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PARDIS

Technology Park

IRAN SILICON VALLEY

SCIENCE AND TECHNOLOGY IN IRAN: A BRIEF REVIEW

IRAN 2023

Contents

In the current competitive situation, production growth and stabilization of economic fluctuations are among the most important macroeconomic goals in any country.
The use of knowledge-based economic indicators as one of the most important tools for managing demand can play an effective role in achieving this goal.
Depending on the structure, relations and economic conditions in the countries, the role of knowledge and knowledge management has been important in influencing the production, and the results of the experimental studies have confirmed it.
Because in the new theories of economic growth, knowledge is not considered as an exogenous variable in the economy, but is regarded as the key element in the economic system.
Knowledge is considered as the main type of capital and economic growth is rooted in the accumulation of knowledge, since it is the origin of technology, innovation and entrepreneurship.
Iran's economy will be the second largest economy in the Middle East and North Africa (MENA) in 2023 with a gross domestic product of nearly 366 billion dollars.
It is also the second most populous country in the region with about 89 million people in 2023. The country has many natural resources and ranks the first in terms of natural gas reserves and the fourth in oil reserves.
It also has the least economic dependence on oil revenues among the oil-rich countries in the MENA region. It is better to briefly refer to some of Iran's achievements in various knowledge-based fields.

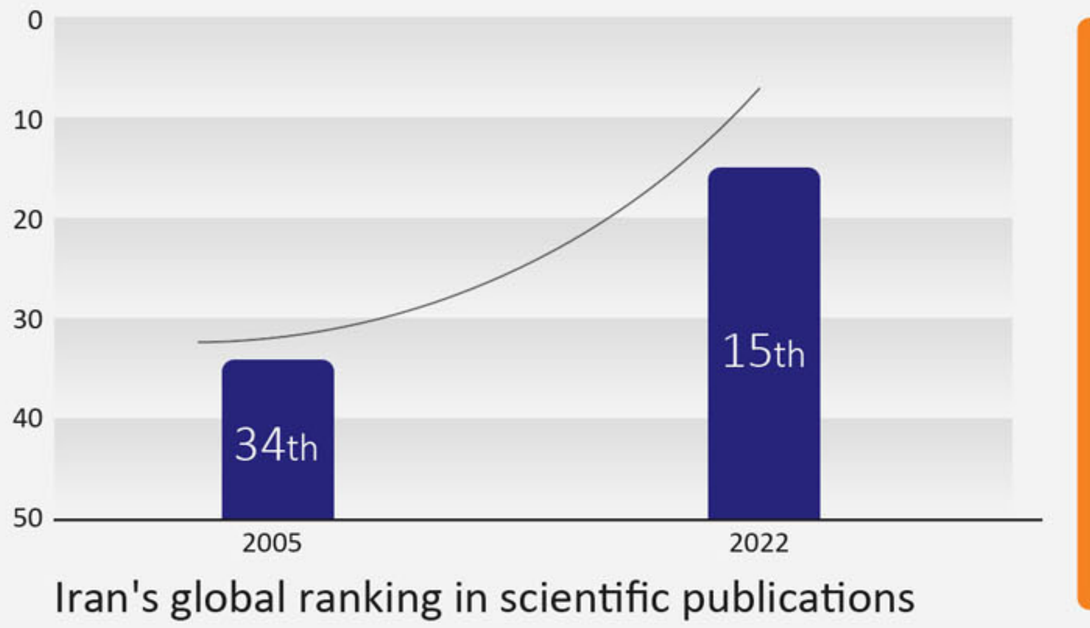
Gross domestic product of nearly

$366 B

2nd largest economy in the Middle East and North Africa (MENA) in 2023

The 1st in terms of natural gas reserves
and the 4th in oil reserves.

About twenty years ago, none of Iran's universities were among the world's top ones; but currently 29 Iranian universities are in these rankings. Iran's global ranking in scientific publications has improved from 34th in 2005 to 15th in 2022.
According to the Global Innovation Index 2023 report, Iran ranks third in the world in terms of the number of engineering graduates. The establishment of knowledge-based companies in science and technology parks for the commercialization of ideas is one of the most important measures that have been taken in the last few years in the country aiming to transform innovations into practical technology.
In 2014 to 2023, the number of knowledge-based companies has experienced a rapid growth, so that even now the number of knowledge-based companies is more than 9,000 ones. The sales of knowledge-based companies reached about 15 billion dollars in 2017 and about 17.5 billion dollars in 2022.
Reviewing the international profiles shows that the Islamic Republic of Iran has gained a worthy place in the production of science under the shadow of scientific policies and in this way, it is among the top 20 countries in the world.
Iran’s scientific position in 2022 in the latest findings of Incites about population distribution statistics, organization and science production journals shows that Iran with 315,032 scientific publications, 284,188 researchers, 15,624 scientific journals and publishers, 88 scientific organizations have 0.33% of the researcher population.

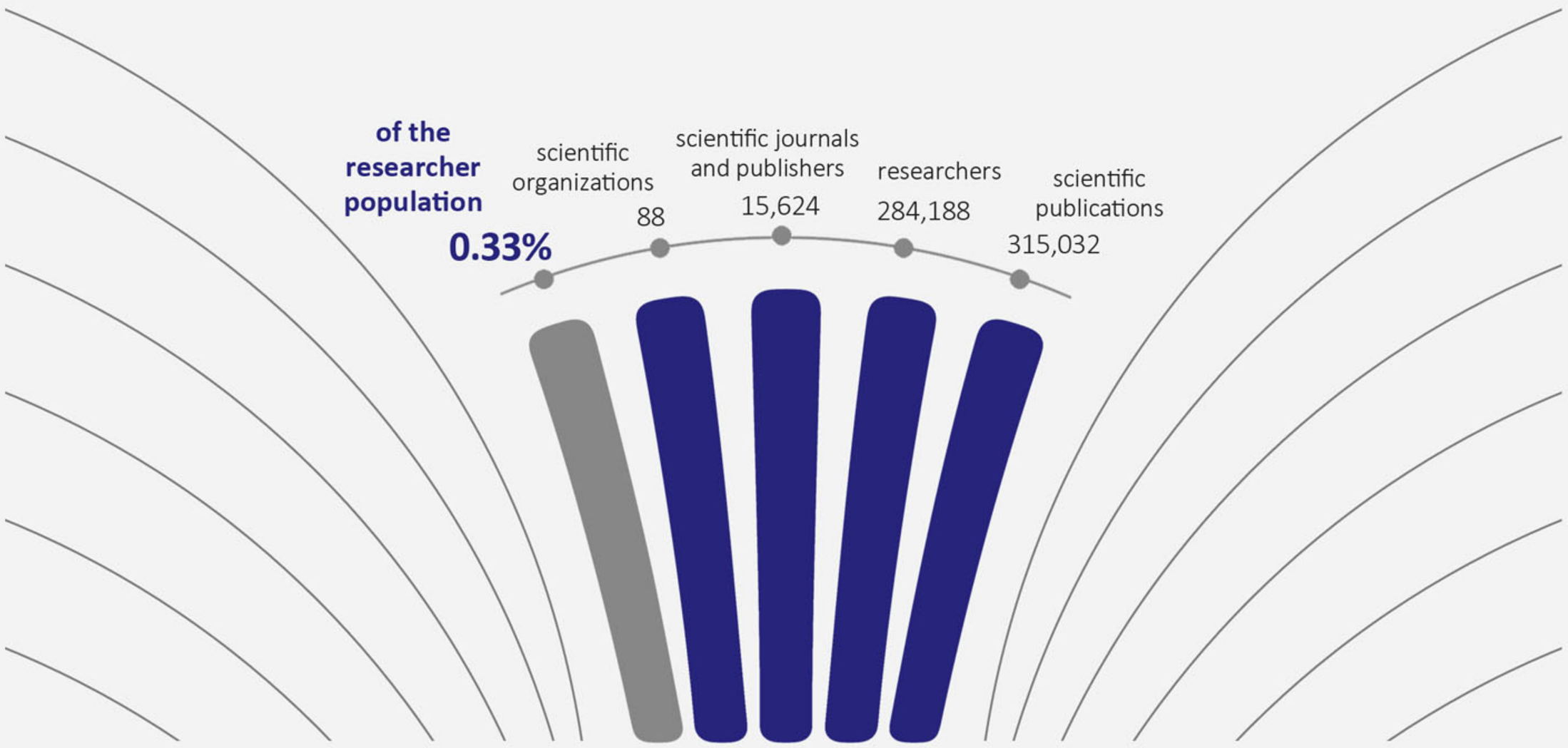


Iran's global ranking in scientific publications

3rd
in the world in terms of the number of engineering graduates.

more than
9,000
ones
the number of knowledge-based companies.

about
$17.5B
The sales of knowledge-based companies in 2022.



In these years, we have witnessed great developments in various branches of science and technology.

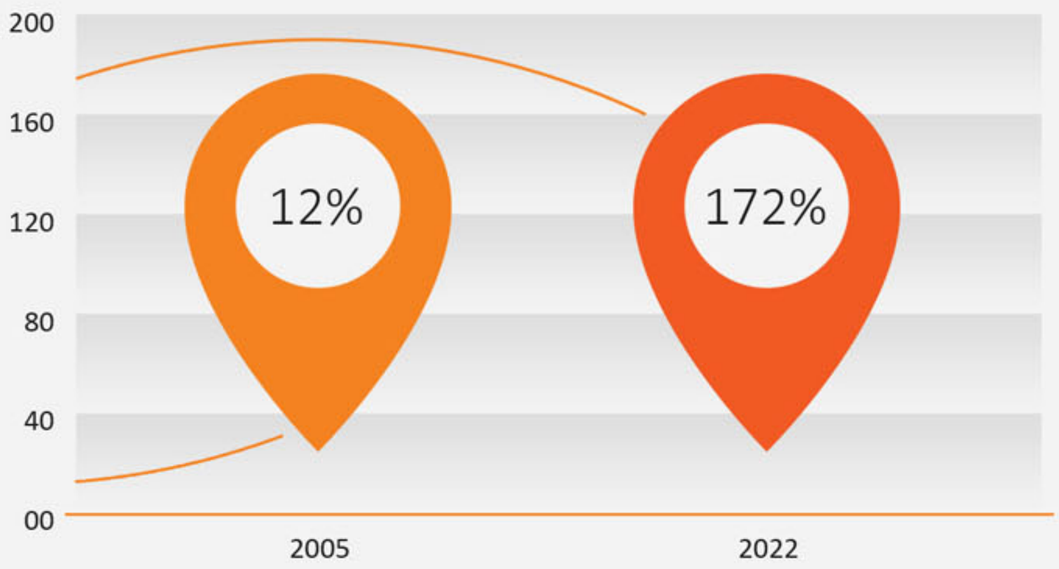
• Information and communication technology infrastructures due to the penetration of mobile phones from %12 in 2005 to %172 in 2022 and the total number of fixed wireless and data internet subscribers in the country this year is more than 113 million (penetration rate of 134 percent).

• In nano knowledge, since Iran started serious activity in this field in 1980, as one of the important areas of

• the Third Industrial Revolution, it has made amazing progress and has been able to rank fourth in the world.

• In the field of nuclear knowledge, apart from defense and security purposes for a country that has experienced aggression and a long war against itself and is always facing the wide enmities of those seeking power, it is very basic and harmful from a scientific point of view.

• As the richest country in oil and gas reserves, which will be depleted in the coming decades, Iran considers the nuclear industry as a comprehensive industry to meet its future fuel and energy needs which are very vital for better diagnosis and treatment of diseases and with the wide range of technologies obtained from its knowledge, no substitute can be imagined for it.



Information and communication technology

Wireless and data internet subscribers in the country this year is more than 113 million (penetration rate of 134 percent).

4th in the Third Industria

40% Most important and productive field of science production in the Islamic Republic of Iran

107 Pharmaceutical factories producing chemical drugs

40 Pharmaceutical factories producing herbal medicines

40 Factories producing raw materials and packaging

97% Supplying medicine needs in the country

1100 Bone marrow transplants annually

85 Exports of knowledge-based products to more than 85 countries

• The country has also achieved valuable successes in launching satellites into space and genetic science.

• Medical sciences are the most important and productive field of science production in the Islamic Republic of Iran with a share of 40%.

• In terms of bone marrow stem cell transplantation, Iran ranks second in the world and first in the region by performing 1,100 bone marrow transplants annually and is among the top 5 centers in the world. Currently, Iran has turned into one of the important hubs of research on stem cells and liver transplantation in the region and the world.

• Due to the number of oppressive sanctions, there are currently about 107 pharmaceutical factories producing chemical drugs, 40 pharmaceutical factories producing herbal medicines, and about 40 factories producing raw materials and packaging in Iran.

• With the efforts of the Iranian researchers, Iran has supplied 97% of its medicinal needs in terms of quantity within the past four decades, and only three percent of these needs are supplied through imports.

• In 2022, due to the unilateral and cruel sanctions, exports of knowledge-based products to more than 85 countries were about 870 million dollars.

With this background, in this report we will discuss the situation of Iran in various branches of science and technology.

General Context of STI

• A large pool of young and talented university graduates, particularly in Science, Technology, Engineering, and Mathematics (STEM)
• High demand for knowledge-based products in local market
• Considerable diversity of industrial and production capacities in comparison with other natural-resource-based economies
• Lower dependence of the government budget on oil and gas revenues as compared to peer resource-rich countries
• Highly developed physical infrastructure (though ageing in some areas)
• High internet and smart phone penetration; remarkable potential for e-commerce and e-services development

STI Governance, Policy Formulation and Coordination

• Establishment of institutions such as VPST and Innovation and Prosperity Fund (IPF) to support Innovation
• Implementation of new measures (e.g. KBF law) for improving STI capacity and strengthening economic impacts.

Intermediary and Supporting Organizations

• IPF support for research and technology funds
• Expansion of technological infrastructure such as S&T parks, Incubators, accelerators, research laboratories and innovation centers

Source: UNITED NATIONS UNCTAD

Education, Research and Technology Institutions

• Development of academic system and Infrastructures
• Effective policies to promote market-oriented research at universities and research organizations
• A strong culture supporting learning and STEM education

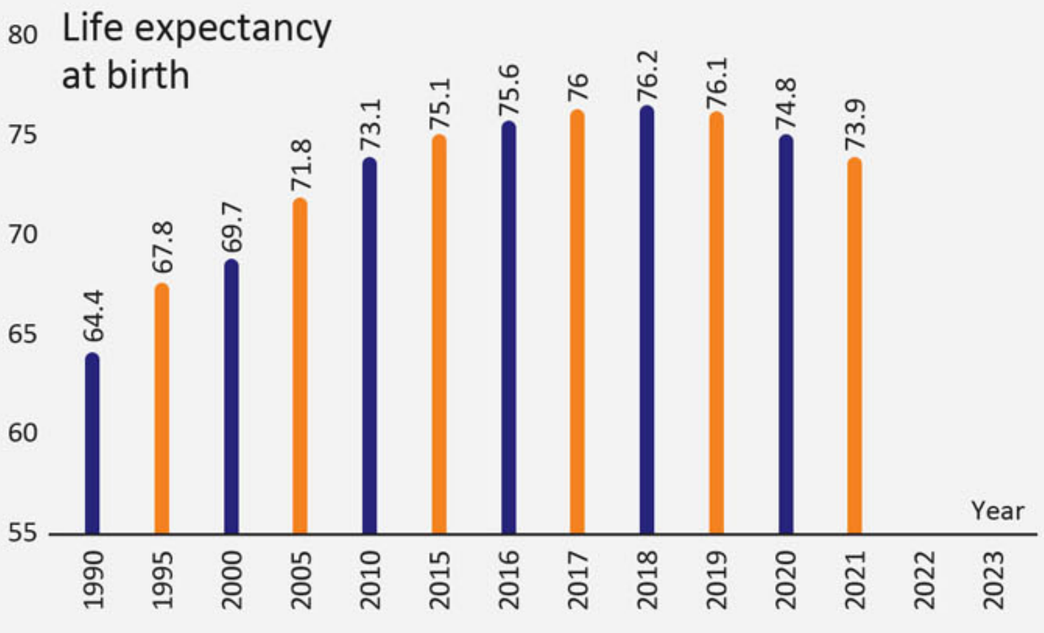
Firms

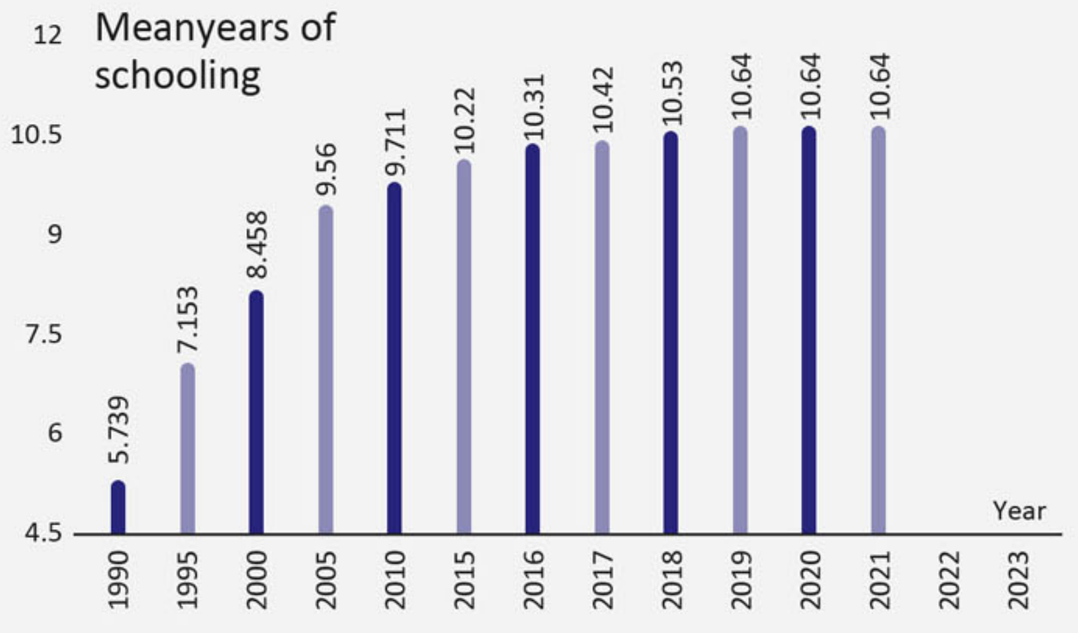
• Large firms in mature industries as a possible market for knowledge-based products
• Growth of KBFs due to government policies

In the Comprehensive Scientific Map of Iran, achieving the first ranking in science and technology in the Islamic world, achieving a prominent scientific and inspirational position in the world, and increasing the production and services based on domestic knowledge and technology to more than %50 of gross domestic product has been given special attention as the major goals of the field of science and technology in the country in the long-term.

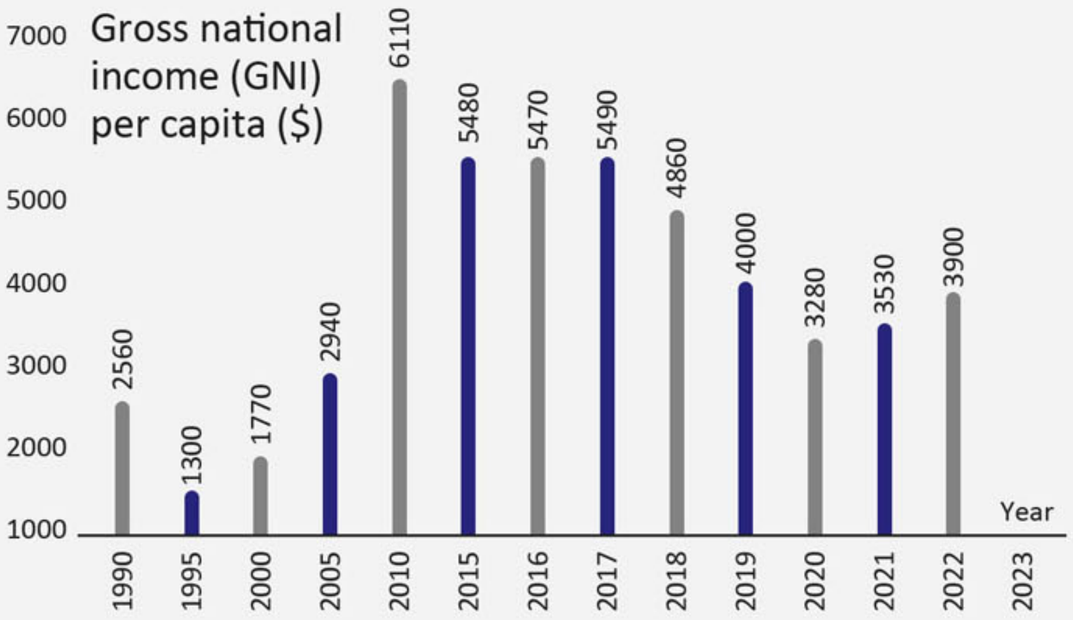
1 . Iran’s Human Development Index (HDI)

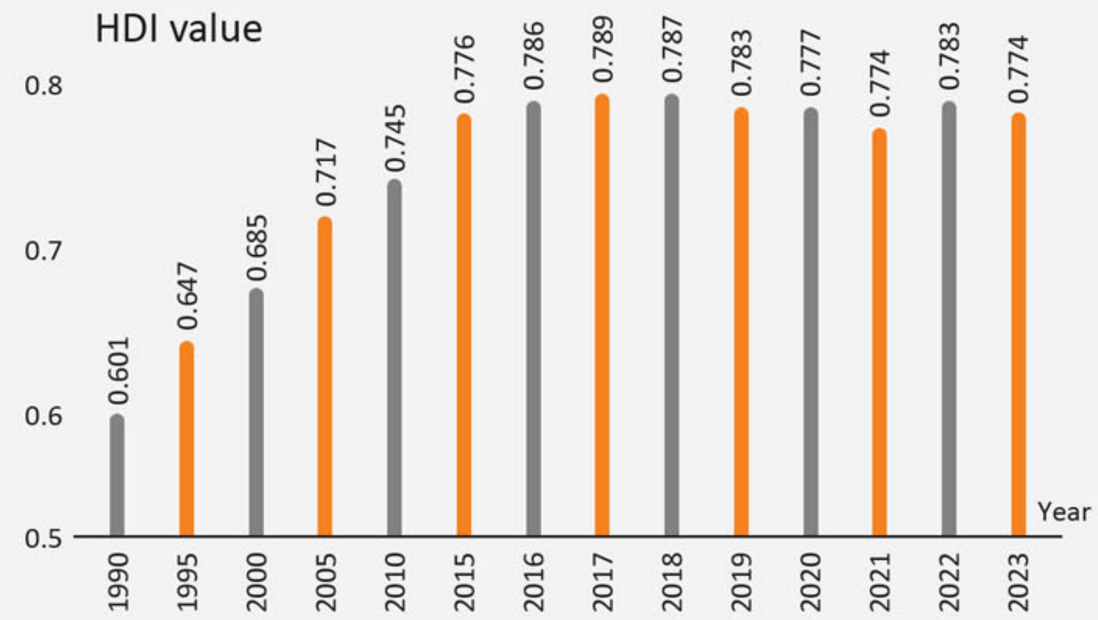
The human development index of Iran in 2023 is 0.774, which has placed the country at the 76th rank among 189 countries in the world, and in this sense, it is an appropriate ranking. This is while we are witnessing a growth of %28.8 since 1990 when this score was 0.601.





Iran’s HD Itrends based on consistent time series data and new goal posts



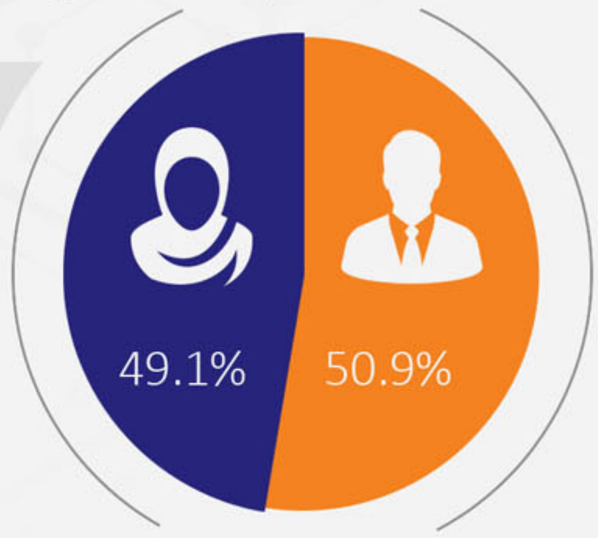


Source: datacatalog.worldbank.org THE WORLD BANK IBRD • IDA | WORLD BANK GROUP

2 . Higher education manpower index

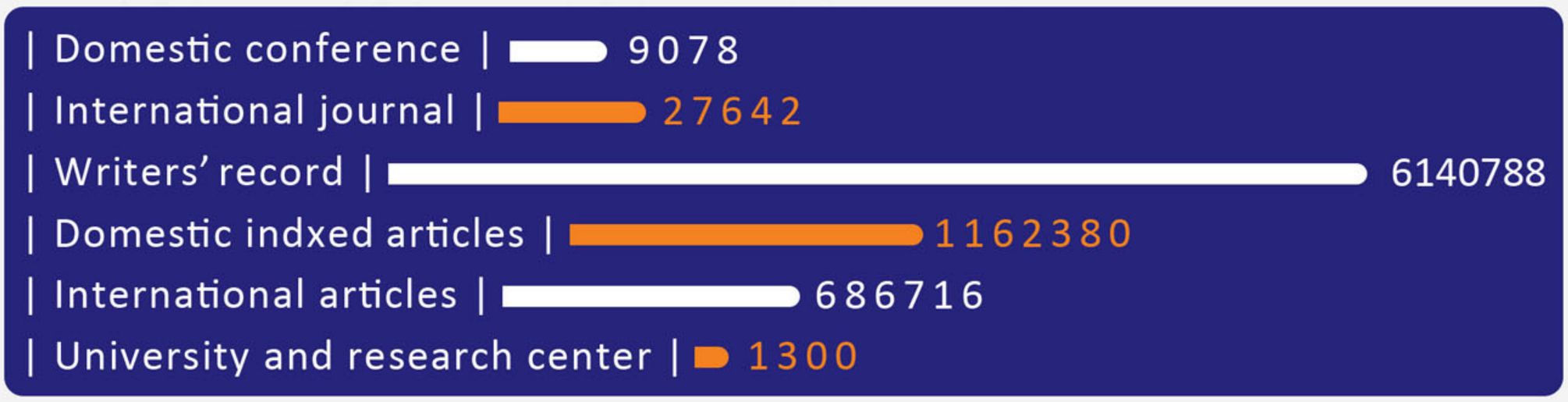
In the 20-year vision of the country, the valuable and superior role of human resources and social capital in developing national production has been emphasized. It is obvious that the human resources of higher education are one of the most important institutions of science, technology and innovation, which can cause development of the knowledge-based economy and the prosperity of the knowledge-based production sector.

In 2022, there are 3,342,220 students studying in the Iranian universities, of which 49.1% are women, and interms of gender balance, Iran is in a more favorable situation than other countries in the region.



