Saudi Arabia
Centre for the
Fourth Industrial
Revolution

Newsletter Q1 2025

C4IR Saudi Arabia

Insights and Highlights



01 Welcome Letter
A Community of Purpose

We're delighted to share the latest insights and updates from our work within the **Fourth Industrial Revolution (4IR) ecosystem** in **Saudi Arabia and beyond.**

At **C4IR Saudi Arabia,** we are committed to enabling the **responsible and equitable adoption** of 4IR technologies. This quarter, we highlight our contributions, including **technical reports, participation in global 4IR discussions, and preparations for the World Quantum Day 2025 celebrations.**

Looking ahead, we're excited to continue **growing our 4IR community of purpose,** working together to drive **positive economic, social, and policy impact** through emerging technologies.

Thank you for being part of this journey!



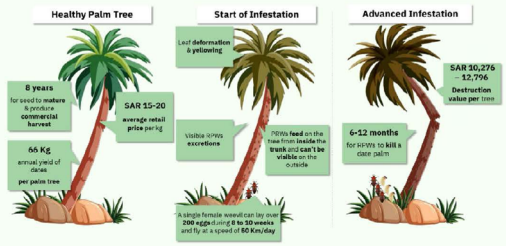
02 News and Developments
Enabling Technological Transformation

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



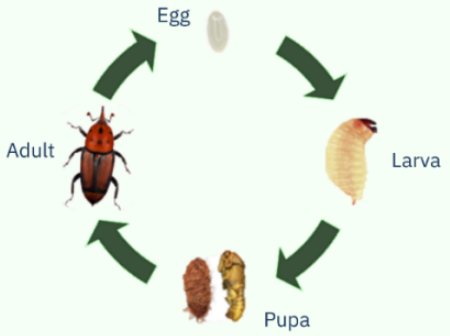
Saudi Arabia is one of the world's leading dates producers, with the industry serving as a cornerstone of the nation's agricultural economy. However, **Red Palm Weevil (RPW) infestations** pose a significant threat to this vital sector.

To address this challenge, C4IR Saudi Arabia has launched **the RPW Infestation Solutions Project,** and our recently released **technical report** provides key insights into its progress.



Source: Developed based on data from International Center for Agriculture and Biological Sciences, Allmha Landscaping and General Contracting, Date Palm Research Center of Excellence at King Faisal University (KFU), and NCPD

***Figure 1**: RPW Life Cycle Stages*



In collaboration with the Ministry of Environment, Water, and Agriculture (MEWA), the National Center for Palms and Dates (NCPD), the National Center for the Prevention and Control of Plant Pests and Animal Diseases (WEQAA Center), WEQAA Center, and leading academic institutions, we are leveraging **advanced technological solutions to combat RPW infestations effectively.**

Quantum Economy Landscape in Saudi Arabia

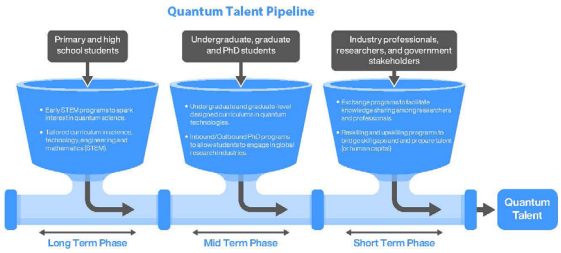


The emerging **quantum economy will transform industries and society** around the world. Saudi Arabia is strategically positioned to harness the benefits of quantum technologies to revolutionize its own economy, strengthen national security, and advance society.

C4IR Saudi Arabia's report into the state of the Kingdom's quantum preparedness analyzes the Kingdom's current capabilities, identifies key stakeholders within the quantum ecosystem, and **highlights innovative initiatives** in the quantum technology domain.

The report also explores the potential impact of this technology across various sectors, including healthcare, energy, and finance, alongside its social, economic, educational, and geopolitical dimensions.

This report marks a **pivotal step** in charting a course toward a national quantum roadmap, setting the stage for substantial technological and economic growth.



