

Regime Change and 5G Network Construction: Malaysia's Strategic Choices Under US-China Competition

QING LU*, RAVICHANDRAN MOORTHY & CHIN KOK FAY
*Research Center for History, Politics and International Affairs,
Faculty of Humanities and Social Sciences,
Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
Corresponding author: P120542@siswa.ukm.edu.my

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Abstract

Amid the rapid growth of the global digital economy, fifth generation (5G) technology has become both a driver of industrial advancement and a key arena of United States (U.S.)-China competition. Capitalizing on its geographical advantages and digital potential, Malaysia adopted the Single Wholesale Network (SWN) model, making it a unique case in Association of Southeast Asian Nations (ASEAN). However, frequent regime changes and great power rivalry have introduced policy uncertainty and geopolitical pressure. This study, based on neoclassical realism, employs qualitative process tracing based on documentary analysis to examine Malaysia's 5G policy choices and technological trajectory. Findings indicate that while the SWN model enhances resource integration and cost control, its limitations in market competition and transparency have raised domestic concerns and weakened policy credibility. Internationally, it has been viewed as a strategic move, exposing Malaysia to diplomatic pressure and investment challenges. Policy shifts have further introduced strategic uncertainties, highlighting tensions between stability and flexibility. The recent transition to a dual-network model represents a crucial step toward greater technological diversity and market competition, opening new avenues for sustainable digital development. Moving forward, Malaysia must navigate the balance between policy stability and adaptability in an evolving global tech landscape.

Keywords: 5G Technology; Single Wholesale Network Model (SWN); U.S.-China Competition; Malaysia; Policy

Introduction

The global race for 5G technology has not only redefined digital connectivity and economic competitiveness but has also emerged as a focal point of geopolitical contestation, particularly between the U.S. and China. As an essential component of national digital transformation strategies, 5G deployment has become a key arena for strategic competition, influencing global supply chains, regulatory frameworks, and national security concerns. In this context, emerging economies such as Malaysia find themselves at the intersection of great power rivalry, forced to navigate technological dependence, infrastructure sovereignty, and policy continuity amidst domestic political transitions.

Malaysia's 5G policy evolution exemplifies the complex interplay between external pressures and internal political constraints. Initially adopting a market-driven, industry-led approach, Malaysia later transitioned to a state-controlled Single Wholesale Network (SWN) model under Digital Nasional Berhad (DNB), before eventually shifting to a dual-network system in response to both domestic and international pressures. Each policy transition coincided with regime changes, reflecting how shifting political coalitions recalibrate national technology strategies in response to competing legitimate

demands.

While much has been written on U.S.-China technology competition, existing research often overlooks the agency of small and middle powers in navigating digital infrastructure governance. Most studies on 5G policymaking focus on developed economies or large emerging markets, while the impact of domestic political transitions on digital policy in smaller states remains underexplored. Malaysia presents a unique case, where frequent government transitions have directly influenced 5G policymaking, shaping technology supplier choices, governance models, and regulatory frameworks.

This study addresses these gaps by exploring the following core questions: How has regime change influenced Malaysia's 5G governance model, from a market-driven approach to a state-led model and eventually a dual-network system? What role has performance legitimacy played in shaping Malaysia's 5G policy adjustments across different administrations? How has Malaysia navigated the U.S.-China technological rivalry while maintaining policy flexibility in digital infrastructure governance?

Grounded in an integrated framework of Neoclassical Realism and performance-legitimacy theory, this study employs qualitative process tracing of publicly promulgated Malaysian 5G policy texts issued between 2018 and March 2025. The documents are arrayed around two critical junctures—the December 2021 launch of the SWN and the May 2023 decision to authorize a second network—and analysed through pattern-matching tests that link systemic pressures, domestic coalitions, and legitimacy imperatives. This procedure traces Malaysia's evolution from a state-led wholesale model to a competitive dual-network framework. By demonstrating how a middle power calibrates digital-infrastructure choices to balance external constraints with internal legitimacy needs, the study advances debates in international political economy and digital-governance scholarship and highlights the explanatory leverage of combining Neoclassical Realism with performance-legitimacy theory for technology-policy research.

This study makes three key contributions to existing literature. First, while Neoclassical Realism has traditionally been applied to military and security policy, this study extends its scope to technology governance, illustrating how states navigate systemic constraints and domestic political incentives when formulating digital infrastructure policies. Second, whereas most research on 5G deployment emphasizes economic and technical dimensions, this study shifts the focus to the role of regime legitimacy, bureaucratic competition, and electoral dynamics in shaping digital policy trajectories. Finally, it offers valuable policy insights for developing nations, providing a framework for balancing economic growth, national security considerations, and external geopolitical pressures in an increasingly contested global technology landscape.

The structure of this paper is as follows: First, it reviews existing literature on 5G competition, ASEAN policy choices, and the application of neoclassical realism in technology policy studies. Next, it examines the evolution of Malaysia's 5G policy, with a particular focus on the impact of regime change on policy stability and implementation. Then, it evaluates the limitations of the SWN model and explores how the transition to a dual-network system influences market competition and Malaysia's digital strategy. Finally, the paper summarizes key findings, discusses policy implications, and outlines directions for future research.

Literature Review

The evolution of technological capabilities serves as both a catalyst and consequence of power redistribution within the international system.¹ When significant technological gradients exist between states, a symbiotic relationship typically emerges technologically advanced "first movers" export mature technologies to less developed nations, which reciprocally function as crucial markets.

This phase of technological cooperation allows leaders to fund research and development through technology transfers while enabling recipients to accelerate industrial development.² However, as power differentials narrow, this interdependence evolves into strategic competition. The dominant state restricts technology exports to curb emerging rivals, whereas ascending powers prioritize indigenous innovation to achieve sectoral leadership.

