DAIO Defense AI Observatory

# Bonds That Separate

## Defense AI in the Arab Gulf States

Heiko Borchert

DAIO Study 25|30

Ein Projekt im Rahmen von

dtec.bw
Zentrum für Digitalisierungs- und Technologieforschung der Bundeswehr

Finanziert von der Europäischen Union
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**About the Defense AI Observatory**

The Defense AI Observatory (DAIO) at the Helmut Schmidt University in Hamburg monitors and analyzes the use of artificial intelligence by armed forces. DAIO comprises three interrelated work streams:

- Culture, concept development, and organizational transformation in the context of military innovation
- Current and future conflict pictures, conflict dynamics, and operational experience, especially related to the use of emerging technologies
- Defense industrial dynamics with a particular focus on the impact of emerging technologies on the nature and character of techno-industrial ecosystems

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# Content

# 1 Summary

Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE), the six Arab Gulf nations that form the Gulf Cooperation Council (GCC), constitute a dynamic group of (very) unequal members. Although they share the same geostrategic theater, the six countries diverge in terms of visions, political ambition, economic and financial power, infrastructure density, digitalization, and military proficiency.

In essence, the Arab Gulf region is a highly competitive policy space, which renders intra-Gulf cooperation difficult. In addition, Arab Gulf nations' readiness to maintain and expand relations with important outside partners like the United States, China, Russia, and European nations further aggravates the challenge of striking occasional intra-Arab Gulf policy alignment. Nowhere is this more visible than in the fields of digitalization and artificial intelligence (AI). Across the region, AI is a "trophy technology" that plays a key role in supporting societal transformation, legitimize the leadership of local rulers, advance and broaden economic diversification, boost indigenous capacities and skillsets, and enable military modernization. Consequently, the strategic initiatives, that have been spun around AI in the Emirates, Saudi Arabia, and Qatar, the three countries that are financially and economically more affluent than the others, are as demanding as contending.

This is the context, in which Arab Gulf nations consider defense AI. Whereas the Emirates, Saudi Arabia, and Qatar embrace defense AI with gusto, Bahrain, Kuwait, and Oman gradually grow into adopting the technology. All six nations have adopted national AI strategies that are rather mute on the role of AI for national security and defense. Arab Gulf nations primarily see defense AI to advance the armed forces' agility in response to geostrategic challenges. In addition, Saudi Arabia and the Emirates harbor competing ambitions for regional and global leadership. AI regulation is an important policy priority, also to make local e-economies attractive. Thus, leading Arab Gulf nations seek policy alignment especially with the United States while aspiring to develop new AI regulatory frameworks grounded in Islamic values.

Against this background, Qatar, Saudi Arabia, and the United Arab Emirates have embarked on envisaging a broad defense AI development portfolio. This includes considerations for the use of AI in air defense; battle/combat management systems and command and control; different cybersecurity/cyber defense applications; intelligence, surveillance, and reconnaissance; predictive maintenance; radar systems; as well as deploying and countering unmanned systems across all domains, to name some examples. Current defense AI use cases, by contrast, are

more limited and mainly pertain to predictive analytics for surveillance, space-based surveillance, cybersecurity, and unmanned systems. Overall, some elements of local strategic cultures such as the tendency to centralize decision-making, compartmentalized information flow or the preference for conformity over independent initiative pose challenges, that will need to be addressed for the successful integration of AI within Arab Gulf armed forces and the nations' defense industrial products.

Building up local defense AI capacities and capabilities goes hand in hand with the ambition to establish and expand the defense industrial and technology base. Across all nations digital ecosystems are being advanced. While the focus is on growing local capacities, Arab Gulf digital and defense ecosystems add extra strategic depth by investing abroad to form partnerships that help advance knowledge and technology transfer. In some cases, competition among members of the ruling families, that are at the helm of different local champions, adds a further layer of complexity that shapes ecosystem dynamics.

Digital transformation of the public sector occurs in parallel to building these ecosystems. Several countries have created dedicated units to advance inter-agency coordination to implement AI. The Emirates have decided to appoint Chief AI Officers across federal government entities, and Oman has a Director of AI and Advanced Technology Program Development in the Ministry of Transport, Communications and Information. Most often, however, it remains open how local defense institutions will adapt to the use of AI. Recent plans for defense digitalization in the Emirates, Kuwait, and Qatar, for example, provide early signals that defense organizational shifts are in the making.

Funding is certainly the one area that best exemplifies Arab Gulf AI ambitions. Significant three-digit billion amounts will be poured into expanding local data centers, advancing the development of local data sets and large language models compliant with Islamic ethics, boosting cloud capacities, improving local electricity supply, and tying in international partners. Although these digital infrastructure investments are likely to benefit national security and defense, specific defense AI spending figures are hard to come by. Open-source information suggests that spending can reach up to low one-digit billion amounts for selected defense AI projects – although it is hard to quantify the proportion that has been earmarked for AI-relevant software development.

Infrastructure and money are important, but regional AI leaders know that they need to invest in education and training to create jobs and grow the local talent base. Thus, all Arab Gulf nations have adopted comprehensive plans to advance primary education and university education, very often in cooperation with foreign partners. Military education institutions are following suit and update their curricula to include AI. In addition, military training exercises organized by international partners provide an important transmission mechanism to expose Arab Gulf armed forces to (foreign) defense AI solutions and concepts, with the US NAVCENT Task Force 59 playing a particularly critical role. It is, however, too early to consider the impact of these new military education and training efforts. Again, traditional preferences for passive and compartmentalized learning and a yet to mature practice of performance analysis and critique are aspects that illustrate challenges; signs that these challenges will be addressed could be seen as early signals of change to come.

In sum, this paper demonstrates that Arab Gulf nations consider (defense) AI pivotal for societal, economic, and military transformation. Given their financial power, Saudi Arabia and the United Arab Emirates – and Qatar to a lesser degree – set their international ambitions even higher. Self-consciously, these countries express geostrategic agency by shaping regional and international affairs according to their competing strategic interests. In so doing, they engage in geostrategic "equi-distancing" to maneuver between the United States, the European Union, China, Russia, and the Global South to create a new playground modeled along their preferences.

Underpinning this ambition, they invest in expanding local defense industries that shall master cutting-edge technologies like AI. This, however, is a daunting task as mastering technology alone is not enough to build defense capabilities. For this, cultural, conceptual, organizational, technological, and operational reform must go hand in hand. And here the track record is yet very mixed. In addition, Arab Gulf nations emphasize the importance of AI when this technology is at the core of geostrategic competition. This, in turn, raises challenging questions regarding data and model sovereignty, that affect the integration of AI into defense capabilities and defense industrial portfolios across the Arab Gulf. Together, the collaborative and competitive dynamics that shape these forces constitute the bonds that separate.

# ملخص


يشكّل مجلس التعاون الخليجي، الذي يضم الإمارات العربية المتحدة ومملكة البحرين والمملكة العربية السعودية وسلطنة عُمان ودولة الكويت ودولة قطر، تجمعاً إقليمياً فاعلاً ولكن غير متكافئ. فمع أن الدول الست تتشارك الموقع الجغرافي الاستراتيجي نفسه، إلا أنها تختلف بوضوح في طموحاتها السياسية، وقدراتها الاقتصادية والمالية، ومستوى بنيتها التحتية ورقمنتها، فضلاً عن تباين جاهزيتها وكفاءتها العسكرية.

تُعد منطقة الخليج العربي إقليماً سياسياً شديد التنافسية، ما يجعل التعاون بين دولها أمراً بالغ التعقيد والصعوبة. ويزداد هذا التعقيد مع سعي كل دولة إلى توطيد علاقاتها مع شركاء دوليين كبار مثل الولايات المتحدة الأمريكية والصين وروسيا والدول الأوروبية بشكل منفرد، وهو ما يقلّص فرص التوافق على سياسات خليجية مشتركة. ويتجلى هذا التباين بوضوح في مجالي الرقمنة والذكاء الاصطناعي، حيث يُنظر إلى الذكاء الاصطناعي كـ «تكنولوجيا رمزية» تحمل أبعاداً سياسية واستراتيجية.

فالذكاء الاصطناعي يُستخدم لتعزيز مسارات التحول المجتمعي، وترسيخ شرعية القيادة، وتوسيع نطاق التنويع الاقتصادي، وتنمية القدرات الوطنية، إلى جانب دوره المحوري في تحديث المنظومات العسكرية. ولهذا جاءت المبادرات الاستراتيجية في الإمارات والسعودية وقطر أكثر طموحاً وجرأة من غيرها، وإن عكست في الوقت ذاته حدّة التنافس فيما بينها.

في هذا الإطار، تنظر دول الخليج إلى إدماج الذكاء الاصطناعي في المجال الدفاعي. وبينما تبنّت الإمارات والسعودية وقطر هذه التكنولوجيا بحماسة، فإن البحرين والكويت وسلطنة عُمان تتبنّاها بخطوات متدرجة. ورغم أن الدول الست وضعت استراتيجيات وطنية للذكاء الاصطناعي، إلا أن معظمها لم يحدد بشكل واضح دوره في قطاعي الأمن والدفاع.

تسعى السعودية والإمارات إلى توظيف الذكاء الاصطناعي في مجال تعزيز مرونة قواتها المسلحة وقدرتها على مواجهة التحديات الجيوـ ستراتيجية، في إطار طموحات متنافسة لقيادة إقليمية وعالمية. كما أن تنظيم الذكاء الاصطناعي يُعد من أبرز الأولويات السياسية في المنطقة، ليس فقط لاعتبارات عسكرية، بل أيضاً لتعزيز جاذبية اقتصاداتها الرقمية. وبالتالي، تسعى الدول العربية الرائدة في الخليج إلى مواءمة سياساتها، لا سيما مع الولايات .المتحدة، مع تطلعها إلى تطوير أطر تنظيمية جديدة مستوحاة من القيم الإسلامية

بناءً على ذلك، شرعت قطر والسعودية والإمارات في بلورة محفظة واسعة لتطوير تطبيقات الذكاء الاصطناعي في المجال الدفاعي، وتشمل الدفاع الجوي، وأنظمة القيادة والسيطرة وإدارة المعارك، وتطبيقات الأمن السيبراني والدفاع السيبراني والاستخبارات والمراقبة والاستطلاع، والصيانة التنبؤية، وأنظمة الرادار، إضافة إلى تشغيل ومواجهة الأنظمة غير المأهولة. ومع ذلك، تبقى الاستخدامات الحالية محدودة نسبياً، وتركّز بالأساس على التحليلات التنبؤية لأغراض المراقبة، والمراقبة الفضائية، والأمن السيبراني، والأنظمة غير المأهولة.

غير أن دمج الذكاء الاصطناعي بشكل فعّال في القوات المسلحة الخليجية ومنتجات الصناعات الدفاعية المحلية يصطدم بعقبات مرتبطة بالثقافة الاستراتيجية السائدة، مثل مركزية القرار، وتجزئة تدفق المعلومات، وتفضيل الانضباط والامتثال على حساب المبادرة الفردية.

وتسعى دول الخليج إلى ترسيخ قاعدتها الصناعية والتكنولوجية الدفاعية عبر تطوير منظومات رقمية متقدمة تركز على القدرات المحلية، مع الاستفادة من الاستثمارات الخارجية والشراكات الدولية لنقل المعرفة والتكنولوجيا. لكن التنافس بين بعض أفراد الأسر الحاكمة، الذين يقودون مؤسسات محلية كبرى في هذا القطاع، يضيف مستوى آخر من التعقيد يؤثر في ديناميات تطور هذه المنظومات.

وعلى صعيد القطاع العام، تتسارع عملية التحول الرقمي. فقد أنشأت عدة دول خليجية وحدات متخصصة لتعزيز التنسيق الحكومي في تطبيقات الذكاء الاصطناعي. ففي الإمارات مثلاً جرى تعيين مسؤولين تنفيذيين للذكاء الاصطناعي على مستوى الحكومات المحلية الاتحادية، بينما استحدثت عُمان منصب مدير برنامج تطوير الذكاء الاصطناعي والتقنيات المتقدمة بوزارة النقل والاتصالات وتقنية المعلومات. ومع ذلك، لا يزال من غير الواضح كيف ستتكيف المؤسسات العسكرية مع هذه التحولات، وإن كانت الخطط الأخيرة للتحول الرقمي في الإمارات والكويت وقطر تشي ببوادر تغييرات تنظيمية وشيكة.

أما التمويل، فيبقى المجال الأكثر وضوحاً لطموحات دول الخليج في الذكاء الاصطناعي. إذ من المتوقع ضخ مئات المليارات في توسيع مراكز البيانات، وتطوير مجموعات بيانات ونماذج لغوية ضخمة متوافقة مع الضوابط والأخلاقيات الإسلامية، وتعزيز الحوسبة السحابية، وتحسين إمدادات الكهرباء المحلية، وربط هذه المنظومات بشراكات دولية. ورغم أن هذه الاستثمارات ستنعكس مباشرة على الأمن القومي، تبقى الأرقام الخاصة بالإنفاق الدفاعي المرتبط بالذكاء الاصطناعي محدودة ومبهمة. وتشير المعلومات المتاحة إلى أن حجم الإنفاق قد يصل إلى مليارات قليلة في بعض المشاريع الدفاعية المعتمدة على الذكاء الاصطناعي، مع صعوبة تحديد النسبة المخصّصة لتطوير البرمجيات الدفاعية المعتمدة على الذكاء الاصطناعي.

إلى جانب الاستثمار في البنية التحتية والتمويل، تعي دول الخليج أهمية التعليم والتدريب لخلق فرص عمل وتنمية القدرات المحلية. ولهذا السبب، تبنّت خططاً شاملة لتطوير التعليم الأساسي والجامعي، غالباً بالشراكة مع مؤسسات أجنبية. كما بدأت المؤسسات التعليمية العسكرية في تحديث مناهجها لإدراج موضوعات الذكاء الاصطناعي. وتلعب التدريبات العسكرية المشتركة مع الشركاء الدوليين، مثل فرقة العمل ٥٩ التابعة للقيادة المركزية للقوات البحرية الأميركية، دوراً محورياً في هذا المجال. ومع ذلك، لا يزال من المبكر قياس أثر هذه الجهود، في ظل استمرار هيمنة أساليب التعليم التقليدية القائمة على التلقين، وتجزئة المعرفة، وضعف ثقافة التقييم النقدي للأداء والتدريب العسكري. لكن ظهور مؤشرات لمعالجة هذه التحديات قد يشكل إشارة أولية على تغيّر قادم.

باختصار، تُظهر هذه الورقة أن دول الخليج العربي تنظر إلى الذكاء الاصطناعي، وبخاصة في المجال الدفاعي، باعتباره ركناً أساسياً في مسارات التحول المجتمعي والاقتصادي والعسكري. وبفضل قدراتها المالية الكبيرة، ترفع السعودية والإمارات، ومعهما قطر بدرجة أقل، سقف طموحاتها الدولية، وتسعى للعب دور مؤثر في صياغة الشؤون الإقليمية والدولية وفقاً لمصالحها الاستراتيجية المتنافسة. ولهذا، تنتهج سياسة متوازنة بين الولايات المتحدة الأمريكية والاتحاد الأوروبي والصين وروسيا ودول الجنوب العالمي، في مسعى لإعادة تشكيل فضاء دولي يتوافق مع أولوياتها وتصوراتها.

وتعزيزاً لهذه الطموحات، تستثمر دول الخليج في توسيع صناعاتها الدفاعية المحلية بهدف امتلاك تقنيات متقدمة مثل الذكاء الاصطناعي. غير أن امتلاك التكنولوجيا وحده لا يكفي لبناء قدرات دفاعية صلبة، إذ يتطلب ذلك إصلاحات متزامنة على المستويات الثقافية والفكرية والتنظيمية والتكنولوجية والعملياتية، وهي مهمة ما زالت نتائجها متفاوتة حتى الآن. كما يبرز الذكاء الاصطناعي في قلب المنافسة الجيو-ستراتيجية العالمية، مثيراً أسئلة معقدة حول سيادة البيانات والنماذج، وهي قضايا ستؤثر بشكل مباشر على دمجه في القدرات الدفاعية وعلى تطور الصناعات العسكرية الخليجية. وفي النهاية، تفرز ديناميات التعاون والتنافس هذه مزيجاً متشابكاً من التكامل والانقسام في آن واحد.

# 2 Thinking About Defense AI

## 2.1 Geostrategic Context

The Arab Gulf nations constitute one of the most complex geostrategic regions. Geopolitical complexities result from intra-GCC fault lines, changing regional dynamics, and the ongoing regional influence of major outside actors. Geoeconomic challenges make things even more demanding. These result from the Arab Gulf region's role as a global connector, the use of Arab Gulf outbound direct investments to provide geoeconomic strategic depth, and fierce competition over (digital) technologies.