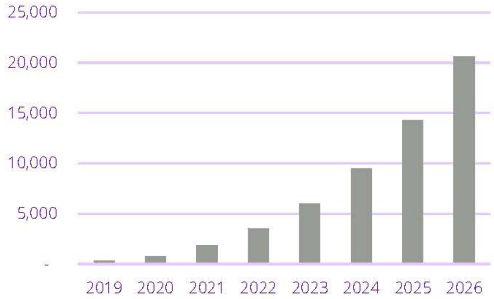
5G Private Mobile Networks Revolutionizing Industry with Private 5G Technology



Mobile Private Systems (MPN) are a recent innovation in telecommunications, offering businesses **devoted, customizable, and low-latency communications** private networks, which advance integration with IoT technology and enhanced security.

In partnership with stc (Saudi Telecoms Company), C4IR Saudi Arabia produced a community paper highlighting how businesses can **seize the opportunities of MPNs,** and presenting possible adoption options.

Our paper is a valuable resource for businesses of all sizes looking to embrace this technology, particularly by offering **technical and financial assessments** of how companies can integrate MPNs into their operations.



Number of Private LTE/5G Networks, Worldwide.

03 Event Highlights

Future Leaders and 100 Years of Quantum

SHAPE MENA 2025

The WEF's **Global Shapers** initiative is a **worldwide community empowering young leaders** through 500 local hubs. Khobar is home to Saudi Arabia's Global Shapers hub with young Saudi leaders preparing to make a sustainable contribution to their communities through research, planning, and project execution.

The Khobar Hub's **SHAPE MENA 2025** event brought together **200 Shapers from 50 Hubs across 40 countries** to collaborate, exchange experience, and develop new ideas under the theme, "Shaping Youth Resilience: Navigating Transformations."

Dr Basma AlBuhairan joined the event's "Meet the Leader" session, engaging in insightful conversation with young leaders about resilience, leadership, and the importance of stepping outside of comfort zones. During the session, attendees explored what it means to lead with authenticity while learning from challenges, embracing collaboration, and believing in one's ability to create impact, also reinforcing that **leadership isn't about having all the answers; it's about adaptability,** integrity, and a commitment to continuous learning.

Engaging with the WEF Global Shaper community reflects **C4IR Saudi Arabia's commitment to preparing future leaders,** as we do through our fellowship programs. We look forward to seeing what these young leaders go on to achieve!







WORLD QUANTUM DAY 2025

The UN has designated 2025 as **International Year of Quantum Science and Technology** (IYQ) commemorating a century of quantum science. At C4IR Saudi Arabia, we're preparing to host World Quantum Day (WQD) celebrations on 14 April – chosen to reflect the first three digits of Planck's constant (4.14) .

Celebrate World Quantum Day 2025 with C4IR Saudi Arabia

Discovering Quantum Possibilities:
A Day of Exploration and Inspiration

- Date: 14 April 2025
- Time: 08:00-17:00
- Location: The Garage, KACST

Learn more about the event on our **website** and **register** to attend.

Highlights from World Quantum Day 2024









04 | Q&A
Expert Insights



Dr Saad Al Owayyed
Quantum Economy Project Lead,
C4IR Saudi Arabia

What is the quantum economy?

Let's start small – literally. Quantum mechanics governs the behavior of matter and energy at the atomic and subatomic levels. The **quantum economy is an emerging sector** fueled by technologies that harness these principles to vastly accelerate computing power, high-fidelity sensors, and communications security.

What are the main opportunities in the quantum economy?

The quantum economy is set to drive innovation across multiple sectors, unlocking new industries, products, and markets. Potential breakthroughs include faster drug discovery, efficient supply chains, and more accurate financial forecasting through quantum computing's ability to detect hidden patterns. And these are just the opportunities we can foresee today - many more are likely to emerge as quantum technologies continue to evolve.