The Pentagon Technological Competitiveness of the Economy (PTCE) framework reveals that China's meteoric rise in technological competitiveness contrasts with the relative decline of U.S. hegemony³. Washington's national security anxieties over Beijing's expanding capabilities have manifested in export controls on sensitive technologies, triggering global economic fragmentation.⁴ This rivalry has engendered divergent models of digital capitalism: China's state-directed model nurtures national champions like Huawei and Alibaba, while U.S. techno-nationalism employs sanctions and investment restrictions to limit Chinese market access.⁵ The resultant bifurcation is particularly evident in 5G infrastructure, where market dominance now dictates innovation trajectories.⁶

The 5G competition transcends technological advancement, constituting a strategic instrument in great power rivalry.⁷ U.S. concerns over Chinese firms' mandatory data-sharing obligations under national security laws have driven the development of Open Radio Access Network (Open RAN) technology.⁸ This techno-security paradigm fosters alliance-building around international standardization, reflecting a broader shift toward bloc-based technological ecosystems.⁹ As a cornerstone of industrial competitiveness, 5G divergence accelerates U.S.-China economic decoupling, undermining multinational corporations' global synergies.¹⁰ Southeast Asia's emergent digital economies exemplify this tension: while attracting substantial cross-border tech investment,^{11,12} regional states face acute dilemmas in balancing Chinese technological affordability against U.S.-led security concerns.¹³

5G deployment in technology-developing nations confronts systemic barriers including infrastructure deficits, policy inconsistency, and market immaturity. Although Oughton et al. propose light-touch regulation to mitigate risks, their framework inadequately addresses political volatility in contexts like Malaysia, where centralized models (e.g., Single Wholesale Network) face industry resistance.¹⁴ Comparative analyses reveal regional disparities: African states leverage policy flexibility for innovation despite resource constraints,¹⁵ while Peru and Indonesia struggle with persistent digital divides despite 5G's theoretical economic benefits.¹⁶ The Technology-Organization-Environment (TOE) framework further identifies technical barriers (hardware limitations, security vulnerabilities) and contextual constraints (consumer skepticism, market competition) as critical impediments.¹⁷ ASEAN member states exemplify the developing world's predicament in navigating U.S.-China tech rivalry. Malaysia's "strategic ambiguity" approach prioritizes ASEAN solidarity while avoiding overreliance on either power,¹⁸ whereas Kuik's "political elite legitimacy path" theory posits that regional policy choices reflect domestic legitimacy maintenance intertwined with economic-security tradeoffs.¹⁹ These adaptive strategies underscore the agency of smaller states in shaping technological ecosystems amid systemic pressures.^{20,21}

Existing scholarship presents three critical limitations that obscure a comprehensive understanding of 5G policy formulation in Southeast Asia. First, regional generalization leads to an overemphasis on ASEAN-level analysis, which neglects the intra-regional variances in technology adoption paths. While ASEAN as a collective entity is often examined in relation to digital infrastructure development, individual member states operate under vastly different economic, political, and strategic considerations, making broad regional assessments insufficient for understanding national-level policy decisions.

Second, regime dynamics remain underexplored in their role in shaping the coherence and stability of technology policymaking. While existing studies acknowledge the role of economic and security considerations in 5G policy decisions, they do not sufficiently examine how political stability affects the continuity and implementation of digital infrastructure policies. Frequent regime transitions can result in shifts in strategic priorities, disruptions in policy execution, and uncertainties in long-term planning. Understanding how these political changes shape digital governance is essential for assessing the sustainability of national 5G strategies.

Third, institutional credibility is insufficiently examined in relation to its impact on international cooperation in the technology sector. Political uncertainty can erode investor confidence and influence the willingness of international technology suppliers and foreign governments to engage in long-term collaborations. However, existing research has not adequately analysed how regime shifts in emerging economies like Malaysia affect external perceptions of policy reliability and the broader implications for foreign investment and multilateral digital cooperation.

This study addresses these gaps through a focused case analysis of Malaysia's 5G policy evolution. It investigates how regime stability influences the formulation of 5G strategies in the context of U.S.-China competition, evaluates the effectiveness of the Single Wholesale Network model in balancing economic efficiency with geopolitical constraints, and examines the challenges to policy continuity during political transitions.

By integrating insights from neoclassical realism and applying them to Malaysia's 5G policy trajectory, this research enhances the understanding of how domestic political stability mediates global technological competition. Additionally, it contributes to the broader discourse on digital sovereignty, institutional trust, and strategic adaptability in emerging economies navigating complex geopolitical landscapes.

Theoretical Framework: Neoclassical Realism and Technology Governance

This research combines neoclassical realism with performance legitimacy theory to systematically explain the evolution of Malaysia's 5G policy. Neoclassical realism emphasizes the interactive relationship between international structural pressures and domestic political variables in shaping state behaviour.²² At the systemic level, the strategic rivalry between the U.S. and China over digital infrastructure, digital technology industries, and institutional norms constitutes the primary external structural pressure confronting Malaysia. The geopolitical contest over 5G technology is manifested not only in the struggle for technological dominance but also in the institutional shaping of regional rules and market trajectories.^{23,24,25} Consequently, the state must balance economic development with national security considerations. However, such external pressures do not unilaterally determine national policy outcomes. Instead, their influence must be filtered and internalized through domestic political mechanisms.

In Malaysia, this domestic transformation of external pressures primarily occurs through three types of "filters": regime coalition shifts and the fragility of parliamentary majorities²⁶; power struggles within the bureaucratic system²⁷; and coordination of interests among telecommunications operators. The interplay among these variables has driven Malaysia's governance model to transition from market-driven to state-led and ultimately to a hybrid competitive-cooperative approach.

Performance Legitimacy Theory further illuminates the political logic behind this "filtering" mechanism. Successive Malaysian governments have relied on quantifiable policy performance indicators (such as GDP growth, network coverage, and foreign direct investment inflows) to consolidate their legitimacy. Thus, 5G policies have gradually become crucial instruments for governments to demonstrate governance capabilities and respond to public expectations. Each policy

adjustment reflects a dynamic balance between addressing external strategic pressures and meeting domestic legitimacy demands. This study predicts that policy inflection points typically emerge at the intersection of intensified external shocks and recalibrated domestic legitimacy considerations.

The controversies and transformations within Malaysia's 5G development trajectory exemplify the complex interplay between external structural pressures and domestic political dynamics. From the initial market-oriented strategy to a single wholesale network model, and eventually to a dual-network structure, each policy shift profoundly reflects domestic political factors, such as regime legitimacy demands, elite interest coordination, and bureaucratic power realignments. Performance Legitimacy Theory further illuminates these internal dynamics, emphasizing how governments strategically leverage policy outcomes to reinforce their legitimacy. Thus, 5G policy choices in Malaysia serve dual purposes—addressing external pressures and fulfilling domestic political objectives, such as meeting public expectations, demonstrating governance effectiveness, and consolidating political power.

