DIGITAL & SPACE SUSTAINABILITY

ANNUAL REPORT IN SAUDI ARABIA

هيئة الاتصالات والفضاء والتقنية
Communications, Space & Technology Commission

وزارة الاتصالات وتقنية المعلومات
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

ITU

2024

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OPENING REMARKS

H.E.Abdullah Al-swaha

Minister of Communications and Information Technology

"The Kingdom of Saudi Arabia is committed to harnessing technology, innovation, and science to empower people, safeguard the planet and shape new frontiers for all. We believe in the pivotal role of green technologies and sustainability efforts to achieve prosperity across all economic sectors. Today, the Kingdom is leading initiatives that transcend borders to help countries adopt the most effective solutions to shape a more sustainable future for all."

Doreen Bogdan-Martin

ITU Secretary-General

"Digital and space sustainability are pillars of humanity's shared future. This report reflects Saudi Arabia's commitment to this endeavor, highlighting the urgent need to harness digital and emerging technologies responsibly to accelerate progress on the Sustainable Development Goals for people and planet."

FOREWORD

H.E. DR.
MOHAMMED AL-TAMIMI
GOVERNOR OF COMMUNICATIONS,
SPACE & TECHNOLOGY COMMISSION

In this 2024 edition of the Annual Report on Digital and Space Sustainability in Saudi Arabia, we uncover a complex web of interconnected topics, each significant in our quest for a more sustainable future. At the heart of this narrative lies the transformative power of digital technologies and Space exploration, both driving economic, social, and environmental progress. According to the International Telecommunication Union (ITU), more than two-thirds of the UN's sustainable development targets can directly benefit from digital technologies. Addressing e-waste is of utmost importance in the realm of digital sustainability, CST launched the "Recycle Your Device" initiative to confront the growing challenge of e-waste while promoting a circular economy mindset. By reimagining the lifecycle of over 100,000 electronic devices, we not only mitigate environmental harm but also pave the way for a more resource-efficient future. Furthermore, we are collaborating with the ITU to develop circular economy regulations in three countries, aiming to transform bigger-picture challenges into opportunities.

CST dedication extends beyond national boundaries. Our involvement in the Space economy demonstrates a broader commitment to sustainability. This is evidenced by initiatives like pioneering research aboard the International Space Station (ISS) in health and science with the first Saudi and Muslim Arab female astronaut. Simultaneously, we inspire the next generation of STEM innovators and set ambitious environmental objectives, steering towards a more sustainable future both on Earth and in Space. We explore emerging green technologies to foster growth and sustainability, securing the future of the global Space economy.

As we navigate the complex intersection of digital, Space exploration, and sustainability, one truth remains clear: our mission is entrenched in sustainable development. The most impactful technologies developed by the global community are meant for everyone. However, even after 20 years, with only 12% of sustainable development goals achieved and more than 2.6 billion people still lack internet access, making our action imperative.

Our commitment is further encapsulated in the "C.I.R.C.L.E.S" framework, which translates into Cutting-Edge Infrastructure, Innovation, Renewable Energy, Reduction of Carbon Footprint, Circular Economy, Leapfrog in Digitalization, Equality & Inclusion, and Standards & Strategic Guidance. With a view to the UN SDGs, we are also exploring a range of emerging technologies such as High-Altitude Platform Systems (HAPS) and Non-Terrestrial Networks (NTN), which leverage Space for digital transformation and will go a long way towards connecting people worldwide who are still without internet access.

Our actions today shape tomorrow's landscape. Through strategic partnerships, innovative solutions, and unwavering commitment, we embark on a journey towards a more inclusive and sustainable future, guided by principles of environmental stewardship and societal progress.

ABOUT
THIS REPORT

This report stands as a landmark reference for sustainability in the digital and Space sectors in Saudi Arabia. Now in its third edition, it aims to educate readers on the multifaceted nature of sustainability—environmental, social, and economic dimensions. The report also highlights the profound impact of technology on progress toward these dimensions, offering updates on crucial initiatives both on and beyond Earth.

The Ministry of Communications and Information Technology (MCIT) and the Communications, Space & Technology Commission (CST) are dedicated to advancing sustainability under the guidance of Vision 2030. This report serves as a vital tool to witness and document our progress, reflecting our commitment to a connected present and an innovative future.

OUR
COMMITMENT

CST has a responsibility to advance meaningful actions that protects our environment and society. To guide the digital and Space sectors on its sustainability journey, the commission has developed C.I.R.C.L.E.S., a roadmap detailing seven key priorities and actions that must be taken.

SUSTAINABILITY MATTERS

WHY WE NEED TO ACT?

