



**Saudi Arabia**  
Centre for the  
Fourth Industrial  
Revolution

Shaping the Future through Collaboration and Innovation

# Annual Report 2024



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## Chairman of the Board Statement

**Dr. Munir M. Eldesouki**

Chairman of the Board of C4IR Saudi Arabia and  
President of King Abdulaziz City for Science & Technology

### Global and national transformation

With Fourth Industrial Revolution (4IR) technologies, the world has the tools to realise profound advances in new ways of working, greater sustainability, and what it means to be human. Yet, amid these opportunities are challenges from access, equitability, and sustainability.

Saudi Arabia's Vision 2030 is driving a no-less profound transformation, fulfilling the Kingdom's national ambition to stand as a thriving economy, a vibrant society, and an ambitious nation. 4IR technologies have already become a major part of furthering this domestic agenda, cultivating an innovation economy, empowering SMEs, and elevating quality of life. The Centre for the Fourth Industrial Revolution (C4IR) Saudi Arabia is committed to harnessing the speed, breadth, and depth of the 4IR revolution to our national development goals.

### 2024 highlights

For all of us in the C4IR Saudi Arabia team, 2024 was a year of achievement – including six projects, nine thought-leading reports, participation in 14 events,

the backing of three rising talents, and the support of over 150 SMEs. This Annual Report highlights those achievements and their impacts and shines a light on our next steps as we look to 2025 and beyond.

### Strategic vision

As we move forward, we thank the Custodian of the Two Holy Mosques, King Salman bin Abdulaziz Al Saud, and his Crown Prince and Prime Minister, His Royal Highness Prince Mohammed bin Salman Al Saud, for steering us toward the future of Vision 2030.

Together with our partners we look forward to building on 2024's momentum and shaping the international conversation. As Saudi Arabia's Centre for the Fourth Industrial Revolution, we will leverage our Kingdom's resources, drive, and ambition, and reinforce its position as a responsible global leader, to bring about the sustainable and equitable adoption of 4IR technologies around the world.



## Managing Director Statement

**Dr. Basma AlBuhairan**

Managing Director of C4IR Saudi Arabia

### Harnessing unprecedented technological change

The rapid and unprecedented evolution and expansion of 4IR technologies demands a combination of wide-spread, multi-audience awareness and transparent, robust policy and regulatory responses. At the Centre for the Fourth Industrial Revolution (C4IR) Saudi Arabia, we are committed to guiding Saudi Arabia's response through the World Economic Forum (WEF) 4IR international network. As both a think-tank and a "do tank," we are enabling the Kingdom to take a responsible lead in shaping the global conversation and enabling its own Vision 2030 goals.

### An impactful 2024

Over the past year, we have been proud to maintain a multi-stakeholder platform, continuing to be a trusted partner, and welcoming diverse participants in the Fourth Industrial Revolution (4IR) ecosystem. Alongside our partners, we have nurtured new value networks, led six projects with broad and sustainable societal impact, and directed dialogue and knowledge through contributing to 14 thought leadership pieces and participating in nearly 20 international events. Through these activities, we have reached over 3 million people, accelerating real and tangible progress towards fulfilling national goals and supporting international targets, including the UN Sustainable Development Goals (SDGs).

### Nurturing a global network

As a member of the WEF 4IR international network, the WEF has been central to these successes as a valued partner throughout 2024. Our affiliation with the WEF has opened avenues for participation in impactful international meetings, including the WEF's Special Meeting on Global Collaboration, Growth, and Energy for Development in Riyadh, and the 15th Annual Meeting of the New Champions in China. In both these meetings, C4IR was able to join leaders and experts in harnessing the power of international dialogue to build an inclusive and sustainable 4IR future. Our contribution showcased the Kingdom's leadership and distinctive position in a

larger technological and economic narrative grounded in traditional values, an approach enhancing global competitiveness and social well-being in-line with Vision 2030.

### Empowering new ideas and new talent

Alongside the WEF, we have also empowered new talent through our prestigious fellowship program; developed an international thought-leadership library of reports, white papers, and analyses; and launched impactful joint initiatives. These include the Quantum for Society Challenge, which focuses on delivering lasting quantum solutions across a range of sectors and is piloting the WEF's Quantum Economy Blueprint as a roadmap for national and global participation. In 2025, we will continue this focus on quantum technology through celebrating World Quantum Day, building on the success of our 2024 event and marking the 100th anniversary of quantum mechanics.

Throughout 2024, C4IR Saudi Arabia's role has become increasingly relevant as a go-to place for dialogue around 4IR technologies. The support of our team, our partners, and our stakeholders within Saudi Arabia and beyond have been invaluable to our mission to accelerate, engage, and enhance the capabilities of 4IR technologies.

### Next steps

Now, as we look ahead, the commitment of these networks will remain integral to our priorities to strengthen our visibility and reputation, scale our national and global impact, and continue to enhance our operational efficiency. As we embark on initiatives and projects alongside the WEF and our other partners, welcome new fellows, continue to publish thought leadership content, and participate in discourse-shaping events, we will build a community of purpose and drive positive economic, social, and policy change through 4IR technologies.



# Acronyms

- **AAM:** Advanced Air Mobility
- **AI:** Artificial Intelligence
- **AI4AI:** Artificial Intelligence for Agricultural Innovation
- **AM:** Autonomous Mobility
- **AMNC:** Annual Meeting of New Champions
- **C4IR:** Centre for the Fourth Industrial Revolution
- **eVTOL:** Electric Vertical Take-Off and Landing
- **GFC:** Global Future Councils
- **G20 GSCA:** G20 Global Smart Cities Alliance
- **IIoT:** Industrial Internet of Things
- **IoT:** Internet of Things
- **KACST:** King Abdulaziz City for Science and Technology
- **KAUST:** King Abdullah University of Science and Technology
- **KFUPM:** King Fahd University of Petroleum and Minerals
- **KSA:** Kingdom of Saudi Arabia
- **KSSO:** King Salman Science Oasis
- **4IR:** Fourth Industrial Revolution
- **MCIT:** Ministry of Communications and Information Technologyies
- **MEWA:** Ministry of Environment, Water, and Agriculture
- **MIM:** Ministry of Industry and Mineral Resources
- **MoTLS:** Ministry of Transport and Logistic Services
- **NIDL:** National Industrial Development and Logistics Program
- **PIF:** Public Investment Fund
- **P2P:** Peer-to-Peer
- **RPW:** Red Palm Weevil
- **SASO:** Saudi Standards, Metrology, and Quality Organization
- **SIDF:** Saudi Industrial Development Fund
- **SDGs:** Sustainable Development Goals
- **SMEs:** Small and Medium-sized Enterprises
- **stc:** Saudi Telecom Company
- **TGA:** Transport General Authority
- **WEF:** World Economic Forum
- **WQD:** World Quantum Day

# 01

## Our Vision

The Fourth Industrial Revolution (4IR) has the potential to offer innovative solutions to global challenges and secure shared prosperity. However, its rapid pace leaves businesses, communities, and governments vulnerable to unprecedented changes, unmanaged risks, and missed opportunities.

**Saudi Arabia** is taking a global lead in spearheading emerging 4IR technologies, pioneering regulatory frameworks, accelerating industry adoption, and fostering cross-sector innovation to drive 4IR-powered sustainable development, economic growth, and social progress. **The Centre for the Fourth Industrial Revolution (C4IR) Saudi Arabia** is an innovation hub and a policy accelerator fulfilling this commitment through a range of activities in collaboration with the **World Economic Forum (WEF)** and its **C4IR Network** of 22 affiliate centres worldwide.

Hosted by the **King Abdulaziz City for Science and Technology (KACST)**, C4IR is:

- **Providing insights and recommendations** for developing governance frameworks for emerging technologies
- **Engaging diverse stakeholders** across government, industry, and academia to co-design policy solutions that align with national priorities
- **Enhancing national capabilities** by fostering expertise in 4IR governance and adoption

In all of our activities, we directly align with Vision 2030's three main pillars: In all our activities, we align directly with Vision 2030's three main pillars. Our efforts to enhance smart city solutions for an elevated quality of life support the Vibrant Society pillar. By accelerating the digital economy and fostering a knowledge-based workforce, we contribute to a Thriving Economy. As we establish Saudi Arabia as a global leader in technology governance, we enable an Ambitious Nation.

Through partnerships with 4IR stakeholders across government, industry, civil society, and academia, C4IR Saudi Arabia's activities are already directly benefitting Saudi Arabia and the global community. In 2024, C4IR granted three fellowships, conducted six projects, benefited 150+ SMEs, and reached over three million people across a range of audiences to showcase the opportunities of 4IR technologies.

For 2025, we will build on these successes with fresh priorities to:



Strengthen our visibility and reputation



Scale our national and global impact



Continue to enhance our operational efficiency

Together with our partners and stakeholders, we are strengthening Saudi Arabia's global position as a responsible leader in 4IR technologies. Through regulatory innovation, industry-wide collaboration, and technological sustainability, we will create a responsible, ethical, and inclusive digital future for the Kingdom.



# Making an impact - 2024

## Fellowships and Training Programs

**1 fellow**

WEF Coordination Fellowship

**3 fellows**

Seconded Fellowship Program

**3 workshops**

Workforce Training

Accelerating the development and implementation of emerging technology governance principles, policies and protocols

**6**

projects

**150+**

SME participants

## Engaging a diverse, inclusive, and collaborative stakeholder community

**14**

publications and contributions

**19**

WEF community events and initiatives

**10+**

contributions to international forums and meetings

**3m**

people reached in brand awareness campaigns

**80%**

stakeholder satisfaction



# 02

## Enhancing Capability: Laying the Foundation for Growth

### 2.1

#### Fellowship Programs

C4IR Saudi Arabia's fellowship programs are cultivating a new generation of thought leaders equipped to shape the trajectory of 4IR technologies. Each program is a unique platform for engagement with groundbreaking and cutting-edge projects, fostering collaboration across diverse sectors and building the technical and strategic expertise necessary to drive impactful change.