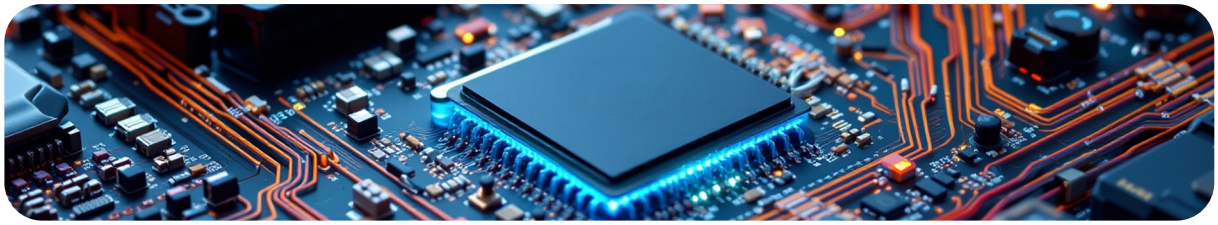
What role does Saudi Arabia play in the global quantum race, and what investments are being made?

While Saudi Arabia's quantum economy is still in its infancy, the Kingdom is actively investing in becoming a global leader in quantum technology. Spearheaded by C4IR Saudi Arabia's Quantum Economy Project, **Saudi is the first nation to pilot the World Economic Forum's Quantum Economy Blueprint** as we develop a comprehensive national quantum roadmap across the public, private and academic sectors. Our own **Quantum Economy Landscape in Saudi Arabia report** is a key element of this roadmap as it lays out the Kingdom's current quantum capabilities and offers a series of recommendations for public, private, and academic sectors to effectively embrace quantum technology.

Key investments are already driving momentum. **Saudi Aramco** has partnered with **Pasqal** to deploy the country's first quantum computer, while a collaboration with **IBM** is exploring quantum applications in the energy sector. Additionally, **NEOM** has joined forces with **Arqit** to advance quantum cybersecurity, reinforcing Saudi Arabia's commitment to shaping the future of quantum technology.

What are the biggest challenges in developing a quantum ecosystem in Saudi Arabia, and how are they being addressed?

Developing a skilled quantum workforce is the main one. C4IR's Quantum Economy Landscape in Saudi Arabia report maps out how the Kingdom can address workforce-readiness, while Saudi universities have begun integrating quantum-focused topics into their curricula. Organizations like the National Information Technology Academy (NITA), King Abdulaziz City for Science and Technology (KACST), and the Saudi Federation for Cyber Security and Programming are also contributing through internships, specialized training, and skill transition programs.



05 Spotlight
Young Talent Taking Action



Muneera AlShunaifi
Seconded Fellow, C4IR Saudi Arabia

The C4IR Saudi Arabia seconded fellowship program is **empowering young Saudi talent** to contribute to national and international policy development on key 4IR issues. In 2024, for the program's third series, **Muneera AlShunaifi** joined from C4IR Saudi Arabia's partner stc (Saudi Telecom Company) to work with C4IR Saudi Arabia and the wider World Economic Forum global 4IR network, which included a one-month placement at the WEF's headquarters in Geneva.

Muneera's fellowship deepens C4IR Saudi Arabia's partnership with stc, one of our core collaborators. Our work with stc also includes the recent community paper, **5G Private Mobile Networks Revolutionizing Industry with Private 5G Technology.** This paper examines the latest telecoms innovation, mobile private systems (MPN), and highlights how businesses can take advantage of this new technology.

During her fellowship, Muneera collaborated with **global experts, policymakers, and industry leaders** to shape strategic frameworks and policy recommendations for Artificial Intelligence (AI), the industrial internet of things (IIOT), and advanced and autonomous mobility (AAM) systems.

- **Artificial Intelligence (AI):** Muneera worked closely with the World Economic Forum's AI Governance Alliance (AIGA), deepening C4IR Saudi Arabia's longstanding collaboration with the AIGA.
- **Advanced and Autonomous Mobility (AAM):** She contributed to two key C4IR Saudi Arabia AAM outputs: an assessment of the current state of autonomous technology in Saudi Arabia and the white paper, 'An Integration Framework for Autonomous Mobility.'
- **Industrial Internet of Things (IIoT):** Muneera worked on the co-development of a strategic framework outlining policy recommendations to support IIoT adoption in the Kingdom.

Reflecting on her fellowship and looking ahead, Muneera says that she is excited 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."



