



# Prioritizing Data Center Locations:

Strategies and Best Practices



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# Introduction

A data center is a physical location that stores computing machines and their related hardware equipment. It contains the computing infrastructure that IT systems require, such as servers, data storage drives, and network equipment. These have become the backbone of modern business operations, essential for storing, processing, and distributing vast data. The demand for data centers is escalating as the digital landscape evolves, driven by the increasing reliance on cloud computing, AI, and data analytics. This surge is not merely a trend but a fundamental shift in how businesses operate, underscoring the critical role these facilities play in enabling seamless access to applications and services across various sectors.

The strategic prioritization of data center locations is vital for organizations aiming to optimize their IT infrastructure. Key factors such as latency, regulatory compliance, cost efficiency, and environmental sustainability influence site selection. As companies navigate rapid technological advancements and heightened consumer expectations, understanding how to position data centers becomes crucial for maintaining a competitive edge and ensuring business continuity.

In response to the burgeoning demand for data centers, stakeholders across the value chain, including technology providers, hyperscalers, and real estate developers, are mobilizing resources to address potential capacity deficits. This competitive landscape drives innovation and evolution within the data center sector as organizations strive to meet the growing needs of a digital-first world while focusing on sustainable practices to minimize their environmental impact.

# Data centers are becoming increasingly vital in the digital era, with leading players expanding their presence to address the capacity deficits

The demand for data centers is soaring as companies adapt to the growing need for cloud services and advanced technologies, driving significant investments in infrastructure to support scalable and secure digital operations. The rise of AI and GenAI is fueling an unprecedented demand for data centers, as businesses require robust infrastructure to support high-performance computing, massive data processing, and seamless deployment of advanced AI models.

## Growing Significance of Data Centers



Global data center demand is expected to reach **171–219 GW** by 2030, driven by an annual growth rate of **19–22%** from 2023



**33%** is the projected average annual growth rate for AI-ready data center demand from 2024 to 2030, with **70%** of total demand dedicated to advanced AI workloads