At the core of the geopolitical complexities is the fragile nature of the GCC. Established in 1981, the GCC was never able to garner enough attention of its members to move forward an agenda to cultivate unifying collaborative action. "The failure of initiatives to pool together within the GCC," Kristian Ulrichsen has argued, "indicates that rulers remain reluctant to share political resources with each other."[1] This is also a consequence of the most unequal economic and political power balance within the GCC, preventing it from fully mitigating "concerns over the potential Saudi hegemony."[2]

Whereas Bahrain, Kuwait, and Oman use the GCC to varying degrees to advance their multinational efforts, competition between Saudi Arabia and the United Arab Emirates as well as the two and Qatar has created constant friction. The Emirates position themselves as a "regional leader and global collaborator," that "embraces globalization while balancing its Islamic and Arab cultural heritage." [3] Technology is key to connect different economic-industrial ecosystems thereby advancing Emirati interests and creating equidistance between the United States and China.[4] Technological superiority is also foundational for the Emirati armed forces; thus the "alignment of the national security apparatus" is central to how the Emirates "design and deploy" their techno-industrial policies. [5]

This collides with Saudi Arabia's understanding of technology as a lever grounded in a sense of "exceptionalism and exclusiveness." Being the custodian of the two holy mosques has contributed to the country framing a "deliberate religiously infused Saudi regional strategy of social power projection."[6] Saudi Arabia also engages in strategic hedging, because it is unsure about the strategic loyalty of

1 Ulrichsen, Centers of Power in the Arab Gulf States, p. 217. See also: Kamrava, Troubled Waters, pp. 79–88.
2 Ulrichsen, Centers of Power in the Arab Gulf States, p. 201.
3 Ahmed/Rafiuddin, "Cultural dimensions of economic development: A Case of UAE."
4 Al-Khatib, "Beyond techwashing," pp. 136, 139; Ahmed/Rafiuddin, "Cultural dimensions of economic development: A Case of UAE."
5 Finlinson, "The United Arab Emirates as a case study on assessing over-the-horizon nuclear proliferation," p. 121; Al-Khatib, "Beyond techwashing," p. 138; Samaan, "The logic of Emirati grand strategy," p. 3.
6 Hetou, "Saudi Arabia," pp. 241–242.

the US ("first wife") and China ("second wife").[7] Finally, also Qatar has been using technology as a major tool to expand its soft power, which has rivalled Saudi hegemony and contributed to the 2017 sanctions.[8]

Religiously motivated fault lines between Saudi Arabia and Iran constitute the essence of cross-regional tensions[9] that mark the second layer of geopolitical complexities. This competition directly affects intra-GCC unity, as, for example, Oman's foreign policy fundamentally deviates from this position of rivalry.[10] Oman's deviation notwithstanding, Iran's sponsorship of proxy forces and its missile and cyber power continue to be seen as sources of regional insecurity.[11] Israel might have temporarily neutralized the particular missile threat[12] and thus shifted the political balance to its favor, but the Gaza war and the September 2025 attack on Hamas leaders in Qatar are seriously straining relations and are blocking the normalization process, which started with the 2020 Abraham Accords.[13] Regime change in Syria is creating another source of instability.[14]

Outside interference describes the third layer of geopolitical complexity in the Arab Gulf, which magnifies problems at the other two layers. There is, however, a clear pecking order of outside influence with the United States, China, and Russia playing in a league of their own.[15] This is, at least in part, due to the active outreach of the GCC nations to these three partners and their long-term role as weapons providers and critical foreign markets, primarily for oil, gas, and petrochemical products. Some of the Gulf nations also provide extra "financial oxygen" to China and Russia and thereby help advance trilateral "cocooning" to withstand Western pressure.[16]

Theodore Karasik's reference to "financial oxygen" opens the perspective for three layers of geoeconomic complexity that complement the region's demanding geostrategic setup. Given their geographic location, Arab Gulf nations have been connecting various economic corridors for centuries.[17] With the Emirates, Qatar,

7 The first/second wife analogy builds on: Ottaway, Mohammed bin Salman, pp. 181–182.
8 Roberts, Qatar, pp. 93–122; Ulrichsen, Qatar and the Gulf Crisis.
9 Hicks, Saudi Arabia's Strategic Culture, p. 147.
10 Baabood, "Oman's independent foreign policy," pp. 107–122.
11 Yamao/Suechika, "Measuring the evolution of Arab states' perceptions of the Iranian threat."
12 But therefore, Narges Bajoghli writes, the bombing has hardened, rather than weakened the regime in Iran. See: Bajoghli, "The generation Iranian hard-liners have been waiting for."
13 Fakhro, The Abraham Accords; "The GCC response to the Iran-Israel war."
14 Triche/Hamzawy, The Gulf shifts policies in response to the 'new' Syria;" Shahbazov, "The Gulf showers Syria with aid – in return for stability and interests."
15 What difference the new Strategic Mutual Defense Agreement, signed by Saudi Arabia and Pakistan on 18 September 2025, will make, is difficult to say right now. Militarily the question of how to coordinate air and missile defense provided by the United States Central Command (USCENTCOM) with Pakistan is open. Politically, it remains to be seen how this agreement will affect the Abraham Accords, the policy of other Arab Gulf states vis-à-vis Pakistan and India as well as Iran's thinking on nuclear deterrence.
16 Karasik, "The triangle faces East," pp. 134–135.
17 Oman' seaborne trading history, for example, reaches back to the 9th century. See: Barrett, "The Sultanate of Oman in historical context."

and Bahrain three of the Arab Gulf nations are among the world's top 25 countries of the DHL Global Connectedness Index.[18] Arab Gulf nations have stepped up efforts to improve their transportation infrastructure and have invested in port, airport, and airline capacities – but most of these activities are competing rather than complementing. Tapping into global trade flows also emphasizes the role of seaborne trade, which brings to the fore maritime security risks such as attacks on tankers. This threat emphasizes the role of naval assets. Receiving more attention as of lately, naval capabilities have long remained in the shadow, also because the region's international partners played key roles in protecting sea lanes.[19]

Boosting transportation infrastructure to enable uninterrupted trade flows comes at a time, when economic policies in some of the Arab Gulf's major export markets turn protectionist. Despite the proximity to key emerging markets in Africa and India, this raises questions about the economic rationale underpinning the respective initiatives. That's why Arab Gulf nations advance vertical supply chain integration by committing to substantial foreign direct investments abroad. This second level of the Arab Gulf's geoeconomic complexity has created a dense network of bilateral investment relationships with the United States, Europe, Russia, China as well as Latin America and Africa. Right now, around 41% of the USD13trn, that Sovereign Wealth Funds have under management worldwide, can be attributed to funds from the Middle East and North Africa.[20] Saudi Arabia's Public Investment Fund (PIF) alone committed to invest USD600bn in the United States during US President Trump's May 2025 visit.[21]

The purpose of these investments is multifold. Investing abroad can advance security of supply, for example, in the food sector. Investing abroad cements strategic relationships, which in turn are seen as insurance policies in times of crisis. Strategic investments also help ensure access to technology and talent, which provide the basis for later transfers of technology and expertise. While providing economic and political benefits, these investment ties also create strategic risks, because of competing relationships between the countries that Arab Gulf nations invest in. For example, Arab Gulf states have not divested from Russia because of its invasion of Ukraine in 2022 and the sanctions,[22] whereas European and US companies did. Similarly, Arab Gulf investment ties with China constantly ring alarm bells in the United States.[23]

18 Altman/Bastian, DHL Global Connectedness Report 2024, p. 301.
19 Thievon, New ambitions at sea.
20 Obnishi/Fujishiro, "Torrent of Middle Eastern money flooding into global marketplace," pp. 3–4.
21 "President Donald J. Trump secures historic $600 billion investment commitment in Saudi Arabia."
22 Cafiero, "Gulf Arab engagement with Russia."
23 Kempe, "Trump's remarkable Middle East tour is all about striking megadeals and outfoxing China."

Finally, Arab Gulf nations strive for local value generation and emphasize establishing local industry and technology bases, also with the help of cutting-edge technologies[24] This constitutes the third geoeconomic layer of complexity. Arab Gulf ambitions in digital technologies and beyond emerge at the time, when AI, robotics, unmanned systems, semiconductors, and telecommunications are at the crosshair of global geoeconomic competition. This competition increasingly politicizes markets, investments, and technologies. There is hardly a "neutral" playground anymore, which forces even financial powerhouses like the Emirates and Saudi Arabia to take sides. Nowhere has this become clearer than in US pressure on Emirati G42 to cut ties with China for cooperation with Microsoft, as will be discussed later.

In sum, the geopolitical factors shaping Arab Gulf security do create new and additional demand signals for the military use of AI. However, the geoeconomic trends shaping the region as well are potentially undercutting the availability of AI. AI can be used for commercial and sovereign tasks. While commercial tasks promote the global diffusion of AI, sovereign tasks emphasize the need to prevent the technology form diffusing globally. That's why, leading Arab Gulf nations want to become technologically independent – but the process of achieving this goal depends on partners ready to share technology and expertise with them. Thus, Arab Gulf ambitions for technology sovereignty are most vulnerable during this transition phase. That's why it is far from obvious that AI will enable them to address current and future geostrategic challenges.

## 2.2 Culture

Culture has become increasingly popular as a concept to explain the foreign policy preferences and behavior of countries. However, the lack of a unifying theory and the heterogeneity of definitions makes it somewhat "elusive."[25] Despite its elusiveness, this section briefly looks at cultural aspects in the Arab Gulf region for two reasons. First, culture is a critical element in assessing if and to what extent military innovation might happen in response to the advent of new technologies and/or strategic challenges.[26] Second, and even more important with regard to AI and the role of data, "different cultures think and process information differently (as) people from different cultures actually see and perceive reality in divergent ways."[27]

24 Young, The economic statecraft of the Gulf Arab states; Miniaoui/Bechr, "The Gulf countries need 'good jobs' in services."
25 Kartchner/Bowen/Johnson, "Consolidation and Enriching the Field of Strategic Culture," p. 503.
26 Borchert/Schütz/Verbovszky, Beware the Hype, pp. 16–18.
27 Kartchner/Bowen/Johnson, "Consolidation and Enriching the Field of Strategic Culture," p. 504.

For this study, it is useful to differentiate between strategic culture and military culture. Strategic culture is generally understood as a set of ideas, traditions, beliefs and habitual behavior, which form an ideational milieu that affects how members of a nation's strategic community view the world and respond to changes.[28] Consequently, strategic culture acts as a filter, influences perceptions and interpretations, and shapes policy objectives, options, and outcomes.[29] In a similar way, military culture denotes the ideational constructs that have been "internalized by a military organization and frame the way the organization views the world, and its role and function in it.[30]

Overall, cultural factors, Garreth Hicks contends, "as opposed to military capabilities have greater primacy in helping us understand inter-Arab politics (and) intra-Islam politics."[31] Along this line of reasoning Zoltan Barany and Kenneth M. Pollack have gone at great length to analyze how culture affects Arab military effectiveness.[32] While it is important to remain cognizant of important cultural nuances among Arab communities and nations, four aspects are particularly important to understand the challenges that political and military leaders need to address to successfully embrace AI:

- **Centralization of Decision-Making**
  Certain characteristics of the (absolute) Arab Gulf monarchies inhibit civil-military relations. Most importantly, decision-making is centralized at the highest level of command, thus limiting the freedom of maneuver of subordinate decision-makers and units.[33] "Delegation of authority," Pollack observes, "is rare and often superficial."[34] This prime cultural aspect is potentially at odds with AI that allows for decentralized command and control (C2) to favor flexibility and initiative on the edge over decision centralization. So far, it is unclear how Arab Gulf armed forces are going to address this fundamental tension – which, to be fair, also poses a major challenge to armed forces elsewhere.

- **Information Flow**
  As a direct consequence of centralizing decision authority, information compartmentalization is the norm. Information is seen as a source of influence and power and thus needs to be protected, also to gain leverage over peers. A "thick fog of ignorance and half-truths" is the result.[35] A cultural restraint to

28 Kartchner, "Defining and Scoping Strategic Culture," p. 6.
29 Duffield, World Power Forsaken, pp. 13–32; Jepperson/Wendt/Katzenstein, "Norms, Identity, and Culture in National Security," pp. 42–65; Pollack, Armies of Sand, pp. 357–362.
30 Theo Farrell's definition quoted by Raska, Military Innovation in Small States, p. 4.
31 Hicks, Saudi Arabia's Strategic Culture, p. 141.
32 Barany, Armies of Arabia; Pollack, Armies of Sand.
33 Barany, Armies of Arabia, pp. 9, 139; Pollack, Armies of Sand, pp. 25, 375–381.
34 Pollack, Armies of Sand, p. 378.
35 Barany, Armies of Arabia, p. 140; Pollack, Armies of Sand, pp. 27, 386–388.

share information and data will, however, be detrimental to creating unified data repositories to train AI and might thus constitute one of the biggest obstacles for defense digitalization in the Arab Gulf region.

- **Conformity**

  Conformity, obedience, and aversion to critical thinking and independent initiative have constituted major sources of military ineffectiveness in the Arab world. In addition to creating incentives to not think independently these cultural traits also undermine the ability to adjust when unexpected things happen.[36] This cultural predisposition does not bode well for the advent of AI for several reasons.[37] How can you judge to what extent AI-driven suggestions and actions meet your military objectives if you don't think about your plans on your own? In addition, creativity is indispensable to make best use of different AI methods for different application areas and missions, which in turn requires critical thinking. And, most importantly, the tendency to "stick to the plan" runs counter to the ability of AI to enhance emergence, for example through tactical versatility that is context-sensitive and thus adapts and adjusts commensurate with battlefield dynamics.[38] In short, left uncorrected, the preference for conformity is likely to seriously inhibit Arab Gulf armed forces from realizing defense AI's full potential.

- **Selective Exposure**

  In line with information compartmentalization Zoltan Barany also identifies selectivity in the sense of limited exposure as a potential source of Arab military ineffectiveness. For foreign deployments, the United Arab Emirates has, for example, most often chosen elite units such as the Presidential Guard or the Air Force.[39] But their improved combat experience will remain of limited value for other units if mechanisms for knowledge diffusion across service boundaries are lacking. In a similar fashion "American technicians have been maintaining and upgrading targeting software and other classified technologies that 'Saudis are not allowed to touch.'"[40] This practice is likely to be deepened the more armed forces use AI to work with sovereign data. But in this regard, Arab Gulf nations are also likely to put their own restrictions on third-party access. Therefore, selective exposure related to AI may prevent the services of a nation's armed forces to develop equal levels of maturity in understanding and using AI, which in turn might significantly slow down the tempo and limit the scope of military AI diffusion.

36 Barany, Armies of Arabia, pp. 12, 136–137, 250–251, 254–256; Pollack, Armies of Sand, pp. 24–26, 371–374.
37 At this stage, I can only speculate how forces of conformity will affect the human-machine relationship in which AI plays an important role. Most likely, the discussed cultural trait would imply strict machine adherence to human command and control, an interpretation that prevailing AI ethics preferences in the Arab Gulf nations seem to confirm (see chapter 2.4).
38 Borchert, "The Very Long Game of Defense AI Adoption: Introduction," pp. 6–8, 33–34.
39 Barany, Armies of Arabia, p. 264.
40 Barany, Armies of Arabia, p. 279.

These cultural characteristics pose challenges. But it is important to understand that culture is adaptable and changes over time. Kenneth M. Pollack rightly emphasized that traditional industrial-warfare shortfalls observed among Arab Gulf armed forces might be overcome if technology can be used in a tailored fashion to target deficiencies. Then, "Arab armies might suddenly do very well."[41] However, for this positive outlook to materialize, leaders will need to put even more emphasis on systematically driving the transformation process of their armed forces as digitalization in general and AI in particular very much depend on understanding and operating armed forces as "holistic systems" rather than a combination of "military verticals."

## 2.3 Defense AI Understanding

Arab Gulf nations consider digitalization and AI as major forces for societal, economic, and technological transformation.[42] This has triggered a flurry of top-down economic interventions typical for the concept of the developmental state.[43] The strategies and concepts underpinning these interventions talk about the opportunities and risks of AI very much in the same way as the policy documents of industrialized nations do. Overall, Arab Gulf ambitions on using AI and digitalization as instruments of transformation are grounded in long-term strategic visions:

- Bahrain's economic vision 2030 emphasized sustainability, competitiveness, and fairness as main strategic goals. Set up in 2008, the vision is being updated within the framework of the Economic Vision 2050. According to Noor Alkhulaif, Minister of Sustainable Development, this new vision has AI at its center, "particularly to enhance productivity."[44] In February 2025, the Parliament also approved a proposal to expand the governmental use of AI in view of automizing public services.[45]
- Kuwait's Vision 2035 or "New Kuwait" plan outlines a future path towards a knowledge-based and "smart" Kuwait. Digitalization is important to advance a connected infrastructure that in turn advances economic competitiveness.[46]

41 Pollack, Armies of Sand, p. 522.
42 For more, see: Bi et al., Digital Transformation in the Gulf Cooperation Council Economies.
43 For more, see: Woo, "The Developmental State," pp. 104–119.
44 Bahrain's Economic Vision 2030; "Bahrain's Economic Vision 2050."
45 Swartz, "Bahrain's AI landscape in March 2025."
46 For more, see: https://www.mofa.gov.kw/en/pages/kuwait-vision-2035 (last accessed 25 September 2025). See also: "New Kuwait 2035," p. 25; Kuwait National Development Plan 2020–2025.

- Oman's Vision 2040 charts the Sultanate's "transition to knowledge and innovation," with digitalization playing a key role to advance the country's digital economy and digital government transformation.[47]
- The Qatar National Vision 2030 envisions all-encompassing development and considers advanced technologies (including but not explicitly mentioning digitalization) as instrumental in achieving this ambition.[48] To implement this vision, the Digital Agenda 2030 puts forward a transformation roadmap that strongly emphasizes AI and the need for investments in digital infrastructure and technologies.[49]
- Saudi Arabia's Vision 2030 charts the path towards a leading digital economy that benefits from sophisticated digital infrastructure. Digital transformation, the implementation plan points out, is essential to realizing the Vision 2030; therefore, the plan also identifies 29 essential digital initiatives.[50]
- The Emirates' most recent UAE Centennial Plan 2071 sets sail on building a knowledge economy that will boost productivity and promote scientific research.[51] The Emirates, the national AI strategy points out, want to "build an AI economy, not wait for one," thus imagining the country to "become world leader in AI by 2031."[52]

On this basis, all Arab Gulf nations have adopted national digitalization strategies, plans, and initiatives that provide the foundation for national AI strategies.[53] These AI strategies vary in scope and depth reflecting different ambitions. If these strategies define AI at all, the definitions are in line with most other national AI strategies that consider AI as

- "techniques and algorithms that give computers the ability to perform a variety of cognitive and advanced functions that mimic human capabilities" (Oman);[54]
- "a technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy" (Bahrain);[55]

47 Oman Vision 2040: Vision Document, p. 15; Oman Vision 2040.
48 Qatar National Vison 2030.
49 Digital Agenda 2030, pp. 7–10.
50 Vision 2030, pp. 44, 57; National Transformation Program 2020, p. 11.
51 For more, see: https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/innovation-and-future-shaping/uae-centennial-2071 (last accessed 25 September 2025).
52 UAE National Strategy for Artificial Intelligence 2031, pp. 7–8.
53 So far, only Saudi Arabia and the Emirates have explicit data strategies. See: National Strategy for Data and AI; Smart Data Strategy.
54 National Artificial Intelligence Policy, p. 4.
55 IGA, General Policy for the Use of Artificial Intelligence, p. 4. Reference to machine creativity (albeit simulated) is rather unusual for a national AI definition. It remains to be seen if and how this emphasis is going to shape Bahrain's AI development trajectory.

- "the capability of a functional unit to perform functions that are generally associated with human intelligence such as reasoning, learning and self-improvement" (United Arab Emirates).[56]

In general, all Arab Gulf AI strategies are rather silent on the possible role AI could play in national security and/or defense. Oman's strategy mentions possible consequences of using AI for the "economic and security systems," without providing more details.[57] The strategies of Qatar and the Emirates address cybersecurity as a challenge that can also provide industry opportunities, while the Kuwaiti strategy emphasizes cybersecurity risks for AI that need to be addressed.[58]

In addition, Kuwait and Qatar have adopted formal frameworks to advance defense digitalization. Kuwait's 2025 plan aims at digital defense transformation, identifies cybersecurity as a key priority, and envisages organizational change (see Chapter 4). In December 2024, Qatar adopted its Defense Digitalization Compass that fully leverages the idea of data-driven digital armed forces that are knowledge-based, flexible, and innovative. While announcing new investments in digital defense infrastructure, this plan also acknowledges the need for a change in mindsets and organizational culture to advance the Qatar Armed Forces digital readiness.[59]

In the Emirates, defense digitalization is seen as key to advance military capability development and optimize the indigenous defense industrial ecosystems for the next evolution iteration. By expanding the country's technological maturity and advancing efforts to boost military education (see Chapter 7) the country also acts upon its experience in recent military operations.[60] The National Defense Industries Strategic Foresight 2025 document outlines a future industry vision that is leveraging AI and other digital technologies to "build sovereign, diversified, and digitally empowered supply networks to secure strategic autonomy."[61]

Against this background, three factors explain why Arab Gulf nations want their armed forces to use AI. First, they see a need to create more flexible and adaptable armed forces that can respond to the dynamically changing threat landscape discussed above. This requires modernization, and modernization for Arab Gulf nations implies digitalization. If and to what extent AI is at the forefront of defense digitalization is a question of each countries international ambition and the maturity of its defense industrial base as the following chapters will argue.