Challenges

33% of the world's population have never used the internet

ITU

8% Energy consumption of data centers is projected to account for the world's electricity by 2030

ITU

Opportunities

10% in broadband penetration can result in **0.77 to 1.5** percent increase in GDP per capita

ITU

20% of global Carbon emissions can be reduced through technologies

WORLD ECONOMIC FORUM

Wadi al Disah, Tabuk, KSA

SUSTAINABLE DEVELOPMENT GOALS

United Nations

Sustainability is key to Improving the quality of life for global citizens, as well as preserving natural resources for future generations. The United Nations has unveiled 17 Sustainable Development Goals (SDGs) as a universal call to action to create a better and more sustainable future for all.

The SDGs cover all major **environmental, social and economic** challenges for a more sustainable global community and planet.

Saudi Arabia's sustainability performance in 2023:

Digital and Space supports all 17 SDGs

70%

Of the SDG targets directly benefit from digital technologies

According to the SDG Digital Acceleration Agenda report issued by ITU and UNDP

40%

Of SDGs targets directly benefit from Space-derived information and earth-observation data

United Nations

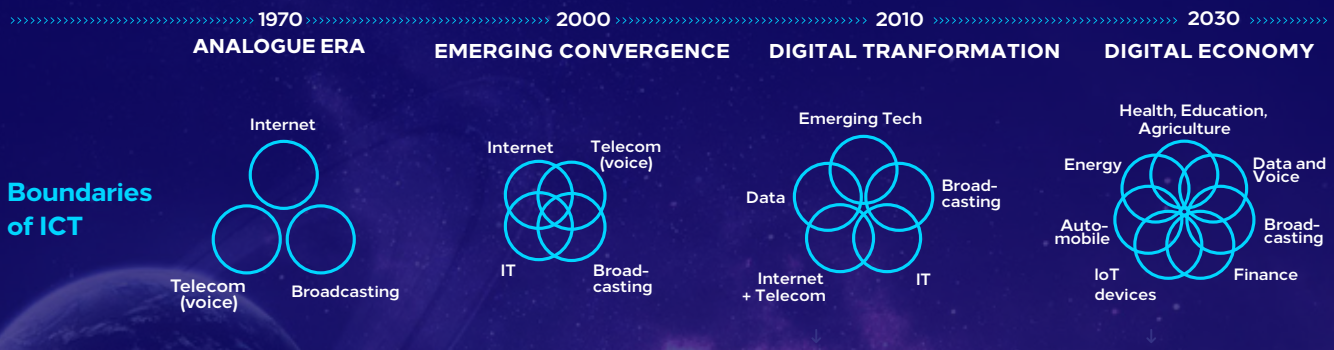
According to the Application of Space to the sustainable development goals by the UN

Edge of the World Riyadh, KSA

DIGITAL AND SPACE TOWARD SUSTAINABILITY

SUSTAINABILITY ON THE EARTH

ICT is critical to ensure truly sustainable transformation. Today, ICT is not a sector of its own but instead intersects with different sectors to connect and enable them in their pursuit of sustainability. In essence, this collaboration moves different stakeholders together toward a sustainable ecosystem by catalyzing the emergence of the **Digital Economy**.



SUSTAINABILITY BEYOND THE EARTH

SPACE4SDGS

Space technology significantly contributes to the UN Sustainable Development Goals, enhancing **communication, disaster management, scientific research,** and **environmental monitoring,** addressing key global challenges

Examples of Space technologies that support the Sustainable Development Goals

- Satellite Earth Observation
- Satellite Positioning & Navigation
- Satellite Communication
- Human Space Flight & Microgravity Research

DIGITAL SOLUTIONS SPARKS SUSTAINABILITY INNOVATION

In a dynamic era marked by relentless change, the intersection of **digital and sustainable** development stands as a beacon of hope, poised to redefine our collective response to urgent global challenges. With mounting environmental concerns, the call to accelerate our path to sustainable development becomes more urgent. At this crucial moment, we viewed **AI** as an example of a powerful force **sparking positive transformation.**

Beyond carbon reductions, here is an **example of global** startups, addressing the 17 Sustainable Development Goals:

Using AI to detect, verify and classify wildfire events in real time, Pano AI contributes to global resilience against the increasing frequency and intensity of climate-related challenges caused by forest fires.

Click Here.. Watch a Video

Leveraging AI for remote, real-time monitoring of aquafarms, NatureDots aims to revolutionize aquaculture-based food chains by ensuring the health of fisheries.

