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From Concrete to Compute The Middle East's Bid for Global AI Infrastructure

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Abstract - Throughout most of modern history, the wealth and ambition of nations was quantified by concrete. Roads, dams, towers and ports were signs of progress. That's changing. The rise of artificial intelligence is transforming the global economy and governments are now shifting investments from traditional construction to the physical facilities that house computation data centers. This article explores the drivers for this shift, and in the Middle East, in particular, how Saudi Arabia, the United Arab Emirates, and Qatar are spending billions on compute infrastructure as part of their post-oil diversification plans. It chronicles the arc from industrial-age infrastructure to the digital economy, discusses today's data center dynamics like sovereign AI and the competition for GPUs, and examines the economics of treating data centers as the new public works. The article also addresses some serious issues such as energy needs, water shortage, geopolitical reliance on chips, and speculative overbuilding. It provides actionable strategies for policy makers, companies and individuals to deal with this transition. The main takeaway is that compute has become a strategic national asset, like oil or electricity, and the countries that create, operate and manage it well will have an undue advantage in the future.

Keywords: Artificial Intelligence, AI Infrastructure, Compute, Gulf States, Sovereign Wealth, Energy, Economic Diversification, Data Centers.

1. INTRODUCTION

Think about what has been successful for the nation over the past 100 years. The Hoover Dam. Interstate system of highways. Skyscrapers of New York, then Shanghai, then Dubai. A nation made its debut on the world stage by pouring concrete and raising steel, for generations. Infrastructure was destiny. You increased in the amount of what you built and you grew. Now a more muted and unusual thing is going on. Head out of Riyadh, or Abu Dhabi, and stroll through some of the desert and you'll discover huge, windowless buildings buzzing behind security fences. They don't have any big lobbies and they don't have any tourists. But their capital inflow is on par with or is greater than the inflow into airports and stadiums. These are data centers, and they are a revolution of thinking in terms of wealth, power and future in nations.

Artificial intelligence is the impetus behind this shift. With the advent of large language models and generative tools, as well as the rise of more powerful AI systems, there is a huge demand for computation. These models need special equipment, a lot of electricity and facilities to run. The core capability to process information at scale compute is now a strategic and limited resource. Governments in turn, pose a new question. So why invest in more concrete when the payoffs of the next century may be in silicon. It's not just

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a technology tale. It's an economics story, a geopolitics story and in many ways a story about national identity. No place is it more pronounced than in the Middle East, where deep-pocketed oil-rich countries with a pressing need to diversify their economies are hoping that compute will be their next big export. This article will delve into the reasons why.

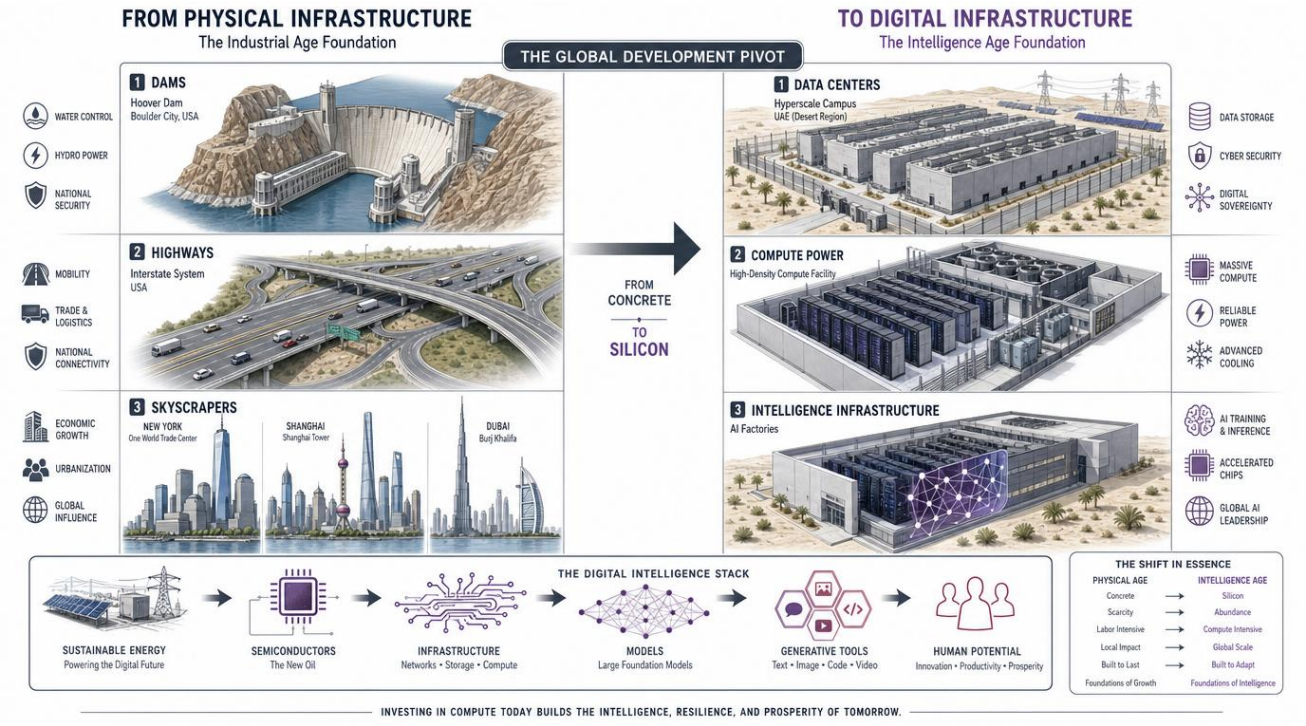

Fig -1: The Global Development Pivot

2. OBJECTIVES

This article has a number of distinct objectives.

1. First, it seeks to give a simple explanation for the shift in economic thinking from traditional concrete infrastructure to digital infrastructure, and in particular, data centers.
2. Second, it aims to provide readers with a realistic appreciation of the reasons for the Middle East's surprising and aggressive role as the focus of this transformation.
3. Third, it offers analytical frameworks for leaders and organizations to assess if and how to engage in compute economy.
4. Fourth, it provides a balanced perspective and recognizes both the opportunities and the risks which this change brings.
5. Finally, it is a book that will get readers to rethink what national strength, productivity and progress will look like in an age of machine intelligence, not physical size.

3. BACKGROUND

3.1 How Infrastructure Defined National Power

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The first step towards comprehending the concrete-to-compute transition is to appreciate the significance of concrete.

3.2 The industrial logic of physical infrastructure

Economic development in most of the twentieth century was of a well-known type. Nations that desired to grow constructed the physical infrastructure which enabled commerce. Roads moved goods. Ports that are linked to world trade. Electricity was introduced to industry by power plants and grids. Railways shrank distances. Dams served dual purposes of water and power.

The economists like Walt Rostow talked of stages of growth where infrastructure investment was a prerequisite for the takeoff of industry. The reasoning was simple. Construct the physical foundation, and productivity, employment and prosperity would come. It was the basis for vast public expenditures, ranging from the New Deal in the United States to the reconstruction of Europe and Japan after World War II to the explosive urbanization of China since 1980.

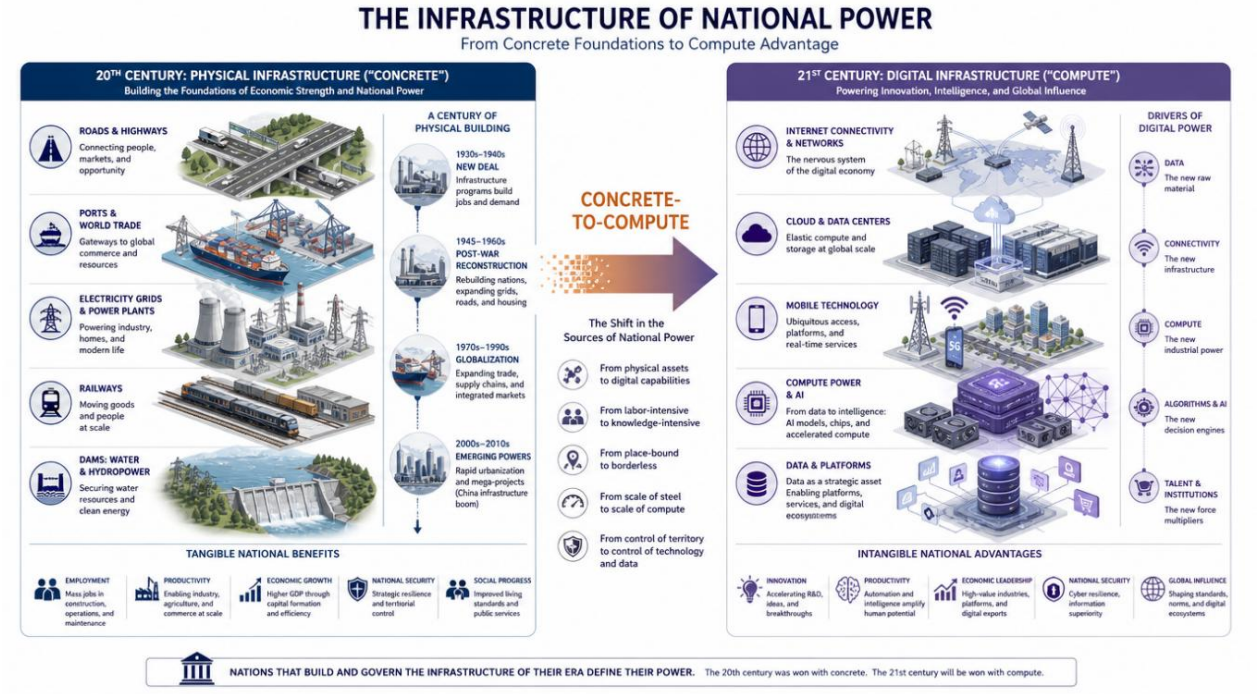

Fig -2: The Infrastructure of National Power

Governments had a number of attractive attributes about concrete. It provided employment right away. It was there, and this was politically advantageous. It generated assets which lasted for decades. But overall it had a tangible impact on the lives of citizens, in terms of transport, water and shelter.

