The āgna Museletter
September 2024

Jetting Into The Future

Dear Reader,

Hello and welcome to The Agna Museletter. This time, we dive into the fascinating world of rockets, jets, and chips, focusing on the progress being made in India and the Middle East. With significant investments in aerospace and AI, semiconductor and allied technologies, these regions are positioning themselves as key players on the global stage.

MUSELETTER HIGHLIGHTS:

Agna INSIGHTS

I. Introduction

The UAE and KSA in the Middle East, along with India, are rapidly emerging as key global hubs for technological innovation, particularly in the fields of aerospace (aviation, space tech), defence (national security, military, and dual-use technologies), and the AI, semiconductor, and allied industries. These sectors—space technology ("rockets"), aerospace ("jets"), and the AI and semiconductor industry ("chips")—are critical not just as technical fields but as engines of future economic growth, technological prowess, and national security. For these regions, leadership in these industries is a demonstration of their growing influence on the global stage.

Through strategic investments, forward-looking policy frameworks, and partnerships with leading global powers, India, the UAE, and KSA are positioning themselves as major players in these critical industries, amplifying their contributions to the global tech ecosystem.

II. Macro Perspective: The Power of Rockets, Jets, and Chips

Aerospace and defence capabilities have long been cornerstones of a nation's supremacy in the 21st century. In the last decade or two, the rise of AI, semiconductor and related industries has become another critical catalyst. Together, these sectors are reshaping national security strategies, enhancing economic resilience, and fueling technological innovation. For India and the Middle East, particularly the UAE and KSA, these industries align with broader ambitions such as achieving self-sufficiency and potentially expanding their stake in global exports for the former, and diversifying and expanding their economies for the latter two.

India, with its burgeoning space program, indigenous national security capabilities, and rapidly growing AI and semiconductor ecosystem, is making significant strides toward achieving self-sufficiency in critical tech sectors. The Middle East, led by the UAE and KSA, is taking parallel steps by diversifying their economies through bold technological initiatives, aiming to solidify their status as tech-driven nations.

India's ambitious national programs, such as the Semicon India Program (a $10B incentive scheme to attract global semiconductor manufacturers), and the "AI for All" strategy, are designed to foster innovation while ensuring national security. This includes AI applications in defence, such as autonomous systems and predictive maintenance for military equipment, are just a few examples of how India is integrating AI into its national security strategy.

Meanwhile, the UAE has shown an unparalleled commitment to advancing its AI and semiconductor industries. The National AI Strategy 2031 aims to establish the UAE as a global AI hub, benefiting sectors from defence to healthcare. Initiatives like establishment of the Advanced Technology

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Research Council (ATRC), the appointment of Chief AI Officers across its Government entities are shaping the country into a leading global AI hub. By working with companies like GlobalFoundries and other global partners, the UAE is accelerating its role in the semiconductor value chain, particularly for security-related technologies. The UAE's space ambitions, supported by a robust National Space Law and the UAE Space Agency, are further solidifying its role in regional security and aerospace innovation.

KSA is making significant strides in these areas through its Vision 2030 program. The Saudi National Strategy for Data & AI aims to position the Kingdom as a global AI leader by 2030, applying AI across sectors, including defence and smart cities. Projects like NEOM and the King Abdulaziz City for Science and Technology (KACST) are at the forefront of AI development, focusing on aerospace, autonomous systems, and cybersecurity. On the semiconductor front, the Saudi government is fostering a domestic chip manufacturing ecosystem through public-private partnerships, laying the groundwork for future innovations and economic growth.

Chapter I. Rockets: Space Technology Leadership and Aspirations

In recent years, innovations in space technology have taken the front seat in terms of national priorities for both India and the Middle East, driven by aspirations for technological leadership and economic diersification.

India: Low-Cost Space Pioneers

India's space program, spearheaded by the Indian Space Research Organisation (ISRO), has gained international acclaim for executing high-impact missions at remarkably low costs.