In 2024, C4IR welcomed three new fellows, who were immersed into the Centre's activities and engagements, including key projects, and had the opportunity to work closely with our partners, including the WEF. At the heart of these initiatives lies a commitment to bridging global innovation with local priorities. Our programs are designed to advance participants' professional growth, contribute to the Kingdom's ecosystem of innovation and economic diversification, and work on cutting-edge solutions that address national and international challenges.

##### WEF's Coordination Fellowship Program

For 2024, C4IR Saudi Arabia welcomed Dr. Waleed Gowharji to the WEF Coordination Fellowship Program. Working directly at WEF headquarters, Geneva, Dr. Gowharji focused on AVIATE, a pivotal WEF initiative advancing innovative frameworks for autonomous vehicles and air transport systems.

By coordinating directly with the WEF on the Saudi elements of this program, Dr. Gowharji has been able to ensure alignment between global expertise and local efforts, serving as a crucial link for knowledge sharing and joint initiatives.

##### Seconded Fellowship Program

C4IR Saudi Arabia hosted three fellows in 2024 for the third cycle of the Seconded Fellowship Program. Muneera AlShunaifi and Mohammed Almohammadi joined from stc (Saudi Telecom Company), while Nouf Alfayez joined from the Public Investment Fund (PIF).

Designed to provide young talents from partner organizations with unparalleled exposure to the Centre's activities and the broader WEF 4IR Network, the Seconded Fellowship Program also equips participants with technical and strategic expertise that will contribute to their professional growth and the Kingdom's innovation ecosystem.

Notably, Muneera spent a month of her fellowship working from the WEF headquarters in Geneva, gaining first-hand of the WEF's AI Governance Alliance's work on global technology policy and contributing Saudi expertise and experience. Muneera returned to the Kingdom with invaluable insights into international best practices that will strengthen national AI integration and regulation efforts.





My fellowship focused on advancing 4IR technologies through engaging with communities, gathering insights and data, shaping policies and strategies to accelerate the Kingdom's digital transformation.

Through this experience, I engaged with global experts, policymakers, and industry leaders to shape strategic frameworks, and policy recommendations for AI, autonomous systems, and IIoT, and studied the current state of 4IR technology in the kingdom through analysis and research. This strengthened my skills in policy development, stakeholder engagement, and research while deepening my understanding of 4IR applications.

I aim to translate these insights into actionable initiatives that drive AI, IIoT, and autonomous system adoption in Saudi Arabia. My next steps include fostering global collaborations, supporting industry implementation, and ensuring that these technologies are deployed ethically and sustainably.



**Muneera Alshunaifi**

stc



The fellowship provided firsthand exposure and engagement in the Centre's operations and projects. It expanded my expertise in technology governance, policy development, and strategic innovation while sharpening my ability to navigate complex ecosystems involving government, industry, and academia.

Beyond technical contributions, the fellowship was a transformative professional growth opportunity, equipping me with the tools to drive high-impact initiatives that bridge technological advancements with regulation and economic development. It also allowed me to build a lasting network of experts.

I hope the projects I contributed to will continue serving as foundational enablers for emerging technology adoption, driving innovation, investment, and policy development in Saudi Arabia.

My next step is to integrate strategic governance models with industry-driven execution frameworks, ensuring emerging technologies are not only adopted but also optimized for business growth and long-term economic impact.



**Mohammed AlMohammadi**

stc

## Key Fellowship KPIs/Outputs

C4IR fellows contributed to:

- **AI Governance Alliance (AIGA):** A WEF initiative focusing on ensuring AI governance contributes to inclusive AI for growth
- **Autonomous Systems:** An assessment of the current state of autonomous technology in Saudi Arabia and co-development of a framework to accelerate pilot projects
- **Accelerating the Impact of IIoT:** Co-development of a strategic framework that outlines the policy recommendation to support IIoT adoption and enhance its impact in the Kingdom
- **Quantum Economy Landscape Report:** Co-authored analysis of Saudi Arabia's readiness for quantum technologies and identification of strategic opportunities to position the Kingdom as a leader in this field
- **Saudi Arabia's First Quantum Day:** Contributed to the organization of the Saudi Arabia's first-ever World Quantum Day event and WQD Summary Report, engaging policymakers, business leaders, and the public on quantum technology's potential
- **White Paper on an Integration Framework for Autonomous Mobility:** Co-development of a white paper outlining a structured approach to integrating autonomous mobility into Saudi Arabia's transportation and logistics sectors

## 2.2

# Training

C4IR Saudi Arabia's internal training programs are designed to enhance our team's skillset, enabling us to deliver on our commitments. During 2024, C4IR ran three training programs, providing nine full days of mandatory training and upskilling a total of 16 team members.



### Theory of Change

Participants gained new skills around project design, including target mapping, establishing strategies and tactics, and measuring progress. This structured approach ensured that the Centre's projects align with our mission and deliver tangible benefits.



### Strategy and KPIs

Participants learnt advanced strategic planning techniques, including setting actionable KPIs to enable our teams to track and optimize performances.



### Generative AI

Participants joined this cutting-edge course on integrating generative AI into operations by responsible and effectively applying AI tools for content creation, data analysis, and workflow automation. This will enhance our capacity to innovate while streamlining complex processes.





# 03

## Our Projects: Impactful, Collaborative Action

The primary focus of the C4IR Network is to engage and collaborate with government, industry, academia, and civil society groups to co-design and co-develop frameworks for the governance of emerging technologies through practical projects. In 2024, we conducted six projects.

These projects aimed to produce three types of outputs:

**Strategy, Knowledge, or Insights:** Guidelines, strategic plans, reports, white papers, policy briefings, and industry insights.

**Protocol or Governance Models:** Non-binding principles, protocols, policies, implementation toolkits, governance toolkits, requirements (e.g. for procurement), incentive structures, and best practice standards.

**Policies and Regulations:** Binding principles/protocols/policies, binding guidelines, government regulations, certifications, industry standards/norms, and standard operating procedures.



### 3.1

## Accelerating the Impact of IIoT for SMEs

Industrial Internet of Things (IIoT) technologies offer Small and Medium Enterprises (SMEs) significant opportunities to improve productivity and efficiency.

However, SME understanding and adoption of IIoT technologies in Saudi Arabia and around the world remains minimal. This C4IR Saudi Arabia project worked to address this challenge.

This project is anchored with the Brazilian project [Accelerating the Impact of Industrial IIoT in Small and Medium Sized Enterprises: A Protocol for Action](#).



### Context

SMEs represent more than 90% of all companies globally and create 70% of jobs (World Bank Group, 2024). Studies show that SMEs that embrace digital tools can improve productivity by up to 25% and reduce operational costs by up to 30%. Unfortunately, SMEs struggle to embrace 4IR tech in comparison to larger businesses, which are six times more likely to leverage IIoT. This worrying trend is exacerbating economic inequality, stifling opportunities for social mobility, and dragging down global industrial productivity.

In Saudi Arabia, SMEs are also a vital element of Vision 2030's economic growth and diversification goals. As the Kingdom works towards empowering SMEs' GDP contribution to grow from 20% to 35%, the number of SMEs has grown to more than 1.5 million in Q2 2024 (Monshaat, 2024, p. 4). However, Saudi SMEs face the same IIoT adoption challenges as their counterparts around the world.



## Objectives

- Enhance IIoT awareness among SMEs
- Increase SMEs' competitiveness through boosting efficiency and productivity



## Strategy

C4IR Saudi Arabia developed an ecosystem of private sector and international partners to collaborate on identifying challenges, exploring opportunities, and proposing solutions to bridge gaps and promote SMEs' IIoT integration. This collaboration focused on three strategic elements:

- Community building: Mobilized diverse stakeholders, including industry leaders, and 120 SMEs to exchange best practices, address challenges, and showcase success stories
- Technical support: Aided 50+ SMEs in navigating and integrating 4IR advances through workshops, usage guides, webinars, and seminars
- Policy advisory: Developed and enhanced a range of policy tools, such as financial incentives and regulatory frameworks, for governments and industrial associations in Saudi Arabia to reduce barriers, simplify IIoT integration, and promote SME IIoT adoption



## Outputs

- **120** SMEs engaged and supported
- **4** Workshops focused on IIoT adoption, implementation challenges, and best practices
- **3** Webinars covering SME success stories, use cases, and expert insights

## Other Contributions

- Supported policy discussions on digital transformation in the ecosystem through different events and publications
- Conducted 8 Maturity Assessments using the SIRI Index, providing tailored transition roadmaps
- Implemented 5 Proof of Concept approaches in collaboration with key stakeholders and partners
- Developed a use case guide
- Contributed to 3 briefing and community papers with partners:
  - **Digital Transformation for SMEs: A Strategic Framework** (2024) a Briefing Paper Co-branded with the WEF
  - **5G Private Mobile Networks: Revolutionizing Industry with Private 5G Technology** (2024), a Community Paper in collaboration with stc
  - **IOT & AIOT: Embedding Intelligence Everywhere** (2024), a Briefing Paper in collaboration with stc





# Case Study: Driving Industrial Efficiency Through Cloud Factories Platform



## Business Focus

We are pioneering the Cloud Factory Platform, a networked manufacturing ecosystem that leverages AI and automation to connect factories. This platform enables factories to share production resources, such as machinery, skilled labor, and production lines, maximizing efficiency, reducing costs, and accelerating production. By integrating cloud-based collaboration, we aim to revolutionize industrial operations, making manufacturing more flexible, connected, and sustainable.

## Project Involvement

Our participation in the program began after attending several Industry 4.0 conferences and advanced manufacturing workshops. Following these engagements, Dr. Ibrahim Al-Shunaifi, Project Lead Manager at C4IR Saudi Arabia, invited us to join the Sandbox P2P initiative after we presented our Cloud Factory concept. This opportunity allowed us to further develop and test our idea in a collaborative, innovation-driven environment.



