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Localizing high tech industries to build resilience and economic growth

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Kushal Agarwal also contributed to this report.

EXECUTIVE SUMMARY

For many decades, manufacturing in the Middle East has been disproportionately concentrated in petrochemicals. The industry contributes 24 percent of GDP in Saudi Arabia and 16 percent in the United Arab Emirates (UAE), compared with less than 1 percent in the U.S. and China.[1] Aside from light manufacturing activity—for clothing and processed foods, for example—Middle East countries import virtually all their manufactured products.

This high imbalance (the ratio of non-oil imports to non-oil exports is upward of two-to-one[2]) presents risks that weaken resilience and could impede future economic growth in the region. In recent years, some countries—chiefly those in the Gulf Cooperation Council (GCC)[3]—have launched ambitious programs to diversify and expand their manufacturing in order to meet national and regional demand, and to position the area as an export platform for companies based in other parts of the world. Typically these projects are implemented as part of a state-led master economic plan.

For governments pursuing these diversification programs, choosing which manufacturing sectors to target for development is critical. Technology is increasingly considered a high priority for localization compared with other manufacturing sectors, given its outsized importance to virtually every other industry, its growth potential, and the wide-reaching and adverse economic effects of supply disruptions. Within the vast technology universe, governments will have to place their bets on which tech segments—and even which product families within segments—to pursue with large-scale projects, and must provide ample support in order to ensure their success.

This report describes the state of manufacturing in the Middle East; the benefits of localizing technology manufacturing; and, for Middle East countries with ambitions to do so, the critical success factors.

WHEN GLOBAL MEETS LOCAL

The technology hardware manufacturing industry is highly concentrated geographically, with companies in a handful of countries functioning as providers to the world. For example, the Congressional Research Service estimated that in 2019, of the 126 semiconductor fabrication plants making 300mm silicon wafers, 36 were in Taiwan, 24 in China, 20 in the U.S., 19 in South Korea, and 13 in Japan—that is, 88.9 percent of such factories were in just five countries. Fabrication capacity is similarly concentrated, with 28 percent in South Korea, 22 percent in Taiwan, 16 percent in Japan, 12 percent in China, and 11 percent in North America—five locations accounting for 90 percent of the total.[4]

Recently, several other countries and cities have created successful tech and digital manufacturing hubs, including Vietnam with electronics assembly (see "Samsung and Intel localize in Vietnam"); Grenoble, France, with microelectronics; and Vilnius, Lithuania, with laser technology. These regions and others increasingly recognize the value in having close access to a range of technologies, especially those that enable industrial innovation and digital transformation, and the supporting ecosystems.

Samsung and Intel localize in Vietnam

Around 2005, Vietnam pursued a localization strategy in order to attract foreign investment and promote economic growth. The country analyzed a variety of product categories for market potential and fit in light of its core competitive advantages—low-cost labor and a low exchange rate—and identified electronics assembly and semiconductor assembly, test, and packaging (ATP) as key opportunities.

The Vietnamese government then moved swiftly and aggressively to put in place the key enablers to attract global tenants, including free trade agreements, significant corporate tax breaks, offers of land subsidies, and a strong seaport infrastructure.

Next, it identified and attracted two anchor tenants, Samsung and Intel. Both demonstrated solid financial positions including ample cash flow, operated multiple business lines, had a strong portfolio mix, were innovation leaders in their respective fields, were experienced in global expansion, and sought to expand further.

Intel established its first ATP facility in Vietnam in 2006. Since then, it has invested a total of US$1.5 billion, including $475 million announced in 2021,[5] making the Vietnam ATP facility the largest one in its network. Samsung started assembly of smartphones in Vietnam in 2008 with a $700 million investment. Over time, it has ramped up its smartphone assembly capacity and expanded into assembling other products, including televisions and wearables.

In the Middle East, the UAE had a head start in pushing the localization agenda, with prominent players such as Mubadala investing in tech services including artificial intelligence (AI), cloud computing, space systems, and telecommunications.

More recently, Saudi Arabia has launched ambitious programs and megaprojects,[6] which could further accelerate the technology and digital localization agenda.

The COVID-19 pandemic is expected to accelerate the localization trend as governments, regional authorities, and large manufacturers rethink their reliance on global supply chains and seek to bolster their resilience, especially in sectors such as semiconductors, whose components and finished products are critical to many other industries in-country.