Click Here.. Watch a Video

King Abdulaziz Center (Ithra), KSA

CST AND SUSTAINABILITY

“C.I.R.C.L.E.S” TOWARD SUSTAINABILITY

In order to enable the ICT and Space sectors, CST has developed a roadmap to achieve its sustainability objectives in alignment with the SDG’s, injecting sustainable thinking into the whole sector.

Alkhobar sea side, KSA

“C.I.R.C.L.E.S” FRAMEWORK GUIDES CST 2023 ACHIEVEMENTS

1 LEADING DIGITAL CIRCULAR ECONOMY AT COP28

At **COP28, the International Telecommunication Union (ITU),** along with over 40 partners from **governments, businesses, civil society,** and **UN agencies,** launched the **Green Digital Action** initiative to boost **digital climate efforts**.

CST spearheaded the digital circular economy track under the green digital action, highlighting the power of government-industry collaboration to bridge gaps in e-waste management for a **circular economy.**

Global challenge:

62 billion kg
Of e-waste was generated globally

Only 22.3%
Of this e-waste is being recycled

Green Digital Action partners:

2 GLOBAL FIRST DIGITAL SUSTAINABILITY STRATEGY TOOLKIT

The Communications, Space and Technology Commission (CST) launched the **"Digital Sustainability Toolkit"** in partnership with the Digital Cooperation Organization (DCO). The toolkit includes five detailed steps to develop a digital sustainability strategic framework that meet all the needs, which begins with **raising awareness,** and realizing the **best practices** to developing strategy, and aligning with **relevant stakeholders,** then ending with **implementation**. This toolkit represents the **Kingdom's commitment** to support the **green economy, climate change,** and exchanging expertise while adopting best practices for a **sustainable society**.

About

1st

Toolkit to develop the digital sustainability strategy

3

Countries adopted C.I.R.C.L.E.S framework

Goals

Invest in the green economy by addressing climate change and sharing experiences internationally

Encourage digital regulators worldwide to develop a strategy for digital sustainability

To read the toolkit click

Wadi Lajab, Jizan, KSA

3 Securing the future growth of global Space economy

The Saudi Space Agency (SSA) and the Communications, Space & Technology Commission (CST) co-host the Space Debris Conference (SDC2024) with the ITU and UNOOSA as partners.

Objectives:

Creating & increasing awareness

Creating & increasing awareness regarding the current scale and growing complexity of the Space debris challenges that face humanity.

Exploring essential legislative

Exploring essential legislative and policy elements that must be considered in addressing the Space debris challenge, considering, and building on any prior work.

Multi-prong research

Promoting the creation and development of a multi-prong research focus covering the scale of the problem, appropriate mitigation measures, and associated global governance mechanisms.

Facts:

36,500

Space debris objects greater than 10 cm

1M

Space debris objects from greater than 1 cm to 10 cm

$294M

Space Situational Awareness estimated market size by 2030

$55M

Active Debris Removal estimated market size by 2030

SUSTAINABILITY REPORTING

SUSTAINABILITY REPORTING IS ESSENTIAL

Sustainability reporting is vital for modern businesses, providing a **transparent** of their **environmental, social, and governance (ESG) impacts**. This involves **disclosing efforts and outcomes** related to sustainability, allowing stakeholders to assess a company's true commitment. By integrating sustainability into core operations, companies can **enhance their reputation,** attract **customers and talent,** and gain better **access to capital.** Furthermore, it helps organizations identify and address **inefficiencies,** fostering **internal accountability** and continuous improvement.

Why sustainability reporting is essential?

Attracting investment

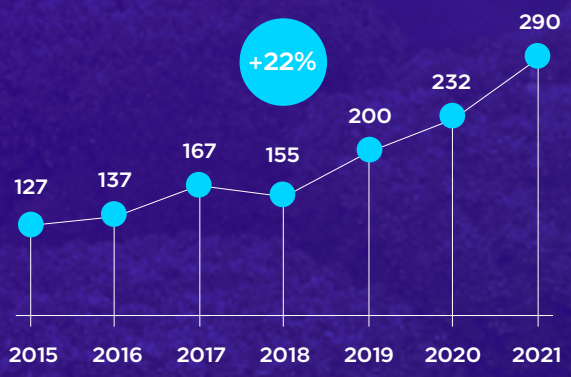
- **$649B** was spent on ESG funds in 2021, a **227%** increase from 2019
- The MSCI World ESG Leaders Index rose **22%** in 2021, compared to **15%** for the MSCI World Index

Attracting talents

- Gallup estimates that low employee engagement costs the global economy **$8.9** trillion, or **9%** of global GDP. This highlights the importance of ESG and social responsibility in boosting engagement and motivation

MSCI World ESG Leaders Index

$USD Ave. Closing Price (Gross)