56 AI Ethics. Principles & Guidelines, p. 12.
57 IGA, National Artificial Intelligence Policy, p. 10.
58 MCIT, National Artificial Intelligence Strategy for Qatar, p. 13; UAE National Strategy for Artificial Intelligence 2031, p. 11; CAIT, Kuwait National AI Strategy, p. 21.
59 "Ministry of Defense launches defense digitalization compass;" "Defense digitalization compass launched."
60 Interview, Abu Dhabi, 8 September 2025. See also: Knights, 25 Days to Aden.
61 National Defense Industries Strategic Foresight 2025, p. 31.

Second, Saudi Arabia and the United Arab Emirates digitize to become regional and global leaders. In this regard, digitalization and AI are meant to make armed forces more efficient to assume an increasingly pan-regional role. This clearly matters for the Emirates, which are increasingly involved in military conflicts far beyond the Arab Gulf and thus require expeditionary capabilities. At the same time, Emirati ambitions are cognizant of the fact that "competitors and partners alike are investing heavily in AI,"[62] thus expressing a "Fear of Missing Out" (FOMO) sentiment characteristic of defense AI approaches in other countries.[63] For Saudi Arabia, defense indigenization seems to be more important at this stage, as the process kicked-in later than in its smaller neighbor.

Third, as both nations directly compete for AI leadership, there is a notable will to "Crowd-Out Your Neighbor," (COYN) that characterizes the policies of Abu Dhabi and Riyadh. This is the flipside of the FOMO motive. But in the case of Abu Dhabi and Riyad, the fear is about not offering the best-connected digital infrastructure, not setting up the fastest supercomputer, not spending more astronomical sums on advancing (defense) AI, or not offering more disruptive defense AI products than their neighbor. In addition, COYN also pertains to the international partnerships both nations maintain and could render them toxic.[64] The Emirates and Saudi Arabia bet big on buying themselves into the US digital technology ecosystem, with Riyadh being a tad more aggressive. Abu Dhabi, by contrast, continues to emphasize its hedging strategy to balance between defense AI cooperation with the US and China and other countries – also to use closeness with one (China) for concessions from the other (United States).

## 2.4 Regulatory Aspects

AI regulation ranks high on the Arab Gulf policy agenda.[65] As Table 1[66] illustrates, all six nations have adopted catalogues of national AI principles that coalesce around similar topics. All Arab Gulf states subscribe to a human-centered approach to AI that ensures ultimate human decision-making. Transparency, safety, and fairness are additional core principles. Interestingly some Arab Gulf nations also emphasize environmental aspects of AI generation, which is noteworthy given the fact that these nations also play the energy card to incentivize the construc-

62 Ibid., p. 45.
63 Borchert, "The Very Long Game of Defense AI Adoption: Introduction," pp. 9–10.
64 See also: Kitishian, "Saudi Arabia: Hundreds of billions for global AI supremacy;" Feakin, "Silicon Sandstorms;" Fitch, "AI companies should be wary of Gulf spending spree."
65 It is also noteworthy that the Gulf Cooperation Council has adopted the "The Guiding Manual on the Ethics of Artificial Intelligence Use in Member State of the Gulf Cooperation Council" in November 2023. For more on this, see: Albous/Al-Jayyousi/Stephens, "AI Governance in the GCC States."
66 To make the table more readable different national principles have been clustered by topics.

**Table 1: National AI Ethics Principles in the Arab Gulf**

| | ARE | BHR | KWT | OMN | QAT | SAU |
|---|---|---|---|---|---|---|
| **Accountability** | ■ | | | | | ■ |
| **Do no harm** | | ■ | | ■ | ■ | |
| **Explainability** | ■ | ■ | | | | ■ |
| **Fairness, avoid perpetuating bias and discrimination, data diversity, integrity** | ■ | ■ | | ■ | ■ | ■ |
| **Human-centered approach, respect human rights** | ■ | | ■ | ■ | ■ | ■ |
| **Human accountability and human decision-making** | | ■ | ■ | | ■ | |
| **Protect the environment, support sustainable development** | ■ | | | ■ | ■ | ■ |
| **Privacy** | ■ | ■ | | | ■ | |
| **System robustness, reliability, security, safety, privacy** | ■ | ■ | ■ | | ■ | ■ |
| **Transparency** | ■ | ■ | ■ | ■ | ■ | ■ |

Sources: Minister of AI, AI Ethics Principles and Guidelines; IGA, General Policy for the Use of Artificial Intelligence; CAIT, Kuwait National AI Strategy; MTCIT, Public Policy for Safe and Ethical Use of Artificial Intelligence Systems; MCIT, Artificial Intelligence in Qatar: Principles and Guidelines for Ethical Development and Deployment; SDAIA, AI Ethics Principles.

tion of energy-intensive data centers in the Arab Gulf region. In addition, there is an economic interest in making sure that commercial and defense products comply with the regulatory requirements of the markets Arab Gulf companies are targeting.[67]

Arab Gulf concern for AI regulation is about more than strategic signaling to align policies with other international partners. Rather it must be seen in context of juxtaposing Western dominance in the field of AI regulation with ethical principles – as well as AI languages and data models (see Chapter 3.2) – grounded "within Islamic normative discourse."[68] Recent reports suggest that Abu Dhabi is mulling plans to set up a new Emirati Center for AI Safety and Policy while Saudi Crown

67 Interview, Abu Dhabi, 9 September 2025.
68 Elmahjub, "Artificial Intelligence (AI) in Islamic Ethics," p. 2.

Prince Mohammed bin Salman proposed convening a Global Ethics Forum in Riyadh to "develop alternative algorithmic governance regimes rooted in Islamic digital ethics and regional sovereignty."[69] With a global Muslim population of around two billion this is a more than legitimate demand. But it also poses challenges as aligning AI systems with the Islamic world's religious and cultural beliefs is not easy, because "Islamic ethics is characterized by multiple layers of highly abstract and often conflicting meta-ethical and normative propositions."[70]

Against this background, the responsible use of AI in the military domain is of relevance to Arab Gulf nations but regulatory guidelines seem patchier. Arab Gulf leaders advocate international AI regulation, when they address the global audience. For example, Omran Sharaf, UAE's Assistant Foreign Minister for Advanced Science and Technology, told the UN disarmament conference in Geneva in March 2025, that control was needed to ensure the unwanted proliferation of AI into the hands of violent non-state actors.[71] More generally, Abdulla Al Ghmadi, President of the Saudi Data and AI Authority, has stipulated "ethics first, then AI" as the principle to develop responsible AI at a conference in September 2024 in his country.[72]

So far, however, it remains open if and to what extent national AI principles are also relevant for defense. In addition, Arab Gulf support for international initiatives advancing regulation of the military use of AI is mixed (Table 2). Whereas Kuwait and Qatar joined the 2023 REAIM Call to Action, only Oman signed up to the 2024 REAIM Blueprint for Action. Up until now, Bahrain is the only Gulf country that has supported the US-launched "Political Declaration on Responsible Military Use of AI and Autonomy."[73] Although not a signatory of this particular US initiative, the United Arab Emirates seem to have a strategic interest in aligning its regulatory positions with the US.[74] This is not surprising given the significant AI investment and business development push the Emirates – and companies controlled by Sheikh Tahnoon bin Zayed, the National Security Advisor – are making in the United States (see Chapter 3.2) and its ambition to secure US technology transfer to the Emirates.

It remains to be seen, if Arab Gulf nations will seek to align regulatory policies with their strategic partners Russia and China. In principle leaders in Moscow, Beijing, Washington, and the Arab Gulf capitals all seem to agree on the meaningful

69 "KSA: CP Mohammed – Musk meeting," p. 5; "UAE: CP Khaled's comprehensive 5-year AI strategy," p. 2.
70 Elmahjub, "Artificial Intelligence (AI) in Islamic Ethics," p. 20
71 Stickings, "World must ensure AI weapons do not fall into wrong hands, UAE minister ways." For more, see: "UAE's international stance on artificial intelligence policy."
72 Alhamawi, "Ethics first, then AI: SDAIA President stresses importance of responsible development ahead of GAIN Summit."
73 Together with the United States, Bahrain is co-leading working group one on assurance of the declaration. See: Freedberg, "US joins Austria, Bahrain, Canada and Portugal to co-lead global push for safer military AI."
74 "UAE: Sheikh Tahnoon's U.S. talks on AI," p. 6; "UAE president welcomes framework promoting AI cooperation with US."

**Table 2: Arab Gulf Nations Endorsing International Initiatives on Responsible of AI in the Military**

| | ARE | BHR | KWT | OMN | QAT | SAU |
|---|---|---|---|---|---|---|
| **UN General Assembly first committee resolution on AI in the military domain (A/RES/79/239)** | ■ | ■ | ■ | ■ | ■ | Abstained |
| **REAIM 2023 Call to Action** | | | ■ | | ■ | |
| **REAIM 2024 Blueprint for Action** | | | | ■ | | |
| **Political Declaration on responsible military use of AI and autonomy** | | ■ | | | | |

Sources: "Fourteen new drafts, including on implications of artificial intelligence in military domain, approved in first committee by 34 votes;" "REAIM 2023 Call to Action;" "REAIM 2024 Blueprint for Action;" "Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy."

human control of AI – but how to operationalize "meaningfulness" is far from clear, as Russia argues.[75] China and the United States are in a regulatory tit-for-tat[76] to keep each other in check and this affects the Arab Gulf, as will be discussed below. Bearing in mind the challenges discussed above, Arab Gulf nations could try to leverage Islamic values more strongly to broaden their regulatory leeway. So far, the Emirates are the only Arab Gulf member of the BRICS group of states. Abu Dhabi actively reaches out to Latin America via BRICS member Brazil and to the Asia Pacific via Indonesia,[77] also a BRICS member. If these nations would support a yet to emerge Emirati-driven defense AI regulatory agenda, remains to be seen. But when it comes to regulating AI in general, this potential vector of influence requires more attention, also because of significant Emirati – as well as Saudi and Qatari – investments in digital infrastructure to direct data flows to the Arab Gulf.

75 Zysk, High Hopes Amid Hard Realities: Defense AI in Russia, pp. 10–11.
76 Kahn, Risky Incrementalism: Defense AI in the United States, p. 10; Lee, "Overtaking on the Curve?" Defense AI in China, pp. 15–17. Sino-American competition is affecting how both countries view Arab Gulf nations: "The United States and China are now engaged in a fierce competition to become Saudi Arabia's preferred partner as it undertakes (a) historic, technology-driven transformation." See: Chilukuri/Scanlon, Countering the Digital Silk Road: Saudi Arabia, p. 1.
77 In September 2025, both nations agreed to partner on training 10 million young Indonesians in software development. See: Lal, "Indonesia partners with the UAE to train 10 million coders," p. 8.

# 3 Developing Defense AI

Creating an indigenous defense industrial base has become a firmly established strategic priority across the Arab Gulf region.[78] The gusto, which countries show in implementing this goal, the scope of national defense industrial portfolios, and the dynamic underpinning the respective strategies are functions of each nation's international ambitions, its financial power, and its techno-industrial maturity. As a result, the defense industrial framework in the United Arab Emirates, Saudi Arabia, and Qatar is more advanced than in Bahrain, Kuwait, and Oman. This is also the reason why this chapter will primarily focus on the first three Arab Gulf nations with occasional reference to the remaining three.

## 3.1 Priorities

Before delving into the case-by-case overview of current defense AI development priorities three remarks are important. First, this chapter combines development priorities and ongoing procurement initiatives and prospects, because it is difficult to draw clear lines between the two. The combination highlights future defense AI trajectories in Qatar, Saudi Arabia, and the United Arab Emirates in contrast to current use cases, which Chapter 6 will discuss.

Second, combining both perspectives is also justified, because of comprehensive demands for the transfer of know-how and technologies to advance local expertise. This is the approach Arab Gulf nations have chosen to develop more traditional hardware-oriented defense capacities, and it is the road they follow even more strongly regarding software-oriented defense skills and products. As a result, also legacy upgrade and modernization programs now come with transfer of technology and know-how demands that pertain to AI.

Finally, Arab Gulf nations still depend on partners to develop their local defense industrial base.[79] While they have been successful in lowering degrees of dependence in legacy segments, international partners remain key in the defense digitalization segment. Whenever possible, the following discussion will thus also refer to the international partners that Qatar, Saudi Arabia, and the United Arab Emirates are reaching out to. The resulting matrix, which Table 3[80] illustrates, shows most interesting lines of potential friction that could emerge from the local strive to knowledge acquisition, partners' reticence to knowledge sharing, and competing relationships between the respective international partners.

78 For more on this topic, see for example: Al-Eshaq/Bakir, "Dynamic security regime," pp. 14–16; Barany, Armies of Arabia, pp. 179–193; Borchert, "The Arab Gulf defense pivot," pp. 299–315; Forrester, "Onshoring efforts," pp. 25–29; Gaub/Stanley-Lockman, Defense industries in the Arab states;" Rossiter/Yates, Abu Dhabi's drive for defense industrialization," pp. 407–424; Samaan, New military strategies in the Gulf, pp. 59–79; Soubrier, "Mirages of power," pp. 135–151; Soubrier, "The Gulf defense industry, at the cutting (h)edge of multi-level power strategies."

79 See also: Samaan, "Indigenous military reforms form the outside."

80 The priority areas are based on Borchert, "The Very Long Game of Defense AI Adoption: Introduction," pp. 15–16 in order to ensure commonality with previous defense AI country studies published in the DAIO series.

**Table 3: Current Arab Gulf Defense AI Development Priorities and International Partners Involved**

| Priority Area | ARE | QAT | SAU |
|---|---|---|---|
| **Air Defense** | Local | USA | (CHN), FRA |
| **Battle/Combat Management** | | | ESP |
| **Command and Control** | | FRA, USA | (CHN), USA |
| **Cyber/Computer Network Operations (CNO)** | TUR | | ESP |
| **Data Analytics/Management** | ISR, USA | | |
| **Data Models and AI Methods** | USA | FRA, USA | |
| **Defense Industrial Research and Development** | (FRA) | | USA |
| **Electronic Warfare** | USA | USA | (CHN) |
| **Fire Support (e.g., Artillery)** | Local | | FRA |
| **Intelligence, Surveillance, Reconnaissance** | CHN, USA | FRA | |
| **Precision Effects (e.g., Missiles, Hypersonics, Torpedoes)** | | | (CHN) |
| **Predictive Maintenance, Logistics, Maintenance/Repair/Overhaul (MRO)** | USA | | |
| **Radar and Early Warning Systems** | CHN, DEU, FRA | ITA | FRA, USA |
| **Space-Based Assets** | FRA/ITA | FRA/ITA | USA |
| **Target Detection, Classification, Identification** | CHN | | USA |
| **Unmanned Aerial Vehicles** | CHN, ITA, USA | CHN, KOR, TUR | (CHN), TUR, USA |
| **Unmanned Combat Aerial Vehicles** | | | (CHN) |
| **Unmanned Ground Vehicles** | BEL, EST | FRA, GBR | USA |
| **Unmanned Surface Vehicles** | FRA | SGP, USA | USA |
| **Unmanned Underwater Vehicles** | FRA | SGP, USA | (USA) |
| **Unmanned Vehicles: Counter Solutions** | BEL, EST, FRA, ISR | | USA |

Country Codes: BEL Belgium, CHN China, DEU Germany, ESP Spain, FRA France, GBR United Kingdom, ISR Israel, ITA Italy, JPN Japan, KOR South Korea, TUR Türkiye, SGP Singapore, USA United States.

Note: The compilation is based on open-source information and personal interviews. In most of the cases reference to international partners denotes ongoing talks or negotiations concerning AI. Official contract signatures are mentioned in the text. Reference to a country in brackets suggest that there might be a temporary halt, problems have emerged, or it is unclear if earlier news about AI-related activities have materialized.

Against this background, Qatar, Saudi Arabia, and the United Arab Emirates currently pursue the following defense AI development priorities:

- **Air Defense**
  Given the missile threat across the region, air defense is a strategic priority irrespective of the role AI can play in improving the respective solutions. As a result of the May 2025 trip of US President Donald Trump to Qatar and the response to the missile attacks on the Al Udeid Air Base in June 2025, Qatar wants to significantly expand investments. In this context, Qatar also seems to benefit from the US readiness to transfer AI technologies for air defense.[81]
  Using AI to advance air defense is one of the topics the Ministries of Defense of Saudi Arabia and France are trying to cover in a bilateral AI partnership agreement.[82]

- **Battle/Combat Management Systems**
  Spain's shipyard Navantia and Saudi Arabia's SAMI, which have formed the joint venture SAMI Navantia, are said to cooperate on integrating AI into Navantia's HAZEM combat management system, but open-source information does not specify the role of AI.[83]

- **Command and Control (C2)**
  The Emirati EDGE Group is in talks with Anduril (USA) on potentially integrating its Lattice software to enhance C2 with AI for potential use in enabling swarming and enhancing adaptive threat recognition systems.[84]
  In May 2024, France and Qatar signed an MoU on sharing expertise and transferring AI technology for C2 to Qatar.[85] In parallel, the US is committed to provide AI-enhanced C2 systems to Qatar.[86]
  SAMI-AEC of Saudi Arabia has reportedly received proposals from Lockheed Martin on AI cooperation, which include the transfer of AI for C2.[87]

- **Cybersecurity, Cyber Network Operations**
  In July 2025, Turkey's Pavo Group announced creating a joint venture with the Emirati EDGE Group in the field of cybersecurity. KEY4 is expected to develop a portfolio including AI, cybersecurity, big data analytics, and electronic warfare.[88] In 2021, Israel's Rafael Advance Defense Systems, IAI and Emirati G42 have set up the Presight.AI joint venture company with the goal to advance AI

81 "Qatar: Defense agreement with the U.S.," p. 5.
82 "KSA: On AI cooperation with France," p. 8.
83 "KSA: SAMI's AI integration projects," p. 7.
84 "UAE: Anduril Industries and UCAVs," p. 9.
85 "Qatar: Update on naval MoU with France," p. 7.
86 "Qatar: AI partnership with the U.S.," p. 8.
87 "KSA: SAMI-AEC's AI cooperation with Lockheed Martin," p. 7.
88 "Pavo Group-EDGE Group joint venture announcement."

and big data technologies.[89] Originally focusing on banking, healthcare, and public safety, the company is now also involved in defense AI (see Chapter 3.2).

Saudi Arabia's SAMI and Scopa Industries have been advancing defense cooperation with Navantia since 2024, also with the goal to develop AI-enhanced intrusion detection systems to protect C2 solutions.[90]

AI-enhanced cybersecurity is also a focus area in Kuwait's Strategic Plan 2025–2030 that prioritizes cooperation with the United States via the US Central Command.[91]

- **Data Analytics and Data Management**

  In this field, the Emirates are in discussion with the US technology company Palantir to explore using AI for predictive geopolitical monitoring and advance the use of AI across the full sensor-to-shooter web.[92]

- **Data Models and AI Methods**

  In parallel to stepping up local efforts to build Arabic AI models (see Chapter 3.2), the three Arab Gulf nations also deepen cooperation with international partners to further the same goal. For example, the Emirates and Alphabet are reportedly discussing how to develop sovereign AI frameworks commensurate with local datasets and regional linguistics and how to advance generative AI interoperability across use in different systems.[93]

  In 2024, Qatar's Barzan Holdings has launched a tender to procure natural language processing (NLP) systems for defense purposes. The tender foresees setting up a R&D center to collaboratively develop NLP and other algorithms in Qatar and would include the transfer of technology. Thales and IBM seem to be competing for the tender.[94]

  In addition, Saudi Arabia's Humain is partnering with US technology companies to build another Arabic Large Language Model (see Chapter 3.2), whereas Oman has launched local initiatives for new language models.[95] It remains unknown to what extent these solutions are also meant to support national security and defense.