3.3 The Gulf and the construction era

This model was adopted in the Middle East in a special manner. With the advent of oil wealth in the mid twentieth century, the Gulf states were able to rapidly develop barren lands into modern cities. This was best exemplified by Dubai. Within a few decades, the little trading port became a global hub thanks to the Burj Khalifa, Palm Jumeirah, large malls and international airports. This building spree was for two reasons. It modernized societies and it diversified the economies, hitherto dependent on raw oil exports, towards

tourism, real estate, finance and logistics. The strategy proved to be effective for a long time. Concrete was the tangible evidence that the desert would be a place to visit.

However, by the 2010s it was clear that the model had some flaws. The real estate market experienced a boom and bust. As the pandemic was later to show, tourism was susceptible to shocks. Not to mention, the long-term life-or-death issue of the engine of wealth, oil. The world was moving towards a transition to other energy sources, resulting in a future decline in hydrocarbon demand. For the oil-rich countries, it was necessary to find a new base, and concrete was not the answer.

3.4 The early digital era

In the meantime, the digital economy slowly and steadily came to maturity. The advent of the internet, cloud computing and mobile technology in the 2000s and 2010s led to the development of a new type of infrastructure that was not fully understood by governments initially. Amazon, Google and Microsoft built data centers to provide cloud services, but these were mostly commercial projects that were based on private demand for storage, websites and applications.

At this time data was already being referred to as the new oil. While catchy, the term was somewhat misleading as data on its own does little. The value of data lies in its ability to process, learn and act on it. Compute is the ability. But until recently, the world had sufficient compute to satisfy its demands, without governments focusing on it as a strategic priority. However, all these calculations were flipped upside down with the introduction of artificial intelligence.

4. THE AI CATALYST

4.1 Why Compute Became the New Concrete

The advent of the powerful generative AI systems around 2022 and 2023 was a pivotal moment. All of a sudden, machines started to write, code, design and reason in a qualitatively new way. These tools were adopted in a hurry by businesses. AI was seen as a technology that could transform productivity, defense, science, and economic competitiveness in all areas, which is why governments started to realize its potential. This discovery sparked a gold rush, not of the AI models themselves. It was the infrastructure that was required to construct and operate them.

4.2 Understanding the compute bottleneck

The frontier AI models need tens of thousands of specialized chips, mostly graphics processing units from companies such as Nvidia, to train them. The chips are used in synchronized groups within data centers, with the chips using huge amounts of electricity and producing massive heat that needs to be cooled. The models are then deployed to millions of users and must be run by the model, known as inference, which requires even more capacity. This led to compute becoming the limiting factor in AI advancements. You would have great researchers and lots of data, but without the advanced chips in large clusters in appropriate facilities, you wouldn't be able to compete at the frontier. This made data centers an asset of critical national importance almost overnight, as opposed to mundane commercial real estate.

4.3 From private convenience to public strategy

The key conceptual change. Data centers were primarily a private affair, constructed by tech firms for the benefit of their customers, in the cloud era. The AI era meant that compute capacity was now something that governments felt they had to secure themselves, like they would oil reserves, electricity supply or military hardware. This concept is encapsulated in the term sovereign AI. It is the capacity of a country to

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design and operate AI systems on its own infrastructure, in its own country, with its own control, and with its own language and cultural information. To achieve sovereign AI, sovereign compute is essential. But when it comes to sovereign compute, it takes data centers, chips and energy.

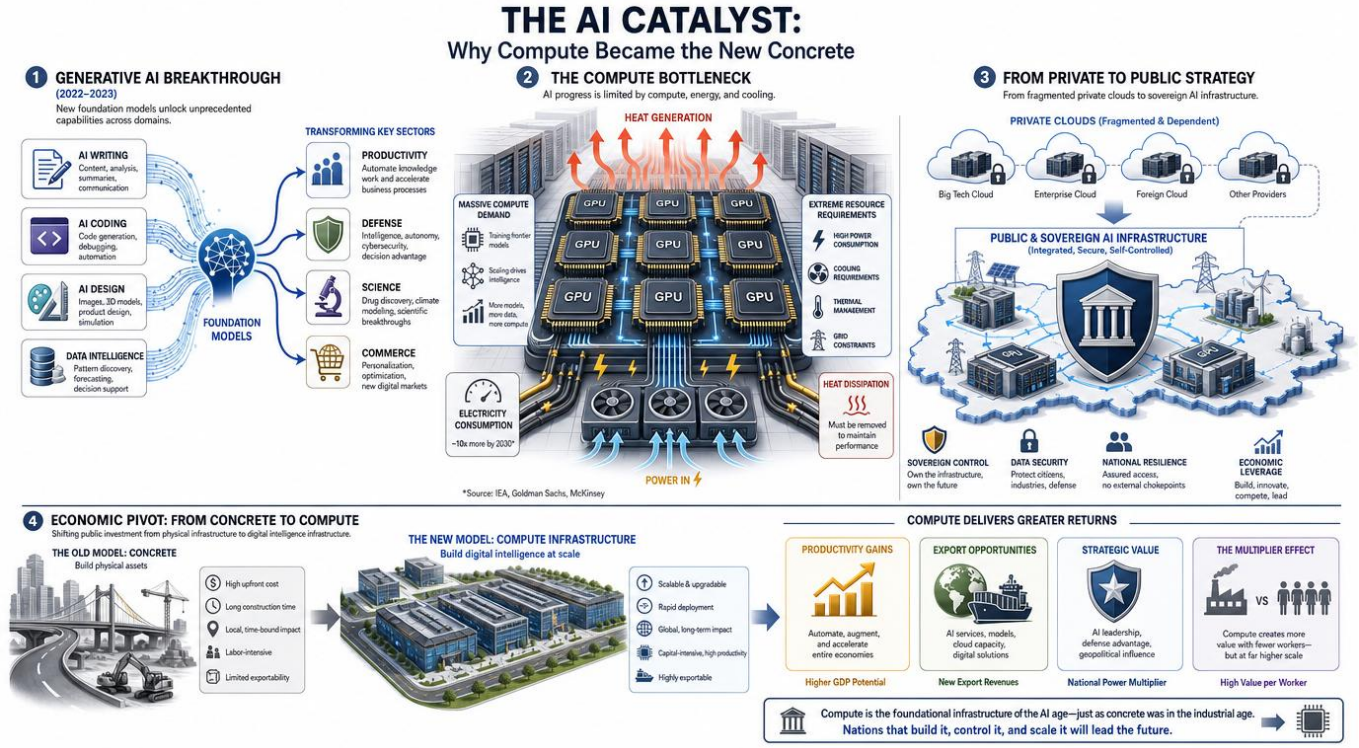

Fig -3: The AI Catalyst Why Compute Became the New Concrete

This is the reason that economic thinking is shifting from concrete to compute. A new highway could boost productivity slightly and in the immediate area. Conversely, a large compute base could put a nation at the heart of this most transformative technology of the century. The potential benefits economic and strategic seem to be much greater.

4.4 The economics behind the pivot

There are a number of economic arguments in favour of such a shift, and it is important to consider them critically.

First of all, there is productivity. The infrastructure that makes AI possible could bring back more than the traditional public works, if AI can bring the productivity gains that its proponents promise. Compute is a productivity multiplier in all industries, from healthcare to finance to manufacturing.

The other is export potential. Data center does not have to be used domestically only. Compute can be offered as a service all over the world. It is possible that a country that has plenty of cheap energy and capital to run AI workloads can export AI to the rest of the world, just like they exported oil. This is an easy analogy for the Gulf states to grasp and embrace.

The third is the option value of relevance. Although the exact rate of return is not known, governments are worried that they will be left behind. Computing is increasingly a condition of being a part of the next

economy. If this one gets missed, it could be strategic irrelevance, making investment more like insurance than a gamble.

The fourth one, and the most controversial, is the multiplier effect. Older investments in infrastructure generate a lot of construction jobs. Once operational, data centers, on the other hand, have relatively small staffs. This is a real drawback of the economic argument and we'll come back to it in challenges.

5. CURRENT TRENDS

5.1 The Middle East Goes All In

The Middle East has become one of the most aggressive and well-funded new entrants to the compute space, while the United States and China reign supreme. The why can be understood by examining the particular benefits and incentives of the area.

5.2 Saudi Arabia and Vision 2030

Saudi Arabia has made AI and compute its core of the diversification plan, Vision 2030. The kingdom has set up an AI firm called HUMAIN, with its sovereign wealth fund, to construct massive data centres and create Arabic language models. The Public Investment Fund has invested vast amounts of money in chips, partnerships and infrastructure. The objective is clearly stated. Saudi Arabia is aiming to be a global AI hub, rather than just a buyer of foreign AI. The reasoning is in line with the kingdom's overall plans. The country has a young population that requires new industries, cheap energy and huge land availability make compute an attractive option to leapfrog into the digital economy. Part of the idea behind the futuristic megacity project NEOM is to use it as a pilot for AI systems in urban environments.

5.3 The United Arab Emirates and the G42 model

The UAE is arguably the country that has progressed the most and strategically. Based in Abu Dhabi, G42 has emerged as a key stakeholder, setting up data centres, creating AI models and establishing partnerships with other countries, notably with Microsoft. The UAE has also introduced Falcon, a competitive open-source large language model built by the Technology Innovation Institute, that caught out many with its prowess. The UAE has been early in showing seriousness about AI, having appointed a minister of state for AI in 2017. It's a strategy that combines home-grown with global aspirations, making Abu Dhabi a neutral battleground for American and other technologies to be deployed at scale.

5.4 Qatar, Kuwait, and the broader region

Other Gulf States are taking similar routes. As part of its national vision, Qatar is making investments in digital infrastructure. Kuwait, Bahrain and Oman are ramping up data centre capacity, many times in conjunction with international cloud providers looking to establish a regional presence. The message is the same in all the countries of the Gulf Cooperation Council. Compute has become the new strategic battleground.