Employees who are engaged

%

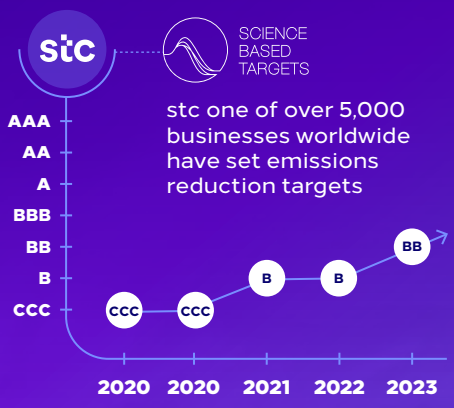
ICT COMPANIES REPORTING STATUS IN KSA

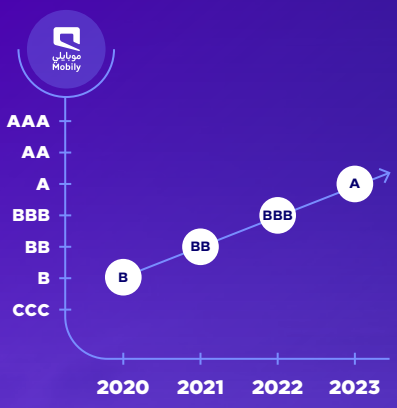
Current Status of Sustainability Reporting for ICT Companies Listed on the Saudi Exchange Market (Main Market or Nomu)

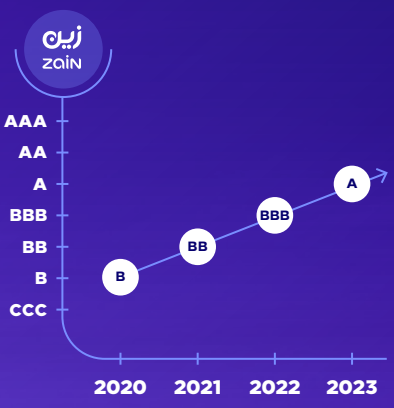
Companies that have released a sustainability report:

stc | Mobily | zain | solutions by stc | Jahez

MSCI ESG Ratings for the TOP 3 ICT Companies :







CCC **B**

LAGGARD
A company lagging its industry based on its high exposure and failure to manage significant ESG risks

BB **BBB** **A**

AVERAGE
A company with a mixed or unexceptional track record of managing the most significant ESG risks and opportunities relative to industry peers

AA **AAA**

LEADER
A company leading its industry in managing the most significant ESG risks and opportunities

Red Sea, KSA

CELEBRATING SAUDI SUCCESS

RECOGNIZING SAUDI SUCCESSES, DEVELOPMENTS, AND INITIATIVES

The Saudi and Middle East Green Initiatives integrate environmental protection, energy transition, and innovative sustainability programs for a greener future. In 2023, Saudi Arabia made significant progress in women empowerment, green initiatives, and renewable energy. The Kingdom's ICT ecosystem has implemented practical solutions to enhance digital sustainability, reduce waste and emissions, and promote connectivity and gender equality in the labor force.

SAUDI GREEN INITIATIVE

DELIVERING A GREENER TOMORROW
As a leading global energy producer, Saudi Arabia is a key player in managing climate change impacts SGI is a whole-of-society initiative that empowers all stakeholders in Saudi Arabia to create and innovate to achieve a green future.

MIDDLE EAST GREEN INITIATIVE

A CATALYST FOR CLIMATE ACTION
The Middle East Green Initiative is working to scale up regional climate action through cooperation and investment. This has resulted in clear and ambitious targets that bring the region together to collectively contribute to achieving global climate goals.

Collaboration between entities is essential to boost sustainability in the KSA

By working together, different entities can leverage each other's strengths and resources to achieve a common goal and drive innovation. With the right partnerships and collaborations, the KSA made significant progress towards a more sustainable future.

- **Improved** resource efficiency
- **Increased** innovation
- **Greater** impact
- **Improved** reputation

Leveraging the power of the technology and right partnerships, Saudi Arabia continues to make substantial sustainability-related including **13 success stories for more than 16** different entities in both the public and private sectors in relation to three main aspects:

- Environmental
- Economic
- Social

AQUA-FI

Transforming Underwater Communication

Aqua-Fi, a KAUST-led project, introduces a novel, low-cost, and low-power underwater internet system. Over 80% of the ocean is unmapped. New technologies and data innovations can transform our understanding. Connecting global ocean data will help find solutions and speed up sustainability efforts.