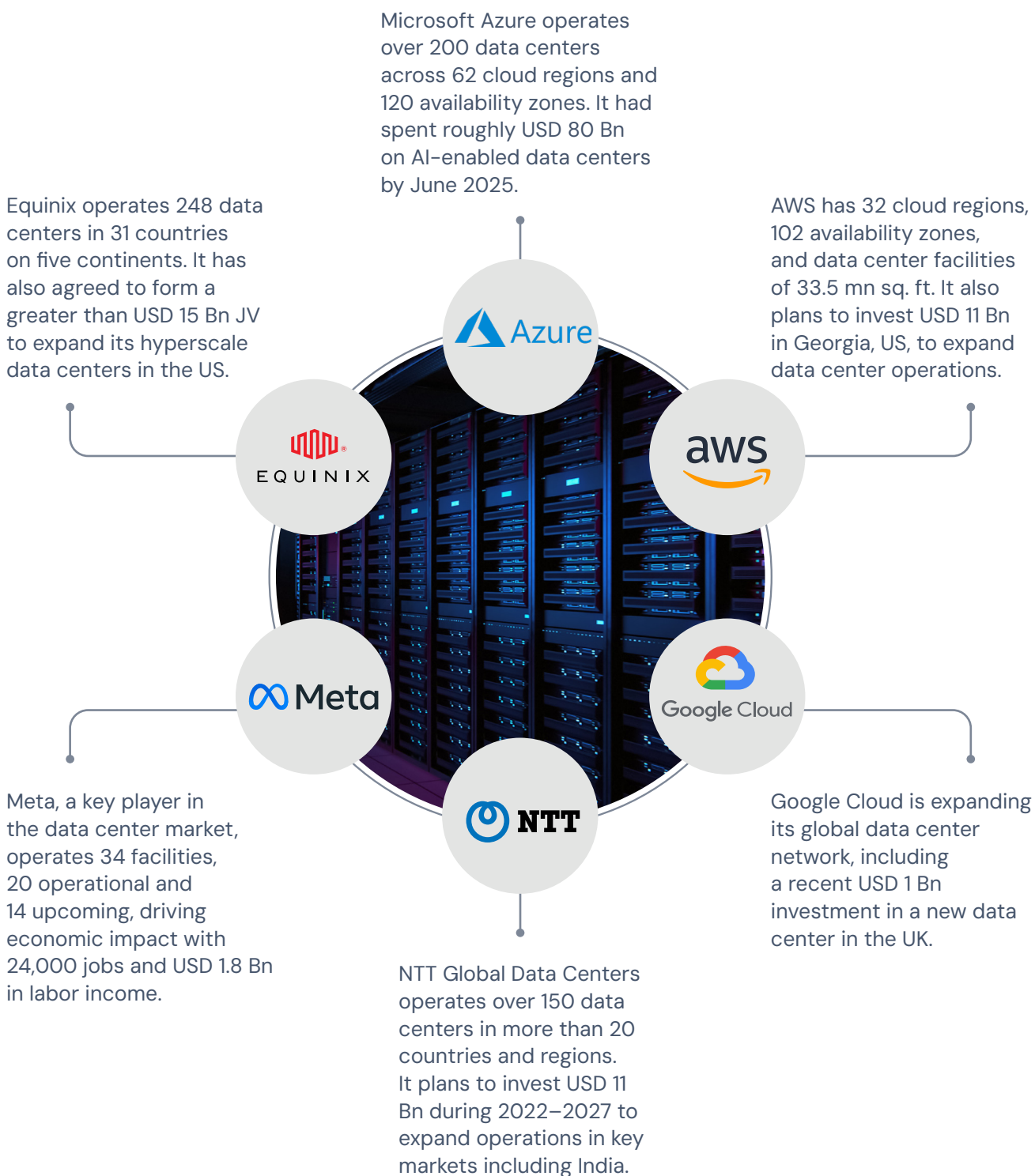


**GenAI** is the fastest growing AI use case, likely to account for **~40%** of total data center demand by 2030



# Broadening Data Center Footprints

Leading players are heavily investing in new data center facilities, reflecting a strategic move to address rising data demands, improve operational efficiency, and support the expanding ecosystem of smart technologies.