## Participation Details

- Creating an integrated platform to connect three of our factories (Allamaa for wooden furniture, Mumtaz glass factory, and KI Factory)
- Developing a dynamic resource-sharing platform for real-time machine, material, and production line coordination
- Testing automated workflow management to route production orders based on capacity and efficiency



## Key Outcomes

- Increase in productivity by optimizing machine usage
- Reduction in waste through resource sharing
- Cost savings by minimizing new equipment investments



## New Opportunities

- Positioned us as pioneers in cloud-based manufacturing, attracting new business collaborations
- Strengthened partnerships with technology providers to scale digital transformation



## Future Plans

- Expand the Cloud Factory Platform to include more factories and external partners
- Implement AI-driven analytics for predictive maintenance and quality control
- Align with Industry 4.0 standards for a fully connected smart manufacturing ecosystem



## Sandbox for a P2P Collaborative Environment for SMEs



### Context

Peer-to-Peer (P2P) Sandboxes are innovative, collaborative environments that enable SMEs to network with potential partners and customers. They reduce transaction costs by eliminating intermediaries, and support scaling while also broadening market access through enhanced visibility and communications. As Vision 2030 within Saudi Arabia and wider global economic goals look to SMEs for growth and job creation, these platforms promise new 4IR technology-enabled advantages to SMEs.



### Objectives

- Pioneer a P2P Collaborative Environment for SMEs, enabling resource sharing and knowledge exchange to reduce costs and improve operational efficiency
- Establish a Controlled Sandbox to test, refine, and optimize the P2P environment before its full-scale implementation
- Develop a roadmap for scale-up



### Strategy

The project engages a broad range of stakeholders, including relevant industry leaders and research institutions, to identify and exchange best practices in support of the P2P environment development. The project has progressed through key stages:

- Awareness-raising: 50+ SMEs from a range of sectors, including manufacturing, retail, and services, joined webinars, seminars, workshops, brochures, and social media
- SME participation: Participating SMEs were given access to the Sandbox's resource-sharing module and a set of tasks to complete, such as listing available equipment, defining resource-sharing terms, and setting up collaboration agreements
- Monitoring: C4IR Saudi Arabia will monitor SME activities within the Sandbox and track the platform's performance, including identifying any technical issues



### Anticipated Outcomes

- Accelerated digital adoption and empowerment of SMEs
- Increased collaboration and knowledge sharing
- Improved competitiveness amongst participating SMEs
- Increased resource sharing
- Improved regulatory compliance and security
- Enhanced access to global markets

## 3.2

# Quantum Economy



## Context

The global digital divide already poses a significant challenge to shared prosperity and connectivity access, and the emergence of quantum technologies threatens to widen this gap. A National Quantum strategy is essential for Saudi Arabia to strengthen its position in the global quantum landscape, and the Quantum Economy Project aims to address this gap to drive economic growth, technological advancement, and societal benefits.

This strategic initiative aims to establish a foundational roadmap for developing a robust quantum ecosystem in Saudi Arabia, in alignment with the [WEF's Quantum Economy Blueprint](#). This roadmap will help countries develop, support and commercialize their quantum technology initiatives, while also aiding policy makers, industry, and academia with a blueprint for developing and growing a national quantum ecosystem.



## Objectives

- Develop a national quantum roadmap
- Cultivate collaborative frameworks and knowledge sharing within the quantum technology stakeholder community
- Promote the importance of quantum technologies to the public and decision-makers



## Strategy

- The project has established specialized workstreams to address specific aspects associated with the development of the National Quantum Roadmap which builds the foundation for fostering innovation and ecosystem growth, ensuring responsible use, and unlocking societal benefits
- These workstreams engage a broad range of stakeholders with a focus on analysing, reporting and recommending strategies to advance Saudi Arabia's quantum capabilities



## Anticipated Outcomes

- Increased awareness and understanding of quantum technologies among the public and decision makers
- A national quantum roadmap

The project also produced immediate outputs:

- [World Quantum Day Report EN, AR](#) (2024), a C4IR Report
- [Quantum Economy Landscape in Saudi Arabia](#) (2024), a report in collaboration with KACST, MCIT, King Fahd University of Petroleum and Minerals (KFUPM), and Saudi Aramco



### 3.3

## Advanced and Autonomous Mobility – A Framework for Evaluating Autonomous Systems in Physical Sandboxes



### Context

Autonomous mobility (AM) offers transformative benefits, including enhanced safety, efficiency, and sustainability, aligning with Vision 2030's goals of innovation, economic diversification, and quality of life. However, global adoption is slowed by regulatory gaps and misaligned pilot projects. Bridging these gaps will both support Saudi Arabia's national transformation and position the country as a global leader in AM.

- Establishing Regulatory Sandboxes to test and refine policies for safe and scalable deployment
- Selecting High-Impact Pilots that align with national objectives and demonstrate feasibility
- Implementing Pilot Programs with rigorous evaluation, stakeholder collaboration, and iterative improvement
- Scaling Successful Use Cases by integrating lessons learned and continuously updating regulatory frameworks



### Objectives

- Accelerate AM adoption through a structured process
- Select pilot projects aligned with national goals.
- Implement pilots effectively and scale successful ones



### Strategy

The project engages a broad range of stakeholders, including industry leaders and research institutions, to co-develop an adoption framework that supports the seamless integration of autonomous mobility by:



### Anticipated Outcomes

- Fostered partnerships between government, industry leaders, and research institutions to drive adoption
- Developed a strategic pathway for scaling autonomous mobility solutions beyond pilots
- Created a structured framework for adoption, informing future policy decisions and investment priorities
- Published the following:
  - [Integrating Autonomous Mobility into the Transport System: A Saudi Arabian Case Study](#) (2024), a White Paper Co-Branded with the WEF
  - [Autonomous Mobility: 3 lessons for success from Saudi Arabia](#) (2023), WEF Blog





### 3.4

## Advanced and Autonomous Mobility - AVIATE Saudi Arabia: Advancing the Future of Advanced Air Mobility (AAM)



### Context

Advanced Air Mobility (AAM) technologies, which include drones, eVTOL aircraft, and autonomous aviation systems, pose a wide range of benefits to transport, logistics, agriculture, education, and health.

As Saudi Arabia accelerates efforts to integrate AAM into its transportation and logistics ecosystem, existing industrial drone applications provide a strong foundation for expansion. Across sectors, unmanned aerial systems (UAS) are already in use for infrastructure inspection, environmental monitoring, precision agriculture, and logistics, demonstrating the potential for broader AAM adoption. However, the broader transition from industrial and enterprise drone use to a publicly integrated AAM ecosystem remains a challenge.

Saudi Arabia's geographic diversity, extreme climate conditions, and expanding urban infrastructure require specialized strategies for implementation. With designated air corridors for testing and national initiatives supporting technological innovation, the country is well-positioned to lead in AAM development while contributing to global best practices. This C4IR Saudi Arabia project was designed to unlock the potential of AAM technologies for the Kingdom, aligning with Vision 2030's goals for a digitally connected, innovation-driven economy, and showcasing Saudi leadership.



### Objectives

- Create a space for industry, regulators, and policymakers to start collaborating on AAM initiatives
- Identify the most pressing regulatory, infrastructure, and operational challenges in the region
- Engage stakeholders in co creating a pilot blueprint for regional AAM adoption



### Strategy

- Facilitate public-private collaboration: Align stakeholders on regulatory frameworks, infrastructure requirements, and operational models for AAM integration
- Strengthen regional & global partnerships: Gain insights, facilitate knowledge exchange, and position Saudi Arabia as a leader in AAM innovation
- Leverage regulatory sandboxes & pilot programs: Gather insights on operational frameworks and assess pathways for safe and efficient AAM deployment

## Artificial Intelligence for Agriculture Innovation (AI4AI)



### Context

The global agriculture sector must become more efficient and sustainable to ensure food security for the world's 9.1 billion population by 2050. Saudi Arabia's Vision 2030 recognises these challenges and aims to transform the Kingdom's agricultural sector to ensure food security and economic diversification. Digital agriculture can contribute to this transformation - nationally and internationally.

In Saudi Arabia, date palms are a key crop and are threatened by Red Palm Weevil infestations. Each infected palm tree can result in a loss of up to SAR12,250 and infestations can spread rapidly within farms. Despite significant budgets and efforts, a definitive solution has yet to be found, necessitating continuous innovation in pest management strategies.

**AI for Agriculture Innovation (AI4AI)** is a WEF initiative, anchored under C4IR India, and later anchored at C4IR Saudi Arabia, which aims to impact 10 million farmers globally (30% women farmers) by 2030 through Public Private Partnerships.



### Objectives

- Promote the use of 4IR technologies for effective pest and disease management in date palm cultivation
- Enhance date palm cultivation efficiency through responsible technology use



### Strategy

The project harnesses various advanced 4IR technologies, including AI, spatial analytics, satellite imagery, and remote sensing, to accelerate the adoption of targeted solutions that improve pest detection and management.

The AI4AI project's activities include

- **Workshops and collaboration:** The project team worked with key partners, including the Saudi Ministry of Environment, Water, and Agriculture (MEWA) and C4IR India, to define the project's scope, pinpoint areas where 4IR technologies can be implemented, and align across sectors, such as agricultural research, pest management, and technology integration
- **Comprehensive gap analysis and technology assessment:** The project worked to identify the most effective technologies and the barriers to their integration
- **Strategic framework development:** Centered on data standardization and integration, policy innovation and regulatory oversight, infrastructure enhancement, human capital development, sustainable funding and investment mechanisms, and fostering a culture of technological acceptance



### Anticipated Outcomes

The project's projected future impacts include:

- Improved detection, monitoring, and treatment efficiency through technology-enabled pest management, reducing reliance on chemical pesticides
- Enabled data-driven decision-making for optimized pest management, ensuring long-term resilience in the date palm sector
- Developed a comprehensive report outlining key insights, technological solutions, and a framework to address adoption challenges

**Technical Report Establishment of Tech-Enabled Pest Management Framework, the Case of the Red Palm Weevil, 2024**



## Smart Cities: Enabling Innovation Through Model Policies



### Context

Smart Cities have the potential to support the United Nations Sustainable Development Goals (SDGs), helping cities become more resilient, more sustainable, and better places to live. Saudi Arabia is committed to developing Smart Cities as hubs for economic growth and diversification, elevated quality of life, and increased sustainability in-line with Vision 2030.

However, the adoption of smart city technologies is hindered by limited stakeholder alignment, rigid procurement practices, and a limited focus on designing user-friendly technologies. To address these challenges, the project aims to advance the responsible and ethical use of smart city technologies in Saudi Arabia by deepening the engagement with and benefit from the G20 Global Smart Cities Alliance (G20 GSCA).



