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SECTOR UPDATES
TECHNOLOGY SERIES

ADVANCED MANUFACTURING IN THE U.A.E.

MARCH 2021

BUSINESS COUNCIL REPORT

Authors

U.S. - U.A.E. Business Council

The U.S.-U.A.E. Business Council is the premier business organization dedicated to advancing bilateral commercial relations. By leveraging its extensive networks in the United States and in the region, the U.S.-U.A.E. Business Council provides unparalleled access to senior decision makers in business and government with the aim of deepening bilateral trade and investment.

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The United Arab Emirates has long viewed the development of its manufacturing sector as a key component of its economic diversification strategy. Moreover, the country has launched a series of bold initiatives to not only grow this sector but also to become a global leader in advanced manufacturing. The Covid-19 pandemic has only reinforced this trend.

This study, the third in a series of reports about how the U.A.E. is harnessing the power of technology to transform its economy, reviews government initiatives in advanced manufacturing before delving into the innovative technologies driving change. Throughout, this study highlights the key U.S.-U.A.E. partnerships at the heart of the U.A.E.'s industrial transformation.

A Strong and Growing Industrial Base

Over the past several decades, the U.A.E. has become an important producer of metals, building materials, petrochemicals, pharmaceuticals, consumer goods, and component parts for its growing aerospace and defense industry. In each sector, the U.A.E. is embracing cutting edge manufacturing processes to maximize efficiency and boost growth.

The U.A.E. benefits from several advantages that contribute to its success as a manufacturing hub. For instance, the U.A.E. enjoys a strategic location and world-class transporation infrastructure. It also offers relatively low taxes, business-friendly regulations, and the ready availability of energy, goods, and labor. The U.A.E. is building on these advantages to develop local industry, boost foreign investment, and become a leader in designing the future of advanced manufacturing.

MUBADALA

GLOBAL FOUNDRIES

Mubadala Investments in Global Foundries

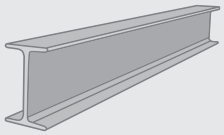
At the same time that the U.A.E. has developed its indigenous manufacturing capabilities, it has made major investments in the U.S. manufacturing sector. For instance, GLOBALFOUNDRIES, the world's leading specialty foundry with two manufacturing facilities in New York state and a site in Vermont, is 100% owned by Mubadala Investment Company. Mubadala has invested $12 billion in the GLOBALFOUNDRIES' FAB 8 facility in upstate New York's Capital Region, representing one of the largest public/private partnerships in New York's history. The company's Fab 8 facility located in Saratoga County, New York employs nearly 3,000 people and supports 18,000 indirect jobs in the region.

U.A.E. Government Initiatives

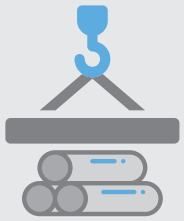
Several national and Emirate-level initiatives demonstrate the U.A.E.'s ambitious and forward-looking goals in the manufacturing vertical.

At a national level, the U.A.E. Strategy for the Fourth Industrial Revolution was launched in September 2017 to advance innovation in future technologies in order to strengthen the U.A.E.'s position as an advanced industrial hub. This strategy has accelerated the U.A.E.'s adoption of advanced robotics and digitization.

The U.A.E. is an important producer of:



Metals

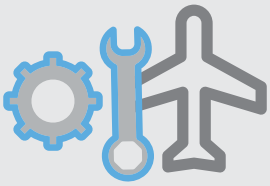


Building Materials

Petrochemicals

Pharmaceuticals

Consumer Goods



Component Parts for Aerospace & Defense

Another initiative of the U.A.E., the Global Manufacturing and Industrialisation Summit (GMIS) was established in 2015 to build bridges between manufacturers, governments and NGOs, technologists, and investors in harnessing the Fourth Industrial Revolution's (4IR) transformation of manufacturing to enable the regeneration of the global economy. A joint initiative by the United Arab Emirates and the United Nations Industrial Development Organization (UNIDO), GMIS is a global platform that presents stakeholders with an opportunity to shape the future of the manufacturing sector and contribute towards global good by advancing some of the United Nations Sustainable Development Goals.