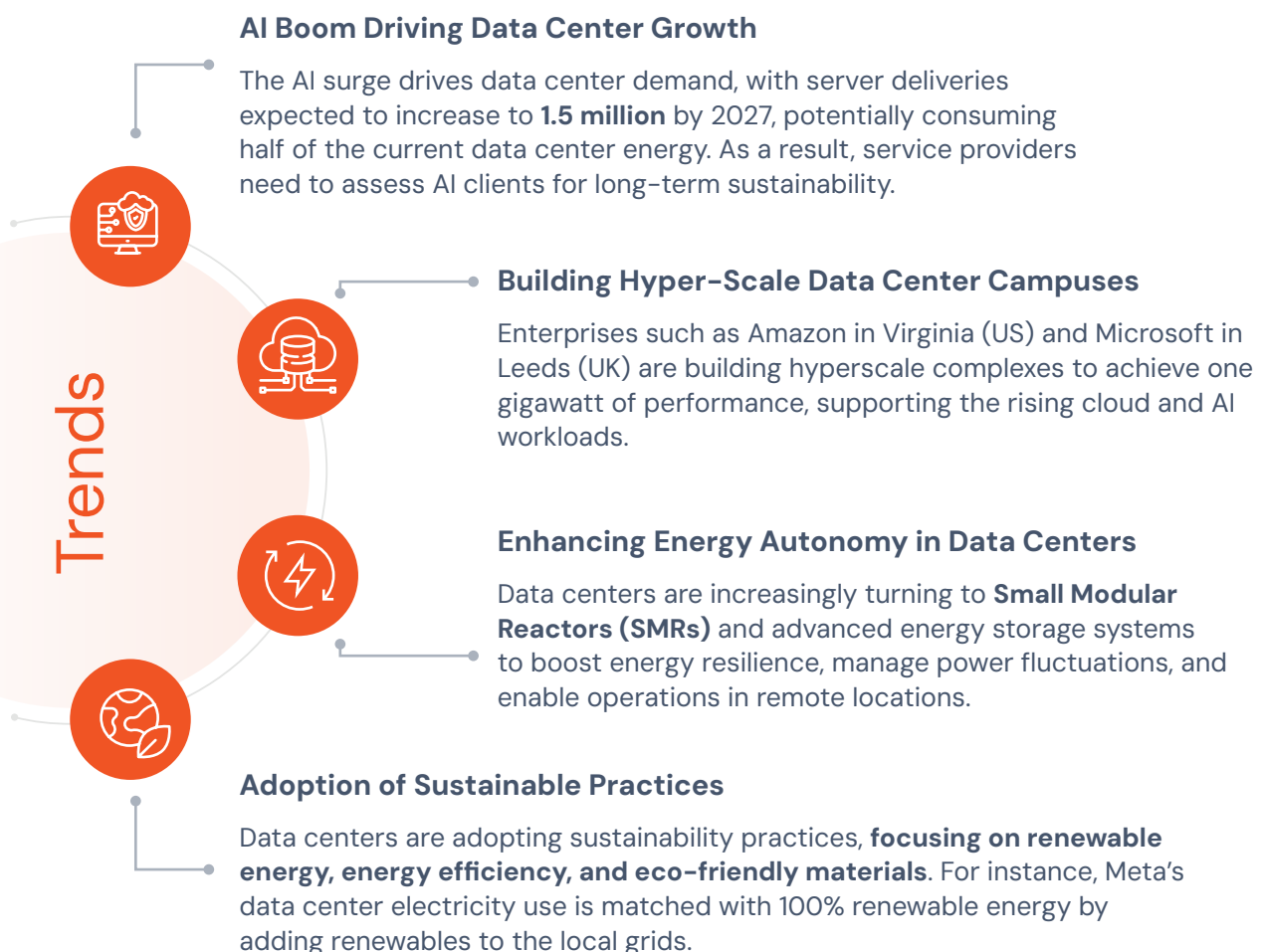




# AI's resource-intensive nature is fueling the demand for advanced data centers

The growing significance of data centers in enabling digital transformation has driven a rapid evolution in their design and operations. Industry leaders are adopting innovative approaches that enhance scalability, efficiency, and environmental responsibility to meet the increasing demands of modern technologies.

## Key Trends in Data Center Adoption



Additionally, vertical data centers are gaining traction with their multi-story designs that optimize space efficiency and provide higher server density than traditional models. These centers offer a scalable and energy-efficient solution by addressing urban space constraints and rising energy demands.



# Choosing the right data center location ensures efficiency, performance, and compliance

Evolving trends such as AI integration, edge computing, and green initiatives necessitate strategic decision-making in data center locations to ensure optimal performance, cost efficiency, and sustainability. The right location minimizes latency, reduces operational costs, enhances security, and aligns with environmental and business goals. It can help in addressing current demands while ensuring scalability and adaptability.

## Key Factors for Choosing Data Center Locations



### Environmental Risk Factors

**Climate and Natural Disasters:** Reducing exposure to natural disasters can prevent operational disruptions and lower costs, improving efficiency and saving energy

**Temperature:** Extreme temperatures directly influence cooling requirements, with colder climates offering cost-saving opportunities in cooling

**Proximity to Water Resources:** This is essential for cooling systems in some data centers, though water-scarce regions may require innovative cooling solutions



### Infrastructure Factors

**Power Availability and Cost:** Access to stable, low-cost electricity, including renewable energy sources, ensures sustainability and operational efficiency

**Telecommunications Connectivity:** Proximity to fiber-optic networks and major internet exchange points ensures low latency and high-speed data transmission

**Transportation and Logistics:** Accessibility to major roads, airports, and ports for equipment delivery and maintenance



### Economic and Regulatory Factors

**Real Estate Costs and Availability:** Affordable land costs and availability of suitable space are important for initial setup and future scalability, allowing for cost-effective construction and expansion

**Labor Availability:** Skilled labor is available at competitive rates

**Tax and Regulatory Environment:** Favorable tax policies and unambiguous regulations create a business-friendly climate, lowering costs and simplifying legal compliance for data center operations