Higher education manpower index

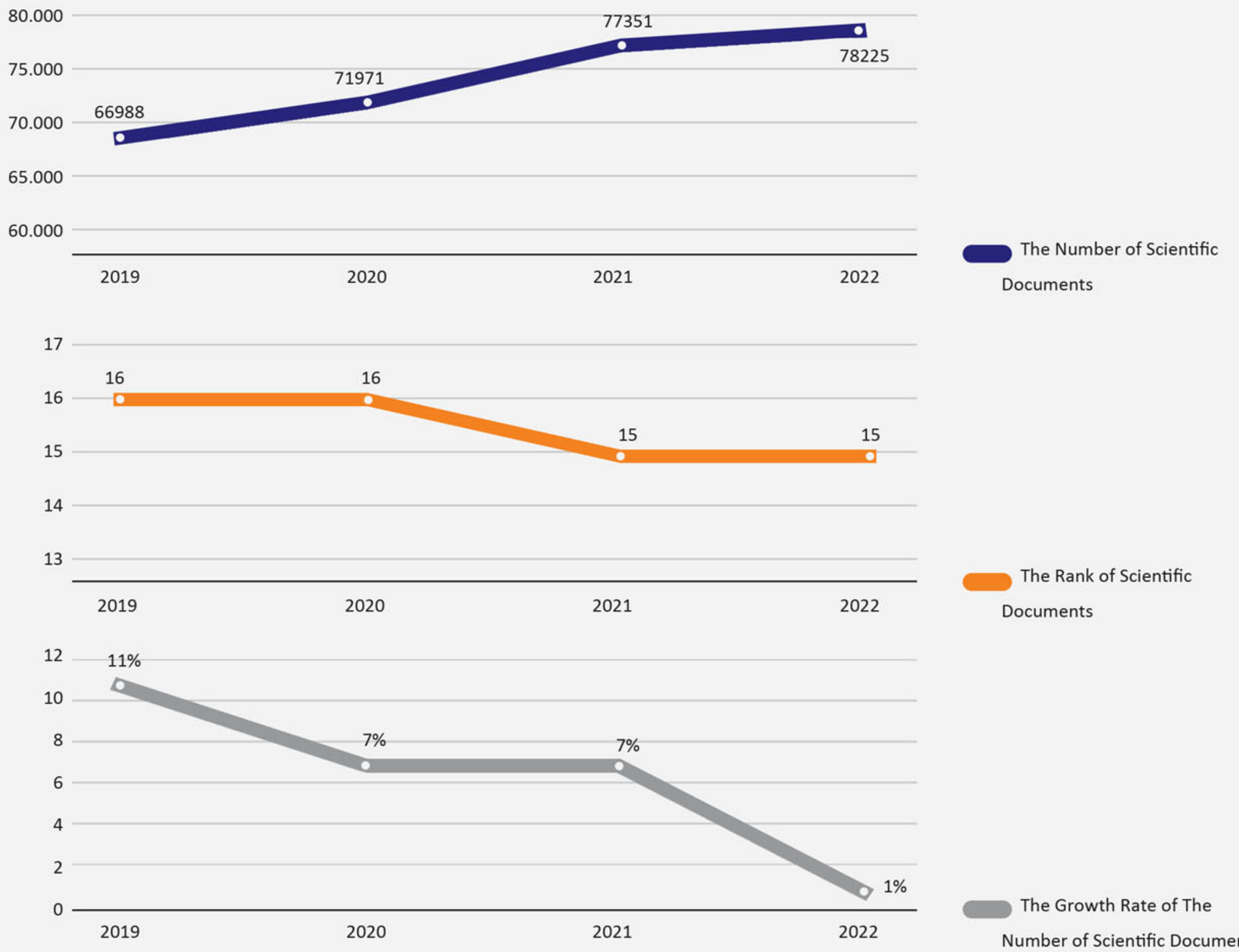
Government and non-governmental and non-profit medical and agricultural universities and research institutes | 2022 - 2023



Source: www.uniref.ir

3 . Scientific Production Index

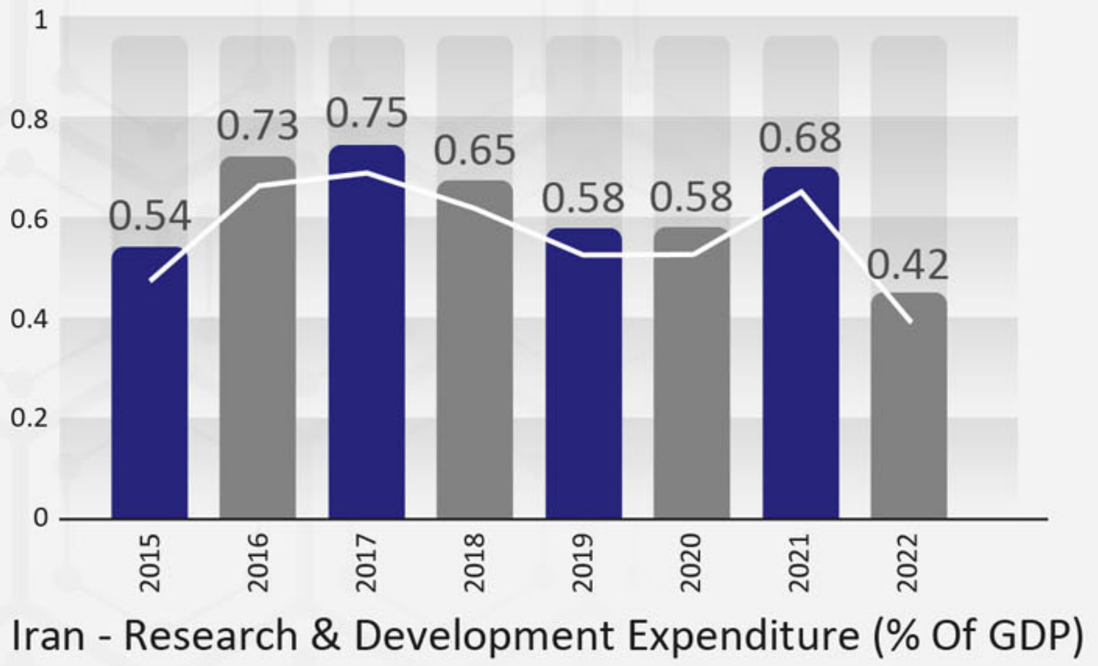
The number, rank and rate of growth of scientific documents of the Islamic Republic of Iran



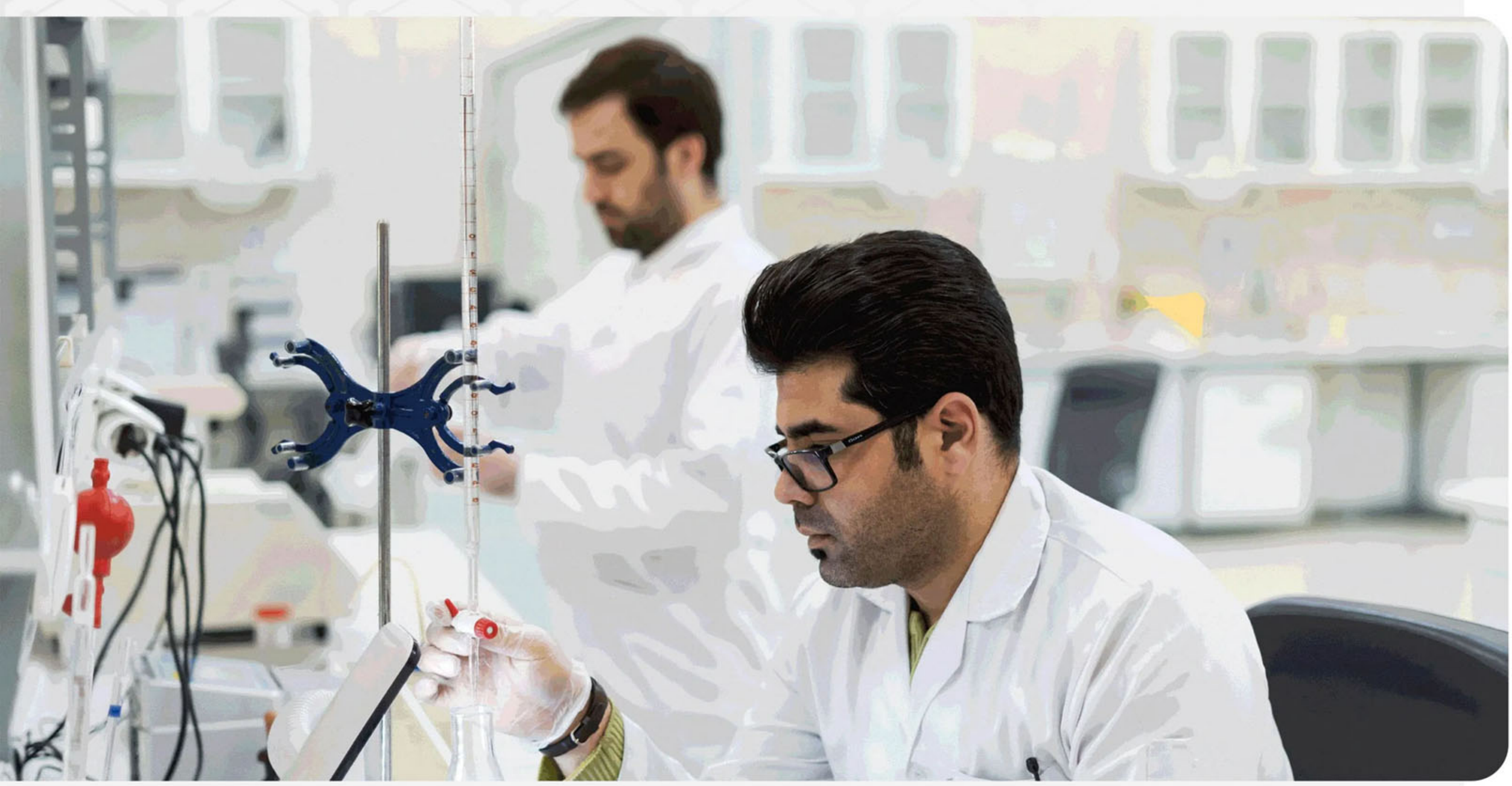
Source: www.scopus.com

3 . Research and development

Research and development
According to Iran's "Twenty-Year Vision Document", focusing on the optimal use of resources and improving productivity, the research and development budget in Iran should reach at least 4% of the gross domestic product at the end of the Iranian calendar year 1404.



Iran - Research & Development Expenditure (% Of GDP)



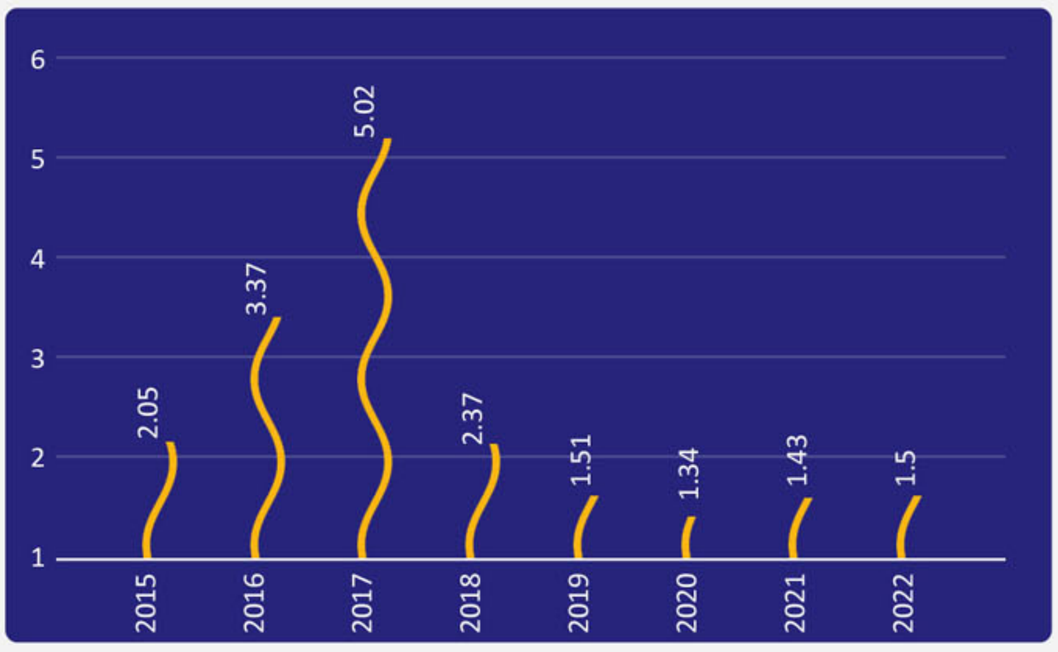
5 . Investment

Today, due to the lack of internal resources for investment, many countries in the world have a strong desire to attract foreign capital and use it as a catalyst for economic growth in the future, which is possible through people with capital and through companies that seek to grow and develop their activities through cooperation with other companies.
Studies show that Foreign direct investment (FDI), for whatever reason and form it takes, has considerable effects on macro-economic variables, including the reduction of interest rates, the reduction of exchange rates, the increase of economic growth, Government tax revenue, government debt reduction, improves income distribution, transfers technology, increases employment, develops exports, reduces imports, and has a positive effect on the balance of payments (BoP).
Iran also tried to create a necessary legal and regulatory environment and a basic prerequisite for entry and activity by passing the "Foreign Investment Promotion and Protection Act "(FIPPA) in 1334 and finally after the Islamic Revolution by passing the Law on Encouragement and Protection of Foreign Investment in 1381 as a replacement for the previous law.

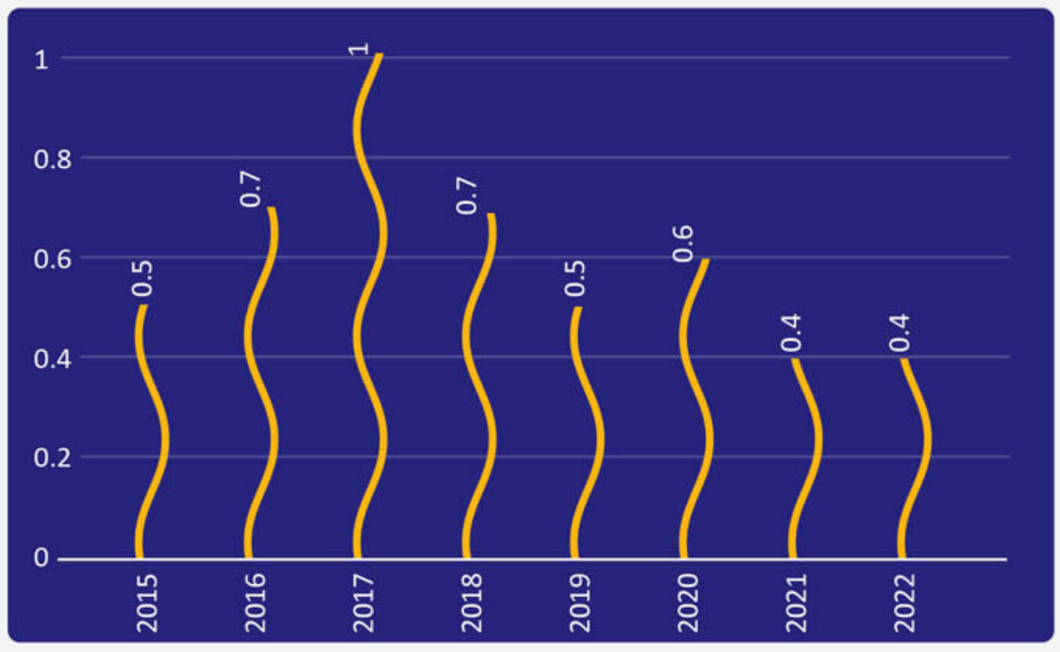
According to the World Bank data and also the report of the United Nations Conference on Trade and Development (UNCTAD), due to former US President Donald Trump's withdrawal from the JCPOA and the return of oppressive sanctions, the amount of foreign investment in Iran has recently decreased. According to this report, in 2022, $1295 billion of foreign direct investment has been attracted in the world, of which Iran's share is equal to 0.1%.

$1295 billion (World)

1% (Iran)



Foreign direct investment, net inflows (Billion US$)
Iran, Islamic Rep.



Foreign Direct Investment, net inflows (% of GDP)

Source: data.worldbank.org THE WORLD BANK IBRD • IDA | WORLD BANK GROUP

Main Trends and Changes in The Field of Innovation Technology in Iran Between

• Improve global ranking in terms of scientificpublications, from 34 in 2005 to 16 in 2016, withIran's rank in nanotechnology and biotechnologyat 4th and 13th, respectively (http://biotechmeter.irand http://statnano.com)

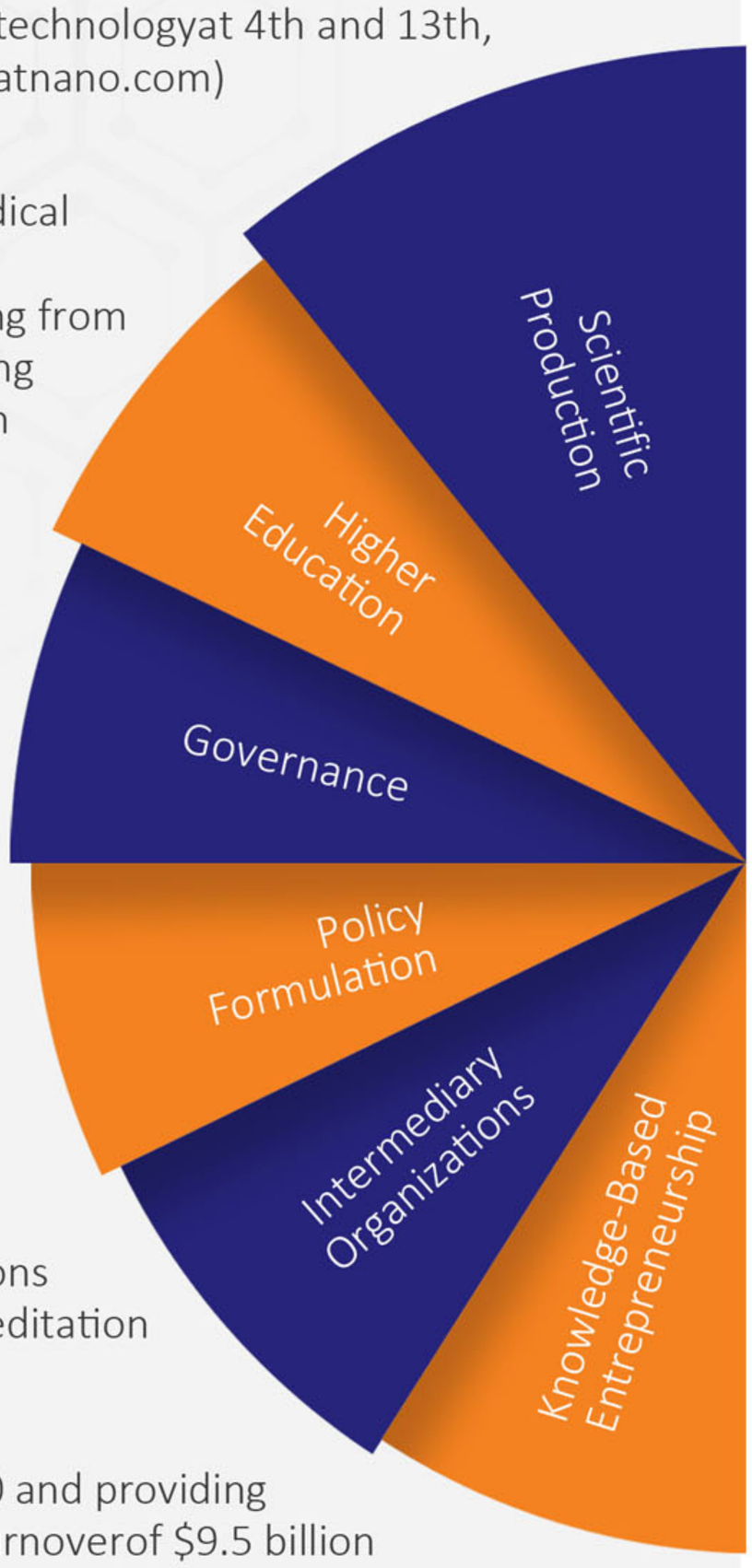
• Equality of men and women in tertiaryeducation; girls dominate in medical sciences nd bachelor degree programs
• A sizeable increase in the number ofstudents in tertiary education, rising from 2.3 million in2005 students to 4.3 million in 2016. Iran is among theleading countries in terms of share of Science and Engineering (S&E) graduates in total graduates, ranking2nd in the world in 2017 (Cornell et al., 2017)

• Emergence of new organizations forpolicy formulation, most importantlyestablishment of the Vice-Presidency for Science and Technology in 2007 and its12 affiliated technology councils

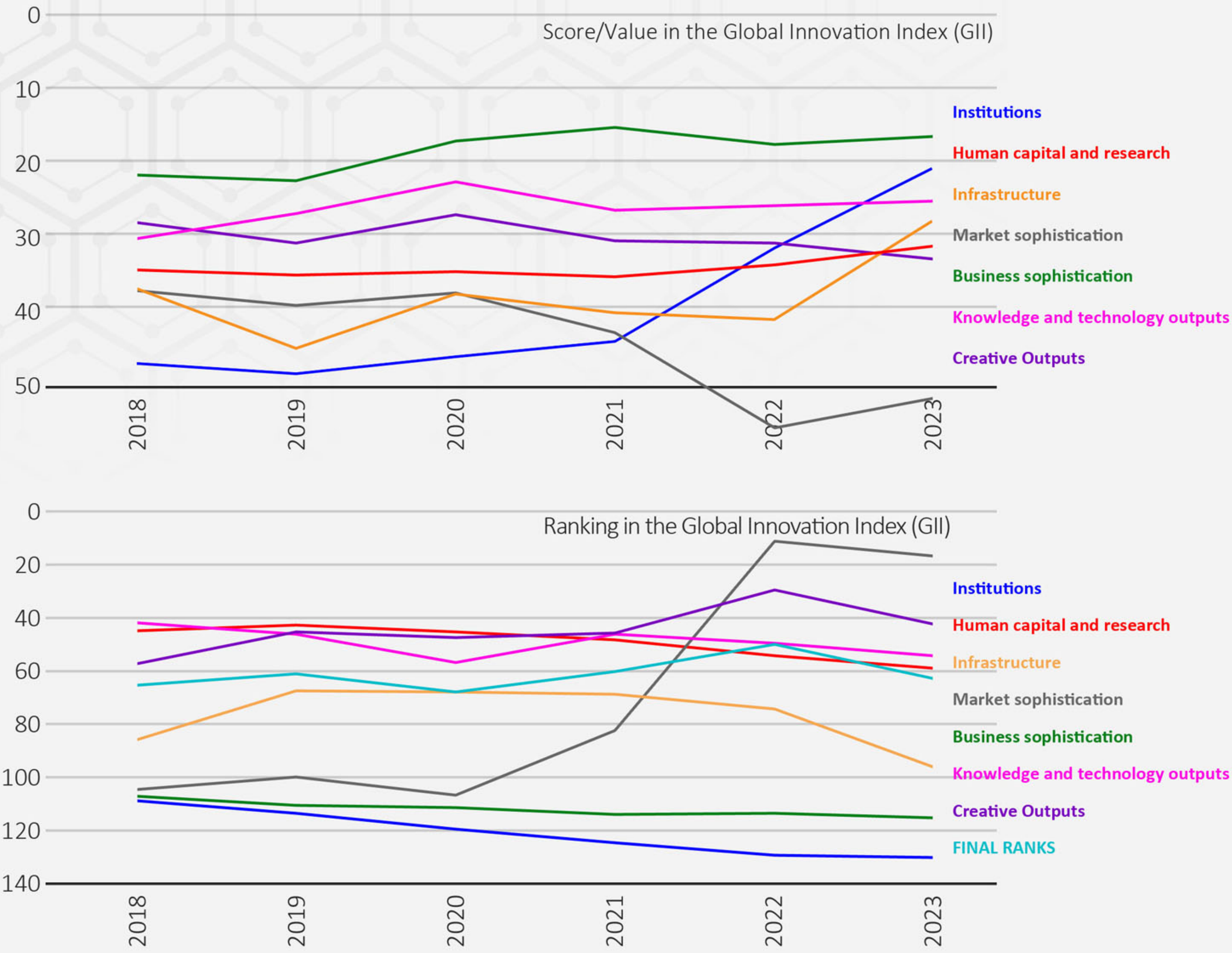
• Ratification of the National Master Planfor Science and Education (NMPSE)in 2011
• Ratification of the National Policy for S&Tin 2014
• Ratification of the National Policy for a ResilientEconomy in 2014
• Passage of the Act of Patents, Industrial Designs andCommercial Signs in 2006

• Establishment and reinforcement ofa range of intermediary organizations such as VCFs, research and technologyfunds, consultancy firms, andaccreditation bodies brokering andattempting to create synergy in STI

• Approval of the law for supporting KBFsin 2010 and providing support to 4068 KBFs by Feb.2019 with a total turnoverof $9.5 billion
• Establishment of the IPF, with an initial capital of $1billion in 2011. Since March 2017, it has funded 2117projects with total turnover of $395 million

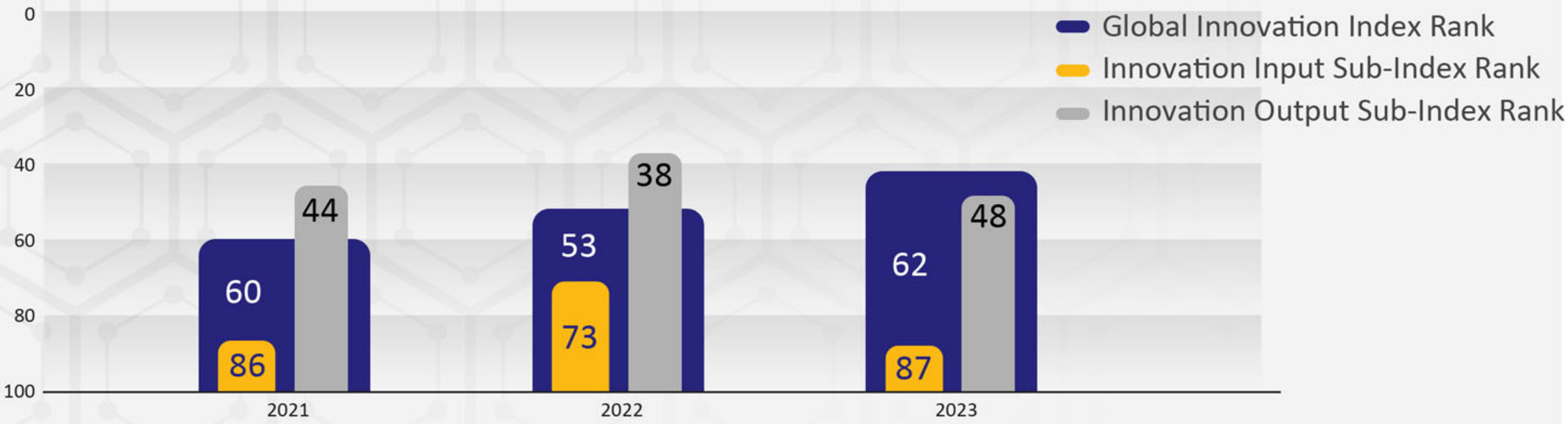


The two tables below compare Iran's ranking in the seven pillars of the global innovation index between 2020 and 2023. Points obtained in 2023 will be reviewed eparately.



Global Innovation Index 2023

In 2023, the Islamic Republic of Iran ranked 62nd in GII, the 87th in the innovation input sub-index, and the 48th in the innovation output sub-index. (Source: Global Innovation Index 2023).



Ranking in the Global Innovation Index (GII)

Based on these results, Iran ranked 62nd among 132 countries. Also, Iran ranked 6th among 37 countries that are classified as low-middle income countries. On the other hand, among the 10 countries of the Central and South Asian region, it is ranked second.

Another output of the 2023 report shows the relationship between the level of per capita income (GDP) and the score of Global Innovation Index (GII). It also provides a trend of the expected innovation performance with respect to income level. Economies that appear above the trend line have performed better than expected, and those that appear below the line have performed less than expected. With this definition, Iran is above the trend line and has performed better than its income level.

Iran’s best rankings include market complexity, innovative outputs, and knowledge and technology outputs, which are ranked 19th, 43rd, and 55th, respectively.

In knowledge and technology outputs, creative outputs, market complexity, human capital and research, infrastructure, Iran performs above the average of the low middle-income group.

In general, Iran's knowledge and technology outputs, creative outputs, market complexity, human capital and research and infrastructure are higher than the average of the middle to low-income group.

On the other hand, Iran has performed above the regional average (Central and South Asia) in the mentioned pillars, except for the infrastructure.

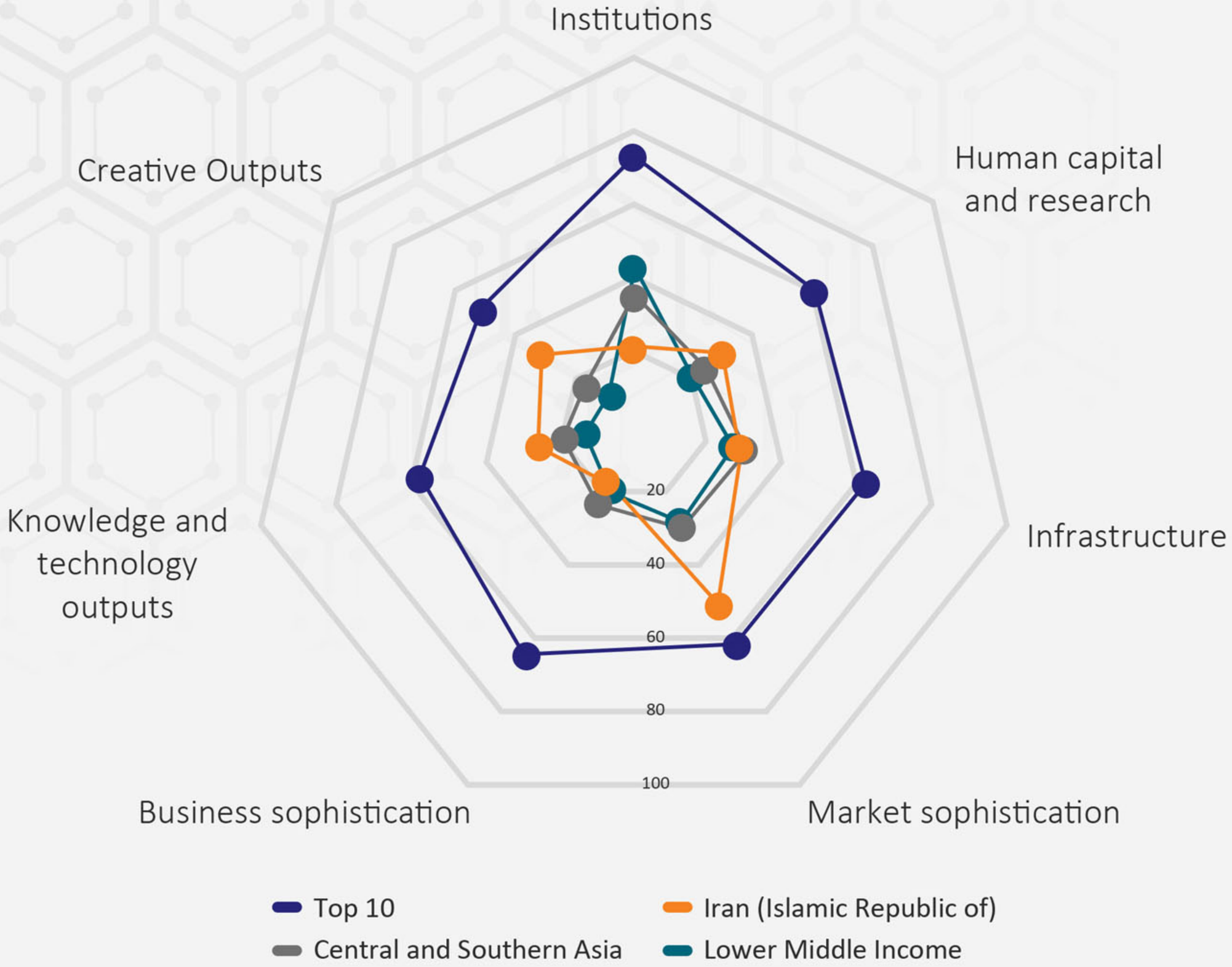
In the 2022 report, there was an index known as new businesses, which in the new report was presented as unicorn value, and Iran's ranking decresed from 90 in 2022 as a new business index to 48 in 2023 as a unicorn value index.

