

The Role of Artificial Intelligence on Startup - A Statistical Study About Few Countries In The World -

دور الذكاء الاصطناعي في المؤسسات الناشئة

- دراسة إحصائية لبعض دول العالم -

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Abstract:

Artificial intelligence plays an important role in the development of start up across the world. Start up that introduces artificial intelligence applications into their products and services benefit from several advantages. This research paper aims to study the extent of applications of artificial intelligence by start up by resorting to some statistics in countries around the world. The results of the study have shown that the United States of America, China, Japan and Britain are considered among the largest investing in the field of artificial intelligence. As in some Arab countries, despite their efforts in the field of artificial intelligence, they are still in the stage of developing strategies and have not yet found their way into practical implementations.

Keywords: Artificial intelligence; Developed countries; Arabs countries; Startup; Statistics.

JEL Classification Codes: G24; L69; L89; G21

ملخص:

الذكاء الاصطناعي يلعب دور مهم في تطور المؤسسات الناشئة عبر العالم، فالمؤسسات الناشئة التي تدخل تطبيقات الذكاء الاصطناعي في منتجاتها وخدماتها تستفيد من عدة مزايا. تهدف هذه الورقة البحثية إلى دراسة مدى تطبيقات المؤسسات الناشئة للذكاء الاصطناعي و ذلك باللجوء الى بعض الاحصائيات في دول العالم. نتائج الدراسة أثبتت أن الولايات المتحدة الأمريكية، الصين، اليابان، بريطانيا تعتبر من أكبر الدول المستثمرة في مجال الذكاء الاصطناعي. أما بالنسبة لبعض الدول العربية، فالبرغم من مجهوداتها في مجال الذكاء الاصطناعي، إلا أنها لازالت في مرحلة وضع الاستراتيجيات ولم تجد بعد طريقها للتنفيذ العملي.

الكلمات المفتاحية: الذكاء الاصطناعي، الدول المتقدمة، الدول العربية، المؤسسات الناشئة، إحصائيات.

تصنيف JEL: G21، L89، L69، G24

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INTRODUCTION:

The issue of start-ups and entrepreneurship has led to a qualitative leap in economic theory that did not really give it to the enterprise which a black box. But on the other hand, sociologists and psychologists have taken an interest in the institution and the behavior of workers like Alton Mayo, Abraham Maslow, etc...A new science called the management was born.

But by the end of the 20th century and the liberalization of financial markets led to the large size of the enterprise, so it had more than one owner, and therefore the owners needed someone to manage it. This is where economists intervened with new theories called governance theories that addressed the problem of separating the function of ownership and management with Berl and Means (1932), Alchian et Demsetz (1972), O. Williamson (1976). However, in recent years, these (large-sized) institutions are facing major financial crises due to high costs, high layoffs and low rates of economic growth, making employment a major constraint for developed countries.

To break from this position, the idea of the contractor was taken back into economic theory and re-read the ideas of R. Cantillon, J.B. Say, and then with Schumpeter, who regarded entrepreneurship as the economic engine of innovation.

With this in mind, developed countries' interest in entrepreneurship and startups has grown in keeping pace with rapid technological advances through the construction of digital infrastructure and work in the field of artificial intelligence, which has emerged from research laboratories and science fiction to become an integral part of our daily lives.

Algeria has also attached great importance to entrepreneurship since the beginning of the 1990s, as it seeks to avoid dependence on the fuel sector, especially after the collapse of oil prices in the world market, through the establishment of bodies and mechanisms to encourage the business climate, and the creation of several financing forms, such as the Emerging Enterprise Finance Fund, which was announced during the proceedings of the National Symposium for Emerging Institutions in 2020, and the creation of a ministry in charge of the knowledge economy and emerging institutions.

So AI became a certainty imperative in the face of Fourth World Technological War, and so you could pose the following problem:

How artificial intelligence applications can help startup?

1- Theoretical framework for the study:

1-1- Artificial intelligence:

The term "artificial intelligence" came to prominence in the 1950s after World War II, and was first triggered by the question: Can a machine think? But this idea was largely confined to the theoretical concept for a long time, and after a while, scientists started to put together algorithms that would support the decision-making systems, and at this point, there were several institutions that took the initiative, including IBM International and some big companies. Then, after that, theoretical ideas or algorithms started to be turned into practical applications, using some tools that mimic human capabilities, and this was done by the computer invention of the American company IBMs, which beat the world chess champion. In recent years, artificial intelligence caused my knowledge explosion after Open II launched the ChatGPT program.