5.5 Why the Middle East has structural advantages

The area has several unique characteristics that contribute to this pivot.

The most apparent one is energy. Gulf has some of the lowest cost electricity in the world and data centres are vast electricity users. This now increasingly involves massive solar potential, which helps to fulfil compute expansion whilst meeting the renewable energy goals. Cheap power is like cheap labor was to manufacturing for data centers.

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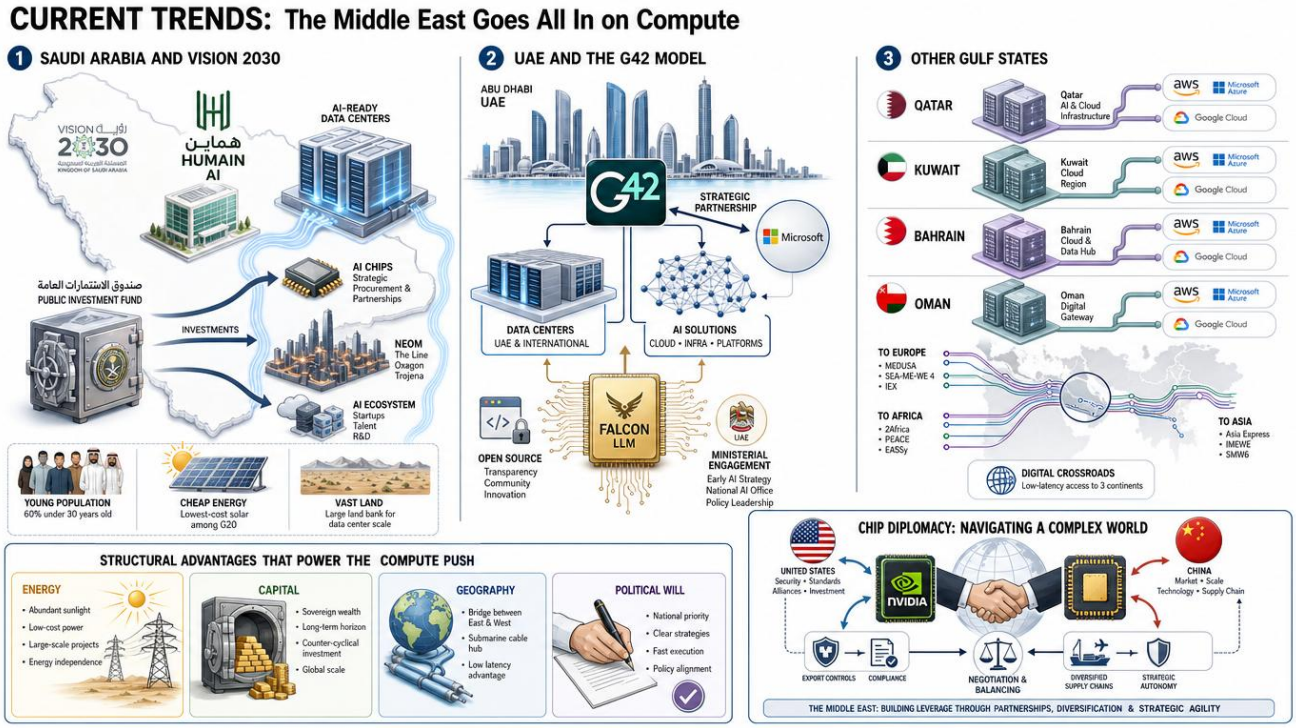

Fig -4: Current Trends the Middle East Goes All in on Compute

Second advantage is capital. The region's SWF's have trillions of dollars at their disposal and can do so patiently and on a scale that private companies cannot. They can take long term bets which markets may avoid.

The third is Geography. The Gulf is located between Europe, Africa and Asia and is a natural digital crossroads. Submarine cables and connectivity can place it as a hub for data flows from around the world.

Political will is the fourth. These states can act swiftly, secure land, and coordinate policies in ways that more slowly moving and disaggregated democracies may not be able to replicate. This can be a double-edged situation, as we will see, but it will do the execution a bit faster.

5.6 The chip diplomacy dimension

One of the hallmark characteristics of 2024 and 2025 has been the talks on access to cutting-edge American chips. Nvidia and other companies in the United States have the most capable AI hardware and control exports for national security reasons. To access these chips, the Gulf states have been conducting high-level diplomacy, so as not to anger the US while also maintaining ties with China. This has transformed compute into a foreign policy issue, as well, with access to chips being used as a leverage for security pledges, investments and technology standards.

6. CHALLENGES THE HARD REALITIES BEHIND THE HYPE

There are serious issues with the pivot from concrete to compute. These need to be addressed in a critical analysis, as the risks are significant and may not be mentioned in promotional stories.

6.1 The energy and water problem

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Data centers are voracious. The power usage of a single large AI data centre can match that of a small city. The demands for compute are increasing and so are the demands for power systems. This is less true for the Middle East, where plenty of energy calms the tension, but doesn't remove it. Compute is electricity not spent elsewhere and a huge growth may be a burden even for energy-rich grids.

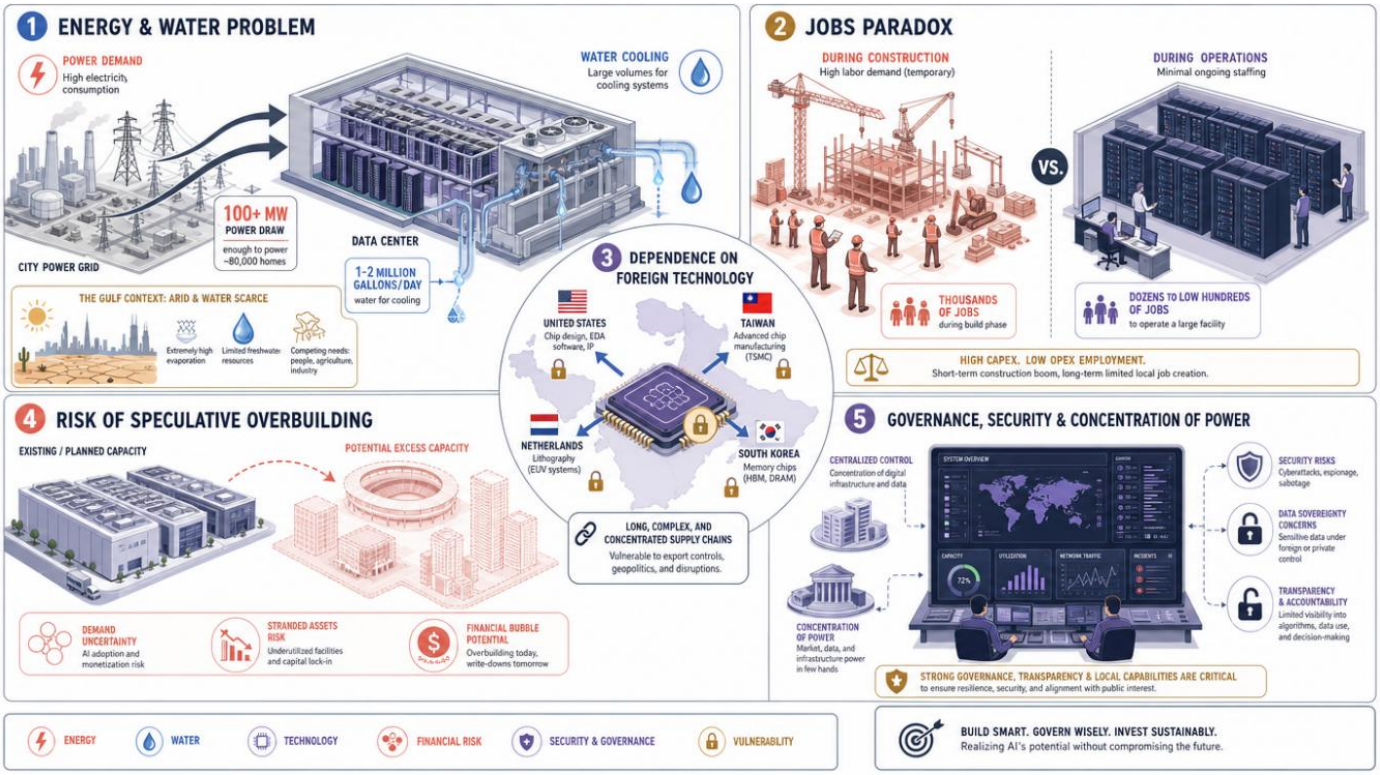

Fig -5: Challenges the Hard Realities Behind the Hype

Water is even more acute an issue. Water is used for cooling in many data centers and the Gulf is one of the world's most water-stressed areas. The use of water in the desert for building water-intensive facilities is an obvious sustainability issue. The use of advanced cooling technologies and treated or seawater can help, but at an additional expense and complexity. The compute boom has a bigger environmental impact than it's typically given credit for.

6.2 The jobs paradox

Perhaps the biggest economic weakness is that. Traditional infrastructure generates a lot of jobs in construction and in the operation. Along a highway, there are builders, maintenance crews and countless businesses. Data centers do not operate in the same manner. They need lots of workers to construct, but when they're up and running a few dozen techs may work at a plant costing billions. The promise is that compute will enable jobs elsewhere in the economy, through the power of AI tools that will increase productivity. This is indirect and uncertain, though. The direct job creation of compute infrastructure is disappointingly light for countries that have to put to work growing young populations. Policymakers need to be frank that data centres will not be the answer to youth unemployment.

6.3 Dependence on foreign technology

In spite of all the investment, the Middle East does not make advanced chips. Nor does the vast majority of businesses anywhere else except in a few companies in the USA, Taiwan, South Korea, and the Netherlands. This gives rise to a strong dependence. The buildings can be constructed and the power supplied, but the most important part the chips has to be imported and can be limited at any time by foreign governments. A deep weakness. It implies that sovereign AI is not sovereign. A country can invest billions of dollars in building data centers, and then have its chips cut off because of geopolitical changes. Without a domestic chip manufacturing capability, real strategic autonomy in compute is not yet a reality, a capability that is extraordinarily difficult and costly to develop.

