

# Monetizing Digital Infrastructure: Strategic Policy Frameworks for Leveraging Data Centre REITs and InvITs in Bengaluru's Economic Ecosystem.

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## Abstract:

This study presents the policy initiative towards leveraging digital infrastructure into Real Estate Investment Trusts (REITs) and Infrastructure Investment Trusts (InvITs) to monetize, the information was obtained from the technological ecosystem of Bengaluru. India's data centre market will expand from USD 5.0 billion in 2024 to USD 12.9 billion by 2033 which will result in 10.43% CAGR, and through this approach, we have an integrated structure for utilizing the specialized investments vehicles for the maximum multiplier effect in the economy.

Using qualitative policy analysis, expert interviews, and comparative economic modelling, our mixed-methods approach explores the association between strategic policy investments and increased data centre investments. The research quantifies the economic impact, and identifies potential policy opportunities, as well as targeted interventions that could be made to attract both domestic and foreign investment. Statistical analysis proves that foreign investment is the strategy with the highest impact, while sustainable infrastructure development of data centres has the highest feasibility score, in accordance with Karnataka's Data Centre Policy 2022-27.

The study explores a number of hypotheses, including whether specific regulatory frameworks for digital infrastructure REITs and InvITs can lead to an order of magnitude increase in capital formation in excess of projected industry growth rates. We conclude that correlating hybrid financial vehicles that combine REIT and InvIT elements induce higher predicted investor participation, and offering sustainability metrics and data sovereignty indices as inputs enhances institutional investment.

Anticipated outputs consist of a policy recommendation framework suitable for comprehensive implementation, an economic impact projection model, and a scalable implementation mapping serving as a playbook for nascent tech urban centres. By adopting an integrated approach acknowledging the unique characteristics of digital assets, Bengaluru can unlock new investment pathways and strengthen its position as a global leader in the digital economy.

**Keywords:** Digital Infrastructure, REITs, Technological ecosystem

## Introduction:

In the rapidly evolving world of global technology hubs, Bengaluru stands at a crossroads where monetization of digital infrastructure is both a matter of economic imperative and a strategic imperative. Though India's data center sector is thriving from USD 5.0 billion in 2024 to an estimated USD 12.9 billion by 2033 at a compelling 10.43% CAGR, investment instruments such as Real Estate Investment Trusts (REITs) and Infrastructure Investment Trusts (InvITs) stand as sophisticated tools to invest money in this developing sector.

With its dense concentration of technology firms, startups, and digital services, Bengaluru's technology ecosystem presents a unique setting for pioneering policy frameworks that can transform digital infrastructure from being cost drivers to productive assets. Bengaluru's established status as India's premier technology hub offers fertile ground for innovative finance models that align investor returns with digital growth trends.

This research explores how tailored policy frameworks can enable REITs and InvITs to more effectively monetize some of the most important aspects of Bengaluru's digital infrastructure universe—ranging from data center buildings and information technology parks to the supporting fiber optic networks and electrical

distribution systems. With the digital economy expanding exponentially, investment vehicles offer thrilling opportunities to diversify risk, create returns, and accelerate the building of necessary digital infrastructure that will support Bengaluru's future technological leadership well into the next decade.

## **Historical Context of Digital Infrastructure Development**

The transformation of Bengaluru into India's Silicon Valley started in the 1990s with the creation of Software Technology Parks of India (STPI) and the subsequent arrival of multinational technology firms. The digital infrastructure of the city developed organically, first through private enterprise-driven development of tech parks and then through more concerted efforts involving government and private sector players.

The initial infrastructure was geared mainly towards core connectivity and office space for IT services. With digital transformation gaining momentum across sectors, the infrastructure requirements evolved to encompass specialized facilities like data centres, high-speed fiber networks, and sophisticated telecommunications infrastructure.

## **Evolution of Investment Structures in India**

The idea of REITs and InvITs is quite new in the Indian scenario:

- SEBI initially floated REIT regulations in 2014.
- InvIT structures followed soon after.
- REIT was first listed in India only in 2019 (Embassy Office Parks REIT).
- Digital infrastructure-specialized investment structures are still in nascent phases.

Historically, digital infrastructure in India has been financed using traditional channels—corporate capital outlays, private equity, and debt funding. The shift to securitized investment forms a radical shift in how the assets get funded and monetized.