### Objectives

- Embed the Innovation-Friendly Procurement Model Policy assessment questionnaire in the G20 Global Smart Cities Alliance Benchmarking Tool
- Develop a roadmap to implement a set of foundational policies for more ethical, responsible Smart Cities in alignment with the work done by the G20 Global Smart Cities Alliance



### Strategy

- Procurement Policy Assessment: Developed a detailed questionnaire to evaluate cities' procurement policies in alignment with the Innovation-Friendly Procurement policy
- Global Benchmarking Integration: Designed the assessment for future integration into the G20 GSCA Benchmarking Tool to align with international best practices
- City Engagement & Capacity Building: Encouraged Saudi cities to self-assess their procurement practices, identify gaps, and adopt innovation-driven improvements



### Anticipated Outcomes

- Advancing the responsible deployment of smart city technologies, contributing to the UN SDGs and enhancing urban services
- Enabling more efficient, responsive, and citizen-centric urban services, benefiting residents
- Strengthening cities' ability to adapt to emerging technologies and address evolving urban challenges
- Positioning Saudi cities as leaders in smart urban development through innovation-driven policies and practices
- Increasing collaboration between government and private sector to reduce financial burden and stimulate local business growth



# 04

## Working with WEF and the C4IR Network: Building the Community, Strengthening Connections

### 4.1

#### Testimonials



C4IR KSA is not just talking about innovation – they're living it. Their bold embrace of cutting edge XR technology in a live setting was inspiring to witness. They created an engaging, immersive experience for an international audience at their AM25 pavilion. It is a strong testament to their commitment to pushing boundaries on the road to Vision 2030.

**Chieh Huang, President of the World Economic Forum's Global Collaboration Village.**



C4IR India and C4IR KSA's collaboration showcases the C4IR Network's strength in driving responsible 4IR innovation. Our joint efforts in areas like AI, Drones, and Agri tech demonstrate a shared vision for positive impact across sectors. This partnership, particularly under Dr. Basma's leadership, fosters peer learning and builds a foundation for a more inclusive and technologically advanced future, aligned with Vision 2030.

**Purushottam Kaushik, Head of C4IR India**



## 4.2

# WEF Communities and Initiatives



## Center for Urban Transformation



### Overview

The **WEF Centre for Urban Transformation** is shaping the future of cities to be sustainable, inclusive, and resilient. It connects leaders from public, private, and civil sectors to address urban challenges and leverage opportunities from rapid urbanization and technological advancements.

The Centre for Urban Transformation's work supports the UN Sustainable Development Goals through three key focus areas:

1. Growing Local Economies: Fostering collaborations to accelerate innovation and build resilient economies
2. Enabling Net Zero, Nature-Positive Cities: Advancing climate action and recalibrating city-nature dynamics
3. Improving Quality of Life: Scaling best practices to enhance services and reimagine urban living



### C4IR Contributions

C4IR Saudi Arabia was invited to join the Advisory Group for the AI Sandbox led by C4IR India, providing strategic insights and expertise. Additionally, it played a key role in supporting the SME project led by C4IR Azerbaijan, sharing knowledge and best practices to help launch their initiative. Furthermore, C4IR Saudi Arabia contributed to the World Economic Forum's Global SME Sustainability Accelerator Survey, reinforcing its commitment to advancing SME resilience and sustainability on a global scale.

- **Modernizing Small & Medium-Sized Enterprises in Saudi Arabia**
- **Digital Transformation for SMEs: A Strategic Framework**

These publications strengthen Saudi Arabia's global reputation and position the Kingdom as a leader in leveraging 4IR technologies for SME empowerment.





## Global Future Council on the Future of Advanced Manufacturing and Value Chains



### Overview

Since 2016, the [Global Future Councils](#) have united leaders from government, business, and civil society to address critical issues, generate insights, and shape global agendas. The Global Future Council on the Future of Advanced Manufacturing and Value Chains focuses on exploring future value chain scenarios influenced by technological advancements, societal changes, and geopolitical shifts for 2030, 2040, and 2050.

The Council's 2024 activities included leading sessions at the Annual Meeting of New Champions in Dalian, China and the Annual Meeting of the Global Future Councils 2024 in Dubai. The Council also released three reports, notably [Scenario planning the future of manufacturing value chains](#). For the next term, it plans to produce a report on "Manufacturing in 2040."



### C4IR Contributions

C4IR Saudi Arabia's Managing Director served as a Council member for the 2023-2024 term, supporting the Centre's active engagement with eight Council workshops and participation in the Annual Meeting. C4IR Saudi Arabia further contributed to consultation on how organizations are adapting their value chain strategies for 2030, engaging with Saudi organizations, including the Saudi Ministry of Industry and Mineral Resources, and Saudi Aramco, to garner regional insights.



## G20 Smart Cities Alliance



### Overview

Established in 2019, the [G20 Global Smart Cities Alliance](#) (GSCA) brings together governments, private-sector partners, and residents to promote the responsible and ethical use of smart city technologies, with the World Economic Forum serving as its secretariat.

The GSCA collaborates with international organizations and city networks representing over 200,000 cities, fostering the adoption of proven policy approaches and co-designing innovative solutions to governance challenges. It advances global policy norms to accelerate best practices, mitigate risks, and build public trust.



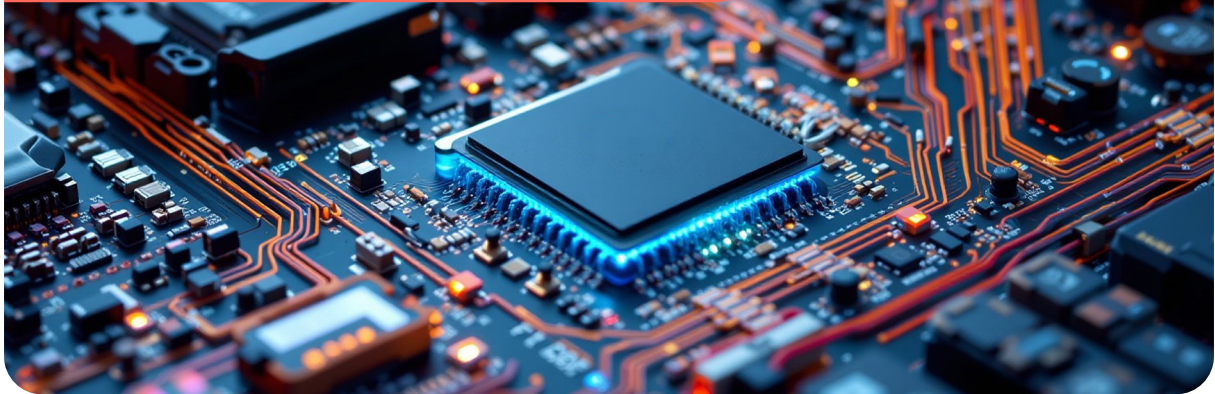
### C4IR Contributions

In 2024, C4IR Saudi Arabia developed a questionnaire for the [Innovation-Friendly Procurement Model Policy](#) that is part of the GSCA model policies benchmarking and assessment tool. This document can be used by procurers and purchasers in public bodies to guide their procurement approach to bring about a range of potential economic, social, and environmental impacts.





## Quantum Economy Network



### Overview

In January 2024, the WEF [Quantum Economy Network](#) launched the [Quantum Economy Blueprint](#), a roadmap to accelerate equitable global quantum ecosystem development. Its objectives include:

- Disseminating insights on quantum computing, sensing, and communication
- Building quantum ecosystems through cross-sector partnerships
- Addressing challenges like cybersecurity risks
- Shaping policies to support quantum industry growth

The Quantum Economy Network fosters collaboration among governments, businesses, and academia to unlock quantum technologies' potential and prepare for their integration into the economy. The blueprint serves as a guide for policymakers, industry, and academia to build a quantum ecosystem, focusing on economic growth, job creation and responsible development.



### C4IR Contributions

C4IR Saudi Arabia was invited to join working groups for the Strategic Visioning Group, Industry Applications Whitepaper, and Quantum for SDGs Whitepaper. Throughout the year, C4IR Saudi Arabia participated in a range of workshops resulting in the publication in September of an Insight Report titled "[Quantum for Society: Meeting the Ambition of the SDGs](#)" for the Sustainable Development Impact Meeting. C4IR Saudi Arabia became the first centre to pilot the blueprint through its Quantum Economy Project.







## AI Governance Alliance



### Overview

The WEF's [AI Governance Alliance \(AIGA\)](#), launched in June 2023, aims to establish global best practices for AI governance, promoting responsible innovation guided by ethics and diversity that empowers communities and industries, streamlines governance, and accelerates societal and technological advancements.

The AIGA addresses diverse areas of AI governance through three primary workstreams

- **Responsible Applications and Transformation:** Engages industry leaders to explore the implications of generative AI and ensure ethical integration of AI technologies
- **Resilient Governance and Regulation:** Brings together stakeholders to develop anticipatory governance mechanisms and durable institutions for effective AI governance
- **Safe Systems and Technologies:** Convenes chief science officers and AI producers to advance consensus on technical governance approaches for advanced AI systems, prioritizing safety and best practices

In 2024, AIGA expanded its initiatives with the launch of the Inclusive AI workstream and hosted the AI Governance Alliance Community Meeting in San Francisco, emphasizing ethical AI development and multi-stakeholder collaboration.



### C4IR Contributions

C4IR Saudi Arabia, as a member of the Responsible Applications and Transformation workstream, contributed to "[Unlocking value from Generative AI: Guidance for responsible transformation](#)," which was published during the Annual Meeting in Davos 2024. Additionally, C4IR supported the Resilient Governance workstream by contributing to "[Governance in the Age of Generative AI: A 360° Approach for Resilient Policy and Regulation](#)."

C4IR also participated in six workshops of the Responsible Applications group's AI Transformation of Industries initiative, contributing to a flagship report series to be unveiled the [Annual Meeting in Davos 2025](#).