6.4 The risk of speculative overbuilding

Booms invite bubbles. Overbuilt infrastructure has littered the history of infrastructure ghost cities in China, unused stadiums and airports. The actual danger is that the compute frenzy that's ongoing today will result in over provisioning. In the event that AI demand doesn't accelerate as anticipated, or hardware efficiency reaches a new level, the massive investments in data centers today may turn into stranded assets tomorrow. The economics of AI is still unclear. There are a lot of businesses that are investing in AI but haven't seen any clear benefits. The infrastructure that has been developed to support the AI business case may be underutilized if the overall business case is not as strong as anticipated. This is a possibility that must be recognized in prudent strategy, and not the endless exponential growth.

6.5 Governance, security, and concentration of power

With a focus on compute, new issues of control and accountability emerge. Who is responsible for the AI systems that are trained on this infrastructure. What measures are taken to secure data. In countries and communities where transparency is not high and civil liberties are not well protected, the ability to control and monitor with powerful AI infrastructure might not be widespread prosperity. The centralized political will that makes for speedy execution also raises concerns about the use of such tools. However, for benefits to be broad-based, it must be genuine and needs governance structures that many compute-building countries do not yet have.

7. SOLUTIONS AND FRAMEWORKS

7.1 Thinking Clearly About the Compute Pivot

What are the implications of this change for leaders, organisations and individuals in terms of the opportunities and risks. Let's look at a few models that clear up the situation.

7.2 Framework one: The compute value stack

It is useful to visualize the compute economy as a stack with each layer providing opportunities and risks.

The foundation input is energy, which is at the bottom. On top of that are the physical infrastructures, the data centers. On top of that are hardware, mostly chips. Next is the model layer, which consists of the AI systems themselves that are trained on the hardware. The application layer is at the top, where AI provides value to end users.

The key strategy is to choose which layer to target, depending on the player's strengths. The Middle East has good cards at the energy and infrastructure levels. Weakness in hardware layer because of reliance on foreign chips. To secure enduring value, it needs to progress towards the model and application layers, where defensible benefits and greater returns are found. Constructing data centers is important but not enough. It's the software that runs on them that's the real prize.

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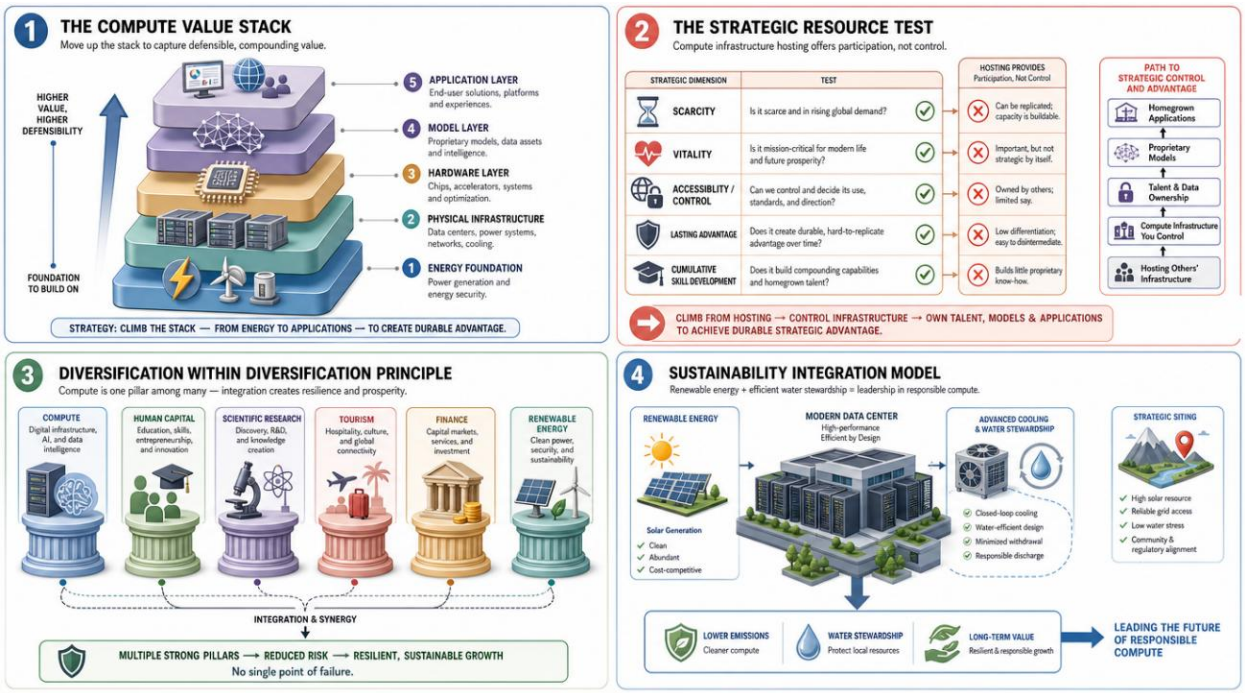

Fig -6: Thinking Clearly about the Compute Pivot

7.3 Framework two: The strategic resource test

Leaders must use a strategic resource test before they can consider compute as the new oil.

1. Is it a resource that is scarce.
2. Is it a resource that is vital.
3. Is it a resource that is accessible.

Is the resource under the control of the nation or is it hosted in the nation. Does the resource provide lasting advantage or just a short-term involvement. Does investing in the resource develop skills that have a cumulative effect over time. When applied truthfully, this test shows that compute infrastructure hosting offers participation, but not control, with chip dependence. In order to gain a durable advantage, it's necessary to climb up the stack towards homegrown talent, models, and applications. This framework helps to prevent the illusion of buildings being strategic strength.

7.4 Framework three: The diversification within diversification principle

The Gulf States are diversifying from oil. However, computing turns into a new single point of failure, a new point of bets. The smarter one would be to consider compute as one of the five pillars, along with human capital, scientific research, tourism, finance, and renewable energy. Compute should complement these other industries and not be the objective of a diversified economy. Don't replace oil with AI infrastructure that hasn't been proven to yield results.

7.5 Framework four: The sustainability integration model

Consideration of energy and water issues should be closely linked with the design of compute expansion, from the beginning. Understanding how to combine solar generation with data centers, investing in innovative cooling and siting facilities strategically can transform a sustainability challenge into a sustainability showcase. The Gulf has an opportunity to be a leader in how compute can look like when it is

responsible and renewable-powered, and this could prove to be a competitive and reputational advantage.

8. PRACTICAL APPLICATIONS

8.1 What This Means for Different Readers

Theories without hands-on experience are of little significance. These are some ways that various audiences can take action.

8.2 For policymakers and government leaders

First, be realistic about the capabilities and limitations of compute infrastructure. It will not directly resolve the unemployment problem, so combine it with parallel programs in education, entrepreneurship and labor intensive industries. Put a lot of emphasis on human capital, as the value of compute can only be realised through people who are able to build models and applications on top of it. Without a substantial talent pool, a data center is a worthless asset.

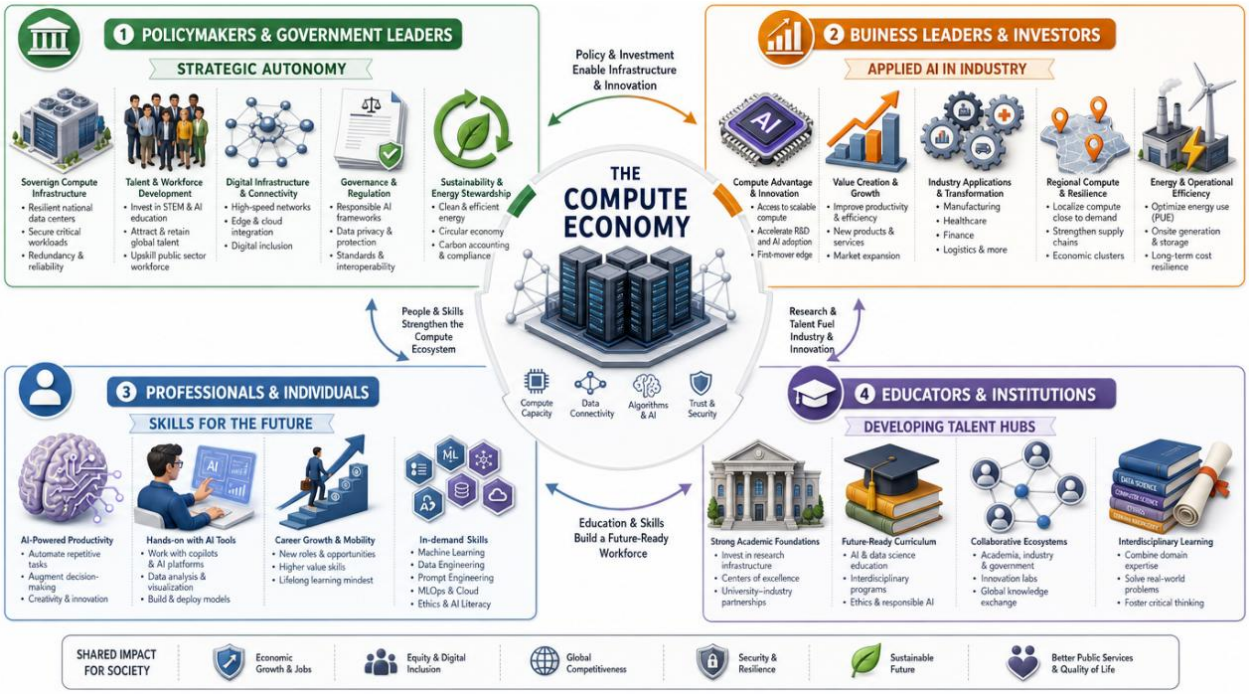

Fig -7: The Compute Economy

Work towards strategic autonomy in a realistic manner. While complete chip independence might be impossible, you can diversify your suppliers, research partnerships and build niche capabilities. Establish governance structures early, such as data protection, AI ethics and transparency, not only for the protection of citizens, but also to attract international clients, who need trust. Embed sustainability as a core part of the initial design instead of adding it as an afterthought.