1-1-1-Definition of artificial intelligence:

Artificial intelligence is the most important thing that came about in the Fourth Technological Revolution, because today the machine is no longer the same as it was in programming, the machine is capable of simulating humans. Although the idea of artificial intelligence emerged in the 1950s, there is no agreed definition.

Artificial intelligence is linguistically made up of two words: intelligence, the ability to perceive and understand; artificial intelligence, the formation of things.

American scientist Marvin Lee Minsky (1956) defined artificial intelligence as the creation of automated mass media programs by humans requiring high-level mental processes (Haiech, 2020, p. 919).

According to the seminal work of Russell and Norvig (2016), Artificial intelligence is concerned with machines that can exhibit human-like intelligence in two ways. First, it focuses on intelligent action. The second way is computational agents, in the information system (Houcine, 2023, p. 119). Artificial intelligence is a type of computational science which is interested in studying and creating computer systems that display some forms of intelligence (طول و بكار، 2023، صفحة 465).

Artificial intelligence is a branching science of computer science in which programs that emulate human mental abilities are created and designed: planning, learning, problem solving, predicting the future, creativity, and thinking (Ait El Bour & Lebzar, 2020, p. 33).

Artificial intelligence is the ability of the machine to perform the cognitive functions that we associate with human minds, such as cognition, learning, problem solving, interaction with the environment, and was practiced creativity (Greetha, 2021, p. 110).

1-1-2-Scientific Application of artificial intelligence:

- 1) Machine learning: letting a machine or computer learn without human intervention.
- 2) Trained Language Models: By training a computer with information from many disciplines, it can answer human questions. The most famous are ChatGpt, Bard, BingAI
- 3) Image Recognition: Information retrieval from photos and videos.
- 4) Robots: By developing robots that are capable of simulating humans, such as Sophia.

1-2- Start-up:

1-2-1- Historical development of entrepreneurship:

The concept of entrepreneurship evolved as the role of contractor changed over time, and the term contractor was first used in French to describe people supplying armies, and this was in 1616 by The concept of a contractor spread to engineering work, and anyone making a deal with the government to pave roads, build bridges and forts became a contractor, and over time the word became an entrepreneur or a person acting as an intermediary between two parties (Casson, 1991, p. 21).

The term relates to economic theory by R. Cantillon, who viewed the businessman as a speculator, where Cantillon described economic life in his era into three groups, the first group described him as the landowners of "non-fixed income people" who lease their land to farmers and live on rent as income, the second group as employees of "fixed income", and the third group as "contractors". Jean Baptiste Say (1767-1832) considered the contractor as coordinator of the production process (Baretto, 1960, p. 6).

J. Schumpeter (1883-1950-) introduced the concept of entrepreneurship as an innovative person, pioneering and creating new private enterprises since the World Depression, which had a significant positive impact on economic growth and job creation (BOUTILLIER & UZUNIDIS, 1999, p. 14).

There has recently been an increased interest in small enterprises and in the important role they play in global economies and in social stability in both developing and developed countries, by absorbing unemployment and raising GDP rates, which contribute to improving the living standards of society (Tripathi, Markku, Pertti, & kari, 2019, pp. 1-2).

1-2-2- The concept of start up:

"Startup" according to the French dictionary Larousse is "a young creative institution, especially in the field of new technologies." The word "startup" originates in English, where the first part "start" means start, and the second part "up" means growth.

Defined by Paul Graham in his article on the growth "growth" as "a company designed to grow at a high speed", the company is not automatically considered a startup simply because it is new, plus, this type of company doesn't need to focus on technology or receive investment financing or have some sort of exit plan, growth is the only thing that matters, is the basis of everything else we associate with startups (Julien & Marchesnay, 1996, p. 15).

The American entrepreneur Eric Ries also defined it as "a human enterprise whose mission is to provide new products or services in its business environment (Grebel, 2004, p. 7).

According to Patrick Fridenson: Being a startup is not related to age, size, or sector of activity. However, the following four questions must be answered (338 صفحة، 2023، تلي و حرمة):

- Strong growth potential.
- Using modern technology.
- The need for huge financing.
- Take risks.