This capability is further exemplified by the recent introduction of ISRO's 'baby rocket', Small Satellite Launch Vehicles (SSLVs), which is poised to solidify India's status as a global leader in affordable satellite launch services. Additionally, the landscape is set to expand further with similar rocket systems like Skyroot's Vikram and Agnikul Cosmos' Agnibaan poised to enter the market soon. According to industry estimates, the satellite launch market in India is projected to grow from $720M in 2022 to $3.5B by 2033, driven by plans from several Indian private space companies, such as Pixxel and Satsure, to develop satellite constellations.

This is just one of many key developments in India's thriving space startup ecosystem, which now boasts over 200 companies, following the government's decision to open the sector to private enterprises in 2020. These rising stars in the Indian space technology landscape are backed by venture capitalists and private investors, who have invested nearly $250M into the ecosystem since 2014.

The ecosystem is catalysed by ISRO & its key associate organisations- IN-SPACe (which promotes and supervises various activities of new space enterprises, including building launch vehicles and satellites, sharing space infrastructure, and establishing new facilities), and the National Space India Limited (NSIL), (the commercial arm of ISRO, focused on enabling Indian industries in high-technology space activities and promoting products and services from the Indian space program).

To elevate the Indian space economy, the government recently announced a ₹1,000 crore (~$120M) VC fund aimed at expanding the space sector fivefold over the next decade, with a vision of capturing 10% of the global commercial space market. Additionally, the Union Cabinet of India has recently approved four groundbreaking space missions for ISRO: Soorya (Next Generation Launch Vehicle - NGLV), Chandrayaan 4, Bharatiya Antriksh Station (Space Station for Scientific Research), and Shukrayaan (Venus Orbiter Mission).

India is not only developing its capabilities for self sufficiency but is also helping other countries develop their capabilities through commercialisation and exports.

Middle East: Bold Space Ambitions

Among UAE and KSA, in recent years, the UAE has made remarkable strides in advancing its space agency, expanding both its space science programs and technological capabilities. Following the successful launch of the Mars Hope Probe in July 2020, as part of the Emirates Mars Mission (EMM), the UAE has positioned itself as a significant player in the global space race, showcasing its technological prowess and commitment to exploration. The Hope Probe, also known as 'Al Amal,' was the UAE's first interplanetary mission, making the country the first Arab nation and only the fifth in the world to successfully reach Mars and gather critical atmospheric data from the red planet.

Building on the knowledge and experience gained from the EMM, the UAE announced the ambitious Emirates Mission to the Asteroid Belt (EMA), set to launch in March 2028. This mission will focus on studying water-rich asteroids as part of the National Space Strategy 2030.

In the realm of Earth observation, the UAE launched its first Synthetic Aperture Radar (SAR) satellite, Foresight-1, in collaboration with Bayanat and Yahsat. This satellite enhances capabilities in disaster management, marine monitoring, and smart mobility through high-resolution, all-weather Earth monitoring.

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The UAE's space efforts extend beyond individual missions, with key partnerships involving global players like the US, UK, and Japan. These collaborations have been instrumental in the success of the UAE's Mars and lunar missions, as well as its participation in international initiatives like the Artemis Accords for lunar exploration and the United Nations Committee on the Peaceful Uses of Outer Space.

The space program is central to the UAE's strategy for economic diversification and the development of a high-tech ecosystem. It supports a knowledge-based economy while promoting gender inclusivity, with the UAE Astronaut Programme training a national team of astronauts. In 2019, Hazza Al Mansouri became the first Emirati to visit the International Space Station (ISS), and in 2023, Dr. Sultan Al Neyadi became the first Arab to conduct a spacewalk. Nora Al Matrooshi is set to become the first Emirati woman astronaut.

To further support innovation and growth in the space sector, the UAE has launched the UAE Space Economic Zones Program and established a $816M (AED 3B) The National Space Fund. Managed by the UAE's National Space Agency, the fund is designed to develop infrastructure supporting the space industry and create an environment conducive to attracting space tech startups and SMEs. Additionally, the fund seeks to implement governance systems that will establish the UAE as a leader in the space sector, attract specialised global companies, and foster partnerships between national and international advanced technology firms.