8.3 For business leaders and investors

Understand that the compute economy affords opportunities beyond building data centers. The most lucrative and defensible value of AI comes from the application layer, where AI is applied to specific industry

problems. Think about where your organisations are in the value stack and where they might be able to shift.

In the case of investors, practice discipline. The compute boom has a bubble-like nature. Differentiate between infrastructure that is needed and infrastructure that is created on the assumption of demand. Seek out projects that have guaranteed energy benefits, have defined customers, and management that is moving up the value chain instead of just pouring concrete around servers. Regional compute infrastructure can help reduce the cost of AI adoption, which is a key metric for businesses in the Middle East to consider. Local compute translates to reduced latency, data residency compliance and Arabic language capabilities. These are all tangible benefits that are worth working on.

8.4 For professionals and individuals

The most profound meaning for individuals is in terms of skills. The rare and precious skills will be those that augment the machines and not compete with them, as compute becomes ubiquitous and AI becomes ubiquitous. Knowing how to use AI tools effectively, their capabilities, and other skills such as AI deployment, data governance, applied machine learning, etc. set you up well. The compute pivot for those in the Middle East and other parts of the world, indicates where the future career and opportunities will focus. This is a realistic and future-oriented step to take when planning your education and skill acquisition. While the traditional construction trades are still important, the young person who learns to make useful AI applications will find more opportunity than the one who learns only the traditional construction trades.

8.5 For educators and institutions

Universities and training bodies need to react to the compute pivot, and develop programs that are creating talent for the top layers of the value stack. This isn't just computer science, it's applied AI, ethics, data governance, and interdisciplinary skills that bridge AI to healthcare, energy, finance and government. Those institutions that act fast can become talent hubs, which can serve as the foundation for the entire compute economy in their region.

9. COMPARATIVE GLOBAL PERSPECTIVE

9.1 How the Middle East Measures Against the Giants

Compute alone is not the pursuit in the Middle East. It is playing in a field where there are three very strong players and knowing the lay of the land helps to understand the opportunities and ceiling that lie ahead.

The U.S. is the leader at almost every tier of the value chain. It creates the most cutting-edge chips, operates the best AI labs, and possesses the largest pool of AI research talent. Its weakness is energy and permitting, as grid constraints and slow approvals slow down the pace of new capacity coming online. This is exactly what the Gulf uses, as they have cheap and abundant power and quick execution.

The other picture is of China. It has powerful talent, enormous home data and aggressive state coordination, but is hampered by export restrictions that prevent it from getting access to the most advanced chips. China's answer is to go for domestic chip production, something the Gulf has never tried and in all likelihood can't because of the huge cost and know how that has been built up.

The European Union is on a different plane. It is pioneering in governance, including the AI Act, and has a focus on trust, privacy, and ethics. However, European infrastructure is smaller in scale and capital

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investment is less than in the rest of the world because of the fragmented decision making process among the member states.

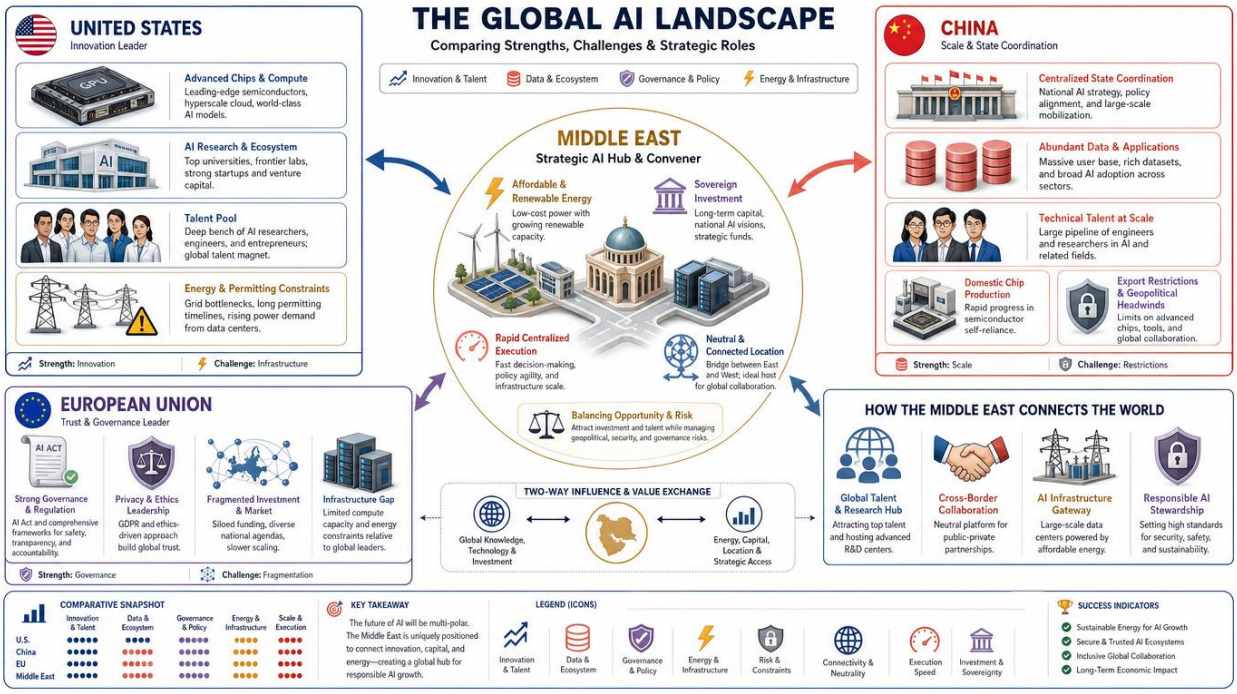

Fig -8: The Global AI Landscape

The Middle East is in a special position with respect to these three. It is not as innovative as the Americans, as big as the Chinese, or as well-regulated as the Europeans. What it does provide is the blend the others don't affordable energy that can be renewed, a forgiving sovereign investor, quick centralised execution and a location that is neutral to the competing camps. This transforms it from a frontier inventor to a strategic host and convener, providing a platform for the deployment of global technology at scale. The danger in this position is that of dependence and getting caught between the US and China. The opportunity is becoming vital infrastructure for both. The realistic goal of the Gulf, then, is to become the world's first choice for hosting AI, and gradually progress toward indigenous models and applications. It's better to acknowledge this truth than to seek a leadership that it's not ready for.

10. IMPLEMENTATION STRATEGIES

10.1 Turning Insight into Action

Knowing what to do does not equal doing it. Below are specific actions for those organizations and governments that want to take action.

Start with a clear understanding of where you are in the compute value stack. Look for your real strengths, be it energy, capital, location, talent or market access. Know your weaknesses, particularly those you can't change. Then break down your goal, step by step. Choose which layers you will own, partner for and just buy. A small country could have infrastructure and specialize in applications, and partner for chips and models. A big, rich country could try to do more vertical integration.

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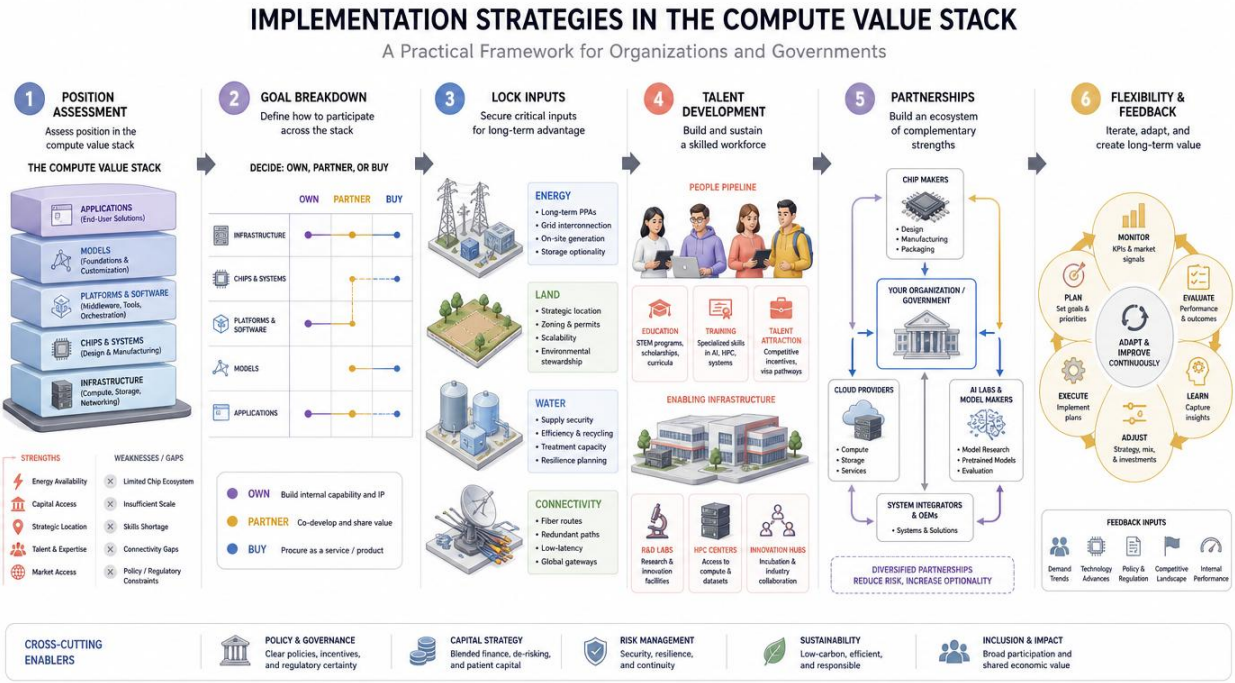

Fig -9: Implementation Strategies in the Compute Value Stack

Afterwards, lock your basic inputs. In the case of compute, it involves energy contracts, appropriate land, water solutions, and connectivity. These are the elements that can be directly mapped to compute advantages from physical-world advantages. Develop talent in tandem with, rather than after, infrastructure. Too many initiatives construct impressive facilities, but fail to have the skilled workforce to exploit them. The development of talents takes years, so it must start at an early stage and be ongoing.