- **Defense Industrial Research and Development**

  NVIDIA and SAMI are reportedly working on setting up a joint AI lab in Saudi Arabia. This lab would play a critical role in the nascent defense AI ecosystem. "Initial focus areas include AI-powered decision support, autonomous target

89 Zaken, "Rafael sets up joint AI venture with UAE's G42."
90 "Saudi-Spanish defense cooperation."
91 "Kuwait: Cybersecurity priorities," p. 9.
92 "UAE: Sheikh Tahnoon and Palantir," p. 8.
93 "UAE: Sheikh Tahnoon-Alphabet meeting," p. 10; "UAE: Sheikh Tahnoon-Sacks meeting," p. 10.
94 "Qatar: Barzan Holdings' AI and NLP tender," p. 8.
95 "Oman's first Large Language Model pioneering in speed and privacy."

identification, and real-time threat detection across multi-domain operations." The respective MoU is reportedly in the finalizing stage.[96]
The Emirates are in similar talks with Thales to set up an AI R&D center in Abu Dhabi. Currently, questions around data governance and digital sovereignty seem to create frictions. The Emirates want "all data, especially those generated or utilized for defense applications" to be "hosted on a sovereign Emirati infrastructure and remain fully accessible under national jurisdiction," whereas Thales is looking for specific carve-outs.[97]

- **Electronic Warfare (EW)**
  In 2023, Tawazun Council and L3Harris Technologies established BAZ Technologies to establish an Emirati capability for AI-enhanced EW.[98] In addition, SGN4L, which belongs to the EDGE Group, is also developing AI-enhanced solutions for electromagnetic spectrum operations.[99]
  Qatar has prioritized integrating AI into EW solutions in its cooperation with the United States.[100]

- **Fire Support**
  In early 2024, Saudi Arabia's SAMI presented a modified Caesar artillery system. Contrary to the original design by KNDS, the new system seems to have AI-enhanced targeting technologies, which were at the core of SAMI's integration efforts. Only a few weeks earlier, KNDS revealed an AI-enhancement for the Caesar systems.[101] It is thus unclear to what extent the respective SAMI application is new and/or indigenously developed.

- **Intelligence, Surveillance, Reconnaissance (ISR)**
  Emirati discussions with Palantir (see data analytics above) also extend into ISR. In addition, there seems to be an interest in using AI to interpret satellite imagery.[102] The country also has ongoing talks with China on using AI for monitoring and surveillance.[103]
  To advance maritime surveillance, Barzan Holdings in Qatar is reportedly in talks with Thales to develop a comprehensive AI-enabled surveillance solution also including the use of unmanned assets in aerial and naval domains as well as AI-enhanced data fusion.[104]

96 "KSA: AI defense cooperation with NVIDIA," p. 7.
97 "UAE: Thales AI R&D center," p. 9.
98 "Tawazun Council, L3Harris Open Intelligence Software Center in Abu Dhabi."
99 For more, see: https://sign4l.ae/ (last accessed 25 September 2025).
100 "Qatar: AI partnerships with the U.S.," p. 8.
101 "KSA: SAMI's artillery system unveiled at WDS," p. 8; "France innovates by integrating AI into Caesar 155mm Howitzer."
102 "UAE: Sheikh Tahnoon-Sacks meeting," p. 10.
103 "UAE: AI, robotics partnership with China," p. 8.
104 "Qatar: Thales and maritime surveillance systems," p. 8.

- **Predictive Maintenance, Logistics, and MRO**

  The Emirates are discussing defense AI research and development opportunities for predictive maintenance solutions with the US.[105]

- **Radar and Early Warning Systems**

  To advance the performance of its radar systems with AI against hypersonic missile threats, the Emirates are reportedly in discussion with China.[106] Similarly, talks between the Emirates' Ministry of Defense and the German sensor company Hensoldt also seem to include plans to integrate AI-enhanced threat analysis with the company's TRML-4D multifunctional radar.[107] In addition, Thales Group and Tawazun have agreed, in May 2025, to set up a Ground Master air surveillance radar production facility in the Emirates to enable local radar manufacturing. The agreement reportedly also includes access to AI solutions that enhance these systems.[108]

  In 2024, Barzan Holdings and Fincantieri of Italy have signed an MoD to develop an anti-drone system including the supply and local production of Omega360 radar units. This radar includes AI components to detect, classify, and identify drone threats. It is unclear if this project also involves AI transfer to Qatar as part of the local production.[109]

  In February 2025, Saudi Undersecretary of Defense for Strategic Affairs MG Salman Al-Harbi held talks with French counterparts to discuss the use of AI to advance early warning systems.[110] SAMI-AEC in Riyadh also received proposals from Lockheed Martin to share AI technologies for radar systems.[111]

- **Space-Based Assets**

  The Franco-Italian company Thales Alenia Space is in talks to sign a Memorandum of Understanding with the EDGE Group to transfer technologies for AI-powered space solutions to the Emirates. Both companies reportedly also agreed to explore using AI to improve detecting space-based threats in real-time.[112]

  Thales Alenia Space has also offered satellite solutions in response to Qatar's maritime and airspace surveillance needs. The respective satellites are reported to have AI-enhance processing units.[113]

105 "UAE: Sheikh Tahnoon-Sacks meeting," p. 10.
106 "UAE-China defense relations: Hypersonic detection radar procurement update."
107 "UAE: Hensoldt and TRML-4D."
108 "UAE: Tawazun-Thales partnership," p. 8.
109 "Fincantieri Group signs MoU with Barzan Holdings for anti-drone radar system in Qatar."
110 "KSA: AI Cooperation with France," p. 7.
111 "KSA: SAMI-AEC's AI cooperation with Lockheed Martin," p. 7.
112 "UAE: Talks with Thales Alenia," p. 8.
113 "Qatar: Satellite offer from Thales Alenia," p. 8.

The use of AI in military satellites and space defense systems was part of a February 2025 discussion between the Saudi and US ministers of defense, suggesting that AI technology transfer from the US may be on the uptick.[114]

- **Target Detection, Classification and Identification**
  The Emirates' ongoing discussion with China on using AI for monitoring and surveillance is also related to enhance target identification with AI and in combination with unmanned systems.[115]
  Saudi Arabia seems to have ongoing discussions with US defense manufacturer RTX (formerly Raytheon) on using AI-enhanced target recognition modules that could be used against cruise missile threats and to counter UAV swarms.[116]

- **Unmanned Aerial (UAV) and Unmanned Combat Aerial Vehicles (UCAV)**
  In line with international developments,[117] AI for use with U(C)AV is a strategic priority for all three nations. China Electronics Technology Group Corporation (CETC) is said to be in talks with the Emirati EDGE Group on providing AI-enhanced classification modules for Tian Shao UAVs. In parallel, EDGE Group is continuing talks with China Aerospace Science and Industry Cooperation (CASIC) on AI-enhanced avionic and control components[118] and with Italy's Leonardo to augment its Falco Xplorer UAV with AI to advance data processing and coalition avoidance.[119]
  Since April 2024, Qatar's Barzan Holdings is reportedly in talks with LIG Nex1 (South Korea), Aselsan and Havelsan (both Türkiye) and undisclosed Chinese companies on AI-equipped UAV.[120]
  Saudi Arabia's SAMI is mulling the idea of integrating AI with UAV provided by Baykar (Türkyie), which agreed to localize UAV production in Saudi Arabia in 2023.[121] In addition, the Saudi Ministry of Defense, SAMI, and SAMI-AEC are in discussions with Shield AI, NVIDIA, and Lockheed Martin about using AI for unmanned systems across all military domains.[122]

- **Unmanned Ground Vehicles (UGV)**
  In February 2025, UGV producer Milrem Robotics, based in Estonia but part of EDGE Group, announced signing a Memorandum of Understanding with Thales Belgium and the Belgian EM&E Group to mount a 70mm rocket system

114 "KSA: Prince Khaled-Hegseth meeting," p. 9.
115 "UAE: AI, robotics partnerships with China," p. 8.
116 "U.S.: Expected defense deal with KSA," p. 10.
117 Borchert, "The Very Long Game of Defense AI Adoption: Introduction," p. 14.
118 "UAE: EDGE, CTEC, and AI-enabled UAVs," p. 8; "UAE: EDGE-CASIC-UAV and AI partnership updates."
119 "UAE: EDGE Group, Leonardo, and UAV technologies integration project." See also: "Leonardo's Falco Xplorer completes successful EUDAAS demonstration, paving the way for unmanned aircraft integration in European Airspace."
120 "Qatar: Barzan Holdings' AI plans," p. 6.
121 "KSA: SAMI's AI integration projects," p. 7; "Saudi Arabia in pact with Turkey's Baykar Tech to localize drone manufacturing."
122 "KSA: SAMI and Shield AI cooperation," p. 8; "KSA: AI defense cooperation with NVIDIA," p. 7; "KSA: Lockheed Martin and unmanned systems," p. 7.

on the THeMIS platform, which is using AI. The goal is to provide the Emirates with a new counter-UAV solution.[123]
Qatar has an ongoing tender for UGV. While Qinetiq is reportedly in a leading position due to its know-how in integrating AI, Thales has stepped up commercial and diplomatic offers.[124]
In Saudi Arabia, several US companies are reportedly in the running for an UGV tender launched in May 2024. SAMI is said to finance developing the winner's "cutting edge AI" modules.[125]

- **Unmanned Surface Vehicles (USV)**
  In April 2025, France's CMN NAVAL and the Emirati EDGE Group created the new joint venture AD NAVAL to build naval ships. According to press reports, the new company aims to produce "AI-driven autonomous systems" and shall also provide the EDGE Group with access to presumably AI technology for predictive maintenance.[126]
  In April 2025, L3Harris Technologies (United States), SAMI-L3Harris, and Zamil Shipyards joined forces to develop USVs made in Saudi Arabia. Although not explicitly mentioned, these platforms could include AI methods for autonomous navigation.[127]

- **Unmanned Underwater Vehicles (UUV)**
  In February 2025, French President Emmanuel Marcon and President Sheikh Mohammed bin Zayed signed a comprehensive AI cooperation agreement. This also addresses Emirati interests to use AI for underwater threat detection and monitoring as well as UUV.[128]
  In 2023, Barzan Holdings and Singapore's ST Engineering started talks about developing UUV and USV with AI components; the current status of these talks is unclear.[129] Since the same year, Qatar seems to have benefitted from US support, as the Qatar Emiry Navy at least got two AI-enabled UUV and USV.[130]
  In the context of the US President's 2025 visit to Doha, it also became known that the US seems ready to transfer AI technologies for UUV to Qatar.[131]
  In 2023, Saudi Arabia has reportedly been offered AI-enhanced UUVs by the US,[132] but there is no public confirmation of such a delivery.

123 "Thales, Milrem Robotics, and EM&E Group sign a MoU for strategic cooperation in the United Arab Emirates;" "Dolan, "Thales, Milrem, EM&E forge robotics Alliance for UAE defense."
124 „Qatar: UGV tender update," p. 8.
125 "Saudi Arabia: SAMI's UGV tender attracts global competition."
126 Bishnoi, "EDGE and CMN NAVLA partner to develop AI-powered warships for next-gen naval defense."
127 "Saudi Arabia teams up with L3Harris for Saudi-made USVs."
128 "UAE: Aerospace cooperation with France," p. 8.
129 "Qatar: Singapore, naval and EW systems," p. 6.
130 "Qatar: Austin discusses enhancing QEN capabilities," p. 6.
131 "Qatar: Defense agreement with the U.S.," p. 5.
132 "KSA: Pentagon offers advanced naval systems," p. 5.

- **Countering Unmanned Vehicles**
  In addition to cooperating with partners on using the THeMIS UGV for counter-UAV solutions, as discussed above, the EDGE Group has also invested USD10M in Israeli start-up company Thirdeye, which uses AI-based electro-optical systems to detect drones. The Emirati company seems to have plans for further developing and commercializing the technology.[133] Developing advanced counter-drone technologies is also at the heart of a recent Thales-EDGE Group partnership agreement, which is reported to integrate AI-enhanced threat detection and jamming.[134]
  Saudi Arabia is reportedly in discussion with RTX on AI-enhanced target recognition to counter UAV swarms.[135]

As outlined above, transfer of technology and know-how is integral to developing defense capacities among the Arab Gulf nations. As this requirement has become a firm demand in return for market access by foreign companies, it is worth mentioning that the United Arab Emirates and Saudi Arabia seem to be working on comprehensive frameworks for partner countries to transfer AI technologies and knowledge:

- Within the next two years the United Arab Emirates reportedly wants to secure the transfer and localization of US AI technology in the Emirates.[136] In this context, Tawazun and the Defense Innovation Unit in the US Department of Defense have signed a letter of intent to deepen defense cooperation, which covers AI and cybersecurity research.[137] In parallel, the Emirates strive to secure AI technology transfers from China, France, Italy, and Japan.[138]
- Talks between France and Saudi Arabia on an AI partnership are ongoing and envisage, for example, setting up a research and development center in Neom that would also focus on AI.[139] However, questions related to technology transfer and sovereignty pose challenges that need time to resolve.[140] Saudi Arabia's discussions with China on transferring AI seem to have lost momentum as the current US administration is willing to engage in transferring AI technology to Saudi Arabia while the outgoing Biden administration offered Riad a defense AI coordination program.[141] Prior to this, Saudi Arabia reportedly talked with China about AI technology transfer in the fields of air defense, C2, electronic warfare, advanced hypersonic missiles, and UCAV.[142]

133 "UAE defense conglomerate invests $10M in Israeli AI startup combat drone threats."
134 "UAE: Thales and C-UAS," p. 8.
135 "U.S.: Expected defense deal with KSA," p. 10.
136 "UAE: Defense agreements with the U.S.," p. 5.
137 "UAE: Tawazun Council and DIU MoU," p. 8.
138 "UAE: Roadmap for strategic relations with China," p. 9; "UAE: Tawazun-Thales partnership," p. 8; "UAE: View on Italy's defense industry," p. 8; "UAE: Expanding defense cooperation with Japan," p. 8.
139 "Saudi-French AI cooperation: officials in charge, entities involved."
140 "KSA: On AI cooperation with France," p. 8. See also: Schiavi, "Saudi Arabia bets on French collaboration to power AI-driven defense."
141 "KSA: CP Mohammed-Trump upcoming meeting and defense pact," p. 9; "KSA: Approach to defense ties with U.S., China," p. 6; "KSA: Defense pact with the U.S. (Plan B)," p. 9. See also: Soliman, "Realigning US-Saudi relations for the AI era;" Kitishian, Saudi Arabia: Hundreds of billions for global AI supremacy;" Feakin, "Silicon sandstorms."
142 "KSA: Current defense ties with China," p. 7; "KSA: Progress on hypersonics with China," p. 7.

In parallel to collaborative ventures with international partners, there are also local initiatives to advance defense AI. In mid-2025, the Emirates have adopted a strategic vision document for the future national defense industries strategy (NDIS). This paper argues that AI is blurring the boundaries between traditional and new defense companies while at the same time underlining the growing need for sovereign solutions and national integration capacities. Overall, this document identifies unmanned systems in all domains, cybersecurity, electronic warfare, space-based applications, and C4I integration as strategic priorities.[143]

In this context, the EDGE Group has embarked on defining group-wide technology initiatives and implementing its AI strategy. The goal is to "infuse" the group's product portfolio with AI. In parallel the group also adopts AI for enterprise processes and to advance supply chain agility.[144] Overall, the EDGE Group follows a pragmatic AI approach that is set to use the technology when it delivers operational value, for example, to improve air defense or the accuracy of mortar systems. [145] Earlier in 2025, the EDGE Group, Beacon Red and Presight.AI also signed an MoU that suggests joint activities on laying the foundation for a sovereign digital architecture to underpin an Emirati sensor-to-shooter web.[146]

By contrast, specific reports about indigenous Saudi defense AI solutions are rare,[147] but ambitions are aiming high. SAMI endeavors to create an AI-driven product portfolio, inter alia, with AI for UAV, UGV, ammunition, C2, early-warning radars, and communication systems.[148]

In sum, the portfolio of defense AI development use cases that Qatar, Saudi Arabia and the United Arab Emirates have set up is expansive. Overall, the focus is on using AI in combination with single platforms that have been identified as a strategic procurement priority or already constitute well established pillars in the indigenous defense industrial portfolio. Adding AI thus seems a natural extension of what is available.

There is, however, also a risk that comes with a platform-based approach, and this risk is related to the cultural trait of compartmentalization, discussed in Chapter 2.2. In the worst case, the compartmentalized use of AI to render single platforms more sophisticated could turn out to be harmful as "military verticals" would be optimized at the cost of (potentially) neglecting the need for a systemic understanding of armed forces. The trend towards expanding defense diversification,

143 National Defense Industries Strategic Foresight 2025, pp. 15, 41–44.
144 Interview, Abu Dhabi, 9 September 2025.
145 "UAE: Air defense priorities, officials in charge," pp. 10–11; "UAE: Integrating AI in mortars," p. 8.
146 Interview, Abu Dhabi, 9 September 2025; "UAE: Beacon Red-Presight.AI MoU," p. 8.
147 United Defense Company has reportedly produced different types of AI-equipped UAV. See: "United Defense Company factory produces eight AI-powered drone types."
148 "KSA: SAMI and AI-driven systems," p. 7; "Executive Summary," p. 4, "KSA: GAMI-SAMI cooperation update," p. 8.

which will also diversify the portfolio of systems provided by different partners, is likely to worsen this problem as the need to integrate different AI components embedded in foreign systems will increase. Therefore, the systemic perspective, which would emphasize using AI, for example, to support concept and capability development, coordinate assets across services and domains to advance interoperability[149] or improve military training with AI red teaming should receive more attention in the future.

## 3.2 Ecosystems

Digitalization and AI are core building blocks of the Arab Gulf nations' strive towards economic diversification. Consequently, all nations have stepped up efforts to advance indigenous capacities by investing political attention and money in setting up local ecosystems. Like elsewhere, Gulf ecosystems involve the public sector, companies, academic and research institutes as well as financial institutions and investors. While the focus is on growing local capacities, Arab Gulf ecosystems in defense and digitalization add extra strategic depth by investing abroad to form partnerships that help advance knowledge and technology transfer. In some cases, competition among members of the ruling families that are at the helm of different local champions adds a further layer of complexity that shapes ecosystem dynamics.