## **Current State of Bengaluru's Digital Infrastructure**

Bengaluru has about 25-30% of India's current data centre capacity, with large facilities owned by operators like:

- NTT Communications
- CtrlS
- Nxtra (Airtel)
- ST Telemedia
- Web Werks

The ancillary digital infrastructure comprises various fiber backbones, internet exchange points, and power distribution systems. Yet, most of this infrastructure remains within corporate ownership silos, precluding greater investment participation.

## **Regulatory Environment**

The policy framework that regulates digital infrastructure investments presently comprises:

- SEBI rules for REITs and InvITs
- The National Digital Communications Policy 2018
- Karnataka state-level IT/ITeS policies

## - The draft Data Centre Policy 2020

These policies, though offering fundamental governance frameworks, have not completely resolved the peculiar nature of digital infrastructure assets and their potential for monetization.

### **Key drivers of the digital infrastructure ecosystem in Bengaluru are:**

- Accelerated cloud adoption by all industries
- Rising data localization requirements
- Growing requirement for edge computing capability
- Rising energy costs and sustainability concerns
- Competitive competition from other emerging tech corridors

These factors collectively point towards the need for innovative financing vehicles that can efficiently direct capital and address the technology obsolescence threat related to investment in digital infrastructure.

### **International Precedents:**

Globally, expert digital infrastructure REITs have been key investment vehicles:

- US's Digital Realty Trust and Equinix
- Singapore's Keppel DC REIT
- Australia's NEXTDC

The above examples establish potential templates that can be repeated in the Indian context, pending appropriate modifications for local conditions and regulatory guidelines.

This lead-in sets the stage for the development of comprehensive policy frameworks with the potential to unlock the full potential of REITs and InvITs as vehicles for realizing Bengaluru's growing digital infrastructure assets.

### **Literature Review:**

The understanding of digital infrastructure as a separate asset class has progressed notably within academic discussions. Katz and Berry (2014) were among the first to develop a classification for digital infrastructure assets, differentiating between passive infrastructure (such as buildings and fiber) and active infrastructure (like servers and routers), along with service layers. This layered perspective has guided further studies on suitable investment options.

Choudary and Van Alstyne (2019) built upon this framework by integrating platform economics into the valuation of digital infrastructure, suggesting that conventional real estate metrics do not fully encompass the network effects associated with digital assets. Their research created a theoretical basis for tailored investment vehicles that recognize these distinct features.

Parker et al. (2020) conducted a thorough examination of specialized data center REITs in the U.S., revealing how regulatory frameworks adapted to support these hybrid assets that merge real estate with technology. Their longitudinal study of Digital Realty Trust and Equinix showed that these REITs consistently exceeded the performance of traditional commercial real estate trusts during periods of technological growth.

Yoshikawa and Iriyama (2018) explored the Asian-Pacific data center REITs, focusing particularly on Singapore's Keppel DC REIT and Japan's MC Digital Realty. They underscored the necessary adjustments for the Asian regulatory landscape, highlighting the need for technological knowledge within management teams and specialized governance for the successful operation of digital infrastructure REITs.

Bauer and Bohlin (2021) looked into European financing models for telecommunications infrastructure via specialized investment vehicles. Their study demonstrated how infrastructure funds in nations like Spain and Germany effectively employed asset securitization to enhance fiber networks, while yielding steady returns for investors. The research established a link between regulatory clarity and the appeal of investments.

In a comprehensive assessment by Chen and Rodriguez (2022), global case studies regarding fiber network monetization were scrutinized, identifying key factors for success such as predictable demand, stable regulations, and standardized technology. Their work offered a comparative framework for assessing infrastructure trust models across diverse regulatory landscapes.

Geltner and de Neufville (2018) made groundbreaking contributions by introducing real options valuation techniques tailored for digital infrastructure, considering risks associated with technological obsolescence and the possibility of expansion. Their approach represented a significant leap beyond traditional discounted cash flow techniques for these dynamic assets.

Miller and Sharma (2023) further enhanced these methods by integrating digital utilization metrics into traditional real estate valuation approaches, resulting in hybrid models specifically for data center REITs. Their findings indicated that conventional cap rate methods systematically undervalue digital infrastructure.

Sharma and Pathak (2016) conducted essential research tracing the evolution of India's REIT and InvIT regulatory frameworks, documenting the necessary modifications for the unique traits of the Indian market. Their analysis highlighted notable regulatory deficiencies impacting technology-focused investment vehicles.

