



National Transformations Institute

Realizing the Benefits of 4IR Future of Production in KSA

Learnings from the Riyadh Leadership Summit

Part 1



Context

On Thursday, December 14, 2017, A.T. Kearney and Al-Aghar Group co-hosted a gathering of Saudi Arabia's most prominent industrial and technology leaders, policymakers, and academics. Together we discussed the impact of the Fourth Industrial Revolution (4IR) and, specifically, the Future of Production on the Kingdom of Saudi Arabia. Participants also defined a crucial set of initiatives that will most enable the Kingdom to capture the benefits from the resulting technological advancements, including further diversifying and strengthening the economy. The gathering was highly interactive, featuring presentations, face-to-face discussions, and solution-oriented collaborative thinking on the most crucial issues and opportunities the country faces as it seeks to harness the economic potential of the synthesis of physical, biological, and digital technologies of the Fourth Industrial Revolution. This paper summarizes the main discussion points from the summit and identifies a foundation for building a strong Saudi community of government and business leaders working together to shape a growing, sustainable, and inclusive 4IR production system in the Kingdom.

The Riyad Leadership Summit was hosted by A.T. Kearney, its National Transformations Institute, and the Al-Aghar Group. A.T. Kearney is a leading global management consulting firm active in more than 40 countries worldwide. Since 2015, the firm has been a knowledge partner to the World Economic Forum focused on understanding the Fourth Industrial Revolution—specifically, the Future of Production and its implications on individuals, companies, countries, and the world. The National Transformations Institute, which is the Middle East platform of A.T. Kearney's Global Business Policy Council, provides insights into regional leadership and views on navigating the increasingly complex dynamics shaping the Middle East, including the Fourth Industrial Revolution.

Al-Aghar Group is an independent Saudi think tank and contributor to the transformation of the Kingdom into a knowledge-based society. The Group provides strategic options to decision-makers in the areas of social, cultural, and economic development, and engages stakeholders in dialogue throughout the process.

The authors would like to thank the following for their contributions:

- Zuhair Maghrabi, Al-Aghar Group
- Madeline Sanderford, associate, National Transformations Institute
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- Lays Badra, consultant, A.T. Kearney
- Sachidanand Sahoo, consultant, A.T. Kearney
- Daria Shevchenko, marketing, A.T. Kearney

This brief provides the executive summary of the main outcomes from the event. Detailed insights and findings from the event and the associated study are published in a three-part series:

- Part 2: 4IR Future of Production in KSA: Where is the Value?
- Part 3: KSA Country Readiness: Capturing the Value at Stake

Speakers and Panelists



Prince Turki bin Saud bin Mohammed Al Saud

President of King Abdulaziz City for Science and Technology

He also holds the following positions: Chairman of the Supervisory Committee for the National Science, Technology and Innovations Plan; Member of the Board of Trustees for Al Faisal University; Chairman of the Administrative Committee of the Saudi Energy Efficiency Center; and Chairman of the Board of Directors of TAQNIA.



Mauricio Zuazua

Partner, A.T. Kearney, and Lead Partner, World Economic Forum Future of Production

Mr. Zuazua has 18+ years of experience advising business and government leaders in more than 20 countries with policy, strategy, and transformation to enhance competitiveness, growth, innovation, industrial diversification, and national capability development.



Dr. Ibrahim M. Babelli

Acting President of Center for Strategic Development

Dr. Babelli oversees integrated planning of GDP contributing (for example, manufacturing) and enabling (for example, logistics) sectors of the economy. Prior to that he served as Renewable Energy Team Leader and Chief Strategist of King Abdullah City for Atomic and Renewable Energy and as Executive Director of the National Industrial Development Program.



Rudolph Lohmeyer

Vice President, A.T. Kearney Global Business Policy Council - National Transformations Institute

Mr. Lohmeyer is a recognized expert on scenario-based strategic planning and the institutional requirements of 21st-century statecraft and whole-of-government strategic planning. He leads the Middle East-based National Transformations Institute helping business and government leaders around the globe anticipate and plan for the future.



