Saudi Arabia
Centre for the
Fourth Industrial
Revolution

December 2023

2023 Annual Report

KACST
مدينة الملك عبدالعزيز للعلوم والتقنية

VISION رؤية 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

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Foreword

Chairman of the Board Statement

As we embrace 2024, Saudi Arabia continues its resolute journey toward innovation and progress. Building on the robust foundations established in the preceding years, the Kingdom consistently demonstrates regional and global leadership in innovation, anchored by the visionary Saudi Vision 2030.

In this era, where innovation is the linchpin of endless possibilities, Saudi Arabia is emerging as a paragon of creativity and progressive thought. Our top ranking in the Government Electronic and Mobile Services Maturity Index (GEMS) is a testament to our pledge to deliver efficient, digitally accessible government services, establishing a global benchmark for excellence.

Supported by a team of dedicated professionals and my commitment as Chairman, the Centre for the Fourth Industrial Revolution in Saudi Arabia (C4IR Saudi Arabia) is a testament to our nation's dedication to shaping the future. Together, we are steering the Centre to new heights, contributing significantly to the Kingdom's innovation and technological advancement journey. Our Centres at the heart of these transformative efforts, working with the RDI Authority, the industry, and academia. We have initiated groundbreaking projects and collaborations that place Saudi Arabia at the forefront of the Fourth Industrial Revolution. Our Centre's role in advancing sectors such as AI, IoT, and blockchain are redefining our national landscape and contributing significantly to global discourse and innovation practices.

Furthermore, hosting the Second Saudi Forum for the Fourth Industrial Revolution in October 2023, the C4IR Saudi Arabia has further cemented its position as a hub for technological and innovative leadership, attracting global experts and pioneers.

As 2024 unfolds, we sincerely acknowledge the visionary leadership of 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, as the cornerstone of our journey toward unparalleled prosperity, innovation, and global stature.

At C4IR Saudi Arabia, we are inspired by this leadership to forge ahead, fostering innovation that resonates not just within our borders, but across the globe. Our Centre is more than an institution; it symbolizes Saudi Arabia's ambitious journey toward a future defined by technological excellence and innovative leadership.

Thank you,

Dr. Munir M. Eldesouki
Chairman of the Board of C4IR Saudi Arabia and President of King Abdulaziz City for Science & Technology (KACST)

Managing Director Statement

We've achieved significant milestones across various projects, initiatives, and programs, each of which has not only bolstered our standing but has also made a meaningful impact on society.

Our collaborations with a diverse range of partners, encompassing both governmental and private sectors, have been yielding promising outcomes. These partnerships have opened new avenues for research, development, and outreach. In an ever-evolving 4IR landscape, our Centre remains at the forefront, addressing crucial regulatory aspects of innovation.

Looking ahead, we stand poised for further achievements. Our strategic plan, though ambitious, is well within our grasp, thanks to the steadfast support of our exceptional team, esteemed partners, and valued stakeholders. We hold unwavering confidence in our continued leadership in shaping the Fourth Industrial Revolution.

I extend my heartfelt gratitude to all who have played a pivotal role in our success. Your unwavering dedication and commitment form the bedrock of our accomplishments.

Together, we are prepared to navigate the challenges and seize the abundant opportunities presented by the Fourth Industrial Revolution and Vision 2030, ensuring a brighter and prosperous future for all.

Thank you,

Dr. Basma AlBuhairan,
Managing Director and Board member of the C4IR Saudi Arabia

Executive Summary

The Saudi Arabia Centre for Fourth Industrial Revolution (C4IR Saudi Arabia) is part of the World Economic Forum's global network of Centres for the Fourth Industrial Revolution (C4IR Network) and, as such, the Centre is a do-tank connecting the government, the industry, and the civil society to advance the implementation of emerging technologies for a human-centred transformation of industries, the economy and the society in the Kingdom of Saudi Arabia. To that end, the Saudi Arabia C4IR engages with a vast network of stakeholders in action-oriented research, developing and testing technology governance frameworks and protocols, and extensive awareness and knowledge sharing.

2023 has been an exciting year for the C4IR Saudi Arabia, and some of the year's highlights include hosting the 2nd Fourth Industrial Revolution Forum for Fostering Innovation for Collective Impact and Sustainable Development, showcasing Saudi Arabia's rapid ascent as a global technology hub; the visit of Børge Brende, President of the World Economic Forum, to discuss the latest transformations and strategic directions in the Kingdom in the realms of digital transformation, emerging technologies, R&D, and the start-up scene; the publication of Modernizing Small & Medium sized Enterprises in Saudi Arabia, a Community Paper co-branded with the WEF; and partnering and providing expert reviews for the challenge UpLink's challenge on Smarter Climate Farmers.

Throughout 2023, the Centre continued forging private and public partnerships critical to C4IR Network's agenda and technology domains. To this end, the C4IR Saudi Arabia conducted six projects related to AI and Machine Learning, Autonomous Systems, Data Economy and Policy, Digital Inclusion, and Quantum Computing, demonstrating the Centre's continued efforts to bring together entities from public and private sectors.

As part of the C4IR Saudi Arabia knowledge dissemination commitment, in 2023, and in addition to the Modernizing Small & Medium-sized Enterprises in Saudi Arabia , Centre also published the White Paper 6G Technology. Connecting the un-connected, the report 2nd C4IR Saudi Arabia Forum: Fostering Innovation Through Collective Impact for Sustainable Development report, the 4IR Use Case Guide and the article Autonomous mobility: 3 lessons for success from Saudi Arabia . The Centre also joined three initiatives: the G20 Smart Cities Alliance, WEF's Lighthouses, and the AI Governance Alliance. It embarked on the 4IR seminars & webinars series, and it was actively involved with the Youth Innovators in Industry 4.0 Hackathon, which took place at stc's headquarters to support Saudi youth in getting ready for the next digital revolution. Apart from hosting the 2nd Fourth Industrial Revolution Forum, the C4IR Saudi Arabia engaged in a dozen of international and local events, notably with a dedicated booth in the LEAP 2023, as keynote speaker in the 2023 Sixth International Conference of Women in Data Science, and as speaker in the UNESCO International Conference on Ethics of Neurology, the Annual International Conference on Smart Mobility, and the WEF's Annual Meeting of the New Champions (AMNC23).

Last but not least, in 2023, the Centre launched the second edition of the Seconded Fellowship Program, in which partner organizations nominated employees for a 12-month program during which the fellows engaged in activities such as conducting research on different emerging technologies, research, engaging and supporting workshops and advocacy activities.