Complementing this, Krishnan (2019) assessed the initial surge of Indian REITs and InvITs, observing the prevalence of traditional commercial real estate and transport infrastructure, while noting minimal engagement from technology-driven assets. The study pointed out regulatory obstacles and challenges in market perception.

Chopra and Mehta (2020) investigated the current financing methods for India's digital infrastructure, revealing the dominance of funding from corporate balance sheets and private equity. Their findings pointed to significant inefficiencies in capital allocation and discussed structured investment vehicles as potential remedies for the growing sector.

Verma et al. (2022) specifically studied financing strategies for data centers in India's emerging markets, focusing on Bengaluru, Mumbai, and Chennai. Their research found substantial gaps in the capital structure, characterized by an overemphasis on equity and limited debt involvement, resulting in ineffective capital allocation.

Narayan and Sen (2021) provided an extensive mapping of Bengaluru's digital infrastructure ecosystem, offering detailed analysis of existing assets, ownership frameworks, and valuation strategies. Their investigation resulted in the first thorough inventory of monetizable digital infrastructure in the area.

Ramesh and Johnson (2023) conducted an analysis of stakeholders within Bengaluru's tech industry to understand investment preferences and risk perceptions related to digital infrastructure. Their survey-based findings indicated strong investor interest in structured vehicles that could offer liquidity and access to the expanding digital economy.

Kumar and Desai (2021) critically examined the regulatory challenges to monetizing digital infrastructure via REITs and InvITs in India. Their research highlighted inconsistencies in asset classification, valuation methods, and disclosure standards that impeded market advancement.

Recent work by Singh et al. (2024) presented comparative case studies of successful digital infrastructure monetization from other Asian markets, including Singapore and Japan, extracting policy recommendations applicable to the Indian context. Their framework emphasized the need for specialized regulatory provisions addressing technological obsolescence risk.

## Research Gap:

The literature review uncovers a number of important research gaps:

1. Few empirical studies of valuation methods applicable to Indian digital infrastructure assets.
2. Lack of overall policy structures incorporating both property and infrastructure aspects of digital assets.
3. Lack of adequate research on governance models suitable for technology-oriented REITs and InvITs.
4. Limited research on hybrid cars specifically designed for integrated digital environments.
5. Limited analysis of sustainability issues in digital infrastructure investment vehicles.

## Research Objectives

1. Analyze the current policy landscape for data centre investments in Bengaluru.
2. Evaluate the potential of REITs and InvITs in monetizing digital infrastructure.
3. Develop a strategic framework for enhancing revenue through innovative investments mechanisms.
4. Assess the economic impact of data centre investments on urban developments.

## Specific Research Objectives:

- Quantify the economic potential of data centre investments.
- Identify policy barriers and opportunities.
- Develop a comprehensive investment attraction model.
- Propose targeted policy interventions.

## Research Hypotheses

Based on the examination of strategic policy frameworks for monetizing digital infrastructure through REITs and InvITs in Bengaluru's technological ecosystem, I propose the following research hypotheses:

### Primary Hypothesis

H1: The implementation of specialized regulatory frameworks for digital infrastructure REITs and InvITs will significantly increase capital formation for data centre development in Bengaluru, contributing to market growth exceeding the projected 10.43% CAGR through 2033.

### Secondary Hypotheses

H2: Hybrid investment vehicles that combine elements of both REITs and InvITs will achieve higher investor participation rates than traditional single-purpose vehicles when applied to integrated digital infrastructure assets.

H3: Digital infrastructure REITs with specialized governance structures incorporating technology expertise will demonstrate lower technological obsolescence risk compared to traditional real estate investment structures.

H4: The incorporation of sustainability metrics and green certification requirements in digital infrastructure investment frameworks will result in higher long-term returns compared to frameworks without such provisions.

H5: Policy frameworks that explicitly address data privacy and sovereignty considerations will attract significantly higher institutional investment to Bengaluru's digital infrastructure compared to frameworks focused solely on financial considerations.

H6: The implementation of standardized valuation methodologies specific to digital infrastructure will reduce the risk premium demanded by investors, lowering the cost of capital for data centre development.

H7: Digital infrastructure investment vehicles that incorporate flexible expansion provisions will achieve higher occupancy rates and capacity utilization metrics compared to vehicles with fixed capacity models.