## AVIATE: Advanced Air Mobility



### Overview

Launched in 2020, the AVIATE initiative promotes the safe, sustainable, and equitable adoption of advanced air mobility (AAM) technologies, including eVTOL aircraft and drones. As part of WEF's efforts to foster public-private collaboration, the initiative addresses regulatory, technological, and societal challenges related to the impact of emerging technologies on air travel, urban transport, and logistics.

AVIATE's key focus areas are

- Understanding the impact of AAM and autonomous aviation
- Identifying use cases and best practices to maximize benefits and mitigate risks
- Facilitating global deployment through the Forum's C4IR network



### C4IR Contributions

C4IR Saudi Arabia has actively participated in the AVIATE global initiative, contributing insights and engaging stakeholder to shape the future of AAM:

- **Aviation Day in 2024, Geneva (March)** - C4IR Saudi Arabia presented key insights and activities from the Kingdom's AVIATE community to stakeholders discussing aviation's future
- **Farnborough Airshow (July)** - [AVIATE launched the White Paper "Advanced Air Mobility: Shaping the Future of Aviation"](#), detailing AAM use cases, highlighting enabling factors, and discussing the required collaboration between public and private stakeholders to accelerate the adoption of AAM technologies
- **AVIATE In-Depth Workshop Series (October & December)** - These workshops focused on addressing industry-wide challenges, including gaps in financing, ecosystem building, and role of public authorities in fostering responsible AAM implementation through collaborative efforts





## Uplink Challenge



### Overview

**UpLink** is the WEF's early-stage innovation initiative, building ecosystems that enable purpose-driven entrepreneurs to scale their businesses in markets essential for a net-zero, nature-positive, and equitable future. In April 2024, C4IR Saudi Arabia announced a partnership with WEF to further support this initiative.

UpLink launches multiple **innovation challenges** each year to source and scale solutions to global issues aligned with the UN Sustainable Development Goals (SDGs). These challenges champion solutions that go beyond incremental change, rewiring industry models to create lasting transformation across industries and societies. They offer participants:

- **Access** to selected World Economic Forum and partner-led events, projects, and communities
- **Visibility** through participation in the WEF's Quantum Application Hub and global digital media channels
- **Networking opportunities** through the WEF and UpLink partner networks
- **Targeted support** on technical, business, and operational matters



### C4IR Contributions

C4IR Saudi Arabia partnered with UpLink for the **Quantum for Society Challenge**, highlighting the transformative potential of quantum technologies. The challenge not only raises awareness about quantum's potential but also fosters collaboration to accelerate its adoption.

The challenge focuses on five key areas

1. Climate resilience
2. Materials and manufacturing
3. Equitable healthcare
4. Agriculture and food systems
5. Freshwater systems

Winners of the Quantum for Society Challenge will be announced at the World Quantum Day Celebration, organized by C4IR Saudi Arabia in April 2025.







## Global Collaboration Village



### Overview

The **Global Collaboration Village**, created by the WEF in collaboration with Accenture and powered by Microsoft Mesh, is designed as an immersive technological tool to enable decision-makers to tackle challenges through co-presence, real-time interaction, and dynamic visualization.

Through features like real-time collaboration, dynamic visualizations, and interactive experiences, the Village fosters impactful discussions and collaborative solutions. More than 200 participants are able to take part in a range of immersive dialogues – from climate and nature, to manufacturing and energy – enabling direct implications for the real world through the expansion of public-private partnerships.



### C4IR Contributions

C4IR Saudi Arabia formalised a partnership with the WEF to collaborate with the GCV in September 2024. Following content development, Saudi Arabia's virtual pavilion was finalized and revealed at the Annual Meeting in Davos in January 2025 within the Global Collaboration Village and hosted an immersive dialogue centered on the evolution of innovation ecosystems in the Intelligent Age. Discussions explored how regional approaches to AI are fueling innovation, transforming industries, and advancing global technology landscapes.



## Fostering Technology Convergence



### Overview

In September 2024, the WEF Centre for the Fourth Industrial Revolution (C4IR) launched a workstream “Fostering Technology Convergence”, examining how AI, robotics, bioengineering, quantum, advanced energies and more are set to form a new foundation for future growth.

The working group seeks to map the enablement, interoperability, and synergies that these domains will have, thereby providing a new roadmap, and set of solutions for our most complex challenges today.



### C4IR Contributions

C4IR Saudi Arabia was invited to be part of the workstream and throughout 2024 participated in focused workshops, discussions, and one to one consultation with the WEF leads of the Fostering Technology Convergence Workstream.

C4IR contributed to the workstream:

- Mapping the new tech stack of the future
- New Applications and Solutions for Convergence
- Second Order and Social Implications of Convergent Tech

# 05 | WEF Events

Throughout 2024, C4IR participated in a range of WEF events, collaborating with our partners and stakeholders from around the world to shape global responses to the opportunities and challenges of 4IR technologies.

## 5.1

### Events Timeline





## 5.2

## Events



### Special Meeting on Global Collaboration, Growth and Energy Development 28-29 April 2024, Riyadh



#### Event Focus

The WEF's **Special Meeting on Global Collaboration, Growth and Energy for Development** helped public and private sector leaders address shared global challenges. Bringing together over 700 leaders from all sectors and industries enabled the meeting to revitalize global collaboration, **catalyse action on energy development**, and **develop a compact for inclusive growth**.



#### C4IR Contribution

During the event, C4IR Saudi Arabia and WEF Uplink announced a collaborative partnership on Quantum Innovations for the SDGs, reaffirming the Centre's dedication to embracing quantum innovation and ensure a comprehensive and inclusive approach to integrating these frontier technologies into broader economic and social systems.

C4IR Saudi Arabia also participated in several sessions illuminating the path forward for applying technological innovations across various sectors:

- **Innovator Communities Welcome session** - C4IR Saudi Arabia highlighted the Kingdom's young and technologically adept population, government-led technological diversification initiatives, and the unique blend of tradition and cutting-edge technology as key features of Saudi Arabia's business-friendly innovation landscape
- **Quantum for All session** - C4IR Saudi Arabia joined global quantum experts to outline the foundational steps needed to build a thriving quantum ecosystem through inclusive policies
- **Converging Frontiers: Future Impact of AI and Emerging Technologies for Sustainable Industries and Society workshop** - C4IR Saudi joined panelists to discuss how the intersection of quantum computing, biotechnology, robotics, and new materials with artificial intelligence could lead to revolutionary solutions in energy production, climate challenges, and sustainable industrial practices
- **The Next Agriculture Revolution session** - Inaugurated by HE the President of KACST and Chairman of the C4IR Saudi Arabia Board and co-lead by the Managing Director of C4IR Saudi Arabia and Head of C4IR India, this session examined the 4IR's transformative power to revolutionize agricultural practices for sustainable global food production and security
- **From Innovation to Inclusion: Advancing Manufacturing workshop** - Focused on the role of advanced technologies in enhancing the digital capabilities of manufacturing sector SMEs to support inclusive growth
- **Cracking the Code to Smarter Cities session** - C4IR Saudi Arabia joined other experts to discuss innovative, inclusive approaches to urban planning and development, emphasizing the best practice of community engagement in driving these initiatives
- **Exploring Collaboration Opportunities between China and Saudi Arabia in Emerging Technologies** - C4IR Saudi and a delegation from China examined how emerging technologies can bolster innovation and bilateral ties



## Global Technology Retreat (GTR) 28-31 May 2024, San Francisco



### Event Focus

The WEF's Global Technology Retreat (GTR) convened over 300 technology leaders and experts from around the world to nurture partnerships and **advance global and local technology** agendas. The GTR aimed to ensure the 4IR contributes to more inclusive, resilient, and sustainable societies.



### C4IR Contribution

C4IR Saudi Arabia actively engaged with the GTR's network of national and sub-national centres to develop new insights, align priorities, and exchange valuable experiences through several sessions:

- The New Urban Tech Stack session** - C4IR Saudi Arabia shared insights into real-world applications of technology to address social and environmental challenges, highlighting Saudi Arabia's SEHA Virtual Hospital, which leverages AI and IoT to revolutionize healthcare
- Community Hub: Driving Impact Around the World** – Part of the Unlocking Gateways of Growth for Small Businesses session, C4IR Saudi Arabia discussed the vital role of SMEs, emphasizing how innovative solutions like the SME Peer-to-Peer platform can foster sustainable and inclusive growth
- The Next Green Revolution session** – C4IR Saudi Arabia joined experts to discuss how advanced agritech innovations address water scarcity. C4IR Saudi Arabia emphasized the need for collective efforts by governments, academia, and producers of all sizes to advance Agritech 2.0 and revolutionize food systems for a more sustainable future
- Quantum for All session** - C4IR Saudi Arabia joined global quantum experts to outline the foundational steps needed to build a thriving quantum ecosystem through inclusive policies



## 15th Annual Meeting of the New Champions (AMNC24) 25-27 June 2024, Dalian



### Event Focus

The WEF's **15th Annual Meeting of the New Champions (AMNC24)** welcomed over 1600 leaders from more than 80 countries to foster cooperation and solutions for sustainable growth. The topics included the global economy, China's economic role, the impact of AI, workforce disruption, industrial transformation, and climate action.



### C4IR Contribution

C4IR Saudi Arabia contributed to the meeting through keynote speeches, panel moderation, and nurturing sessions

- **Saudi Q&A: Transforming SMEs with Technology Session** – C4IR discussed the challenges and opportunities facing SMEs in adapting to technological advancement, offering insight from the Saudi experience in enabling SMEs to adopt 4IR technologies

- **Panel participation: Reimagining Value Chains for 2040 Workshop** – C4IR joined a panel of industry leaders and academics to explore the future evolution of global value chains in an era of rapid technological advances
- **Keynote Address: Collaborative Growth: Fostering Partnerships and Technological Integration for SMEs** – C4IR highlighted the importance of the digital economy to sustainable SME growth and success
- **UpLink Welcome Session** - C4IR highlighted the pivotal role of the 4IR Centres Network in driving innovation and sustainable growth

AMCN24 also featured participation from startups nominated by C4IR Saudi Arabia. These included **SDM**, a digitally enabled Saudi healthcare startup, which showcased how AI-driven technology is enhancing the early detection of chronic diseases.