### Qatar

Qatar's government sets the strategic guidance for the country's digital transformation and thus plays a prominent role in the national digital ecosystem (Figure 1). The Ministry of Communications and Information Technology (MCIT) is shaping the overall strategic ambition, advancing digital infrastructure, and pushing for local skillset improvements. In this regard, MCIT is cooperating with Scale.AI on using AI-enhanced tools, for example for predictive modelling, and with Google on cloud computing.[150] The ministry has set up the Qatar Digital Academy that cooperates with Microsoft and Huawei, and the National AI Committee to advance interagency coordination on AI-related work.[151] Besides the Qatar Research, Development and Innovation Council (QRDI), which develops the nation's RDI strategy,[152] the Ministry of the Interior and the Ministry of Defense are key for

149 As argued above, the Emirates are about to complement platform-centric approaches with an increasing emphasis on integration; Qatar's Barzan Holdings has similar ambitions.
150 "MCIT and Scale AI;" "MCIT announces awarding the framework agreement of cloud computing services for the government sector to Google Cloud." For more, see:
151 https://www.mcit.gov.qa/en/initiatives/qatar-digital-academy/; https://www.mcit.gov.qa/en/artificial-intelligence-committee/ (last accessed 25 September 2025).
152 For more, see: https://qrdi.org.qa/en-US/About (last accessed 25 September 2025)

national security and defense. The former is cooperating with IBM on AI applications,[153] whereas the latter has set up Barzan Holdings as the main local defense champion.

The Qatar Foundation is at the heart of the academic and research subsystem. The foundation set up the Education City,[154] which involves the Hamd Bin Khalifa University (HBKU) and local outfits of US and European universities. HBKU and Qatar University offer specialized AI programs.[155] HBKU and the Queen Mary University of London have launched work on developing a joint roadmap for AI cooperation.[156] In addition, HBKU and the Carnegie Mellon University Qatar have signed memoranda of understanding with Barzan Holdings on research and innovation that benefits local companies.[157]

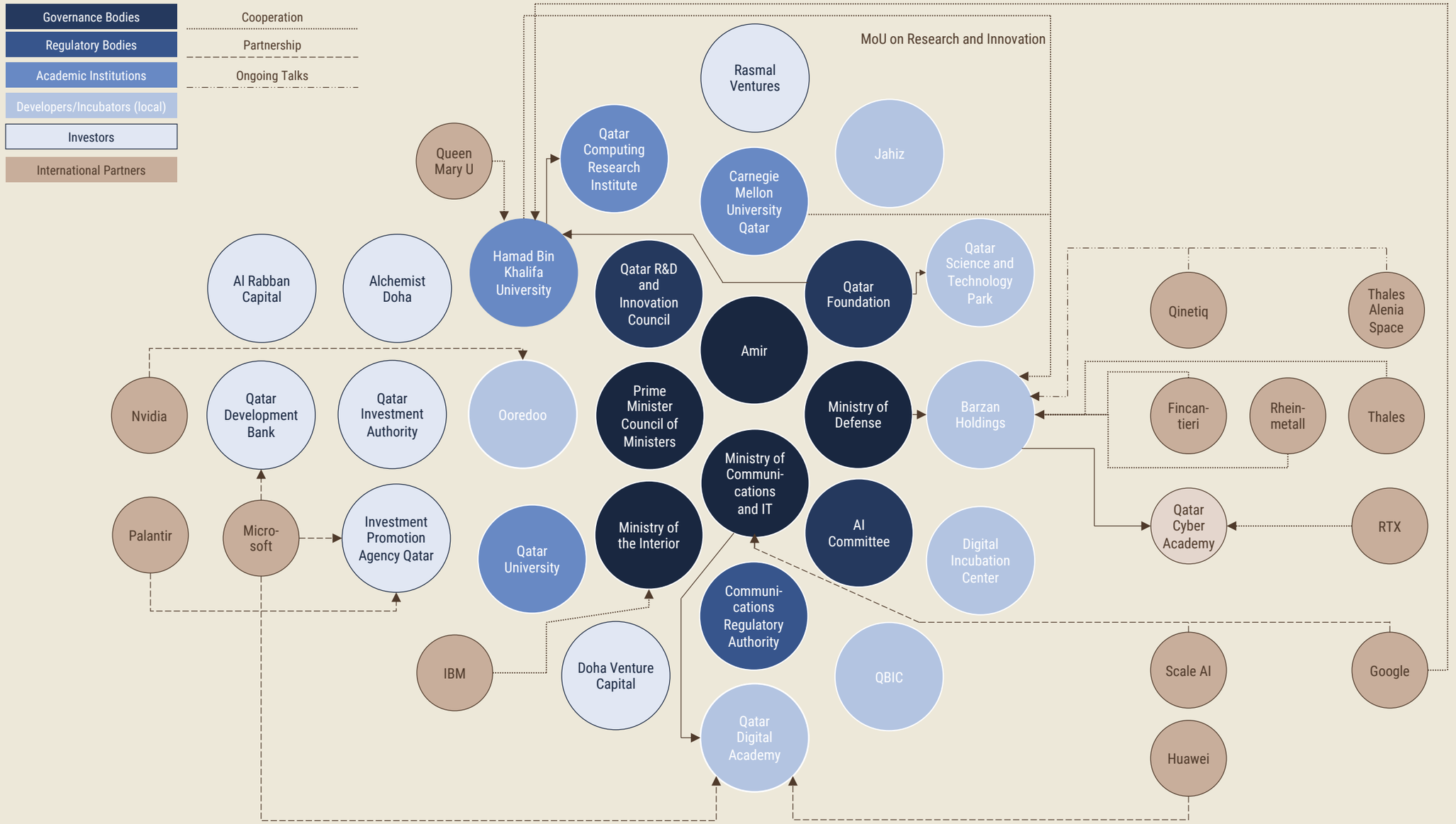
The Qatar Computing Research Institute (QCRI), founded at HBKU in 2010, has been a key actor from the start to establish local research capacities. In addition to the university's general education efforts, QCRI has developed Fanar, a generative AI platform focused on Arabic-centric thinking and understanding. Local partners like Qatar University and the Qatar National Library have supported the development of high-quality datasets; Google Cloud was acting as a technology partner.[158]

Developers inside and outside the corporate sector benefit from the foundation provided by universities. The Qatar Science and Technology Park, for example, is a member of Qatar Foundation and works as a key incubator and innovation hub that has invested USD3bn in the past 14 years to advance research and development in technology acceleration.[159] Companies like Ooredoo, the local telecommunications operator, provide the ecosystem's important AI infrastructure, for example in cooperation with Nvidia.[160]

Ultimately, Barzan Holdings is the country's national defense champion. Established in 2016, the company is currently undergoing a strategic transformation. Abdullah Hassan Al-Khater (CEO) is pushing for AI integration with a strategic agenda emphasizing sovereign systems integration and digital sovereignty. In addition, Barzan looks for opportunities to acquire AI startups in the US, Europe, and the Asia Pacific region and envisages becoming a potential AI exporter.[161]

153 "IBM signs agreement with Ministry of Interior, Qatar."
154 For more, see https://www.qf.org.qa/about (last accessed 25 September 2025).
155 Mouriesse, "Qatar's AI development."
156 "UK and Qatar launch project to boost artificial intelligence collaboration."
157 "CMU-Q, Barzan sign MoU;" "Barzan Holdings signs MoU with HBKU for cooperation in research, innovation."
158 Mouriesse, "Qatar's AI development." For more on Fanar, which means "lighthouse," see: https://www.fanar.qa/en (last accessed 25 September 2025).
159 For more; see: https://qstp.org.qa/ (last accessed 25 September 2025).
160 "Ooredoo launches AI cloud in Qatar."
161 "Qatar: Al-Khater 2025 defense priorities," p. 8; "Qatar's defense shift: Barzan Holdings and the rise of indigenous military capabilities;" "Qatar AI projects: Main objectives and eyed companies for cooperation."

**Figure 1:** **Select Group of Stakeholders Constituting Qatar's Digital and Defense AI Ecosystem**



Barzan Holdings is also the main interlocutor for international partners. The company is working with Thales on integrating AI into C2 solutions to advance maritime surveillance and with Fincantieri on developing the Omega360 radar with AI.[162] Barzan Holdings and Rheinmetall, via their joint venture Rheinmetall Barzan Advanced Technologies, have been working on AI-enhanced C2 to improve "mission accuracy."[163] Furthermore, reports suggest that Barzan Holdings is in talks with Thales Alenia Space on AI-enhanced processing units and with QinetiQ and Thales on AI for unmanned ground vehicles.[164]

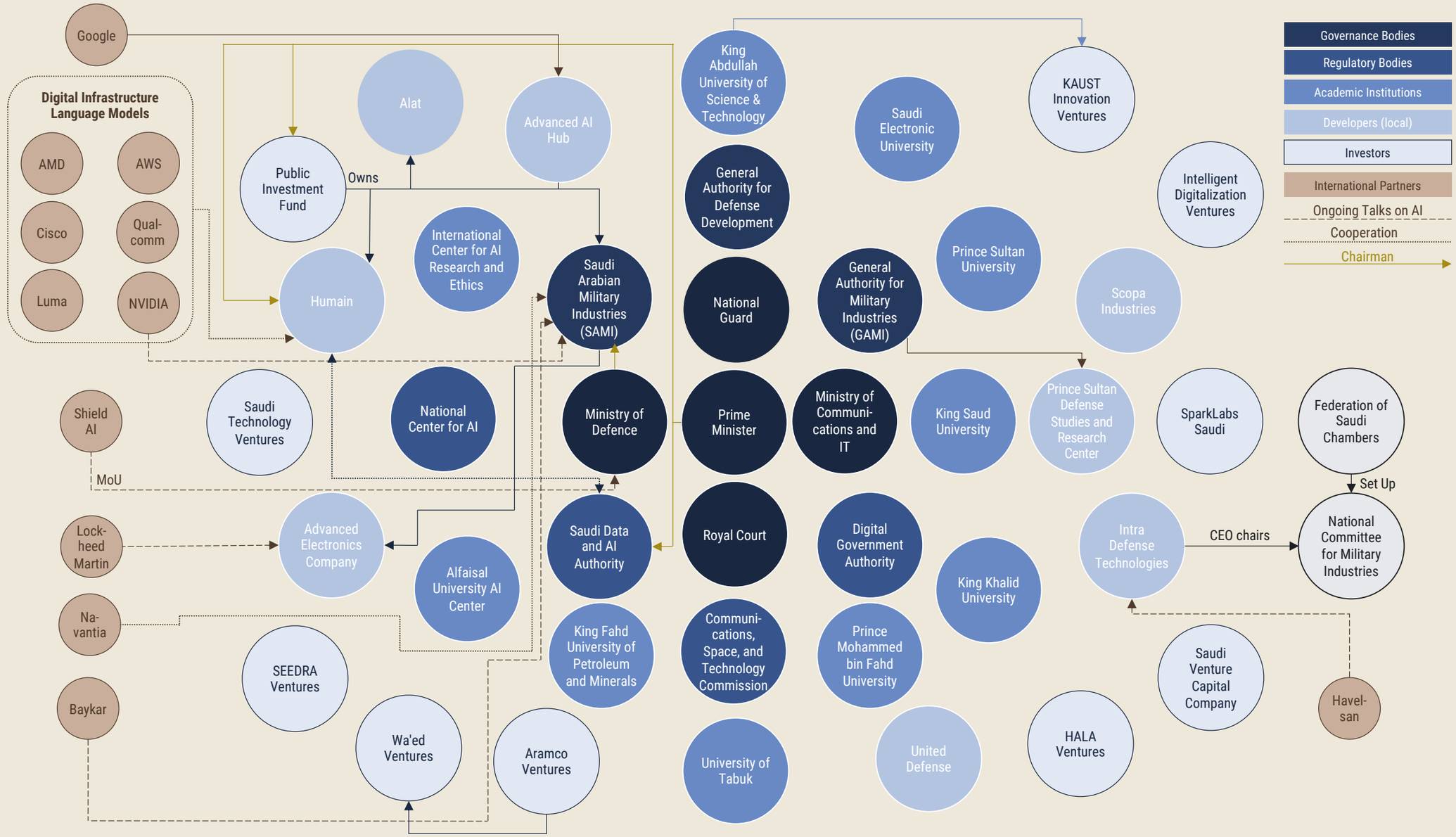
Financial and investment institutions round off Qatar's ecosystem. Most of these stakeholders do not (yet) follow a dedicated defense focus but their activities and partnerships help advance the country's overall digitalization, which is also likely to benefit local talent and expand local digital infrastructure.[165] In this regard the Investment Promotion Agency Qatar is partnering with Palantir, and Microsoft is partnering with Qatar Development Bank.[166] In September 2025, the Qatar Investment Authority joined other institutional investors to invest in Anthropic, a US AI company.[167] Some accelerators and venture capitalists also provide access to more global financial networks that have tapped into defense such as Alchemist Doha, for example.[168] Similarly, Qatar Investment Authority is targeting investments in AI and data centers abroad, most recently in the United States,[169] which could – in the long run – enable defense-relevant skills and technology transfer.

## Saudi Arabia

Saudi Arabia's digital and AI ecosystem has been modeled around the strategic vision of Crown Prince Mohmmed bin Salman. He has been the driver behind the country's Vision 2030, and he has set in place the enabling institutions expected to turn ideas into reality. That's why he is at the heart of the ecosystem depicted in Figure 2. As the country's Prime Minister, he is chairman of the Saudi Data and AI Authority, which is central to advancing digitalization. He also chairs the Public Investment Fund (PIF), the main engine that underpins economic transformation and national and foreign strategic investments, and Humain, the country's latest digitalization and AI champion. This gives the Crown Prince a firm grip on all strategic levers.

162 "Qatar: Thales and maritime surveillance systems," p. 8; "Fincantieri Group sings MoU with Barzan Holdings for anti-drone radar system in Qatar."
163 Peruzzi, "Rheinmetall Barzan Advanced Technologies delivers C2 software to national security and defense customers."
164 "Qatar: Satellite offer from Thales Alenia," p. 8; "Qatar: UGV tender update," p. 8.
165 "Qatar's $5 billion AI startup ecosystem."
166 "Palantir Technologies to bring big data expertise to support Qatar's economic transformation;" "QDB, Microsoft Qatar partner to foster innovation, accelerate startups and SME's digital transformation."
167 "Qatar looks to close regional AI gap with Anthropic investment."
168 Alchemist Accelerator has supported Onebrief, as US company, that offers digital planning and collaboration tools for armed forces. For more, see: https://vault.alchemistaccelerator.com/companies/public/onebrief (last accessed 25 September 2025).
169 Kanowsky, "Qatar's QIA plans to double U.S. investments in coming years."

**Figure 2:** **Select Group of Stakeholders Constituting the Saudi Arabia's Digital and AI Ecosystem**



Building up a local defense industry is central to the Saudi Vision 2030.[170] That's why the country's defense institutions have been modernized, with Prince Khalid bin Salman, the Crown Prince's brother, at the helm of the Ministry of Defense. The Ministry has created three implementing instruments. Established in 2017, the General Authority for Military Industries (GAMI), chaired by Prince Khalid, sets the military equipment policies and is also responsible to advance defense industrial localization. Also in the same year, the Saudi Arabian Military Industries (SAMI), the industrial leg of GAMI and owned by PIF, was established. Four years later, Saudi Arabia has established the General Authority for Defense Development (GADD), an independent entity, which sets the framework for defense research, development, and innovation.[171]

Three public entities relevant to advance Saudi digitalization complement this defense core. Responsibility for the country's digital technology and infrastructure development rests with the Ministry of Communications and Information Technology.[172] As the performance of the government is important to achieve the Crown Prince's strategic vision, the Digital Government Authority is responsible for digital government and inter-agency cooperation.[173] Finally, implementing and updating Saudi Arabia's data and AI agenda rests with the Saudi Data and AI Authority (SDAIA).[174] SDAIA's work is supported by the National Center for AI (NCAI),[175] which drives the national AI priorities, and the National Data Management Office (NDMO), which has been entrusted to "manage, digitize, develop and enable national data."[176] Finally, the Communications, Space, and Technology Commission is Saudi Arabia's digital regulator.[177]

Saudi Arabia is strengthening the academic and research segment of its digital and AI ecosystem to provide the country with the skills needed to achieve the Vision 2030 goals. The King Abdullah University of Science and Technology (KAUST) plays a key role in the country's AI ambition, which is reflected, inter alia, in the set-up of the Generative AI Center of Excellence and the hiring of Jürgen Schmidhuber, Co-Director of the Center and former Director of the Swiss AI Lab.[178] SDAIA, which has established this center together with KAUST, has also partnered with the King Fahd University of Petroleum and Minerals to establish a Joint Research Center for AI.[179] By September 2024, the country had established a total of 11 centers of excellence.[180]

170 "Our aim is to localize over 50 percent of military equipment spending by 2030." Vision 2030, p. 48.
171 Pons, "The three engines with which Saudi Arabia is building up its own military industrial sector."
172 For more, see: https://www.mcit.gov.sa/en (last accessed 25 September 2025).
173 For more, see: https://dga.gov.sa/en/about-DGA (last accessed 25 September 2025).
174 For more, see: https://sdaia.gov.sa/en/default.aspx (last accessed 25 September 2025).
175 For more, see: https://sdaia.gov.sa/en/Sectors/Ncai/Pages/default.aspx (last accessed 25 September 2025).
176 For more, see: https://sdaia.gov.sa/en/Sectors/NDMO/Pages/default.aspx (last accessed 25 September 2025).
177 For more, see: https://www.cst.gov.sa/en/about/who-we-are/cst-strategy (last accessed 25 September 2025).
178 For more, see: https://www.kaust.edu.sa/en/; https://www.kaust.edu.sa/en/research/generative-ai; https://cemse.kaust.edu.sa/profiles/jurgen-schmidhuber (last accessed 25 September 2025).
179 For more, see: https://ri.kfupm.edu.sa/jrcai (last accessed 25 September 2025).
180 State of AI in Saudi Arabia, p. 45.