As in previous years, Iran has had better ranking in terms of innovation output indicators than innovation inputs. The main strengths of Iran's innovation are the trade marks with the 1st rank, the "percentage of science and engineering graduates" with the 3rd rank, the market value with the 5th rank, and the formation of gross capital with the 9th rank in the world.

In terms of knowledge and technology outputs, Iran ranked 13th and 16th in the patents based on origin and software costs indexes, respectively, and the latter index has improved compared to 2022 and received a better ranking. Also, the index rank of "PCT Patents" is 40, which has not changed much compared to last year.

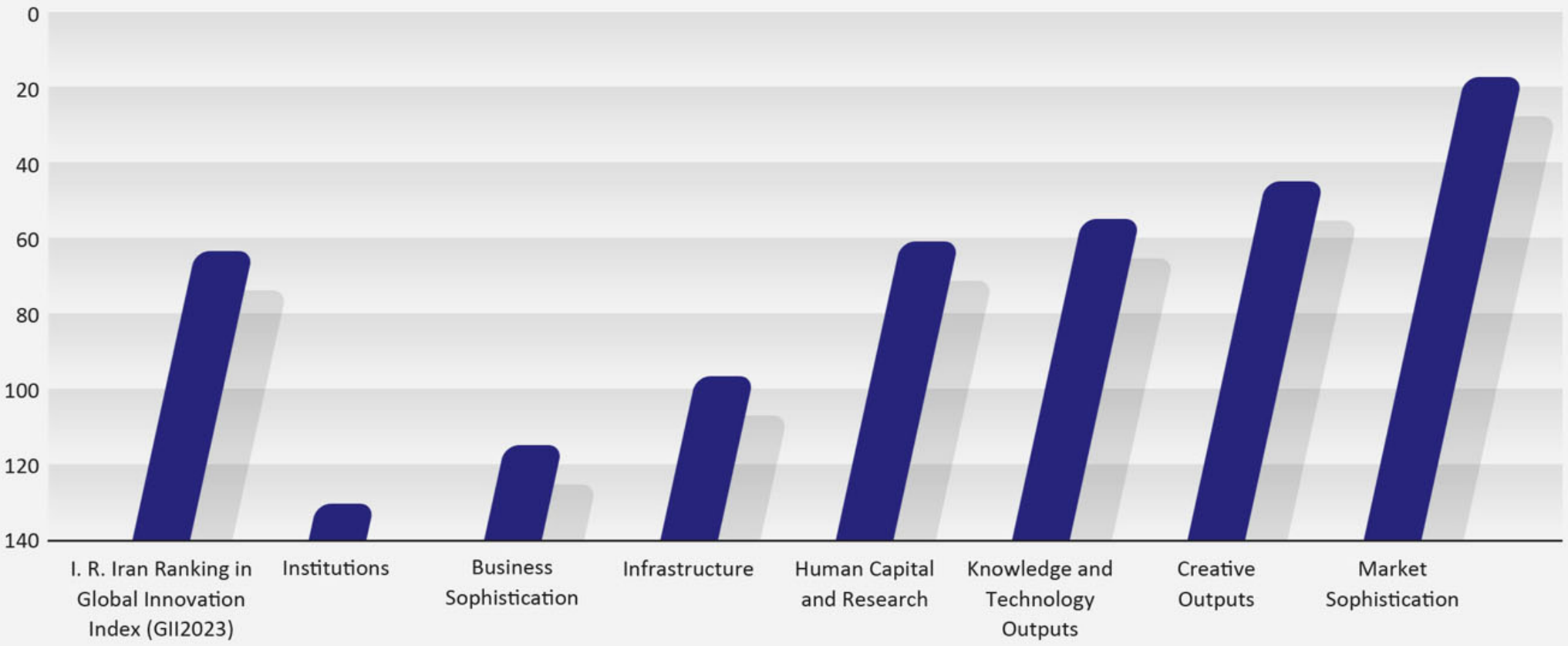
Compared to the regional countries, Iran's ranking is higher than Kuwait, Georgia, Oman, Armenia, Egypt, Pakistan, Azerbaijan, and Lebanon, but it is far behind Russia, Saudi Arabia, Qatar, India, Turkey, Malaysia, and the United Arab Emirates.

Interestingly, Iran and Indonesia are at the same level in terms of innovation index, and therefore, opportunities for bilateral technological and innovative cooperation can lead to the promotion of both countries’ position.



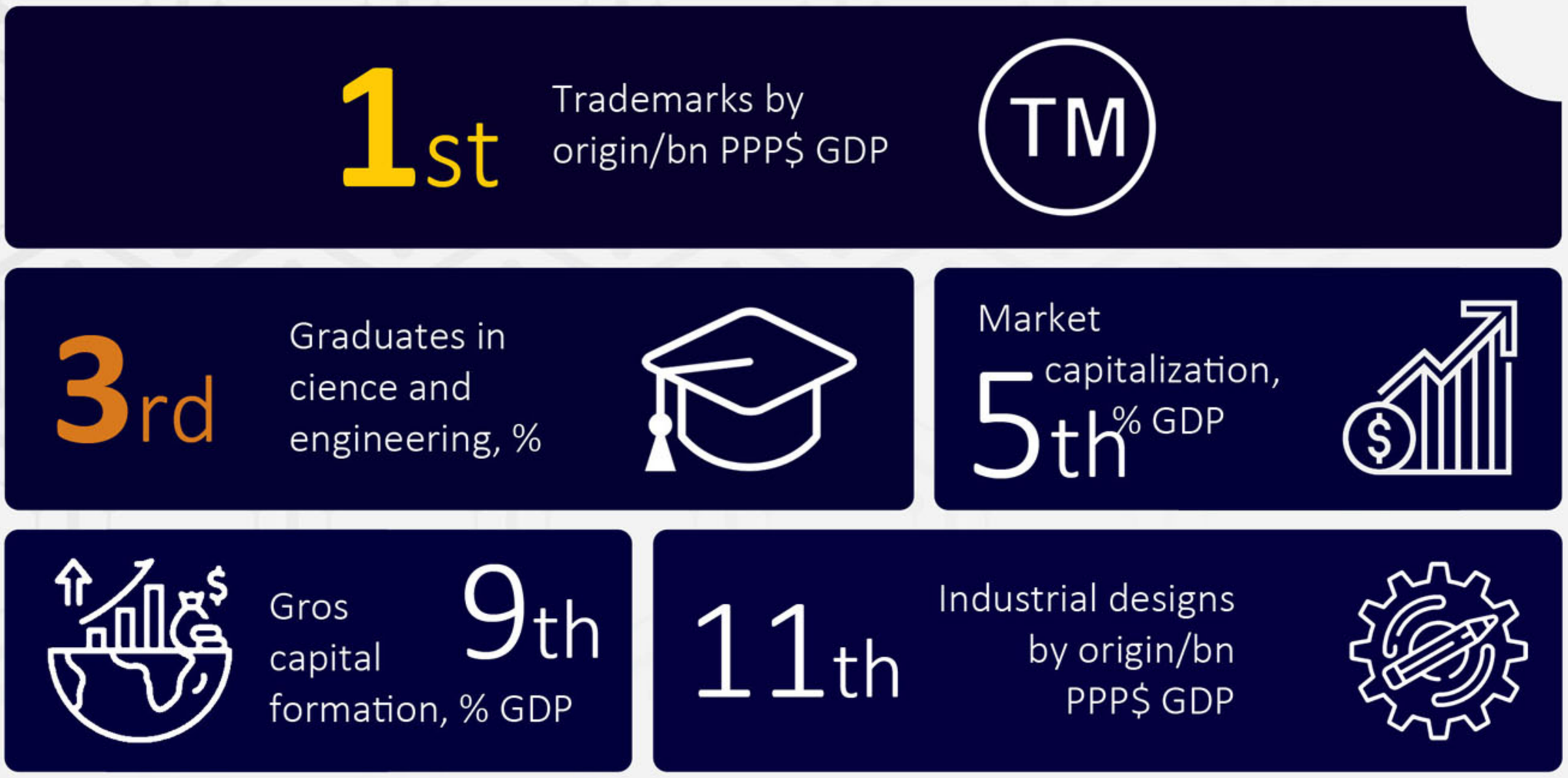
Benchmark of Iran (Islamic Republic of) against other country groupings for each ofthe seven areas of the GII Index

Iran’s rankings in the seven areas of the Global Innovation Index (GII 2023)
The Islamic Republic of Iran had the best performance in the market complexity and creative output, and the weakest performance in the institutional sector and business complexity.



Ranking in the Global Innovation Index (GII 2023)

The strengths of the innovation indicators of the Islamic Republic of Iran in 2023



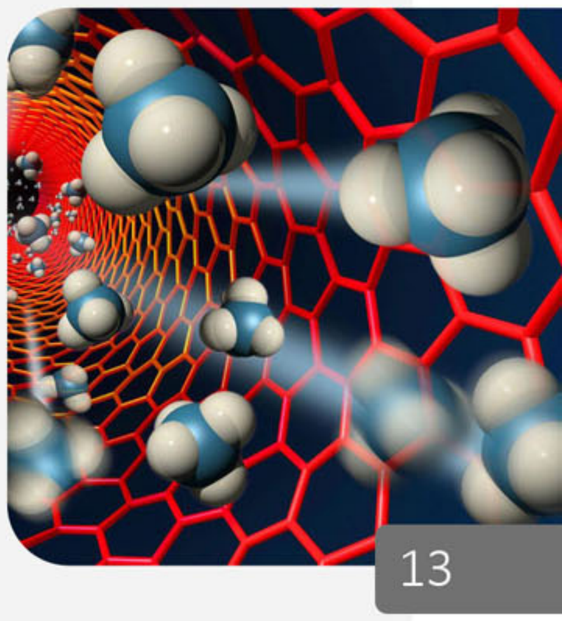
7 . science and technology infrastructure index (knowledge-based companies and start-ups)

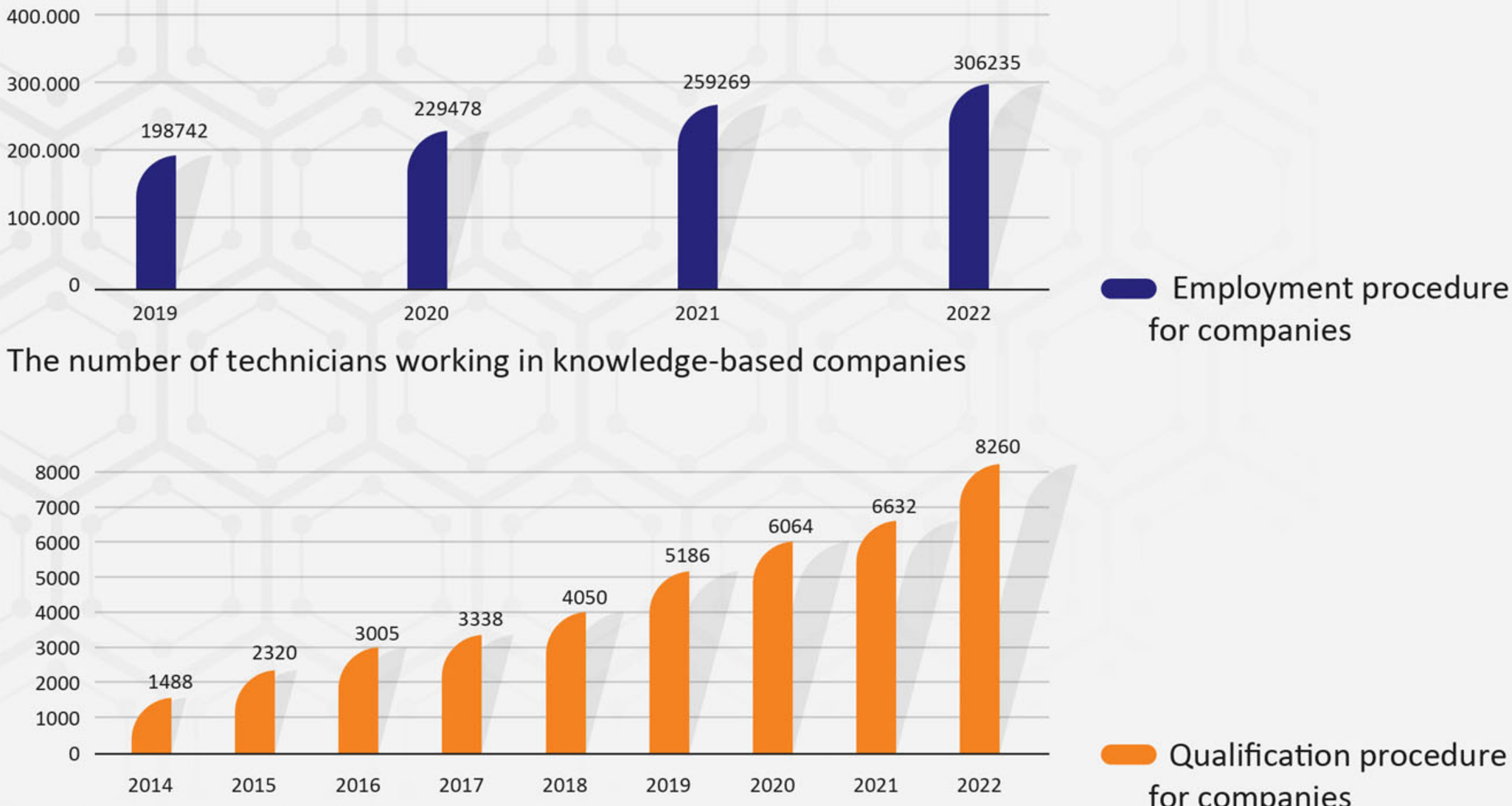
With the formation and growth of knowledge-based businesses and the increase of their share in the national production, the economy based on resources and the sale of raw materials are replaced by the knowledge-based economy.

Earlier efforts in creating a domestic environment for the formation and development of knowledge-based companies have paved the ground for flourishing these companies.

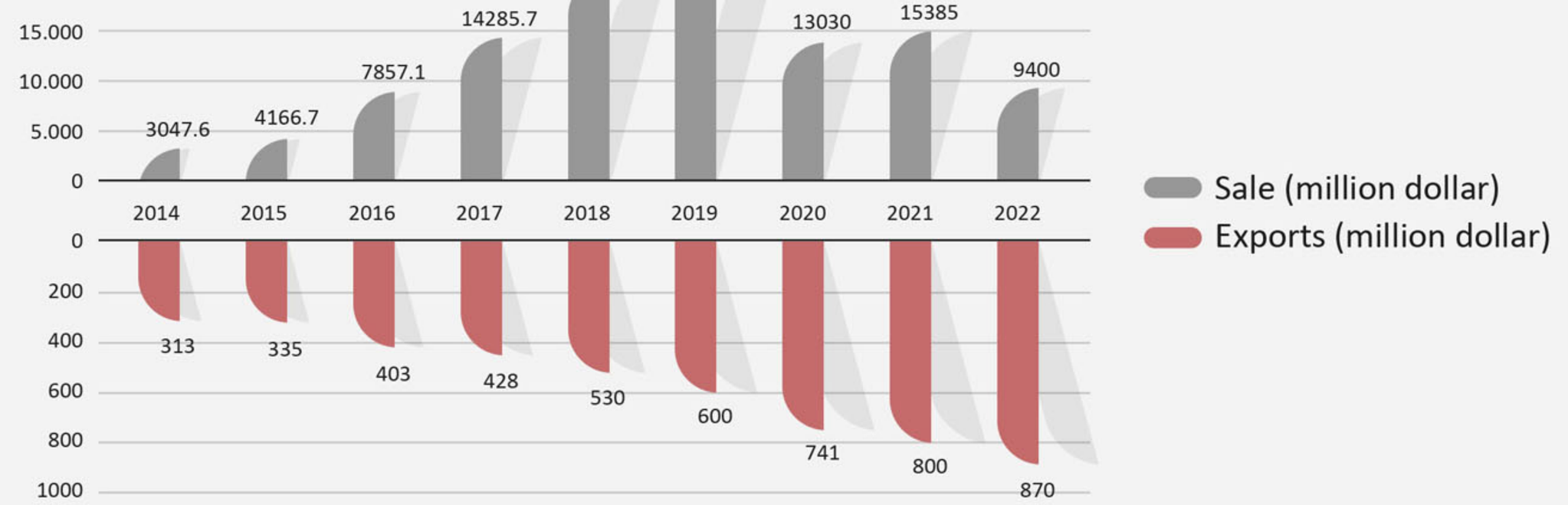
By supplying the country's demands in the technological and strategic fields, knowledge-based companies have taken important steps in line with materializing the prosperity of national knowledge-based production, and by exporting their products, they have started advancement in the economy and national prosperity.

The working group for evaluation and recognition of competence of knowledge-based companies and institutions and monitoring the implementation has so far approved more than 8,000 knowledge-based companies that are active in various technological fields.





The number of technicians working in knowledge-based companies



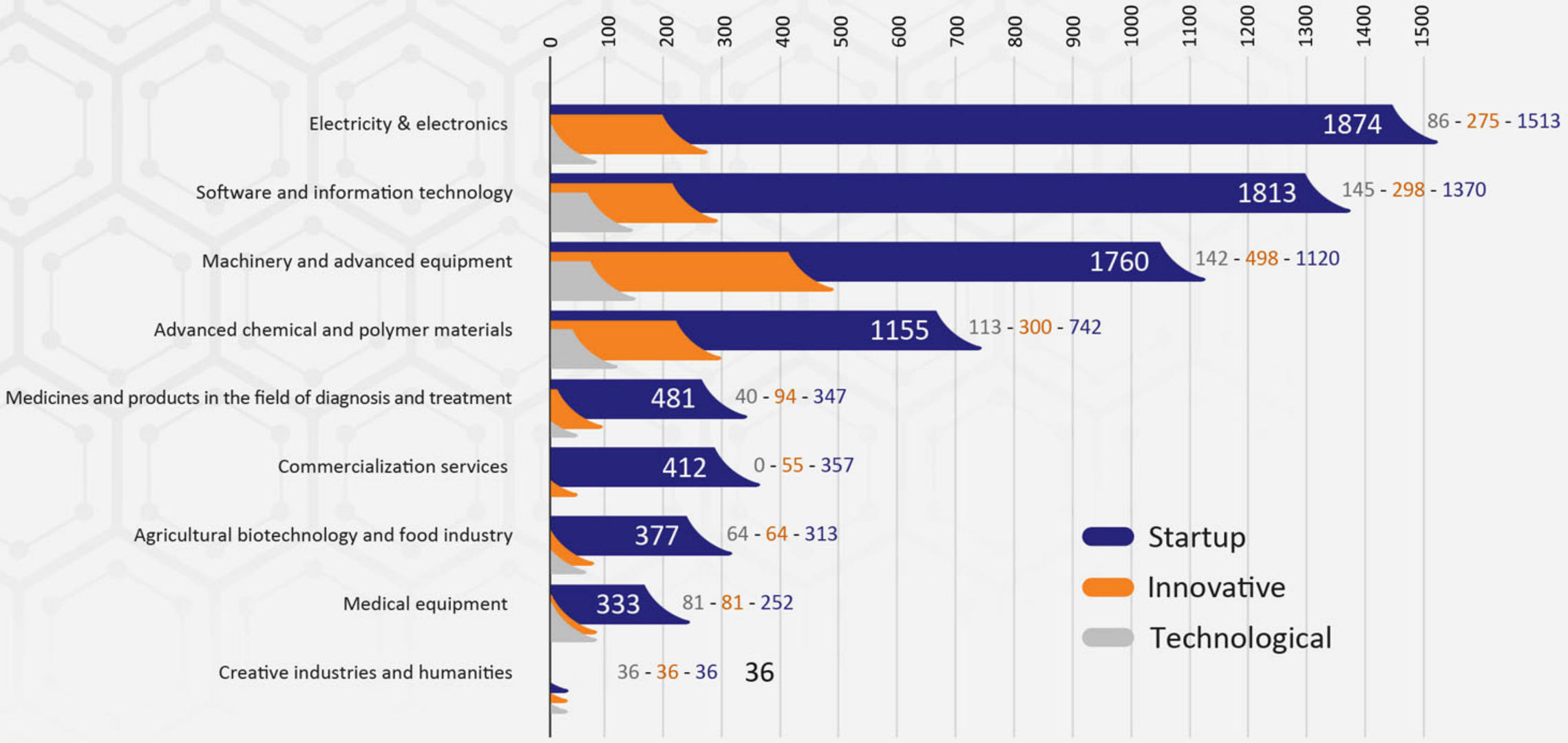
Number of knowledge-based companies

Exports of knowledge-based companies and sales volume (million dollars)

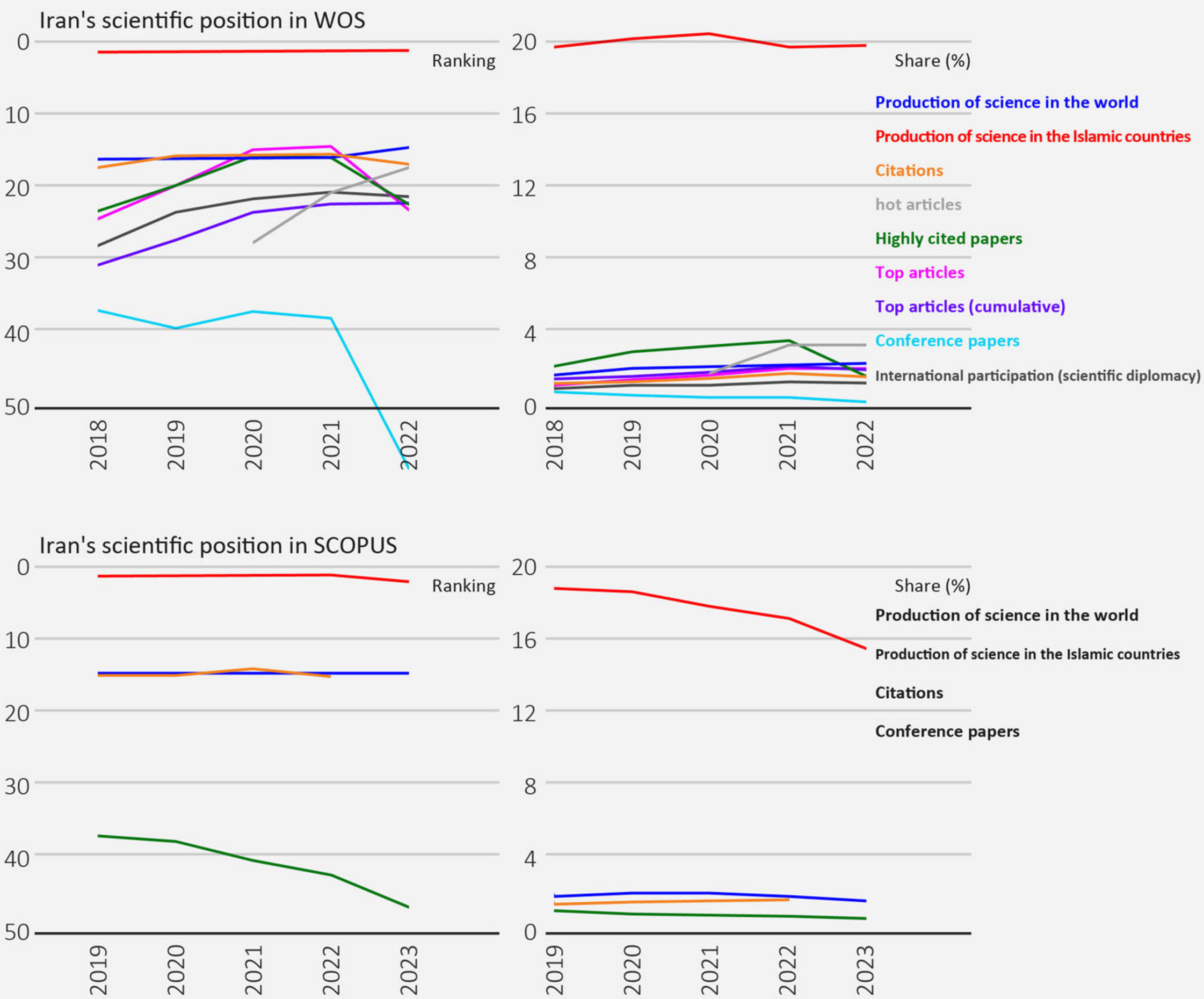
Source: Iran Chamber of Commerce, Iran Trade Promotion Organization,
Center of International Science and Technology Cooperation (CISTC)

With the development of infrastructures, the growth of human resources and the creation of financing mechanisms, ground has been prepared for the country's players in entrepreneurial ecosystem and startups.