The Technology: **Bi-directional lasers**

This technology enable high-speed, reliable communication between underwater devices. This technology allows for real-time data transmission and reception, essential for monitoring and research

The Technology Benefits:

Achieved data rates of **2.11 Mbps** over a distance of **20 meters**

Real-time data transmission between submerged equipment and surface stations enables ocean monitoring for aquaculture, energy, environment, and security

SDG Supported:

THE WORLD'S FIRST ZERO-EMISSION 5G NETWORK

Red Sea Global | زين ZAIN

Zain KSA has unveiled the first zero-emission 5G network at the Red Sea, in collaboration with Red Sea Global, This revolutionary network will provide unprecedented connectivity prioritizing biodiversity in the region.

The unique 3D-printed towers are powered by 100% renewable energy, seamlessly integrating with the environment to address visual distortion; they are specifically designed for shared use by all service operators.

The Technology: **Pioneering engineering, 5G network, 3D printing techniques, Solar energy**

These technologies help to provide cutting-edge infrastructure, offering high-speed connectivity, creating sustainable and visually harmonious structures, and ensuring the network is powered by renewable energy.

The Technology Benefits:

- The world's first zero-emission **5G** network
- Powered by **100%** renewable energy
- **Natural harmony** with seamlessly blends with the resort's natural beauty
- **Highest 5G** speed in the region

SDG Supported

USING GEOSPATIAL TECH AND REMOTE SENSING TO OPTIMIZE AGRICULTURE

The project aims to compile comprehensive agricultural data for the Kingdom, using satellite imagery and field validations. This database will support decision-makers in developing and enhancing the agricultural sector.

The Technology: Geospatial technologies and Remote sensing

Using these technologies enable precise monitoring and management of feed crops, ultimately enhancing efficiency and sustainability in the agricultural sector.

The Technology Benefits:

Saving
9 Billion
Cubic meters of groundwater in the sedimentary shelf areas

Defining
40 K
different agricultural activities

Survey of
400 K
Agricultural Registries Around the Kingdom

Covering
1.2 Million
Square Kilometers of Sedimentary Shelf Areas

36 K
Registered farmers using agricultural License Issuance Service

SDG Supported:

ENHANCE AND SIMPLIFY THE CREATION OF SOLAR POWER

OptimalPV

An innovative solution that automates the design of solar rooftop systems, utilizing cutting-edge algorithms and machine learning to enhance and simplify the creation of solar power installations for rooftops.

The Technology: Machine learning, Cutting-edge algorithms

These technologies help to enhance the initiative by automating and optimizing the design process for solar rooftop systems, improving accuracy, efficiency and scalability in creating solar power installations.

The Technology Benefits:

Efficient
Increase profitability by **40%**

Quick
Perform feasibility study and generate design in few minutes

User Friendly
No prior knowledge of photovoltaic systems is needed

Affordable
Reduce design costs by **80%**

Flexible
Easily adjust design parameters to fit your needs

No Site Visit
Our technology relies on satellite image analysis

SDG Supported:

REACHING FOR THE STARS

The Saudi Space Agency (SSA) launched the Kingdom's first sustainable Human Space Flight (HSF) program, which aims to prepare Saudi cadres to become professional astronauts. These astronauts will be launched on both short and long-stay missions to conduct research for the benefit of all humanity. The research focus areas of the HSF program will not only benefit us on Earth but will enable future missions to the Moon and Mars. These focus areas include but are not limited to physical science, human health, biology, biotechnology, biopharma, Earth Science, in-Space manufacturing, and technology development.

Ali Alqarni

"Space and I, we ran in parallel, until we crossed paths.

You can see whole stars there, and that triggered my curiosity as a child."

Rayyanah Barnawi

"As a little kid, I was like a little explorer, who loved to know more about my surroundings and how things worked, my father, a chemical engineer taught me that you have to look for the answers yourself, not wait for someone to feed them to you."

SSA-HSF1 Scientific experiments:

- Blood-Based Biomarkers
- Alteration in Telomere Length
- Pupillometry to Measure Intracranial Pressure
- Use of EEG to Measure Brain Electrical Activity
- Optic Nerve Sheath Diameter Measurement
- Cerebral Perfusion and Alterations of Brain Position in Microgravity
- Cloud Seeding in Microgravity
- Experiments in Cell Science

SDG Supported:

WORLD'S FIRST INDUSTRIAL AI MODEL

Saudi Aramco has made a groundbreaking advancement by launching the industrial sector's first generative AI model. This innovation signifies a major leap forward in technological advancement and sustainability.

The Technology: **Language models, Quantum computing and real-time data analytics**

These technologies enabled advancing problem-solving, efficient decision-making, and timely insights for optimized operations and sustainability.