In general, a startup is defined as a new type of institution whose primary goal is innovation and creativity, and which always seeks to grow and expand significantly and rapidly. It is also characterized by high uncertainty and high risk, with the potential to reap huge profits if it succeeds (Marty, 2002, p. 6). Startups start by validating the market, confronting the problem, comparing solutions, and then building a viable product (07 صفحة، 2023، داقو و عياد).

The first definition of start up in Algeria was given through Article 69 of the Finance Law issued in 2020, where a conference entitled Algeria-Distrupt was held on start up.

The startups defined in Algerian law as any institution subject to the law and respecting the following criteria: (The official newspaper of Algerian Republic, 2020, p. 11)

- The institution must not be more than 8 years old.
- The organization's business model should be based on innovative products, services, business model or any idea.
- The number of workers should not exceed 250.
- The annual turnover must not exceed the amount determined by the National Committee (4 billion DZD).
- The company's capital must be owned at least 50% by natural persons or investment funds.
- The growth potential of the enterprise must be large enough.

1-3- Areas in which artificial intelligence is used by startups:

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Startups can benefit from artificial intelligence in (Apurva & Pratik, 2020):

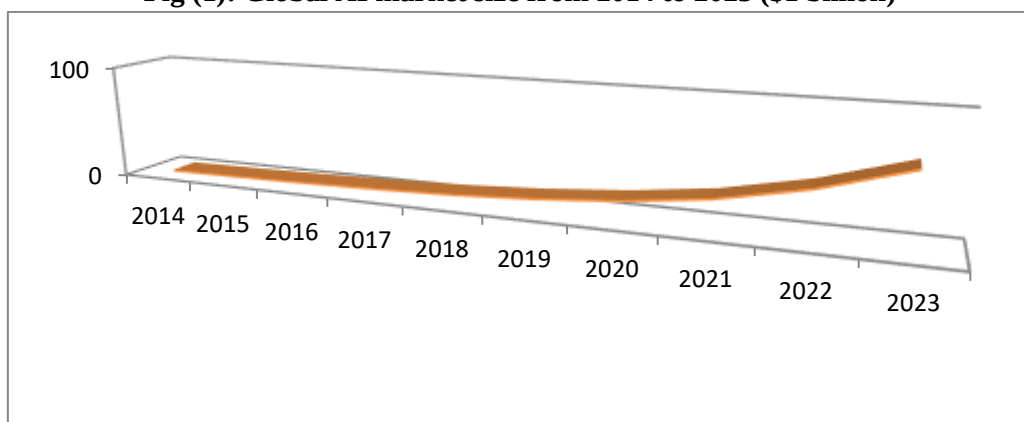
- Provide innovative services such as merging new online services to connect with customers.
- Provide market and competitor data and explore potential opportunities.
- Digital marketing by creating smart platforms that provide important market information to reach targeted customers quickly and at low cost.
- Attract efficiencies because most startups don't have a human resources department to choose the best talent and competence. Like Adzuna, which launched an intelligent robot known as Prepper that can generate questions corresponding to more than a million jobs in large companies.
- Improve the level of service for business customers under smart technologies by opening direct channels with customers to receive their inquiries.

2- Some statistics of startup in the field of artificial intelligence:

2-1- The size of the global artificial intelligence market:

In the current era, the business world requires a lot of attention to achieve competitive advantage and high performance, which has led to the inevitability of new technologies and investment in artificial intelligence. Although there are no clear statistics in this area, there are now expectations that the market for artificial intelligence will reach \$984 billion by 2025:

Fig (1): Global AI market size from 2014 to 2023 (\$1 billion)