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About the C4IR Saudi Arabia

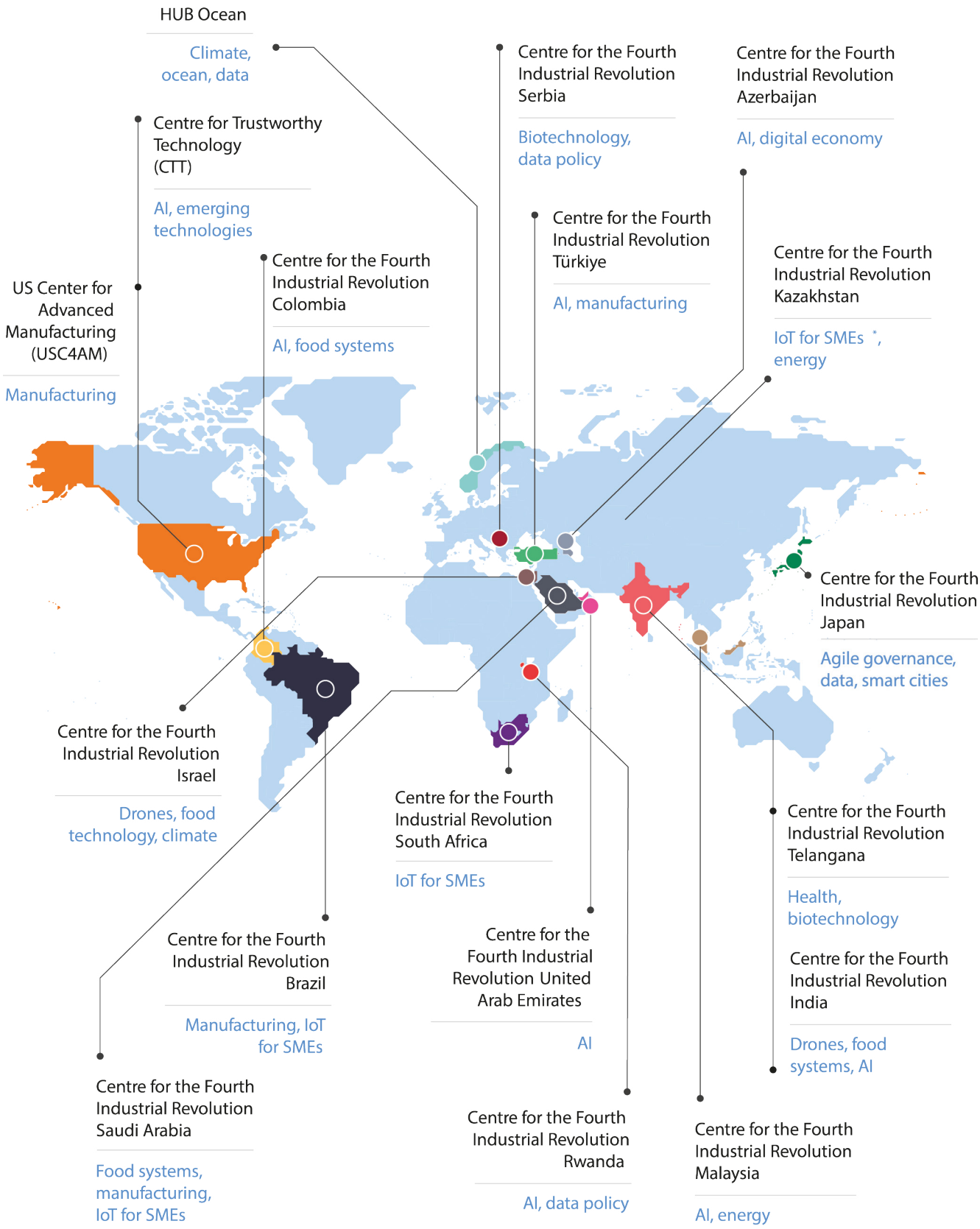
The Centre for the Fourth Industrial Revolution in the Kingdom of Saudi Arabia is a “do tank” to advance the benefits of 4IR in the Kingdom by developing practical and adaptive protocols for the governance of emerging technologies.

The C4IR Saudi Arabia is one of the 18 WEF Affiliate centres globally that form the C4IR Network, which connects centres across the globe to catalyse international collaborative efforts towards concrete multi-stakeholder output for the development and testing of scalable technology governance frameworks. The C4IR Saudi Arabia is hosted by the King Abdulaziz City for Science and Technology (KACST) in Riyadh.

The network’s technology domains

- AI and machine learning
- Digital inclusion
- Autonomous Systems
- Digital safety and trustworthy technology
- Climate and agri-tech
- Metaverse
- Bioeconomy
- Quantum
- Data economy and policy
- Space

WEF C4IR Network



C4IR Saudi Arabia Vision

To influence the governance of 4IR emerging technologies development and deployment for the long-term benefit nationally and globally.

C4IR Saudi Arabia Mission

To be a platform for multi-stakeholder collaboration across public and private sectors that aims to maximize the social and commercial benefits and minimize the risks of 4IR technologies in the Kingdom of Saudi Arabia through facilitating the co-design, testing, and refinement of governance protocols and policy frameworks.

C4IR Saudi Arabia Objectives

1. Maximize social and commercial benefits of 4IR Technologies in KSA.
   (Boost 4IR Awareness)

2. Accelerate the development and implementation of practical and adaptive protocols for the governance of emerging technologies to foster adoption and best serve Vision 2030.
   (Boost Participation)

3. Engage key national 4IR Stakeholders from the government and private sector to co-create, co-design, and pilot new approaches to 4IR technologies adoption and governance.
   (Boost 4IR Impact)

4. Support building national 4IR capabilities and prepare future-forward talents with hands-on international experience to develop key 4IR governance skills through C4IR Saudi Arabia fellowship opportunities.
   (Build Human Capabilities)

Centre's Leadership

The Board of Directors, chaired by the President of the host institution, the King Abdulaziz City for Science and Technology (KACST), is collectively responsible for directing C4IR Saudi Arabia towards achieving its vision. The Board ensures that C4IR's strategic leadership, impact, governance, management supervision, and control are robust and effective. It ensures the long-term success of the Centre and the delivery of impact to its stakeholders, the Saudi government, the private sector, and civil society, in addition to the C4IR Network.