Create effective partnerships. No country or company can do it all, in a world where chip dependence and fast-changing technology are prevalent. Collaborations with chip makers, cloud providers and AI labs are crucial. The trick is to work together without losing long-term independence. Lastly, incorporate feedback and flexibility into the plan. Because of the unknown direction of AI, don't make any definite assumptions that could turn out to be incorrect. Invest with a degree of flexibility, be mindful of demand and make adjustments accordingly. It's not about a one-time, cast-in-place bet on concrete that envelops servers.

11. FUTURE PROSPECTS WHERE THIS IS HEADING

So what lies ahead for the concrete to compute transition especially in the Middle East.

11.1 The maturing of sovereign AI

Sovereign AI is likely to get more advanced. Countries will transition from merely hosting infrastructure to building their own models to be capable, especially in local languages and for local cultures and regulations. Gulf states will probably be a major space in which to make real leadership strides in Arabic-language AI, as global companies have less reason to optimize for it.

11.2 Energy and compute convergence

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Energy and compute will become even more closely connected. With the growth of renewables, areas with low cost solar power, such as the Gulf, could become the preferred destination for energy-intensive AI workloads. Compute may end up wherever clean energy is the cheapest, changing the landscape of digital economy. The Middle East is setting itself up for this future.

11.3 The efficiency wildcard

One of the big unknowns is the rate of efficiency gains. But if AI models are vastly more efficient that is, if they need less compute to do the same things the massive build out in place today may be too much. On the other hand, if demand continues to outpace efficiency, the investments of today may seem paltry in the future. This is a wildcard in which flexibility is key.

11.4 Geopolitical realignment around compute

Compute will play a growing role in geopolitics. The access to chips and control of data centers, as well as leadership in AI, will become as integral to international relations as energy and military power have been. The Middle East's potential as a technology battleground among various powers may also increase, but with the danger of its being caught between giants. The U.S.-China technology competition will continue to be a tricky and pivotal issue.

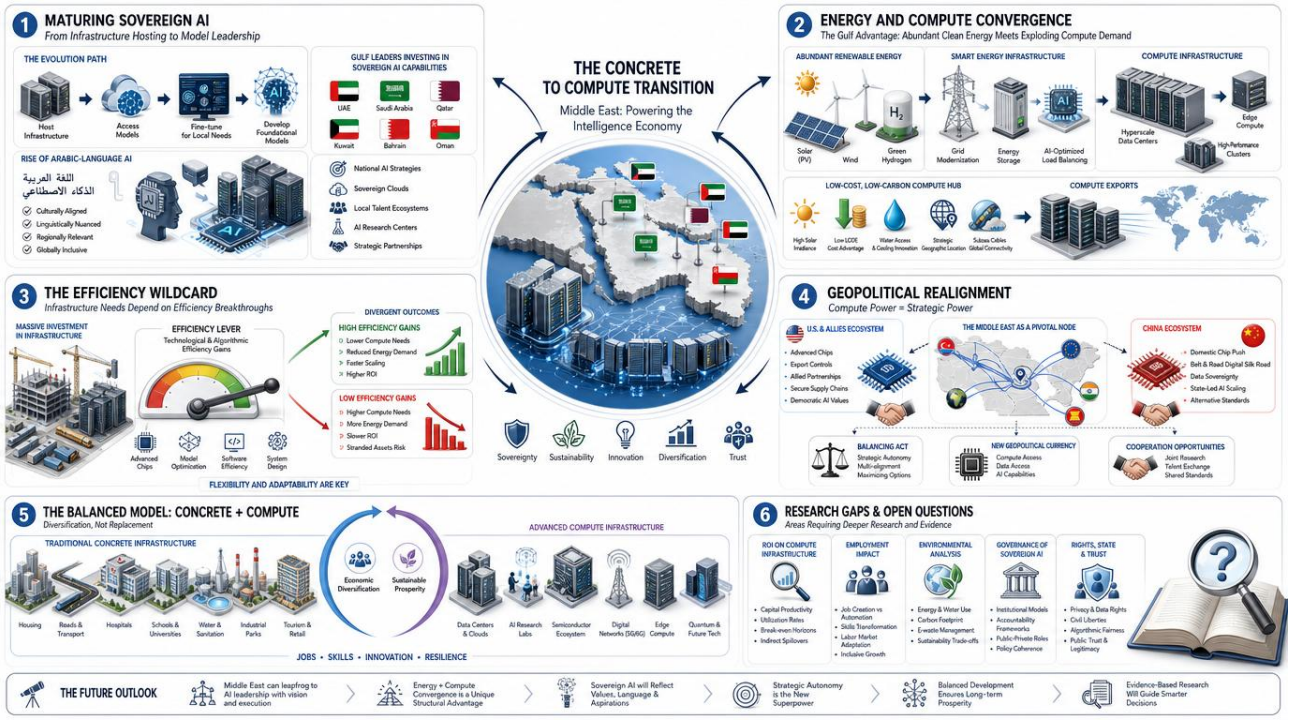

Fig -10: The Concrete to Compute Transition

11.5 A more balanced model

The most probable positive scenario is one in which compute is one powerful pillar in the context of true diversification of economies, not a magic bullet for everything else. The most intelligent countries will not rely on compute but leverage it to strengthen other capabilities. Concrete will not go away. There's still a need for homes, roads and hospitals. However, the incremental dollar of strategic investment will more and more go to compute, and the smartest leaders will balance both.

11.6 Research gaps worth exploring

Some key issues have not been addressed and warrant further study. There are no thorough, independent analyses of the real ROI of national compute infrastructure versus other ways of investing capital. There is a need for improved long-term employment analysis of a compute-centric economy, particularly for youth. There's a need for a more in-depth honest analysis of the environmental impacts of large-scale compute in water-stressed areas. But the governance arrangements for sovereign AI, where the state, individual rights and international trust are all at stake, are still very young and need much more study from scholars and policymakers. These gaps are areas for true academic and policy contribution.

12. CONCLUSION

One of the biggest changes in economic thought in generations is the change from concrete to compute. For 100 years, countries have been using physical dimensions to gauge their advancement how many roads, towers and dams they can construct. The new measure Artificial Intelligence brings is its ability to process information at scale and governments are reacting accordingly, viewing compute as a strategic resource, like oil or electricity. With cheap energy, plenty of capital and a desperate need to transition away from hydrocarbons, the Middle East has become an unexpected and forceful champion of this transition. But it is not an easy road to follow. There are real issues to contend with weak job growth, heavy reliance on foreign chips, environmental stress and the potential for real speculative overbuilding. The crux is that data centers need to be built but are not enough. The real upside is to be able to move up the value chain to talent, models and applications, and to maintain compute as one of the cornerstones of a well-diversified economy. The countries and organizations that construct intelligently, generate power sustainably, govern responsibly, and invest in people will have an over-proportional voice. It's not just about the concrete surrounding the servers, it's about the intelligence within and that's where the future lies.

REFERENCES

[1] En, W. (2026). From structured compute to governed infrastructure. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.6136867
[2] Gilbert, C. G. (2005). Beyond resource allocation: How definition and impetus interact to shape strategic outcomes. From Resource Allocation to Strategy. https://doi.org/10.1093/oso/9780199277445.003.0011
[3] Mseer, I., & Sabri, M. O. (2025). The role of AI and big data for economic diversification. Studies in Systems, Decision and Control. https://doi.org/10.1007/978-3-031-87550-2_98
[4] Pasupuleti, M. K. (2025). Carbon-negative AI scheduling: Turning national compute into a climate asset. International Journal of Academic and Industrial Research Innovations(IJAIRI), 05(10), 15-30. https://doi.org/10.62311/nesx/rp-30102025-15-30
[5] Roy, D., & Srivastava, R. (2021). The impact of AI on world economy. Artificial Intelligence and Global Society. https://doi.org/10.1201/9781003006602-3
[6] Waters, S. (2022). Observations and entanglements: The early stages of the analogue-digital shift in music's infrastructure and organisation. Observations and Entanglements: The Early Stages of the Analogue-Digital Shift in Music's Infrastructure and Organisation. https://doi.org/10.5920/analoguedigitalshift
[7] (2003). Government data centers. https://doi.org/10.17226/10664
[8] (2010). Saudi arabia—malaysia bilateral investment treaty. The Law of Investment Treaties, 451-458. https://doi.org/10.1093/law/9780199206056.005.0006
[9] Agrawal, V. (2025). Moore's law & the AI compute bottleneck. International Scientific Journal of Engineering and Management, 04(01), 1-8. https://doi.org/10.55041/isjem02229