In conclusion, the analytical framework constructed in this study clearly illustrates that while systemic external pressures significantly influence states, policy responses ultimately stem from internal political calculations, institutional constraints, and legitimacy considerations. Neoclassical Realism provides a robust theoretical foundation for understanding Malaysia's strategic positioning amidst U.S.-China digital competition, while Performance Legitimacy Theory clarifies how domestic political dynamics drive policy formulation and adjustments. Through an in-depth analysis of technological cooperation models, industrial upgrading pathways, and cybersecurity policies, this study aims to reveal the strategic logic and political motivations underlying Malaysia's policy choices.

The U.S.-China Game in the Global 5G Race: Technology Advantage, Policy Support and Market Expansion

Since the 1990s, the U.S. and Europe have led global innovation in the telecom industry, with firms like Lucent, Motorola, and Nortel dominating markets, including China.²⁸ However, from the late 1990s, China prioritized developing its indigenous telecom sector through policy support and resource allocation, leading to the rapid rise of Huawei and ZTE. These two companies gradually took control of the dominant position in China's mobile communication industry and, leveraging the "Going Global" strategy, accelerated their expansion into international markets, filling the gaps in Africa, the Middle East, and South Asia that had long been underserved by Western telecommunications firms. In 2012, Huawei surpassed Ericsson as the world's largest telecom equipment supplier.²⁹

The "Made in China 2025" strategy further elevated 5G as a core technology, offering policy support to enable Chinese firms to lead global competition. Alongside the Belt and Road Initiative (BRI), launched in 2013, China accelerated the export of 5G and digital infrastructure, facilitating Huawei and ZTE's expansion in BRI countries. By 2024, Huawei held nearly 40% of the global telecom equipment market, while Nokia and Ericsson's together held 30%.³⁰ Meanwhile, U.S.-based telecom manufacturers have diminished, leaving Ericsson, Nokia, Huawei, and ZTE as the dominant players in 5G core technologies.³¹

According to the Global 5G Competitiveness Report published by the U.S. Cellular Telecommunications and Internet Association (CTIA), China has become a global leader in 5G technology alongside the United States.³² This competitive landscape highlights China's strategic advancements in 5G through robust policy support, technological innovation, and aggressive international market expansion, reflecting significant shifts in the global communications technology hierarchy.

In response to the rise of Chinese companies, the United States has implemented a series of strategic measures to maintain its technological leadership. In 2019, the Trump administration issued the Executive Order on Securing the Information and Communications Technology and Services Supply Chain, restricting U.S. firms from using Chinese 5G equipment on national security grounds.³³ This was followed by the U.S. National Strategy to Secure 5G, which explicitly links 5G technology to national security.³⁴

To address its disadvantages in the telecommunications infrastructure supply chain, the United States has implemented a series of policy support and technological innovation measures aimed at reducing reliance on Huawei equipment and enhancing its own competitiveness. Internationally, the U.S. has leveraged the “Clean Network” initiative to collaborate with allies in establishing 5G security standards, seeking to restrict Huawei and ZTE from accessing the markets of allied nations.³⁵ Concurrently, the U.S. has established dedicated funds to support the research and development of ORAN technology, promoting the participation of domestic companies in the supply chain. By leveraging the openness of ORAN technology, the U.S. aims to break the monopoly of traditional equipment suppliers and diminish the market position of Chinese companies. The U.S. has also promoted Starlink’s low-Earth orbit (LEO) satellite technology to enhance connectivity in remote regions, positioning it as a complementary solution where terrestrial infrastructure is limited.

Both major powers regard science and technology diplomacy as a critical component of their national strategies, mobilizing the combined efforts of governments, enterprises, and research institutions to drive technological expansion. In key sectors such as 5G, both countries’ strategies reveal strong elements of digital geopolitics not only in terms of technological dominance and supply chain security, but also in shaping global market order and digital governance norms.

However, the two powers diverge significantly in their strategic philosophies and diplomatic pathways. China adopts a development-oriented approach, emphasizing technological cooperation to promote economic transformation and social progress. It advocates a “low politicization” logic of technology, seeks to build an inclusive technological community, and actively promotes infrastructure exports and Digital Silk Road cooperation. In contrast, the U.S. adheres to a security-oriented paradigm, treating high technology as a core asset in great power rivalry. Guided by a “high-politics” logic, it has constructed “small yard, high fence” alliances, aiming to uphold its technological supremacy through standard-setting, industrial containment, and alliance consolidation³⁶. This politicized and institutionalized framework of technological competition not only seeks to constrain the global expansion of Chinese firms but also exerts profound influence over other countries’ digital development trajectories.

In practice, Chinese companies have leveraged their complete industrial chains, cost-effective products, and flexible financing models to secure strongholds in developing markets. In contrast, the U.S. emphasizes the security risks of Chinese equipment while maintaining its position through alliances and innovation. This rivalry has transcended technology to shape the future reshape the architecture of global digital power.

Amid intensifying U.S.-China competition, emerging economies—particularly ASEAN countries—have become focal points of strategic rivalry. The capital-intensive nature of 5G deployment forces these states to weigh economic viability against strategic autonomy and institutional compatibility. China’s provision of low-cost, rapidly deployable solutions offers development opportunities for many countries, while the U.S. seeks to build rule-based coalitions and reinforce institutional primacy to enhance its influence in shaping global digital order. These strategic divergences are drawing competing blueprints for the digital world to come and transforming the foundations of global communications governance and technological standards.

The U.S. Strategy for 5G Development in Malaysia

Since elevating bilateral relations to a “Comprehensive Partnership” in 2014, the U.S. has consistently embedded security-centric logic into its technological collaboration with Malaysia, emphasizing infrastructure resilience, network security, and geopolitical alignment over purely economic or developmental outcomes.³⁷

Although U.S.-Malaysia relations cooled under Donald Trump's government (2018–2020), underlying cooperation remained resilient, primarily due to its alignment with broader U.S. strategic security imperatives³⁸. Following Joe Biden's election, this security orientation has intensified. U.S.-Malaysia collaboration has increasingly focused on cybersecurity and data governance—areas explicitly recognized by Malaysian officials as central to their national digital economy strategy.³⁹ The U.S. approach integrates extensive research and development support, particularly through initiatives like the National Spectrum Strategy⁴⁰, which fosters technological innovation while simultaneously embedding security standards designed to limit exposure to Chinese vendors.