### Customer-Centric Factors

**Proximity to Customers:** Reduces latency for services, especially critical for cloud services and real-time applications

**Market Demand and Growth:** High-growth regions with increasing demand for data services attract data center investments



# Best practices are being adopted to address the complexities of modern data center development across different locations to drive efficiency and resilience in data center operations

Leading players strategically select locations by evaluating key factors such as energy infrastructure, proximity to users, workforce availability, and suitable land, tailoring data center designs accordingly. This approach enables efficient operations and optimal service delivery while addressing the complexities of modern data center development. Companies ensure alignment with local and global standards by adopting practices such as embracing sustainable operational models, adhering to evolving regulatory frameworks, and fostering strategic collaborations.

## Best Practices from Various Locations



Google Cloud

### Seawater Cooling in Hamina, Finland



Google's Hamina data center in Finland utilizes seawater for cooling by repurposing old mill infrastructure. The cooling system circulates seawater through modules and returns it at a similar temperature, reducing the environmental impact.

### Wind Power Strategy in Oklahoma, US



Google's Pryor data center in Oklahoma uses 140 MW of wind power from the Grand River Dam Authority, resulting in nearly 90% carbon-free energy. This practice aligns with environmental goals and energy cost optimization.

### Rerouting Tasks for Grid Reliability in Taiwan



Google data center in Taiwan uses its carbon-intelligent platform to reroute non-urgent tasks to other locations during peak summer hours, ensuring grid reliability while maintaining service performance. This approach balances operational efficiency with sustainability.





### **Underwater Data Center Innovation in Scotland**



Microsoft's two-year Natick project in Scotland submerged 855 servers near the coast to explore the advantages of underwater data centers. The initiative showed fewer malfunctions than traditional land servers, minimizing corrosion and hardware failures while offering benefits such as rapid deployment, long-term connectivity, and enhanced efficiency and sustainability.

### **Using Renewable Energy and Adiabatic Cooling in Arizona, US**



Microsoft's data center in Arizona partners with Longroad Energy for a 150 MW solar plant and uses Renewable Energy Certificates (RECs) to offset energy use. The facility also incorporates adiabatic cooling, utilizing outside air for cooling purposes when temperatures are below 85°F, optimizing energy efficiency.



### **Partnering with Local Bodies in Oregon, US**



AWS has partnered with local organizations such as the Umatilla Electric Cooperative (UEC) to source renewable energy for its data center operations. This collaboration includes a sustainable water recycling initiative, where 95% of the cooling water is repurposed for agricultural use, demonstrating the benefit of working closely with local communities to support eco-friendly practices.