To train future space experts, the UAE has also announced the establishment of the National Space Academy, supported by the National Space Fund. Initiatives like the student-led HCT-SAT-1 project further demonstrate the country's commitment to nurturing young talent.

Chapter II. Jets- Defence aka National Security (Military & Dual Use Technologies))

Defence aka National Security:

As global threats evolve and the need for modern defence solutions intensifies, all the three nations are focusing on building indigenous capabilities while exploring collaborations among themselves and with allied global powers to modernise their defence systems.

Currently, US (and some allies) heavily outweighs all other countries in military spending, defence exports, and security levers it has built worldwide, while China the closest second is rapidly enhancing its defence capabilities, albeit limited to projecting power primarily within Asia. These evolving geopolitical dynamics have prompted mid-powers, including India, the UAE, and KSA, to bolster their military and security capacities through localisation initiatives and increased defence spending.

India has made significant progress in its aspirational pursuit toward becoming a net exporter of defence technologies. Since 2014, it has managed to increase its defence exports by 23 times, thanks to programs like Aatmanirbhar Bharat (Self-Reliant India) and Make in India, which emphasise domestic manufacturing. Policies like the Positive Indigenisation Lists ensure that local production is prioritised over imports. Furthermore, India's iDEX (Innovations for Defence Excellence) and iDEX Prime programs, run by DRDO, foster early-stage innovation in strategic defence technologies. The government's allocation of 25% of its R&D budget to industry-led research further supports these efforts, and the country is focused on developing strategic defence corridors in states like Uttar Pradesh and Tamil Nadu. India is also deepening its defence ties with Western nations, as demonstrated by partnerships such as QUAD and the INDUS-X initiative, which explore tech and defence collaborations.

The UAE and KSA, too, are bolstering their defence capabilities. KSA, the world's second-largest importer of defence technologies between 2018 and 2022, is aiming to localize 50% of its military needs by 2030 under its Vision 2030 program. This goal is supported by the creation of the General Authority of Military Industries (GAMI) and Saudi Arabian Military Industries (SAMI), both of which are central to localising production. Joint ventures with international defence firms are helping KSA achieve this ambitious goal.

The UAE, meanwhile, is reducing its dependency on imports through multiple initiatives such as the creation of free zones dedicated to the military and security sectors, as well as awarding $6.4 billion in contracts to local defence firms. The UAE's investments span a wide range of modern technologies, from unmanned systems to AI-enabled security infrastructure.

Aviation (One of the Dual-Use Technologies):

The aviation sector, particularly new-age technologies like UAVs (unmanned aerial vehicles) and Advanced Air Mobility systems (AAM)/ eVTOLs (electric vertical takeoff and landing vehicles), represents the future of military and dual-use applications. India has recently introduced its first indigenously developed combat UAV, the FWD 200B, designed for a variety of combat missions. This development enhances India's unmanned warfare capabilities and offers an affordable alternative to imported systems. Indian startups like Vinata Aeromobility and ePlane Company are also advancing sustainable eVTOL technologies for both military and civilian applications, aligning with the global push for greener, more efficient transportation systems. Notably, California-based Archer Aviation entered into a memorandum of understanding (MoU) with

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InterGlobe Enterprises, the parent company of IndiGo, to introduce electric air taxis in India by 2026, subject to appropriate regulatory approvals. With its burgeoning urbanisation and demand for efficient transportation solutions, India is poised to become the largest market for electric air taxis in the world.

In parallel, the UAE and KSA are also heavily investing both capital and other resources in advanced aviation technologies. NEOM is making significant strides by investing and striking strategic partnerships with companies such as Regent (to expedite electric seaglider development) and Volocopter (an eVTOL company). Additionally, US-based eVTOL developer Joby Aviation signed a MoU with the Department of Municipalities and Transport (DMT), Abu Dhabi Department of Economic Development (ADDED), and the Department of Culture and Tourism – Abu Dhabi (DTC Abu Dhabi) to establish and expand air taxi services in Abu Dhabi and beyond.

