.

Ø Nurturing innovation and innovators:

*Dubai Studio City: Dubai Studio City provides advanced facilities and services for companies across the broadcasting, film and TV production, music, and entertainment sectors. Equipped with the region's largest sound stages, backlots, sets, water tanks, recording studios, and offices, it offers a comprehensive solution to facilitate an easy, efficient, and innovative production process.

Based on this information, here are three recommendations:

1. Enhance digital infrastructure: Continue investing in and upgrading digital infrastructure to maintain the UAE's competitive edge in the region. This could include implementing 5G networks, expanding smart city initiatives, and supporting the development of emerging technologies like AI and blockchain.
2. Foster innovation ecosystems: Develop more specialized innovation hubs and incubators focusing on specific industries or technologies. This could help attract more startups, encourage knowledge transfer, and create synergies between established companies and new ventures.
3. Streamline business processes further: While the UAE is already leading in ease of doing business, there's always room for improvement. Consider implementing a unified digital platform that integrates all government services related to business setup and operation, making it even easier for entrepreneurs and investors to navigate regulatory requirements.

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Analysis of the United Arab Emirates' position in the global map of innovation and digitization, and the success of "Silicon Oasis" in the Kingdom

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