3D Printing

3D printing, also known as additive manufacturing, is one area in which the U.A.E. is advancing rapidly. With countless applications in sectors ranging from construction and aerospace to healthcare, 3D printing is poised to play a transformational role in the U.A.E.'s industrial development.

The adoption of 3D printing technologies is especially apparent in Dubai's construction sector. The Emirate, which has introduced a 3D printing strategy in line with its broader industrial strategy, is home to the largest 3D-printed building in the world. By 2030, Dubai aims to use 3D-printed materials for 25% of all new construction.

In Abu Dhabi, 3D printing has also been embraced in a variety of innovative ways. For instance, in 2019, Etihad Engineering, the Maintenance, Repair, and Overhaul division of Etihad Aviation Group, collaborated with 3D technology providers to open an additive manufacturing facility capable of producing and reducing the weight of cabin parts.

هيئة الصحة بدبي
DUBAI HEALTH AUTHORITY

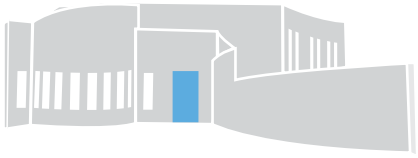
الإتحاد
ETIHAD
AIRWAYS
ABU DHABI

Healthcare presents yet another space in which the U.A.E. is applying 3D printing. In February of 2020, Dubai Health Authority opened a 3D printing lab to help DHA medical professionals test aortic valve implants, reconstructive surgery parts, and other medical devices.

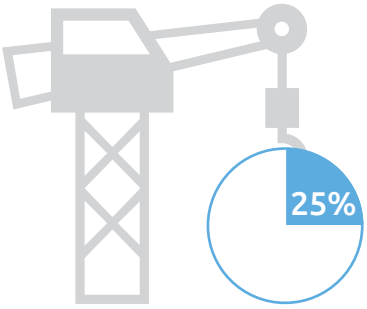
Given the many valuable uses of 3D printing technology, the U.A.E. has taken an increasingly proactive approach to partnerships in the space. In July 2020, the Dubai government launched the 3D Printing Strategic Alliance, which will allow for coordination between government and 3D printing businesses in the case of crises. The strategy, which is being led by the Dubai Future Foundation, aims to boost the U.A.E.'s capacity to manufacture locally in an effort to mitigate supply chain strains, an especially important objective in the context of the coronavirus pandemic.

Industry 4.0 & Digitalization

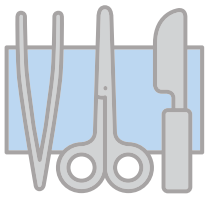
Digitalization in its many forms, including the application of Internet of Things technology, artificial intelligence, and blockchain, are also factoring heavily into the U.A.E.'s industrialization strategies.



Warsan Building in Dubai is the largest 3D-printed building in the world.



Dubai aims to use 3D-printed materials for 25% of all new construction.



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GE Aviation & Emirates Shape the Future of Flight

GE Aviation and Emirates are working together to implement digital solutions for the future of flight. Roll-out is nearing completion for GE's Flight Pulse application and electronic Flight Operations Quality Assurance (eFQQA) solution on Emirate's fleet of B777 and A380 aircraft. FlightPulse is a mobile app that provides pilots with data and analytics to help them fly more efficiently and help reduce carbon emissions. The eFQQA service uses flight data generated by the aircraft and its systems to help Emirates better manage their fleet, providing previously unavailable insight into their operations.

Emirates Global Aluminum, one of the world's largest premium aluminum producers, has played a central role in adopting digitalization to advance industry in the U.A.E. Owned equally by Mubadala Investment Company and the Investment Corporation of Dubai, EGA has long been a leader in innovation in manufacturing processes. In fact, for more than 25 years, EGA has used its own advanced aluminum smelting technology in every smelter expansion and retrofitting of older production lines. EGA's latest technology, the 10th generation, is amongst the most energy efficient in the world, and in 2016, EGA became the first U.A.E. industrial company to export its core process technology.