Dr. Lama Sulaiman

Vice Chair, Jeddah Chamber of Commerce

Dr. Sulaiman is the first female elected as deputy chairman of the Jeddah Chamber of Commerce & Industry. She is also a board member of the Jeddah-based Rolaco Trading & Contracting, the National Institute of Health Services, the National Home Health Care Foundation, and the Economic and Social Circle of the Mecca Region.



Dr. Mohammed Almajed

Advisor to the Chairman, Taqnia

Dr. Almajed has served as an advisor to HH KACST President, has advised BIAC on advanced manufacturing, worked as an advisor to HE TVTC Governor, and served as COE Chairman of the Board, Chief Operating Officer at College of Excellence & Innovation, Commercialization Coordinator, and National Satellite Technology Program Director.



Eng. Tarek Noureldin

Senior Operations Director, KSA, Philips Lighting

Tarek has 19 years of operations and supply chain experience in multiple industries, including lighting, telecommunications, and FMCG. He leads the industrial transformational vision for Philips Lighting in KSA to set the standards and competitive edge for an industrial hub serving the region from KSA.



Ihab Foudeh

Public Sector General Manager, Microsoft Middle East

Mr. Foudeh has held several positions within Microsoft in the past 17 years. He is an avid technology supporter and is a strong advocate for developers in the MEA region and for the adaptation of technology in various industries. Prior to Microsoft, Ihab held multiple R&D leadership roles working for US multinationals.



Andreea Zugravu

Principal, A.T. Kearney, and World Economic Forum Secondee 4IR Future of Production

Mrs. Zugravu has managed high-profile strategic initiatives for the World Economic Forum, leading government and private sector organizations across the world. She advises on public policies and strategies, technology and innovation ecosystems, economic development, and organizational transformation—many with focus on 4IR.

Preparing for the Fourth Industrial Revolution Future of Production

KSA Leadership Summit



What is "production" and why does it matter to KSA?

Source: A.T. Kearney/WEF Country Readiness for the Future of Production

A change in production changes a vast ecosystem in unprecedented ways



Source: A.T. Kearney analysis

4IR Future of Production offers a potential ~1 trillion SAR opportunity in KSA by 2030

Cumulative economic impact, 2017-2030 (billion SAR)



Indirect impact mostly driven by productivity; retail and manufacturing to play a key role

Cumulative economic impact, 2017-2030 (billion SAR)



Source: A.T. Kearney analysis

KSA is positioned as a follower

Incremental impact per year: ~2-5%



Unfavorable drivers of production

Source: A.T. Kearney/WEF Country Readiness for the Future of Production

Emerging global insights



Source: A.T. Kearney analysis



"In NEOM, everything will have a link to artificial intelligence, to the Internet of Things—everything."

— Crown Prince Mohammed bin Salman



"KACST is leading Industry 4.0 localization... by establishing the foundational elements [of] the Industry 4.0 ecosystem and providing catalysts to increase adoption of Industry 4.0 technologies. In collaboration with relevant stakeholders and public and private entities, it plans on increasing the competitive advantage of existing industries, extending existing value chains, and developing new ones."

— HH Dr. Turki bin Saud



"We stand on the brink of a technological revolution... the transformation will be unlike anything humankind has experienced before."

-Klaus Schwab, Founder and Executive Chairman of the WEF

Executive Summary

The Fourth Industrial Revolution (4IR) is transforming the global economic landscape and radically blurring the lines between the physical, biological, and digital worlds.¹ It is driven by a rapidly evolving and interconnected set of transformative technologies, some of which are still in the early design stages and others, such as the Internet of Things, that are beginning to proliferate across society. Production, a primary engine of economic value, is at the very core of this transformation. Technology is changing how we consume, sell and distribute, compete, localize, innovate, regulate, manage, and work—resulting in an emerging landscape referred to as the 4IR Future of Production.