Additional research bodies have been created. The International Center for AI Research and Ethics (ICAIRE) was launched in 2024 by SDAIA in cooperation with UNESCO to "advance competencies and legislative frameworks in the field of AI."[181] The AI center at the Alfaisal University provides AI research and training in different fields;[182] the university has also set up the AI Academy in the past to expose undergraduate students to AI. In addition, the Prince Sultan Defense Studies and Research Center (RSDSRC) is instrumental in advancing defense research in areas adjacent to digitalization such as Command, Control, Communications, and Intelligence (C3) as well as radar and EW systems.[183]

Humain and Alat are the two strategic, PIF-owned pillars of the corporate digital ecosystem. Humain's main task is to develop Allam, an Arabic large language model (LLM), for which it has entered strategic partnerships with all major US digital technology companies.[184] Alat is meant to provide and develop the hardware that Humain's software solutions need. Focusing on semiconductors, electronics, and AI infrastructure, the company also has its own USD100bn fund for strategic investments.[185] To further expand digital infrastructure capacities, PIF and Google joined forces in October 2024 to set up an advanced AI hub that will leverage the US company's cloud technology and generative AI models.[186]

At the core of the local defense industry, that is increasingly important to advance digitalization, sits SAMI. As the industrial arm of the Ministry of Defense, SAMI has become the central interlocutor for foreign industrial partners signing partnerships and establishing joint ventures. Hitherto independent defense companies have also been merged with SAMI. Former Advanced Electronics Company, established in 1988, now operates as SAMI-AEC[187] for advanced electronics and is, for example, in talks with Lockheed Martin on using AI. Intra Defense Technologies,[188] whose CEO has been appointed to head the new National Committee for Military Industries in March 2025, is a raising newcomer. Its rise seems to come at the cost of other companies like Scopa Industries, which has reportedly been sidelined by GAMI and SAMI as of lately.[189] Recently, Intra also signed an MoU with Havelsan (Türkiye) on military simulation technologies.[190] United Defense, another private

181 "Saudi Arabia unveils International Center for AI Research and Ethics." For more, see: https://icaire.org/ (last accessed 25 September 2025).
182 For more, see: https://coe.alfaisal.edu/en/ai (last accessed 25 September 2025).
183 For more, see: https://www.psdsarc.org.sa/ (last accessed 25 September 2025).
184 Kitishian, "Saudi Arabia: Hundreds of Billions for global AI supremacy;" "Tech company Humain to launch Allam, first Saudi-developed Arabic AI model." For more, see: https://humain.ai/en/ (last accessed 25 September 2025).
185 Kitishian, "Saudi Arabia: Hundreds of Billions for global AI supremacy." For more, see: https://alat.com/en/ (last accessed 25 September 2025).
186 "PIF and Google Cloud to create advanced AI hub in Saudi Arabia."
187 For more, see: https://www.aecl.com/en/ (last accessed 25 September 2025).
188 For more, see: https://intra.sa/ (last accessed 25 September 2025).
189 "Saudi go-between for Turkish and German defence firms on the rise in MbS's inner circle."
190 "Havelsan and Intra Defense Technologies sign MoU to enhance military simulation technologies."

defense company, is gradually moving into indigenously developing UAV, loitering munition, and AI solutions.[191]

Saudi Arabia underpins its digitalization and AI ecosystem with significant investments (see Chapter 5). Core strategic investments are channeled through PIF, the Saudi sovereign wealth fund, which has around USD925bn under management.[192] In addition, leading companies and institutions have set up their own funding vehicles to advance nurturing an indigenous startup landscape. KAUST Innovation Ventures is supporting university spinoffs, and Aramco Ventures, is, inter alia, focusing on digital solutions in the fields of AI and analytics as well as cybersecurity.[193] In parallel, private venture capital companies have been established. For example, Saudi Technology Ventures is focusing on AI-native startups; Intelligent Digitalization Ventures invests in software as a service, AI, and drone-based aerial services; and Wa'ed Ventures, as Aramco Ventures venture capital fund, invests in AI, fintech, and the growing market of space technology companies.[194]

## United Arab Emirates

The Emirates are on a strategic mission to firmly establish the country as a leading AI destination. This process started in the early 2000s with initial semiconductor investments, reached a symbolic height with the 2017 appointment of the world's first AI minister, and has since led to a robust techno-financial ecosystem anchored locally and abroad.[195] Like in the neighboring Arab Gulf countries, AI initiatives and investments are the result of dedicated strategic interventions. But in the Emirates, these interventions originate from different strategic ambitions that key members of the ruling family pursue. Although Khaled bin Mohammed bin Zayed, son of the Emirates' President Mohammed bin Zayed and Crown Prince of Abu Dhabi, and his uncle Tahnoon bin Zayed, Emirati National Security Advisor, work towards the same strategic goals, there is a potential for friction given the different institutions and companies both leaders control (Table 4).

Abu Dhabi Crown Prince Khaled bin Mohammed's core influence on AI rests on his role as Chairman of the Advanced Technology Research Council, which was instrumental in advancing AI research and development particularly related to large language models. He also considers "AI diplomacy" an important tool to

191 For more, see: https://www.ud.sa/ (last accessed 25 September 2025).
192 For a detailed look at PIF's current portfolio including international investments, see: https://www.pif.gov.sa/en/our-investments/our-portfolio/#ourportfolio_e=0 (last accessed 25 September 2025).
193 For more, see: https://innovation.kaust.edu.sa/entrepreneurs/kaust-innovation-ventures/ and https://aramcoventures.com/portfolio/ (last accessed 25 September 2025).
194 For more, see: https://stv.vc/; https://idv.sa/; https://www.waed.net/en/portfolio (last accessed 25 September 2025).
195 For a general overview of this development, see: Strategy in AI's shifting sands; Allen/Adamson/Heim/Winter-Levy, The United Arab Emirates' AI ambitions.

**Table 4: Roles of Khaled bin Mohammed bin Zayed and Tahnoon bin Zayed**

| Role | Khaled bin Mohammed bin Zayed | Tahnoon bin Zayed |
|---|---|---|
| **Family** | ■ Son of Mohammed bin Zayed, Presi-dent of the Emirates | ■ Brother of Mohammed bin Zayed, President of the Emirates |
| **Politics** | ■ Crown Prince of Abu Dhabi | ■ Deputy Ruler of Abu Dhabi<br>■ National Security Advisor |
| **Public Sector** | ■ Chairman Abu Dhabi Executive Council<br>■ Chairman Advanced Technology Research Council (ATRC)<br>■ Vice Chairman Artificial Intelli-gence and Advanced Technology Council (AIATC) | ■ Chairman Artificial Intelligence and Advanced Technology Council (AIATC) |
| **Private Sector** | ■ Chairman Abu Dhabi National Oil Company (ADNOC)<br>■ Chairman International Defense Exhibition (IDEX) | ■ Chairman Abu Dhabi Developmental Holding (ADQ), International Holding Group, Royal Group Holding<br>■ Chairman Group 42 (G42) |
| **Financial Sector** | | ■ Chairman Abu Dhabi Investment Authority (ADIA)<br>■ Chairman First Abu Dhabi Bank<br>■ Chairman MGX |

Sources: "Thanoun Bin Zayed's increasing domination of the Abu Dhabi economy;"
"UAE: Sheikh Tahnoon's AI consolidation," p. 6; "Sports enthusiast, leader of national projects;" "In his capacity as Ruler of Abu Dhabi, UAE President issues a resolution reconstituting Artificial Intelligence and Advanced Technology Council."

advance Emirati foreign policy goals.[196] By contrast, Sheikh Tahnoon bin Zayed's influence is directly related to the strategic role AI plays in national security and the dense network of corporate and financial mandates he has.[197] The latter give him the opportunity to closely align strategic and security interest with investment priorities, which requires a delicate balancing act between his own and the Emirates' ambition and the political and industrial interests of international partners. Although both decision-makers occasionally align their agendas, analysts and partners of the Emirati AI sector are well-advised to keep a close eye on where AI activities originate to assess their prospects.

196 "UAE: CP Khaled's coming advanced technology initiatives, ARTC's foreign investments;" "UAE: CP Khaled's role in AI and defense projects," p. 6.
197 "UAE: Sheikh Tahnoon's AI consolidation," p. 6; "Tahnoon bin Zayed chairs ADQ Board of Directors meeting."

Against this background, the work of the Ministry of Defense is complemented by the Ministry of Industry and Advanced Technology (MOIAT), and the Office of AI (Figure 3). Headed by Sultan bin Ahmed Al Jaber, who is also CEO of ADNOC, the task of the MOIAT is to "develop an integrated industrial system that leverages advanced technologies."[198] The AI Office, headed by Omar Sultan Al Olama, the Minister of State for AI, Digital Economy and Remote Work, is relevant to coordinate activities among governments and with the private sector.[199] Within the broad framework set by the Emirates Research and Development Council (ERDC) technology and sector-focused councils launch and coordinate strategic initiatives:

- The Advanced Technology Research Council (ATRC) is the Emirates' primary research and development organization, which is engaged in advancing the country's technology ecosystem, launching technology challenges, and nurturing talent development. ATRC played a key role in developing and commercializing the Falcon LLM.[200] Most recently, ATRC and the Tawazun Economic Council agreed to cooperate on defense research, including AI.[201] In addition, ATRC is reportedly eyeing strategic stakes in defense AI and cybersecurity companies in France, Italy, and Spain to advance the transfer of technology.[202]
- The AI and Advanced Technology Council (AIATC), set up in 2024, shall accelerate AI development and has launched the Abu Dhabi AI and Robotics Initiative and MGX, a financial body.[203]
- The Smart and Autonomous Systems Council (SASC), established in 2024, is working on a strategy to "establish the necessary infrastructure for developing and using smart systems." Among other stakeholders, Faisal Al-Bannal, Chairman of the EDGE Group, is a member of the Council.[204]
- The UAE Cybersecurity Council was established in 2020 with the goal to develop the Emirates' comprehensive cybersecurity strategy and make sure that cybersecurity aspects are reflected in its digital legal and regulatory framework.[205] In cooperation with Google Cloud, the Council launched the new Cybersecurity Center of Excellence in April 2025.[206]

Several regulatory bodies such as the Telecommunications and Digital Government Regulatory Authority, the Gov Digital, the Dubai Center for Artificial

198 For more, see: https://moiat.gov.ae/en/about-us (last accessed 25 September 2025).
199 For more, see: https://ai.gov.ae/about_us/ (last accessed 25 September 2025).
200 For more, see: https://www.atrc.gov.ae/about-atrc (last accessed 25 September 2025); Strategy in AI's shifting sand, pp. 26–27. As Allen/Adamson/Heim/Winter-Levy, The United Arab Emirates' AI ambitions, p. 23, argue, there are reliability and performance questions related to Emirati LLM.
201 "Tawazun, Advanced Technology Research Council sign agreement on national defense R&D."
202 "UAE: ATRC eyeing European AI firms for equity stakes."
203 Strategy in AI's shifting sands, p. 25.
204 "Hamdan bin Mohamed bin Zayed chairs first meeting of Smart and Autonomous Systems Council."
205 "Mohammed bin Rashid approves UAE Environment Policy, UAE Cybersecurity Council, and UAE National Media Team."
206 "UAE launches Cybersecurity Center of Excellence in collaboration with Google Cloud."

Intelligence, and the Dubai Electronic Security Center round off the public sector segment of the Emirates' digital and AI ecosystem.[207]

The academic and research network has been woven around the Mohammed bin Zayed University of AI (MBZUAI), which was set up in 2019. MBZUAI is tasked to advance education and R&D and offers Bachelor, Master, and doctoral programs on AI.[208] In parallel, MBZUAI and G42 have joined forces to develop AI reasoning models such as K2 Think, which has been released in September 2025.[209] Research in AI, robotics, and cryptography is also part of the agenda of the Technology Innovation Institute (TII) that is part of the ATRC.[210] In September 2025, TII and NVIDIA agreed to set up the TII-NVAITC Joint Lab for AI and Robotics.[211] In addition, Khalifa University, the University of Dubai, and the American University of Sharjah also run dedicated AI and data science entities as well as education programs and thus contribute towards establishing local knowledge.[212]

The corporate AI and defense ecosystem is anchored in the EDGE Group and G42. The EDGE Group is the defense powerhouse of the Emirates that emerged out of the merger of several independent defense entities over years. Today, the company comprises several thematic and technological clusters[213] and has its eyes firmly set on integrating AI into its product portfolio. The company has set up an AI Center of Excellence and launched its Group AI Accelerator in May 2025.[214] As discussed in the previous chapter, the group is in talks with Leonardo and CASIC to integrate AI into UAVs and has set up a new cybersecurity joint venture with Turkey's Parvo Group, that will also develop AI-enhanced solutions. Established in late 2023 and expanded in February 2025, the EDGE Group also provides the XRANGE testing and evaluation facility that could be used to assess, for example, AI-enhanced UAV or EW solutions.[215]

G42 epitomizes the Emirates' AI ambitions like hardly any other company. The company rose to fame during the Covid-19 pandemic as it helped the Emirates

207 For more, see: https://tdra.gov.ae/en/; https://www.dge.gov.ae/en/what-we-do/digital; https://www.dubaifuture.ae/dubai-centre-for-artificial-intelligence; https://www.desc.gov.ae/ (last accessed 25 September 2025).
208 For more, see: https://mbzuai.ac.ae/about/ (last accessed 25 September 2025).
209 Model performance is controversially discussed. For more, see: Moorhead, "The UAE showcases its abilities in AI reasoning with K2 Think model" vs. Mündler et al., "Debunking the claims of K2 Think."
210 For more, see: https://www.tii.ae/about-us (last accessed 25 September 2025).
211 "Abu Dhabi's TII and NVIDIA launch Middle East's first joint 'AI & Robotics' NVAITC research lab."
212 For more, see: https://www.ku.ac.ae/college-research/data-science-and-artificial-intelligence; https://www.aud.edu/aud-school/school-of-engineering/departments/department-of-electrical-and-computer-engineering/department-programs/master-of-science-in-artificial-intelligence-msai/; https://www.sharjah.ac.ae/academics/degree/graduate/master-of-science-in-artificial-intelligence (last accessed 25 September 2025).
213 These clusters include platforms and systems, missiles and weapons, space and cyber technologies, trading and mission support and homeland security as well as cross-cluster activities in technology and innovation and research and development. For more, see: https://edgegroupuae.com/entities (last accessed 25 September 2025).
214 "EDGE launches 'Group AI Accelerator' to drive excellence in AI-enhanced solutions."
215 "EDGE unveils the region's first multidomain test range;" "XRANGE expands operations with new runway, advanced facilities, and enhanced services."

develop AI-enhanced surveillance solutions. Today, it sits at the core of a technology ecosystem of its own, as the companies with an Asterix in Figure 3 illustrate.[216] It is this central role that also explains the recent USD1.5bn investment of Microsoft in G42. The Seattle-based company sees its Emirati partner as a powerful "gateway to the Global South" for itself and other US companies.[217] The company also plays a key role in the Stargate UAE project, the establishment of a prestigious new AI Campus, which is to be realized in cooperation with Cisco, Nvidia, Oracle, Open AI, and the Japanese Soft Bank Group.[218] During the pandemic, G42 also signed an MoU with Rafael Advanced Defense Systems and Israel Aerospace Industries, which led to the creation of the joint venture company Presight.[219] Moreover, G42 envisages expanding international ties via AI investments and acquisitions in Europe and the Asia-Pacific region to advance the country's technological sovereignty. Among other companies, G42 is reportedly eyeing AI chip and edge computing firms as well as companies involved in AI for logistics, military intelligence, predictive maintenance, and unmanned systems.[220]

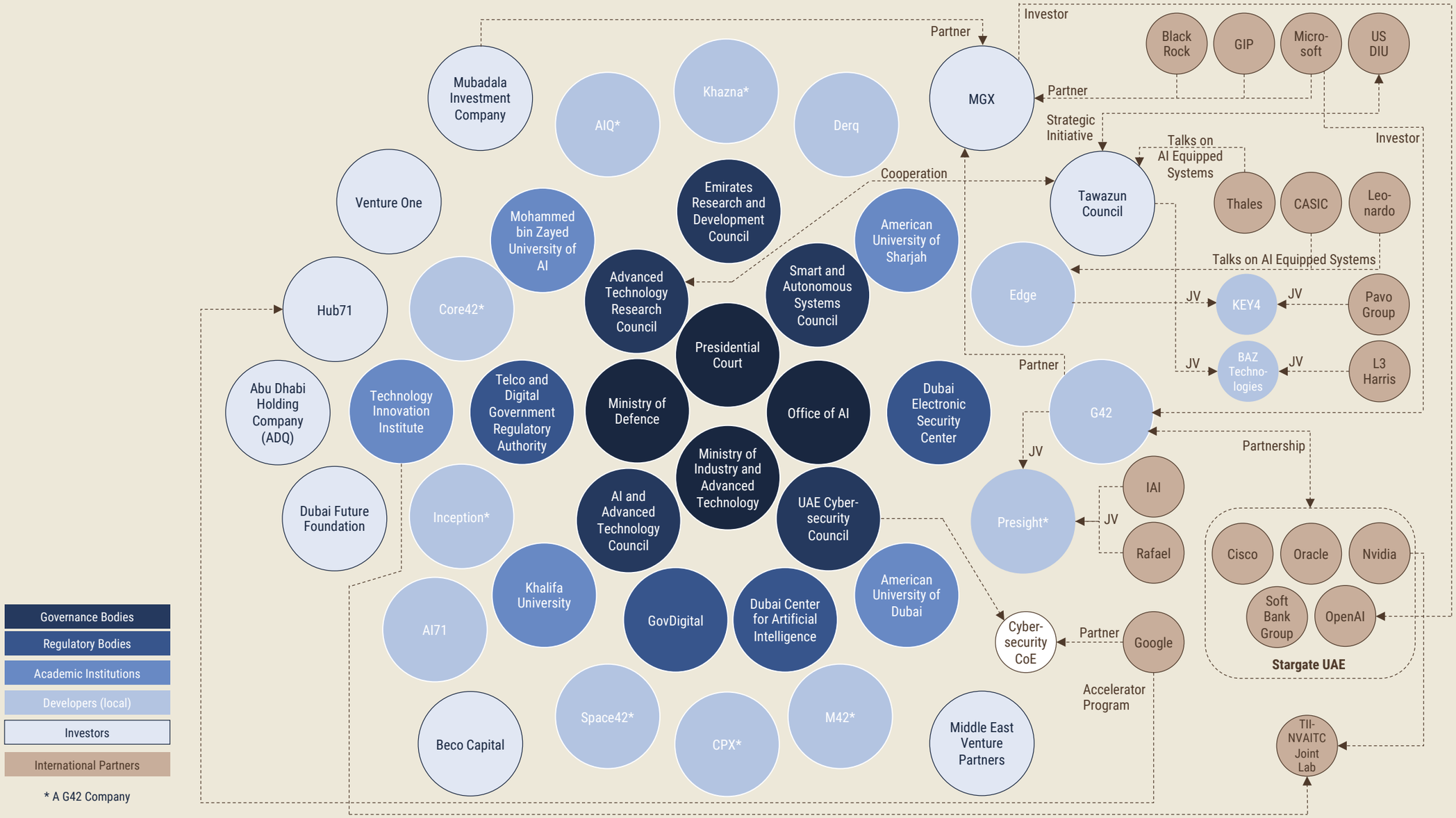
Despite its prominence, controversies around G42 do not abate. The key problem, national security experts in the US argue, are the company's Chinese ties, which were a central concern in the run up to Microsoft's investment. Although the company indicated it had cut these ties and divested from other Chinese technology companies, the authors of a recent CSIS study argue there remain "reasons to be skeptical of G42 and the UAE's decoupling claims (because the Emirates) will continue to develop a strong trade relationship with China at the same time as with the United States."[221]

In addition to the EDGE Group and G42, other notable local AI developers include AI71, which uses expertise in developing the Falcon LLM to advance Emirati LLM solutions, and Derq is using AI for intelligent traffic systems. [222]

The Emirati financial ecosystem consists of traditional sovereign investors and newly established strategic investment vehicles. Mubadala and the Abu Dhabi Developmental Holding (ADQ), the sovereign wealth funds, and Tawazun Council are key representatives of the traditional financial instruments the Emirates have established to tap into foreign technology companies and enhance technology transfer. The latter is the task of Tawazun Council, which has signed an MoU with

216 These companies engage in energy (AIQ), cloud and infrastructure (Core42 and Khazna), cybersecurity (CPX), AI-enhanced software products and analytics (Inception and Presight), healthcare (M42), and space-based intelligence (Space42)
217 Allen/Adamson/Heim/Winter-Levy, The United Arab Emirates' AI ambitions, p. 20.
218 "Global tech alliance launches Stargate UAE."
219 For more, see: https://www.presight.ai/ (last accessed 25 September 2025); "G42 joins forces with Israeli Rafael and IAI to defeat Covid-19."
220 "UAE: Sheikh Tahnoon's AI investment and acquisition via G42."
221 Allen/Adamson/Heim/Winter-Levy, The United Arab Emirates' AI ambitions," pp. 6, 8.
222 For more, see: https://ai71.ai/ and https://en.derq.com/ (last accessed 25 September 2025).