In the realm of network security and deployment, the Cybersecurity and Infrastructure Security Agency (CISA) has taken proactive measures to address potential security vulnerabilities in 5G networks.⁴¹ Through the release of security slicing guidelines and collective risk management strategies, CISA has sought to enhance 5G network resilience. These efforts not only safeguard U.S. national security interests but also provide a security framework for Malaysia and other partner nations, influencing their 5G deployment strategies.

Beyond terrestrial infrastructure, the U.S. has also leveraged satellite technologies to extend digital connectivity. The Starlink initiative, led by SpaceX, represents a significant advancement in LEO satellite networks, which can expand coverage in rural and underserved areas. In 2023, Malaysia licensed Starlink to enhance connectivity in remote educational institutions, aligning with broader digital inclusion and U.S. strategic influence.⁴²

At the diplomatic level, the U.S. and its allies explicitly links 5G infrastructure choices to national security risks, actively discouraging Malaysian cooperation with Chinese telecom giants like Huawei. In May 2023, U.S. and European Union diplomats warned the Malaysian government that involving Huawei in the construction of a second 5G network could pose a “national security risk” and harm Malaysia's international business reputation.⁴³ In public statements, U.S. Ambassador to Malaysia Edgard D. Kagan underscored the importance of using “trusted” technology providers to maintain Malaysia's standing as a secure investment destination. He stated that corporate decisions on supply chain restructuring are driven more by concerns over intellectual property security than by geopolitical tensions alone.⁴⁴ This stance reflects the U.S.' strategic objective of limiting the global expansion of Chinese companies by leveraging security concerns and diplomatic influence.

Furthermore, the U.S. extends its security-driven strategy beyond direct diplomacy into corporate decision-making by influencing multinational telecom firms operating in Malaysia. The example of Telenor's shift from Huawei to Ericsson—prompted by the U.S.-led Clean Network Initiative—exemplifies how U.S. geopolitical imperatives influence corporate choices in supply chains,⁴⁵ thereby reinforcing Malaysia's technological alignment with American security preferences.

Collectively, The U.S. employs a multifaceted, security-oriented strategy in Malaysia, systematically integrating technological investments, cybersecurity standards, corporate influence, and diplomatic pressures. These measures reflect a broader American effort to shape regional digital infrastructure in Southeast Asia and counter China's expansive presence by prioritizing security and strategic alignment over purely developmental considerations.

China's strategy for 5G development in Malaysia

China's strategy in Malaysia's 5G sector distinctly reflects a development-centric logic, emphasizing economic transformation, infrastructure deployment, and inclusive technological growth. China's telecommunications companies, particularly Huawei and ZTE, have established a strong foothold in developing markets, leveraging cost advantages and technological adaptability to expand their presence. Their business strategy revolves around accumulating capital and technological strength in emerging economies before advancing into high-end Western markets. Although Huawei's core business focuses on cutting-edge technologies, its competition with Western technology firms in regional markets relies more on phased technological adaptation and continuous technological upgrades to gain an advantage⁴⁶. This model not only provides a blueprint for China's high-tech industries to compete with the U.S. but also generates demonstration effects that strengthen China's technological influence in neighbouring countries.

Since entering Malaysia in 2001, Huawei has become central to the nation's telecom landscape, supporting critical infrastructure projects such as the High-Speed Broadband (HSBB) initiative and 4G network development. Huawei's deep integration with Malaysia's telecom operators—including Telekom Malaysia (TM), Maxis, and Celcom—has provided a foundation for extensive 5G deployment, underpinning Malaysia's digital transformation through affordable and effective technological solutions.⁴⁷

This relationship is further reinforced through high-level diplomatic engagements and explicit political support from successive Malaysian governments. In 2017, during the Belt and Road Forum for International Cooperation, Prime Minister Najib Razak and President Xi Jinping committed to strengthening cooperation in information and communications technology (ICT).⁴⁸ This relationship was further reinforced during Mahathir Mohamad's second tenure as Prime Minister (2018–2020), when high-level diplomatic engagements and explicit political support underscored Malaysia's pragmatic alignment with China's digital development model. Despite mounting U.S. diplomatic pressure, Mahathir framed Chinese technologies as reliable and cost-effective, underscoring Malaysia's preference for development-oriented autonomy over externally imposed security concerns.⁴⁹

Despite Huawei's exclusion from the National Digital Corporation's 5G tender under the Muhyiddin Yassin administration, Malaysia and China have maintained strong cooperation in digital economy and communications infrastructure through high-level visits and agreements. Under the Anwar Ibrahim government, Malaysia deepened its ties with China by incorporating Huawei technology into its second 5G network, reflecting Malaysia's pragmatic approach to balancing the technological competition between the U.S. and China⁵⁰. These collaborations reflect Malaysia's high recognition of Chinese technology and its pragmatic approach to pursuing multilateral cooperation in the rapid advancement of digital transformation.

Beyond infrastructure, China's technological footprint extends into strategic initiatives such as smart-city development, talent training, and small and medium-sized enterprises (SMEs) digitalization, effectively integrating Huawei's technological strengths into Malaysia's socioeconomic fabric. Likewise, ZTE has complemented these efforts by introducing advanced network innovations, including ultra-broadband radio (UBR) and energy-efficient network technologies, supporting Malaysia's broader sustainability and digital objectives.

China's deep integration into Malaysia's 5G landscape is built on long-term partnerships, cost-effective solutions, and multi-sector collaboration. Through Huawei's and ZTE's extensive contributions, China has positioned itself as a vital player in Malaysia's digital ecosystem. While Malaysia continues to balance its engagement with both China and the U.S., its deep-seated reliance on Chinese technology signals a long-term strategic partnership in digital infrastructure development.

As regional 5G competition intensifies, Malaysia's evolving position will remain central to the broader geopolitical contest between Beijing and Washington in shaping the future of Southeast Asia's digital economy.

Overall, China's presence in Malaysia's 5G strategy reflects a development-oriented model of cooperation, which stands in sharp contrast to the U.S.' security-centric approach. Malaysia's wide-scale adoption of Chinese technologies not only highlights its strategic focus on economic transformation and technological inclusivity but also underscores its pragmatic approach to maximizing national interests amid the broader U.S.-China digital rivalry.