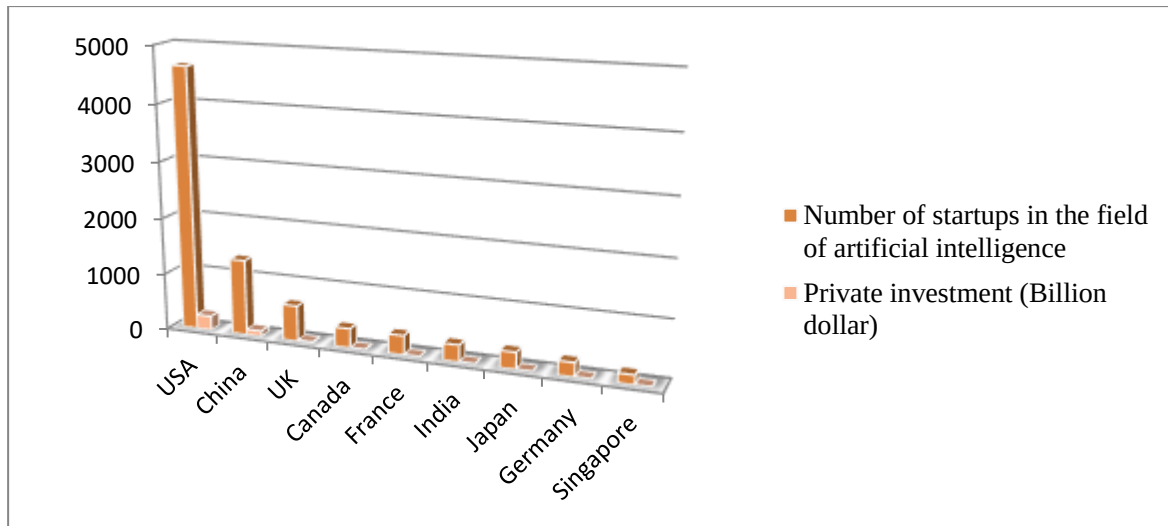
Source: Authors contribution based on (Mordor intelligence, 2024)

On the table, we see a rapid rise in the size of the AI market, rising from 1.6 billion \$ in 2014 to 41.2 billion \$ in 2021, with growth estimated at 57% in 2022 compared to the previous year.

The United States is the largest market for artificial intelligence, with a volume of \$32.1 billion in 2022, followed by China with 14.7 billion \$, Japan with 7.3 billion \$, followed by India, Britain, France, Canada and Brazil.

The figure below shows the top countries investing in artificial intelligence:

Fig (2): List of the most prominent countries investing in artificial intelligence



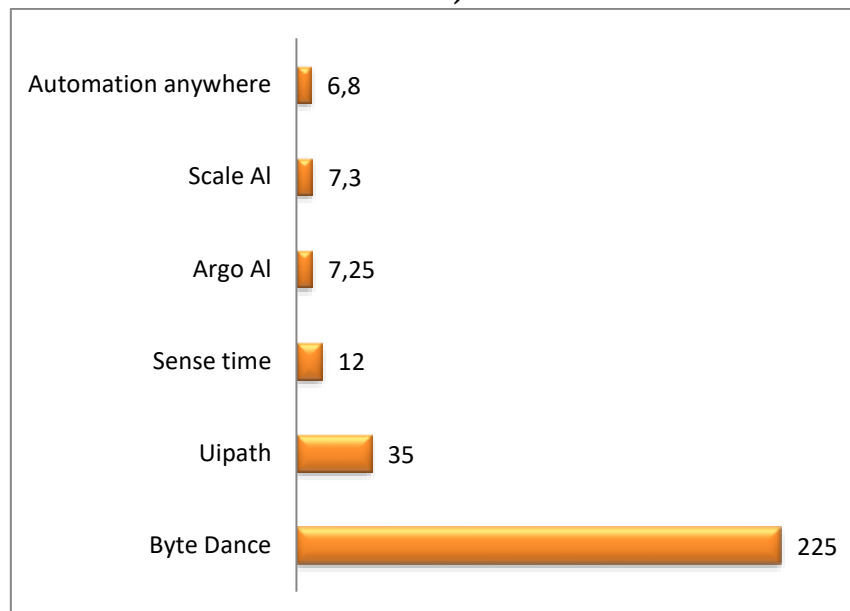
Source: Authors contribution based on (alaraby, 2023) reports

The United States ranked first in the AI race, with 4,643 AI startups and 46,533 AI patents in 2021, and the largest AI user country in 2023, with 11.72% followed by Japan, China and the United Kingdom. In 2022, 524 AI startups were founded in the United States with 47 billion dollars in non-government funding. At the same time, 160 startups received 71 billion dollars in China.