Further, Archer Aviation also entered a multi-million dollar framework agreement with the Abu Dhabi Investment Office (ADIO) to accelerate its commercial air taxi operations in the UAE, set to launch late next year. This agreement follows the MoU announced during ADIO's Smart and Autonomous Vehicles Industry (SAVI) cluster launch in 2023, aimed at revolutionising urban mobility. The initiative encompasses local manufacturing, operational setup, and training initiatives, solidifying Abu Dhabi's role as a frontrunner in advancing urban air mobility. Moreover, the construction of vertiports will facilitate air taxi services, alongside local production of Archer's Midnight aircraft.

Additionally, ADASI (Advanced Defence Systems International), a key player in the UAE's unmanned systems sector, is enhancing UAV capabilities by developing and integrating advanced technologies for defence applications. Their products, including the "Falcon" series of unmanned aerial vehicles, are designed for both reconnaissance and combat missions, showcasing the UAE's commitment to indigenous defence technologies.

Emerging as another player, Chinese start-up EHang announced a strategic partnership with ADIO and a leading fintech group in the MENA region, Multi Level Group (MLG), to introduce air taxi services. This alliance aims to bolster business activities in manufacturing, flight operations, research and development (R&D), as well as training and maintenance services.

Together, these initiatives reflect a broader trend, where advanced aviation platforms can serve both military and civil sectors, including logistics and disaster response. With substantial investments and collaborations, India, the UAE, and KSA are positioning themselves as key players in the global new age aviation landscape.

Chapter III. Chips: AI, Semiconductor, and Allied Industries

AI & Allied Industries:

AI has become an essential driver of technological advancement, national security, and economic growth, and India, KSA, and the UAE are making significant strides in this domain.

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India's AI sector is advancing rapidly, with the potential to contribute $500 billion to the economy by 2025, fueled by a young, digitally skilled workforce. With 65% of the population under 35 and over 1.5 million engineers graduating annually, India is positioned as a global hub for AI talent. From Silicon Valley to Bengaluru, Indian professionals have been instrumental in shaping the global AI landscape. The challenge now is to channel this talent towards inclusive, socially impactful solutions.

India's vast diversity—spanning over 1.4 billion people and numerous ethnic groups—necessitates AI systems that cater to a wide range of needs. To address ethical concerns and the governance of AI, the Indian government has launched initiatives aiming to re-skill over 10 million people by 2025, preparing the workforce for an AI-driven future while ensuring that technological advancements do not exacerbate social inequalities.

While India is home to more than 1,600 AI-focused startups and boasts a vibrant tech ecosystem, AI R&D investment still lags behind the U.S. and China. India's current annual AI R&D spending is $665 million, and significant growth in research, collaboration, and policy reform is needed for the country to become a global leader in responsible AI development. With its rich ethical traditions and burgeoning tech ecosystem, India is well-positioned to drive AI innovation that balances technological progress with social responsibility.

KSA and the UAE are also making significant strides in developing their local AI tech ecosystems, driven by substantial capital investment and the creation of favorable regulatory and technological support systems. Earlier this year, Saudi Arabia announced plans to establish a $40 billion AI fund, led by its Public Investment Fund (PIF), to support tech startups in AI, including chipmakers and large-scale data centers. The Kingdom's AI market is projected to grow at a compound annual growth rate (CAGR) of 29% by 2030, while cloud services are expected to expand by 23% annually until 2029. To support these AI workloads, Saudi data centers are being outfitted with advanced cooling systems and high rack densities.

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Tonomus, Neom's cognitive technology company, is actively working to advance a data center hub in Neom, building digital infrastructure and forming partnerships with international players like Oracle. Additionally, regulatory frameworks such as the Cloud Computing Regulatory Framework (CCRF) and the Personal Data Protection Law (PDPL) are enhancing KSA's appeal to global hyperscalers. Saudi Arabia also benefits from electricity costs 30-50% lower than global averages, supported by investments in renewable energy through Acwa Power.