Malaysia's 5G Network Construction Progress

5G technology has been positioned not only as a strategic catalyst for economic growth and social connectivity, but also as a key performance yardstick for successive Malaysian administrations. According to the Malaysian Institute of Economic Research (MIER), 5G-related economic activities are projected to contribute an additional RM12.7 billion to Malaysia's GDP between 2021 and 2025, with RM5.3 billion expected in 2025 alone. As the adoption of 5G technology expands, its contribution to Malaysia's GDP, particularly in support of Industry 4.0, is anticipated to grow steadily.⁵¹ As adoption deepens—especially in support of Industry 4.0 and advanced services—its economic pull is projected to rise steadily. In line with these projections, the government has set ambitious targets: by 2025 5G should add RM 8.5 billion annually to GDP and generate 750,000 high-skilled jobs, while by 2030 cumulative digital-economy output linked to 5G is expected to exceed RM 150 billion.⁵²

These growth forecasts carry a clear political logic. The targets were announced amid the 2020 change of government and heightened political uncertainty; the Perikatan Nasional (PN) coalition used an assertive 5G agenda to demonstrate economic stewardship. In August 2020 it launched the National Digital Network (JENDELA), investing RM 21 billion (US \$4.45 billion)—financed through the Malaysian Communications and Multimedia Commission's Universal Service Provision Fund and industry contributions—to boost broadband coverage and quality, upgrade 4G, and retire 3G⁵³. In February 2021 the MyDigital Blueprint was released, aligning 5G with the Twelfth Malaysia Plan (12MP) and the *Shared Prosperity Vision 2030* (Wawasan Kemakmuran Bersama 2030), and branding Malaysia a “digitally driven, high-income nation and a regional leader in the digital economy.”

Under the JENDELA plan, Malaysia's 5G network construction is being carried out in two phases. The first phase (2020–2022) focused on enhancing 4G network coverage and performance, targeting 96.9% national mobile network coverage, broadband speeds of 35 Mbps, and coverage for 7.5 million households. This phase also freed up resources for 5G by gradually decommissioning 3G networks. The second phase (2022–2025) centers on nationwide 5G deployment, aiming for 80% population coverage. To address the digital divide, technologies such as Fixed Wireless Access (FWA) are being leveraged to extend connectivity to remote areas.⁵⁴ However, challenges remain, including spectrum allocation, high infrastructure costs, and the expense of deploying small base stations.

In 2020, the Muhyiddin government adopted the SWN model to facilitate 5G rollout and established DNB to oversee infrastructure construction and operations. This model aimed to reduce costs through resource pooling, prevent infrastructure duplication, and ensure rural and remote areas received 5G coverage. In July 2021, DNB awarded Ericsson (Malaysia) Sdn Bhd the RM11 billion contract to design and build the national 5G network. Ericsson was tasked with end-to-end network design and development, including the core network, radio access network (RAN), and transmission network, while also providing financing support to minimize government expenditure.⁵⁵

Despite challenges such as terrain limitations, global material shortages, and pandemic-related delays, Malaysia achieved significant milestones in the first phase of JENDELA (Table 1). By the end of 2022, 5G coverage had reached 47.1%, surpassing targets. Upgrades were completed for 37,977 base stations, 1,778 new 4G towers were built, and 7.74 million homes gained Gigabit fiber access. The average mobile broadband speed increased to 116.03 Mbps, satellite broadband was deployed in 839 remote areas, and the 3G network was successfully retired by the end of 2021. These infrastructure milestones not only laid a strong foundation for Malaysia’s digital economy and 5G expansion but also served a symbolic political function. By publicly highlighting quantifiable progress the government translated technical outputs into visible governance outcomes. This framing reinforced the ruling coalition’s performance legitimacy amid public demands for economic recovery and inclusive digital access.⁵⁶

Table 1: Progress Update for JENDELA Phase 1

	Premises Passed with Fibre Connectivity	Mobile Broadband Speed	4G Coverage in Populated Areas
JENDELA Phase 1 targets (End of 2022)	7.5mil Premises Passed	35Mbps	96.9%
JENDELA Phase 1 Achievement (31 December 2022)	7.74mil Premises Passed	116.03Mbps (Mean) 43.46Mbps (Median)	96.92%
JENDELA Phase 2 targets (2022-2025)	9 mil Premises Passed	100Mbps	100%
Baseline (September 2020)	4.96 mil Premises Passed	25Mbps	91.8%

Sources: JENDELA Phase-1 Concluding-Report.

As planned, once the state-owned DNB hit 80% coverage in dense areas, the government shifted to a dual-network model to foster competition.⁵⁷ The policy pivot was announced in May 2023. By September 2024 Malaysia had achieved the 80 per cent benchmark—one of the fastest 5G deployments in Southeast Asia. JENDELA’s ultimate success will hinge on two indicators: (i) whether the dual-network regime delivers real market efficiency and service improvements, and (ii) whether 5G adds RM 8.5 billion to GDP in 2025 as projected.

Overall, The JENDELA program has significantly enhanced network quality in both urban and rural regions, laying a critical foundation for Malaysia’s digital transformation. In particular, the adoption of FWA and other targeted technologies has helped to bridge the digital divide in underserved rural regions. These tangible infrastructure gains not only support the goals of the Shared Prosperity Vision 2030 but also enhance public confidence in the government’s commitment to inclusive digital development and equitable infrastructure provision.

Controversies and Implications: Policy Transitions Under Domestic and International Pressure

Malaysia's 5G development journey underscores its strategic navigation through global digitalization trends and the technological rivalry between the U.S. and China. The shift from a market-led model to a state-controlled SWN model, and more recently to a dual-network arrangement, exemplifies the complex interplay between systemic structural pressures and domestic political dynamics. This policy evolution was shaped not only by geoeconomic imperatives surrounding technology standards, but also by inter-agency bureaucratic contestation and regulatory challenges in spectrum governance. The successive restructuring of 5G governance, supplier selection, and spectrum allocation illustrates how Malaysia—guided by both international constraints and internal political calculations—adapted its digital infrastructure policy within a contested global environment.

That interaction was most visible in 2021, when the government adopted the SWN model and awarded a RM 11 billion turnkey contract to Ericsson.⁵⁸ Observers widely interpreted the move as tacit alignment with Washington's "Clean Network" initiative. A closer reading, however, shows the decision was not a simple act of choosing sides. It simultaneously addressed Western security concerns over Chinese equipment while preserving Malaysia's long-standing digital-economy ties with Beijing. This dual calculation exemplifies the Neoclassical Realist claim that systemic pressures are filtered through domestic political needs, highlighting the strategic agility with which smaller states navigate contests over digital sovereignty.