2-2- The world's leading AI startups:

The figure below represents the 2023 AI startup unicorn statistics with the world's largest market value:

Fig (3): Market Values Unicorn start ups investing in Artificial Intelligence for 2023 (\$1 billion)



Source: Authors contribution based on (Statista, Montant de la valorisation des licornes du domaine de l'intelligence artificielle (IA) dans le monde en 2023, 2023) reports

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Unicorn startups are emerging companies that are not listed on the financial market, have a market value of more than \$1 billion, are growing, and are turning to venture capital firms for funding. One for the most important of these companies is ByteDance, Uipath and Sense time:

- Byte Dance: A Chinese unicorn startup with the world's highest market share of \$225 billion, active in short-video applications, is known as TIKTOK, the world's most heavily loaded application.

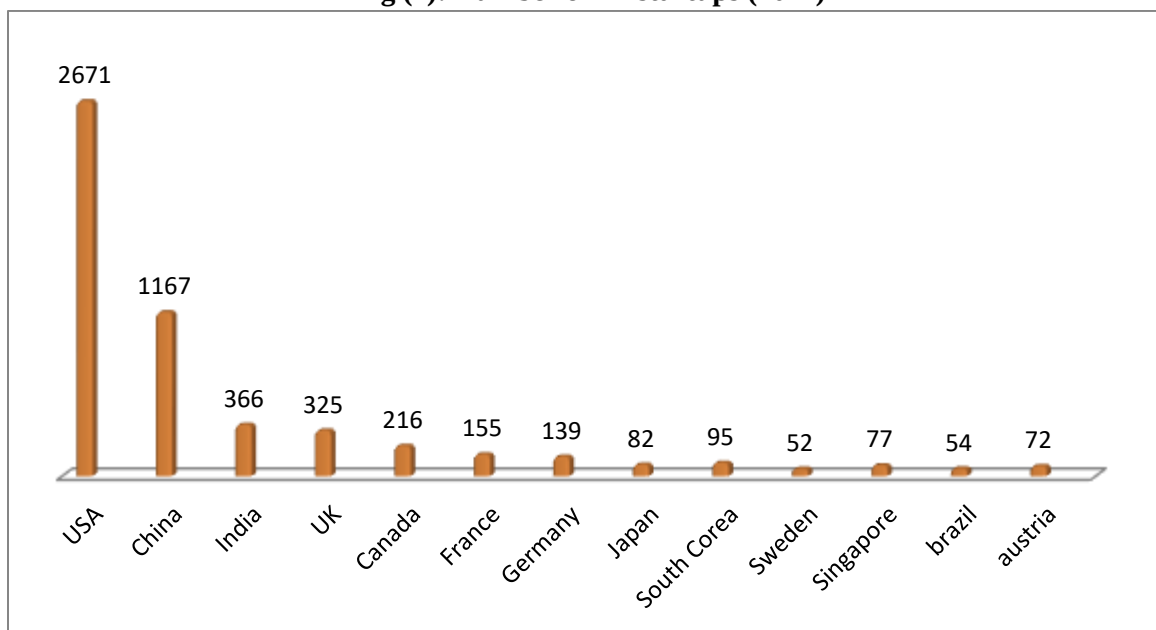
- Uipath: A Romanian company is marketing platforms that allow for the programming of day-to-day business activities. Its market share is estimated at US\$35 billion.

- Sense time: A Chinese AI company, founded in 2014, that works in image recognition and computer vision in fields as diverse as cybersecurity and personalized medicine, has an estimated market share of \$12 billion, earning \$620 billion in funding in 2019.

2-3- Number of emerging institutions in the field of artificial intelligence in the world:

For startups such as deep learning and robotics, AI use is plentiful, accounting for 59.51% of all institutions active in AI. The figure below shows the number of such companies worldwide:

Fig (4): Number of AI startups (2021)