The Technology Benefits:

250 billion parameters
enable high precision in predictions and outputs

7 trillion data points
provide a robust foundation for analysis

90 - year history
of data collection ensures comprehensive insights

SDG Supported:

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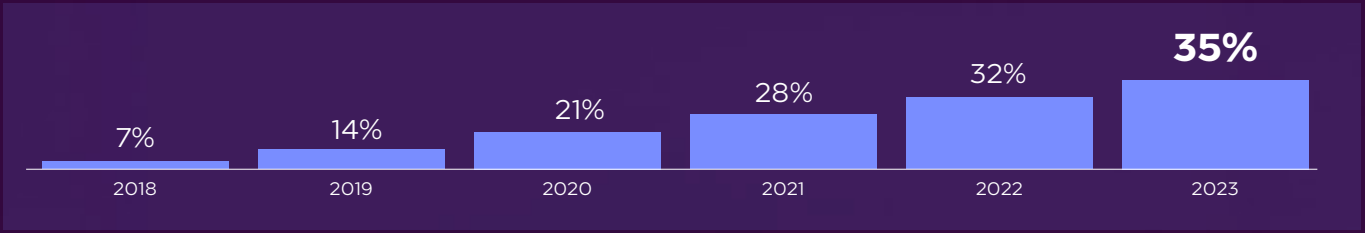
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

VISION 2030 GUIDES KSA TOWARDS BECOMING A GLOBAL LEADER

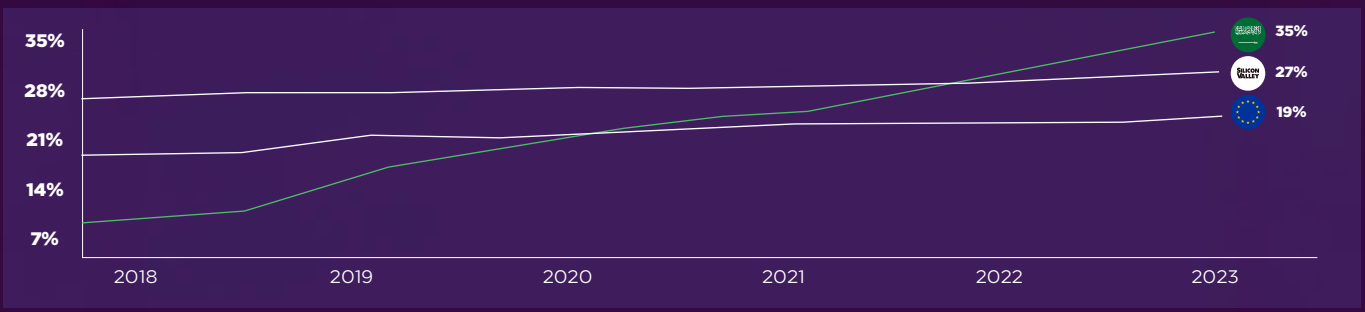
in women's empowerment

35% Women's Participation in the Digital Sector

Rapid Progress Shape Women's Participation



Women's Participation Globally



SDG Supported:

DEEPTECH NANOTECHNOLOGY TO DISRUPT CONVENTIONAL MEDICINE

NANOPALM
DEEP NANOTECH

Manufactured smartly utilizing machine learning and DeepTech Nanotechnology. NanoPalm via its NGLNs promises affordable and accelerated pharmaceutical R&D activities to accelerate clinical trials in a cost-effective manner and ensure the success of drugs in gene therapy.

The Technology: Artificial intelligence and DeepTech Nanotechnology

These technologies help to optimize pharmaceutical R&D, accelerating clinical trials, and improving the success rates of drugs in gene therapy through precise and cost-effective solutions.

The Technology Benefits:

Lowering the average capitalized R&D cost from **$4.54B to $100M**

Efficacy increase from **10% to 85%**

Accelerate the duration of therapeutic R&D to commercialization down **to 5 years**

SDG Supported:

3 GOOD HEALTH AND WELL-BEING

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

TRANSFORMING MEDICINE WITH 3D PRINTING

مستشفى الملك فيصل التخصصي ومركز الأبحاث
King Faisal Specialist Hospital & Research Centre

King Faisal Hospital and Research Center is revolutionizing healthcare with a personalized approach by leveraging advanced technologies. The hospital is revolutionizing healthcare by using cutting edge 3D printing technology for a more personalized approach.

The Technology: 3D printing

Using this technology helps the hospital to enhance patient care through precise diagnosis and surgical planning.