While the SWN model offers strategic advantages, international experience has exposed its significant limitations. According to the GSMA, countries that adopted the SWN model—such as Belarus, Mexico, and Rwanda—have commonly faced deployment delays, low spectrum utilization, reduced transmission speeds, and limited market competition.⁵⁹ These global precedents have further intensified domestic scepticism in Malaysia regarding the viability of the SWN approach.⁶⁰ On the domestic political front, the shift toward a centrally managed model led by the state-owned DNB extended beyond technical considerations, triggering inter-agency power struggles. The Ministry of Finance (MoF) and the MCMC played competing roles in shaping the country's 5G governance structure. Historically, the MCMC served as the primary regulatory authority overseeing spectrum allocation and telecom market competition, ensuring that private operators had direct control over infrastructure deployment. However, the introduction of DNB under the MoF's jurisdiction signified a shift in authority, with the finance ministry assuming a dominant role in infrastructure management. This restructuring reflected a broader policy dynamic, where bureaucratic agencies compete to define national technology strategies and secure greater institutional influence.

The establishment of DNB as a monopoly network provider positioned it as a "super-agent" in Malaysia's telecom sector, responsible for the end-to-end development and operation of the national 5G network. Unlike traditional regulatory models, where private telecom operators compete for spectrum and build their own networks, DNB's state-controlled model required all operators to lease 5G access from a single government-backed entity. This approach aligned with broader trends in state capitalism, where governments take a proactive role in strategic technology sectors to enhance economic resilience and national security. However, the concentration of power within DNB raised concerns about efficiency, transparency, and market competition, leading to growing resistance from industry stakeholders.

Major telecom operators, such as Maxis, Celcom, and Digi, strongly opposed the SWN model, arguing that it restricted their spectrum autonomy and made their technology decisions and service pricing heavily dependent on DNB policies⁶¹. While centralized management may reduce costs in the short term, critics contend that it inhibits market competition and stifles long-term innovation. As a

result, in 2021, Malaysia's four largest telcos, Celcom, Digi, Maxis and U Mobile, have proposed to the government that additional 5G networks be allowed to operate in parallel with DNB.⁶²

Additionally, DNB's bidding process to select Ericsson as the primary supplier lacked transparency. Although Ericsson's bid was RM700 million lower than the second-lowest bidder (reducing the project cost to RM15 billion), detractors argued that the process inadequately accounted for long-term competitiveness and technological diversity. Insufficient communication with industry stakeholders and the public regarding supplier selection and policy implementation further exacerbated scepticism about the fairness and accountability of the SWN model.⁶³ This has not only exacerbated social and industry scepticism about the transparency and fairness of the policy but has also been perceived as a lack of accountability to the public, further eroding the credibility of the policy.

These domestic and international pressures, along with challenges in policy execution, ultimately led Prime Minister Anwar Ibrahim to review the previous administration's 5G policy.⁶⁴ In May 2023, the government announced a transition from the SWN model to a dual network model, addressing concerns over spectrum autonomy and reintroducing competition to enhance efficiency and flexibility in 5G deployment. The shift also allowed Huawei to regain access to Malaysia's 5G program, a move widely interpreted as a strategy to balance Eastern and Western technological partnerships.⁶⁵

Despite easing earlier controversies, new challenges have emerged. The government's decision to award the construction and operation of its second 5G network to U Mobile has raised concerns. Critics question the company's foreign ownership structure, shareholder backgrounds, and potential political interference in the bidding process. Furthermore, U Mobile's relatively small size, compared to more established operators like Maxis and CelcomDigi, has drawn scrutiny over its competitiveness. In response, Communications Minister Fahmi Fadzil clarified that U Mobile was selected through a rigorous, independent evaluation conducted by the MCMC, based on its business proposal, technical capabilities, and customer satisfaction record, without executive intervention.⁶⁶

The evolution of Malaysia's 5G governance policy clearly reflects the policy mechanism emphasized by neoclassical realism: the interplay between structural pressures arising from U.S.–China competition in the 5G domain and domestic variables—institutional rivalry, coalition politics, and legitimacy concerns—jointly shaped the country's path-dependent development trajectory. The transition from a market-oriented model to a state-led approach and ultimately to a dual-network framework illustrates the strategic flexibility of middle powers in technological governance. Crucially, the resilience of Malaysia's 5G policy is not solely determined by external geopolitical dynamics, but more fundamentally by how domestic political actors internalize and translate international pressures into concrete policy outcomes.

Regime change reshapes Malaysia's 5G development model

Regime change has been particularly significant in reshaping Malaysia's 5G development model, and performance legitimacy, as an important component of regime legitimacy, has played a key role in this process. Indeed, performance legitimacy is an important logic of governance in developmental states, and the formulation and adjustment of Malaysia's 5G policy reflects this feature. The government has tightly linked 5G development to national economic growth and digital transformation objectives as a demonstration of its governance capability. For example, in the "Shared Prosperity Vision 2030", 5G is explicitly positioned as a core driver for economic diversification and enhancing global competitiveness, with the goal of achieving 80% coverage in densely populated areas by 2024.⁶⁷ Whether through the implementation of the SWN model or the subsequent shift to a dual-network model, the government has consistently emphasized the policy's direct contributions to society,

including job creation, improved public service efficiency, and advancing national modernization.

However, the impact of political transitions on Malaysia's 5G development model and timeline cannot be ignored. Frequent policy shifts due to changes in administration have at times stalled progress. Nevertheless, successive governments have sought to strengthen the performance legitimacy of 5G policies to consolidate their governance foundation and support the digital economy. Following the defeat of the Barisan Nasional (BN) coalition in 2018, the Pakatan Harapan (PH) government prioritized 5G deployment to bolster its legitimacy. It planned to allocate 5G spectrum through a tender process and encouraged local telecom companies to form consortia for network construction.