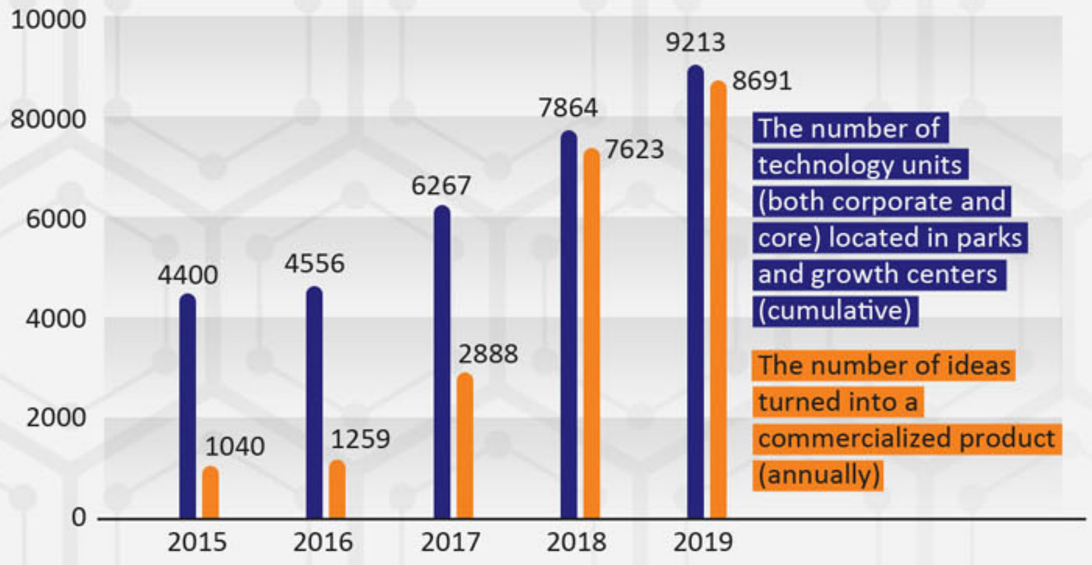
The number of knowledge-based companies by technology category in 2022



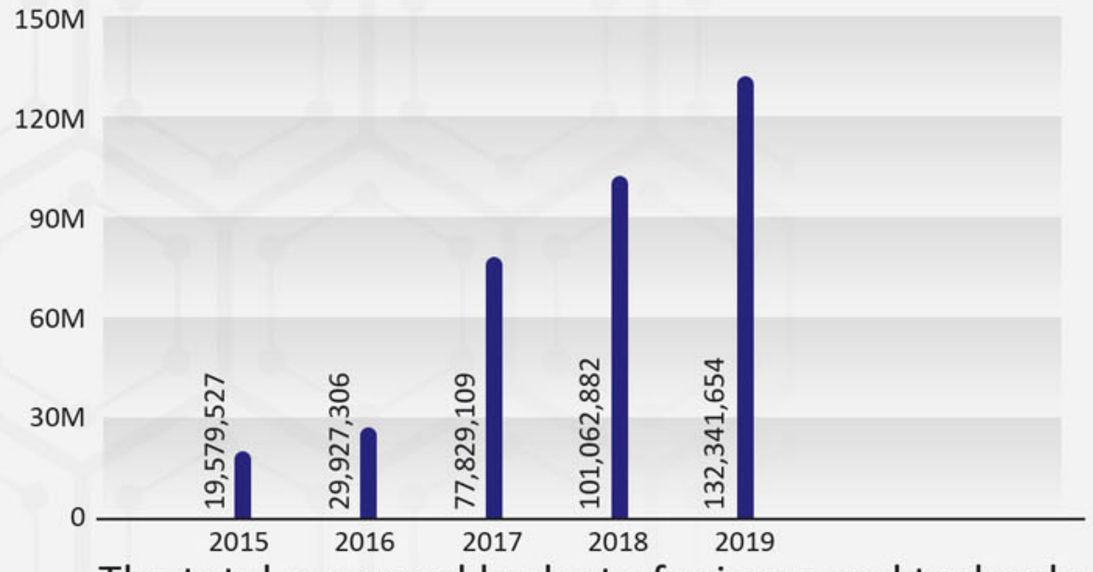
The total number of knowledge-based companies at the end of 2022 and the first quarter of 2023: 8260



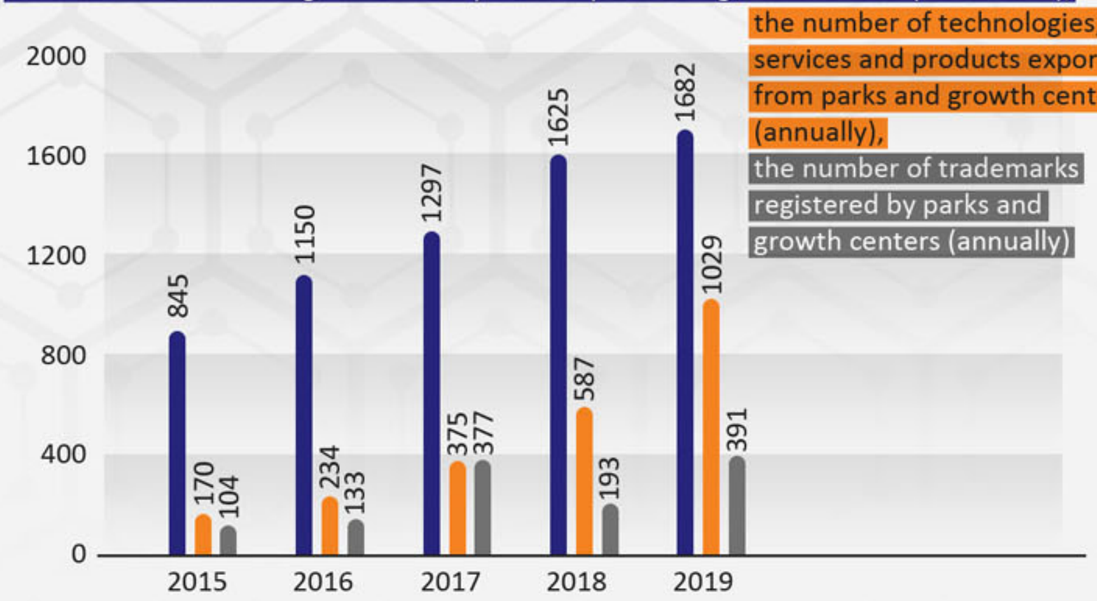
Number of technology units (both corporate and core) located in parks and growth centers (cumulative)



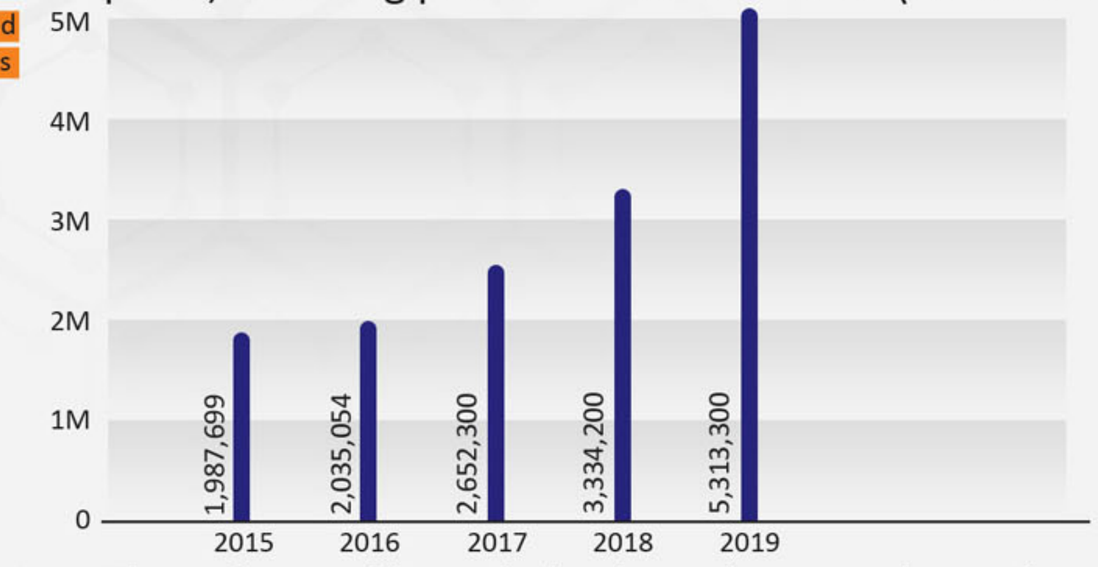
Total annual sales of companies in science and technology parks and growth centers (dollars).



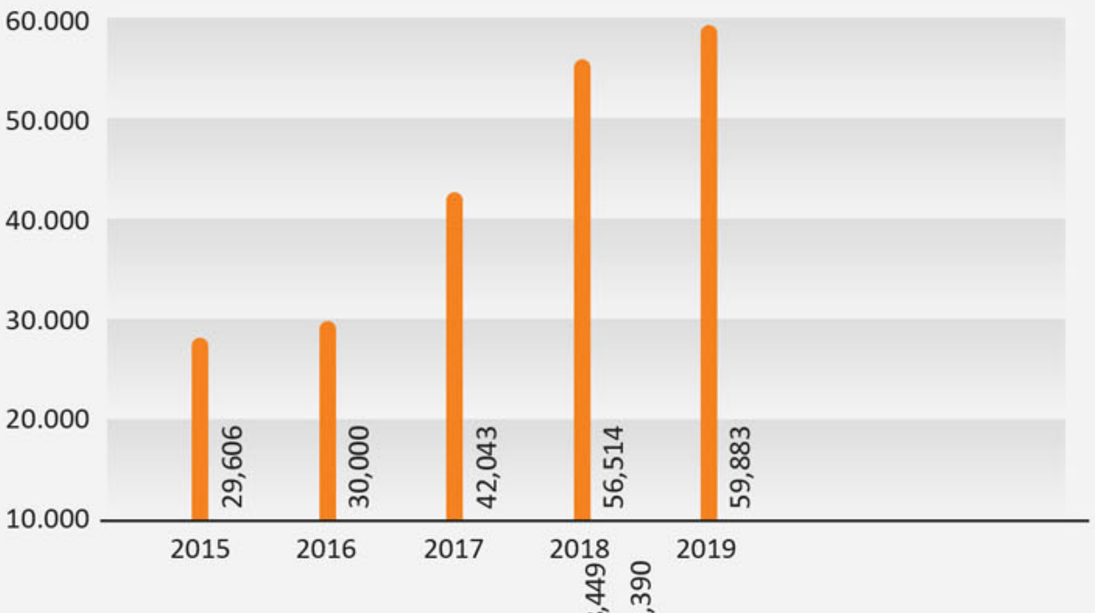
The number of knowledge-based companies in parks and growth centers (cumulative), the number of technologies, services and products exported from parks and growth centers (annually), the number of trademarks registered by parks and growth centers (annually)



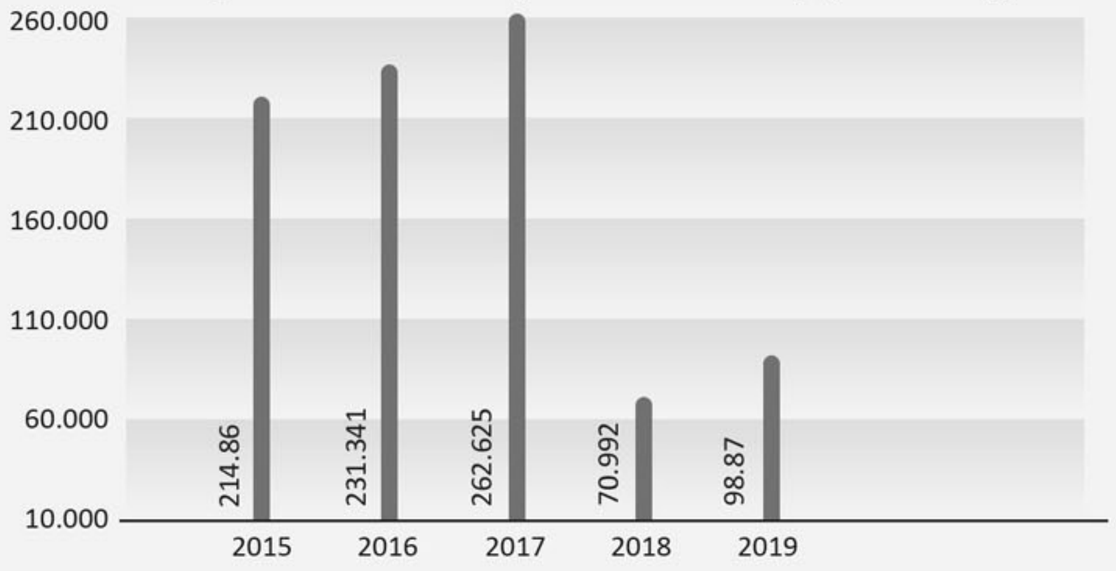
The total approved budget of science and technology parks, including provincial and academic (million rials)

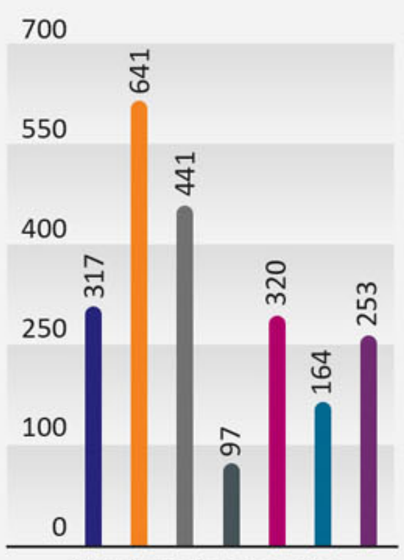


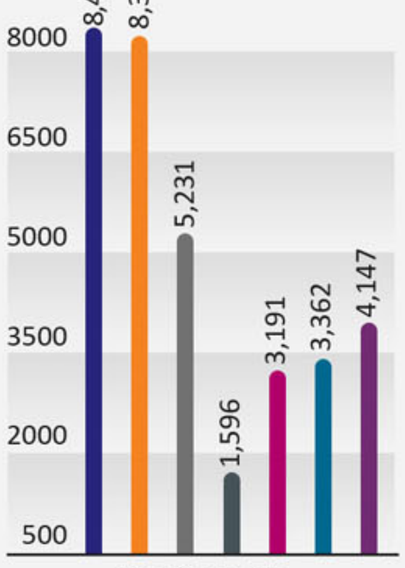
The number of technologists working in science and technology parks and science and technology development centers (cumulative)

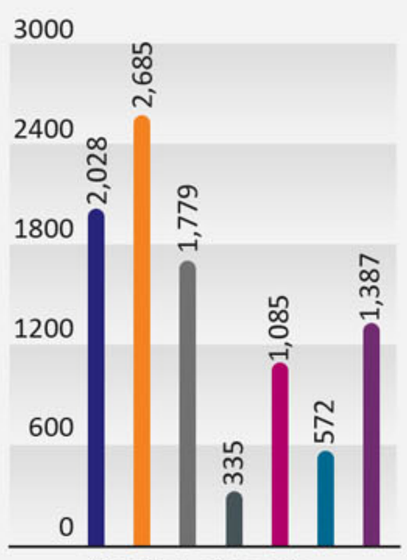


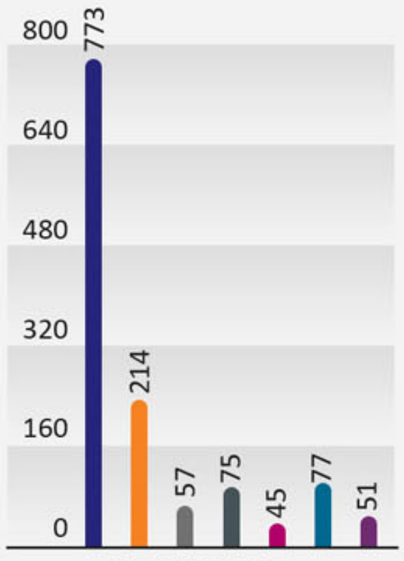
The volume of knowledge-based exports by parks and growth centers (million dollars) (annually)

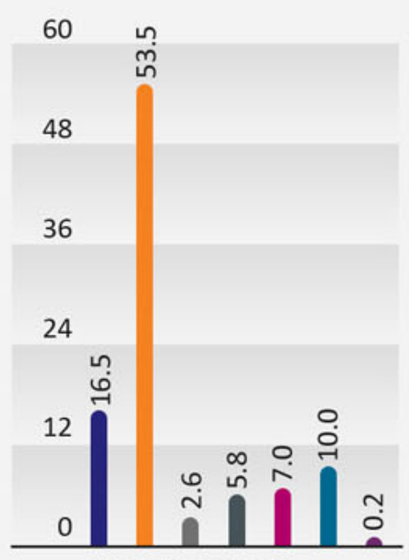


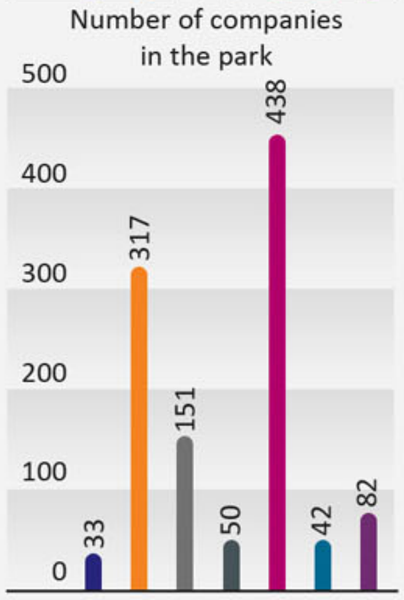


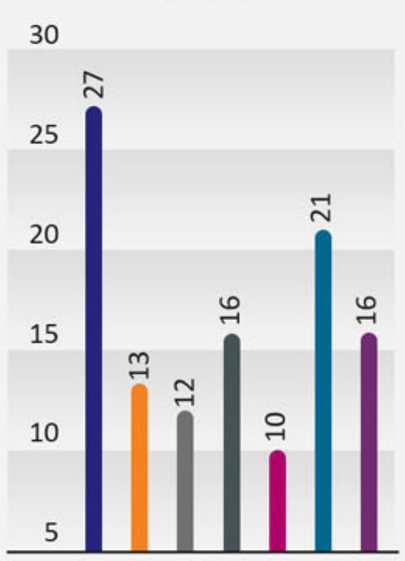


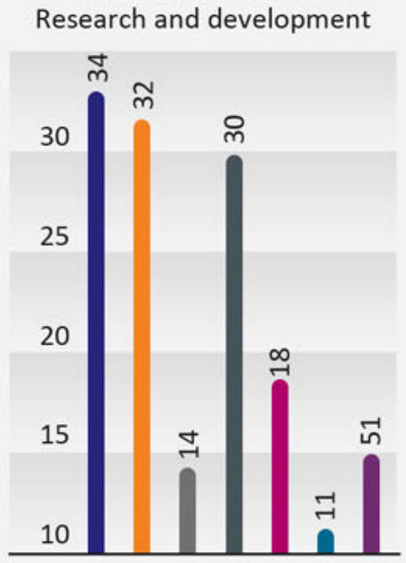


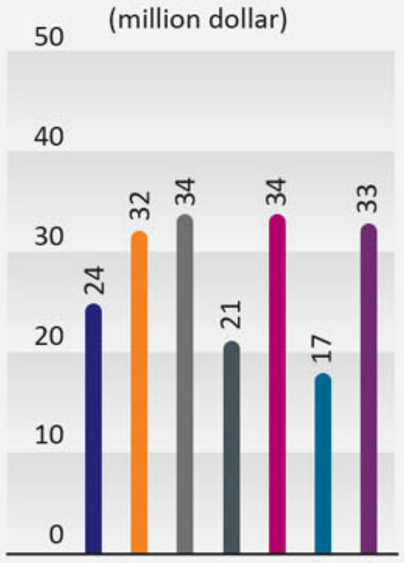


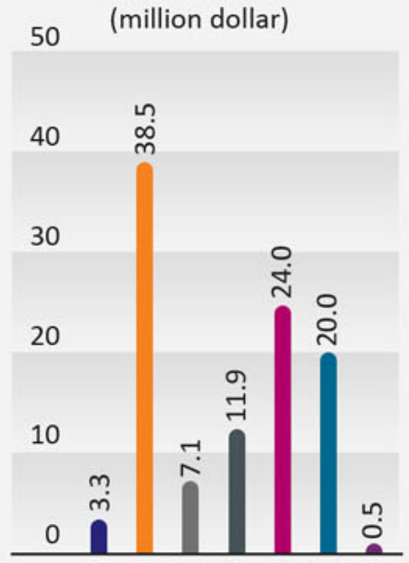












- Pardis Technology Park
- Isfahan Science and Technology Town (ISTT)
- East Azarbaijan Science And Technology Park
- Alborz Science and Technology Park
- Fars Science and Technology Park
- Semnan Science and Technology Park
- University of Tehran Science & Technology Park (UTSTP)

8 . Technology

The Islamic Republic of Iran has adopted a comprehensive approach in developing new technologies with the aim of creating wealth and relying on emerging technologies.As a result, Iran has been able to gain a significant share in regional and international markets.Entering these fields at the right time, along with focusing on the endogenous development model in promoting science and technology, has paved the grounds for achieving this goal.In this section, we will discuss Iran's situation in some technological fields.

8 . NANO-technology

Iran has started policy making for developing Nanotechnology in 2001. Iran Nanotechnology Innovation Council (INIC) was established in 2003 to ensure coordination and synergy between all institutions and organizations in charge of Nanotechnology development.

In August 2005, the " Strategic Plan" (a ten-year strategy for developing Nanotechnology in Iran 2005-2015) was approved by the government. Now, with the implementation of the strategic plan and its three complementary stages until 2022, Iran has ranked fourth in the world in Nanotechnology after China, India and the United States.

Source: Report of the performance of the document on expanding the use of Nanotechnology in 2022

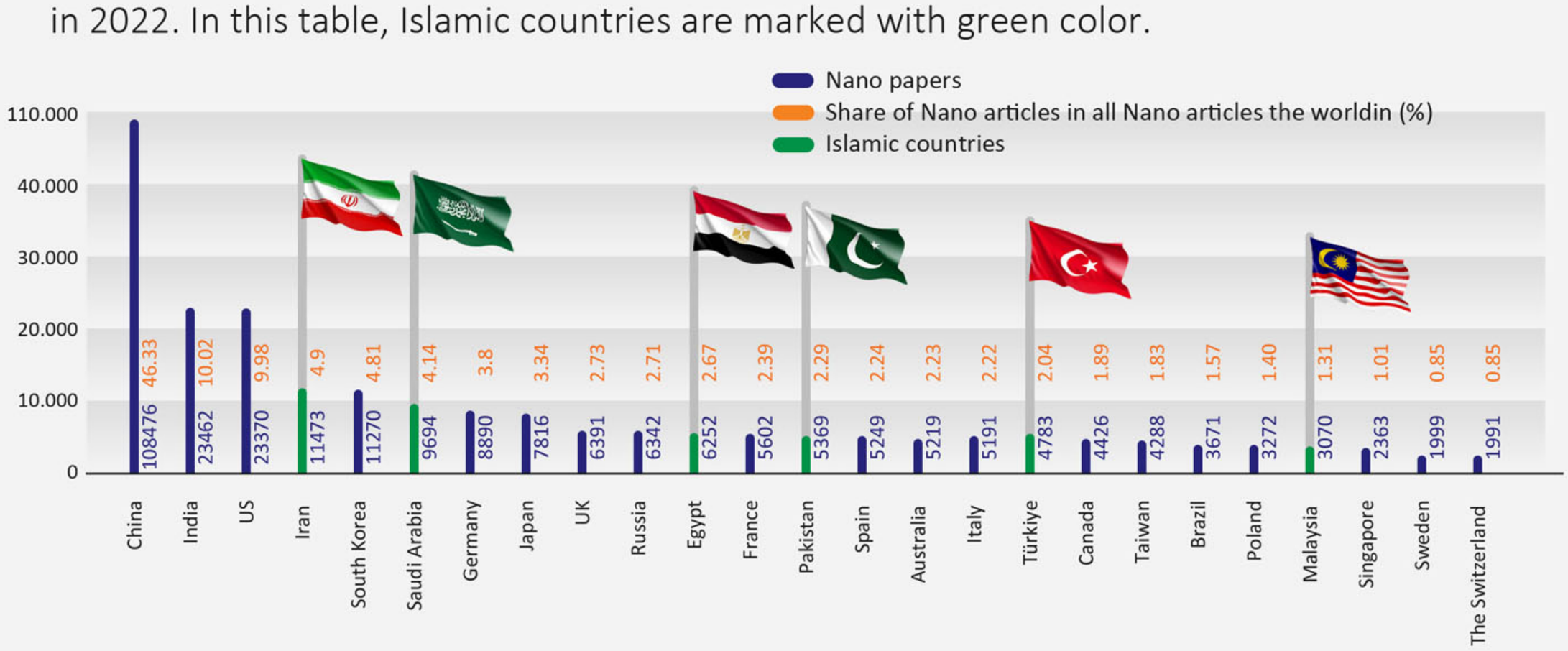
Iran’s international position in publishing Nano papers

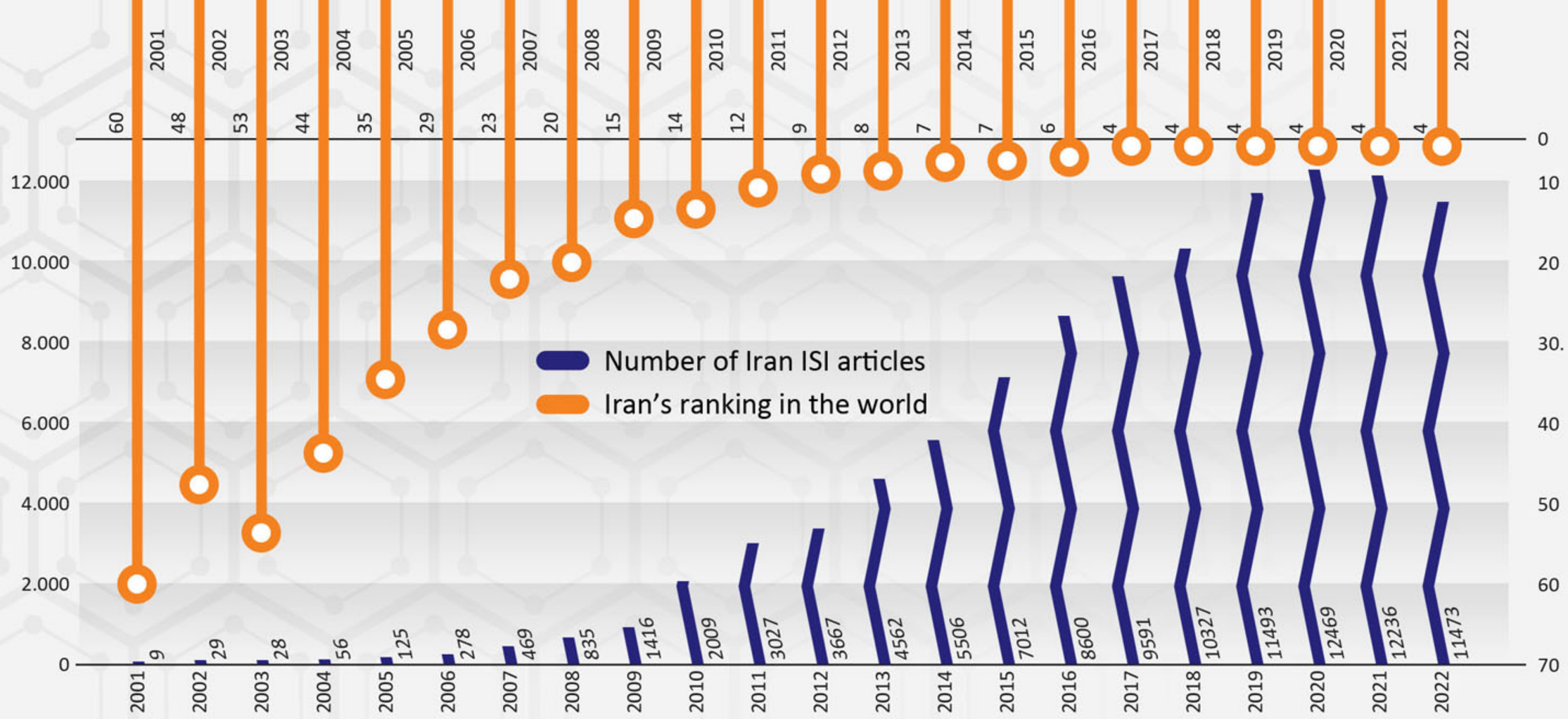
In 2022, 11,473 Nanotechnology articles were indexed by the Iranian researchers in Web of Science (WOS), which is equivalent to 4.9% of all Nano articles published in 2022. With this share of Nano publications, Iran ranked 4th in the world, just like last year. This is while Iran ranked 58th in the world and 6th in the Middle East in 2000 with eight Nano articles when a few Iranian researchers and scientists were familiar with this emerging technology and before establishing Iran Nanotechnology Innovation Council.

In the following years, Iran always experienced an upward trend in the Nano sciences. Iran’s average annual growth in Nano articles in these 22 years was 46.92%. The number of Iranian Nano articles in 2022 includes 8.25% share of all scientific articles published in Iran in WOS, while the share of Nano articles from all world articles in 2022 was 8.48%. The share of Iran's joint Nano articles with other countries in 2021 was about %32, and China, the US, Türkiye, Iraq and Canada respectively had the largest share in the publication of joint articles with Iran.

Iran also ranks 18th in terms of Nano articles per population (2021) and ranks first in the world (2021) in terms of the number of articles per GDP based on PPP (PPP).

The table below shows the top 25 countries’ ranking in the publication of ISI Nano articles in 2022. In this table, Islamic countries are marked with green color.



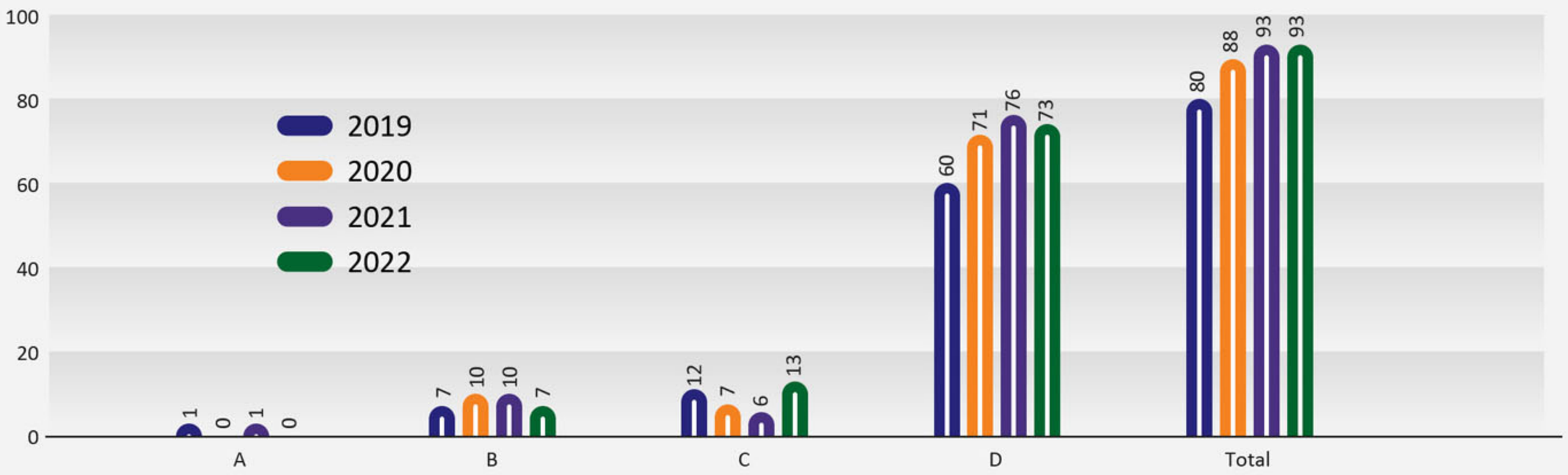


The growth in Iran's Nano articles and Iran's ranking in the world

The number of Nano articles published by Iran in the world's top scientific journals

The federation of Iran’s top scientists, based on reliable sources such as the Nature Index and the Impact Factor and Eigen Factor indices, as well as the opinion of the scientific elites in each field, classifies and introduces the world's top scientific journals in four categories from A to D (in order of points) every year.

The following graph shows the Iranian Nano articles in these four journals. In total, the number of articles published in these magazines was 93, which did not increase compared to last year, but the number of articles in each category has changed, which is clear in the graph below.