EQUINIX

### **Focus on Sustainability in Singapore**



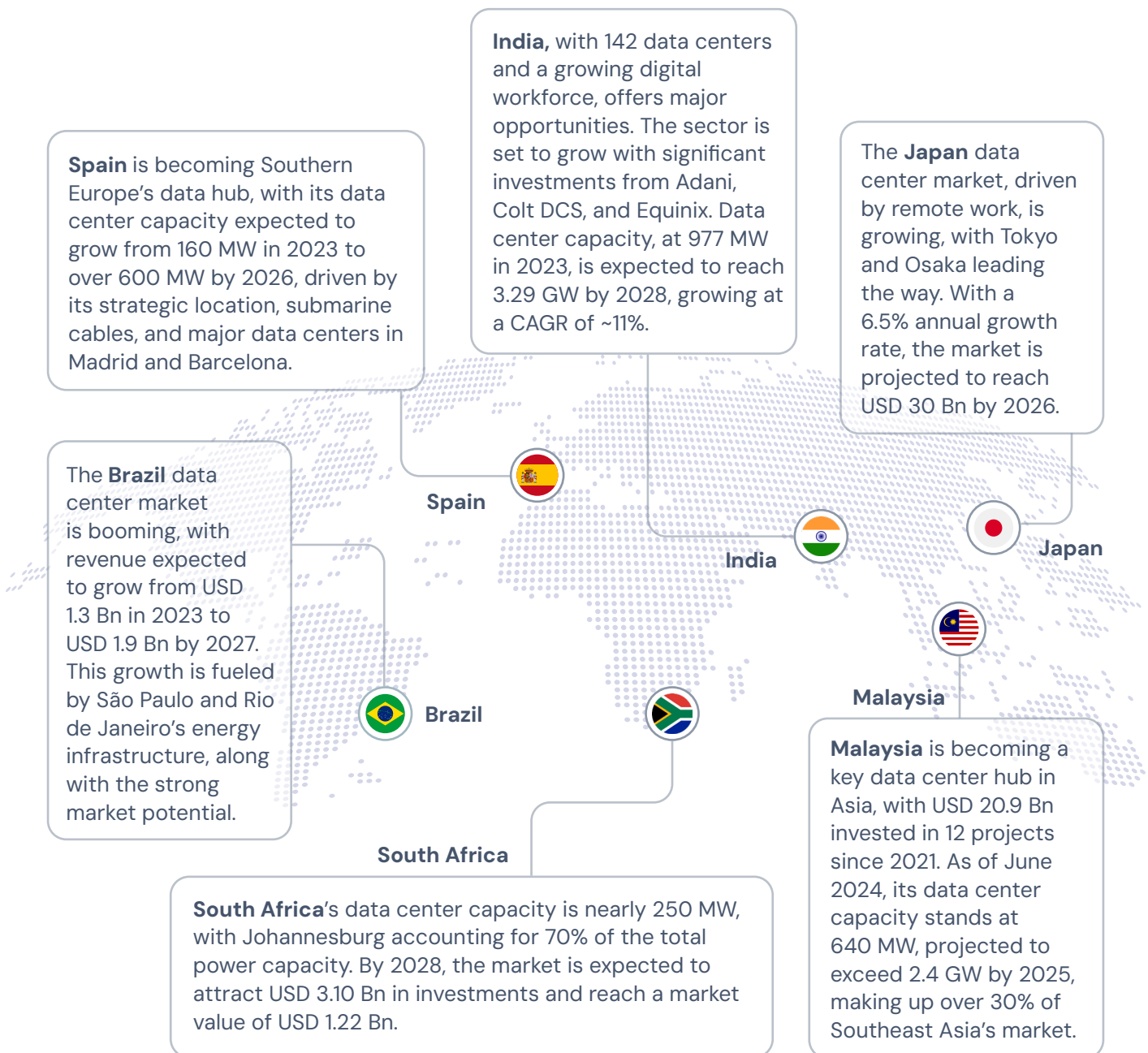
Equinix has adopted a comprehensive sustainability strategy to address the challenges posed by Singapore's land availability constraints and wind conditions for renewable power generation. The strategy focuses on low-carbon energy alternatives and innovation, with the purchase of renewable energy credits supporting clean energy generation. In collaboration with the National University of Singapore, Equinix is exploring energy-efficient, sustainable data center solutions to reduce its environmental impact.

Leading organizations worldwide are embracing best practices, while new emerging destinations are gaining prominence due to their strategic advantages and compliance requirements with the respective data protection laws.



# New destinations are becoming key data center hubs, fueled by rising demand for digital infrastructure and strategic factors

Mature markets such as the US and Germany provide stability and steady demand while emerging markets exhibit rapid growth fueled by digital transformation and IT investments. Increasing cloud adoption, e-commerce expansion, and smart technologies drive data center demand. Additionally, regulatory compliance, data sovereignty, and the need for localized infrastructure further accelerate data center development.