H.E. Dr. Munir ElDesouki
President, King Abdulaziz City for Science & Technology
Chairman

Dr. Hosam Rowaihy
Advisor, Ministry of Economy and Planning

Eng. Suliman Almazrou
CEO, National Industrial Development and Logistics Program

Prince Sultan bin Khalid bin Faisal Al Saud
CEO, Saudi Industrial Development Fund

Dr. Mishari AlMishari
Deputy Director, National Information Center, Saudi Data Artificial Intelligence Authority

Eng. Mohammad Robayan
Deputy Minister For Technology, Ministry of Communications & Information Technology

Haithem AlFaraj
Chief Technology Officer, stc

Mr. Meshal Almashari
Director of Digital Strategy, Investment and Growth Organization, Saudi Aramco

Mark Hallum
Director Of Advanced Manufacturing And Innovation, NEOM

Dr. Ali Alshaikhi
Vice President Of Research And Innovation, King Fahd University of Petroleum and Minerals

Prof. David Keyes
Senior Associate to the President for Strategic Projects, King Abdullah University for Science & Technology

Prof. Yazeed AlSheikh
Vice President For Graduate Studies & Research And Development, King Saud University

Jeremy Jurgens
Managing Director & Head Of The C4IR, World Economic Forum

Dr. Basma AlBuhairan
Managing Director, C4IR Saudi Arabia
Board Secretary

Summary of Performance

6 Active Projects — Boost 4IR Impact

5 Publications — Boost 4IR Impact

1 WEF Fellowship Program Engagement — Build Human Capabilities

6 Seconded Fellowship Program Engagement — Build Human Capabilities

14 4IR hosted events — Boost C4IR Awareness

122 Social Media Posts — Boost C4IR Awareness

100+ Press releases — Boost C4IR Awareness

2 C4IR Newsletter — Boost C4IR Awareness

17 Global engagements — Boost Participation

2

Fellowship Programs

2.1 WEF's Coordination Fellowship

The C4IR Saudi Arabia project fellowship aims to produce a set of insights and recommendations on 4IR technology as well as advance the progress of the Centre's technology project portfolio—in the case of the current fellow, autonomous vehicles (AV) testing and deployment, with Saudi Arabia context as a case study. It also aims to help increase awareness and transparency of these technologies among the population. The fellowship is aligned with the C4IR Network's goal of helping shape the trajectory of technological change. The fellow will engage the public and private sectors and foster collaboration, which aims to contribute to Vision 2030 by training the next generation of 4IR thought leaders.

The coordination fellowship ensures connectivity and collaboration between the Forum and Centre for the Fourth Industrial Revolution Saudi Arabia and is the focal point for this engagement. The engagement entails the following activities:

Fellows are selected by C4IR KSA based on their specific skills and expertise and are based at WEF headquarters, as pre-agreed with the Contracting Entity. The current fellow is Waleed Gowharji, working under the guidance of the Leads for Autonomous Mobility and Engagement at the C4IR Network and Partnerships.

2.2 The Seconded Fellowship Program

After its success in 2023, the Centre launched the second cycle of the Seconded Fellowship Program to offer employees of partner organizations the opportunity to be part of the Centre's activities, projects, and events. The program is an accelerator for a dynamic community of exceptional employees with the vision, courage, and influence to drive positive change. This program offers fellows the opportunity to engage with ongoing activities at C4IR Saudi Arabia and the global C4IR Network, gain valuable knowledge about multi-stakeholder dialogues, and create impact by participating in projects and events. C4IR Saudi Arabia partner organizations nominate employees to be seconded at the Centre for 12 months, either in a full or part-time capacity. These Seconded fellows will be allocated to projects at the beginning of 2024.

Benefits of this program include:

- Engaging with the C4IR Network to curate, build, and share world-leading insights and learnings on 4IR technologies.
- Gaining practical experience at the intersection of technology and public policy, with deep insights into the mindset of industry leaders, regulators, and academia.
- Creating a lasting network of connections across institutional and geographic borders.
- Fellows are high-performing individuals with demonstrated expertise in their industry, technology or policy area, and looking for a unique professional growth opportunity to achieve and drive high-impact results.

Seconded Fellowship Testimonials

Sara AlHudaithy, a Senior Legal Advisor at NIDLP and a full-time Seconded Fellow at the Centre, says: “These experiences not only expanded my skill set but also underscored the importance of collaboration and knowledge exchange in driving innovation...”

Raneem Al Kattan, a Public Policy Department Manager at SDAIA and a part-time Seconded Fellow, “Throughout my fellowship, I have had the privilege of working on the Heavy Lift Drones project ... This experience gave me a deep understanding of the real-world implications of technology governance and equipped me with the necessary tools to navigate the complexities of the 4th Industrial Revolution.”

Afnan Mahfouz, a Senior Policies Specialist at the Ministry of Economy and Planning and a part-time Seconded Fellow, states: “The Seconded Fellowship Program at the C4IR Saudi Arabia is a unique opportunity for mid-career professionals to work on cutting-edge projects at the intersection of technology and society ... it offers work on real-world projects with leading experts worldwide.”

3

Projects and Initiatives

Throughout the 2023, the C4IR Saudi Arabia conducted six projects with 63 stakeholders whose outcome was the signature of four Memorandums of Understanding, six publications, and seven workshops.

Output

Stakeholders

3.1 Accelerating the Impact of IIoT for SMEs

Overview

Small and medium-sized enterprises (SMEs) are primary drivers of economic activity and social mobility, accounting for over 90% global companies and 70% global employment opportunities. Yet SMEs need to be faster to embrace the technological advancements ushered in by the fourth industrial revolution. As a result, we find that corporations with more than 500 employees have higher adoption rates of in-house Industrial Internet of Things (IIoT) than smaller enterprises. Such corporations are six times more likely to leverage IIoT, further driving economic inequality, restricting social mobility, and slowing down global industrial productivity. The benefits of resolving the adoption barriers faced by SMEs through digital transformation best practices for example, could potentially unlock benefits for a broader set of stakeholders, including increased firm profitability, larger addressable markets for technology companies, expanded tax revenue for governments, and improved environmental and social outcomes.

Objectives

- To create an enabling environment for SMEs to benefit from IioT technologies.
- To ensure that SMEs have access to necessary resources and support.
- To reduce the cost of adopting and implementing IIoT technologies.

Stakeholders

Signing of MoUs

Workshops

Hackathons

3.2
AI for Agricultural Innovation (AI4AI)

Overview

AI4AI is a WEF initiative designed to drive fast-paced institutional design to identify and close policy gaps that arise from the accelerated pace of technological change. Launched by C4IR India, AI4AI is an anchored project at C4IR Saudi Arabia that aims to develop a regulatory framework to integrate the advanced 4IR technologies required to build the scope and pace necessary for a digitally-enabled transformation in the agriculture sector (starting with a pilot in the palm sector), with a focus on enhancing productivity and efficiency in all stages of the value chain. Consequently, it will help to achieve a sustainable agriculture ecosystem in the Kingdom of Saudi Arabia.