Amidst international technological competition, then-Prime Minister Mahathir Mohamad stressed that Malaysia would independently select its technology partners based on national interests, rather than blindly following the U.S. and its allies in excluding Huawei.⁶⁸ He further emphasized that Malaysia sought close economic cooperation with China and rejected an adversarial stance.⁶⁹ Under this policy context, Malaysia achieved significant milestones in its cooperation with Huawei. In 2019, the government launched 5G pilot projects covering nine states and six industries, with Huawei and local operator Maxis signing a memorandum of understanding to jointly advance 5G trials. This policy not only reflected high recognition of Huawei's technological capabilities but also demonstrated Malaysia's flexible diplomatic strategy amid U.S.-China technological rivalry.⁷⁰⁷¹

In 2020, following the collapse of the PH government, Muhyiddin's Perikatan Nasional (PN) administration quickly positioned the adoption of the SWN model as a showcase of governance capacity and administrative effectiveness.⁷² To underline its commitment to accelerating digital transformation, the government launched the MyDigital initiative and placed the MoF firmly in control of the newly established DNB, sidelining the MCMC in the process. However, the decision to adopt the SWN model and select Ericsson as the sole primary vendor drew intense domestic and international criticism, highlighting deeper bureaucratic competition over strategic control of the nation's digital infrastructure. Concurrently, the Ministry of Finance's takeover of 5G rollout sidelined the MCMC, highlighting the intensifying bureaucratic competition over control of the country's strategic digital infrastructure.

According to the Opensignal report on the 5G Global Mobile Network Experience Awards 2022 (Table 2), Malaysia had been ahead of Thailand, Indonesia, and the Philippines in 5G progress as of 2019. However, policy changes and political instability caused repeated delays in deployment, significantly slowing progress. Ultimately, Malaysia's pilot 5G rollout did not begin until late 2021.

Table 2: Timing and achievements of 5G construction in major ASEAN countries

Country	Trials	Commercial NSA 5G	Commercial SA 5G	Achievements and Targets
Malaysia	2019	2021	2022	5G network achieved 80.2% coverage of populated areas. The 5G adoption rate among mobile subscribers had risen to nearly 36%.
Singapore	2019	2020	2021	5G network had achieved over 95% nationwide coverage. Two nationwide networks with full-fledged 5G capabilities.
Philippines	2019	2019	2020	Globe's 5G network coverage reached 97.67% in Metro Manila areas. The core 5G market is expected to grow at a compound annual growth rate (CAGR) of 5.3 per cent from 2024 to 2030.

Thailand	2019	2020	2020	5G coverage is forecasted to reach 92% of the population by 2025.
Indonesia	2019	2021	2021	5G coverage is forecasted to reach 32% of the population by 2025.
Vietnam	2019	2020-2023	2024 ¹	Government aims for 100% population to be connected to 5G by 2030.

Sources: Author’s compilation.

Sworn in after the 2022 election, Prime Minister Anwar Ibrahim ordered an immediate review, saying DNB’s creation had been “not formulated transparently” and lacked a proper tender.⁷³ On 3 May 2023 the cabinet approved a dual-network model to “end the monopoly element” and “dismantle entrenched rent-seeking.”⁷⁴ Communications Minister Fahmi Fadzil told Parliament the switch would take effect once DNB hit 80 % coverage because “global best practice is competition, not monopoly.”⁷⁵ The new model was promoted as a solution to enhance the efficiency and flexibility of 5G deployment through market competition, while also providing an opportunity for Huawei to re-enter the program. This adjustment was seen as a pragmatic balance in the context of U.S.-China technological rivalry. However, under the new policy, the decision to award the second 5G network to U Mobile—a relatively smaller operator with a complex shareholder structure—sparked public concerns over potential political interference. In response, Communications and Digital Minister Fahmi Fadzil clarified that U Mobile was selected through a rigorous and independent evaluation process conducted by the MCMC, and that the decision was made without any political involvement.⁷⁶ Whether the dual-network framework delivers lower wholesale prices and the promised RM 8.5 billion GDP boost in 2025 remains the key test of the Unity Government’s performance narrative.

Whether it was the PH government’s cooperation with Huawei, the PN government’s centralized approach via DNB, or the Anwar administration’s shift to a dual-network model, the pursuit of regime legitimacy has consistently been the core logic driving Malaysia’s 5G policy development. Successive governments have sought to reinforce their legitimacy through the performance outcomes of digitalization policies, which can be observed in two key aspects:

Economic growth and societal benefits:

5G policies have been framed as tools to promote economic growth, create employment, and bridge the digital divide. Each administration has aimed to align 5G deployment with the public interest to demonstrate tangible benefits.

Symbolic significance of digital transformation:

5G policies have been positioned as flagship projects symbolizing national modernization. Governments have used the demonstration of policy outcomes to strengthen public trust while highlighting the country’s technological autonomy in the context of international competition.

Overall, regime legitimacy has played a dual role in Malaysia’s 5G development. On the one hand, it has driven governments to strengthen performance legitimacy through policy outcomes and strategic communication. On the other hand, differing legitimacy demands across administrations have caused disruptions to policy direction and implementation.

Political transitions have reshaped Malaysia’s 5G development model, bringing both challenges and opportunities for policy evolution. While frequent changes initially slowed progress, each government prioritized digitalization by leveraging performance legitimacy to advance the agenda. This legitimacy-driven policy adjustment reflects Malaysia’s unique approach to digital

transformation, offering valuable insights for other developing nations seeking to balance international competition with domestic needs.

Trade-off Between Economy and Security: Multi-Dimensional Considerations for Malaysia's 5G Policy

Malaysia's 5G policy also reflects a complex trade-off between economic imperatives and national security concerns. The Malaysian government recognizes that 5G technology is not only a critical tool for boosting productivity and attracting foreign investment but also a key driver for economic diversification and enhancing global competitiveness. As such, 5G has been incorporated into the country's long-term economic planning as an integral part of the "Shared Prosperity Vision 2030". Prime Minister Anwar Ibrahim has further emphasized telecommunications infrastructure as a priority investment area in the 2025 national budget, reinforcing Malaysia's ambitions as a regional digital hub.⁷⁷ Yet these economic aspirations are increasingly constrained by strategic uncertainty and security imperatives generated by intensifying U.S.-China technological rivalry. Malaysia must now navigate geopolitical risks tied to vendor trust, data governance, and infrastructure control—risks that complicate its pursuit of economic openness and efficiency. This external contestation has deepened domestic debates over how best to secure critical infrastructure while avoiding overdependence on any one supplier. It has also compelled successive governments to recalibrate their 5G approaches considering shifting public expectations, alliance alignments, and internal legitimacy needs. As a result, Malaysia's 5G strategy has evolved through a continuous negotiation between growth-driven ambitions and security-sensitive constraints—highlighting the multifaceted nature of digital policymaking under strategic pressure.