06 C4IR Saudi Arabia on the Global Stage

As part of the World Economic Forum's 4IR network, C4IR Saudi Arabia actively engages in events to collaborate with partners, stakeholders, and experts in scaling up key initiatives.

World Economic Forum Annual Meeting, 20-24 January

C4IR Saudi Arabia reinforced its dedication to advancing innovation and spearheading the Kingdom's global 4IR leadership through our dynamic presence at the WEF's annual meeting in Davos. This included hosting and participating in immersive sessions in the Global Collaboration Village metaverse, alongside real-world discussions and meetings exploring vital 4IR opportunities and key themes.

C4IR Saudi Arabia:

- Hosted **five metaverse sessions,** including an immersive panel on Innovation Ecosystems and discussions covering advanced manufacturing and regulatory frameworks for innovation in this unique venue for conversations on the intersection of technology, policy, and regulation.
- Joined an immersive panel discussion on Innovation Ecosystems at the Global Collaboration Village in the Congress Center. **C4IR Saudi Arabia outlined its role in translating strategy into actions** through stakeholder engagement and collaboration, with a commitment to advance the 4IR technologies in the Kingdom.
- Participated in a panel under the theme, "Metamorphosis of Industrial Cities into Smart, Innovative, and Sustainable Hubs," hosted by the **Royal Commission for Jubail and Yanbu.** C4IR Saudi Arabia emphasized the Kingdom's approach to **urban transformation, integrating technology, world-class infrastructure, and strong government support.**
- Examined **aviation's role in shaping a connected, resilient future** in a session hosted by GACA at the Saudi House Pavilion. C4IR Saudi Arabia emphasized pilot programs, designated airspaces, and tangible use cases as essential to unlocking the potential of Advanced Air Mobility (AAM).
- Shared **insights on leadership, innovation,** and the evolving role of women in shaping Saudi Arabia's future. At the World Changers Power Women's Talk, Dr Basma AlBuhairan highlighted the value of authenticity, perseverance, and adaptability in driving transformation across industries.
- Explored the **evolving relationship between technology and humanity** at the HCLSW Roundtable, Technology & Humanity. C4IR Saudi Arabia shared insights on how emerging technologies can be harnessed responsibly and inclusively to benefit society by supporting human-centric progress, supporting robust governance, and ensuring equitable access to new technologies.



BioGravity, 16 January

C4IR Saudi Arabia took part in the "Health & Space, for the Betterment of Humanity" panel at BioGravity's fourth workshop, discussing **the link between space exploration and biomedical innovation,** highlighting space-driven medical technologies and their potential to transform healthcare on Earth. The session also emphasized research commercialization, cross-sector collaboration, and the role of Communities of Practice in driving innovation.





SPE AI Symposium, 4-5 February

This event examined **AI's ability to optimize resource management,** enhance energy efficiency, and lead the charge in reducing the energy sector's environmental footprint. C4IR Saudi Arabia addressed the paradox of AI's demand for energy against the potential for AI-led innovations to create cleaner, smarter, and more resilient energy systems.

Innovation in Economies of the Future, 10 February

C4IR Saudi Arabia moderated the discussion, **Smarter, More Human-Centric Cities- Rethinking Public-Private Collaboration for Impact.** The conversation examined how advanced technologies enable cities to learn, adapt, and evolve. The session underscored the importance of innovation and collaboration in ensuring that cognitive cities are designed to better serve people, enhancing urban living through intelligent, responsive systems.





LEAP 2025, 11 February

Dr Basma AlBuhairan joined a panel discussion hosted by Women in Tech Saudi Arabia, **"Shaping the Future: Innovation, Skills Growth, and Collaboration in the Age of Intelligence."** Her participation highlighted some of C4IR Saudi Arabia's projects enhancing the uptake of digital solutions across the public and private sectors. Dr. AlBuhairan also moderated a session hosted by the Saudi Research, Development and Innovation Authority (RDIA) titled, **"Smarter, More Human-Centric Cities- Rethinking Public-Private Collaboration for Impact",** examining the shift from traditional smart cities to "cognitive cities."