The top scientific journals of the world in four categories A to D

Iran's global position in patenting Nanotechnology

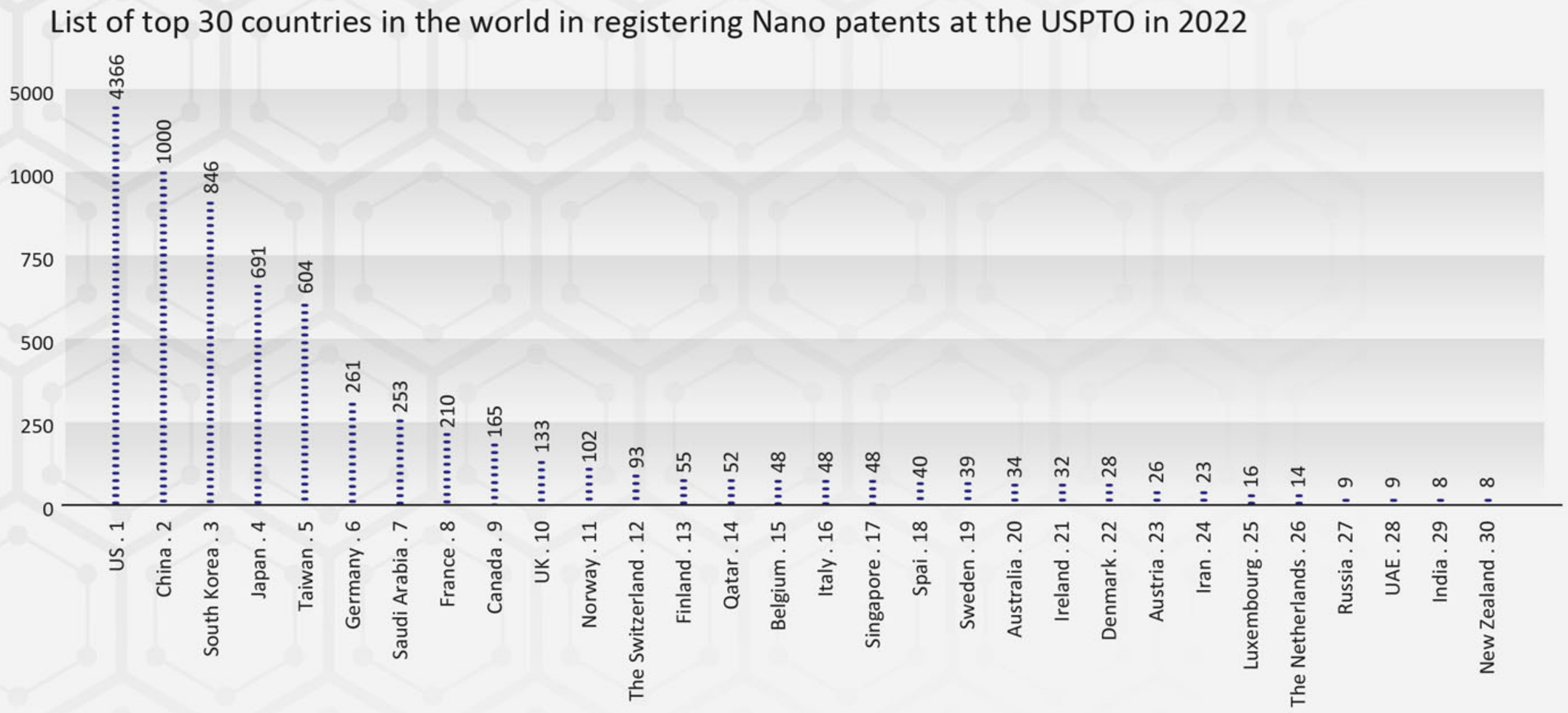
By the end of 2022, Iran has published a total of 312 Nanotechnology patents in the US and European patent offices. Iran has had 23 Nano patents in 2022 in the United States Patent and Trademark Office (USPTO).

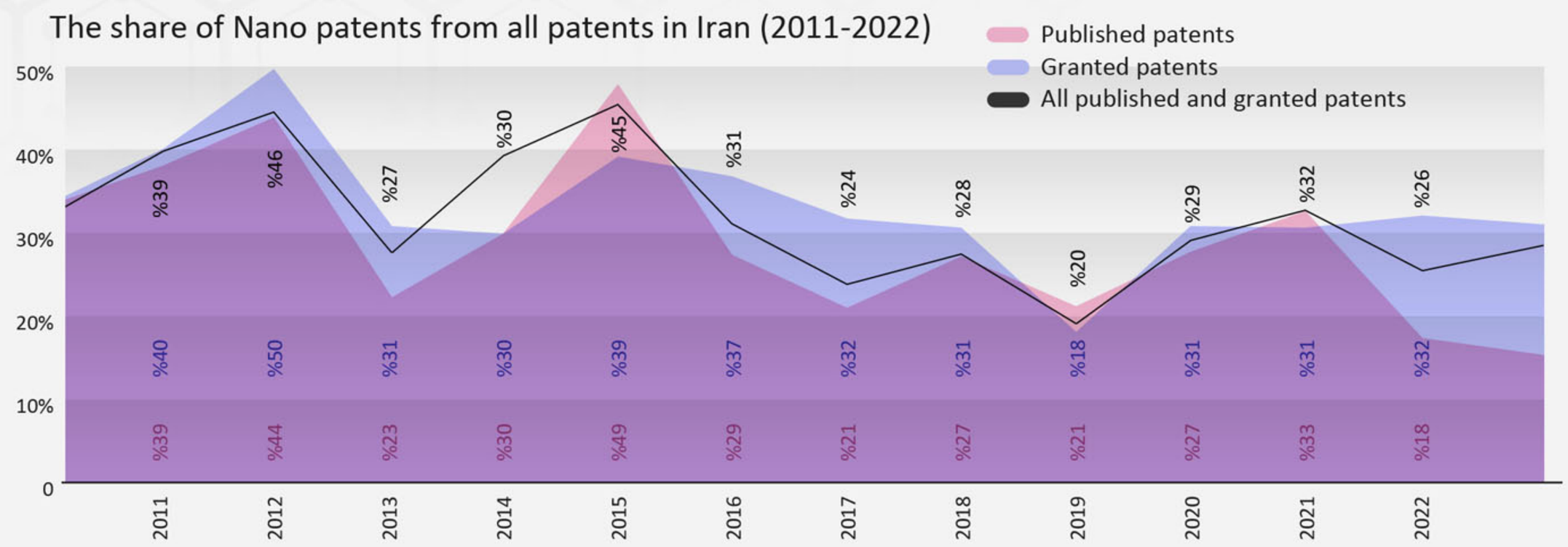
In addition, 10 other Nano inventions are being registered in this officethis year.

Accordingly, Iran's rank 24th in USPTO patents in 2022.

No invention related to Nanotechnology has been registered in the European Patent Office (EPO) this year. The ratio of the number of patents to the number of Nano articles shows that 0.3 Nano patents have been registered for every 100 Nano articles.

However, it should be noted that the same number of inventions related to Nanotechnology includes a share of about 31% of all patents registered in Iran in the US and European patent registration offices. The statistics related to this field are given in the table below.

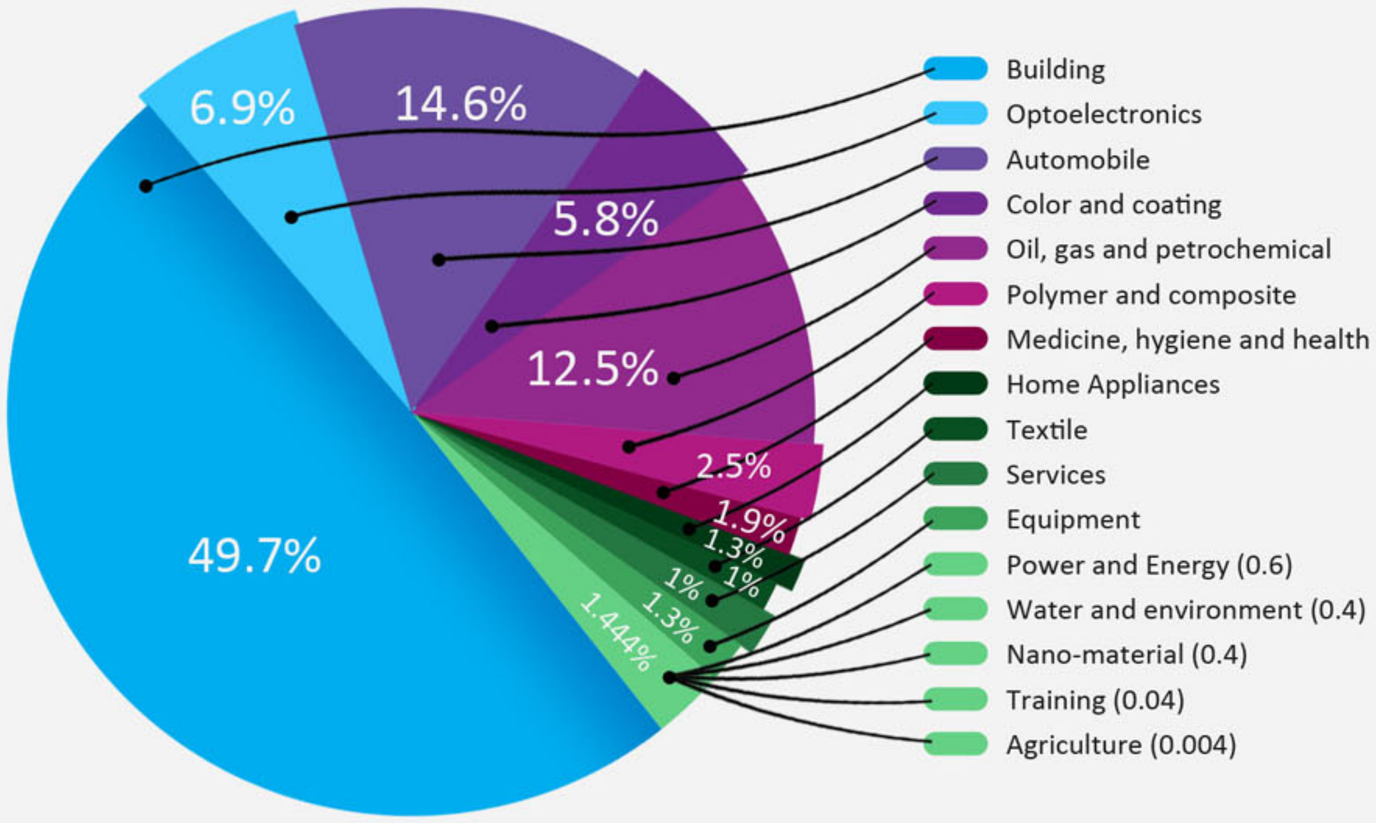




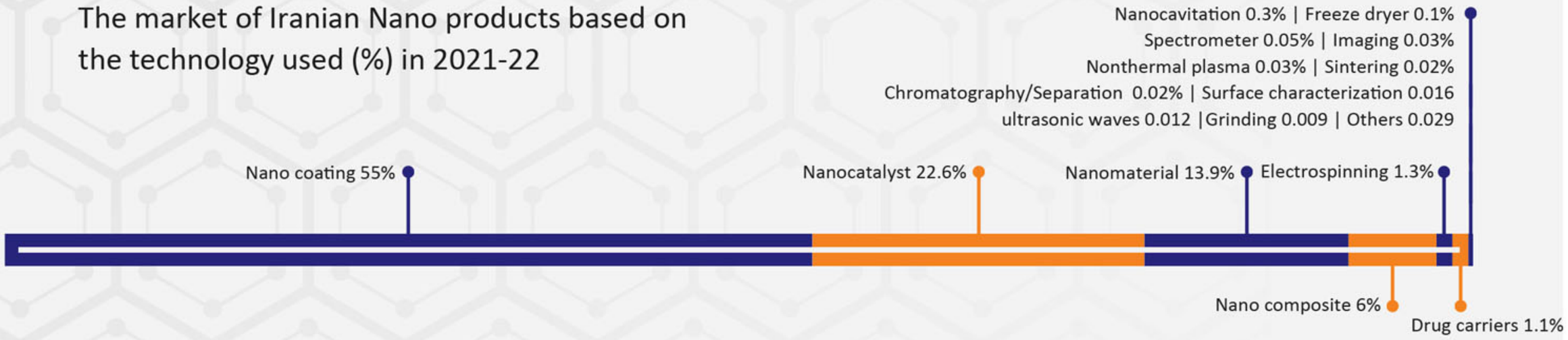
The construction industry covers nearly half of Iran's Nanotechnology products market in 1401, which is equal to $240 million.

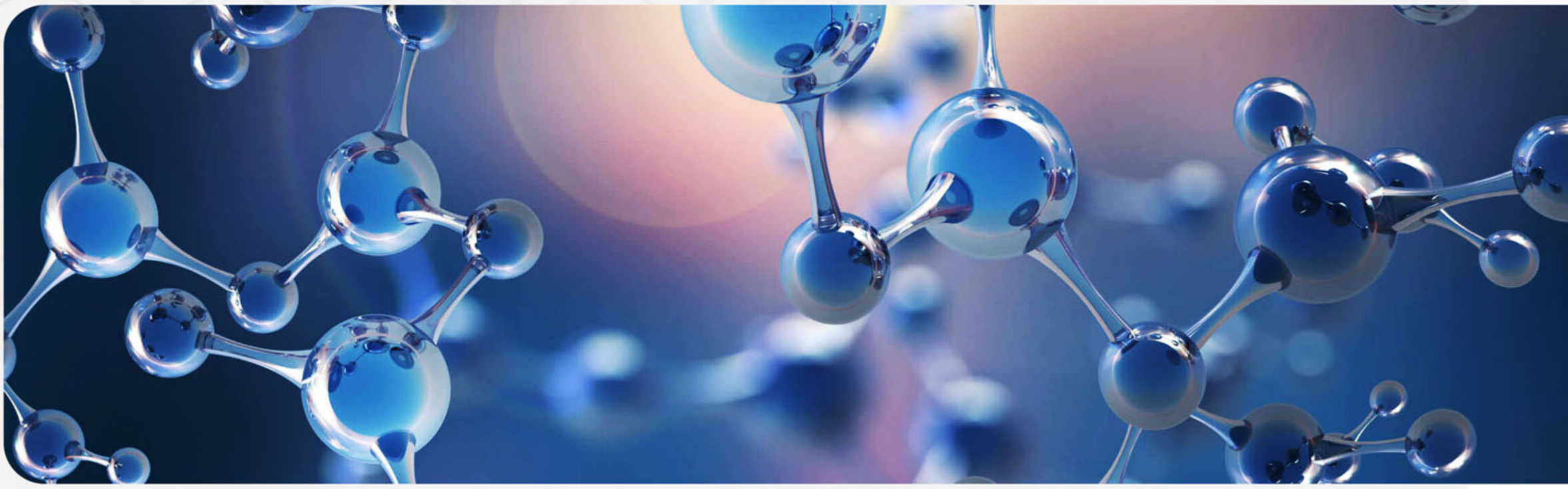
96% of this figure is related to the market of sanitary ware, tiles and reflective glass. The automobile and transportation industry are in the next position and the volume of the sales of Nanotechnology products in this field is about $69.5 million, of which nearly 75% are car Nano-catalysts..

Almost all the 12.5% share of the oil and gas industry is made up of Nano-catalysts. The two fields of education and agriculture have a very small share (below 0.1%) of the Iranian Nano technology market.



Iran's Nano companies' overall sales based on industrial areas in the production of goods(%) for 2021-22



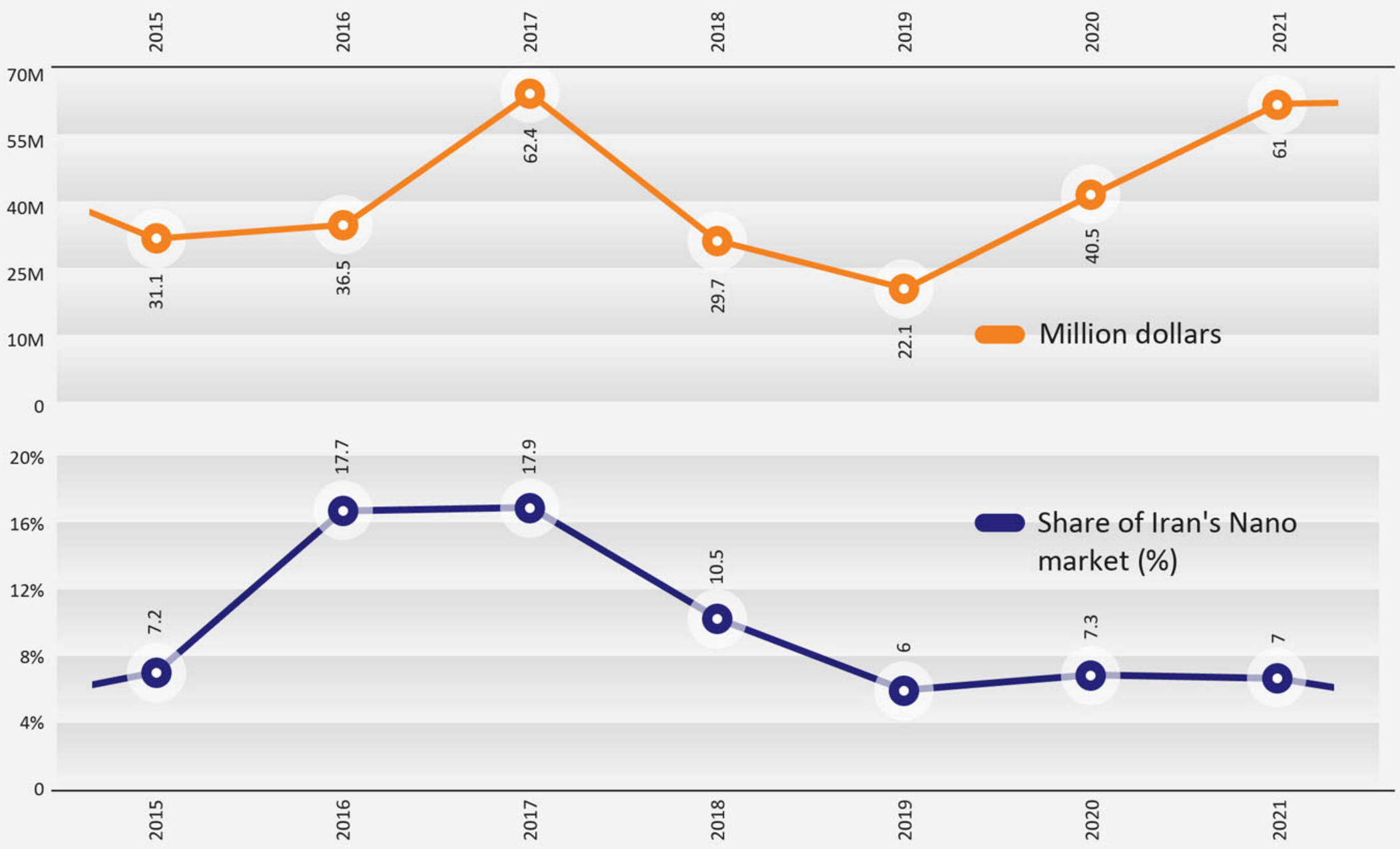


Volume of Iran's Nanotechnology products exports

The expansion of Iran Nanotechnology Innovation Council export programs, especially in recent years, made it possible for Iran's Nano technology products, equipment and services to enter the world markets.

After 1398, when the lowest amount and share of Iran's Nano technology product exports were recorded, the volume of exports in this field has been increasing and in 1400, it grew by 53% compared to the previous year; but the 7% share of exports from the whole Nano market has not changed much.

The volume and share of Iran's Nanotechnology products exports in recent years are shown in the following chart.



The volume and share of Iranian Nanotechnology products exports from 2015 to 2021

Biotechnology

Biotechnology is known as one of the advanced technologies in the 21st century and is one of the seven main industries that will determine the economic vision of societies in the upcoming decades.

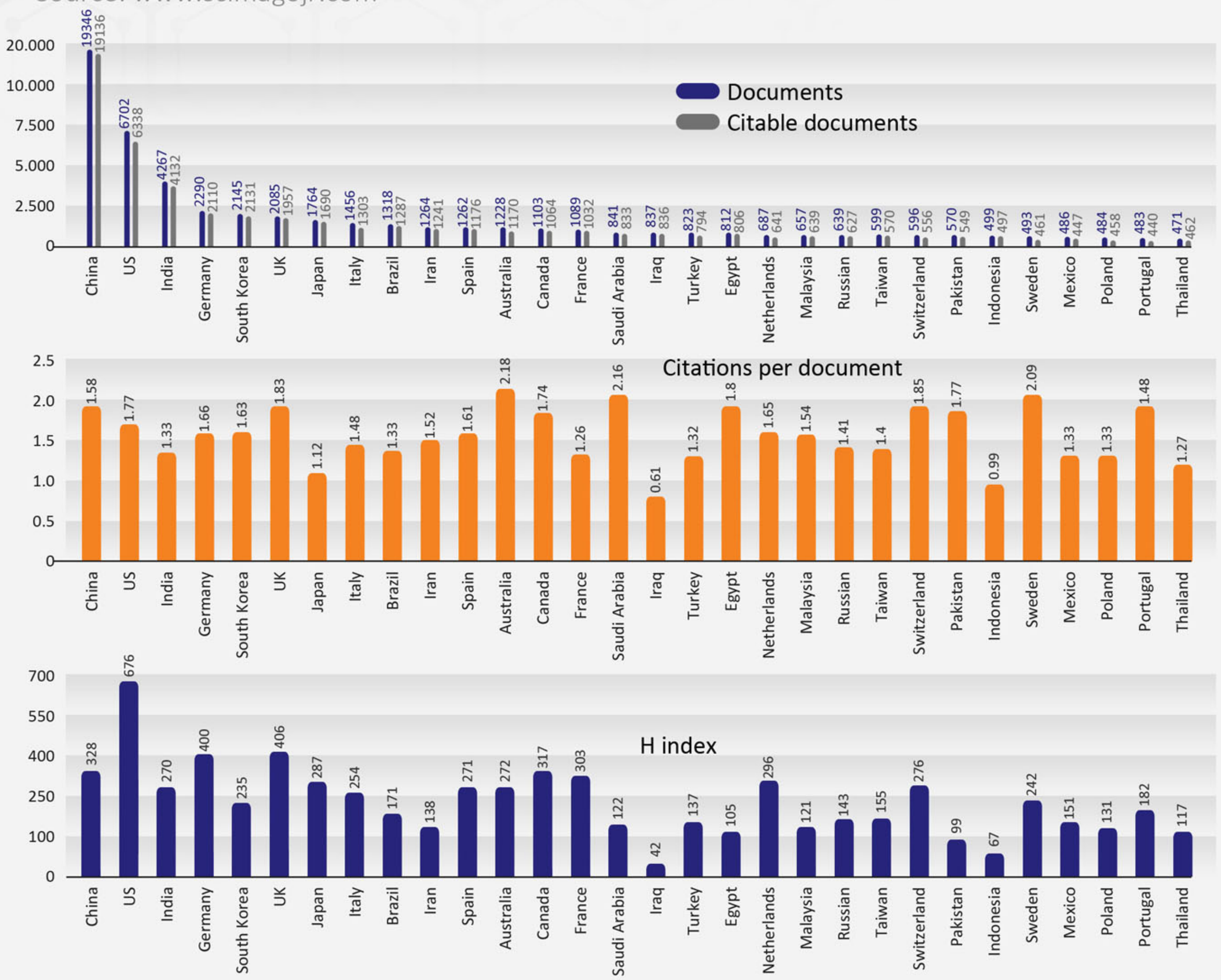
Biotechnology has a long history and is very developed in Iran.

The background of biotechnology research and academic centers in Iran goes back to a century ago, when traditional biotechnology was first used for the production of drugs and vaccines in Pasteur Institute of Iran (PII).

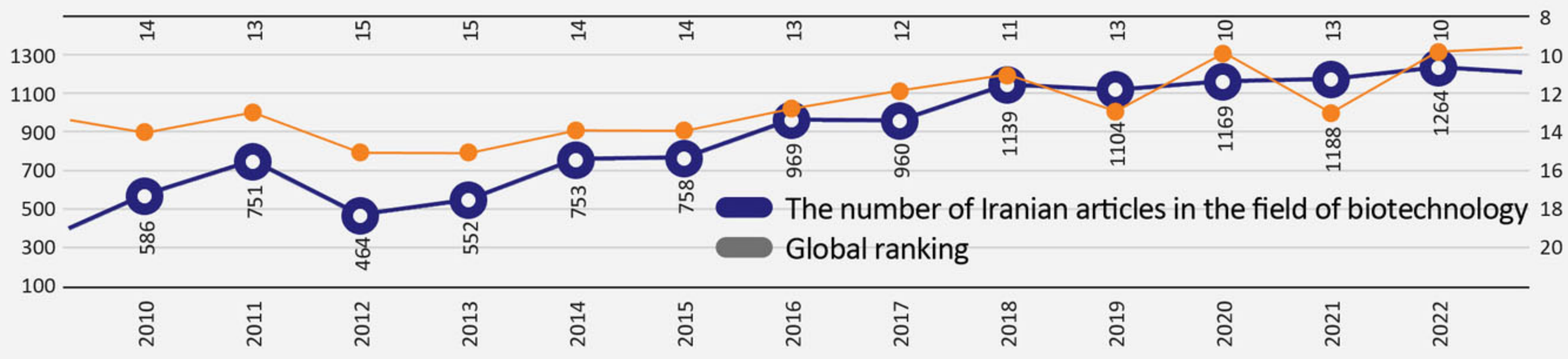
Pasteur Institute of Iran which was established in 1921 and the Razi Vaccine & Serum Research Institute in 1924 are two good centers in Iran for bio-technological research.

In 2022, Iran ranked 10th in the world in terms of the number of bio-technology articles published in the world prestigious journals.

Source: www.scimagojr.com



Iran's share in bio-technology articles in 2022 is 1.92% compared to the world countries.



The number of articles and Iran's global ranking in the field of biotechnology

8 . Stem Cells

The history of stem cell research in Iran goes back to the first hematopoietic stem cell transplantation (HSCT) in the 1990s.

Since 2004, such studies in Iran have been concentrated on the research on embryonic stem cells, which led to the extraction of new lines of stem cells in the country.

Since 2005, research in the field of tissue engineering and regenerative medicine have begun. Since 1994, Iranian researchers have published numerous articles in the field of stem cells in prestigious journals.

From this point of view, the Islamic Republic of Iran has achieved the first rank among the Middle Eastern and Islamic countries and the second rank among the Eastern Mediterranean and North African countries.

By increasing investments in this field, Iran can be among the top 10 countries in the world in terms of science and wealth creation in this field by 2025.

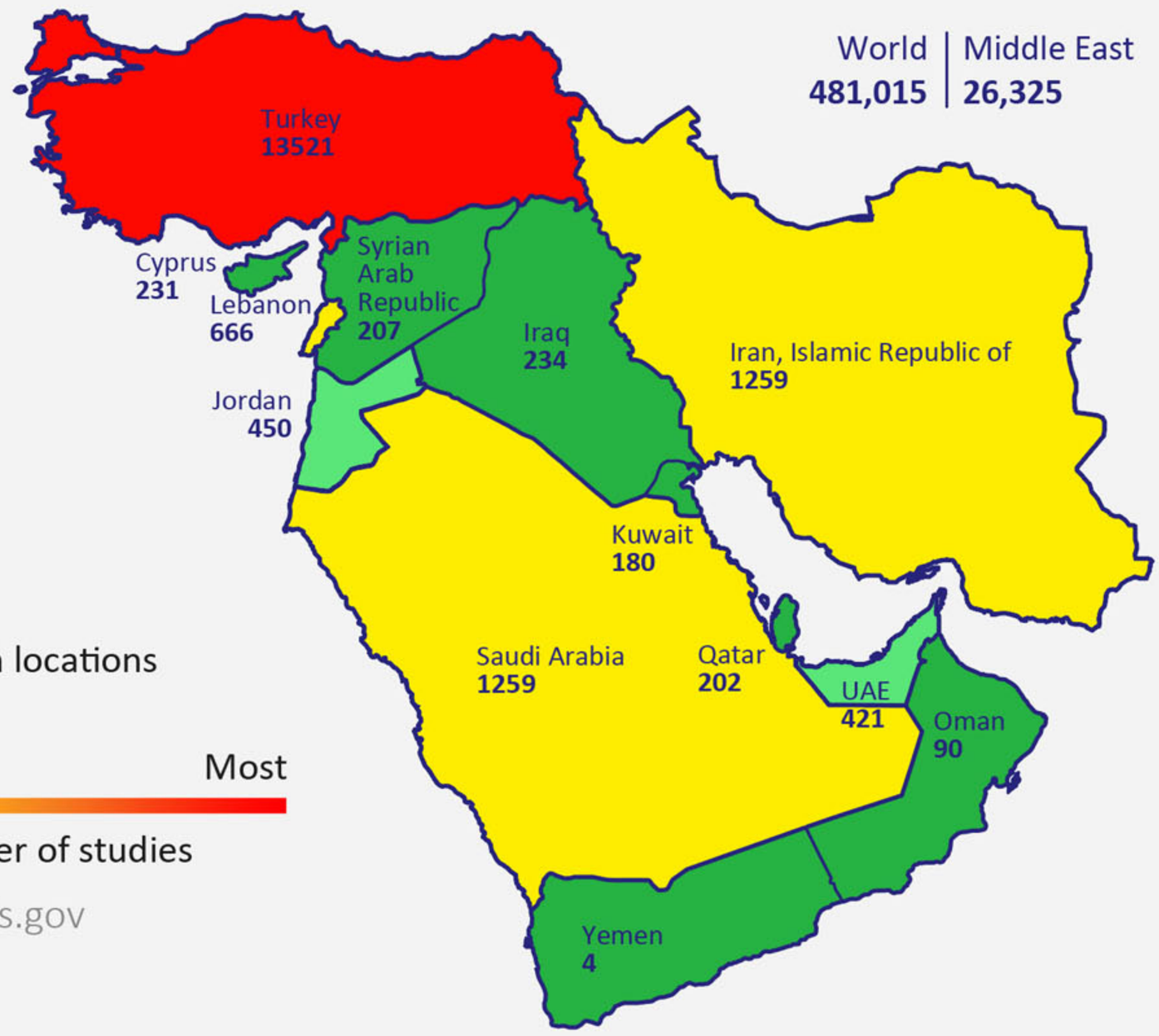
According to the statistics provided by the Vice Presidency for Science, Technology and Knowledge-Based Economy, Iran ranked 13th in the world in terms of the growth based on the production of science in this field and the first in the region.