Objectives

- Promoting the development and adoption of AI and other 4IR technologies for Agricultural innovation.
- Improving productivity and efficiency through responsible and safe use of AI and other 4IR technologies.
- Ensuring an enabling environment among smallholding farmers to benefit from AI and other 4IR technologies.

Stakeholders

3.3
Heavy Lift Drones Delivery in Saudi Arabia

Overview

This project focuses on developing enabling regulations for the commercial use of heavy-lift drones by identifying a beneficial use case that can serve the operational models of heavy-lift drones for delivery applications. International aviation authorities are currently investing efforts in allowing the use of delivery drone applications with limited scope. Despite these efforts, the complete implementation of heavy-lift delivery drones has yet to be accomplished. C4IR Saudi Arabia has identified and engaged with several stakeholders and community leaders in the Kingdom of Saudi Arabia to develop the necessary regulatory frameworks for using heavy-lift delivery drones, positioning KSA as a global leader in enabling heavy-lift cargo solutions and serving as a hub for emerging drone technologies.

Objectives

- Create a platform to govern and accelerate the adoption of heavy-lifting drones in the Kingdom.
- Reform the current policies and regulations to speed up adoption of heavy lift drones.
- Increase public awareness about the utilization of autonomous air mobility.

Stakeholders

GACA · GEOSA · KACST · KAUST · King Fahd University of Petroleum & Minerals · aramco · VOLOCOPTER · Ministry of Communications and Information Technology · SHARQ · Prince Sultan University · Royal Commission for Riyadh City · Ministry of Transport and Logistic Services · Saudi Federation for Cybersecurity, Programming & Drones · SANS · Vision 2030 · National Industrial Development and Logistics Program · NEOM · Saudi Standards · Unmanned Vehicles Technology Association

3.4
Test Drive: Autonomous Systems Compliance within Regulatory Sandboxes

Overview

This project aims to develop a compliance framework for integrating mobility systems testing within a regulatory sandbox environment in Saudi Arabia. Aligned with Vision 2030, this project seeks to accelerate the transformation of the transport sector while ensuring safety and efficiency. By providing key stakeholders such as the Ministry of Transport and Logistic Services (MoTLS) and Transport General Authority (TGA) with oversight on existing pilots and deployments, it aims to inform policy interventions through a dashboard that provides insight on how to adapt the testing environment to get the required policy objectives. The project leverages TGA's Regulatory Sandbox to facilitate collaboration among companies, fostering the introduction of new solutions while ensuring compliance. Through this project, efforts are taken to strive to propel Saudi Arabia's transport sector forward by providing valuable insights for decision-makers to navigate the deployment of autonomous systems effectively. Ultimately, it will drive progress towards safer, more efficient transportation in Saudi Arabia

Objectives

- Promote development of the mobility industry in KSA by fostering collaboration and knowledge-sharing among stakeholders in the transport sector leading to more effective and efficient urban governance.
- Provide stakeholders with key insights regarding autonomous mobility testing including:

  Characterization of Current State: provide an overview of the existing state of autonomous testing within the regulatory sandbox.

  Benchmarks: Comparison against industry peers or other companies within a specified geographic context.

  Identify High-Impact Areas: Clear identification of areas with high impact, enabling companies to prioritize testing improvements effectively.

Stakeholders

KACST مدينة الملك عبدالعزيز للعلوم والتقنية
KAUST
جامعة الملك فهد للبترول والمعادن King Fahd University of Petroleum & Minerals
مدن MODON
مدينة محمد بن سلمان Mohammed Bin Salman City Nonprofit غير الربحية
NEOM
الهيئة الملكية لمحافظة العلا Royal Commission for Al-Ula
stc
وزارة النقل والخدمات اللوجستية Ministry of Transport and Logistic Services
الهيئة العامة للنقل TRANSPORT GENERAL AUTHORITY

3.5
Smart Cities

Overview

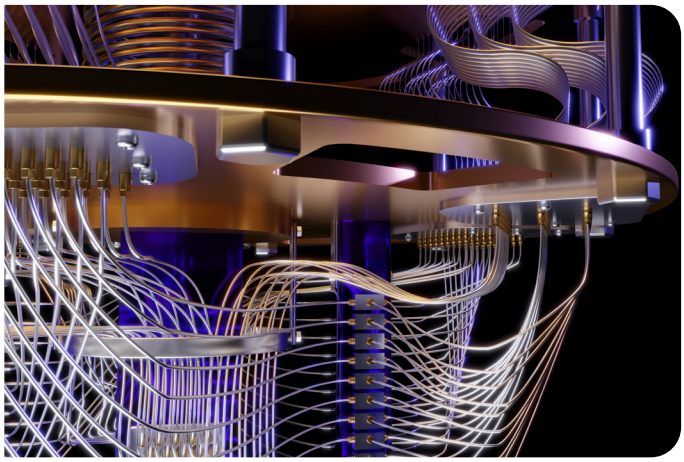
This project aims to establish a community to collaborate around sustainable urban living and design scalable guidelines, frameworks, and other tools that can be leveraged to enable responsible use of technology and promote sustainability among stakeholders.

Objectives

- To address challenges and opportunities relating to the rise of building virtual cities using frontier technologies such as Digital Twins and the Metaverse. A virtual Twin of a city acts as a common digital asset to all stakeholders, leading to better coordination of typically complex and interconnected systems such as energy and water.
- To leverage the collaborative multistakeholder community for smart cities to assess critical policy gaps related to their governance of frontier technologies.

Stakeholders

Deloitte.
هيئة تطوير منطقة المدينة المنورة
Al Madinah Region Development Authority
stc
هيئة الحكومة الرقمية
Digital Government Authority
G20 Global Smart Cities Alliance
KACST
مدينة الملك عبدالعزيز للعلوم والتقنية
KAUST
وزارة الشؤون البلدية والقروية
Ministry of Municipal & Rural Affairs
NEOM
مدينة محمد بن سلمان
Mohammed Bin Salman City
Nonprofit غير الربحية
Thynkli
الهيئة الملكية لمحافظة العلا
Royal Commission for Al-Ula
الهيئة الملكية لمدينة الرياض
ROYAL COMMISSION FOR RIYADH CITY
aramco
رؤية 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA
National Industrial Development and Logistics Program
وزارة الاقتصاد والتخطيط
MINISTRY OF ECONOMY & PLANNING
SDAIA
الهيئة السعودية للبيانات والذكاء الاصطناعي
Saudi Data & AI Authority



3.6
Quantum Economy

Overview

With 2.9 billion people lacking internet access, the digital divide already poses a significant challenge. However, the emergence of quantum technologies presents a new and potentially even wider divide, with unequal access leading to severe geopolitical and economic consequences.