Under the Perikatan Nasional (PN) administration (2020–2022), the SWN model was introduced to optimize resources, reduce capital expenditure, and accelerate nationwide deployment. By adopting Multi-Operator Core Network (MOCN) technology, Malaysia sought to increase spectrum efficiency while preventing infrastructure duplication. Despite logistical hurdles, regulatory delays, and global supply chain disruptions, Malaysia successfully achieved 80% 5G coverage in high-density areas by 2024, a milestone that underscored the government's capacity for large-scale digital execution.⁷⁸ Yet, from a security vantage, the centralized model sparked institutional unease: it shifted spectrum and vendor control away from the MCMC toward the MoF, raising concerns about regulatory oversight and infrastructure vulnerability.

While the SWN model initially achieved its efficiency goals, it became increasingly evident that market dynamics and private sector engagement were necessary for long-term sustainability. The transition to a dual-network model under the Unity Government (2022–present) reflects Malaysia's effort to correct inefficiencies by introducing competition. Communications Minister Fahmi Fadzil has emphasized that the second 5G network will be entirely privately funded, ensuring cost-effectiveness without burdening public finance.⁷⁹ From an economic perspective, this move sought to align the rollout with market dynamics; from a security standpoint, it served as a safeguard against systemic vulnerability in a geopolitically contested digital environment.

Meanwhile, Malaysia must carefully reconcile competing pressures to ensure that its 5G policy safeguards economic competitiveness without compromising national security. Beyond its economic benefits, 5G technology is also closely tied to national security, data sovereignty, and geopolitical stability. Malaysia's security calculus has evolved in response to shifting global power dynamics, particularly the escalating U.S.-China technology rivalry. The United States has framed 5G security as a national strategic priority, using the "Clean Network" initiative to pressure allies and partners to exclude Huawei from critical infrastructure. China, on the other hand, has promoted

5G cooperation through the “Digital Silk Road,” positioning Huawei as a cost-effective, high-tech alternative for developing economies.

Malaysia must carefully reconcile competing pressures to ensure that its 5G policy safeguards economic competitiveness without compromising national security. During Mahathir Mohamad’s tenure as Prime Minister, a pragmatic security strategy was adopted, emphasizing national autonomy while prioritizing economic development. Under the subsequent administration of Muhyiddin Yassin, the SWN model was introduced as the primary 5G development strategy, reflecting heightened attention to network security. The DNB was tasked with the centralized management and construction of 5G infrastructure, a model designed to mitigate security risks and technological vulnerabilities. To address external pressures, the government selected Ericsson as the primary supplier, partially addressing U.S. concerns over Huawei’s technology.

Beyond 5G infrastructure, the Malaysian government has reinforced its security considerations through the Cybersecurity Act 2024 and amendments to the Personal Data Protection Act, requiring multinational companies to establish servers within the country and restricting cross-border data flows to ensure regulatory control over critical data⁸⁰. This policy not only responds directly to cybersecurity threats but also serves as a tool for safeguarding Malaysia’s national interests within the digital economy.

Under Prime Minister Anwar Ibrahim, the government has allowed Chinese companies to participate in the construction of a second 5G network while retaining Ericsson’s dominant role in the first network. This strategy of technological diversification reflects Malaysia’s attempt to strike a balance under the pressure of U.S.-China competition. By reducing reliance on a single supplier and fostering competition, the government aims to enhance the security and stability of its networks.

The development of Malaysia’s 5G policy illustrates the government’s holistic approach to balancing economic and security considerations. Economic interests drive policy design, as seen in the SWN model’s cost and coverage efficiency and the dual-network model’s responsiveness to market demands and public expectations. At the same time, security needs are addressed through data sovereignty policies and technological diversification strategies. In weighing economic interests against geopolitical pressures, Malaysia prioritizes economic benefits, focusing on digital economy development, resource optimization, and economic diversification. Through data sovereignty and diversified technological choices, Malaysia navigates the dual pressures of international competition and domestic needs. With political stability as a foundation, the government employs flexible adjustments in technological strategies to maximize national interests.

Conclusion

This paper examines how Malaysia’s evolving 5G policy reflects the strategic balancing act of a developmental state navigating external technological competition and domestic political constraints. By integrating Neoclassical Realism and Performance Legitimacy Theory, the study explains how successive Malaysian governments have adapted 5G policies to balance economic growth, national security, and regime legitimacy. The findings reveal that Malaysia’s policy trajectory—from a market-driven approach to a state-led SWN model and ultimately to a dual-network framework—demonstrates a dynamic response to geopolitical pressures, economic priorities, and governance challenges. These shifts illustrate that technological governance in developmental states is not only shaped by economic imperatives but also by security concerns and political adaptability.

This study confirms that external geopolitical pressures alone do not directly dictate policy outcomes; rather, their impacts are significantly mediated by domestic political variables and legitimacy calculations. The empirical findings underscore that technological governance in developmental

states is not merely an economic or technocratic exercise but inherently involves strategic political manoeuvring aimed at demonstrating administrative competence, meeting public expectations, and securing regime legitimacy.

Theoretically, the study advances existing scholarship by combining NCR's analytical sensitivity to external-domestic interactions with PLT's emphasis on the political legitimacy of economic performance. This integrated framework not only enhances explanatory precision but also offers a replicable analytical tool for exploring technology-policy choices in similarly positioned middle-power or developmental contexts.

From a policy perspective, Malaysia's 5G development experience offers practical lessons for other developing countries seeking to balance innovation, security, and sovereignty. First, promoting competitive multi-vendor ecosystems and adopting open standards can reduce dependency on any single geopolitical bloc. Second, institutionalizing whole-of-government coordination—across telecommunications, finance, defence, and economic ministries—ensures strategic alignment and faster decision-making. Third, data sovereignty and cybersecurity should be strengthened through robust localization laws and responsive governance frameworks. Finally, sustained investment in local R&D and digital talent is crucial for long-term technological resilience. These strategies can help states navigate intensifying global tech competition while securing inclusive and autonomous digital futures.

In an era of intensifying global digital competition, Malaysia's case illustrates how mid-sized economies can hedge between great powers while advancing their own developmental goals. As more states seek to navigate technological interdependence and strategic autonomy, Malaysia's approach provides a valuable model for balancing external pressures with domestic needs in an increasingly contested digital landscape.

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Notes

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