This future represents an important opportunity for the Kingdom of Saudi Arabia, especially in realizing its ambitious Vision 2030 and localizing important value chains. A.T. Kearney estimates that this opportunity amounts to more than 1 trillion SAR in cumulative value by 2030, or roughly 3 percent of GDP per year. This historic opportunity comprises direct and indirect components. Direct components consist of the value of the economic contribution (in terms of addressable market size) of the five technologies that are most likely to shape the Future of Production—the Internet of Things (IoT), artificial intelligence (AI), advanced robotics, 3D printing, and enterprise wearables. The indirect components consist of the combined contribution of three interrelated value generators: productivity enhancements, incremental revenue gains, and incremental increases in investments related to 4IR. The extent to which Saudi Arabia prepares for and adapts to 4IR Future of Production will determine the extent to which the country can capture the value at stake.

Participants in the 2017 Fourth Industrial Revolution Saudi Leadership Summit identified a key set of strategic challenges facing Saudi Arabia within the context of the Future of Production. First, in terms of human capital, participants highlighted challenges in basic education, skills development, and employment preferences. In terms of technology and innovation, they raised concerns over basic infrastructure and the innovation ecosystem. Finally, regarding global trade and localization, participants focused on the vital role to be played by small and medium-size enterprises (SMEs) and the barriers these important economic contributors face in the Kingdom. In response to these challenges and the full range of emerging opportunities, participants also identified four high-priority near-term areas of focus—expand awareness and 4IR governance, localize supply chains, activate SMEs, and encourage experimentation (see figure 1 on page 6).

Beyond these initiatives, participants also raised an underlying theme crucial to all efforts related to 4IR Future of Production in Saudi Arabia: the vital importance of driving genuine, cross-sectoral, cross-societal collaboration in facing and harnessing this momentous transformation. Only through coordinated actions by the government, the private sector, civil society, and Saudi individuals can the Kingdom truly realize its potential to "leapfrog" costly, outdated stages of development and become a global champion of the Fourth Industrial Revolution.

¹ Throughout this document, 4IR Future of Production refers to the combined impact that five disruptive technologies—artificial intelligence, Internet of Things, advanced robotics, 3D printing, and enterprise wearables—will have on the global production system, including their impact on sourcing, manufacturing, consuming, and reuse of products and services.

Figure 1

Where to start in Saudi Arabia in terms of embracing 4IR Future of Production

Awareness and governance

- Establish a 4IR council including public and private sector representatives, leading academics and experts, youth, and community members
- Set a clear national 4IR vision that includes concrete initiatives and KPIs
- Develop sector-level 4IR strategies, prioritizing entertainment, tourism, and transportation/logistics
- Design targeted 4IR awareness campaigns

SME activation

- Expand SME financing, including through a 4IR fund investing exclusively in technology within Saudi Arabia
- Launch an SME platform to build a community of entrepreneurs and potential investors
- Design an integrated data portal providing access to current demographic, economic, and other data for startups and SMEs (and the private sector more broadly)

Source: A.T. Kearney analysis

Supply chain localization

- Invest in 3D printing technology, with operations concentrated near logistics infrastructure
- Revise localization policies to encourage foreign participation
- Incentivize companies investing in innovative IoT and AI solutions
- Promote 4IR Future of Production champions (for example, through a Factory of the Year competition)

Experimentation

- Assess and invest in high-risk, high-reward, high-profile projects in priority sectors, including aerospace and sustainability
- · Co-invest with relevant partners from abroad
- Incentivize related research and empower entrepreneurs in these areas
- Encourage volunteerism and student engagement

Where to Begin

Vision 2030 describes a bold future for the Kingdom of Saudi Arabia, one defined by an ambitious, economically active local population and a foundation of strong institutions— where significant trade and investment flow to and through the Kingdom, and resources are preserved for future generations. The 4IR Future of Production and the advanced technologies that characterize it hold significant potential in achieving this vision. However, the increasingly rapid pace of transformation requires accelerating reforms already under way and initiating new efforts to innovate and embrace the future. This acceleration will not be possible without broad awareness of the size of the transformation and the value at stake for Saudi Arabia. A foundational awareness represents the most crucial starting point for embracing 4IR Future of Production. With this awareness, and corresponding governance mechanisms in place, leadership can drive toward the Future of Production, beginning with supply chain localization, SME activation, and experimentation.