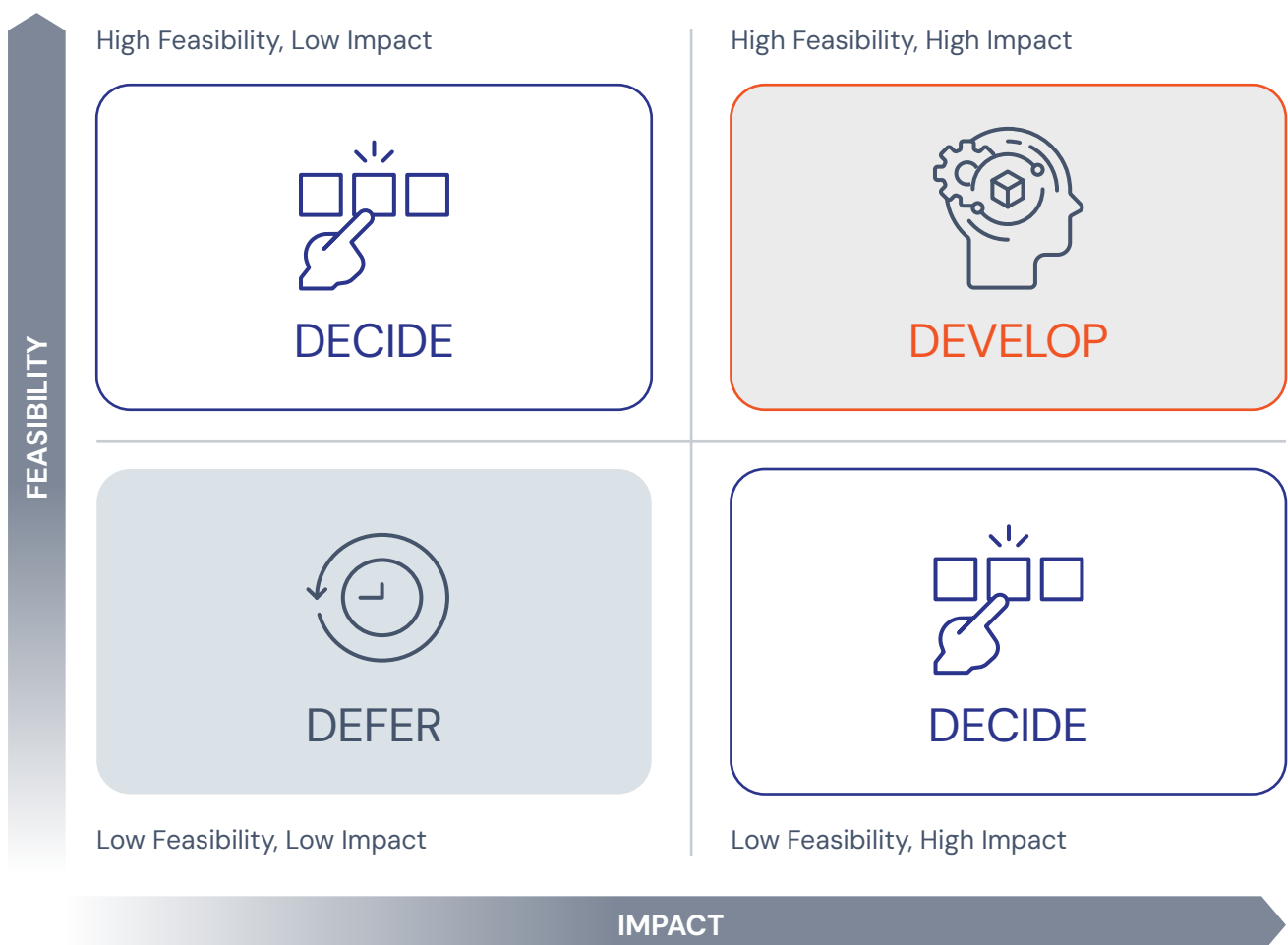




# Data center locations should be prioritized based on impact and feasibility

As the establishment of data centers increases across various locations, it becomes essential to prioritize and evaluate the potential impact and feasibility before selecting a site. Early assessment of these factors allows organizations to ensure the success of their data center projects, optimize efficiency, and reduce long-term operational risks. Impact refers to the potential benefits a particular location can offer for the data center's performance, growth, and alignment with business objectives. Feasibility focuses on the practicality and costs of setting up and maintaining the data centers at that location.

