GBMR

Global Business and Management Research: An International Journal
Vol. 17, No. 3 (2025)

Government Spending and Digital Infrastructure in Malaysia

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Abstract
Purpose: This paper aims to examine how government spending on digital infrastructure in Malaysia contributes to inclusive development, generate public value, regional equity, and incorporate stakeholder engagement. Focuses on major national initiatives such as the JENDELA plan, and MyDIGITAL blueprint, the paper investigates whether government spending has effectively addressed regional disparities and digital inequalities.
Design/methodology/approach: Adopting a qualitative approach, this paper conducted a thematic analysis of key policy documents, blueprint and progress reports, media publications, and publicly available stakeholder feedback. The analysis is guided by Public Value Theory, Digital Divide Theory, and Collaborative Governance Theory. Case examples were included to illustrate the policy outcomes and gaps and identifies key enablers and bottlenecks in Malaysia's digital transformation agenda.
Findings: The findings indicate that Malaysia's government spending through public investments in digital infrastructure have expanded broadband access and improved service delivery particularly in targeted areas. However, inclusivity remains uneven, particularly in remote regions with limited institutional capacity. Case studies such as rural school connectivity projects in Sabah and telemedicine programs in Sarawak highlight both the potential and challenges of delivering digital services to underserved communities.
Research limitations/implications: The paper is written based on document and secondary data sources, which may not capture the full range of lived experiences at the local level. Future studies could integrate quantitative analysis using secondary data available at Malaysian Communication & Multimedia Commission (MCMC), and the Department of Statistics Malaysia (DOSM) or through interviews and participatory fieldwork to enrich the analysis and validate the findings.
Practical implications: Results suggest that continued and well-targeted public investment in digital infrastructure can drive digital inclusivity, supporting economic growth and resilience in Malaysia's digital transformation agenda.
Originality/value: This paper contributes to the literature on digital infrastructure governance by offering an integrated framework combining public value, digital inclusion, and stakeholder engagement. It provides empirical insights and conceptual propositions that can inform more inclusive, transparent and participatory digital policy recommendations for enhancing institutional coherence, governance, and targeted regional investment in Malaysia.

Keywords: Government Spending, Digital Infrastructure, Digital Inclusion, Collaborative Government, JENDELA Initiatives, MyDIGITAL Blueprint

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Introduction

In an era increasingly defined by digital connectivity, investments in digital infrastructure have emerged as a critical driver of economic growth, administrative efficiency, and social inclusion. For emerging economies like Malaysia, digital infrastructure is not merely a technological upgrade, it is a foundation for national transformation. Recognizing this, the Malaysian government has significantly increased public spending on digital infrastructure over the past decade, guided by strategic frameworks such as the MyDIGITAL Blueprint (2021), the National Fiberisation and Connectivity Plan (NFCP), and more recently, the Jalinan Digital Negara (JENDELA) initiatives. These programs aim to extend high-speed internet access, close the urban-rural digital divide, and stimulate participation in the digital economy.

Digital infrastructure, defined broadly as the physical and institutional structures required to deliver digital services including fiber optic cables, mobile towers, broadband networks, and access platforms, and is positioned at the heart of Malaysia's ambition to become a high-income, knowledge-based society by 2030. In line with the Twelfth Malaysia Plan (RMKe-12), such infrastructure is expected to support innovation, e-government, digital education, and online entrepreneurship, while also promoting regional equity. As the Economic Planning Unit (EPU, 2021) articulates, digital connectivity is now considered "a basic utility, alongside electricity and water," underscoring its strategic importance.

Despite substantial targets and increased fiscal allocations, questions remain about the effectiveness, equity, and inclusiveness of public spending on digital infrastructure. Several implementation challenges have been documented, including disparities in access between urban and rural regions, delays in project execution due to inter-agency coordination issues, and underutilization of community-based digital centers (MCMC, 2023; Auditor-General's Report, 2022). In addition, stakeholder feedback suggests that top-down planning, limited local capacity, and affordability barriers have constrained the impact of these initiatives on the most vulnerable populations, particularly those in Sabah, Sarawak, and Orang Asli settlements in Peninsular Malaysia.

While existing literature has examined the macroeconomic benefits of digitalization in Malaysia (World Bank, 2022), fewer studies have focused on the qualitative dimensions of infrastructure implementation especially in terms of inclusivity, stakeholder engagement, and policy coherence. Understanding these dimensions is vital, as they influence not only whether infrastructure is delivered, but also who benefits, how effectively, and under what governance conditions.