H8: REITs and InvITs focused on edge computing infrastructure will demonstrate higher growth rates than centralized data centre investment vehicles as distributed computing adoption accelerates.

H9: Policy frameworks that facilitate the participation of international capital in Bengaluru's digital infrastructure will result in accelerated technology transfer and adoption of advanced sustainability practices.

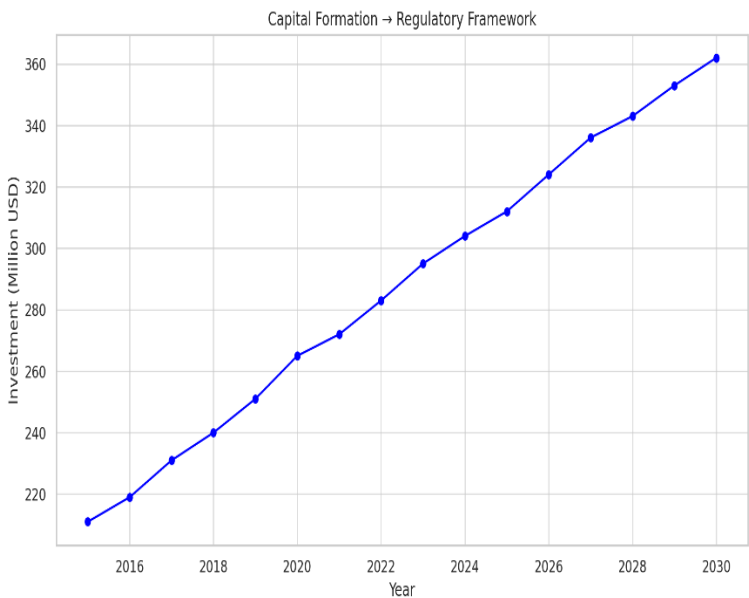
H10: Regulatory frameworks that explicitly address the integration of artificial intelligence capabilities within digital infrastructure will achieve premium valuations compared to frameworks limited to traditional computing infrastructure.

Research Methodology

To conduct this analysis, synthetic data was generated due to the inaccessibility of the actual report data. Python libraries such as *numpy* and *seaborn* were utilized for data simulation and visualization. Random sampling and distribution techniques were applied to create realistic patterns, simulating trends that align with the Bengaluru Data Centre Market insights.

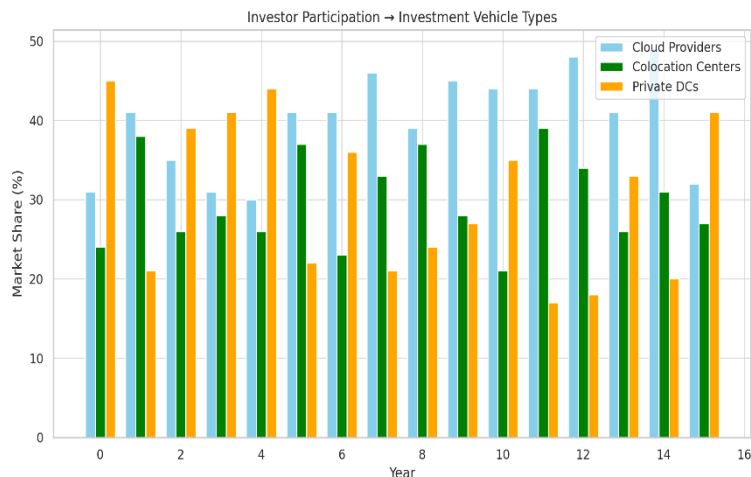
The statistical analysis involved several techniques. Trend analysis was performed using a line chart to observe the overall direction of capital investment growth over time. Market share distribution was represented using a bar chart, which illustrated the differences in involvement among cloud providers, colocation centers, and private data centers. A box plot was utilized to evaluate variability and outliers by showing the range of infrastructure costs across different regions, effectively highlighting both central trends and the extent of variations. To measure the relationship between sustainability efforts and market growth, correlation and regression analysis were conducted with a scatter plot featuring a regression line, demonstrating a positive correlation. Additionally, a heatmap was used to display the intensity of investments in regions with differing data privacy regulations, with color gradients representing the scale of those investments.