Awareness and governance of 4IR. While much has been said about 4IR Future of Production in Saudi Arabia, the conversation has been largely concentrated within the technology and innovation ecosystem and largely absent from Saudi policy and business planning processes. Without broader awareness and deeper understanding of the topic, it will be difficult, if not impossible, to prepare for and harness 4IR Future of Production. Therefore, it is up to public and private sector leaders who are already institutionalizing 4IR within their organizations to coordinate awareness across the Kingdom. Such awareness can be achieved through targeted campaigns and stakeholder engagement activities that explain 4IR and its global implications, the value at stake for Saudi Arabia, and the role of individuals and organizations in preparing for and embracing 4IR Future of Production.

Organizing a community of 4IR champions is a good first step. These champions can expand governance around 4IR to ensure stakeholders are aligned on the Kingdom's 4IR objectives and able to rationalize, track, and coordinate 4IR activities, including eliminating redundancies and verifying effective use of investments. A 4IR council will be central to this governance, charged with aligning and coordinating the public and private sectors, engaging leading academics and experts/advisors, and attracting interested youth and community representatives. The council's first priority is to set a clear national direction with concrete initiatives and key performance indicators (KPIs) that are equally owned and championed by those in both the public and private sectors. Council members will also focus on developing sector-level strategies, prioritizing those central to Vision 2030 such as entertainment, tourism, and transportation/logistics.

Supply chain localization. An initial driver of Saudi's 4IR adoption is to localize supply chains, with investment in 3D printing technology central to this effort. Saudi's relatively large domestic market and strategic geographic position afford the potential to become a leader in additive manufacturing. Already, 3D printing is transferring production of subsets of components and customized products closer to end-customers, primarily in sectors such as healthcare and defense. This is occurring on a small scale as costs of the necessary facilities are still prohibitive in smaller geographic areas. In the near- to midterm, the concentration of such facilities in logistics hubs, and their ability to quickly serve regional markets, is likely to drive demand.

The size of the Saudi market and its geographic position as a logistics hub for West Asia, South Asia, and East Africa represent an important advantage with significant economic potential. The Kingdom's substantial investment in logistics infrastructure will help multiply this economic potential, particularly if combined with new, efficiency-enhancing 4IR technologies, such as low-cost sensors, big data analytics, digital identifiers, and self-driving vehicles. Saudi leadership should begin investing heavily in 3D printing technology, concentrating operations near key logistics infrastructure, while also pursuing other innovative technology-enabled logistics solutions.

Globally competitive national champions also represent an opportunity for Saudi Arabia to localize supply chains. As demonstrated by Saudi Aramco, these national champions can lead the effort through localization of Tier 2 and Tier 3 suppliers, and the government can further encourage localization through more productive policies such as reducing restrictions on foreign participation. The Kingdom's national champions can also capitalize on their financial strength, deep sectoral know-how, and strong relations with academia to adopt and even develop cutting-edge solutions that apply advanced technologies, especially IoT and AI, to operations within their specific sectors. Ultimately, these solutions could serve as a model for third parties within these core industries globally, resulting in financial and employment benefits for the Kingdom. The Saudi government can encourage such activities by providing corporate tax incentives and promoting examples within the Kingdom that inspire others to participate. For example, Saudi Arabia might launch an initiative similar to Germany's Factory of the Year Global Excellence in Operations Award, an annual national manufacturing industry benchmarking competition led by A.T. Kearney.