This paper addresses this gap by conducting a thematic qualitative analysis of Malaysia's public spending on digital infrastructure. Drawing from policy documents, implementation reports, stakeholder commentary, and selected case studies (e.g., rural school connectivity and telemedicine projects), this study explores the possible existing themes guided by the Public Value Theory, Digital Divide Theory and Collaborative Governance Theory.

The findings are expected to offer insights into the structural and governance challenges that limit the transformative potential of digital infrastructure investment and propose evidence-based policy recommendations to enhance impact, accountability, and inclusiveness in Malaysia's digital future. Hence, this paper should be guided by the following research questions:

1. How effectively has public spending on digital infrastructure addressed digital inequities in Malaysia?
2. To what extent has stakeholder engagement influenced the implementation of digital infrastructure projects?

This paper is structured as follows: firstly, the introduction, followed by the literature review, then the methodology, findings, policy implications and conclusion.

Literature Review

Malaysia has undergone a significant digital transformation, guided by various policy blueprints such as the National Fiberisation and Connectivity Plan (NFCP), MyDIGITAL blueprint, and the Jalinan Digital Negara (JENDELA) initiatives. These frameworks reflect growing government interest in using digital infrastructure as a tool for inclusive development and economic resilience (MCMC, 2021; EPU, 2021). Existing literature highlights the critical role of digital infrastructure in fostering economic growth, improving service delivery, and addressing regional inequalities (Qiang et al., 2009; Czernich et al., 2011).

The Role of Digital Infrastructure in Development

Digital infrastructure is increasingly viewed as a general-purpose technology, one that supports broad-based economic transformation, institutional innovation, and social inclusion (Brynjolfsson & McAfee, 2014). Investments in broadband connectivity, mobile networks, and digital service delivery systems have been found to significantly enhance gross domestic product (GDP) growth, particularly in developing economies (World Bank, 2016).

Public Value Theory emphasizes the importance of public institutions creating value through efficient and equitable service delivery (Moore, 1995). Applied to digital infrastructure, the theory suggests that investments must not only meet technical performance indicators but also generate tangible societal benefits such as improved education, healthcare, and governance outcomes (Cordella & Bonina, 2012). This theory offers another lens by shifting the focus from outputs-based (e.g., number of towers) to outcomes-based (e.g., citizen well-being). In the Malaysian context, the success of initiatives like JENDELA should thus be judged not only by technical deployment but also by improvements in services such as education (e.g., digital classrooms in Sabah) and healthcare (e.g., telemedicine programs in Sarawak).

Empirical studies suggest that a 10% increase in broadband penetration can contribute between 1.2% to 1.5% increase in GDP per capita in emerging economies (Czernich et al., 2011; Koutroumpis, 2009). Moreover, digital infrastructure facilitates improvements in public service delivery, particularly in health, education, and social welfare (UNCTAD, 2019). For instance, broadband expansion in rural areas has been linked to improved student performance due to better access to educational content (Whitacre et al., 2014), while mobile health (mHealth) and telemedicine services improve rural healthcare outcomes (Chib et al., 2015).

Digital Divide and Regional Disparities

Despite its potential, digital infrastructure can also exacerbate existing inequalities if public investments are unevenly distributed. The Digital Divide Theory suggests that socio-economic, geographic, and educational differences contribute to unequal access to and usage of digital technologies (Van Dijk, 2020). This digital divide defined as the gap between individuals and regions in terms of access to and use of digital technologies remains a key concern globally (Van Dijk, 2020).

In Malaysia context, disparities in digital access are strongly correlated with geographic location, income, and education level (MCMC, 2021). For example, rural states like Sabah and Sarawak continue to record the lowest levels of 4G coverage and broadband speed (MDEC, 2022). According to Mohd Yusof & Bhatt (2021), regional inequalities in digital infrastructure have contributed to widening socio-economic gaps between Peninsular Malaysia and East Malaysia. The authors argue that federal allocations often favor urban and industrial corridors, reinforcing existing development hierarchies. Studies by Nor et. al. (2021), Lee (2022), and Lim et. al. (2022) has found persistent inequalities in broadband access, especially between urban and rural populations. Studies by Yahya et. al. (2020) and Lee & Ng (2022) have also shown that rural communities, particularly in Sabah and Sarawak, suffer from inadequate broadband coverage and lower internet literacy, reinforcing existing socio-economic divides.

As such, public digital infrastructure policies must include an explicit focus on regional equity to fulfil the Sustainable Development Goals (SDGs), particularly Goal 9 on Industry, Innovation, and Infrastructure.