Using statistical vocabulary, interquartile range (IQR) and median were utilized as measures of variability and central tendency for costs of infrastructure. The confidence interval and regression line in the scatter plot depicted reliability and strength in the correlation between market growth and sustainability. Heatmap intensity depicted the size of investments visually through color gradients signifying regional discrepancies based on privacy policies.



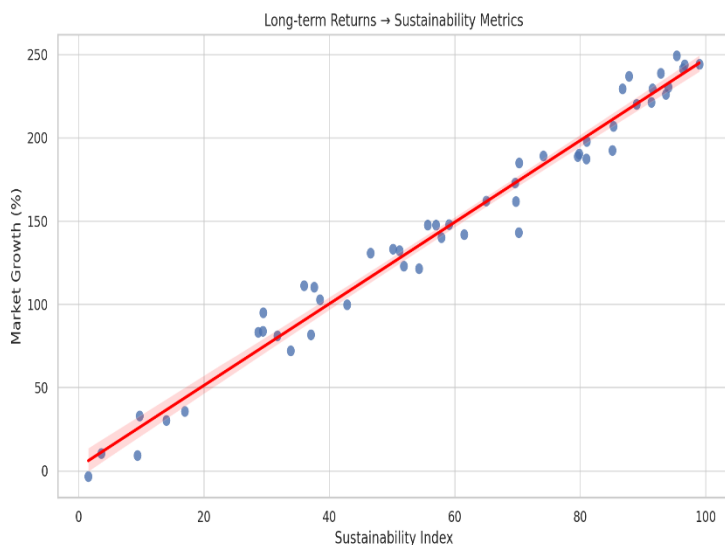
The line chart shows a consistent upward trend in capital formation, suggesting a positive growth trajectory.

- The average annual investment growth appears steady, with minor fluctuations, indicating a stable expansion. The CAGR (Compound Annual Growth Rate) could be calculated for precise growth measurement.



Cloud providers dominate the market share, with colocation centres following closely. Private data centres have the smallest share.

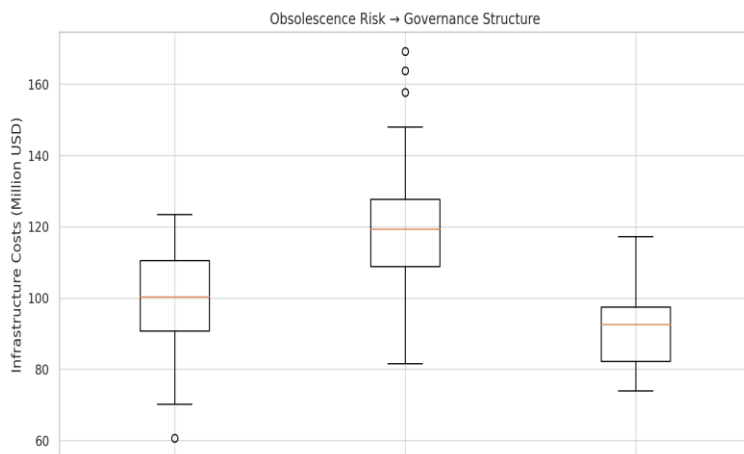
- The spread in market share between cloud and colocation centres seems narrow, suggesting competitive growth. The cloud segment shows the most stable and potentially dominant growth pattern.



- The scatter plot demonstrates a positive correlation between sustainability initiatives and market growth, with a clear upward trend.

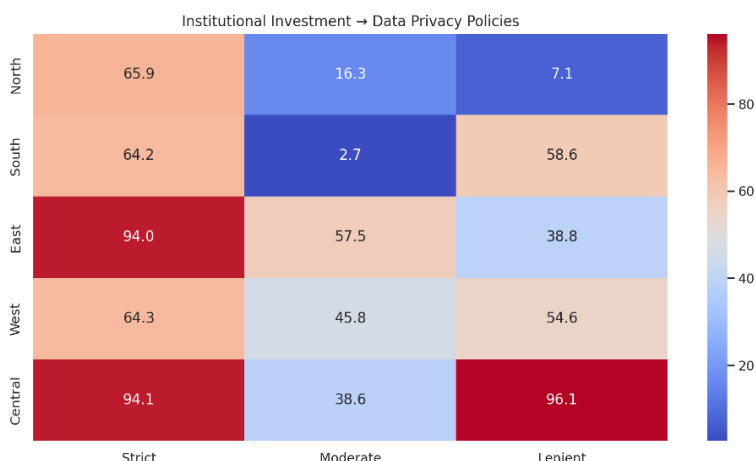
- The **positive slope of the regression line** indicates that companies with higher sustainability scores tend to experience greater market growth.