Governments can consider three groups of manufactured tech products—with a combined Middle East market size of roughly $125 billion, according to our estimates—for Middle East localization opportunities (*see Exhibit 1*).

Advanced materials: Advanced materials are specifically engineered to exhibit novel or enhanced properties, such as increased strength or chemical reactivity, that confer superior performance relative to conventional materials. They include carbon fibers, advanced composites, and nanomaterials. They also include smart materials, which sense and react to environmental conditions or stimuli—whether electrical, chemical, thermal, mechanical, or magnetic.[7] We estimate the 2025 Middle East market size at $5 billion to $8 billion.

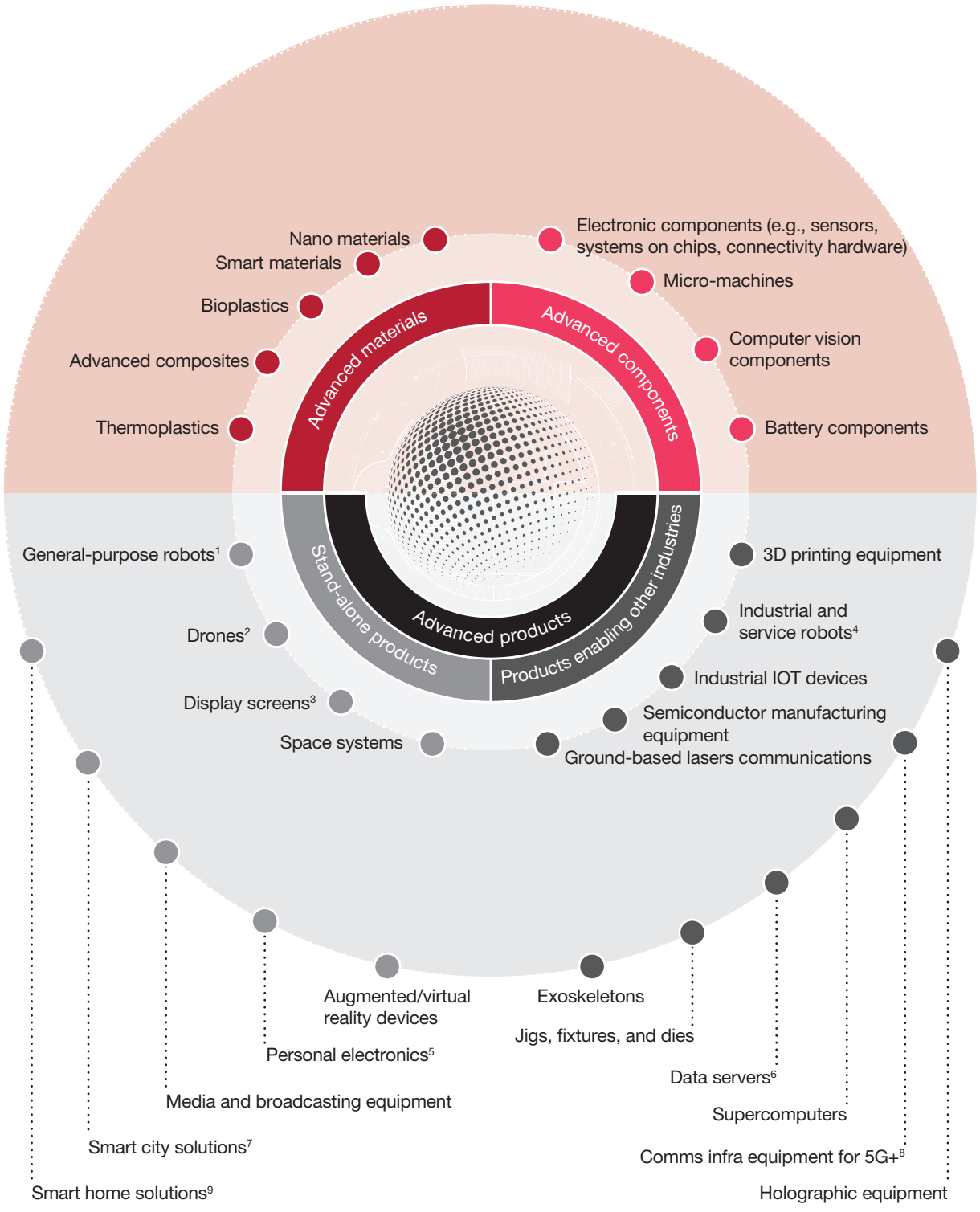
Advanced components: The advanced components category includes semiconductor components such as microprocessors and other computer chips, and computer vision components such as lenses and image sensors. We estimate the 2025 Middle East market size at $20 billion to $25 billion.