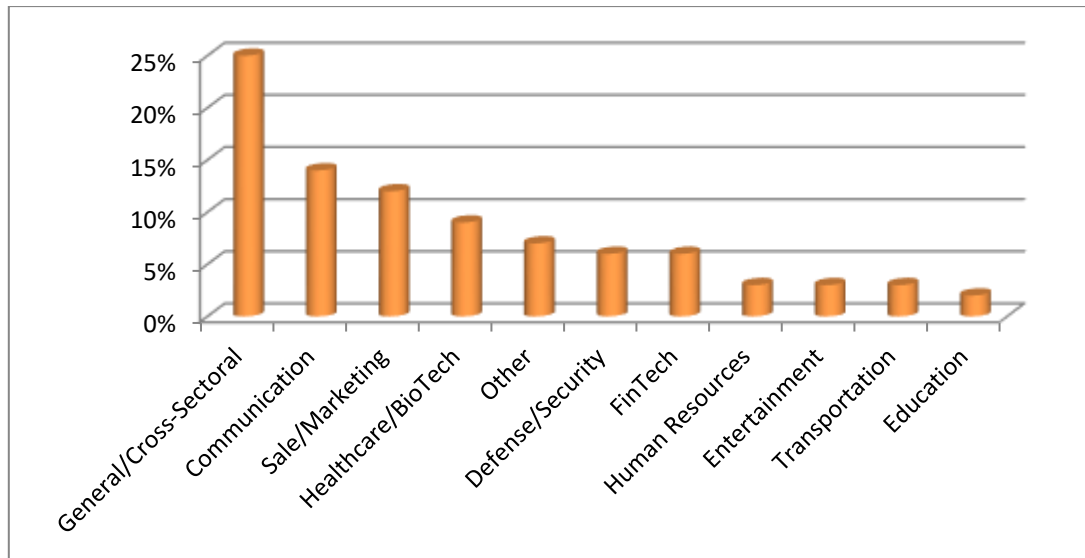
Source: Authors contribution based on (Statista, 2024) reports

The figure above shows that there are more than 15,000 AI institutions in the world, with USA and China having the largest number of companies with a total of 2,671 and 1,167, respectively.

2-4- Share of AI startups worldwide by industry:

When it comes to new projects, AI is most often found within technology and communications based industries such as healthcare, retail, financial services, education and transportation, as shown in the table below:

Fig (5): Share of AI startups worldwide (with over 1%) by industry in 2018

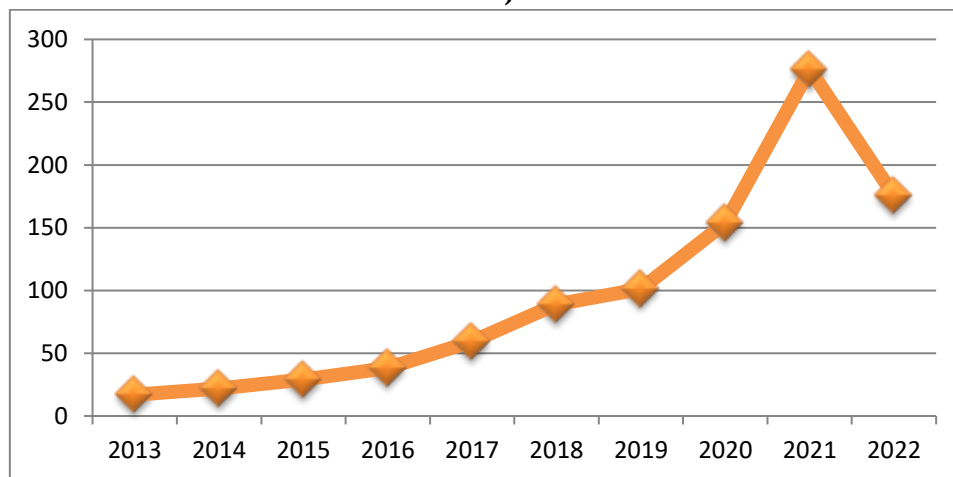


Source: Authors contribution based on
(Statista, Share of artificial intelligence (AI) startups worldwide in 2018, by industry, 2020)

2-5-Worldwide investment and revenue of emerging institutions in artificial intelligence:

After addressing the size of the global AI market and the number of emerging institutions active in it, we will provide the scale of startup investment in this area as follows:

Fig (6): Annual investment value of AI startups worldwide between 2013 and 2022 (\$1 billion)