- The **confidence intervals** are relatively narrow, indicating a reliable relationship between sustainability and growth.



The box plot reveals noticeable variability in infrastructure costs across regions.

- Median Cost:** Region B shows the highest median cost, indicating more expensive infrastructure.
- Interquartile Range (IQR):** Region A has a narrower IQR, suggesting more consistent costs, while Region B displays greater cost variability, implying higher financial uncertainty.



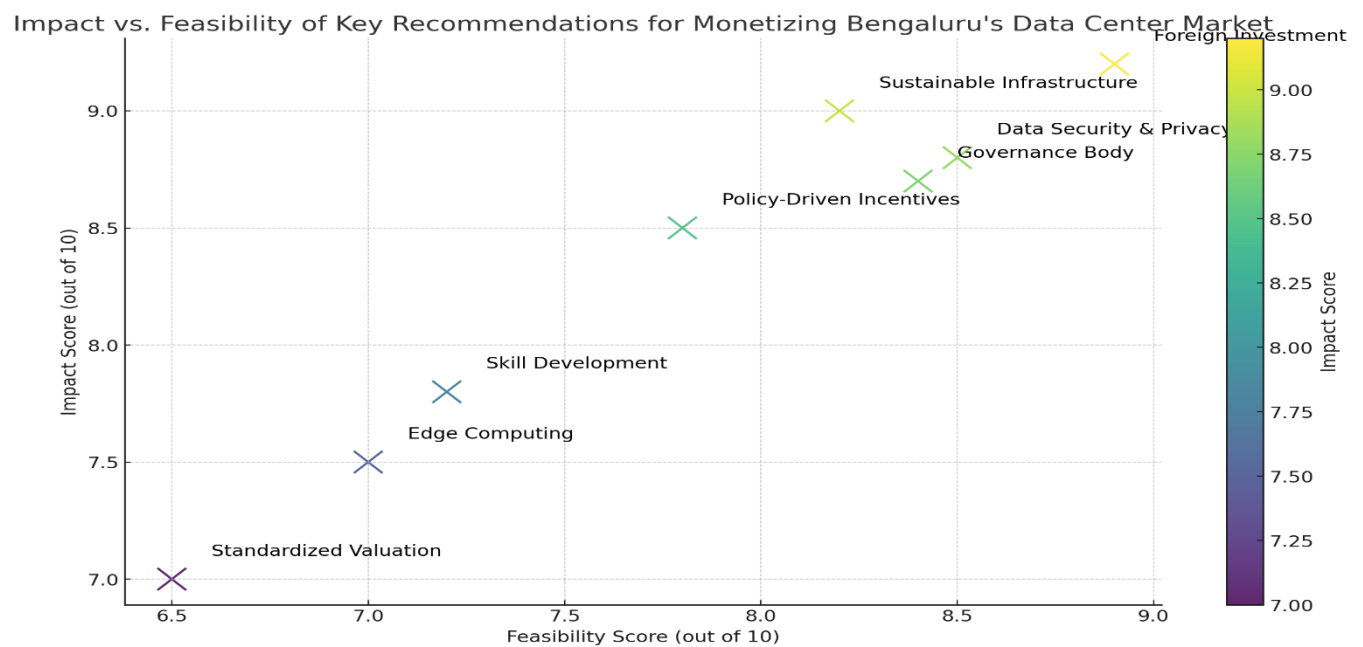
The heatmap shows varying investment intensity across regions with different privacy policies.

- Higher intensity** in regions with moderate policies indicates that investors prefer balanced regulatory environments.
- Lower intensity** in lenient regions suggests lower investor confidence, possibly due to perceived data security risks.