The Technology Benefits:

- **5,158** Virtual model
- **1168** Printed models
- Up to **30%** Reduction of surgical time
- **Customized** Brachytherapy Treatment
- **Innovative** Orthopedic Approach
- **Precision** Decision-Making in Aneurysm Case

SDG Supported:

MIDDLE EAST'S FIRST TECH USING AI TO DIAGNOSE CHRONIC DISEASES

SDM has launched SAARIA to utilize AI for early detection and diagnosis of diabetic retinopathy with 97% accuracy. This condition affects diabetics and can cause irreversible blindness. The initiative helps diagnose diabetic eye disease early and prevents other organ complications.

The Technology: Artificial intelligence (AI)

Using an eye fundus camera, precision-trained AI algorithms help to accurately read and interpret images in English and Arabic, improving diagnostic capabilities and outcomes.

Impact:

SAARYA has the potential to safeguard **7 million** people living with diabetes in the kingdom

80% of SDM is empowered by young Saudi young women

SDG Supported:

BRIDGING GENERATIONS:

The Smart Truck Bringing Digital Education to Remote Communities

The Smart Truck, equipped with a digital classroom, is the result of a joint effort between stc and Huawei. This innovative vehicle travels throughout the Kingdom, reaching remote areas with the aim of increasing awareness and bridging the gap between the elderly population and rapidly developing technologies

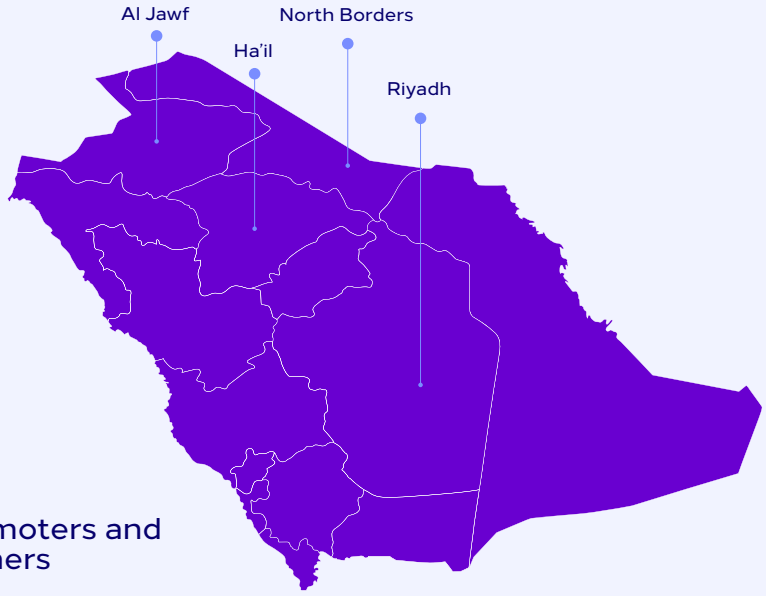
Impact:

4,200
Elderly beneficiaries

1,150
Awareness session

20
Governorates

75
Promoters and trainers



SDG Supported:

EHSAN

National Charitable Work Platform, backed by 13 government bodies, aims to boost the Kingdom's charitable and developmental efforts. It focuses on increasing the non-profit sector's impact on GDP and empowering both individuals and institutions to participate in social responsibility. Ehsan, the platform, emphasizes reliability, transparency, and streamlining donations, striving for a smoother and more effective system for charitable contributions and community development

Impact:

More than
4.68 Billion SAR
in total donations have been collected

More than
4.9 Beneficiary
benefited from Ehsan

More than
100 Million donation
transactions have been carried out

Guinness World Records Award 2023

The most individual donations with total number of 558,173 donations in 24 Hours for a campaign supporting of those in need; by water provision, healthcare, food baskets, seniors care and others.

SDG Supported:

HEMAM'S MOBILITY MISSION:

Launching Specialized Transport Services for Riyadh's Disabled and Elderly Communities

The Hemam app is pioneering in its field, offering a specialized fleet dedicated to transporting individuals with disabilities, whether they have permanent disabilities, are elderly, or are recovering from day surgeries. Hamam goal is to facilitate the mobility of people with disabilities without any difficulties. Launched in Riyadh, the app operates with a fleet available around the clock. It provides customers with flexible options for making requests, allowing for immediate bookings or scheduled trips for a later time.

Impact:

On average per month:

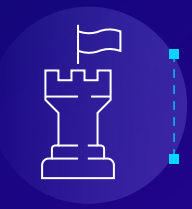
- Over **500** customers served
- More than **1,000** rides completed
- Approximately **15,000** km traveled

SDG Supported:

FUTURE OUTLOOK

BUILDING SUSTAINABILITY INTO OUR DIGITAL AND SPACE FUTURE

Saudi Arabia's consistent investment in its digital infrastructure over the past several years is positioning the Kingdom to be a **leader in digital sustainability** commitments around the world.