There is a great need for a national quantum technology strategy that focuses on developing and sustaining different focus areas namely: R&D, workforce, industry growth, socio-economic impact, and international collaboration. The WEF Quantum Economy Blueprint provides a clear and detailed roadmap that nations can consider adopting.

Objectives

- Support in the development of a national quantum strategy.
- Cultivate collaborative frameworks and knowledge sharing within the quantum technology stakeholder community, leading to a more informed and efficient approach to governance.
- Promote the importance of quantum technologies to the public and decision-makers.
- Position the Kingdom for quantum cybersecurity sovereignty.

Stakeholders

KACST مدينة الملك عبدالعزيز للعلوم والتقنية
KAUST
جامعة الملك سعود King Saud University
NEOM
جامعة الملك فهد للبترول والمعادن King Fahd University of Petroleum & Minerals
سابك sabic
وزارة الاتصالات وتقنية المعلومات MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY
SIDF
PIF صندوق الاستثمارات العامة
stc
البنك المركزي السعودي SAMA Saudi Central Bank
aramco
رؤية 2030 المملكة العربية السعودية KINGDOM OF SAUDI ARABIA
National Industrial Development and Logistics Program
وزارة الاقتصاد والتخطيط MINISTRY OF ECONOMY & PLANNING

3.7 Initiatives

3.7.1 G20 Smart Cities Alliance

Overview

The G20 Global Smart Cities Alliance was created in 2019 with the World Economic Forum as a permanent Secretariat. The Alliance has rapidly created a global community of cities, experts, and institutions, working together to accelerate the adoption of better policies for more responsible deployment of smart city technology.

Representing more than 200,000 cities and local governments, companies, start-ups, research institutions, and non-profit organizations, the Alliance is leading numerous initiatives in more than 100 pioneer cities around the world focusing on smart city governance through mobility, administration, infrastructure, energy, as well as cultural and creative industries.

Objectives

- To address challenges and opportunities relating to the rise of building virtual cities using frontier technologies such as Digital Twins and the Metaverse. A virtual Twin of a city acts as a common digital asset to all stakeholders, leading to better coordination of typically complex and interconnected systems such as energy and water.
- To leverage the collaborative multistakeholder community for smart cities to assess critical policy gaps related to their governance of frontier technologies.

Stakeholders

Deloitte.

هيئة تطوير منطقة المدينة المنورة
Al Madinah Region Development Authority

aramco

SDAIA
الهيئة السعودية للبيانات والذكاء الاصطناعي
Saudi Data & AI Authority

3.7.2 Lighthouses

Overview

This initiative is a recommendation received from the Saudi Bureau of Experts to co-develop fourth industrial revolution lighthouses between the United Arab Emirates and Saudi Arabia under the Saudi-Emirati Coordination Council to contribute to increasing the number of establishments eligible to enter the list of the “Global Lighthouses Network” for the Fourth Industrial Revolution globally.

Objectives

1. Exchange of knowledge and experiences between the two countries.

2. Coordination between the United Arab Emirates and Saudi Arabia to increase the number of qualified establishments in the two countries to enter the list of the Global Lighthouses Network.

Stakeholders

KACST مدينة الملك عبدالعزيز للعلوم والتقنية

KAUST

جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals

Ministry of Industry & Mineral Resources

وزارة الاتصالات وتقنية المعلومات
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

مدن
MODON

وزارة الطاقة
MINISTRY OF ENERGY

aramco

مجلس التنسيق السعودي الإماراتي
The Saudi-Emirati Coordination Council

وزارة الاقتصاد والتخطيط
MINISTRY OF ECONOMY & PLANNING

3.7.3
AI Governance Alliance

The goal of the AI Governance Alliance is to bring stakeholders together to positively impact existing AI governance efforts. The initiative builds on the extensive network and resources of the World Economic Forum to engage with different regions while contributing to shaping a global approach to address the transformative nature of generative AI systems. This initiative is organized into three workstreams: Responsible Applications and Transformation, Safe Systems and Technologies and Resilient Governance and Regulation.

In 2023, the C4IR Saudi Arabia was invited to be part of the AI Governance Alliance officially, and in particular the working group on “Responsible Applications and Transformation.”

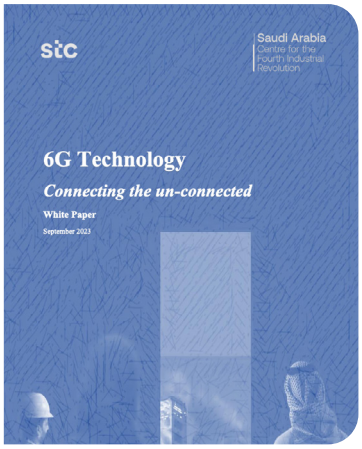
4

The Centre's Publications

4.1 Modernizing Small & Medium Sized Enterprises in Saudi Arabia

In June, the KSA C4IR published the ***Modernizing Small & Medium sized Enterprises in Saudi Arabia***, a Community Paper co-branded with the World Economic Forum, as part of our Centre's project Accelerating the Impact of Industrial Internet of Things for Small & Medium Enterprises.
The publication highlights the significant efforts in Saudi Arabia to support the digital transformation of industry, with a particular focus on industrial SMEs. As smaller businesses face multiple challenges in adopting and benefiting from the digital revolution, ensuring they are not left behind is crucial. This paper features 3 case studies from Saudi Arabia, showcasing successful private-public cooperation in supporting industrial SMEs and building a more resilient economy.

4.2 6G Technology. Connecting the un-connected



Published in September, the White Paper ***6G Technology: Connecting the un-connected*** is the result of the joined efforts of the Saudi Telecom Company (stc), and the C4IR Saudi Arabia to bridge the digital divide by advancing 6G technology.

This pivotal White Paper discusses how 6G technology, with its revolutionary potential for high-speed connectivity, is set to transform the telecommunications landscape. 6G Technology Connecting the un-connected serves as both a roadmap and a testament to the commitment of stc and C4IR Saudi Arabia to unite technology and innovation in the pursuit of universal connectivity.