Iran ranks 6th in producing gene therapy, cell therapy and tissue engineering products and is higher than China, India and Australia.

According to the latest statistics of the Stem Cell Research Center, 20 cell therapy centers active in the field of hematopoietic stem cell transplantation are currently active in the country, while the number of hematopoietic stem cell transplants has surpassed 1,300 per year.

In addition, 10 comprehensive centers for stem cells and regenerative medicine have been established in the country.

Among the other topics that have been taken into consideration in the study of the stem cell field is the increase in the number of knowledge-based companies, which are now more than 200 ones producing items and providing services in this field.



8 . Medicinal plants and traditional medicine

Due to the growing interest in the use of natural products in the pharmaceutical and food industries and global health issues, Iranian people, officials and industries are increasingly aware of the benefits of medicinal plants and the importance of integrating traditional medicine into the new health care system.

Iran has 8,000 medicinal plants and 450 species of plants with medicinal properties, and about 15-20 percent of Iranian herbal medicines are unique in the world.

Moreover, there is a rich legacy of traditional medicine with more than 14,000 reference books.

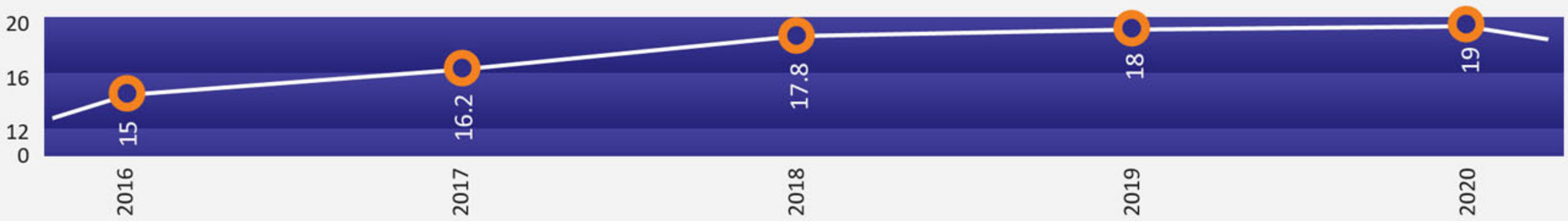
Since 2008, the Islamic Republic of Iran has been successful in increasing the number of active researchers in the field of medicinal plants and traditional medicine.

Accordingly, it should be said that there are more than 1,400 knowledge-based companies active in the field of health, of which 450 ones are active in the field of herbal medicines, biotechnology, and food industries.

The value of medicinal plants and herbal and traditional products exports in 2012 was about $350 million, which has reached more than $660 million in recent years.

The total value of exports minus saffron is also estimated at $370 million.

FAO (World Food and Agriculture Organization) has predicted that the volume of trade in medicinal plants will grow 100 times by 2050 and will incredibly reach $5,000 billion.



The global trend of increasing the consumption of medicinal plants

Iran's current situation in the field of medicinal plants and traditional medicine is as follows:

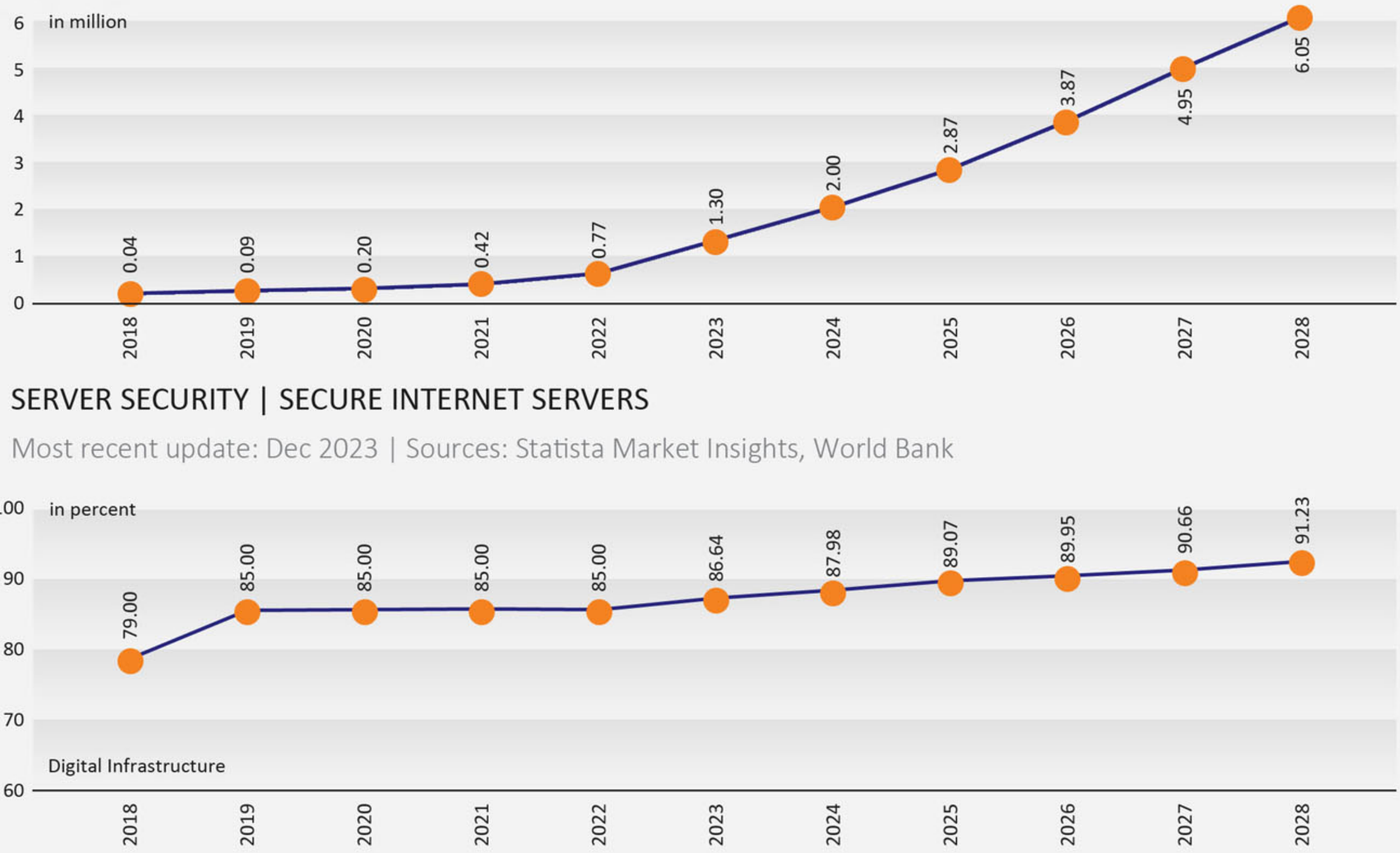
- Development of more than 100 knowledge-based companies in medicinal plants, herbal medicines, natural products and traditional medicines.
- Manufacturing and commercialization of more than 480 knowledge-based products with human and animal origin
- Development of more than 400 companies in the field of herbal medicines, natural products and traditional medicines.
- Issuing a license to produce natural medicinal products with human and animal origin up to 3400 cases;
- Production of about 3,800 research articles that have been published on the Scopus website.
- Improving Iran's scientific production ranking in medicinal plants to 15th;
- Increasing the number of faculties of medicine and traditional medicine to 8;
- Recruiting more than 100 faculty members in traditional medicine schools and accepting more than 500 students in various programs of traditional medicine and traditional pharmacy;
- Establishing more than 20 traditional medicine health and treatment centers by early 2016;

• Admission of more than 6,000 students in fields related to medicinal plants at all levels (bachelor's, master's, PhD).
• Improvement and development of the gene bank of native or endangered medicinal plant species and preservation of 1,400 plant species.
• Preparing an expert atlas of medicinal plants to record the benefits of plants and preserve plant species
• Identifying and recording information related to phytopathology and distribution of 2,300 plant species in the country
• Collecting 20 entrepreneurial packages for medicinal plants and natural products;
• Compilation of job standards including 134 job titles in 7 main sectors of the value chain.

5.8 . Information and communication technology

The following tables and pictures show the current state of information and communication technology in Iran and its comparison with neighboring countries.

networkreadinessindex.org/country/iran-islamic-republic-of

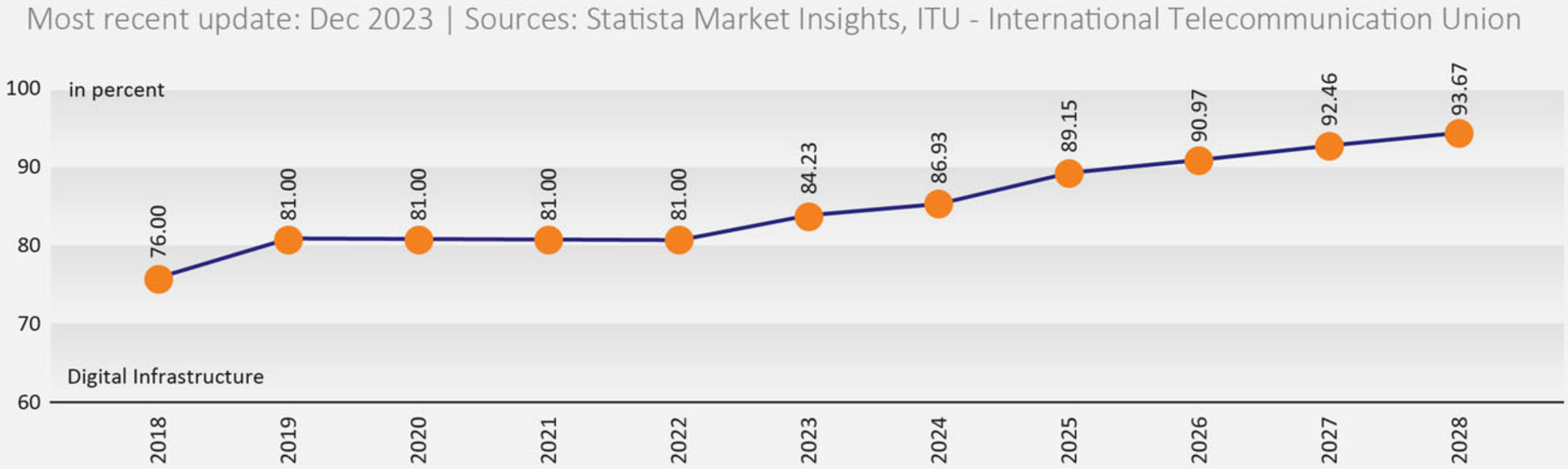


SERVER SECURITY | SECURE INTERNET SERVERS

Most recent update: Dec 2023 | Sources: Statista Market Insights, World Bank

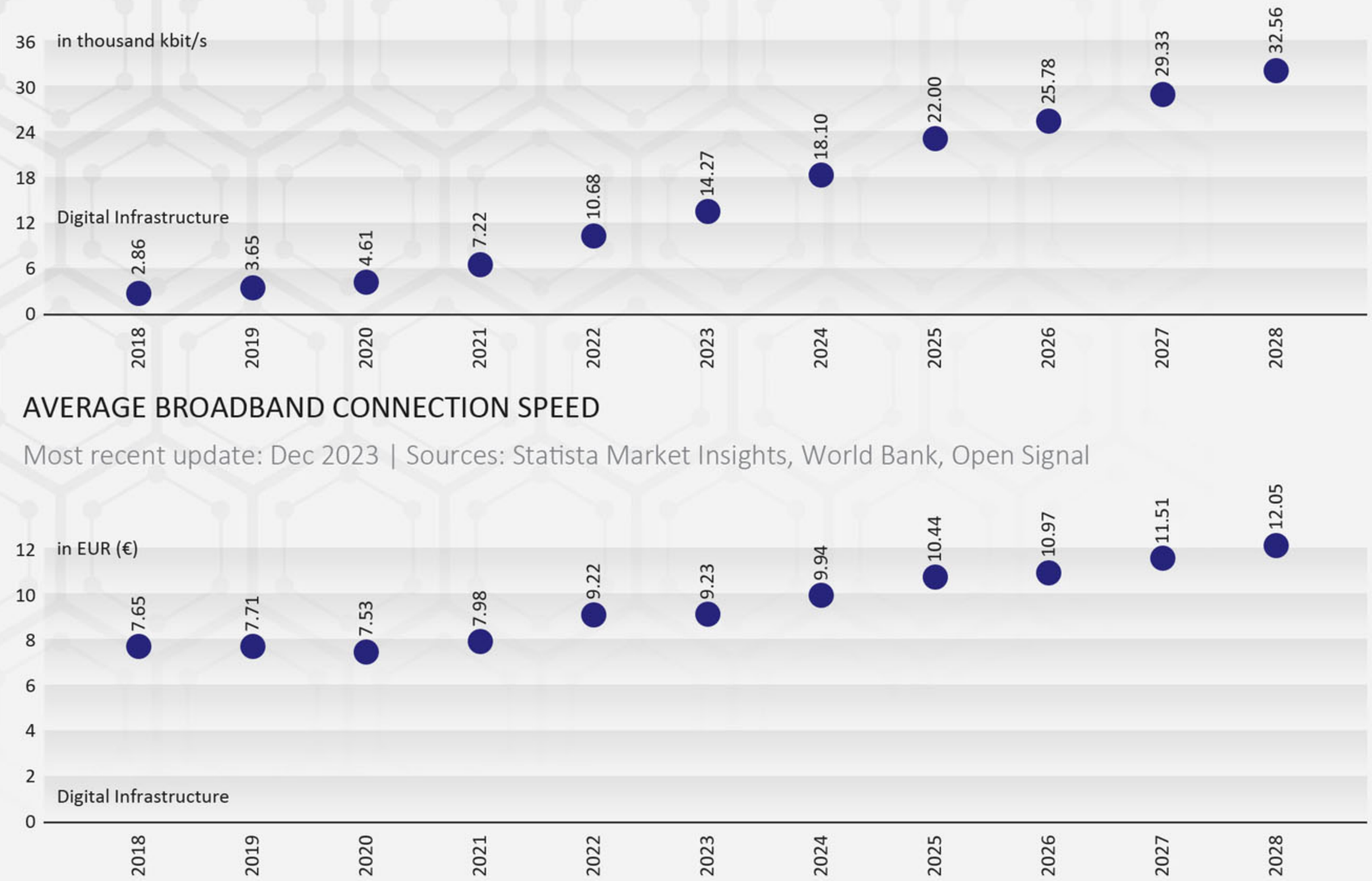
3G NETWORK COVERAGE

Most recent update: Dec 2023 | Sources: Statista Market Insights, ITU - International Telecommunication Union



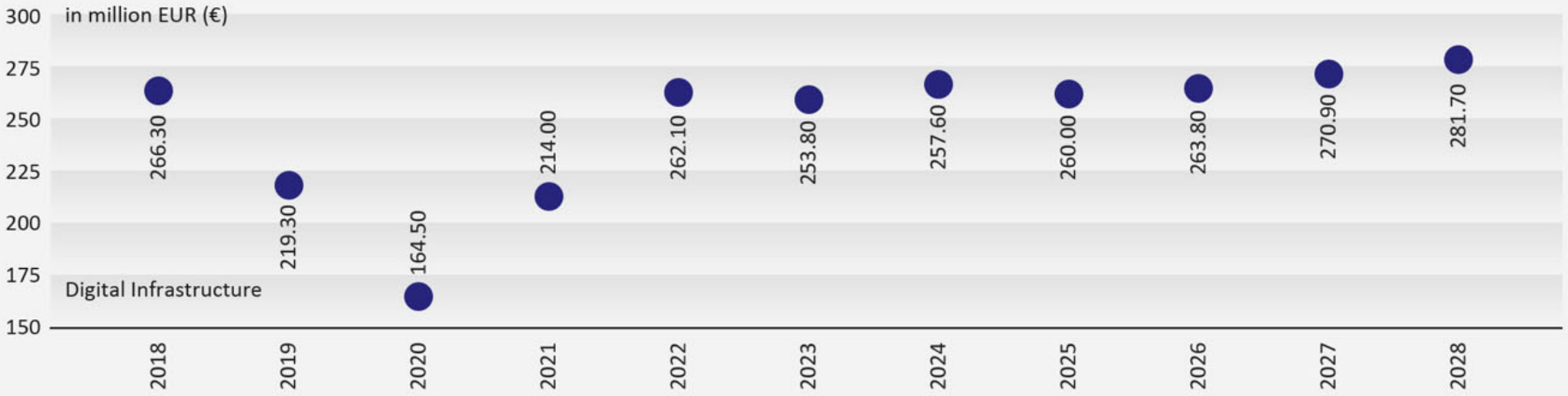
4G NETWORK COVERAGE

Most recent update: Dec 2023 | Sources: Statista Market Insights, ITU - International Telecommunication Union



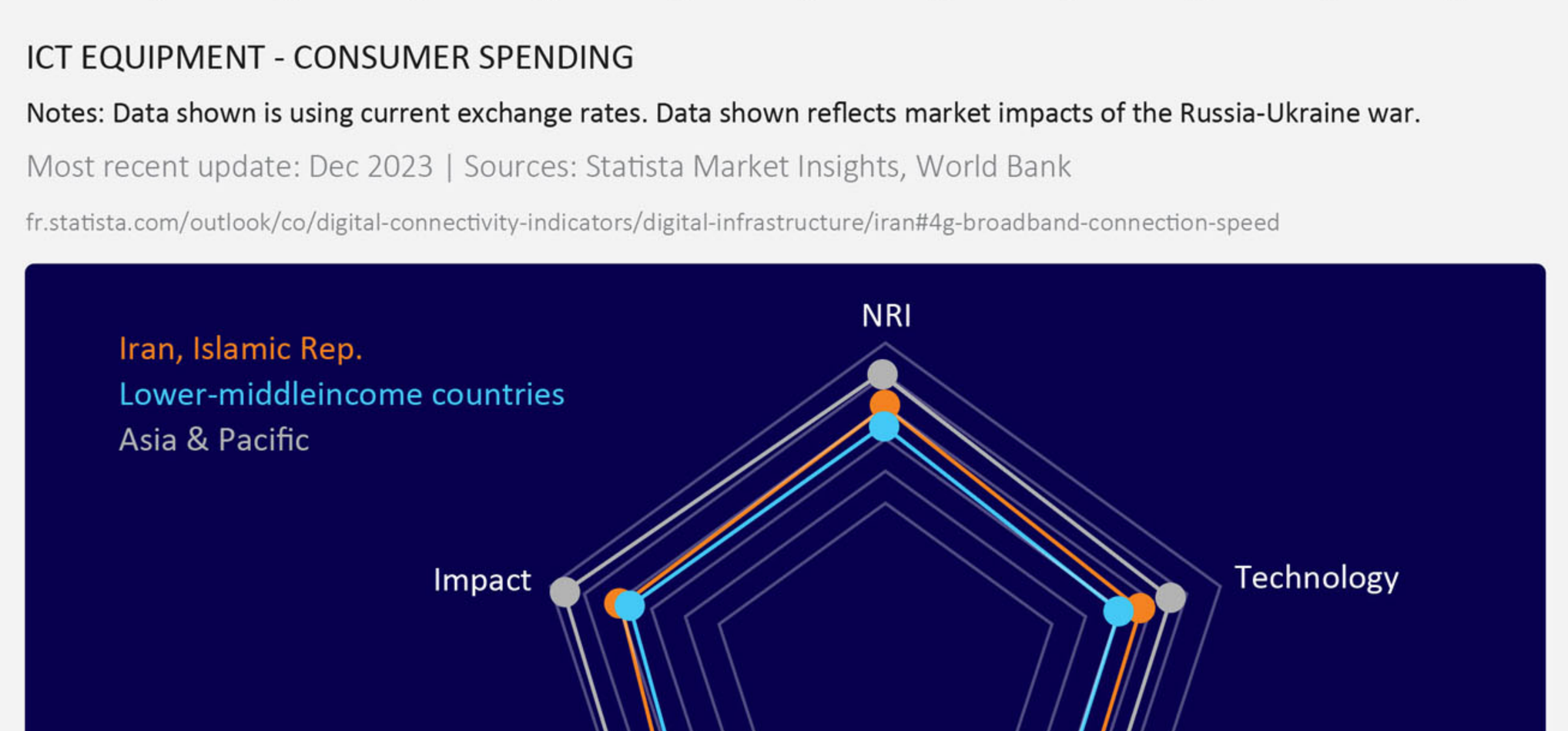
AVERAGE BROADBAND CONNECTION SPEED

Most recent update: Dec 2023 | Sources: Statista Market Insights, World Bank, Open Signal



ICT SERVICE EXPORTS - PER CAPITA

Most recent update: Dec 2023 | Sources: Statista Market Insights, World Bank, IMF

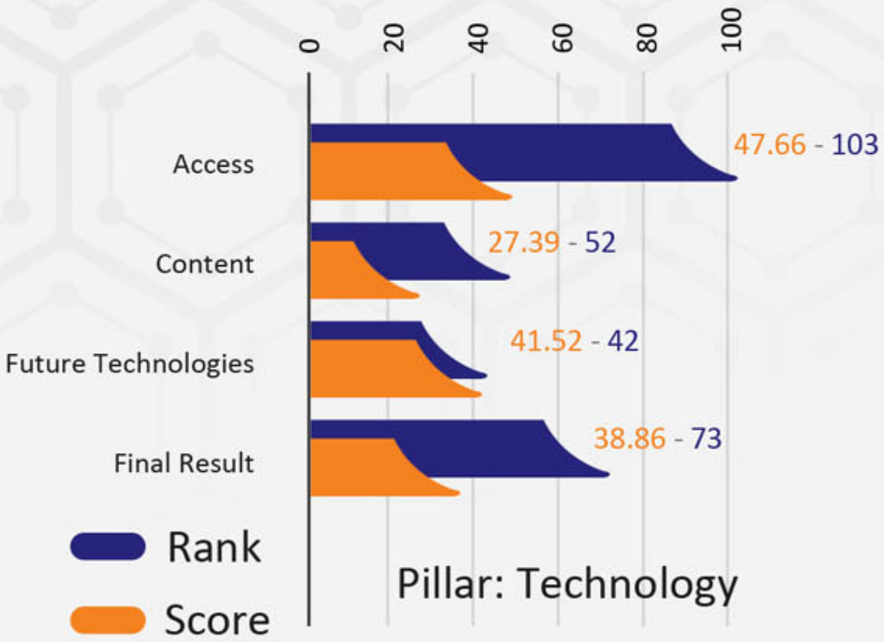


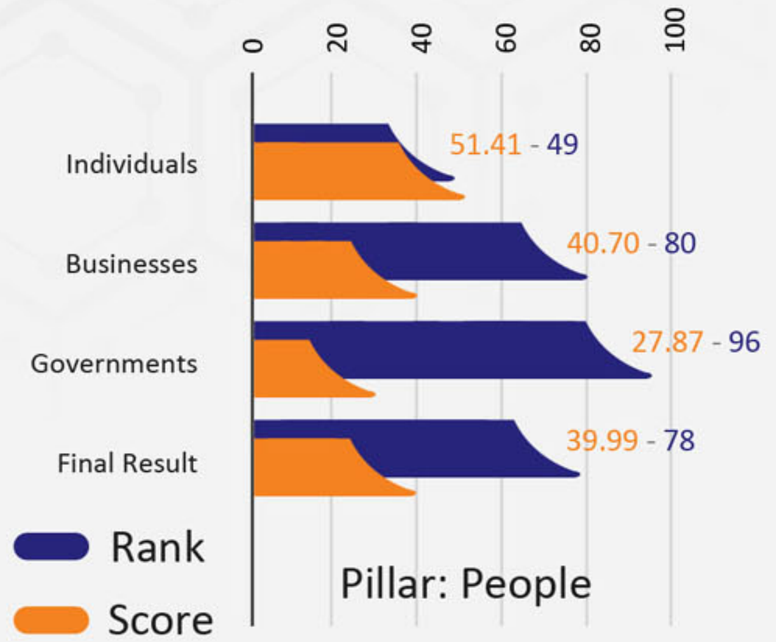
ICT EQUIPMENT - CONSUMER SPENDING

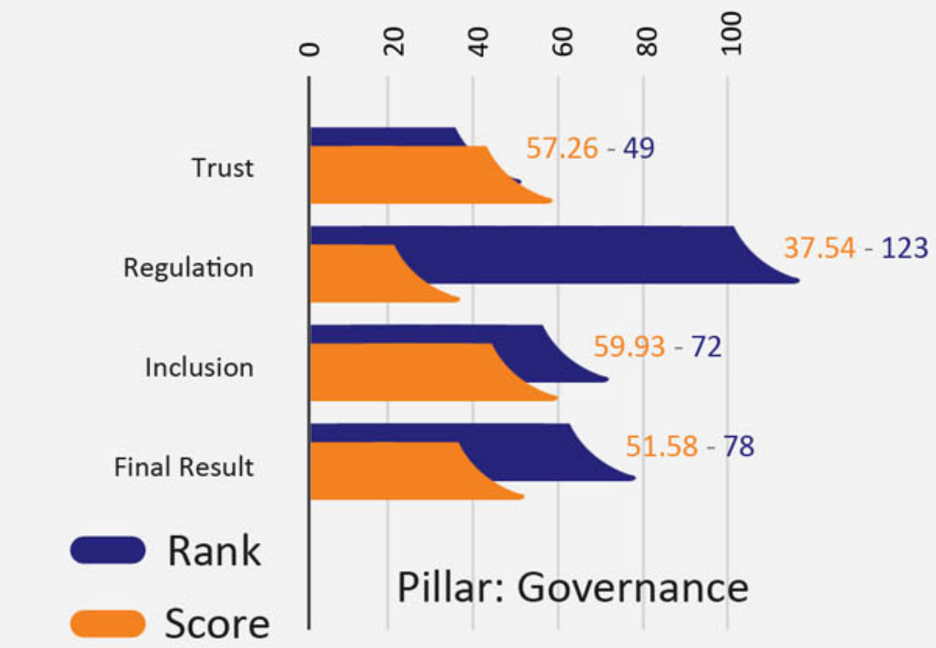
Notes: Data shown is using current exchange rates. Data shown reflects market impacts of the Russia-Ukraine war.