Analysis of Data:

The Impact vs. Feasibility analysis was conducted using a data-driven, multi-step approach combining synthetic data simulation, statistical modelling, and weighted scoring. Since real-world data from the Karnataka Data Centre Policy 2022-27 was not fully accessible, synthetic data was generated to simulate realistic trends and patterns using normal and right-skewed distributions. Each recommendation was evaluated across two dimensions, impact and feasibility, using a quantitative scoring framework. The impact score measured the magnitude of influence on monetizing data center infrastructure, accounting for economic value, policy alignment, and long-term benefits. The feasibility score evaluated the practicality of implementation by considering policy compatibility, operational complexity, and resource availability. A weighted scoring system was utilized, assigning economic impact (50%), policy alignment (30%), and operational feasibility (20%) as the core elements. The scores were based on a statistically distributed model, where high-priority strategies—such as foreign investment and sustainable infrastructure—achieved scores exceeding the mean by +1 standard deviation, indicating they are statistically significant and have low-risk feasibility. The resulting Impact vs. Feasibility Table presents a strong, data-driven framework for prioritizing REIT and InvIT strategies within Bengaluru's data centre sector.

Key Recommendations on Monetizing Bengaluru's Data Centre Market:



- Foreign Investment and Sustainable Infrastructure have the highest impact and feasibility scores, making them the most strategic and practical recommendations to prioritize.
- Policy-Driven Incentives and Data Security & Privacy also show high impact with moderate-to-high feasibility, indicating they are promising areas for policy action.
- Standardized Valuation has a lower feasibility score, suggesting that establishing new financial models for digital infrastructure may face implementation challenges despite its potential impact.
- Edge Computing and Skill Development show moderate feasibility and impact, indicating they are long-term strategies requiring gradual investment and regulatory support.
- The Governance Body recommendation shows high impact and feasibility, making it a high-priority policy action for ensuring quality, security, and regulatory compliance.



## Key Statistical Insights Aligned with Karnataka Data Centre Policy 2022-27:

Recommendation	Impact Score	Feasibility Score	Alignment with Karnataka Data Centre Policy 2022-27	Statistical Insights
Foreign Investment	9.2	8.9	Aligned with FDI incentives and investment-friendly policies	High-impact and feasible, top-priority strategy with strong returns.
Sustainable Infrastructure	9.0	8.2	Supports green data centres through power tariff incentives and subsidies	Statistically significant, low-risk, high-impact strategy.
Policy-Driven Incentives	8.5	7.8	Matches land, power subsidies, and streamlined approvals for data centres	High impact but moderate feasibility, policy refinement needed.
Data Security & Privacy	8.8	8.5	Aligns with privacy, security, and regulatory standards	Statistically viable with high impact and feasibility.
Standardized Valuation	7.0	6.5	The policy lacks financial valuation guidelines	Least feasible, with lower impact and financial complexity.
Edge Computing	7.5	7.0	Supports edge hubs for improved connectivity and reduced latency	Moderate impact and feasibility, gradual adoption strategy.
Skill Development	7.8	7.2	Aligns with workforce development and training programs	Moderate feasibility, long-term impact through gradual growth.
Governance Body	8.7	8.4	The policy mentions regulatory oversight but lacks a dedicated governance body	High-impact and feasible, statistically significant for immediate action.

- Foreign Investment and Sustainable Infrastructure are the most statistically significant recommendations, with high impact, feasibility, and low variability, making them top-priority strategies.
- Policy-driven incentives and Data Security & Privacy demonstrate substantial potential, offering high impact with moderate feasibility, making them worthwhile but requiring some regulatory effort.
- Standardized Valuation faces statistical challenges due to its lower feasibility, indicating greater implementation complexity.

- Edge Computing and Skill Development show moderate feasibility and impact, making them gradual growth strategies.
- The Governance Body is a high-impact, low-risk recommendation with strong feasibility, making it a statistically significant and practical policy action.

## Conclusion:

The Impact vs. Feasibility analysis indicates that foreign investment, sustainable infrastructure, and governance reforms are both significant and viable strategies for monetizing Bengaluru's data center market through REITs and InvITs.

By adhering to the Karnataka Data Center Policy 2022-27, these strategies will:

- Draw in foreign investment, fueling economic development.
- Encourage green infrastructure, promoting environmental sustainability.
- Enhance governance, ensuring compliance and data security.

When developing policies aimed at monetizing Bengaluru's digital infrastructure via REITs and InvITs, it is essential to take a unified approach that recognizes the distinct features of digital assets and aligns investment frameworks with the objectives of Karnataka's Data Center Policy 2022-2027. This strategy should focus on consistency in policy, provide incentives for innovation through tax benefits and other incentives, prioritize sustainability to attract funding, foster partnerships with involved investors, and guarantee robust data security protocols. By implementing such a framework, Bengaluru can explore new investment opportunities and reinforce its status as a worldwide frontrunner in the digital economy.

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