4.3
2nd C4IR Saudi Arabia Forum: Fostering Innovation Through Collective Impact for Sustainable Development

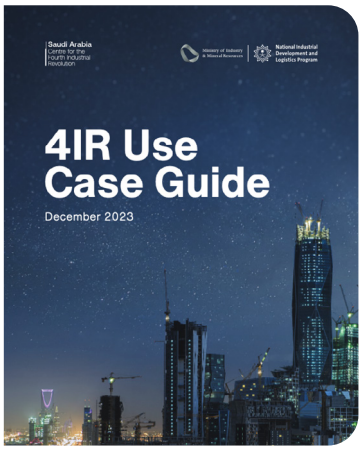
Published in October, the ***2nd C4IR Saudi Arabia Forum: Fostering Innovation Through Collective Impact for Sustainable Development*** report is a collection of the outcomes and insights of the 2nd C4IR Saudi Arabia Forum. As such, it sheds light on Saudi Arabia's pivotal role in shaping the future through innovation, global integration, and strategic public-private partnerships.

4.4
Autonomous Mobility: 3 Lessons for Success in Saudi Arabia

Published in October in the WEF's website, the article ***Autonomous mobility: 3 lessons for success from Saudi Arabia*** is part of the Annual Meeting of the Global Future Councils.

The article discusses Saudi Arabia's transformative journey toward autonomous mobility in the transportation sector and how the country is shaping the future of transportation, focusing on safety, efficiency, and innovation.

4.5
4IR Use Case Guide



Published in December, the ***4IR Use Case Guide*** is the result of a collaborative effort between the centre, the National Industrial Development and Logistics Program (NIDLP), and the Ministry of Industry and Mineral Resources (MIM)

This guide presents a comprehensive range of use cases for 4IR technologies that have been successfully implemented in various industries across Saudi Arabia. These use cases are categorized into different areas of application: 1. Digital Planning and Management Tools; 2. Maintenance; 3. Quality Assurance; 4. Logistics and Supply Chain; 5. Safety Monitoring; 6. Energy management; and 7. Automation. These use cases underscore the vast potential of 4IR technologies to revolutionize industrial and business operations, contributing to increased efficiency, safety, and quality across various sectors.

4.6
Newsletters

The C4IR Saudi Arabia has launched a quarterly newsletter in the third quarter of 2023. The newsletter provides updates on the centre's activities, including its projects, publications, and participation in events.

5

Events, Engagements, and Webinars

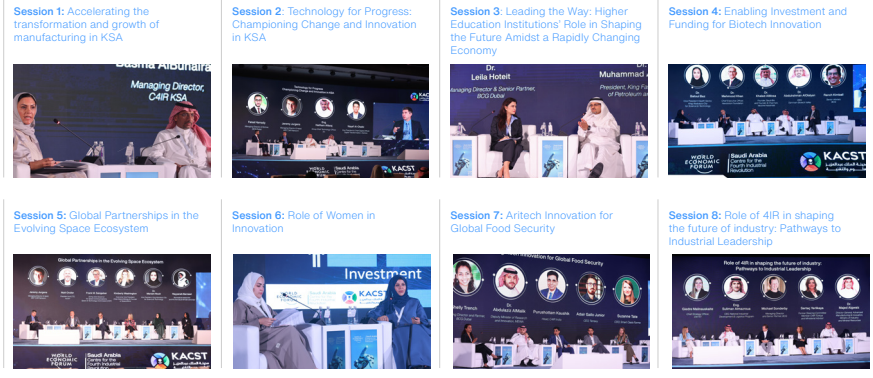
5.1 Events

5.1.1 The 2nd Saudi Fourth Industrial Revolution Forum

The C4IR Saudi Arabia hosted the second Fourth Industrial Revolution forum in Saudi Arabia on October 9 at the King Abdulaziz City for Science and Technology. The forum's theme, "Fostering Innovation Through Collective Impact for Sustainable Development," drew inspiration from the Kingdom's efforts to build and drive a culture of innovation across major sectors, such as industry, energy, health, and agriculture.

The centre called on its global network of partners, policymakers, business leaders, startups, entrepreneurs, innovators, and experts to discuss and explore some pressing challenges and transformative opportunities at the intersection of innovation, global integration, and public-private partnerships. The discussions were organized around eight sessions.

The event underscored Saudi Arabia's emerging role as a leader in early technology adoption. It emphasized the need for supportive regulatory and policy frameworks that encourage innovation and protect intellectual property. It aimed to explore how



Clockwise from top left corner 1) Fireside Chat: Accelerating the transformation and growth of manufacturing in KSA; 2) Panel: Technology for Progress: Championing Change and Innovation in KSA; 3) Fireside Chat: Leading the Way: Higher Education Institutions' Role in Shaping the Future Amidst a Rapidly Changing Economy 4) Panel: Enabling Investment and Funding for Biotech Innovation; 6) Panel: Global Partnerships in the Evolving Space Ecosystem; 5) Fireside Chat: Role of Women in Innovation; 7) Panel: Agritech Innovation for Global Food Security; and 8) Panel: Role of 4IR in shaping the future of the industry: Pathways to Industrial Leadership.

the Kingdom is building a collaborative innovation ecosystem with global partners. The event also focused on the importance of innovation, global integration, and public-private partnerships in today's interconnected world. It highlighted the role of innovation in driving economic growth, competitiveness, and societal progress, emphasizing its potential to create human-centered applications that spread globally. Public-private partnerships leverage collective expertise, resources, and networks to foster innovation for positive global impact.

5.1.2 LEAP 2023

From February 10 to 13, Riyadh celebrated the third edition of LEAP. This tech conference brings innovators and experts worldwide together to connect and build a wider network.

The centre participated in LEAP 2023 with a dedicated booth and signed three MoU with stc, Yokogawa, and EyoTic to design governance policies that support the application of 4IR technologies in the Industrial Sector. In addition, the centre's Managing Director, Dr. Basma AlBuhairan, moderated the ministerial panel discussion "Dealing with the unpredictable Economic consequences of 4IR technological progress."

5.1.3 2023 Sixth International Conference of Women in Data Science (WiDS) Conference

On March 14 and 15 Prince Sultan University organized, in collaboration with Standford University, the Sixth International Conference of Women in Data Science (WiDS). The conference aims to foster women's interest and professional participation in data science, engineering, and computer science.