Advanced products: The advanced products category includes personal electronics, smart home devices, and space technologies, along with industry-enabling products such as industrial, general purpose, and service robots, 3D printing equipment, and exoskeletons (wearable robots). We estimate the 2025 Middle East market size at $80 billion to $90 billion.

These three groups include only products that are highly differentiated and that benefit from a footprint in-country; thus, R&D and software design and development, for example, are excluded. The groups comprise a mix of components and end products. Some of the products in these groups are disruptive and innovative; others are more mainstream but satisfy a pressing need that local companies across numerous industrial sectors have. Three products alone—semiconductors, sensors, and robots for industrial or general-purpose use—could provide an estimated $25 billion in revenues by 2025.

EXHIBIT 1

The technology and digital cluster landscape



[1] Includes learning and programmable robots. [2] Focus is primarily on commercial surveillance drones; cargo, passenger and military drones evaluated in the the mobility sector. [3] Includes smart and interactive boards. [4] Includes collaborative robots. [5] Includes phones, tablets, laptops/personal computers, gaming consoles, and wearables. [6] Includes servers used for cryptocurrency and payment transfers. [7] Includes smart parking meters, smart street and traffic lights, smart traffic monitoring systems, smart trash bins, smart energy, and smart water meters. [8] Includes fiber and networking cables, and networking devices. [9] Includes smart kitchen and home appliances, home control systems, as well as smart furniture and bins—with applications in the home and the hospitality industry. Note: IOT = Internet of Things; the technology and digital cluster landscape was defined following a bottom-up approach that considered the global industry classification standards. Source: Strategy&

STEPS TO ESTABLISH A TECH MANUFACTURING FOOTPRINT

For Middle East governments pursuing economic diversification and localization, a tech manufacturing footprint is increasingly considered a linchpin, given the visibility of massive projects already underway, the growing wave of industrialization and digitization region-wide, and the potential to secure captive in-country demand. We estimate that the market for industrial and service robots in the region could reach $4 billion by 2025, and that for industrial internet of things (IOT) devices could reach $1.5 billion. As a result, competition among countries—to stake claims on tech segments, gain first-mover advantage, and attract as tenants global tech companies looking to establish a regional foothold—will be fierce.

Already in the Middle East, NEOM Tech & Digital Company, founded in 2021 as the first subsidiary to be established out of NEOM, is building advanced digital infrastructure in Oxagon[8] to support new data centers, AI and advanced robotics operations, secure and high-speed networking, and more. Likewise, the industrialization and innovation strategy of the UAE led by Mubadala projects is focused on localization.

In this environment, governments must pursue localization opportunities that have confirmed market potential and grant them the right to win, establish a supportive ecosystem, and carefully choose tenants.

Pursue localization opportunities

Experience elsewhere indicates that the best product–market fit and product viability are based on several criteria:

- **Sufficient demand:** A product has captive and sizable national and regional market demand that exceeds minimum viable manufacturing plant capacity and scale. Products that broadly fit into one of two archetypes have significant regional potential. First, they have several applications in manufacturing environments. This includes, for example, industrial robots or industrial IOT devices. Second, they incorporate innovations that have the potential to disrupt conventional technologies. 3D printer and 5G systems reflect this archetype. Tenants potentially can break even in the short to medium term by ensuring that their offerings meet national and regional demand.
- **A fragmented market:** Localization of technology and digital products typically creates high direct, indirect, and induced economic benefits; hence, competition among countries to capture these opportunities on a product-by-product basis is stiff. Countries that attempt to localize products whose markets are already highly concentrated may have difficulty attracting tenants. Therefore, a fragmented market presents a better opportunity for investors.
- **Cost-competitiveness:** The products are cost competitive globally owing to low-cost access to labor in-country, renewable energy, and readily available raw materials.
- **Potential network effects:** The products have potential network effects for additional manufacturing localization opportunities, either vertically, with further integration within the value chain, or horizontally, with applications across multiple industries.