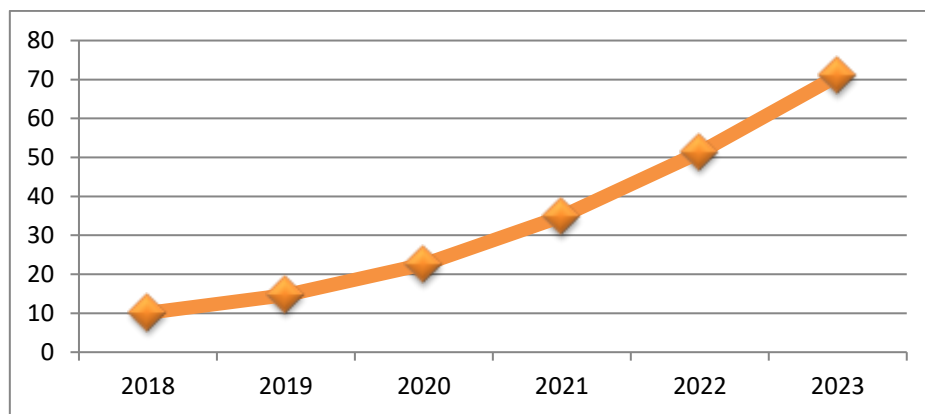
Source: Authors contribution based on (Statista, 2024) reports

Through the above figure, the annual investment of start-ups in artificial intelligence has increased from 16 billion \$ in 2013 to 175 billion \$ in 2022, with a peak of 276 billion \$ in 2021, reflecting the growing interest in this technology. In 2022, that value fell to 175 billion. which may be the result of various factors such as market changes or economic conditions.

The figure below shows the total annual income of start-ups in artificial intelligence:

Fig (7): Total annual income of start-ups in artificial intelligence software from 2018 to 2023 (billion US dollars)

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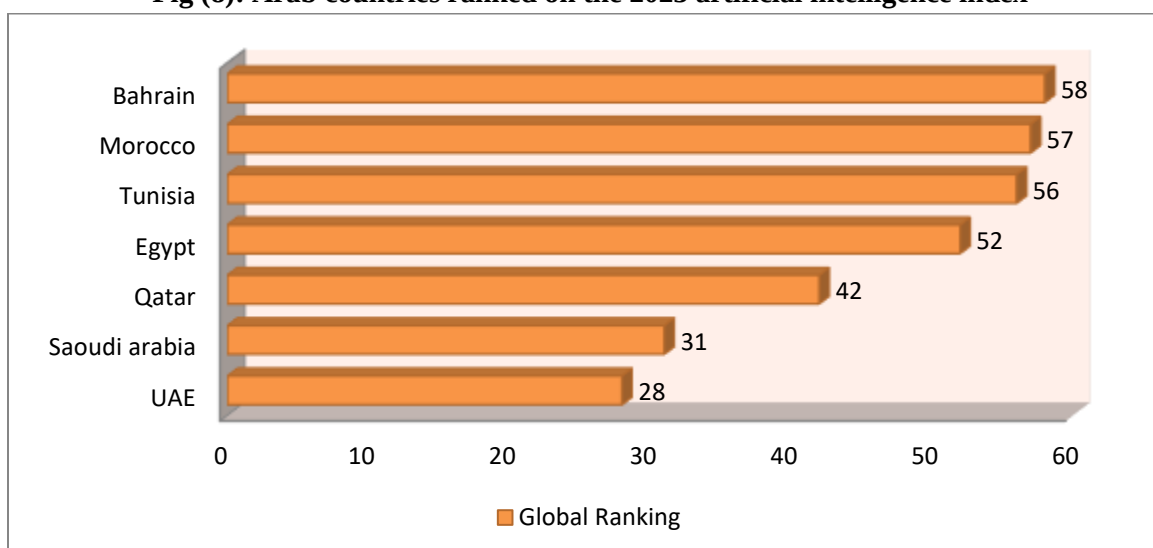
Source: Authors contribution based on (Statista, 2024) reports

From the figure, it shows that the revenues of startup from the artificial intelligence software market amounted to 10.1 billion US dollars in 2018, rising significantly in 2021 by 34.87 \$ billion, reaching over 70 billion \$ in 2023, and this is due to the introduction of smart applications such as Chat GPT, language processing and automation programs, better speech recognition, etc. The use of ChatGPT reached 1 million users in 5 days in 2022 and 100 million per month in 2023.

3- Statistics of some Arab countries in the field of artificial intelligence:

The developed countries are in a race with research in the field of artificial intelligence, which has a positive impact on the increase in gross national income. However, the Arab countries, particularly Algeria, are still lagging behind in this area in comparison with the developed countries, despite some of the efforts they have made in this area. The following figure shows the ranking of the Arab countries on the 2023 artificial intelligence index:

Fig (8): Arab countries ranked on the 2023 artificial intelligence index



Source: Authors contribution based on (Asharq, 2023) reports

The United States of America ranked first in the world, followed by China in the second in the world, while seven Arab countries were among the most active in the field of artificial intelligence.