[10] Author, N. G. (1979). Doe/solar export opportunities workshop. https://doi.org/10.2172/5780807
[11] Bi, Y., Yan, F., Guo, S., Chen, Z., Ma, X., & Zhang, J. (2024). Data center traffic characteristics in the era of cloud application. 2024 IEEE Opto-Electronics and Communications Conference (OECC). https://doi.org/10.1109/oecc54135.2024.10975715
[12] Blazev, A. S. (2021). Global energy balance. Global Energy Market Trends. https://doi.org/10.1201/9781003152019-2
[13] Cronin, I. (2026). Introduction to generative AI systems. Building and Training Generative AI Models. https://doi.org/10.1007/979-8-8688-2332-9_1
[14] Fox, R., & Hao, W. (2017). Cloud computing. Internet Infrastructure. https://doi.org/10.1201/9781315175577-11
[15] Gaillard, N. (2012). Definition, typology, and refinement of sovereign ratings. A Century of Sovereign Ratings. https://doi.org/10.1007/978-1-4614-0523-8_3
[16] Holtz-Eakin, D., & Schwartz, A. E. (1995). Spatial productivity spillovers from public infrastructure: Evidence from state highways. https://doi.org/10.3386/w5004
[17] Kobzan, S., & Pomortseva, O. (2023). Real estate market: Trends and developments. SpringerBriefs in Geography. https://doi.org/10.1007/978-3-031-31248-9_2
[18] Likosky, M. B. (2018). Infrastructure for commerce. The Silicon Empire. https://doi.org/10.4324/9781351145282-6
[19] Porkaew, P., & Supnithi, T. (2010). Missing phrase recovering by combining forward and backward phrase translation tables. Lecture Notes in Computer Science. https://doi.org/10.1007/978-3-642-14640-4_10
[20] Reddy Alavalapati, K. (2025). Ai-driven cloud resource allocation for AI model training. International Journal of Science and Research (IJSR), 625-630. https://doi.org/10.21275/sr25527075206
[21] Rostow, W. W. (1978). Growth and structural change. The World Economy. https://doi.org/10.1007/978-1-349-04172-5_6
[22] Singh, R., & Gill, S. S. (2023). Next generation edge computing: A roadmap to net zero emissions. Journal of Economy and Technology, 1, 208-221. https://doi.org/10.1016/j.ject.2023.12.001
[23] You, J., Wu, J., Jin, X., & Chowdhury, M. (2021). Ship compute or ship data? why not both?. Symposium on Networked Systems Design and Implementation, 633-651.
[24] (1909). The advantages reinforced concrete for railway construction. ACI Journal Proceedings, 5(1). https://doi.org/10.14359/16329
[25] (2014). Productivity trends in the natural resource industries: A cross-cutting analysis. Productivity in Natural Resource Industries. https://doi.org/10.4324/9781315060774-10
[26] (2020). Economic development in the gulf cooperation council countries. Springer Singapore. https://doi.org/10.1007/978-981-15-6058-3
[27] (2022). Appendix d chronology of WWII and post-wwii events and activities. Beyond the Betrayal. https://doi.org/10.5876/9781646421848.c030
[28] Bashkin, V. N., & Trubitsina, O. P. (2022). Geopolitical risks for oil and gas industry in the arctic zone of the russian federation. Environmental Pollution. https://doi.org/10.1007/978-3-030-95910-4_2
[29] Farra, F. (2026). What is the future for AI economics?. Governing The Future. https://doi.org/10.1108/978-1-80686-763-920261026
[30] Held, C. C. (2018). Manufacturing and transportation: Middle east heartland. Middle East Patterns. https://doi.org/10.4324/9780429493454-12
[31] Langer, C. (2025). Chinese archaeology in the middle east: Heritage, transnational connectivity, and the belt and road initiative. Middle East Critique, 1-19. https://doi.org/10.1080/19436149.2025.2505271
[32] Li, X., & Abangbila, L. (2024). Resistance to medical artificial intelligence: Integrating AI awareness, AI risks, and displacement of responsibility. Journal of Infrastructure Policy and Development, 8(11), 7923. https://doi.org/10.24294/jipd.v8i11.7923
[33] Martinez, A., Akins, A., Hood, C., Johnson, K., & Mann, K. (2026). Water usage in data center infrastructures: A multidimensional framework ethical analysis. 2026 Systems and Information Engineering Design Symposium (SIEDS). https://doi.org/10.1109/sieds69358.2026.11540139
[34] Mogielnicki, R. (2025). Setting the sovereign wealth fund scene in the middle east and asia. International Political Economy Series. https://doi.org/10.1007/978-3-031-85260-2_1
[35] Nurunnabi, M. (2020). Knowledge-based economy in saudi arabia and vision 2030. Research, Innovation and Entrepreneurship in Saudi Arabia. https://doi.org/10.4324/9781351040020-4

[36] Ojanperä, T. (2024). Productivity leap – internet to the power of 2. AI Revolution. https://doi.org/10.1201/9788770046312-5
[37] Putrevu, J., Mertzanis, C., & Kampouris, I. (2023). Sustainable investment conditions, venture capital, and new firm creation in the middle east and north africa. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4597754
[38] George, D. (2025b). Cyber resilience in an AI-Driven world: a Strategic framework. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.18002783
[39] George, D. (2026a). The Agent Economy: How autonomous AI systems are restructuring knowledge work, capital allocation, and the architecture of enterprise value. Open MIND. https://doi.org/10.5281/zenodo.18555677
[40] Sood, S. (2025). Ai-first tiny companies: Case studies, design logic, and emerging governance risks. THE INTERNATIONAL JOURNAL OF MANAGEMENT SCIENCE AND BUSINESS ADMINISTRATION, 7. https://doi.org/10.18775/ijmsba.1849-5664-5419.2014.121.1001
[41] George, D., Dr.T.Baskar, & Dr.M.M.Karthikeyan. (2026). India's M.A.N.A.V vision: Redefining global AI governance through Human-Centric principles and strategic sovereignty. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.18730381
[42] Styszynski, M. (2018). Deradicalisation initiatives in saudi arabia. International Case Studies of Terrorist Rehabilitation. https://doi.org/10.4324/9780429468445-4
[43] George, D. (2026c). Architectural Convergence in Security Operations: a technical framework for AI-Augmented Threat Detection, Automated response, and Organizational cyber resilience. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.19986642
[44] Tollon, F. (2026). Avoiding responsibility monoculture: Cultivating a thriving ecosystem of responsibility for AI. ACM AI Letters. https://doi.org/10.1145/3820053
[45] Wells, P. E. (2025). New entrants, new exits, same industry?. How the Global Automotive Industry Stole our Green Mobility Future. https://doi.org/10.4337/9781035329588.00015
[46] George, D. (2026b). Self-Driving Networks: AI automation for Enterprise IT. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.19335608
[47] Wogan, D., Murphy, F., & Pierru, A. (2018). The costs and gains of coordinating electricity generation in the gulf cooperation council utilizing the interconnector. https://doi.org/10.30573/ks--2018-dp36
[48] George, D. (2023b). The potential of generative AI to reform graduate education. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.10421475
[49] Yamada, H., Sakamoto, T., Horie, H., & Kono, K. (2013). Request dispatching for cheap energy prices in cloud data centers. 2013 IEEE 2nd International Conference on Cloud Networking (CloudNet). https://doi.org/10.1109/cloudnet.2013.6710580
[50] George, D. (2025a). The AI Job Revolution - How emerging roles are reshaping the future of work and creating new career pathways. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17211185
[51] (2009). In US, green energy job creation outstripping traditional sectors, says report. Physics Today, 2009(06). https://doi.org/10.1063/pt.5.023461
[52] George, D. (2024). Finance 4.0: The transformation of financial services in the Digital Age. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.11666694
[53] (2010). Saudi arabia—malaysia bilateral investment treaty. The Law of Investment Treaties, 451-458. https://doi.org/10.1093/law/9780199206056.005.0006
[54] (2018). Mapping the digital middle east. Digital Middle East. https://doi.org/10.1093/oso/9780190859329.003.0001
[55] (2018). The form of the gulf political economies. The Economy of the Gulf States, 109-142. https://doi.org/10.1017/9781788211857.007
[56] (2023). Falcon. The Arden Encyclopedia of Shakespeare's Language, 239-239. https://doi.org/10.5040/9781350601529.5430
[57] (2023). State-led reform in the UAE. The UAE after the Arab Spring. https://doi.org/10.5040/9780755648061.ch-3
[58] George, A., S.Sagayarajan, AlMatroudi, Y., & George, A. (2023). IF/THEN Democracy: Exploring the world of Decentralized Autonomous Organizations (DAOs). Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.8051072
[59] (2025). Digital infrastructure, investment, and ICT services export: Evidence from the organization of turkic states. Journal of International Economics Research, 1(1). https://doi.org/10.54216/jier.010101