Establish the ecosystem

After identifying the right opportunity, it is critical for Middle East governments to put in place a supportive ecosystem conducive to growth. Some components of such an ecosystem are below.

Financial incentives
The program will take a holistic view of the cost of ownership over a five- to ten-year planning horizon. Incentives for potential tenants may include direct subsidies—for purchasing land, buildings, and equipment—to lower up-front capital expenditure requirements for greenfield projects. Incentives may also include indirect subsidies to reduce long-term operating expenditures. Import and export duty exemptions, tax breaks, or corporate tax holidays, which eliminate income tax obligations for recipients for a set number of years, are examples of indirect subsidies.

Global supply chains
The government will also need to ensure seamless integration into global supply chains, enabled by reliable and modern physical infrastructure for road, sea, and air transport, and by digital networking capacity. Depending on the current state, countries may need to improve the efficiency of their seaport and air transport services, or promote open trade by, for example, streamlining customs and border clearance procedures or simplifying trade tariffs. Also, free trade agreements with strategic demand and supply markets can help lure potential tenants.

Regulatory and policy support
Reforms to import/export and customs regulations may further support efficient logistics systems. Requirements targeted to emerging technologies may include policies to support IOT adoption, security protocols to prevent hacking and protect user data, augmented reality/virtual reality content regulations, strong intellectual property protection frameworks and conflict resolution mechanisms, and frameworks to encourage the ethical use of products and define product liability.

Reliable and cost-effective utilities infrastructure
Reliable utilities are an important prerequisite for localization. High-quality and stable electricity, for example, is critical for semiconductor fabrication because minor fluctuations in power can lead to expensive machine recalibration processes and render silicon wafers unusable. Governments can also leverage the Middle East's natural advantages in wind and solar power to satisfy requirements from manufacturers committed to renewable energy as part of their decarbonization strategies.

Talent
The government can work to develop national talent pools while also streamlining visa processes to make it easier to hire foreign labor. To encourage foreign workers with needed skills to relocate to the region, the government can provide services that will support a quality of life in line with international standards, such as world-class schools, healthcare, and entertainment centers. It can also offer talent-related financial incentives to manufacturers, including tax credits for hiring qualified in-country talent and grants to cover employee training. Additionally, the government can invest in specialized and dedicated education programs in collaboration with localized industries to build an industry-ready national talent pool.

Enabling business and trade policies
To boost investor confidence, the government must take steps to ensure investors can easily and securely conduct business. This effort may include instituting regulatory policies that permit 100 percent company ownership; easing the process for profit repatriation; offering long-term land leases; passing favorable intellectual property protection laws; lowering initial setup costs; creating streamlined, dedicated government processes for licensing, registration, and the like; and ensuring high financial recovery rates for shareholders in the event of bankruptcy.

Choose tenants carefully

To bolster the likelihood of success with its localization strategy, the government should target tenants that hold leadership positions in their industries and that, by virtue of their prominence, can attract other companies into their operating sphere. Likewise, companies that invest significantly in R&D warrant special consideration; given the blistering pace of change in the tech industry, these companies are more apt to retain their leadership position and remain viable over the long term.

Companies should also demonstrate a strong financial position, including ample cash flow to cover initial capital investments and withstand financial losses during the first few years (losses are typical with greenfield tech manufacturing investments). Companies that have prior experience with greenfield localization projects are more apt to have the capabilities to succeed. Thinking longer term, companies with multiple business units are attractive because they can generate additional manufacturing business in the future.

Meanwhile, companies considering geographic expansion should know that every tech ecosystem comes with its own risks and opportunities. The U.S. offers large captive market demand but high manufacturing labor costs. China, by contrast, offers large demand and relatively low labor costs, but with intellectual property and regulatory risks. Potential Middle East tenants will need to assess all their options and place their own strategic bets.