## Sustainable Development Impact Meetings 23-27 September 2024, New York



### Event Focus

The **Sustainable Development Impact Meetings (SDIM24)** convened over 1,400 global leaders from diverse sectors to advance dialogue and progress on the UN SDGs through public-private collaboration. With only 17% of SDG targets on track for 2030, SDIM24 set a clear agenda for continued action leading to upcoming global events, including COP28 and the WEF Annual Meeting 2025.



### C4IR Contribution

C4IR Saudi Arabia participated in the SDIM24 as a speaker

- **Urban blueprints for a Net Zero Nature Positive Transition session** - C4IR Saudi Arabia emphasized innovative policies, flagship projects, and green financing as key to advancing urban sustainability, highlighting tools like the Innovation-Friendly Procurement Model to foster markets for sustainable solutions. C4IR Saudi Arabia further highlighted NEOM and AMAALA as models of net-zero leadership through renewable energy, green hydrogen, and ecosystem preservation, supported by financing frameworks like Green Bonds and Sukuk for scalable green development

## Annual Meeting of the Global Future Councils 15-17 October 2024, Dubai



### Event Focus

The **Annual Meeting of the Global Future Councils 2024 (AMGFC24)** convened over 500 experts from 80 countries to address global challenges through interdisciplinary collaboration and advancing actionable insights across key themes. These included strategic intelligence initiatives, innovation for inclusive growth through AI, climate action and energy transition, building trust for global collaboration, and public engagement and knowledge dissemination.



### C4IR Contribution

C4IR leadership contribution focused on the Future of Manufacturing and Advanced Value Chains Global Future Council. Alongside partners and stakeholders, discussions involved identifying the trends, opportunities and future of manufacturing and value chains, examining them from a holistic perspective.

## 4th Annual Urban Transformation Summit

### 21-23 October 2024, San Francisco



#### Event Focus

The **4th Urban Transformation Summit** brought together global leaders, policymakers, and industry experts to address urban challenges and opportunities. The summit emphasized sustainable development, digital transformation, and inclusive growth, generating outcomes including fostering public-private partnerships, showcasing innovative projects, and emphasizing actionable frameworks for urban equity and efficiency.



#### C4IR Contribution

C4IR Saudi Arabia highlighted its pioneering role in leveraging 4IR technologies in the Kingdom to enhance smart city infrastructure and urban resilience. The centre participated as a speaker in the sessions:

- **Unlocking Green Procurement in Cities** – C4IR Saudi Arabia emphasized how the Kingdom is advancing Vision 2030's sustainability goals by leveraging green finance models, public-private partnerships, and innovative procurement policies
- **Enabling Shared Economic Opportunity** – C4IR Saudi Arabia highlighted peer-to-peer platforms as vital tools for reducing barriers to innovation for SMEs, helping SMEs adopt new technologies through resource sharing, real-world testing, and new market connections

## From Sand to Soil: Nature-Positive Approaches to Urban Desertification

### 5 December 2024, Riyadh



#### Event Focus

The **UN Convention to Combat Desertification (UNCCD) COP16** united leaders from governments, the private sector, civil society, and global stakeholders to accelerate progress in sustainable land management. COP16 was a critical moment for governments and non-state actors to slow and reverse land degradation.



#### C4IR Contribution

C4IR Saudi Arabia joined WEF in examining urban desertification

- **From Sand to Soil: Nature-Positive Approaches to Urban Desertification** – C4IR Saudi Arabia shared innovative approaches to urban regeneration in the Kingdom, highlighting how initiatives such as the Wadi Hanifa Rehabilitation Project and AIUla Vision are reconnecting nature with urban spaces to create resilient, inclusive communities. These insights underscored how Saudi Arabia's unique landscapes and cultural heritage can serve as a model for tackling urban desertification globally



# 06

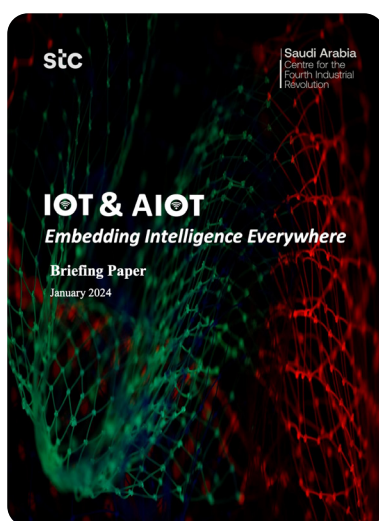
## Publications: Shaping the Global Conversation

C4IR Saudi Arabia's briefing papers, reports, and analyses form an impactful thought leadership library for partners, stakeholders, and policy makers. Together we are helping shape and lead the global conversation on how to equitably and sustainably utilize 4IR technologies.

### 6.1

#### C4IR Saudi Arabia Publications

During 2024 C4IR issued nine publications and contributed as thought leader to five further publications.



#### Briefing Paper | AIOT & IOT. Embedding Intelligence Everywhere

In January, we released a collaborative briefing paper with Saudi Telecom Company (stc), [IOT & AIOT: Embedding Intelligence Everywhere](#). This paper marked a significant milestone in understanding and harnessing the combined power of the Internet of Things (IoT) and Artificial Intelligence (AI) evolving into Artificial Intelligence of Things (AIoT).



## World Quantum Day Report

The World Quantum Day Report (available in [EN](#) and [AR](#)) report serves as a comprehensive summary of the events and activities conducted from April 17-25, 2024, by C4IR Saudi Arabia in collaboration with King Abdulaziz City for Science and Technology (KACST) and the King Salman Science Oasis (KSSO). The report aims to elevate public understanding and foster global and national collaboration in quantum science and technology.

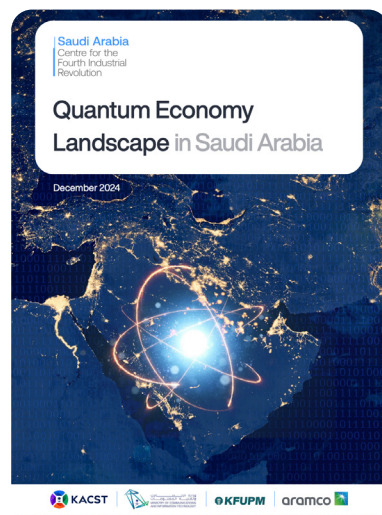


## Community Paper | 5G Private Mobile Networks: Revolutionizing Industry with Private 5G Technology

In October, we published a community paper in collaboration with [stc](#), [5G Private Mobile Networks: Revolutionizing Industry with Private 5G Technology](#). This paper comprehensively explores the transformative potential of private 5G networks for industries, covering key deployment options, technical and financial evaluations, and use cases across various sectors.

## Quantum Economy Landscape in Saudi Arabia

Our [Quantum Economy Landscape in Saudi Arabia](#) report outlines a strategic initiative to develop a national quantum roadmap for Saudi Arabia, aiming to guide the integration and optimization of quantum technologies across key economic sectors. The report sets the stage for substantial technological and economic growth while also demonstrating the Kingdom's commitment to responsible 4IR leadership.





## Establishment of Tech-Enabled Pest Management Framework, the Case of the Red Palm Weevil

Produced collaboratively with the Ministry of Environment, Water, and Agriculture, our [Establishment of Tech-Enabled Pest Management Framework, the Case of the Red Palm Weevil](#) report offers a detailed strategy to combat the Red Palm Weevil (RPW) infestation in Saudi Arabia, a critical threat to the country's palm and date sectors. The report highlights how early RPW detection and robust management using drone technology and genetically engineered bio-controls, combined with new regulatory and operational frameworks for these technologies, can both mitigate immediate threats and establish long-term agricultural sustainability in-line with Vision 2030 goals.

## 6.2

### WEF Co-Branded Publications

#### Integrating Autonomous Mobility into the Transport System: A Saudi Arabian Case Study

C4IR Saudi Arabia was the primary author on the Autonomous Mobility C4IR Physical Technologies initiative's white paper, [Integrating Autonomous Mobility into the Transport System: A Saudi Arabian Case Study](#). The paper presents a structured framework to accelerate autonomous mobility pilots and deployments as these new technologies transform global transport.

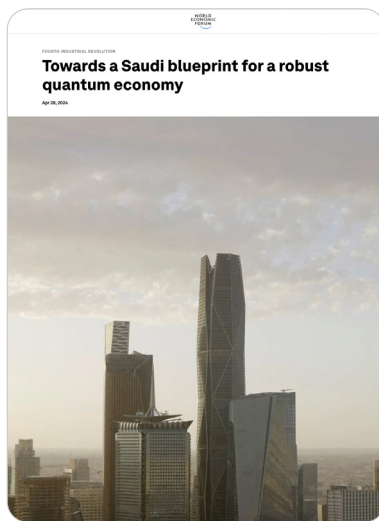
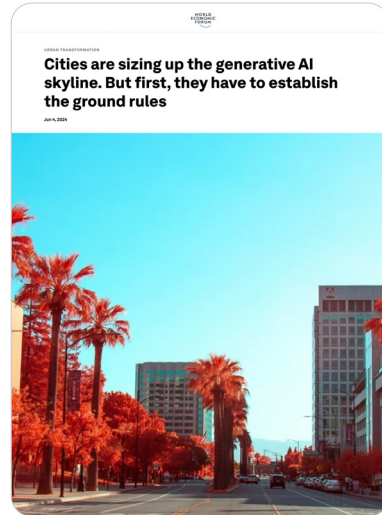


#### Digital Transformation for SMEs: A Strategic Framework

C4IR Saudi Arabia was the primary author of the briefing paper [Digital Transformation for SMEs: A Strategic Framework](#), which outlines policy recommendations to support and incentivize SME adoption of digital technologies. The paper incorporates insights and recommendations from the Kingdom's experiences, drawn from workshops, interviews, and surveys with public and private sector stakeholders.

## WEF Blog | Cities are sizing up the generative AI skyline. But first, they have to establish the ground rules

As part of C4IR Saudi Arabia's Fellowship Program, Sara Al Hudaithy, a fellow from the Saudi National Industrial Development and Logistics Program (NIDLP) conducted research on governance frameworks for the responsible and ethical use of generative AI. This work culminated in the publication of a co-authored [WEF blog](#) on June 4, coauthored with the WEF, emphasizing the critical role of cities in addressing the complexities of AI integration.