This **strong infrastructure,** complemented by a **comprehensive strategy, visionary leadership,** and a **forward-looking regulatory framework,** will enable the Kingdom to limit its own environmental footprint.

In addition to the **MCIT's ICT Sector strategy,** the **Communications, Space and Technology Commission (CST)** is also preparing to meet future challenges with a stronger hand. This includes a focus on advancing the **Space sector** to support technological innovation and sustainability.

CST is also committed to contributing to the achievement of the **UN's Sustainable Development Goals,** placing them at the center of its regulatory practice.

The future is digital, and CST is ready with full force as it marches toward becoming one of the world's most developed **5th generation digital regulators**.

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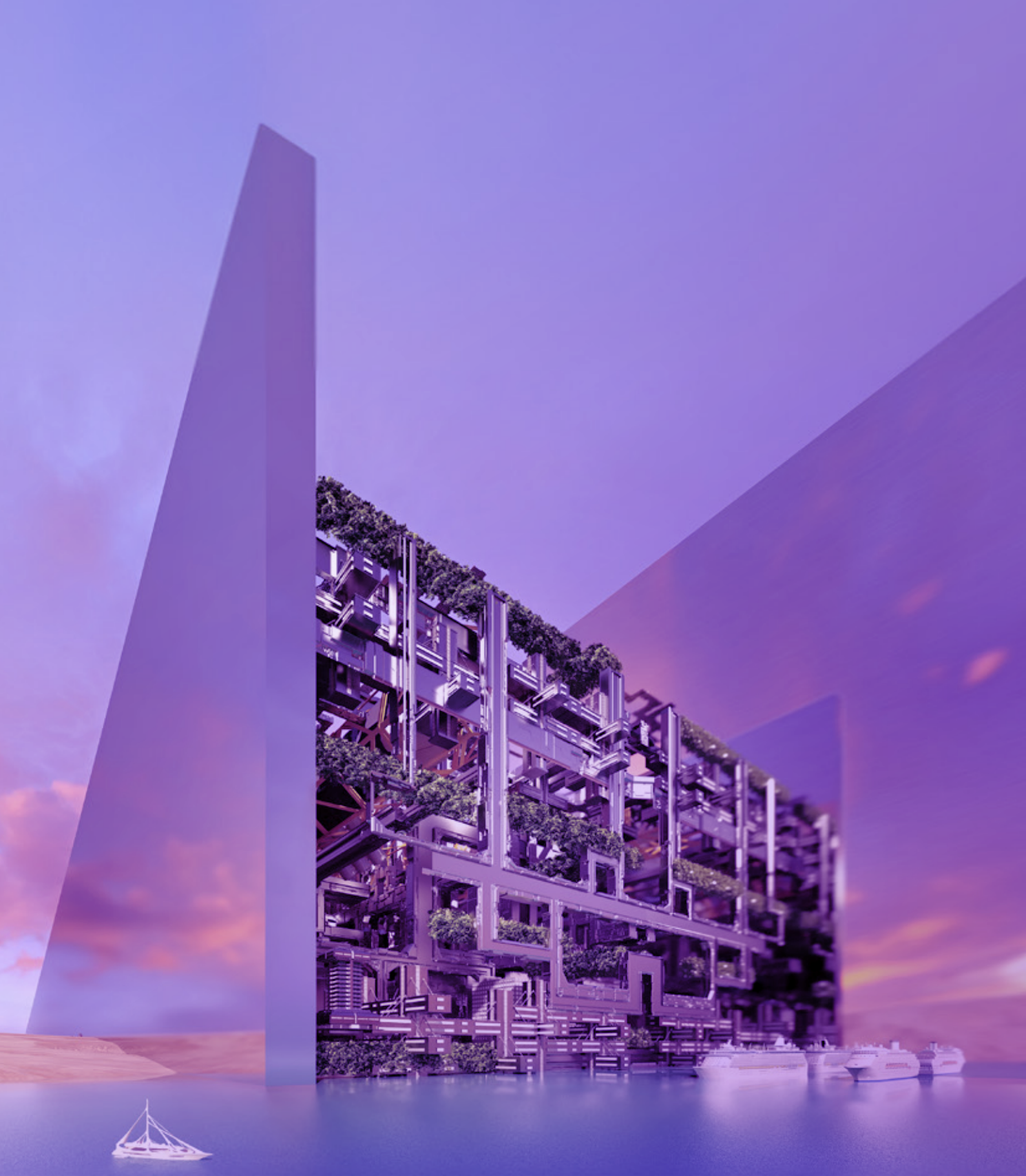

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