## 3D Framework: Prioritization Based on Feasibility and Impact

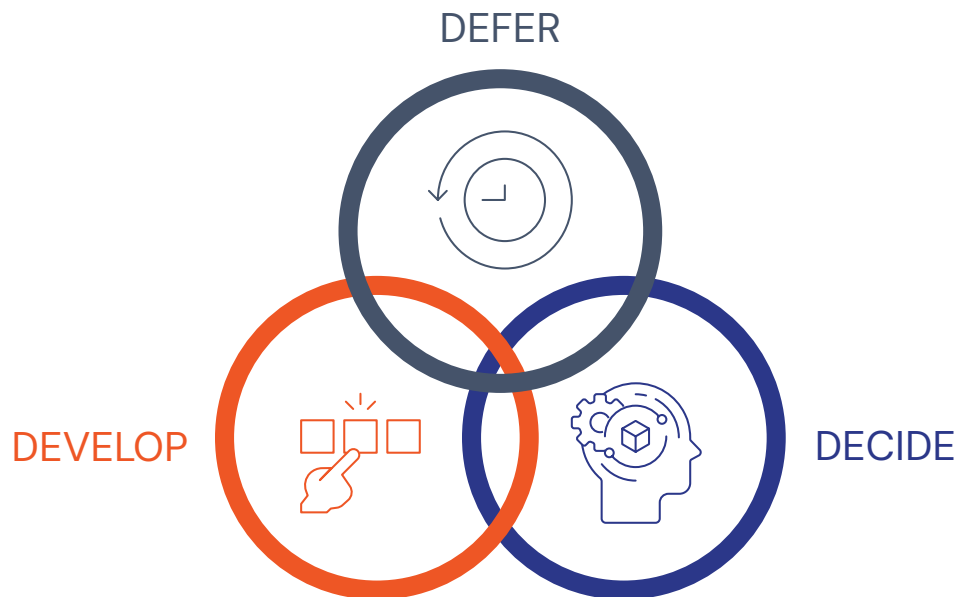


## Locations with fewer business benefits and significant challenges

Examples: Regions from Sub-Saharan Africa, parts of the Middle East and Central Asia

Impact: These regions face ongoing political instability and underdeveloped infrastructure, limiting the ability to establish long-term sustainable data centers with reliable operations.

Feasibility: Power supply issues and inadequate network connectivity increase the complexity and cost of development.



### Ideal locations with great business advantages and operational feasibility

Example: Northern Virginia, the US

Impact: Handle significant global internet traffic with high demand from government and enterprises, offering central connectivity and low-latency access

Feasibility: Competitive energy prices, strong infrastructure, skilled workforce, ample land for expansion, renewable energy, and minimal natural disaster risk.

### Locations with potential but practical challenges or limited business benefits

Example: South Africa

Impact: High demand for data centers from large companies and enterprises, with power reliability challenges such as load-shedding in South Africa

Feasibility: Land limitations and energy challenges in regions such as South Africa may drive costs, but favorable tax incentives and renewable energy potential present viable expansion opportunities.



A man with a beard and glasses, wearing a brown long-sleeved shirt, is kneeling in a server room. He is focused on a bundle of yellow fiber optic cables, which he is holding and organizing. The room is filled with tall server racks that have perforated metal doors. The lighting is dim, with a strong greenish-blue glow emanating from the server equipment, creating a high-tech atmosphere. The man is positioned on the right side of the frame, leaning into the server racks.

# Conclusion

The location of a data center is a critical success factor in meeting the growing demands driven by AI, cloud computing, and digital transformation. Selecting sites with stable, cost-effective energy, preferably renewable, ensures sustainability and operational efficiency. Proximity to robust fiber optic networks and internet hubs minimizes latency and supports high-speed connectivity, essential for real-time data processing.

Geographic and climate stability further reduce risks from natural disasters and optimizes energy efficiency through lower cooling costs. Strategic site selection maximizes value by mitigating risks and enhancing performance. While only a few locations meet all ideal criteria, adopting best practices helps organizations leverage local strengths to thrive in diverse environments.

For enterprises, incorporating location analysis in their data center strategies is essential. Organizations can future-proof their investments, ensure compliance with evolving data privacy regulations, and effectively address the demands of the digital era by evaluating economic incentives, regulatory landscapes, and workforce availability.

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