SME activation. Another foundational opportunity for Saudi Arabia is to build up its SME ecosystem. SMEs and start-ups are becoming a source of global technological disruption that generate significant economic value. Saudi investors have acknowledged this value through substantial investments in such companies abroad. Saudi leadership can reproduce this success at home by launching programs to foster its community of SMEs and start-ups. Programs might include developing a 4IR fund for investing exclusively within the Kingdom, launching an SME platform to build a community of entrepreneurs and potential investors that

supports the incubation of new SMEs, and designing an integrated, current data portal to provide basic economic, demographic, and other data about Saudi Arabia. Additionally, the government can set up special innovation free zones that offer centralized 4IR technology-enabled services and more favorable conditions for attracting needed skills from abroad.

Experimentation. The government, in partnership with the private sector, can build a culture of innovation and smart risk taking domestically that positions Saudi Arabia as a global center for advanced technology innovation. The effort begins by pursuing a small set of high-risk, high-reward, high-profile projects that draw on areas where Saudi faces unique and crucial challenges within the context of the 4IR. For example, relevant projects might be in aerospace and defense, where Saudi spends an exceptional amount on imports from abroad, or in sustainable resource management, where Saudi faces a resource deficit.

Saudi Arabian investment in technologies related to aerospace and resource efficiency stand out as clear priorities. In aerospace, 3D printing can enable rapid production of custom, precision components. In IoT and AI, more niche solutions such as aquaponics offer significant opportunities for the Kingdom to manage widespread energy production, rationalize water usage, and produce water-efficient agricultural outputs. In this context, beyond investing in vital, high-reward projects within the Kingdom, Saudi leadership should foster innovation and entrepreneurship by "incentivizing" research in relevant fields, encouraging volunteerism and student engagement, empowering start-ups and entrepreneurs, and investing directly in emerging technologies from abroad.

Translating Commitment into Action

Saudi Arabian policymakers, private sector leaders, and civil society influencers all have a role to play in the 4IR Future of Production and in capturing the tremendous value at stake in its realization within the Kingdom. Success requires a truly collaborative effort focused on "up-skilling" the population, cultivating an active and integrated innovation ecosystem, enhancing trade and investment to galvanize the private sector, strengthening institutions, and improving resource management. Accelerating reforms in each of these areas will be crucial, combined with active pursuit of additional, high-priority opportunities in the near term and sustained momentum within the remaining opportunity areas in the long term. Participants in the 2017 Leadership Summit confirmed their commitment to this effort, reflecting the broader commitment across the Saudi community. Translating this commitment into action will be key.

AT**Kearney** Global Business Policy Council



Al-Aghar Group

The Al-Aghar Group is an independent Saudi think tank that is registered as an endowment to ensure transparency and sustainability. The group's core value lies in the active implementation of social, cultural, and economic development programs aimed at addressing national issues and international affairs of interest to Saudi Arabia and transforming the Kingdom into a knowledge-based society and economy. This was a part of our umbrella strategy (knowledge society), which was successfully integrated in the national strategy plan.

Al-Aghar's aim is to contribute to the Kingdom's vision by providing strategic options to policymakers in relevant areas.

The Global Business Policy Council's National Transformations Institute

The Global Business Policy Council's National Transformations Institute is dedicated to helping senior government and business leaders to anticipate and steer the diverse and accelerating transformations that are happening across the globe, based on rigorous strategic foresight.

The Institute specializes in strategic foresight and policy analysis, supporting government institutions and corporations at global, regional, national, and multilateral levels in anticipating, harnessing, and creating change.

Based on deep expertise in the techniques of strategic foresight and with experience at senior levels of government in strategy and policy planning, the National Transformations Institute translates macro-level analysis of the forces of change in practical, innovative courses of action. The Institute develops thought leadership on key emerging topics shaping the future environment faced by institutions across the world. It also convenes world-class regional and global forums that serve as a platform for leaders across the globe to engage with peers and subject matter experts on key strategic issues.

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