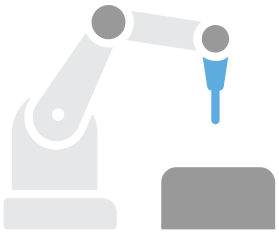
EGA is now actively progressing the use of Industry 4.0 technology throughout its operations. For example, EGA is maximizing performance at its Al Taweelah alumina refinery with the use of digital twinning—a system in which a virtual copy of a physical asset or product is used to simulate and model complex operations. EGA uses digital twinning to train new employees, optimize resources, and boost safety. EGA's technology development team continues to work with universities all over the world – including MIT – to combine the latest academic thinking with its industrial expertise.


Honeywell AI Partnership Drives Efficiency at ADNOC

Abu Dhabi National Oil Company (ADNOC) is maximizing efficiency and managing refinery maintenance using Honeywell Forge software, which collects data and processes analytics in an AI model library. Honeywell Forge monitors performance indicators to improve operations over time and provides notifications when maintenance work is necessary. The partnership comes as part of ADNOC's 2030 innovation strategy and has already led to cost savings and increased reliability.

Robotics

Strata, the U.A.E.'s composite aero structure manufacturing leader, is helping to drive transformation in the global aerospace industry through investments in robotics. In 2019, Strata announced a collaboration with U.A.E.-based DGWorld to automate assembly operations such as drilling, reaming, and countersinking—all of which are critical in the production of aircraft components. Once the process is qualified, the robotics system will be integrated into Strata's production line. Strata's move towards automating production capabilities with the use of robotics alongside employees will reduce processing times and save costs, offering greater efficiency advantages for the company's global customers.



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Strata and Honeywell Mobilize to Produce PPE

The adoption of robotics technology and use of advanced manufacturing capabilities allowed Strata to quickly pivot to producing N95 masks to help meet the U.A.E.'s demands for personal protective equipment (PPE) in the midst of the coronavirus pandemic. In partnership with Honeywell, Strata ramped up to full capacity production using its advanced technology to produce millions of the critically important masks.

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Exechon Enterprises, a joint venture between U.S. aerospace and defense giant Lockheed Martin, the U.A.E.'s Injaz National, and Sweden's Tecgrant AB is also advancing the role of robotics in the U.A.E.'s manufacturing sector. In 2017, Exechon introduced the XMini robot, the first machine tool built in carbon fiber. The XMini robot is now used by Refco Metals of Al Ghurair Group, a U.A.E. autopart supplier for leading brands like Ford.

XMini Robot

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Looking Ahead

The Covid-19 pandemic, which demonstrated the fragility of global supply chains, only reinforced the U.A.E.'s desire to build up its domestic manufacturing sector. In this spirit, in July 2020, Abu Dhabi's Department of Economic Development outlined investment opportunities in 27 fields to boost local manufacturing of basic consumer and industrial products in a push towards self-sufficiency.

At the same time that the pandemic reinforced the U.A.E.'s industrial push, the pandemic has led the U.A.E. to accelerate its ongoing efforts to leverage technology to diversify its economy and move even faster toward a knowledge-based economy. In July 2020, the U.A.E. appointed His Excellency Sultan Al Jaber, the head of Abu Dhabi National Oil Company (ADNOC), to a newly created position, the U.A.E. Minister of Industry and Advanced Technology. Both the name of this Ministry and the appointment of one of Abu Dhabi's most visionary businessmen to its head reflect the importance that the U.A.E. is placing at a national level to revolutionizing industry through the adoption of groundbreaking technologies.

As such, expect the U.A.E. to play an ever-more prominent role in the future of manufacturing in the coming years. Moreover, expect leading U.S. companies to stand side by side with the U.A.E. as it does so.

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