By 2030, KSA aims to increase its data center capacity from 300 MW to 1,300 MW, positioning the Kingdom as a hub for AI and cloud infrastructure while addressing the global shift away from constrained data hubs in Europe and the US.

Further, at Global AI Summit held in Riyadh, Saudi energy giant Aramco signed MOUs with Cerebras Systems and FuriosaAI for AI and supercomputing collaboration, Rebellions for deploying Neural Processing Unit chips in its data centers, and SambaNova Systems to enhance AI capabilities in the Kingdom. The company also introduced a AI supercomputer, one of region's first, powered by NVIDIA GPUs for complex tasks and partnered with Qualcomm Technologies for generative AI solutions in facility monitoring. These efforts are expected to be a part of a broader strategy, including the Saudi Accelerated Innovation Lab and the Global AI Corridor ecosystem, leading to the development of Aramco's first large language model for industrial AI applications and the Eye on AI Programme for cybersecurity governance.

The UAE is also making notable progress in AI and its data center infrastructure. Initiatives such as the UAE Council for Artificial Intelligence and smart city projects under the D33 strategy are key drivers. The UAE has committed $500 million to AI startups, including FalconAI, and fosters innovation through sandbox models. The appointment of Omar Al Olama as the world's first Minister of AI underscores the UAE's focus on leadership in this sector. Additionally, the crown prince of Dubai appointed 22 Chief AI Officers across various government entities to spearhead specialised plans and programmes in the field of AI and advanced technology.

Investments in infrastructure and talent development support the UAE's AI and cloud growth, with institutions like the Mohamed bin Zayed University of AI (MBZUAI) and the DIFC's AI & Web3 campus preparing skilled professionals. Companies like G42 are emerging as AI leaders, reinforcing the UAE's role as a tech gateway for the Middle East and African markets.

Both KSA and the UAE are strategically positioned at the crossroads of Europe, Asia, and Africa, enhancing their potential as hubs for global data traffic and AI-driven innovation. Comprehensive initiatives like KSA's Vision 2030 and the UAE's D33 plan are creating ecosystems that facilitate AI and cloud technologies. Together, these nations are establishing a framework for growth in the coming decade, addressing the needs of AI companies while solidifying their roles in the global tech landscape.

Semiconductor revolution:

The semiconductor industry, often referred to as the backbone of modern technology, is vital to the economic and national security interests of both India and the Middle East region. Semiconductors power everything from consumer electronics to advanced defence systems, and the global chip shortage has only highlighted the strategic importance of securing domestic production capabilities.

India: Becoming a Semiconductor Powerhouse

India is actively working to establish itself as a key player in the global semiconductor industry. Government initiatives like the Production Linked Incentive (PLI) scheme are encouraging major global companies to set up semiconductor manufacturing plants in the country. This effort aims to strengthen India's electronics and automotive industries by securing a steady supply of chips.

The semiconductor market in India is projected to grow by 11.60% between 2024 and 2029, reaching a market volume of $13.31 billion by 2029. These investments are part of a broader strategy to make India self-reliant in critical technologies and reduce its dependence on foreign chip suppliers.

KSA & UAE: Investing in High-Tech Chip Industries

The Middle East is also making strategic investments in semiconductor production, recognising the critical role chips play in both defence and civilian technologies. KSA has set up a fund valued at $266.61 million to invest in semiconductor firms. This fund aims to increase the number of semiconductor companies operating in the Kingdom over the next five to six years, with a focus on AI-driven chips that will power its ambitious smart city projects under Vision 2030. KSA also aims to attract 25 foreign industry experts and provide increased support for sector-specific startups to help them achieve global recognition.

Governments across the region are emphasising research and development to build resilient semiconductor industries that support both civilian applications and national defence needs.

To Wrap It Up

India, the UAE, and KSA are at the forefront of a global technological renaissance. By investing in rockets, jets, and chips, they are securing their economic and security futures while establishing themselves as key players in the tech arena. The convergence of aerospace, defence, and

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semiconductor technologies will drive future growth. By leveraging their unique strengths, these nations are positioning themselves as influential leaders in the geopolitical landscape. With strong governance and a focus on innovation, India and the Middle East are poised to lead technological advancements for decades to come.