The centre's Managing Director, Dr. Basma Albuhairan, delivered a keynote speech, "Leaping into the Future with Quantum". Dr. AlBuhairan's speech highlighted the importance of the upcoming era of quantum computing. Some key points of the speech included the following takeaways:

- Quantum computing can perform multiple tasks simultaneously at extremely high speed with lightning-fast results, potentially triggering organizations to collect even further consumer data, magnifying an already severe concern.
- The increase in quantum computer usage increases the probability of ethical risks.
- Given its cost and rapid development, organizations can explore the option to join a quantum ecosystem to leverage and benefit from quantum computing.
- The WEF has an initiative to support countries in their quantum technology through knowledge sharing and creating a roadmap across academia, industry, and government.

5.1.4 Youth Innovators in Industry 4.0 Hackathon

From March 19 to 21 the Youth Innovators in Industry 4.0 Hackathon was held at the stc headquarters in Riyadh. The hackathon was organized by stc, in collaboration with Ultrahack, and powered by Nokia. The aim was to support Saudi youth in getting ready for the next digital revolution.

Participants of this hackathon had to generate a well-conceived idea that leverages new emerging technologies such as AI and ML, IoT, Virtualization, AR/VR/MR, NLP, Cloud Computing, Web 3.0, or blockchain in one of the following industry verticals: Tourism, Education, Telecom/IT and Manufacturing. The idea had to be unique and with a convincing business proposition.

The centre participated as members of the jury to evaluate and select the winners of the hackathon. Winners were supported by stc in making the minimum viable product (MVP) for the most innovative ideas.

5.1.5 Annual International Conference on Smart Mobility

The King Abdullah University of Science and Technology (KAUST) hosted the International Conference on Smart Mobility IEEE (SM'23) on the university campus from March 19 to 21.

The C4IR Saudi Arabia's Project Lead for Autonomous Vehicles, Dr. Waleed Gowharji, spoke on the discussion panel "Shifting Gears towards Sustainable Mobility and Community". The panel aimed to focus on sustainable development and sustainable mobility and their connection to one another. The panel shed light on the practices required by stakeholders in industry, academia, and government to achieve sustainable mobility.

5.1.6 Paris Airshow

The Paris Air Show, the world's largest air show and aerospace-industry exhibition event, was held in Riyadh from June 19 to 23.

On that occasion, representatives from the centre joined senior government officials to discuss how policymakers can enable Advance Air Mobility (AAM) and Autonomous aviation technologies to unlock their social benefits.

5.1.7 UNESCO International Conference on Ethics of Neurotechnology

On 13 July 2023, the C4IR participated at the International Conference on the Ethics of Neurotechnology on the theme "Towards an Ethical Framework in the Protection and Promotion of Human Rights and Fundamental Freedoms" organized by UNESCO and held at its Headquarters in Paris.

The Conference explored the immense potential of neurotechnology and addressed the ethical challenges it poses to human rights and fundamental freedoms. It brought together policymakers and experts, representatives of civil society and UN organizations, academia, media, and private sector companies, to prepare a solid foundation for an ethical framework on the governance of neurotechnology.

The Managing Director of the centre, Dr. Basma Albuhairan, participated as speaker in the high-level session of the conference "A Ministerial panel on Regulations and Policy Action for Neurotechnology Ethics."

5.2 4IR Seminars & Webinars Series

The centre has hosted a series of seminars and webinars focusing on 4IR applications in KSA to give the global community a chance to participate.

5.2.1
Unleashing the Power of Industry 4.0

On March 25, the centre conducted the webinar "Unleashing the Power of Industry 4.0: Exploring the Fusion of Cloud Computing and AI".

Amr Adly, Chief Architect at Solutions at stc, delivered the webinar attended by the C4IR Saudi Arabia's local partners from the government and private sector, as well as members from the WEF and the C4IR Network.

The main takeaways of the webinar were:

- Industry 4.0 represents a paradigm shift, where digital technologies are seamlessly integrated into manufacturing processes, enabling a new era of efficiency, innovation, and competitiveness.
- The convergence of Industry 4.0, cloud computing, and AI are causing us to witness a powerful synergy that amplifies the capabilities and impact of such technologies.
- Cloud computing offers scalability, flexibility, and cost optimization, while AI empowers it with intelligent automation, predictive analytics, and cognitive decision-making.

5.2.2
Is the Metaverse Here to Stay?

On March 27, the centre hosted the seminar "Is the Metaverse here to stay?". The session was delivered by KPMG Digital Lighthouse Lead Mazhar Hussain and Consultant Shaikha AlMahasheer, accompanied by KPMG ICT Head Dr. Samer Abdallah.

Highlights from the talk included the current implementation of the Metaverse in multiple industries, such as finance, tourism, and entertainment, and projections of the public sector to be forecasted as the most important sector to invest in the Metaverse. Considerations of the Metaverse could be threefold:

- Societal- the development of more immersive virtual experiences and its contribution to building new communities
- Economical- consumers are moving quickly to adopt the decentralized and self-sovereign data aspects of Web 3.0
- Political- identity management and taxes in the Metaverse.

5.2.3
C4IR Saudi Arabia and Eyotic's Joint Webinar Series on Industrial Intelligence

In collaboration with Eyotic, the Centre initiated a webinar series to drive the digital transformation in Saudi manufacturing sectors. This series serves as a dynamic platform for sharing insights, learning, and exchanging expertise in digital manufacturing. The webinars took place on November 9, December 12, and December 20 and have so far covered pivotal topics such as Manufacturing Execution Systems (MES), the evolving role of industrial operators, and strategies to enhance shop floor productivity

5.3 WEF's Engagements

5.3.1 Uplink Food Challenge

UpLink is the Word Economic Forum's innovation platform that focuses on connecting entrepreneurs and investors to address innovative solutions to global pressing issues as outlined by the UN Sustainable Development Goals. In 2023, Uplink and the Ministry of Economy of the Kingdom of Saudi Arabia collaborated on a food challenge to source scalable solutions to accelerate action on food security, food waste management, food stability and climate smart agriculture. The C4IR Saudi Arabia was a Supporting Partner to this challenge titled 'Smarter Climate Farmers Challenge'

Twelve winners were announced from over 200 submissions. The challenge called for solutions using climate-smart agriculture approaches to improve food production, promote better living standards, respond to climate change and lead to the efficient care of the planet's resources within food ecosystems. Its focus areas included: knowledge, skills, and education; resource efficiency and sustainability; inclusive technology; and innovative financing. Twelve winners were announced from over 200 submissions.

5.3.2 Annual Meeting of the New Champions (AMNC23)

From June 27 to 29, the WEF hosted its Annual Meeting of the New Champions in the People's Republic of China under the theme "Entrepreneurship: The Driving Force of the Global Economy' Annual Meeting of the New Champions (AMNC23)".