Symposium of Quantum Computing and Technology, 17-18 February

The Centre participated in a workshop on the Quantum Economy Project at the Symposium of Quantum Computing and Technology at the King Fahd University of Petroleum & Minerals (KFUPM). The session focused on integrating human capital, developing quantum economy infrastructure, and ensuring secure access to critical quantum technology hardware, highlighting the need for both the Saudi public and private sectors to **accelerate strategic investments in quantum technologies.**



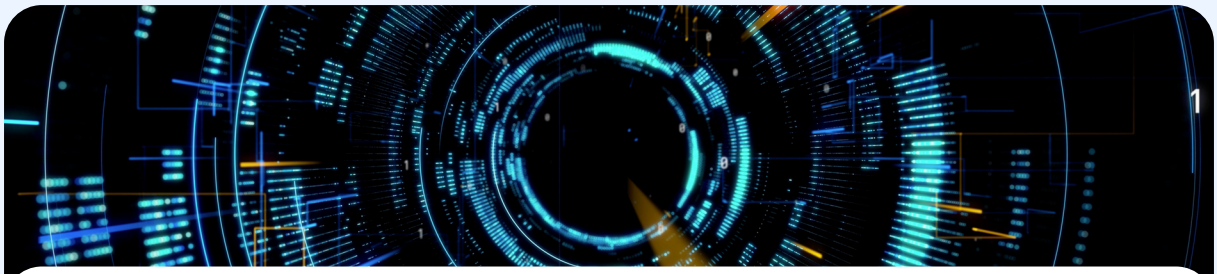


KPMG Public Sector Excellence Forum, 24 February

Dr Basma AlBuhairan joined the session, Balancing Present Delivery with Future-Ready Human Capital and Technology. She highlighted **Saudi Arabia's investments in AI and emerging technologies** and stressed the importance of public-private partnerships, lifelong learning, and localized training programs. Dr. Basma emphasized the shift from reactive adaptation to proactive transformation, urging industries to embrace experimentation and cross-sector collaboration.

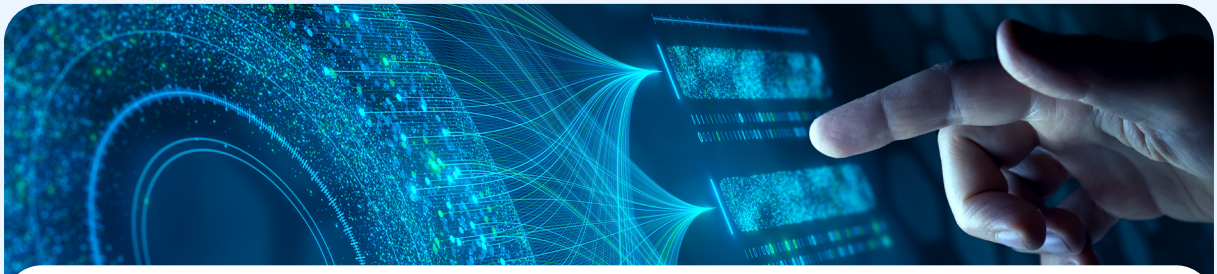
07 Upcoming Events

Explore Quantum Science with C4IR



Dawn of the Quantum Age, 20 March (virtual session)

Mohamed Bourennane, Professor of Quantum Information and Quantum Optics at Stockholm University, will provide **an overview of quantum mechanics,** exploring its historical evolution and foundational principles, wave-particle duality, atomic structure, quantum tunnelling, and quantum entanglement.



Quantum Materials: Designing the Future, 29 April (virtual session)

Shadi Fatayer, Assistant Professor in Applied Physics at KAUST, **will explore the fascinating world of quantum materials,** including their distinctive characteristics, topological quantum materials, superconductors, 2D quantum materials, quantum spin materials and quantum dots.



Quantum Computing: The Next Frontier, 27 May (virtual session)

Abdulmohsen Alsaui, a PhD candidate focusing on optical and wireless communication, photonics, quantum communication, quantum computing and machine learning, will introduce the **fundamentals of quantum computing** and its transformative potential.

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Stay up to date on the latest projects and developments shaping the Kingdom's 4IR ecosystem

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