Disclaimer: *Within defence aka national security, as a fund, our focus is only on dual-use technologies and applications, and we do not intend to invest in companies that fall under the purview of core defence/military. We will share more details on this in our upcoming Agna Engineering Thesis.*

Agna PERSPECTIVE

The Indian Semiconductor Mission (ISM)
is poised to receive a second funding phase, potentially up to US$10B, which would significantly bolster India's semiconductor ambitions.

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The researchers at Princeton Plasma Physics Laboratory
used bursts of protons and X-rays to track these interactions, which revealed a process called magneto-Rayleigh Taylor instability.

READ MORE

We've progressed from devices built for single-use purposes—
rigid and serving only one function—to the modern era where technology is designed to integrate various capabilities seamlessly. In a world that demands adaptability and versatility, the future belongs to those who innovate beyond limits.

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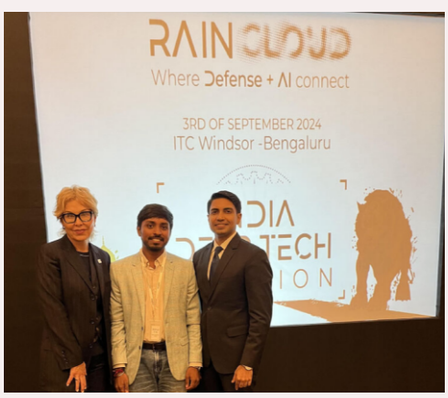
TEAM ENGAGEMENT

Fintech24

Our Founder and General Partner, Pranav Sharma, attended the Fintech24 event and his experience as a speaker by stating that the high-level government engagement and focus on fostering innovation in fintech made it one of the most impactful events he's been part of.

India Deep Tech Pavilion

Our Research & Investments Lead, Rahul Nagaraj, attended the inauguration of the India Deep Tech Pavilion by RAINCLOUD, which was an exclusive space for Indian deep tech companies to showcase their products and services to top global OEMs and investors - for supply chain partnerships and funding opportunities.



Dubai AI and Web3 Festival

Rahul was further accompanied by our Marketing Lead, Seema Tharani, for the inaugural edition of Dubai AI and Web3 Festival. The attendees explored cutting-edge integrations of artificial intelligence, blockchain, XR, and decentralised systems that are advancing digital economies and driving technological innovation. They also engaged in meaningful discussions with startups and fellow investors.

On the 'FRONT'IER TECH

Robotic Heart Surgery

Robotics revolutionised heart surgery in KSA, enabling minimally invasive procedures with quicker recovery and fewer complications, marking a new era in healthcare.
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India's High-Altitude Pseudo-Satellite

India's groundbreaking solar-powered High-Altitude Pseudo-Satellite (HAPS) is set to revolutionise strategic surveillance, with the potential to surpass existing global benchmarks in long-duration, unmanned aerial flight.
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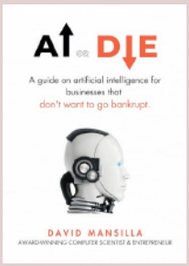
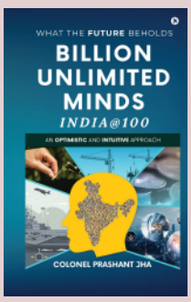
Agna RECOMMENDS

AI or Die by *David Mansilla*



In this book, the author reveals how the rapid spread of AI is not something to fear but rather an immense opportunity. For entrepreneurs feeling anxious about this shift, the book demonstrates how leveraging AI can propel business growth by 10x, unlocking untapped potential for innovation and success.
Read more

India@100 : What the Future Beholds by *Colonel Prashant Jha*



This book is a clarion call for India's inclusive growth, showcasing its strides in digitisation, innovation, and infrastructure, while urging the need for nanofinance to truly empower every citizen and unlock the nation's immense potential.
Read more

Questions? Feedback? Different perspective?
We invite you to engage with us and collaborate.

Warm Regards,
Team Agna

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