

OPPORTUNITIES AND CHALLENGES OF DEPLOYING SOVEREIGN CLOUD IN CAMBODIA'S TELECOMMUNICATIONS SECTOR

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Abstract

This paper investigates the opportunities and challenges Cambodian telecommunications companies face in deploying sovereign cloud infrastructures using OpenStack. The analysis is grounded in Cambodia's Digital Economy and Society Policy Framework (2021–2035) and the country's push toward digital sovereignty. It identifies key opportunities, including enhanced data sovereignty, regulatory compliance, vendor neutrality, and cost efficiency. It also explores major challenges such as technical complexity, shortages of skilled cloud engineers, integration hurdles with legacy systems, and financial and policy uncertainties. The study draws on case examples such as Vietnam's Viettel Cloud, Indonesia's Telkom Cloud, India's MeghRaj initiative, and Cambodia's own Ezecom OpenStack pilot to demonstrate regional lessons and local applications. The findings indicate that OpenStack provides Cambodian telcos with a viable pathway toward sovereignty and scalability, but success requires phased implementation, workforce development, public–private partnerships, and alignment with evolving regulations. The conclusion argues that sovereign cloud adoption is a critical step in Cambodia's digital transformation journey, balancing data security with long-term competitiveness in the regional and global economy.

Introduction

The rapid growth of Cambodia's digital economy has intensified the demand for secure, scalable, and locally governed cloud infrastructures. The Ministry of Post and Telecommunications (MPTC), through the Digital Economy and Society Policy Framework 2021–2035, has emphasized the role of digital sovereignty in national development. Telecommunication companies are positioned as central players in this effort, given their control of the country's data infrastructure. A sovereign cloud—defined as a cloud environment compliant with national data localization and protection laws—represents both an opportunity and a challenge. OpenStack, as a leading open-source cloud platform, offers flexibility, vendor neutrality, and cost savings, making it an attractive foundation for building Cambodia's sovereign cloud. This paper explores three

Key dimensions:

1. Opportunities for telcos to enhance data sovereignty, reduce costs, and build local ecosystems.
2. Challenges including technical complexity, talent shortages, and integration barriers; and
3. Strategies for sustainable adoption that align with government policies and international best practices.

Opportunities of Sovereign Cloud Deployment

Deploying a sovereign cloud provides Cambodian telcos with several advantages. First, it strengthens data sovereignty, ensuring that sensitive information remains within national jurisdiction. This is increasingly important as Cambodia moves to enact its first data protection law. By leveraging OpenStack, telcos can meet compliance requirements while retaining control over infrastructure. Regional precedents, such as Vietnam's Viettel Cloud and Indonesia's Telkom Cloud, show how sovereign clouds can enhance trust and strategic independence.

Second, sovereign clouds support scalability and innovation. OpenStack enables rapid provisioning of compute, storage, and network resources, positioning telcos to meet growing demand from enterprises, startups, and government services. The platform's compatibility with container technologies like Kubernetes fosters innovation in fintech, ecommerce, and AI-driven services. Cambodia's telecom sector, supported by new Tier III-certified data centers, is well positioned to leverage these capabilities.

Third, sovereign clouds deliver cost efficiency. OpenStack eliminates licensing fees and reduces vendor lock-in, allowing telcos to deploy on commodity hardware and pass savings to customers. Ezeecom's award-winning OpenStack cloud initiative in Cambodia highlights how local operators can reduce costs and improve affordability. In addition, building local ecosystems of software developers and IT services around sovereign clouds can stimulate job creation and drive national digital growth.

Challenges Facing Cambodian Telcos

Despite the clear benefits, deploying a sovereign cloud in Cambodia entails substantial challenges. First, technical complexity is a significant barrier. OpenStack comprises numerous interdependent services that require advanced skills in orchestration, automation, and large-scale system management. Without strong expertise, deployments risk instability.

Second, the shortage of skilled cloud engineers is acute. Cambodia's IT workforce is still developing, and advanced DevOps and cloud-native skills are limited. The need for training programs, certifications, and academic partnerships is urgent to close this gap.

Third, financial and market constraints are significant. Establishing sovereign cloud infrastructure requires heavy capital investment in data centers and hardware, while the domestic cloud market remains relatively small. Telcos must balance costs with demand generation, competing with established hyperscalers like AWS and Microsoft Azure.

Finally, regulatory uncertainty presents risks. Cambodia's draft data protection law, while promising, remains under development. Without clear compliance guidelines, telcos may face difficulties ensuring long-term alignment with policy. Moreover, integration with legacy systems adds complexity, given the hybrid infrastructures in use across Cambodian telcos

Strategies and Path Forward

To address these challenges, Cambodian telcos must adopt phased, collaborative, and capacity-building strategies. Phased implementation, starting with pilot projects on noncritical workloads can reduce risk and allow teams to build experience. Workforce 6 development is critical, requiring investment in training, certifications, and partnerships with universities and regional open-source communities.

Public-private partnerships will be essential. Collaboration with government agencies can align cloud initiatives with national digital policies and provide anchor clients such as e-government projects. Government incentives, such as tax breaks for cloud investments, could further encourage adoption.

Telcos can also leverage community and vendor support during the initial deployment phase, utilizing managed OpenStack distributions to accelerate implementation. Differentiating services through stronger local support, compliance guarantees, and industry-specific solutions can help telcos compete with global providers. Finally, maintaining rigorous security practices and continuous improvement will be critical to sustaining trust and competitiveness

Conclusion

Sovereign cloud adoption represents both an opportunity and a challenge for Cambodian telecommunications companies. By leveraging OpenStack, telcos can strengthen data sovereignty, reduce costs, and foster innovation while ensuring compliance with emerging data protection laws. However, technical complexity, skill shortages, financial risks, and regulatory uncertainty must be carefully managed. The path forward lies in phased deployment, workforce development, and strong public-private collaboration. With these strategies, Cambodian telcos can transform into full-fledged ICT service providers, driving the country's digital transformation and strengthening its long-term competitiveness in Southeast Asia.

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