[60] George, D. (2023a). Preparing Students for an AI-Driven world: Rethinking curriculum and pedagogy in the age of Artificial Intelligence. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.10245675
[61] AI-ML and IoT-Enabled FOG-Assisted image processing Framework employing CNN's. (2026, April 10). IEEE Conference Publication | IEEE Xplore. https://ieeexplore.ieee.org/document/11541680/
[62] George, A., & George, A. (2020). INDUSTRIAL REVOLUTION 5.0: THE TRANSFORMATION OF THE MODERN MANUFACTURING PROCESS TO ENABLE MAN AND MACHINE TO WORK HAND IN HAND. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.6548092
[63] Gambling, S. (2013, August 23). How to cite my own submitted but not yet published work? Academia Stack Exchange. https://academia.stackexchange.com/questions/12101/how-to-cite-my-own-submitted-but-not-yet-published-work
[64] George, D., Dr.T.Baskar, & Siranchuk, D. (2025). Examining university obsolescence claims in the conversational AI era. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17715188
[65] Kollar, J., & Stokols, A. (2025). Geopolitical ecologies of cloud capitalism: Territorial restructuring and the making of national computing power in the U.S. and China. Environment and Planning a Economy and Space, 58(1), 38–58. https://doi.org/10.1177/0308518x251369704
[66] George, D., Shaji, T., & Siranchuk, D. (2025). AI personalized Learning The hidden cost to children's critical thinking. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17963271
[67] Ooijevaar, M. (2026, May 27). Global AI Governance Law and Policy: United Arab Emirates. IAPP.org. https://iapp.org/resources/article/global-ai-governance-uae
[68] George, D., George, A., Dr.T.Baskar, & Dr.V.Sujatha. (2023). The rise of hyperautomation: a new frontier for business process automation. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.10403036
[69] Szlezak, W., Peisch, A., Lawler, K., & Ho-Walker, J. (2026, May 15). Beyond the Bubble: Why AI Infrastructure Will Compound Long after the Hype. KKR. https://www.kkr.com/insights/ai-infrastructure
[70] George, D., George, A., & Dr.T.Baskar. (2023). Neuro-Gaming: How video games shape the brain's cognitive landscape. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.10427117
[71] The Collective Intelligence. (n.d.). Collective Intelligence — AI strategy & implementation. Collective Intelligence. https://collectiveintelligence.co/research/compute-arms-race
[72] Wikipedia contributors. (2026, May 1). Economy of the Middle East. Wikipedia. https://en.wikipedia.org/wiki/Economy_of_the_Middle_East
[73] George, D., & George, A. (2025). The AI Job Revolution - How emerging roles are reshaping the future of work and creating new career pathways. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.17009242
[74] (2025). Ai's power requirements under exponential growth: Extrapolating AI data center power demand and assessing its potential impact on U.S. competitiveness. https://doi.org/10.7249/rra3572-1
[75] (2026). Modeling mechanical cooling equipment for data centers across U.S. climate zones to optimize power and water usage. 2026 ASHRAE Winter Conference. https://doi.org/10.63044/w26nav185
[76] Bailey, C., Mankin, D., Kelliher, C., & Garavan, T. (2018). Strategic management and strategic human resource management. Strategic Human Resource Management. https://doi.org/10.1093/hebz/9780198705406.003.0003
[77] Berti, E. (2021). Enerscape: Compute energy landscapes. CRAN: Contributed Packages. https://doi.org/10.32614/cran.package.enerscape
[78] Blum, M. (2018). Measurement and metrics. An Economist's Guide to Economic History. https://doi.org/10.1007/978-3-319-96568-0_44
[79] Chapman, A. (2021). U.S. data centers rely on water from stressed basins. Eos, 102. https://doi.org/10.1029/2021eo160719
[80] Comfort, W., & Phatty-Jobe, A. (2024). The role of AI innovation clusters in fostering youth employment in africa: Opportunities, challenges, and implications. https://doi.org/10.64329/ncwn6125
[81] ElSayary, A. (2026). AI policy in the gulf and middle east. Advances in Computational Intelligence and Robotics. https://doi.org/10.4018/979-8-3373-4908-4.ch006

[82] Eshraghi, A., Sadeghi-Mobarakeh, A., Reihani, E., Motalleb, M., & Mousavi, S. A. (2018). Power consumption cost optimization using solar photovoltaic systems for data centers. 2018 North American Power Symposium (NAPS). https://doi.org/10.1109/naps.2018.8600613

[83] Hornik, K., Meyer, D., Schwendinger, F., & Theussl, S. (2011). ROI: R optimization infrastructure. CRAN: Contributed Packages. https://doi.org/10.32614/cran.package.roi

[84] James, L. (2023). Managing the new competition with china. Toward a U.S.-Japan Technology Alliance, 103-121. https://doi.org/10.5040/9798216417347.ch-6

[85] Manimegalai, V., Rukkumani, V., Gayathri, A., Pandiyan, P., & Mohanapriya, V. (2023). An overview of global renewable energy resources. Renewable Energy and AI for Sustainable Development. https://doi.org/10.1201/9781003369554-2

[86] Miller, S. (2022). AI and criminal justice. Ethics in the AI, Technology, and Information Age, 207-216. https://doi.org/10.5040/9798881836429_ch16

[87] Prat, A. (1996). Shared knowledge vs diversified knowledge in teams. Journal of the Japanese and International Economies, 10(2), 181-195. https://doi.org/10.1006/jjie.1996.0010

[88] Stratmann, J. (2025). From requirements to tests how sovereign generative AI accelerates product development. ELIV 2025. https://doi.org/10.51202/9783181024553-431

[89] (2023). AI and geopolitics: How might AI affect the rise and fall of nations?. https://doi.org/10.7249/pea3034-1

[90] Acuto, M., Seijas, A., McArthur, J., & Robin, E. (2021). Night-time governance trajectories: The importance of scale and politics. Managing Cities at Night. https://doi.org/10.1332/policypress/9781529218275.003.0005

[91] Aziz, M. I. A., & Abdullah, D. (2014). Malaysia: Becoming an education hub to serve national development. International Education Hubs. https://doi.org/10.1007/978-94-007-7025-6_7

[92] Bento, V. (2022). Strategic autonomy. Strategic Autonomy and Economic Power. https://doi.org/10.4324/9781003248392-7

[93] Cameron, K. (2021). Responsible leadership as virtuous leadership. Responsible Leadership. https://doi.org/10.4324/b22741-9

[94] Connell, D. (2000). The importance of self-reliance: Ngos and democracy-building in eritrea. Middle East Report, 28. https://doi.org/10.2307/1520192

[95] Dolins, S. B. (2006). Using the balanced scorecard process to compute the value of software applications. Proceedings of the 28th international conference on Software engineering. https://doi.org/10.1145/1134285.1134441

[96] Domenech, T., & Borrion, A. (2022). Embedding circular economy principles into urban regeneration and waste management: Framework and metrics. Sustainability, 14(3), 1293. https://doi.org/10.3390/su14031293

[97] En, W. (2026). From structured compute to governed infrastructure. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.6136867

[98] Gazieva, L. (2019). Human capital and its importance in the economy. SCIENTIFIC DEVELOPMENT TRENDS AND EDUCATION. https://doi.org/10.18411/lj-11-2019-80

[99] Gilbert, C. G. (2005). Beyond resource allocation: How definition and impetus interact to shape strategic outcomes. From Resource Allocation to Strategy. https://doi.org/10.1093/oso/9780199277445.003.0011

[100] Gowing, M. (1974). Nuclear power: Feasibility studies. Independence and Deterrence. https://doi.org/10.1007/978-1-349-15529-3_7

[101] Gulabani, S. (2017). Hands-on elastic compute cloud. Practical Amazon EC2, SQS, Kinesis, and S3. https://doi.org/10.1007/978-1-4842-2841-8_2

[102] Hamza, I. R. (2017). Japanese efforts to build smart power in the gulf. Strategies of Knowledge Transfer for Economic Diversification in the Arab States of the Gulf, 82-91. https://doi.org/10.1017/9783959940153.007

[103] Mamrutha, H. M., Khobra, R., Krishnappa, G., Wadhwa, Z., Tiwari, R., Singh, G., & Pratap Singh, G. (2023). Importance of integrating physiological breeding to augment crop breeding. Translating Physiological Tools to Augment Crop Breeding. https://doi.org/10.1007/978-981-19-7498-4_1

[104] Moud, H. I., Kibert, C. J., Flood, I., Hakim, H., & Shojaei, A. (2018). Greening data centers: Beyond LEED version 4. Construction Research Congress 2018. https://doi.org/10.1061/9780784481301.073

[105] Pfeiler, T. M., & Egloff, B. (2018). Personality and meat consumption: The importance of differentiating between type of meat. Appetite, 130, 11-19. https://doi.org/10.1016/j.appet.2018.07.007

[106]Pittaluga, G. B., Reghezza, A., & Seghezza, E. (2020). Reconsidering the modernization hypothesis: The role of diversified production and interest-group competition. European Journal of Political Economy, 65, 101929. https://doi.org/10.1016/j.ejpoleco.2020.101929
[107]Price, K. F. (1991). Strategic human resource issues: Perceptions of the human resource planning society corporate sponsors. Bottom Line Results from Strategic Human Resource Planning. https://doi.org/10.1007/978-1-4757-9539-4_2
[108]Russo, E., Ott, D. L., & Moeller, M. (2022). Is there a place for neurodiversity in the talent pool?. Diversity in Action. https://doi.org/10.1108/978-1-80117-226-420221014
[109]Shoaib, A. (2022). Multiple benefits of green infrastructure. The Palgrave Encyclopedia of Urban and Regional Futures. https://doi.org/10.1007/978-3-030-87745-3_28
[110]Simbolon, E., & Aisyah, L. (2022). PALM OIL BIODIESEL: CHALLENGES, RISKS AND OPPORTUNITIES FOR REDUCING AND REPLACING THE NON-RENEWABLE FOSSIL FUEL DEPENDANCY - a REVIEW. Scientific Contributions Oil and Gas, 36(1), 15-29. https://doi.org/10.29017/scog.36.1.645
[111]Theberge, L., & Kernaleguen, A. (1979). Importance of cosmetics related to aspects of the self. Perceptual and Motor Skills, 48(3), 827-830. https://doi.org/10.2466/pms.1979.48.3.827
[112]Thiel, K. A. (2004). Biomanufacturing, from bust to boom...to bubble?. Nature Biotechnology, 22(11), 1365-1372. https://doi.org/10.1038/nbt1104-1365
[113]Tikhonova, A. (2018). The estimation of the importance of universities performance assessment for stakeholders. Economy of Region, 14(2), 536-546. https://doi.org/10.17059/2018-2-16
[114]Weinstein, A. (2018). Customers want exceptional value now!. Superior Customer Value. https://doi.org/10.4324/9781351214346-1
[115]Unknown. (2000). Sanger taps homegrown talent. Science, 288(5469), 1149-1149. https://doi.org/10.1126/science.288.5469.1149a
[116](2015). Front matter. TMS Middle East - Mediterranean Materials Congress on Energy and Infrastructure Systems (MEMA 2015). https://doi.org/10.1002/9781119090427.fmatter
[117](2017). Local benefits, local choices. Broken Benefits, 236-247. https://doi.org/10.46692/9781447333272.022
[118](2018). Introduction. Computational Context. https://doi.org/10.1201/9780429453151-2
[119](2025). The cannabis industry pivot. Cannabis Careers, 53-64. https://doi.org/10.5040/9798881843069.ch-004
[120]А.А., К. (2018). СУПЕРКОМПЬЮТЕРЫ - ГОНКА ВЫЧИСЛИТЕЛЬНЫХ ТЕХНОЛОГИЙ. Цифровая экономика. https://doi.org/10.34706/de-2018-03-06