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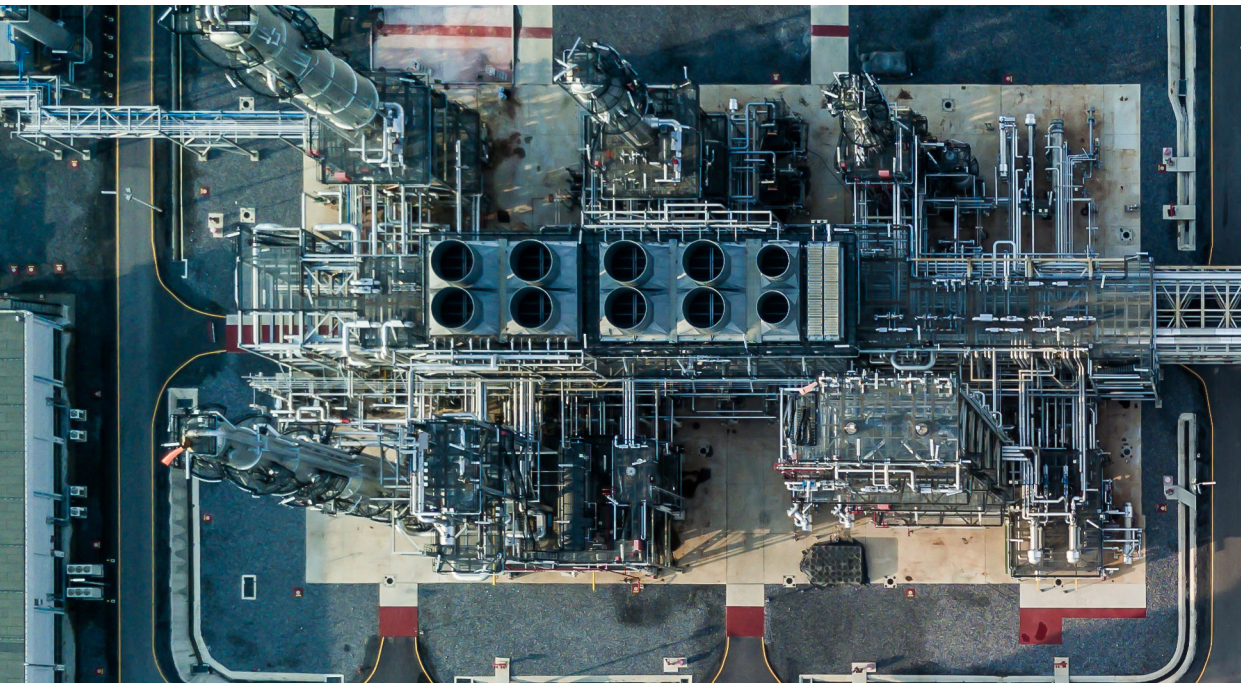
CONCLUSION

Economic diversification is an imperative. The COVID-19 pandemic threw into sharp relief the region's susceptibility to supply chain disruptions and challenged the region's resilience, making it difficult or impossible for companies to secure the technology on which they now heavily depend. Technology components and products are an integral part of modern-day economic and business activity. As competition intensifies to establish national tech manufacturing ecosystems and satisfy captive and global demand, Middle East country governments will need to move quickly to place their bets in those areas—materials, components, or products—where they have a right to win, and create the ecosystems to enable localized companies to launch and thrive.



ENDNOTES

1. Based on oil rents as a percentage of GDP for 2019, World Bank data bank (https://data.worldbank.org/indicator/NY.GDP.PETR.RT.ZS?locations=CN).
2. Saudi General Authority for Statistics.
3. The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
4. Michaela D. Platzer, Karen M. Sutter, and John F. Sargent Jr., "Semiconductors: U.S. Industry, Global Competition, and Federal Policy," Congressional Research Service, October 26, 2020 (https://crsreports.congress.gov/product/pdf/R/R46581).
5. Intel, "Intel Invests Additional $475 Million in Vietnam: In January 2021, Intel Corporation Announces a Further Investment of $475 Million in Intel Products Vietnam," January 26, 2021 (https://www.intel.com/content/www/us/en/newsroom/news/invests-additional-475-million-vietnam.html#gs.oi7nwh).
6. Karim Abdallah, Ramy Sfeir, Charly Nakhoul, and Fady Halim, "Managing the $1 trillion wave of GCC real estate megaprojects: The institutional setup" Strategy&, 2021 (https://www.strategyand.pwc.com/m1/en/reports/2020/real-estate-megaprojects.html).
7. Science Direct, "Smart Material" (https://www.sciencedirect.com/topics/chemistry/smart-material).
8. Oxagon (https://www.neom.com/en-us/regions/oxagon).

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