**Figure 3:** **Select Group of Stakeholders Constituting the Emirati Digital and AI Ecosystem**



the Defense Innovation Unit of the US Department of Defense in May 2025 to advance collaborative defense technology projects.[223] Mubadala, in turn, has partnered with G42 to set up MGX for dedicated investments in AI, AI infrastructure, and semiconductors. MGX is involved in current French-Emirati AI partnership discussions and has partnered with BlackRock, Global Infrastructure Partners, and Microsoft to set up the Global AI Infrastructure Investment Partnership potentially worth USD100bn.[224] Recently, MGX also invested in OpenAI and Altera, the Intel subsidiary. [225]

Finally, venture capitalists and accelerators round off the financial ecosystem. At the end of 2024, Hub71 hast partnered with Google to offer an accelerator program for 25 startups.[226] The Dubai Future Foundation serves a similar goal via the Dubai Center for Artificial Intelligence.[227] So does Venture One, another ATRC entity, with a focus on commercializing technology solutions in areas like autonomous and secure systems, sensing technologies, or information security.[228] Beco Capital and Middle East Venture Partners are early and growth stage venture capitalists with a focus on software and AI investments and software-as-a-service.[229]

223 "US Defense Innovation Unit and United Arab Emirates partnering to enhance defense-tech ecosystems."
224 For more, see: https://www.mgx.ae/en; "BlackRock, Global Infrastructure Partners, Microsoft and MGX launch new AI partnership to invest in data centers and supporting power infrastructure."
225 Sigalos/Cappt, "OpenAI boosts size of secondary share sale to $10.3 billion;" "MGX joins Silver Lake in Altera acquisition."
226 "Google to offer startup program at Hub71 in Abu Dhabi."
227 For more, see: https://www.dubaifuture.ae/10-years-ahead (last accessed 25 September 2025).
228 For more, see: https://www.ventureone.ae/ (last accessed 25 September 2025).
229 For more, see: https://becocapital.com/portfolio/; https://www.mevp.com/funds (last accessed 25 September 2025).

# 4 Organizing Defense AI

Digital transformation, which drives visionary plans for economic and societal change across the Arab Gulf region, has led to a first wave of public sector reforms. This provides a suitable basis for future reforms to accommodate the use of AI. So far, however, dedicated organizational reform to adopt (defense) AI is rare in the region. Where it occurs, it reflects overall strategic ambitions and the growing complexity of local defense industrial ecosystems.

In Bahrain, King Hamad bin Isa Al Khalifa is the supreme leader of the Bahrain Defense Forces (BDF), while defense policy is coordinated and implemented by the Minister of Defense Affairs in cooperation with the BDF Commander-in-Chief. In 2022, the Ministry has set up the Military Institution for the Development of Warfare Industries (MIDWI). Currently led by LTG Shaikh Nasser bin Hamad Al Khalifa, MIDWI is responsible for defense research and development and leads innovation initiatives.[230] Digital transformation is coordinated across ministries by the Ministerial Committee for Information Technology and Communication (MCICT) and the Information and eGovernment Authority (IGA), which plays the key role in providing strategic guidance for digital transformation. Dedicated defense AI coordination mechanisms seem not yet to exist.[231]

In Kuwait, the Undersecretary of Defense, currently Sheikh Dr. Abdulla Meshal Al-Sabah, sits at the intersection of strategic planning, implementation, and organizational reform. He also chairs the Strategic Planning Committee. The Strategic Planning Sector, a division within the Ministry of Defense, drives long-term defense strategies and organizational reform.[232] Updating administrative structures is at the heart of the Defense Strategic Plan 2025–2030, which emphasizes "driving digital transformation" and "prioritizing cybersecurity" as strategic objectives. Driving through this new plan is the task of the Undersecretary of Defense, who is also responsible for defense R&D and innovation as well as digital transformation.[233] Whereas the Ministry has created the position of a Senior Cyber Advisor, a dedicated senior position focusing on defense AI seems missing.[234]

The ruler and ruling family members traditionally hold key defense positions in Oman. Sultan Haitham bin Tarik bin Taymur Al Said is the country's supreme authority and Minister of Defense, while his son Aayyid Shihab bin Tariq Al Said acts as Deputy Prime Minister for Defense Affairs. Strategy as well as policy making and implementation are the responsibilities of the Directorate General of Strategic Planning and Policy in the Ministry of Defense. At the strategic level defense R&D

230 "HM King establishes Military Institution for the Development of Warfare Industries at BDF;" "Bahrain: MIDWI's Progress, Leadership and Future Initiatives."
231 https://www.iga.gov.bh/en/category/vision-and-mission (last accessed 25 September 2025).
232 "Kuwait launches defense strategy."
233 "Kuwait unveils Defense Strategic Plan 2025–2030 to strengthen national security."
234 "Ministry of Defense Advisor (MoDA) Program: Kuwait – Senior Cyber Advisor." Interestingly, the respective job description has been issued by the Defense Security Cooperation Agency in Arlington, Virginia.

and innovation are shared tasks involving the Deputy Prime Minister for Defense Affairs and the Ministry's Secretary General. Public reports suggest that the Secretary General is also playing a major role in coordinating digital transformation within the Ministry of Defense, while overall coordination for digital transformation rests with the Ministry of Transport, Communications and Information (MTCIT).[235] MTCIT has also created the position of a Director of AI and Advanced Technology Program Development.[236] So far, Oman's Ministry of Defense does not seem to have a similar position.

Qatar's Emir Tamim bin Hamad Al Thani is the Commander-in-Chief and Sheikh Saoud bin Abdulrahman bin Hassan bin Ali Al Thani acts as the Deputy Prime Minister and Minister of State for Defense Affairs. The Ministry sets the overall policy framework while the Office of Research, Experiments, and Development (RED), a unit established within the Qatar Armed Forces, is tasked to "foster a culture of innovation" and enhance defense R&D.[237] As discussed in chapter 2.3, the Defense Digitalization Compass is the major digital transformation initiative led by the Deputy Prime Minister and Minister of State for Defense Affairs together with LTG (Pilot) Jassim Bin Mohammed Al Mannai, Chief of Staff of Qatar Armed Forces, who oversees implementation.[238] Although this initiative emphasizes the need for comprehensive organizational and cultural change, it is unclear if a dedicated position on defense AI has been created.

In Saudi Arabia, Prince Khalid bin Salman Al Saud, the brother of Crown Prince and Prime Minister Mohammed bin Salman Al Saud, is Minister of Defense. The Ministry's Undersecretary for Strategic Affairs and the Undersecretary for Procurement and Armament shape the broad policy framework.[239] To set the course and implement defense R&D and innovation activities, Saudi Arabia has created GAMI and GADD as well as SAMI as the government's defense industrial arm and PSD-SARC as the dedicated defense and security research arm (see chapter 3.2).The Ministry's own General Department of Information Technology is driving digital defense transformation including AI. In public, the Assistant Minister of Defense for Executive Affairs frequently represents the General Department's activities, often in cooperation with the Governor of the Digital Government Authority.[240] So far, however, neither he nor any other senior figure has been identified as the Ministry's official AI Coordinator.

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235 "Oman's Ministry of Defense Launches Software Programs." On the MTCIT's role, see: https://www.mtcit.gov.om/ITAPortal/About/About.aspx (last accessed 25 September 2025).
236 The current director is Hamdan Al Alawi. For more, see: https://www.linkedin.com/in/hamdan-al-alawi-9ba319107/ (last accessed 25 September 2025).
237 For more, see: https://arabglobalscholars.org/en/organizations/office-of-research-experiments-development (last accessed 25 September 2025).
238 "Ministry of Defense Launches Digital Digitalization Compass;" "Defence Digitalisation Compass Launched."
239 For more, see: https://saudipedia.com/en/article/268/government-and-politics/ministries/ministry-of-defense (last accessed 25 September 2025).
240 "Ministry of Defense showcases digital transformation achievements at 'Digital Excellence Day'."

In the United Arab Emirates, President Sheikh Mohammed bin Zayed Al Nahyan is Supreme Commander of the Armed Forces and Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum is Minister of Defense, Crown Prince of Dubai, and Deputy Prime Minister. Driven by technology-infused modernization ambitions, the Ministry's Policy and Strategy division develops defense strategies, the Command-and-Control Directorate[241] oversees information and communication technology, and the Military Acquisitions and Procurement division handles procurement and technology issues. At the strategic level, the Minister of Defense and the Minister of State for Defense Affairs, Mohammed Ahmed Al Bowardi, lead defense R&D and innovation. When it comes to implementing the respective ambitions, the main responsibilities rest with MG Dr. Mubarak Saeed Ghafan Al Jabri, Assistant Undersecretary for Support and Defense Industries.[242] Faisal Abdulaziz Al Bannai also plays a critical role as he acts as the ATRC Secretary General and is Chairman of the EDGE Group (see chapter 3.2).[243]

Given the strategic importance of digitalization in the Emirates, the country has created the Higher Committee for Government Digital Transformation that coordinates inter-agency interaction, to which the Ministry of Defense aligns.[244] In April 2024, the Emirates decided to appoint Chief AI officers across federal government entities.[245] In June 2024, 22 Chief AI Officers have been appointed, among others with Dubai Police and the General Directorate of Civil Defense in Dubai.[246] Although it is unclear if the Ministry of Defense in Abhu Dhabi has also appointed a Chief AI Officer, the Executive Office of the Ministry of Defense acts as a central coordinating unit to align the activities of different public and private stakeholders.[247]

241 Currently headed by Staff Brigadier Engineer Saeed Rashed Al Zahmi. See: https://space.gov.ae/en/about-us/about-the-agency/board-of-directors/his-excellency-saeed-rashid-saeed-al-zahmi (last accessed 25 September 2025).
242 For more, see his profile at: https://space.gov.ae/en/about-us/about-the-agency/board-of-directors/his-excellency-dr-mubarak-bin-gavan-al-jabri (last accessed 25 September 2025).
243 For more, see his profile at: https://manhom.com/en/profiles/faisal-al-bannai/ (last accessed 25 September 2025).
244 "Cabinet approves formation of Higher Committee for Government Digital Transformation."
245 Bhat, "Dubai to appoint AI officers across all government entities."
246 "Hamdan bin Mohammed appoints 22 Chief AI Officers across government entities in Dubai." AI use by government departments is currently under review. See: Alomar, "UAE to evaluate government departments on AI use, minister says."
247 Interviews, Abu Dhabi, 8–9 September 2025.

# 5 Funding Defense AI

Arab Gulf digitalization ambitions have triggered a spending bonanza across the region that offers plenty of space to build modern digital infrastructure and benefits from cheap electricity costs to run it. Saudi Arabia, for example, wants to become one of the world's leading digital hubs by announcing to invest

- Up to USD100bn in project Transcendence to invest in AI infrastructure and data centers;[248]
- Up to USD100bn via Alat's fund to invest in AI hardware and manufacturing;[249]
- Around USD77bn in Humain's infrastructure project that includes investments to expand data centers and chip design;[250]
- USD14bn over 10 years in cooperation with Oracle to invest in digital cloud and AI infrastructure;[251]
- USD10bn in cooperation with Google to invest in operating an AI hub in the country;[252]
- USD5bn in cooperation of Humain with AWS to build an AI zone in Saudi Arabia.[253]

To put these commitments in context: Amazon plans capital expenditure (including warehouse investments) of around USD100bn in 2025, and Google invests around USD75bn in 2025 to expand its digital infrastructure.[254]

In comparison, the latest digital infrastructure investment announcements by the United Arab Emirates include

- Up to USD100bn initiative supported by MGX, Microsoft, and BlackRock to scale AI infrastructure capacity;[255]
- USD20bn for the Stargate UAE digital cluster to boost AI infrastructure;[256]
- USD3.5bn investments in 2025–2027 to fully digitize and automate government processes[257]
- USD0.5bn investment by Du, an Emirati telecommunications company, and Microsoft for the Du-Microsoft Hyperscale Data Center in Dubai[258]

248 Al-Barkati, "Saudi Arabia's $100bn tech investment shows global leadership on AI, says Microsoft executive."
249 Kitishian, "Saudi Arabia: Hundreds of billions for global AI supremacy."
250 Priyadarshi, "Humain: Inside Saudi Arabia's $77b vision 2030 AI superpower project."
251 "Oracle's commitment to Saudi Arabia and President Trump's vision for global prosperity."
252 "Google Cloud and PIF advance AI hub in Saudi Arabia."
253 "AWS and Humain announce a more than $5b investment to accelerate AI adoption in Saudi Arabia and globally."
254 Kessel, "Amazon follows Google, Meta, and Microsoft with plans to boost spending on AI"; Ashare, "Google pours billions into AI, cyber and infrastructure expansion."
255 "BlackRock, Global Infrastructure Partners, Microsoft and MGX launch new AI partnership to invest in data centers and supporting power infrastructure."
256 Lee, "Abu Dhabi's Stargate UAE."
257 Grey, "Is Abu Dhabi poised to emerge from the shadows of Dubai?"
258 Butler, "Microsoft and Du to develop $544m data center in the UAE."

Complementing these digital infrastructure investments, ADQ and Energy Capital Partners are investing around USD25bn to expand the Emirates' power infrastructure.[259] In addition, the Emirates also plan to invest around €30–50bn (USD35–58bn) to "build Europe's largest AI data center in France."[260] In parallel, Emirati and Italian companies join forces to build "Europe's largest AI compute cluster" in Italy[261] while Mubadala is in talks – potentially worth more than USD100bn – with Samsung and TSMC on hosting new semiconductor plants in the Emirates.[262]

While these initiatives also partially cover the advancement of local digital skills, some Arab Gulf nations have also launched dedicated digital skilling initiatives. Qatar, for example, spends USD2.5bn as part of its Digital Agenda 2030 on data and AI to strengthen local capabilities and attract global talents.[263] G42 and Microsoft will join forces in the Emirates to back a USD1bn fund to advance workforce training and boost local AI skills.[264]

Although all these initiatives have the potential to benefit national security and defense, it is mostly unclear how the impact could look like.[265] Traditionally, Saudi Arabia (around USD72bn in 2024) and the Emirates (around USD22bn in 2024) are big military spenders that run significant defense import portfolios, whereas defense spending in the other Arab Gulf nations ranged between USD1.4–10bn in 2024.[266] Specific figures on defense digitalization or defense AI are very hard to come by. Reports suggesting that, for example, the Emirates "planned to invest a trillion dollars in artificial intelligence for its ministry of defense over the next decade," only seem realistic when considering huge infrastructure investments; and even then, the sum can be considered most ambitions.[267] By contrast, rare public information about specific defense AI projects suggest that sums are lower:

- EDGE Group in the Emirates is calculating around USD480M to develop a new AI-enhanced C-UAV solution with Thales.[268]
- Qatar has set aside around USD300M in early 2025 for procuring AI, EW and communications.[269]

259 "Abu Dhabi, Dubai among top emerging data center markets in 2025, reveals report."
260 "UAE to invest billions in France AI data center."
261 "G42 and iGenius join forces to deploy Europe's largest AI compute cluster, paving the way for an AI first economy."
262 Fitch/Ward/Sohn, "Chip giants TSMC and Samsung discuss building Middle Eastern megafactories."
263 Mouriesse, "Qatar's AI development."
264 Althoff, "Microsoft and G42 partner to accelerate AI innovation in UAE and beyond."
265 For example, the Emirati vision paper on the future defense industrial strategy explicitly mentions Stargate UAE in the chapter on dual use innovation that is portrayed as a "strategic fore multiplier," but clear indications how this data center complex will empower military capabilities have yet to emerge. See: National Defense Industries Strategic Foresight 2025, p. 34; Interview, Abu Dhabi, 8 September 2025.
266 The Military Balance 2025, p. 321.
267 Zetter, "UAE recruiting US personnel displaced by DOGE to work on AI for its military."
268 "UAE: Thales and C-UAS," p. 8.
269 "Qatar: 2025 defense budget," p. 8.

- Qatar's Barzan Holdings has earmarked around USD1bn for the defense NLP project discussed in Chapter 3.1 that also includes setting up national AI R&D centers.[270]
- The Saudi Ministry of Defense is said to have allocated around USD2bn for AI without specifying details and set aside another USD300M for AI-enhanced UAV. There is also talk of funds being allocated to AI-equipped border surveillance systems.[271]

Although these figures include other hardware and software components, software development costs that matter for AI vary greatly between the Arab Gulf and other regions.[272] Three-digit million amounts on AI software development could be close to reality for the ambitious defense AI plans in Qatar, the Emirates in Saudi Arabia. For comparison, the US technology company Palantir, which engages in defense AI, spent around USD500M last year on research and development.[273]

270 "Qatar: Barzan Holdings' AI and NLP tender," p. 8.
271 „KSA: Defense budget allocations," p. 7.
272 Jackson, "2025 software development price guide and hourly rate comparison;" "Software development cost in the Middle East."
273 For more, see: https://www.macrotrends.net/stocks/charts/PLTR/palantir-technologies/research-development-expenses (last accessed 25 September 2025).

# 6 Fielding and Operating Defense AI

Chapter 3.1 has discussed the demanding development ambitions Arab Gulf nations are pursuing in the field of defense AI. To implement the respective development goals, armed forces across the Arab Gulf are gradually moving into adopting AI for a select group of national security and defense tasks. The following priority areas are particularly noteworthy:[274]

- **AI Analytics for Maintenance, Repair, and Overhaul**
  In 2021, Lockheed Martin announced using an Emirati-built AI application to "detect paint and primer defects on its airframes." Specific details were not given but the report suggests that the application facilitates the "time-consuming process of inspecting aircraft manually."[275]

- **Predictive Analytics for Surveillance**
  Using AI for predictive analytics is straight forward as it enables users to collect initial technological experience. It is also an application area that can support many different missions and tasks. The United Arab Emirates, for example, is using AI-empowered predictive analytics for national security tasks such as domestic surveillance and border surveillance with programs like Oyoon in Dubai and Falcon Eye in Abu Dhabi.[276] Bahrain has also deployed AI-enhanced surveillance for maritime security and border control,[277] which also constitutes a use case in Kuwait. [278]

- **Space-Based Surveillance**
  In the Emirates, the Ministry of Energy and Infrastructure and the Mohammed bin Rashid Space Center have launched Satgate, satellite-based AI technology to track ships and advance anomaly detection in support of maritime infrastructure protection and coastal security.[279] Similarly, Oman has launched OL-1, its first satellite, from a Chinese space station in November 2024 using AI-enhanced optical sensors to provide high-resolution real-time images for earth observation.[280] And in March 2025, Bahrain launched the locally built Al Munther satellite using AI for "onboard image processing."[281]

274 Readers are most likely aware that news reports about Arab Gulf armed forces using AI mushroom. Most of these reports, however, are vague or fuzzy regarding the particular use of AI, the methods employed, and the tasks to be accomplished by AI. Thus, it is difficult to gauge the true status of the role of AI in the respective projects. Therefore, the examples mentioned in this chapter only refer to use cases, which seem to exist and provide sufficient level of detail outlining the role of AI.
275 Mezher, "Lockheed to use UAE-designed AI for all aircraft."
276 Kaarlsson et al., "The AI opportunity for GCC defense and security;" "The threats of personal data in the AI application towards national security in the UAE;" "The rise of AI surveillance in the UAE: implications for human rights."
277 "Bahrain deploying AI a spart of maritime surveillance system;" Nasruddin/Struckman, "AI in Bahrain."
278 "Securing Kuwait: A journey through business continuity and cybersecurity.
279 "Ministry of Energy and Infrastructure launches Satgate project to enhance maritime mapping."
280 "Launch of OL-1 satellite heralds Oman's entry into space race,"
281 Alkhalifa, "Bahrain launches its first locally-manufactured satellite 'Al Munther' to boost space capabilities."