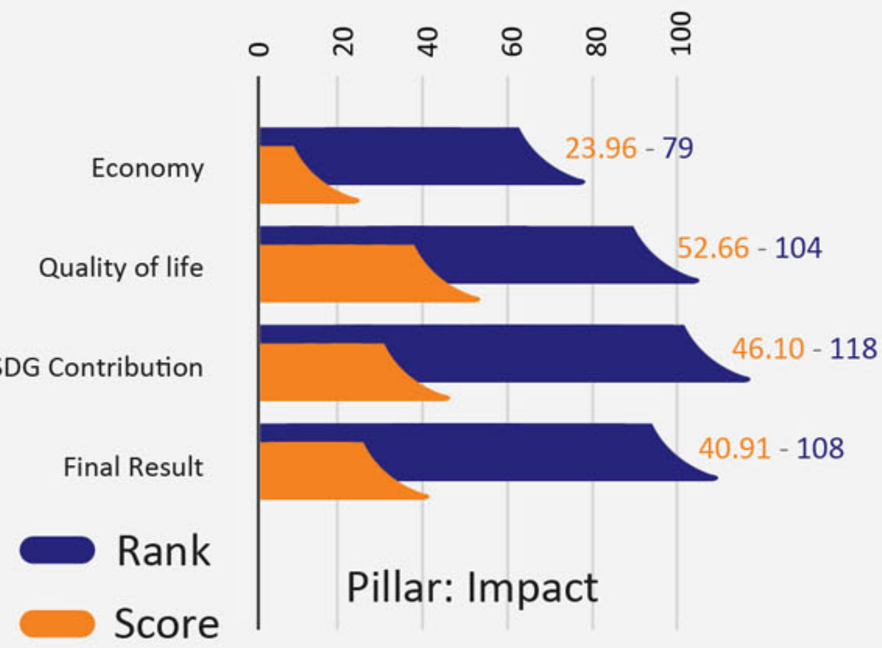
Most recent update: Dec 2023 | Sources: Statista Market Insights, World Bank

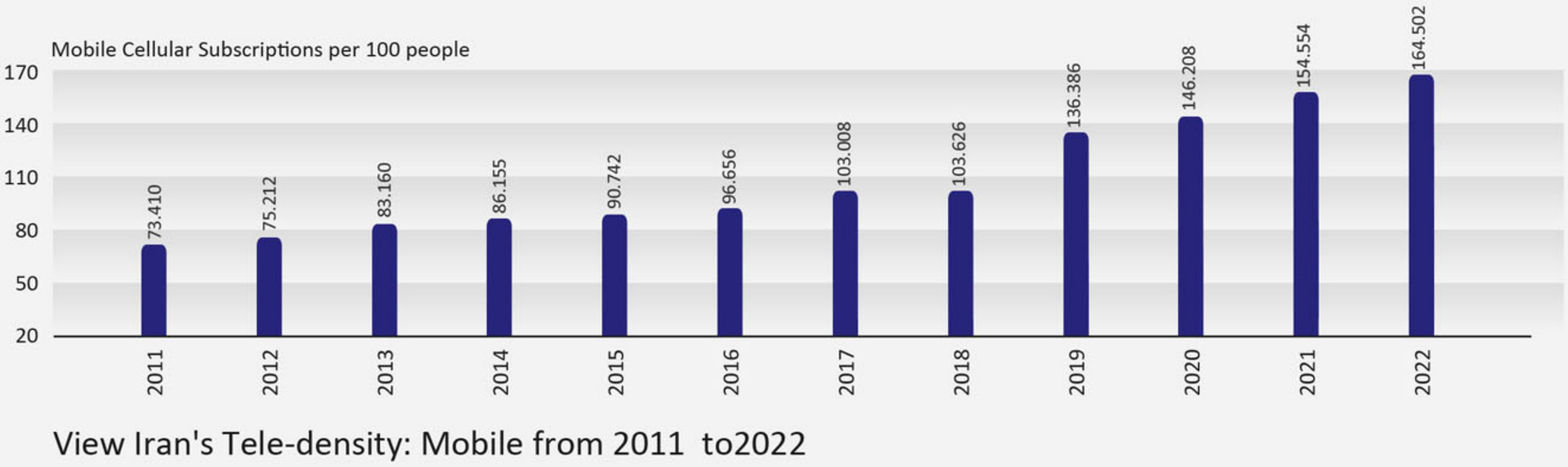
fr.statista.com/outlook/co/digital-connectivity-indicators/digital-infrastructure/iran#4g-broadband-connection-speed









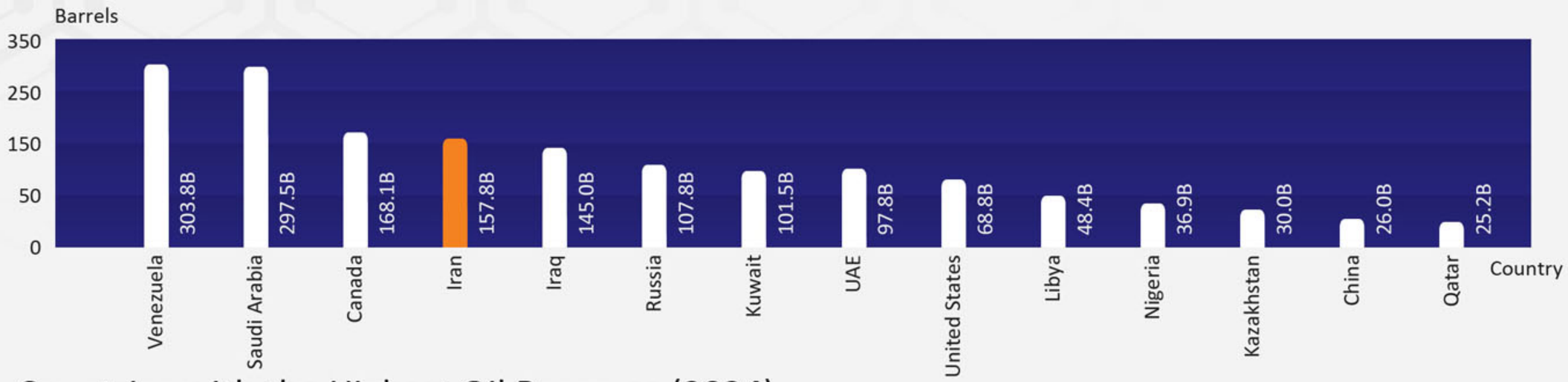


View Iran's Tele-density: Mobile from 2011 to2022

Source: ceicdata.com/en/indicator/iran/teledensity-mobile & World Bank

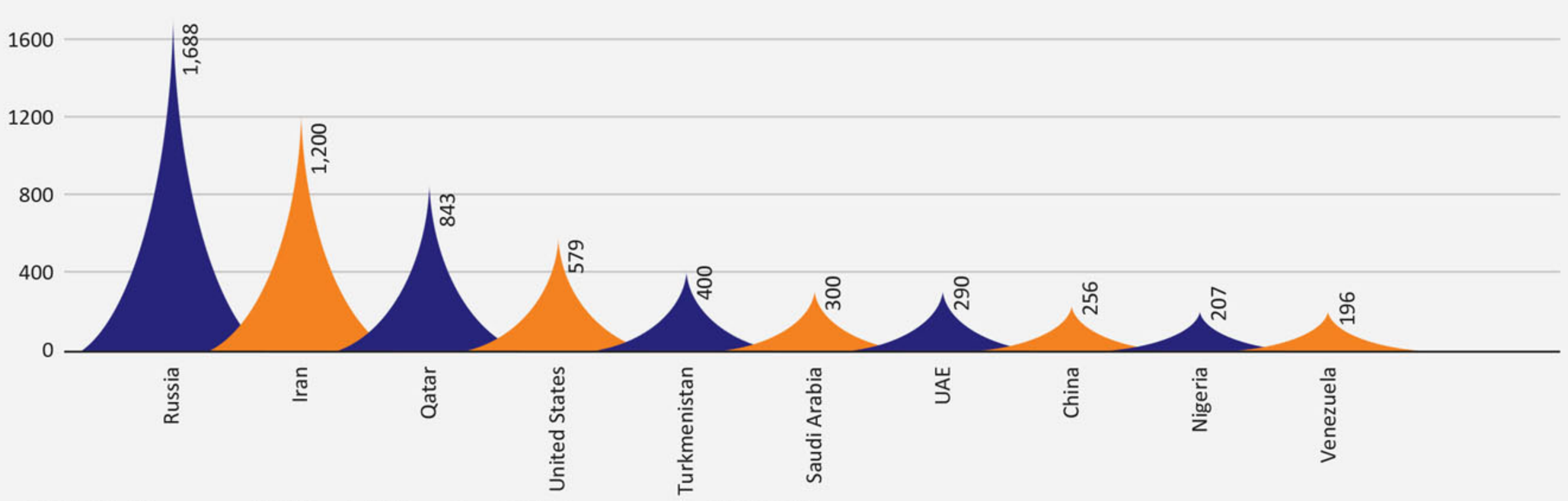
Oil and gas industry

The first oil field in Iran was discovered in Masjedsoleyman in the early 20th century.
Currently, Iran's discovered oil reserves are about 158 billion barrels.
On the other hand, Iran has a long history in the gas industry, which dates back to 1908 AD. In the beginning, there were many challenges in using natural gas.
However, with the spectacular technological advances and the experience gained over time, Iran is currently among the pioneering countries in the world in terms of natural gas production and reserves.
According to natural gas and oil reserves, Iran ranks 1st and 4th respectively. Iran's crude oil reserves are approximately 10% of the world's oil reserves, and with 1,200 trillion cubic meters of natural gas, it has the largest natural gas resource in the world after Russia.



Countries with the Highest Oil Reserves (2024)

Source: www.datapandas.org



OPEC Share of World Crude Oil Reserves (2022)

Source: OPEC Annual Statistical Bulletin 2023
www.worldometers.info/gas/gas-reserves-by-country

8 . Renewable energies

In recent years, Iran has been trying to reduce the use of fossil resources and replace them with clean and renewable energy sources. Therefore, according to its geography, there are many capabilities and capacities in this field, which are mentioned below.
Currently, 51 universities and research centers and 83 laboratories are working on renewable energy. The attractiveness of Iran's renewable energy capacity is undeniable and can be considered as a long-term investment opportunity.

• Hydropower

Hydropower plant appeared as an acceptable renewable alternative in Iran in the 50s. Unlike most Middle Eastern countries, Iran has a wide network of rivers that allow the country to rapidly increase the scale of hydropower capacity.

• Solar energy

Iran has a variety of climates and a lot of dry areas. Since the southern, northwestern and southeastern regions receive sunlight about 300 days a year, this country is in suitable conditions in terms of solar energy capacity.
The share of solar power plants at the beginning of 2023 was more than 450 MW, which accounted for 53% of the capacity of renewable power plants.

• Wind power

Despite the technical capacity of more than 100,000 megawatts, Iran can be placed next to developed countries such as France and England in terms of wind power capacity. Therefore, according to the country's topography and existing capabilities, the use of wind power is considered one of the most important priorities for the development of renewable energies. According to the laws approved by Iran's Sixth Development Plan, 5% of the total power needed by the country should be provided from renewable sources. It is expected that a significant share of this capacity will be obtained from wind farms across the country.

• Geothermal energy

Iran has started the construction of the first geothermal power plant in the Middle East. This pilot station will be built in the northwest of Ardabil province and is expected to produce 30 megawatts of electricity.
This project is being built as a pilot on a reservoir of geothermal energy with the capacity to produce about 250 megawatts of electricity.
While geothermal energy in Iran is in the early stages of development, it is still estimated that there is a significant capacity in this regard.
For example, a study by Stanford University researchers states that it is possible to develop the use of geothermal energy in Iran in 14 separate geographical areas (almost the entire country).
Currently, 51 universities and research centers and 83 laboratories are working on renewable energies.

پارک فناوری پردیس

بهشت فناوری منطقه

PARDIS

Technology Park

IRAN SILICON VALLEY

Paradise of Technology

Pardis Technology Park (PTP)

Introduction

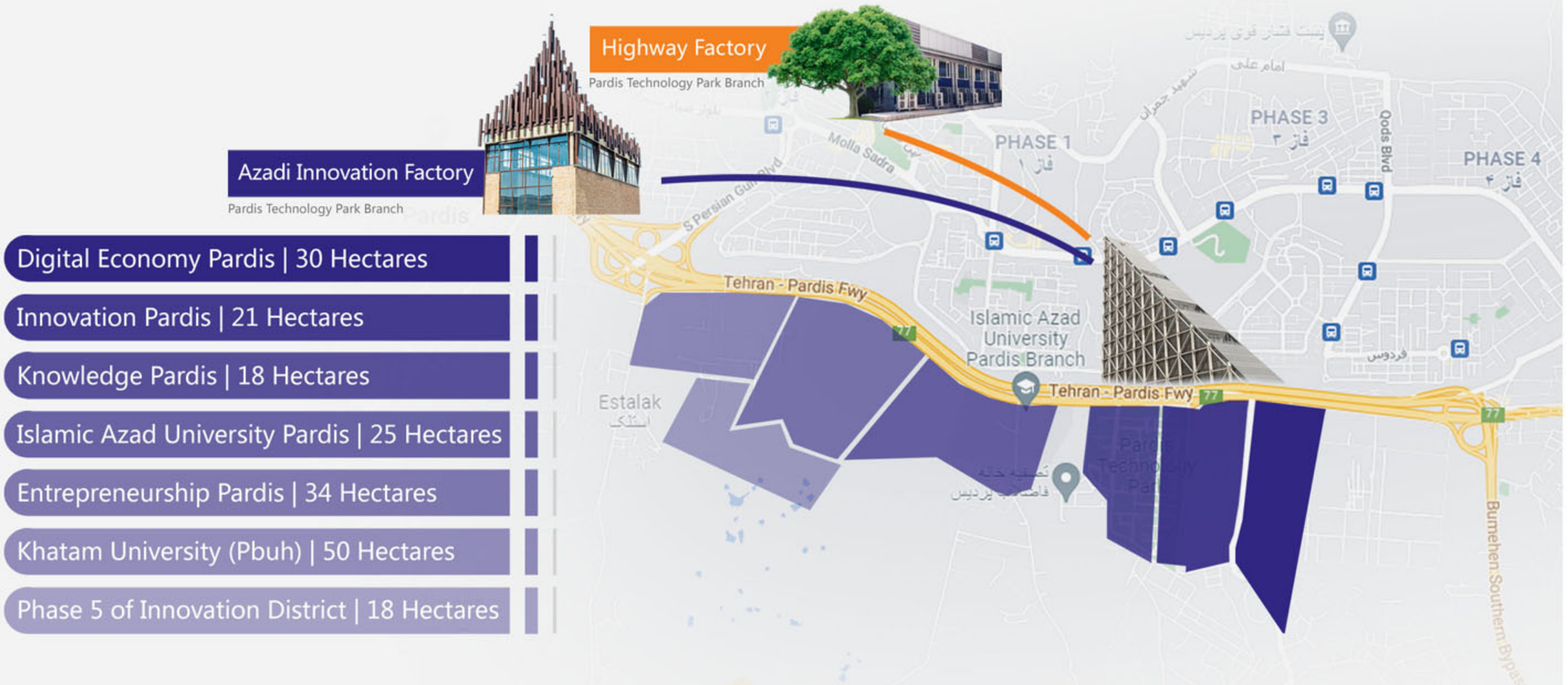
Pardis Innovation district as the propellant of Iran's economy and in line withreplacing oil resources by attracting foreign and domestic talents and experts by using the capabilities of technology and innovative companies, a platform for integration between the three pillars of innovation, industrial and residential zones. Created in the east of Tehran province.

Pardis with and area covering 4,150 hectares and 170,000 population is one of the best geographical locations for establishing innovation district in Iran. It can be connected to Islamic Azad University of Rudehen, Pardis Payame Noor University, Islamic Azad University of Pardis Innovation District, Bumehen Satellite Station and Institute for Cognitive Science Studies.

Firoozkooh Industrial Town, Khorramdasht Industrial Zone, Kamard Industrial Zone, Siah Sang Industrial Zone and Damavand Industrial Zone can also be connected to Pardis.

It is predicted that by 1403, in this area, 5,000 students, 20,000 active manpower, one thousand technology and knowledge-based companies, 100 Iranian specialists returned to the country, 120 million dollars of exports and 30 thousand billion tomans worth of sales.

Pardis Technology Park (PTP) as the main part of Pardis Innovation District (AOI) is under the supervision of the Vice Presidency for Science and Technology has an area of more than 145 hectares, located 20 km east of Tehran metropolis, which can be expanded to one thousand hectares in the near future.



Pardis Technology Park has now two branches in Tehran. The first branch of Azadi Innovation Factory with an area of 18,500 square meters and the second branch of Highway Innovation Factory with an area of about 5,000 square meters. Both of these were remote places that have been renovated with the cooperation of the private and public sectors.

This market has created the capacity of neighborliness for owners of idea, freelancers, entrepreneurs and experts in various fields and has paved the way for networking and services for applicants.

Creating the opportunity for maintaining synergy between startups, using experienced trainers' services, connection with the investor network, funds and investment, services

and facilities like cafes, training rooms and meetings, etc. are part of the support and benefits provided for the presence of startups in these factories.

Pardis Technology Park (PTP) is located in the heart of prestigious scientific, research and academic centers and creates access to expert staff. On the other hand, the proximity to the industrial towns of Khorramdasht and Firouzkooh, each of which has special privileges for production in industrial dimensions, provides a suitable environment for small and medium sized companies to be able to conduct their research in these towns and turning them to mass production.

Pardis Technology Park is located in 97 km of Imam Khomeini International Airport (IKIA) and is located near main corridors of north-south and East-West to Europe, Central Asia, ECO states, Persian Gulf and Commonwealth of Independent States (CIS).

Pardis Technology Park (PTP) is the most important technology park in Iran, built next to the north-south fiber optic network and is close to prestigious international research and academic institutions.

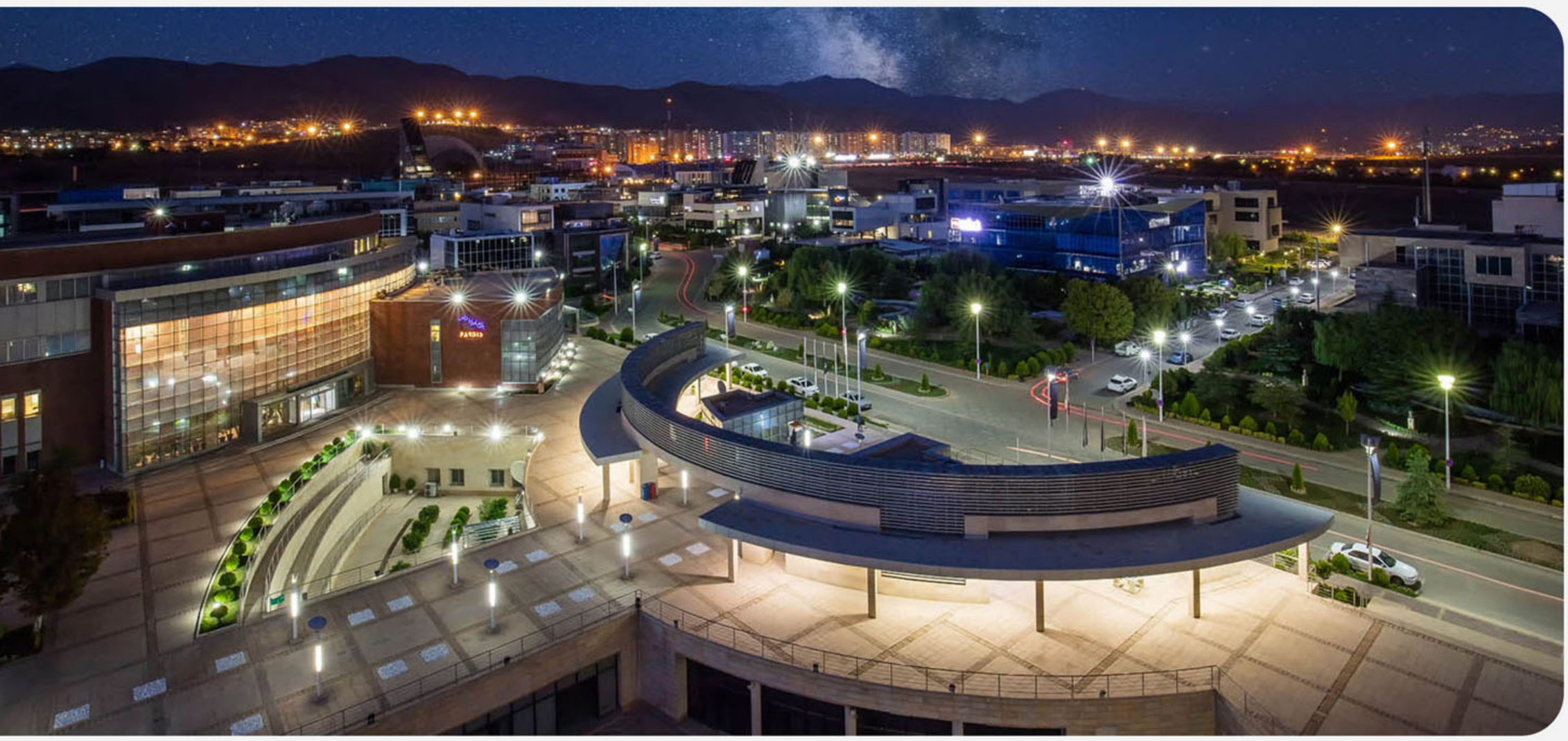
It creates a unique opportunity for commercializing researches and technology in Middle East countries, CIS and ECO states.

Pardis Technology Park (PTP) can pave the way for growth of knowledge-based and innovative companies by presenting high-level services, creating competitive atmosphere, incubators spinoff processes and expert staff.

Pardis Technology Park (PTP) as the most pioneering technology park in Iran is known for many prestigious domestic and foreign organizations.

It is governed by the board of trustees including 15 members. Based on the regulations of the head of the board of trustees is the first vice president and other members are from individuals and entities from various ministries, scientific and academic centers.

In order to become the main center for economic, research and scientific activities in the region and compared with other parks and research centers in the region, Pardis Technology Park (PTP) has more appropriate legal benefits and capacities to be able to use the existing conditions aiming to properly create suitable connection with global markets.



Pardis:

- **Location**

Pardis is located in the central part of Tehran. This city is located 17 km east of Tehran and on the outskirts of the Tehran-Abali region. The city covers about 1,540 hectares and it is built at an altitude of 1,800 meters above sea level. Pardis Technology Park is one of 11 phases Pardis.

- **Pardis Universities**

There are four universities near Pardis and about 30,000 students are studying in engineering, human sciences, health and medical fields. These universities include Payame Noor University, Islamic Azad University of Pardis, Islamic Azad University of Firuzkuh and Islamic Azad University of Rudehen.
About 600 faculty members including professors and assistant professors were working in these universities in 2019.

- **Vegetation**

Due to the fact that Pardis is located in a hot, dry climate, it is rarely covered with dense vegetation, and has currently7 hectares of green space.

- **Climate Features**

According to statistics, the coldest time of the year is in January with an average temperature of 4.4 ° C and the warmest temperature is in July with 32.7 ° C. With a relative humidity of 43%, it is a suitable weather condition compared to other areas in Iran.

The average annual rainfall is 386 mm, which is usually snowfall. The highest precipitation is in March with 59.6 mm and the lowest in July-September which is about 2.6-5.3 ml. The average number of rainy days is about 55 days a year. The highest humidity is in December-February with 72%-74% and the lowest in June to August with 40%-44.5%.

PTP Missions, Objectives and Prospects

Mission: Encouraging and supporting companies with advanced technologies to increase their ability to compete in global markets.

Prospects: Becoming the most important hub of technology in West Asia

Objectives:

- Promoting cooperation between industries, universities and research centers
- Commercializing knowledge and innovations
- Increasing Hi-Tech Companies competiveness power
- Attracting foreign investment on advanced technologies
- Accelerating process of transferring knowledge
- Paving the way for foreign resident elites' employment in the park

Foreign companies' establishment in Pardis Technology Park (PTP)

Foreign companies which are eager to establish themselves in Pardis Technology Park will be able not to follow the usual procedure of the Foreign Investment Organization (FIO) and use the process in PTP in this regard, described below:

For Priorities of establishment in Pardis Technology Park

Certainly this type of establishment is considered as one of the main priorities of Pardis Technology Park (PTP). In addition, PTP has provided many facilities for those companies that create a training center, such as various conference halls, laboratories, etc.

After-sales service for high-tech products (Hi-Tech)

Creating an after-sales service platform for high-tech products (Hi-Tech) in Pardis Technology Park (PTP) gives companies a better chance to enter the Iranian local and regional markets.

As soon as a company plans to provide such services, Pardis Technology Park (PTP) paves the way for the company to successfully join the Iranian market.

Different Establishments in Pardis Technology Park

1 . Elite Technology Incubator Center: A building for start-ups, college graduates, and entrepreneurs with specific ideas who lack sufficient funding or work experience.
Some of the services presented by Elite Technology incubator center for startups' growth are seen in the following figure:

Source: techelite.ir

2 . Multi-Tenant Building (MTB): A building for companies that have already started their activities, but due to limited access to financial resources or limited number of staff, do not need a very large space or a separate building.It includes spaces with office, laboratory facilities for the construction of prototypes, which will be transferred to the company after construction by the
government (under a leasing agreement).

3 . Land Plots: Those companies that have extensive and long-term experience in the field of advanced technologies and have their own laboratories, workshops and experts and have the ability to invest and develop their business activities should buy part of the lands and should start building Based on Pardis Technology Park (PTP) considerations and criteria.

In 2022, there are about 441 high-tech companies working in Pardis Technology Park (PTP), which have been selected from among over3,000 membership applications. The technology structure of the members in the first phase is seen in Figure 1:

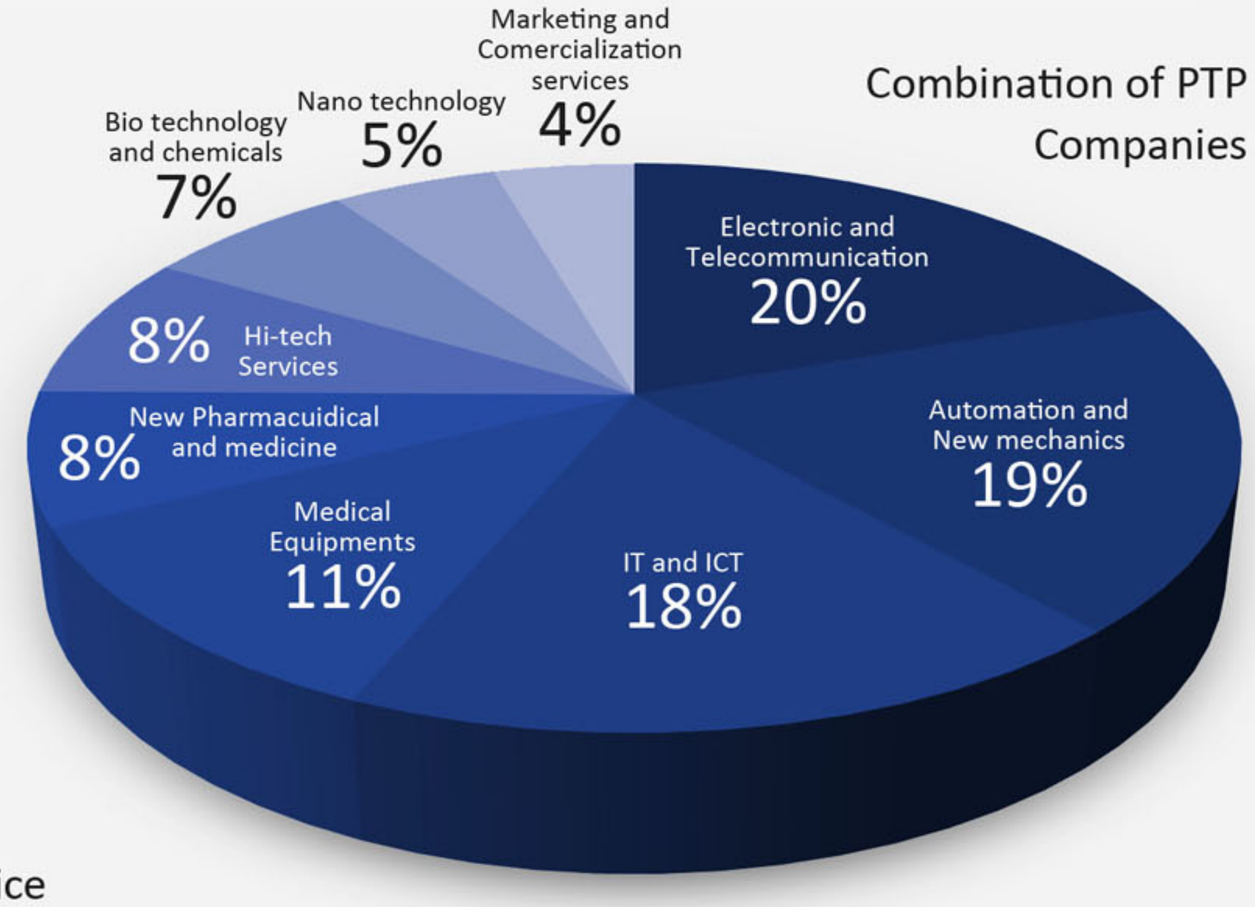


Figure 1- Reference:
Pardis Technology Park Administration office

Pardis Technology Park (PTP) in 2022-2023

4.5 Billion
in Affiliated Companies
In 2022 Turnover

+440
Member companies
Include:

- Land Plots Companies
- Members of Commercialization Center
- Members of Elite Technology Incubator Center

+3000
Membership request

Production and Exports
of **38 Products**
and Hi-Tech Services To
40 Countries

+16
Joint Venture

+2200
Hi-Tech Products

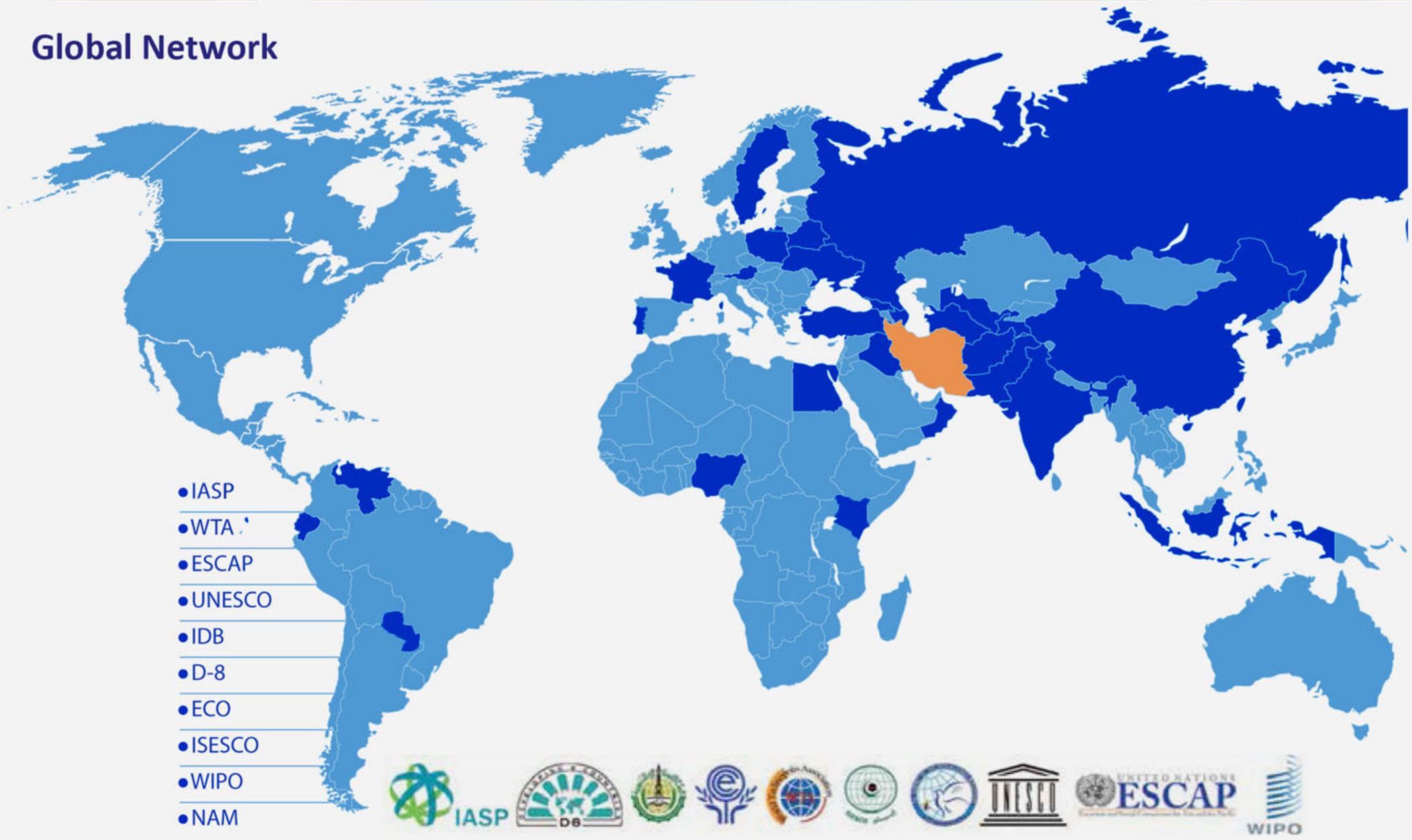
+8000
Employed Experts

50
50 Board of Directors from Universities

By 2022, The Government Has Invested About **$150Million** In Pardis Technology Park. The Private Sector Has So Far Invested About **$3.5Billion** In PTP.
(More Than 23 Times the Government.)