The centre's Managing Director, Dr. Basma AlBuhairan, led a session highlighting the importance of 4.0 technologies in the digital transformation of SMEs. The session showcased Saudi Arabia's ongoing 4IR journey, focusing on the National Industrial Development and Logistics Program (NIDLP), National Productivity Program (NPP), and Future Factories Program (FFP), which aim to transform Saudi Arabia into an industrial powerhouse and global logistics hub. The session also provided insights on how to develop a large-scale strategy for SMEs to adopt emerging technologies.

Dr. AlBuhairan also facilitated a workshop on "Unlocking future preparedness for mid-size companies."; providing insights into the current SME's landscape of data use and challenges and identifying innovative and practical technical solutions to help SMEs leverage data derived from the technology revolution. It also provided a space for collaboration to shape the direction and scope of the SME Data Readiness initiative at the WEF.

5.3.3 WEF's Network of Global Future Councils

The World Economic Forum's network of Global Future Councils (GFC) is a multistakeholder and interdisciplinary knowledge network dedicated to promoting innovative thinking to shape a more resilient, inclusive, and sustainable future. The network convenes around 600 of the most relevant and knowledgeable thought leaders from academia, government, international organizations, business, and civil society, grouped in expertise-based thematic councils. It is an invitation-only community and members are nominated for a two-year term.

The centre's Managing Director, Dr. Basma AlBuhairan, attended the GFC meeting in October as a member of the Shaping the Future of Advanced Manufacturing and Value Chains Council meeting, as the 2023/2024 Council focuses on future manufacturing value chain scenarios and the impact of technological and societal shifts. It aims to analyze and influence decision-making in industry and policy, considering technology's role and implications for a future manufacturing vision by 2050.

5.3.4 Lighthouses Paving the Way to Sustainable Manufacturing

From November 30 to December 1, the World Economic Forum's Centre for Advanced Manufacturing and Supply Chains hosted the "Lighthouses paving the way to sustainable manufacturing" China, Suzhou.

This two-day event brought Senior executives and experts driving the transformation of manufacturing, operations, and supply chains focused on leveraging advanced manufacturing technologies to help organizations achieve decarbonization targets and catalyze a new era of industrial sustainability.

The C4IR Saudi Arabia's Project Lead for Accelerating the Impact of IIoT for SMEs, Dr. Ibrahim Alshunaifi, represented the centre at the event.

5.3.5 Official Visit

In March, Borge Brende, President of the World Economic Forum, visited the Kingdom and met with the President of King Abdulaziz City for Science and Technology (KACST) and the Chairman of the CRIR KSA Board, H.E. Dr. Munir Eldesouki and the C4IR Saudi Arabia team.

The visit consisted of a meeting at KACST's Innovation Tower and a tour of The Garage, an innovation hub supporting tech start-ups. During the meeting, the conversation revolved around the latest transformations and strategic directions in the Kingdom, its digital transformation, emerging technologies, start-up scene, and R&D.

The centre's Managing Director, Dr. Basma AlBuhairan, briefed Mr. Brende on the centre's latest achievements, activities, and WEF engagement. The visit was a strategic step towards further enhancing the dialogue and collaboration between C4IR Saudi

5.3.6 WEF Artificial Intelligence in Advanced Manufacturing

On June 13 the C4IR Saudi Arabia attended the WEF Artificial Intelligence in Advanced Manufacturing Event hosted by the MEXT Technology Centre and the Centre for the Fourth Industrial Revolution in Türkiye together with the Forum's Centres for Advanced Manufacturing and Supply Chains to discuss with multi stakeholders the untapped value from AI in Manufacturing, as well as the role it can play in helping manufacturing companies improve productivity, agility, sustainability and workforce engagement.

This event provided the opportunity to:

1. Gain insights from various stakeholder on Advanced manufacturing and supply chains.

2. Discuss best practices in approaching the AI journey.

3. Explore the role of collaboration in driving innovation and supporting the adoption of AI.

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The C4IR Network Community

Recognizing that technology is a powerful force that drives progress, transformation, and innovation, the World Economic Forum opened its first Centre for the Fourth Industrial Revolution in San Francisco in 2017, followed by centres 15+ across five continents, forming the WEF C4IR Network, a global network of do thanks with the mission of helping stakeholders harness the full potential of technological progress for the equitable and human-centered transformation of industries, economies, and societies.

WEF Community Meetings. The WEF C4IR Network shapes technology governance and sectoral transformation with over 30 large-scale initiatives across multiple work streams with participation from public and private organizations. As such, the WEF is continually launching new initiatives.

The Centre is engaged in ongoing and regular meetings with the following WEF communities:

1. Healthcare Community
2. Advanced Energy Solutions
3. Urban Transformation Platform
4. C4IR Communications Community
5. National AI Strategy Peer Network Sessions
6. National Quantum Blueprint Core Community
7. G20 Smart Cities Alliance
8. Artificial Intelligence Governance Alliance

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The Way Forward

Aligned with the C4IR Saudi Arabia's purpose of paving the way for the public and private sectors to partake in the fruits of the Fourth Industrial Revolution, the 2023 has seen notable strides, as reflected in this Annual Report. Moving forward, in 2024 the centre will continue with its commitment and efforts to generate substantial stakeholder value and foster contributions to the centre's core domains through:

Talent

In the understanding that our most valuable asset is our talent pool, in 2024, the centre will continue redefining its structure and operational model to cultivate an environment conducive to realizing our resources' fullest potential and instilling a collaborative "win-win" ethos.

Stakeholders

Recognizing that our engagement with stakeholders is paramount and that competent talent is fundamental to leadership in the Fourth Industrial Revolution (4IR), the Centre is poised to launch the third edition of our fellowship program in 2024. Selected participants will receive hands-on training by actively participating in centre-related projects and nurturing their skills and competencies.

Knowledge sharing

In 2024, we will continue our commitment to understanding, creating awareness, and sharing knowledge of 4IR technologies through publications and attending and hosting events, seminars, webinars, and talks featuring industry leaders. Additionally, we are exploring the launch of regular newsletters and informative materials about emerging technologies.

C4IR Network

Expanding our collaboration with the WEF and the C4IR Network also remains a central focus for 2024. We are dedicated to partnering with centres globally to advance the outcomes we produce jointly. This collaborative spirit extends to Centre-specific and joint publications within the C4IR Network.

Dashboard

To gauge and oversee our progress, we're developing a comprehensive dashboard to monitor the status of all Centre activities and engagements. This proactive tool will enable timely decision-making, averting unexpected challenges, delays, and surprises while ensuring alignment with our progress and key performance indicators (KPIs).

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