## WEF Blog | Towards a Saudi blueprint for a robust quantum economy

The [blog](#), co-authored by the WEF and the C4IR Saudi Arabia, emphasizes the strategic importance of developing a tailored quantum economy roadmap for Saudi Arabia, focusing on pivotal sectors like healthcare, finance, and cybersecurity, in-line with Vision 2030. It highlights how the Quantum Economy Blueprint can serve as a foundational guide for nations to build and enable equitable quantum ecosystems, reinforcing Saudi Arabia's commitment to becoming a responsible 4IR leader.





## 6.3

### Publication contribution highlights

C4IR Saudi Arabia has contributed insight, commentary, and thought leadership to a range of publications, reports, blogs, and articles by our partners and 4IR stakeholders.



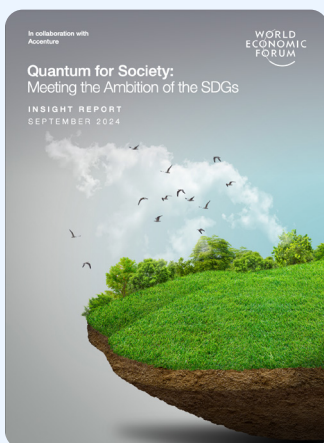
#### Agritech: Shaping Agriculture in Emerging Economies, Today and Tomorrow



KSA faces arid conditions and water scarcity, challenging traditional farming. Therefore, there is a strong need to embrace emerging technologies like vertical farming, controlled environment agriculture (CEA) and precision agriculture with IoT, and use biotechnology for resilient crops. C4IR KSA is collaborating with C4IR India through AI4AI for agricultural innovation programmes to bolster food security and enhance sustainability. We look forward to contributing towards collaborating with global agritech entities to foster knowledge exchange and implement advanced solutions to enable a more prosperous and sustainable future.



Basma AlBuhairan, Managing Director, C4IR Saudi Arabia, [Agritech: Shaping Agriculture in Emerging Economies, Today and Tomorrow](#), published by [C4IR India](#) in April 2024



#### Quantum for Society: Meeting the Ambition of the SDGs



C4IR Saudi Arabia's collaboration with the World Economic Forum holds the potential to unlock innovative solutions that address sustainability challenges through the power of quantum technologies, while also creating a more inclusive, collaborative, innovative and impactful innovation ecosystem in Saudi Arabia and beyond.



Basma AlBuhairan, Managing Director, C4IR Saudi Arabia, [Quantum for Society: Meeting the Ambition of the SDGs](#) released as part of [Sustainable Development Impact Meetings – Transformative Action on the SDGs](#) in September 2024



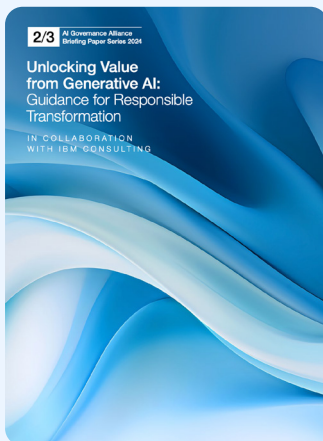
## Agritech for Women Farmers: A Business Case for Inclusive Growth

“

Gender-inclusive agritech can unlock untapped potential for sustainable growth and development. Collaborative efforts of government, private sectors, startups, academia, investors and civil society are essential to leverage agritech solutions that address the unique challenges faced by women farmers and empower them with access to technology and agricultural resources. Empowering women in Saudi Arabia's agriculture sector is key to realizing Vision 2030, as their contributions are vital to food security and sustainable rural development.

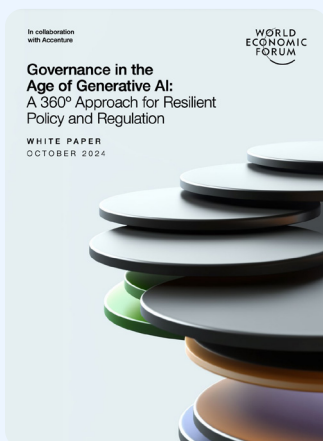
”

Basma AlBuhairan, Managing Director, C4IR Saudi Arabia, [Agritech for Women Farmers: A Business Case for Inclusive Growth](#) released in November 2024



## Unlocking Value from Generative AI: Guidance for Responsible Transformation

The Managing Director of the C4IR Saudi Arabia contributed as thought leader to the report [Unlocking Value from Generative AI: Guidance for Responsible Transformation](#), published by the WEF, in collaboration with IBM consulting, as part of the AI Governance Alliance initiative, in 2024



## Governance in the Age of AI: A 360° Approach for Resilient Policy and Regulation

The Managing Director of the C4IR Saudi Arabia contributed as thought leader to the White Paper [Governance in the Age of AI: A 360° Approach for Resilient Policy and Regulation](#), published by the WEF, in collaboration with Accenture, as part of the AI Governance Alliance initiative, in 2024

# 07

# Awareness

## 7.1

### C4IR's growing reach

The C4IR Advocacy and Partnerships team is committed to expanding our impact and influence, showcasing Saudi leadership in emerging technologies and ensuring shared, sustainable growth.

In 2024, the C4IR team launched a series of strategic initiatives, high-impact awareness campaigns, webinars, participation in prominent events, and C4IR-organized seminars to advance the adoption of 4IR technologies and reinforce Saudi Arabia's innovation ecosystem.

2

Awareness Campaigns

2

Buzz videos

12

Engagements hosted/participated in

1

Flagship event – World Quantum Day

10

Seminars/Webinars with over

6

Local community events

## 7.2

### Campaigns

#### Brand Awareness Campaign

Through October and November, we targeted both the general public and the research community, reaching over 3 million people, to emphasize C4IR Saudi Arabia's vision and initiatives, showcasing the Kingdom's 4IR leadership. These messages were disseminated via LinkedIn and X, highlighting the Centre's contributions to Saudi Arabia's innovation ecosystem.

#### Autonomous Systems Campaign

The Autonomous Systems campaign, launched in December, spotlighted C4IR Saudi Arabia's pioneering projects in collaboration with industry, government, and academia. This initiative underscored the transformative impact of autonomous systems across multiple sectors, further solidifying C4IR Saudi Arabia's reputation as a leader in innovation and cross-sector collaboration.





## 7.3

### Buzz videos

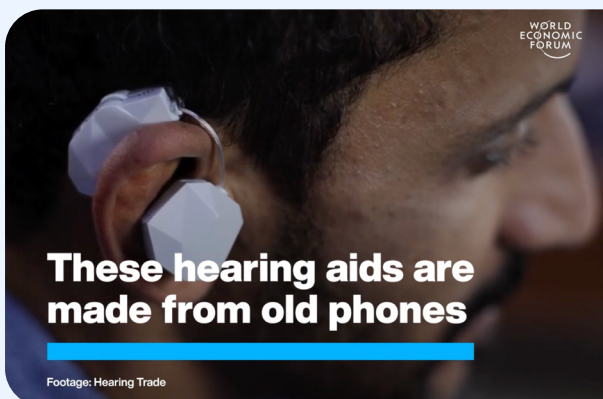
C4IR Saudi Arabia provided stories to WEF's Buzz videos team, highlighting key initiatives within Saudi to be highlighted through WEF's global platform.

#### SAARIA – AI detecting a vision threatening disease

C4IR Saudi Arabia highlighted **SAARIA**, a ground-breaking AI solution developed by SDM for the early detection of diabetic retinopathy, a major cause of blindness. The video highlighted how SAARIA's tech improves health outcomes while also saving an estimated 11 billion SAR across Saudi Arabia's diabetic population, further emphasizing the Kingdom's Vision 2030-empowered innovation and startup ecosystem.

#### The Hearing Trade project

C4IR Saudi Arabia's second video highlighted **The Hearing Trade project**, an stc initiative supported by C4IR Saudi Arabia that produces affordable, eco-friendly hearing aids from discarded phones. Addressing the dual challenges of electronic waste and accessibility, it aligns with Vision 2030's goals of innovation and sustainability.



## 7.4

### Webinars

#### Smart Vision

C4IR Saudi Arabia, in partnership with **stc** and **Giza Systems**, hosted the "Smart Vision KSA: Shaping Tomorrow's Cities Webinar" in January. The event brought together industry leaders and experts to discuss advancements in Smart Cities, focusing on sustainable urban technologies, smart infrastructure, and the future of urban planning. Participants explored how innovations like IoT, AI, and Big Data enhance urban living, promote sustainability, and shape modern, efficient cities.

#### Smart Cities, Digital Twins and The Metaverse – Opportunities and Challenges

C4IR Saudi Arabia and **iot squared** hosted "Smart Cities, Digital Twins, and the Metaverse – Opportunities and Challenges," in February. Experts explored the potential of smart cities, the intricacies of digital twins, and the evolving landscape of the metaverse, shedding light on the opportunities and challenges these technologies present for societies and urban environments.

#### Industry Tech talks

C4IR Saudi Arabia, in partnership with **KAUST Innovation** and **Saudi Industrial Development Fund (SIDF)**, launched Industry Tech Talks, a webinar series featuring industry experts discussing best practices and the latest technological trends driving innovation and efficiency. Six webinars were conducted between July and December 2024, covering a range of topics including AI, the quantum economy, battery electric vehicles, and the green hydrogen supply chain.

**INDUSTRY TECH TALKS**

Jul-Dec 2024

Zoom

جامعة الملك عبدالعزيز  
King Abdulaziz University of  
Science and Technology

50  
YEARS

SIDF  
صندوق التنمية الصناعية السعودي

Saudi Arabia  
Centre for the  
Fourth Industrial  
Revolution

## 7.5

### C4IR events and seminars

C4IR Saudi Arabia hosted a series of events and seminars, deepening our impact and showcasing Saudi thought leadership on the integration of emerging 4IR technologies into national policy frameworks and innovation ecosystems.