- **Cybersecurity**
  Arab Gulf nations use AI to enhance cybersecurity and thereby illustrate the pressing need to protect the national digital infrastructure and other critical infrastructure using digital technology. Saudi Arabia, Oman, and the Emirates use AI-enhanced threat detection and analysis.[282] Qatar also uses AI to automate cyber-related incident response.[283]

- **AI-Enhanced Unmanned Systems**
  Given the prevalent use and development of unmanned systems across the region, it comes as no surprise that enhancing these platforms and their sensors with AI is en vogue. While, for example, the Emirates are using AI-enhanced UAV for maritime security,[284] the Royal Saudi Naval Forces have launched an AI-enhanced USV.[285]

But there may be more than meets the eye, as there is a significant grey area of AI applications and methods embedded in foreign defense systems and solutions that Arab Gulf nations have procured (and continue to purchase). One of the most prominent examples is air and missile defense.[286] The Emirates, Qatar, and Saudi Arabia use Kongsberg's NASMAS (National Advanced Surface-to-Air Missile System) that can use AI for C2.[287] Saudi Arabia and the Emirates also use Russia's Pantsir-S air defense systems, which seems to have been updated with AI, particularly for target location.[288] In addition, both countries also use the Rheinmetall Oerlikon Skynex air defense system. Its Multi Sensor Unit uses AI to automatically verify and classify threats.[289] As this system was co-developed with Rheinmetall, EDGE's SkyKnight air defense system uses the Oerlikon Skynex control node.[290] SkyKnight, in turn, is reported to receive a lot of attention from other Arab Gulf and fellow Arab nations[291] – thus indicating a future trajectory of (formerly foreign) AI algorithm diffusion via locally built (air) defense systems.

282 Alkhunaizi, "How Saudi Arabia is leveraging AI to strengthen cybersecurity leadership," "Artificial intelligence in cybersecurity in Oman." Using AI, however, does not necessarily increase cybersecurity readiness. In the Emirates, for example, 96% of all organizations have reportedly embraced AI for threat intelligence, but only 30% have "achieved mature cybersecurity readiness levels." See: Malin, "Cisco: UAE organizations embrace AI security solutions."
283 "How is Qatar developing its cybersecurity capabilities to keep apace with technological advancements?"
284 Sourisse, "AI in defense: the exponential impact."
285 Ghandour, "Revolutionizing Defense Operations: Saudi Arabia Unveils AI-Powered Naval Vessel."
286 Again, a word of caution is needed as it is often unclear which export versions have been delivered to Arab Gulf nations and what the respective modification upgrade packages include.
287 "NASAMS vs FSAD."
288 "Russian Pantsir air defense system gets artificial intelligence upgrade."
289 Oerlikon Skynex Air Defence Systems, p. 8.
290 "EDGE entity HALCON signs partnership with Rheinmetall Air Defense to develop multi-sensor unit." The control node is the battle management systems. https://edgegroupuae.com/solutions/skyknight (last accessed 25 September 2025).
291 "UAE: On EDGE SkyKnight," p. 9.

# 7 Training for Defense AI

Education and training are two ways to build know-how and skillsets for military purposes. Arab Gulf nations have adopted programs that consider the challenges that the advent of AI poses in the defense environment. In so doing, collaborative training opportunities that involve the United States seem to play a particularly prominent role.

Before looking in detail at modifications of military education and training it is worth remembering that Arab Gulf nations started to embed AI literacy into their broader education ecosystems. In Bahrain, universities have launched AI degree programs and coursework. Microsoft, the Bahrain Labor Fund (Tamkeen), and the Bahrain Polytechnic set up a dedicated AI academy, while the Fund also offers specialized AI and data science training. These activities complement comprehensive AI training programs offered by the Bahraini government.[292] In similar ways the Ministry of Education in Kuwait has joined forces with Kuwait University to update computer science education with AI. Google actively supports these activities, among others by suggesting setting up a Government AI Campus to offer training courses.[293]

Oman's Sultan Qaboos University and the University of Technology and Applied Sciences have created dedicated AI chairs and labs to advance research and education. Oman also actively uses support from UNESCO to advance AI curricula and research. In parallel, several universities now offer academic AI programs.[294] In Qatar, the Carnegie Mellon University (CMU-Q) launched an AI undergraduate program in August 2025[295] that complements the core activities of the Qatar Foundation and its related institutions in advancing AI literacy, as described above.[296]

Saudi Arabia is about to roll out AI "across all stages of general education."[297] Universities like KAUST established dedicated labs and programs and set up incubators/accelerators to commercialize university research. The "One Million Saudis in AI" program expands AI training for university students and graduates.[298] With MBZUAI, the Emirates have established the world's first graduate research university focusing exclusively on AI. In parallel, other universities have advance their AI activities and currently offer more than 40 degrees and special programs. Furthermore, the Emirates have launched a national program to train the Chief AI Officers that serve across the public sector.[299]

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292 "Building skills in AI and STEM;" Swartz, "Bahrain's AI landscape in March 2025; "The first of its kind in the region."
293 "Kuwait leaps ahead with AI integration into education;" "Integrating AI into curriculum development, equipping a new generation of students."
294 Waqas, "Universities in Oman harness AI for development;" "Oman marks International Day of Education with AI focus;" "Exploring the impact of AI on modern education in Oman."
295 "Carnegie Mellon University in Qatar launches landmark bachelor's degree in Artificial Intelligence." See also: "Carnegie Mellon Qatar creates AI strategy for future-ready graduates."
296 For more, see: https://www.qf.org.qa/research/artificial-intelligence (last accessed 25 September 2025).
297 "Saudi Arabia to roll out AI curriculum across all education levels in 2025/26."
298 Saudi Arabia: AI Readiness Assessment Report; "Call for Saudis to join national AI training."
299 For more, see: https://mbzuai.ac.ae/about/ (last accessed 25 September 2025); Rasheed, "UAE embeds AI into education from kindergarten to PhD;" "UAE Government launches Chief AI Officers' training program to enhance future tech leadership."

It is within this context that national security and military education institutions have stepped up their efforts, too:[300]

- In Bahrain, the Royal Academy of Police cooperates with different public sector partners to advance AI courses for security sector stakeholders.[301] In Oman, the National Defense College has integrated AI into its courses and has made AI the topic of its 2024 annual symposium.[302] The Military Technological College, which offers technical and academic education, is addressing the interplay between technologies and future skills requirements by organizing focused scientific weeks. In 2024, the 5th scientific week focused on AI and future technology.[303] Furthermore, AI also plays a role in the educational efforts of Oman's new Hadatha Center for Cybersecurity Industry Development.[304]
- In Qatar, the Strategic Studies Center of the Qatar Armed Forces has set up a course on cybersecurity and AI in 2021.[305] In addition, the Multidimensional Warfare Training Center is a potential hub to integrate "innovation and experimentation into all training activities."[306] At the intersection of defense and national security, the Qatar Cybersecurity Academy, set up in cooperation with RTX (formerly Raytheon), is said to be using AI for cybersecurity training.[307]
- At the end of 2023, the Zayed II Military College conducted its first AI course, developed with MBZUAI. The Joint Command and Staff College has been adopting AI to advance e-learning and tailor it to student needs.[308] In addition, the Zayed Military University, that was established in 2021, is cooperating with Khalifa University on a computer science Bachelor program for military cadets that is said to cover AI as well.[309]
- Saudi Arabia's Command and Staff College has been transformed into the new National Defense University, which was inaugurated in 2024. Given the country's AI ambition and the task of the university to "pave the way for a new phase of professional military education"[310] it is likely that AI will feature in the program, but there is no confirmed public information that this is already the case.

300 Publicly available information on dedicated activities in Kuwait is lacking.
301 "iGA and Royal Academy of Policy collaborate on AI training for Ministry of Interior team members."
302 "National Defence College organizes symposium on AI."
303 For more, see: https://www.mtc.edu.om/about/vission-mission/?csrt=17833875751391215961 (last accessed 25 September 2025); "Military Technological College marks conclusion of 5th scientific week on AI, future technology."
304 For more, see: https://www.squ.edu.om/Hadatha (last accessed 25 September 2025).
305 For more, see: https://ssc.qaf.mil.qa/en/trainings/ (last accessed 25 September 2025).
306 For more, see: https://qa.sidecloud.net/institutions/qatar-multidimensional-warfare-training-center (last accessed 25 September 2025). While AI is likely to play a role as part of the technology used for the center's computer assisted exercises, it is unclear to what extent it is also a training and education subject.
307 For more, see: https://qca.com.qa/index.html (last accessed 25 September 2025).
308 "UAE Deputy Chief of Staff inaugurates first course on AI at Zayed II Military College;" Ali Alnaqbi/Yassin, "Current status, challenges and strategies of AI and E-learning in the UAE military education system."
309 Interview, Abu Dhabi, 8 September 2025; "Zayed Military University, Khalifa University cooperate to enhance education and research."
310 Al-Harthi, "Saudi Arabia inaugurates National Defense University."

The presence of foreign military is an important feature of the Arab Gulf military training and education scene, as this provides outside partners with a vector of influence to shape local mindsets through technology exposure and practical experience. For example, the US NAVCENT Task Force 59, based in Bahrain, is regularly organizing training exercises, which create opportunities to collect first-hand experience in using AI-enabled naval systems and test AI-enhanced platforms.[311] For example, the US NAVCENT's 2025 International Maritime Exercise (IMX) offered a way to train and test the use of AI for cybersecurity and analyze data gather by naval sensors.[312]

While growing in number and scope, it remains to be seen to what extent ongoing and planned military education and training initiatives will advance defense AI literacy and readiness. As Barzan and Pollack discuss at great length, deficiencies in scientific and technological teaching, that have existed in the past, as well as a preference for passive learning and compartmentalized learning, would be insufficient to create the AI know-how and skillset Arab Gulf armed forces are looking for. In addition, when exposing local militaries to AI through military exercises and tests, great care would need to be given to simulating real military challenges and provide honest feedback on training performance as both are needed to nurture trust in AI.[313]

311 Grey, "US UAE naval forces train AI platforms during exercise to improve detection capabilities;" Harper, "How US Central Command's task forces are shaping the future of operational AI."
312 Renfroe, "Drones and AI take center stage in Navy-led Middle East exercise."
313 Barany, Armies of Arabia, pp. 115–119, 249–258; Pollack, Armies of Sand, pp. 415–451. See also: Samaan, "Indigenous military reforms from the outside," p. 78.

# 8 Conclusion

AI has captured a firm place in the imaginaries of senior Arab Gulf leaders – and it is here to stay. The big question is, to what extent ambitious AI plans will help grow robust defense capabilities. Responses to this question depend on how well Arab Gulf nations will balance sovereignty and dependence, adjust AI-enhanced defense capability and defense industrial portfolios, address the normative aspects of technology-driven development and cooperation and to what extent they will ensure public-private cooperation to protect a burgeoning cluster of data centers meant to direct global digital data flows to one of the world's militarily most conflict-ridden region.

**How to balance sovereignty and dependence?** As discussed, Arab Gulf nations strive to build indigenous digital and industrial ecosystems. But on the way to reduce dependence, they need partners that are willing to share technology and expertise. With AI currently at the crosshairs of geostrategic competition, how best to balance dependence with demands for sovereignty is difficult to answer. The supply of critical raw material to produce chips, semiconductors, digital infrastructure, data, digital technologies and – last, but not least – diverging cultural perspectives all constitute elements of the sovereignty challenge. So far, money and the prospect of prosperous new digital markets are the major drivers that support Arab Gulf AI ambitions. But when it comes to national security and defense, these drivers might be of limited use, as US concerns about China related to the G42-Microsoft cooperation illustrate.

Therefore, Arab Gulf nations need to consider how sovereign their AI solutions should be and what sovereignty means in this context. One answer is related to the defense industrial portfolio to be discussed next. The other answer pertains to ambition and narratives. Yes, there is a growing appetite for technology localization and "made in" products. This can help forge bonds among nations that prefer to diversify away from traditional (Western) technology providers. But if you want to build cross-national cooperation using a technology stack that should be "non-Western" by design, thought should be given to how realistic this claim is – as somebody else's technology will likely come with thorny sovereignty questions, too. Thus, a more balanced narrative would explicitly emphasize aspects of co-development by foreign and local partners and mute ideas of full-scale technology independence – thereby helping to advance Arab Gulf ambitions without deterring partners.

In parallel, Arab Gulf nations should also explore to what extent maintaining a portfolio of various foreign AI algorithms is politically palatable and technologically feasible. For example, integrating AI for C2 will likely be more "invasive" than using AI for simple pattern recognition. At the same time algorithms of different producers may need to interact if, say, radar enhancing AI is combined with AI meant to advance missile performance on a naval platform. If a national combat

management system (CMS) would do the trick to "shield" algorithms from directly interacting is difficult to say and needs more thought as CMS do not yet constitute an indigenous defense industrial capability in the Arab Gulf.[314] In addition, CMS-centric resource management can potentially harm performance and mission effectiveness that decentralized AI-enabled coordination can boost.

**When is a defense industrial portfolio too diversified to sustain?** The Emirates, Saudi Arabia, and Qatar maintain very broad defense industrial portfolios. Augmenting existing products with AI seems logical as it makes the existing product portfolio even more attractive. But the problem is that the underlying product portfolio is too broad "in terms of market segments, technologies to be mastered, and local production development plans"[315] to be sustainable. With all respect to Arab Gulf defense industrial plans, for the time being, the key focus is on defense import substitution. But import substitution comes at a cost and raises questions regarding the competitiveness of defense substitutes. Introducing AI into the equation will make things even more difficult, as the above sovereignty discussion made clear. In addition, current defense AI ambitions are competing thus suggesting that Arab Gulf defense AI solutions could mimic each other.

Thus, Arab Gulf nations should clarify what difference they want AI to make and how they want to develop it? One way would be to focus on true indigenous capability gaps, for example in the maritime domain, and focus on making AI to contribute to closing these gaps. Another option could turn the heavily diversified armaments portfolios of Arab Gulf armed forces into a strength by advancing AI solutions that improve interoperability across the products of different suppliers and partners.

**How neutral is technology?** This question is deliberately normative and should be considered along two avenues. First, it is somewhat ironic that the Emirates and Saudi Arabia emphasize ideas of digital sovereignty in parallel to doubling down on investing in partner countries and companies. Investments, of course, are supposed to provide a political lever. But this is a risky approach given the critique that Emirati and Saudi foreign policy is causing in Washington and European capitals.[316] Forging bonds with China, as said above, is equally thorny as this raises even more concerns in Western nations. Arab Gulf nations might thus need a more strategic approach to gauge the "normative coping capacity" of their partners: AI-solutions that are likely to stir controversy with partners might need to

314 As argued above, tackling this integration challenge is a strategic priority for the United Arab Emirates.
315 Borchert "The Arab Gulf defense pivot," p. 311. There are indications that countries are reconsidering past preferences. As discussed in chapter 3.1, the Emirates are emphasizing a more focused vision for their future defense industrial ecosystem prioritizing "depth over breadth, focusing our resources on key areas where technological leadership is strategically vital." See: National Defense Industries Strategic Foresight 2025, p. 46.
316 Fitch, "AI companies should be wary of gulf spending spree."

be developed on their own, whereas less controversial solutions would open the door for collaborative solutions.

Second, Arab Gulf nations refer to the global Muslim community to make the case for AI solutions that reflect Islamic values. They also have a point in arguing that Western technology champions dominate global technology imaginaries and technology development.[317] For reasons of national security, an Islamic technology stack might thus sound very attractive to garner political support and build bridges across Islamic countries in Africa, the Arab Gulf and the Asia Pacific region. The role that Malaysia and Indonesia play in food security – by defining what constitutes halal food and setting up regulatory bodies that check for compliance[318] – could even offer a blueprint for an Islamic AI regulatory regime.

But then, the question emerges to what extent policy alignment with the United States is instrumental or detrimental to developing (potentially) alternative ideas to regulating digital technology? Furthermore, Arab Gulf and other Islamic nations would need to explore in detail how to turn Islamic values into distinct features relevant for software development. Finally, and very specifically about defense AI, critical questions emerge from the fact, that a lack of trust has so far prevented Arab Gulf nations from establishing integrated air defense solutions.[319] While it may be speculated that Arab Gulf countries might build more trust with other Islamic nations, the readiness to share local defense AI solutions with them (and others) is the ultimate litmus test that will decide to what extent ambitious Arab Gulf nations can turn their claim for AI leadership into meaningful defense AI partnerships with others.

**What if data centers become high value targets?** Arab Gulf nations pour significant sums into building local data centers – also to underline their quest for data sovereignty. But building data centers in one of the world's militarily most conflict-ridden region is nothing but puzzling. To be fair, the puzzle is not new as the protection of on- and offshore energy infrastructure has posed headaches for decades. But although the destruction of this infrastructure has immediate (but temporary) effects on energy prices, the destruction of data centers would most likely cause more far-reaching ripple effects given global data flows that these centers are meant to direct to the Arab Gulf region.

317 Elmahjub, "Artificial Intelligence (AI) in Islamic ethics," p. 2.
318 Lever, "The postliberal politics of halal;" "Sustaining Malysia as the global leader in the halal industry."
319 It remains to be seen how plans to share intelligence related to missile threats, that the Arab Gulf states adopted in the aftermath of the September 2025 missile attacks by Israel on Hamaz leaders in Doha, will evolve. For more, see: Mostafa, "Gulf states to increase intelligence sharing and hold air defense drills after deadly Israeli strike on Doha."

Cybersecurity is the logical first aspect to consider, as Arab Gulf nations do.[320] But the physical protection, that ultimately also entails a defense element, needs more thought. As François Delerue argues, the comingling of military and commercial data and perhaps also the co-location of military and commercial data centers in clusters make it difficult to assess, if these centers would constitute legitimate targets under humanitarian international law.[321] Thus potential (missile) threats against data centers require Arab Gulf nations to take strategic responsibility to ensure business continuity. How this should be done is beyond the scope of this study. But it is worth noting, that Arab Gulf nations will need to balance their very own national security interests against the commercial and state interests of the partners, they lure into storing data with them – particularly as some of these partners are antagonists. But irrespective of their bilateral relationships, digital companies from the United States, China, and elsewhere, that are involved in operating data centers in the Arab Gulf region, will need to the lend a helping hand in ensuring complex safety and security regimes for these centers. This, in turn, is likely to require Arab Gulf defense and security forces to engage in multinational public-private cooperation arrangements at a level not yet seen today.

320 Allen/Adamson/Heim/Winter-Levy, The United Arab Emirates' AI ambitions, pp. 21–22.
321 Delerue, "Data centers and international humanitarian law."

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