UAE : ranked first in the Arab world and 28th in the world after being second in the Arab world in 2022. Among the most important efforts in this area were the establishment of the Emirates Council for Artificial Intelligence in 2017, and the establishment of the Emirates Award for Robotics and Artificial Intelligence.

Saudi Arabia : has ranked second and 31st globally. One of Saudi Arabia's important efforts in the field of artificial intelligence is the establishment of the Saudi Authority for Data and Artificial Intelligence, as well as the establishment of the King Abdulaziz City for Data and Artificial Intelligence.

Qatar: developed an artificial intelligence strategy in 2020, ranked third Arab and 42nd international in the field of artificial intelligence.

Egypt: Special attention was paid to the field of artificial intelligence in 2018, especially in the universities of major cities, which ranked fourth in the Arab world and 52 th in the world, after 7 th in the Arab world and 52th in the 2020s.

Tunisia: The policy of artificial intelligence was launched in 2018, with the aim of contributing to sustainable development and creating jobs in this area. It also ranked 5th in the Arab world and 56th in the world.

Morocco: The Kingdom of Morocco launched the so-called "Morocco 2020 Strategy" in 2014, and in 2019 launched the so-called "Khawarizmi" program to support research in the field of artificial intelligence. Morocco ranked 6th in the Arab world and 57th in the world.

Bahrain: Bahrain has adopted a number of digital initiatives, the most important of which are the "Block Chain" technology and smart cities. Bahrain has also ranked seventh in the Arab world and 58th in the world.

Algeria: Although Algeria has not been included in international lists and indicators of artificial intelligence, Algeria has begun to work to improve the business climate by accelerating the overall digitization of administrative transactions. It has also emphasized the support of emerging institutions through the resolution 1275 to encourage university graduates carrying innovative projects. Algeria's efforts in the field of artificial intelligence include:

- Establishment of the National Institute of Artificial Intelligence, whose mission is to create engineers specializing in artificial intelligence applications.
- Establishment of the Centre for the Development of Advanced Technologies in 2023, whose mission is to conduct scientific research, technological innovation and training in technology and robotics.

On Thursday, 27 April 2023, has been created the first saloon activities of start-ups, micro-entrepreneurs and artificial intelligence sponsored by the director of the University of Algiers 1. This salon also defined the participation of some public institutions, including the Algiers Stock Exchange and some public banks, and the introduction of some innovative projects in this area, such as mobile robot, which is involved in accompanying civil protection personnel in their relief work to avoid human harm.

- A university and a spacious dance for start-ups inaugurated the Artificial Intelligence House to accompany students carrying innovative projects.

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Conclusion:

Many analytical and empirical studies have found the importance of using artificial intelligence to increase the performance of enterprises (sales growth, cost reduction, research and development investments, job creation, competitive advantage), as well as transforming the enterprise from traditional to advanced models that can cope with modern technologies during (Babina, Fedyk, Alex, & Hodson, 2021, p. 133):

- Acceleration of production and service processes
- Reducing human error.
- Reducing costs and increasing productivity
- Supports most of the digital marketing activities.

Through statistics, we have noted that developed countries are investing huge amounts in artificial intelligence, which reached 175 billion \$ in 2022, with the aim of increasing GDP growth rates and replacing workers with machinery because of rising labour wages and old age rates. Those who have been less dependent on industrialization in developing countries will be less dependent on industrialization.

The reality of the Arab States in the application of the emerging institutions of artificial intelligence, including Algeria, remains remote for the following reasons:

- The problem of financing for start-ups: alternatives to modern financing for start-ups in Algeria are weak and insufficient to avoid financial difficulties. There is no legal and regulatory framework governing modern financing mechanisms (such as group financing, venture capital ...etc) in Algeria.
- The problem of the flow of the Internet, the lack of a culture of financing and electronic investment through the Internet, and the lack of State intervention in promoting this activity through the provision of more safeguards.
- Lack of a well-developed technology finance architecture such as the Block Chain technology.
- Political conflicts and instability in most Arab States;
- Failure to benefit from the expertise of developed countries and Arab brains specializing in the field of artificial intelligence.
- The high cost of artificial intelligence applications.

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