#### World Quantum Day (WQD) 17-18 April 2024

C4IR Saudi Arabia hosted an exhibition to celebrate **WQD** in partnership with King Salman Science Oasis (KSSO). Our primary goal for WQD 2024 was to promote understanding of quantum technologies and make the complexities of this revolutionary science accessible to every visitor.

Exhibitions from leading institutions, including KACST, KFUPM, and IBM, showcased cutting-edge advancements in quantum computing and cryptography through live and virtual demonstrations. These were supported by panels and expert seminars on topics such as the role of education in fostering a quantum-ready workforce and integrating quantum technologies into the Saudi economy.

The event successfully brought together experts, policymakers, and the public, garnering significant media attention. The event was also highlighted by the WEF platform, attracting global interest, and listed as the first Saudi event on the World Quantum Day official website.

#### Event



50+ in-person visitors



9 panel discussions, seminars, and technical sessions



9 exhibits



#### Coverage



3

Media Interviews



124

social media posts reaching over 18 million people



30,730

Twitter/X impressions



3000+

live streams viewed



28

articles across Arabic & English local, regional, & international media



44,744

LinkedIn impressions



14 Million

people media reach



75%

positive media sentiment





## Awareness Seminars in collaboration with Oliver Wyman

### Saudi Arabia and the Rise of Quantum Economy, 18 April 2024

The inaugural panel, Saudi Arabia and the Rise of Quantum Economy, was held as part of the World Quantum Day event. It highlighted the revolutionary impact of quantum technology on global industries across computing, communication, sensing, and more.



### Smart Education and its implications for the Kingdom, 10 December 2024

The Smart Education: Implications for Saudi Arabia seminar at the KACST Conference Hall brought together experts to explore the transformative impact of AI in education and its alignment with Saudi Arabia's Vision 2030. Key discussions covered insights into how AI is reshaping human-machine interaction, a student's perspective on AI integration in learning, and findings from a report on global best practices in smart education, including lessons from Estonia, South Korea, and the UAE. The seminar sparked a dialogue on AI-driven innovation in education, promoting knowledge sharing and advancing a smarter, more inclusive learning ecosystem in Saudi Arabia.



**3**  
panelists and one  
moderator



**1700**  
LinkedIn  
impressions



**50**  
in-person  
participants



**800**  
Twitter/X  
impressions

## 7.6

### C4IR event participation

The C4IR Saudi Arabia leadership team contributed insight, experience, and expertise to events around the world, demonstrating Saudi Arabia's responsible 4IR leadership.



### Quantum Innovation Summit 28-29 February 2024, Dubai

C4IR Saudi Arabia played a key role at the inaugural [Quantum Innovation Summit](#), underscoring our commitment to advancing quantum technologies. With the quantum technology market projected to reach \$106 billion by 2040, the summit brought together global experts, industry leaders, and innovators to explore the transformative potential of quantum technologies across sectors, particularly biotechnology, logistics, communication, and climate science.



### Hannover Messe Exhibition 22-23 April 2024, Hannover

C4IR Saudi Arabia participated in the [Hannover Messe Exhibition](#), offering valuable insights into the latest advancements in sustainability and efficiency from quantum technologies and digital platforms. Through meetings with industry leaders and sector companies, we explored new opportunities for collaboration and partnership.





## Pasqal Middle East Roadshow 15 May 2024, Riyadh

C4IR Saudi Arabia participated in the **Pasqal** Middle East Roadshow with our managing director delivering the keynote, “Quantum Leap: Unveiling the Quantum Economy Landscape in the Kingdom,” highlighting the transformative potential of quantum technologies. The event also showcased key initiatives, including World Quantum Day 2024 and the launch of our Quantum Economy Project.



## 5th International Smart Factory Summit 12-14 June 2024, Switzerland

C4IR Saudi Arabia participated in the **5th International Smart Factory Summit** in collaboration with the UN Industrial Development Organization. Dr. Ibrahim AlShunaifi, our project lead for SMEs, spoke on the panel, “Smart Factories Around the Globe for a Sustainable Future,” to share insights on leveraging smart factory and other 4IR technologies to enhance productivity and sustainability in SMEs.



## Saudi Food Show 21–23 May 2024, Riyadh

C4IR Saudi Arabia participated in the Saudi Food Show, hosting a session on “The Role of Technology in Improving the Efficiency and Production of Food.” The discussion highlighted the importance of emerging technologies in addressing food security challenges, such as IoT-based smart monitoring to reduce food spoilage and precision agriculture to optimize resource use in-line with Vision 2030 sustainability goals.



## KSU Industrial Intelligence (I2) Pilot Program | KSU visit 11 September 2024, Riyadh

C4IR Saudi Arabia hosted an interactive evening with students from King Saud University representing various engineering disciplines. We engaged in insightful discussions about the future workforce and the Centre’s role in supporting Saudi Vision 2030 innovation goals.



## World Manufacturing Forum (WMF) 14–15 October 2024, Milan

C4IR Saudi Arabia attended to the [World Manufacturing Forum 2024](#), examining the innovative pathways shaping the future of manufacturing and paving the way for progress and growth.



## Future of Mobility Forum 28 November 2024, Riyadh

The Future of Mobility Forum focused on integrating modern technologies to enhance logistics while driving sustainability and economic growth. C4IR Saudi Arabia moderated, “The Future of the World and Saudi Arabia in Autonomous Vehicles,” panel, welcoming distinguished speakers who explored the challenges and opportunities of adopting advanced transportation technologies.



## Frontier Technology for the SDGs Global Conference for Giftedness and Creativity 24–26 November 2024, Riyadh

C4IR Saudi Arabia participated in the [Global Conference for Giftedness and Creativity 2024](#), joining the, “Strategic Planning for the Gifted and Creative Workforce” panel. Our team shared insights on nurturing talent in the 4IR age, emphasizing giftedness as a societal asset, and highlighting the need to foster both emotional intelligence and intellectual aptitude. We advocated for public-private collaboration to build ecosystems that support gifted individuals through partnerships, mentorships, and innovation hubs, while also discussing global trends to recognize and embrace neurodiversity as part of driving innovation and prosperity for all.



## UNESCO's Fireside Chat on Emerging Technologies 9 December 2024, Riyadh

During the UNESCO's Fireside Chat on Emerging Technologies, held on the sidelines of King Salman Science Oasis' Science and Technology Festival, C4IR Saudi Arabia highlighted our key initiatives harnessing 4IR technology to advance Saudi Arabia's Vision 2030. We showcased how our fellowship programs, the Quantum Economy Project, and frameworks for autonomous mobility are fostering innovation, collaboration, and SME 4IR integration.



# 08

## The Road Ahead: Building Momentum and Scaling Impact

Since its inception in 2020, C4IR Saudi Arabia has transformed from an ambitious vision into a collaboration powerhouse, leading Saudi Arabia's advancements in the governance of 4IR technologies. As we look to fulfilling our nation's Vision 2030 goals, we will build on the momentum and success of 2024 to achieve national objectives, shape the global conversation, and drive meaningful change.

In 2025, our events, projects, initiatives, and activities will champion Saudi Arabia's 4IR leadership as we work to harness quantum technologies to enhance for economic growth, sustainability, elevated quality of life. We invite all our partners, stakeholders, and broader community members to join us in shaping a sustainable, innovative future for all.

### 8.1

## Proposed Activities for 2025

### Events

In 2025, we plan to continue to drive local and international engagement with partners, stakeholders, and the general public on the transformative potential of 4IR technologies.

- **World Quantum Day 2025 (WQD 2025):** To celebrate 100 years of quantum mechanics, Saudi Arabia will host WQD for a 2nd time to raise awareness of quantum technologies
- **WEF Quantum Economy Regional Policy Roundtable:** As part of WQD 2025, we will aim to present the Quantum Economy Blueprint and discuss its applicability to the Middle East region
- **Third Saudi Forum on 4IR:** This high-profile global event on governance and innovation will drive inclusive innovation to empower SMEs







## Projects

Our proposed projects for 2025 are designed to align with Vision 2030 goals and national priorities to deliver maximum impact and scalability.

1. **Enabling Saudi Leadership in Critical Minerals:** Saudi Arabia has a unique opportunity to position itself as a global leader in supporting the energy transition through leveraging an estimated US\$2.5 trillion worth of untapped mineral wealth. This project will aim to support:
  - Addressing Global Supply Chain Vulnerabilities
  - Driving Economic Diversification
  - Enhancing Environmental Sustainability
2. **Harnessing Synthetic Media for Education Transformation:** Synthetic media and generative AI present transformative opportunities to reshape education in Saudi Arabia by enabling personalized learning experiences, addressing teacher shortages, and enriching cultural and educational content. This project will aim to support:
  - Revolutionizing Education
  - Accelerating Vision 2030 Goals
  - Addressing Risks with Governance

## Initiatives

### WEF Bioeconomy Initiative

The tech-driven bioeconomy represents one of the most significant opportunities to revolutionize value chains and provide better commercial outcomes by transforming sectors such as healthcare and chemicals.

C4IR Saudi Arabia will join in the WEF's bioeconomy Working Group A: "Conveying Real World Value," to assist in developing and disseminating an evidence-based value proposition for bio-innovation.

Together with the WEF and our partners, we will aim to:

- Promote the economic potential of bio-solutions to enhance understanding and foster acceptance
- Tackle obstacles impeding the widespread use of biosolutions in various industries and regions
- Guide a safe and equitable transition to bioeconomy practices within environmental limits

### Community building (national and global partnerships)

Collaboration, partnerships, and community building will continue to drive our successes and deepen our impacts. From partnerships with global giants like Saudi Aramco, the Public Investment Fund, and the World Economic Forum to local initiatives to empower SMEs and students, we will continue to build a network of change-makers dedicated to sustainable progress.

### Talent and leadership development

Our unwavering focus on talent development will continue to guide our strategy. Empowering the next generation of thought leaders remains at the core of our mission.

- **Fellowships:** We remain committed to supporting emerging talent through the three fellows in our third cycle of the Seconded Fellowships and the prestigious WEF Fellowship
- **Saudi Arabia Team:** By fostering professional growth within our team and nurturing young talent across Saudi Arabia, we aim to create a legacy of innovation, resilience, and excellence

# Saudi Arabia

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