30%
Managing Directors of The Affiliated Companies and Professors

Global Network



Pardis Technology Park (PTP) International Network

The success of technology parks and their companies is intertwined with their cooperation and participation, especially in the international arena. So, geographical borders are gradually disappearing. Pardis Technology Park is one of the top organizations in Iran that is a member of the following associations:

- International Association of Science Parks (IASP)
- World Techno Polis Association

There are also international organizations with which Pardis Technology Park (PTP) has defined joint projects in various fields of technology, such as:

- UNESCO
- D-8 Organization for Economic Cooperation
- World Intellectual Property Organization (WIPO)
- UNICEF

Mustafa Prize:

The Mustafa Prize is a top science and technology award granted to the top researchers and scientists of the Islamic World biennially.
It is is awarded in four categories:

- Life and Medical Science and Technology
- Nanoscience and Nanotechnology
- Information and Communication Science and Technology
- All areas of science and technology

The laureates in each fields will be awarded USD 500,000/- which is financed through the endowments made to the Prize.
The laureates will also be adorned with a special medal and certificate.

1 . International Innovation & Technology Exhibition (INOTEX)

Progress in science and technology and reinforcing knowledge-based economy are among the most important objectives of developing and developed countries.

INOTEX is held annually in Iran aiming to showcase the latest innovations and achievements in technology from all over the world and developing their market.

It is the most important exhibition in the field of high-tech products in Iran, so that many domestic and foreign companies have participated in various exhibitions recently, and so far several agreements and MoUs of cooperation in various fields have been signed.

website: www.inotex.com

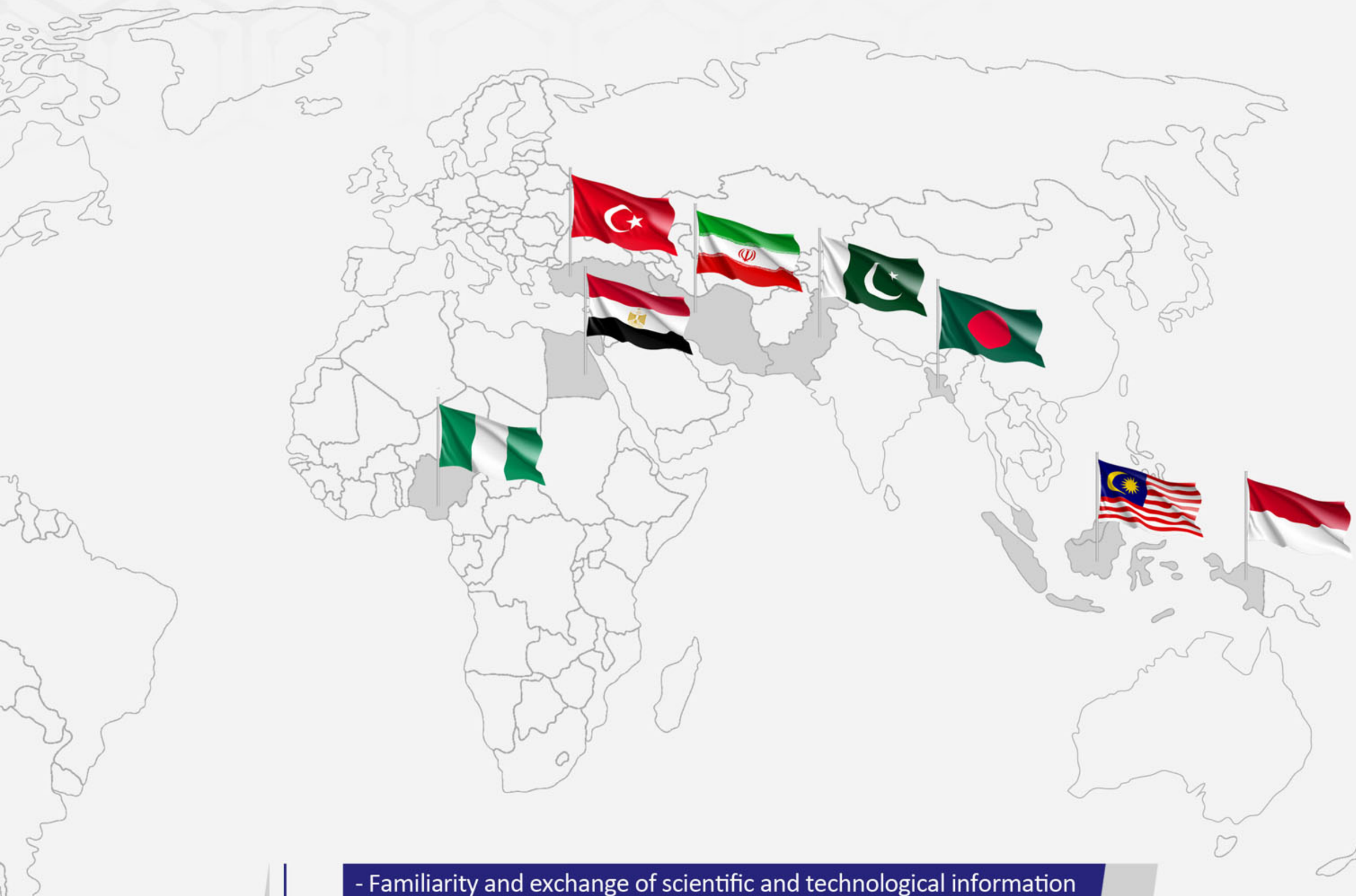
INOTEX2023 achievements in a glance:

D-8 Technology Transfer & Exchange Network (D-8TTEN)

TTEN has been designed aiming to facilitate and accelerate access to information technology of D8 member states and cooperation based on web portal as infrastructures of this network.

Based on the approvals of the D8 3rd conference of member countries and Iran's special mission to create the portal, this platform as TTEN virtual secretariat was created by Iran's Technomartas a representative of Pardis Technology Park, for 6 months. (www.d8tten.org)

website: www.d8tten.org



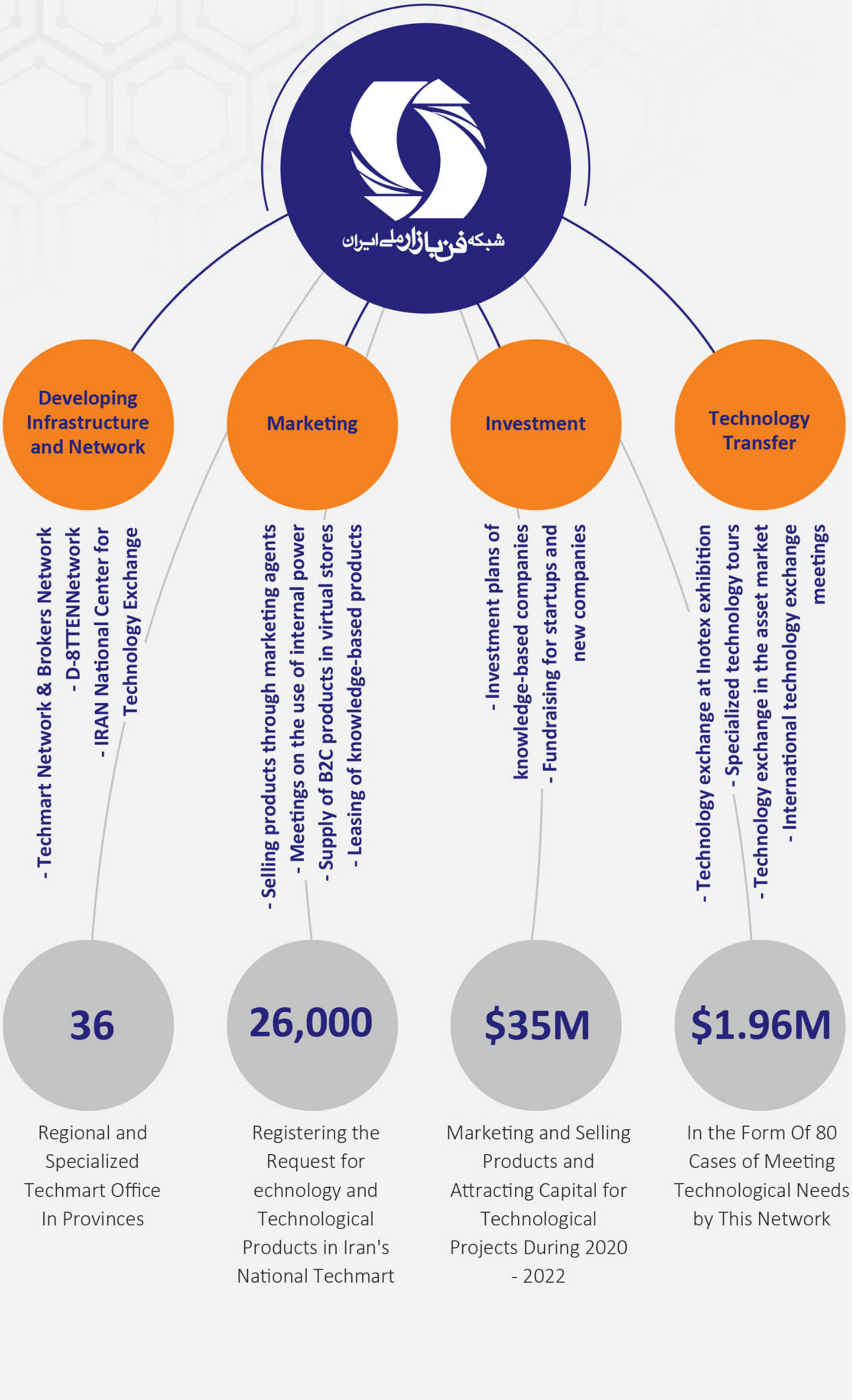
Objectives

- Familiarity and exchange of scientific and technological information between member states
- Possibility of defining joint scientific and technology projects
- Possibility of using experiences and commercialization model of technology in member states.
- Helping solve technical and industrial needs of member states.

The National Center for Technology Exchange (Technomart)

The National Center for Technology Exchange (Technomart) in Pardis Technology Park has been operating since 2004 aiming to implement the basics of technology development and transfer throughout the country and has now become the largest national technology database.

Technomart activities are classified into four categories:



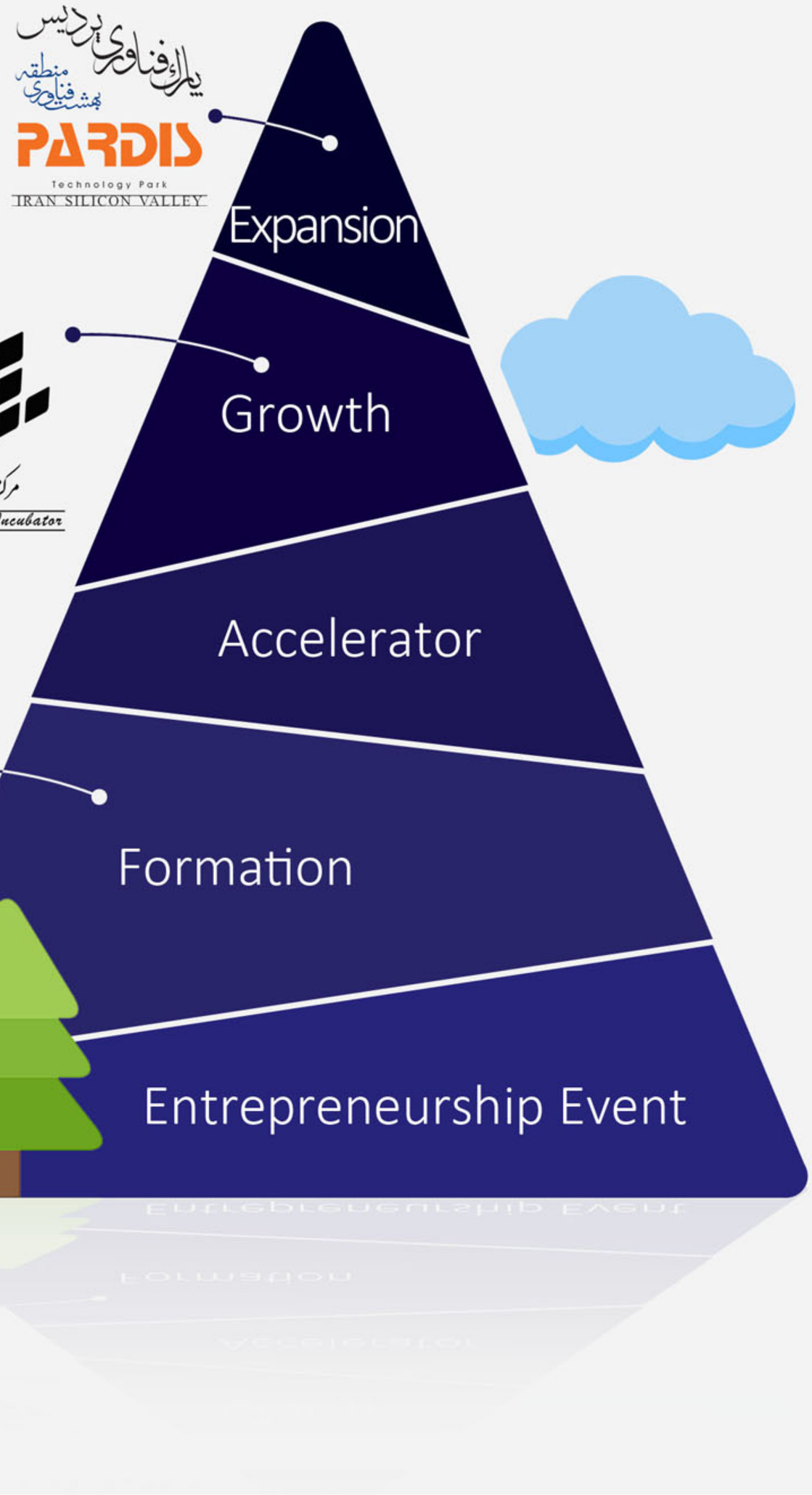
Innovation Acceleration Center

Innovation Acceleration Center was established to support entrepreneurship in technology and innovation, implementation of entrepreneurship events Iran and the development of entrepreneurial culture among the young generation and university students, in 2014 and under the support of the Vice Presidency for Science and Technology.

Innovation Acceleration Center pave the way for startups growth by linking private sector with government, by taking advantage of co-working atmospheres and by active accelerators and enables them to produce their services in a suitable situation.

Accordingly, Innovation Acceleration Center holds Pardis Summit annually aiming to create network and synergy between active elements in technology and innovation ecosystem.

مرکز شتابدهی نوآوری



Available Professional Services in Pardis Technology Park

Pardis Technology Park (PTP) presents the following services for facilitating investment process for national and international investors in technology, innovation and indigenizing technology in Iran.

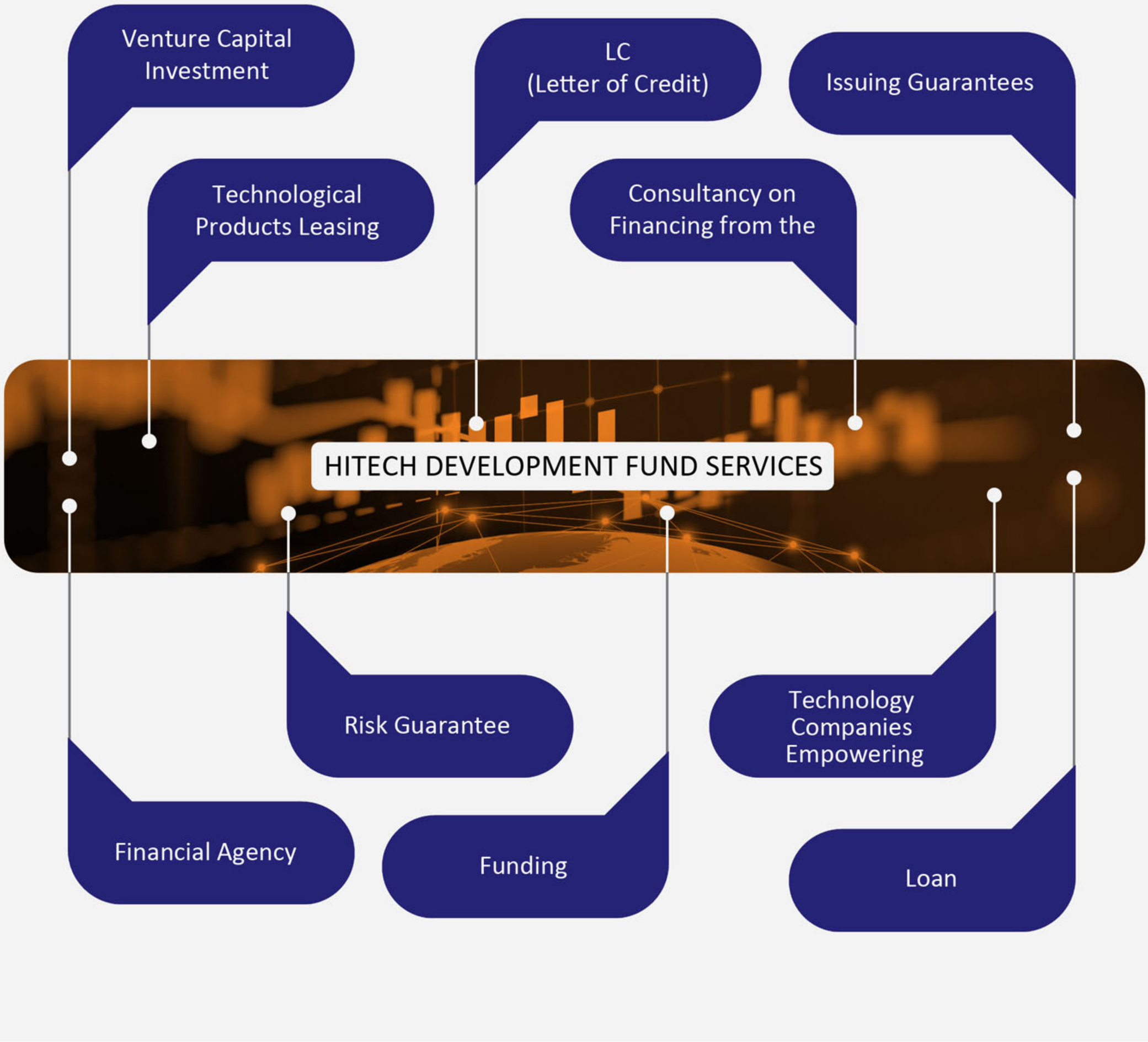
Technology Business Development Center

Services & Incentives

- Conducting Business Plans & Feasibility Studies
- Technology & Business Services
- Hi-Tech Development Fund
- Clearance & Customs Services
- Empowerment
- Validation, Evaluation & Solution Assessments
- Joint Exhibitions Technology Tours
- Attendance in Exhibition
- Facilitation for Using Seminar Halls
- Facilitation for Producing Prototypes
- Legal & IP Services
- Marketing & Market Researches
- Technology Evaluation Services
- Technology Transfer
- Insurance
- Expert Recruitment
- Training Courses
- Technology Tours
- Accounting & Financial Services
- Consultancy in Trade & Export

1 . Financing Services and Attracting Investment:

The fund is currently established at Pardis Technology Park (PTP) aiming to provide services to companies such as investment, civil partnership, rental product, banking guarantees, partnership, loans and various services.



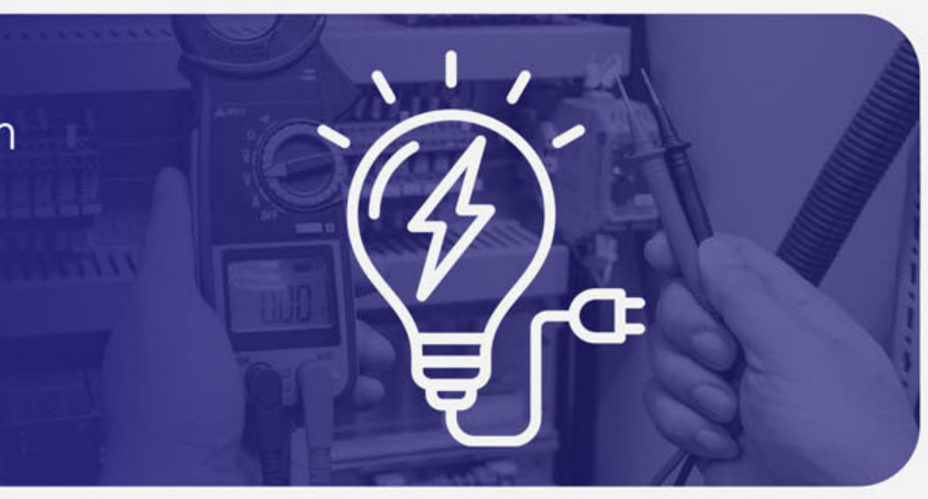
Pardis Technology Park (PTP) Infrastructures

Installation Tunnel

One of the most special and successful construction projects in Pardis Technology Park is the facility tunnel, which with a length of more than **5500 meters**, houses all water, electricity, telephone, gas, sewage pipelines and internet lines. The advanced intelligent control system of this tunnel will both boost its security and has helped reduce energy costs.

Electricity

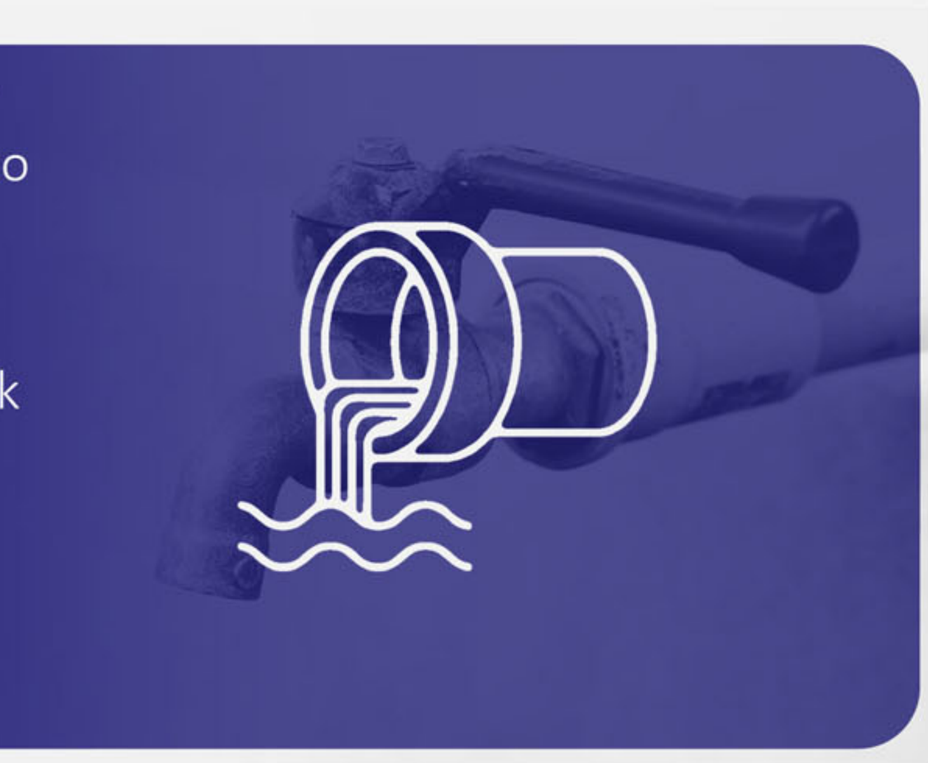
63 kV ground substations in Pardis Technology Park and supplying about **80-MVA** of electricity in phases one and two to meet the affiliated companies' needs and its distribution through thirty, **20-kV** ground substations between companies.



Water & Sewerage Pipelines

The **5,600-meter water supply network** and the **5,400-meter sewerage network** are connected to the relevant urban networks through the facility tunnel.

It is worth noting that there is a separate network for drinking water consumption and another network for non-drinking purposes such as watering vegetation and firefighting in public areas.



Gas

Pardis Technology Park gas is fed through the **250-pound** Boomehen line, which is **4,250 meters long**, and enters the park through the 10,000 station, 250-60.

Telecommunication

Pardis Technology Park Telecommunication Center has the capacity of **10,000 telephone lines** and all telecommunication services in the field of copper wire and fiber optic cable can be assigned based on the regulations of these centers.

General Facilities

Medical Clinic

kindergarten

Sports Courts

Sport Complex

Stationery

Taxi Services

Goverment Services Counter

Melli Bank

Butchery

Mosque

Bakery

Castoms & Trade Services

Refah Chain Store

Travel Agency

Coffee Shop

Barber Shop

Dana Insurance

IP & Legal Services

Electrical Services

Carwash & Car Services

Ayandeh, Pasargad & Resalat Bank ATMs

- Hotel
Pardis Hotel is located in Pardis Technology Park in a unique place, between knowledge-based companies, and is built on three floors with 27 suites.
Email:info@pardis-hotel.ir | Website: pardis-hotel.ir

Scooter Rack

Hotel (Cafe, Laundry, Pool)

Restaurant

Resalat Bank

Saderat Bank

Intrest-free Loan Fund

Gym Club

Exchange Office

Postbank

Special Incentives and Deregulation in Pardis Technology Park (PTP)

• Tax Exemption For 20 Years (Since Its Establishment)

The exemption is imposed on incomes, contracts and salaries of staff PTP affiliatedcompanies are now required to pay Value-Added Tax (VAT) to carry out their projects outside the Technology Park.
If the affiliated companies sign a contract with each other for the implementation of a project (the employer and the contractor are both members of the park), both of them are also exempted from paying VAT.

• Flexible Labor Laws

The labor law in the Pardis Technology Park (PTP) are in accordance with the Free Trade Zone (FTZ) regulations.

• Customs Exemption for Import of Machinery and Equipment.

• Flexible Rules for Foreign Investment

Foreign companies in Iran can own 49% of a company's share, as well as 49% of their staff can be foreigner, while, they own 100% of a company, its land and the building in which they have made, are and can receive a deed.
Also, unlike other parts of Iran, their employees can be 100% foreigner.

• Better Access to Public Auctions and Tenders

Knowledge-based companies in Iran enjoy 30% more concessionsfor participating in tenders and auctions.
It means that their final score is multiplied by 1.3, while by attending the technology park and thanks to the technology license issued for the company, they benefit from a 50% higher coefficient, which means a 50% higher chance in tenders only by attending the technology park which is an important and fundamental advantage.

• Land Costs Here Are Much Cheaper Than in Tehran

• Electricity Consumption Research Tariff for Companies

The electricity consumption tariff is considered as for researchfor all companies in the park, and as a result, the cost of electricity consumption has decreased by about 60% from normal conditions outside the park, which is very important. So, technology park should technology permission.

ABBREVIATIONS:

ACRONYM	*MEANING*	*ACRONYM*	*MEANING*
AOI	Area of Innovation	JV	Joint Venture
CIS	The Commonwealth of Independent States	LAPFI	Attraction and Protection of Foreign Investment
D-8	8 Developing Countries	MENA	Middle East & North Africa
D8- TTEN	D8 Technology Transfer and Exchange Network	MoU	Memorandum of Understanding
ECO	Economic Cooperation Organization	MPIEF	Mustafa Prize Investment and Endowment Fund
FDI	Foreign Direct Investment	NAM-STC	NAM Science and Technology Centre
FIO	Foreign Investment Organization	OIETAI	Organizationfor Investment, Economic andTechnical Assistance of Iran
FIPPA	Foreign Investment Promotion and Protection Act	PTP	Pardis Technology Park
FTZ	Free Trade Zone	PTPILT	PTP Investment and Localization of Technology
GII	Global Innovation Index	S & T	Science & Technology
GNI	Gross National Income	STP	Science &Technology Park
HDI	Human Development Index	UNDP	United Nations Development Program
IKIA	Imam Khomeini Int'l Airport	UNESCO	Un Educational, Scientific & Cultural Organization
IASP	International Association of Science Parks	UNICEF	United Nations Children Fund
IDB	Islamic Development Bank	VAT	Value-Added Tax
INOTEX	International Innovation and Technology Exhibition	WIPO	World Intellectual Property Organization
ISESCO	Islamic Educational, Scientific and Cultural Organization	WTA	World Technopolis Association

Pardis Technology Park

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