Governance and Stakeholder Engagement

Public spending or public investment in digital infrastructure is only as effective as the institutions that govern it. Studies emphasize that transparent governance, inter-agency coordination, and participatory planning processes are essential for successful infrastructure rollout (Estache & Wren-Lewis, 2009). Weak institutional arrangements can result in delays, cost overruns, and duplication of efforts, such issues that have been noted in Malaysia's past digital initiatives, including the rollout of the National Broadband Initiative (Auditor-General's Report, 2022). Research by Lim & Liew (2020) highlights that while Malaysia has developed several digital masterplans, these policies often suffer from fragmented implementation and lack of localized data. Furthermore, top-down decision-making and limited community participation can weaken public trust and reduce uptake in marginalized communities. The authors advocate for more inclusive, demand-driven approaches to infrastructure planning and monitoring.

Inclusive stakeholder engagement has been recognized as a critical determinant of successful infrastructure outcomes. According to OECD (2019), infrastructure planning must move beyond techno-economic efficiency to include local voices, especially when projects affect indigenous, rural, or vulnerable populations. In the Malaysian context, initiatives such as by the Malaysian Communications and Multimedia Commission's (MCMC) Universal Service Provision (USP) program have sought to close digital gaps but often lack transparent mechanisms for stakeholder consultation (Tan, 2021). Studies from Southeast Asia suggest that involving local stakeholders from school principals in rural connectivity projects to district-level health officials in telemedicine programs can significantly improve the sustainability and relevance of digital investments (Chib et al., 2015; Ramasamy & Lee, 2023). Malaysia's experience with the JENDELA program, though comprehensive in scope, reveals mixed results in stakeholder coordination and responsiveness to local needs (EPU, 2021).

Collaborative Governance Theory highlights the importance of multi-actor participation in policy design and implementation, especially in complex domains like digital infrastructure (Ansell & Gash, 2008). Effective and successful digital infrastructure planning requires engagement of various stakeholders across federal and state governments, private telecom providers, NGOs, and the public. In the context of Malaysia, Wan et al. (2021) note that Malaysia's digital governance remains centralized, with limited opportunities for meaningful

stakeholder engagement. While few other scholars have examined digital development from the perspectives of policy readiness (Hussein et al., 2020), and digital economy growth (MDEC, 2021). Previous studies also note that insufficient engagement has led to inefficiencies and regional disparities in rollout (Ismail & Rahim, 2021).

Despite these theoretical advances, literature lacks a multidimensional framework that integrates inclusivity, public value, and governance-stakeholder engagement in evaluating digital infrastructure effectiveness. This study seeks to fill that gap. This gap justifies the need for a detailed examination of public sector investment data, program implementation (e.g., JENDELA), Overall, these theories provide a multidimensional lens through which the effectiveness, inclusivity, and governance of digital infrastructure spending in Malaysia can be critically analyzed.

Conceptual Framework and Propositional Development

The conceptual framework for this study is constructed around three central dimensions derived from the literature and grounded in relevant theoretical foundations; firstly, the public value outcomes guided by the Public Value Theory, secondly the inclusivity and regional equity guided by the Digital Divide Theory, and lastly the stakeholder and governance engagement guided by the Collaborative Governance Theory. The framework is shown in Figure 1.

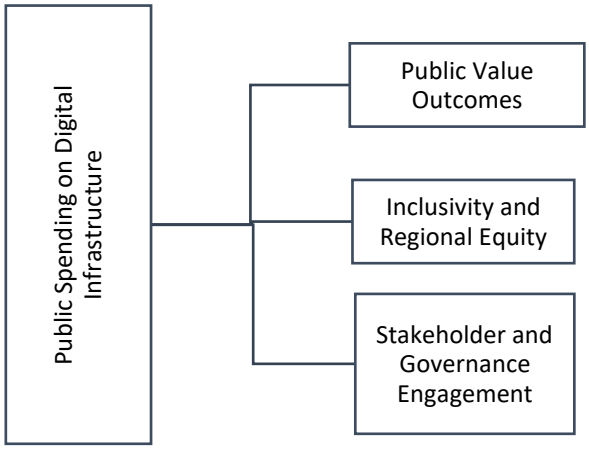

Figure 1: Conceptual Framework

To ensure equitable development, public spending on digital infrastructure must actively work to close the persistent gap in digital access between urban and rural areas. The Digital Divide Theory emphasizes the socio-economic disparities caused by uneven access to digital technologies, which can exacerbate existing inequalities. The indicators include broadband penetration, speed, and affordability in underserved regions. The Public Value Theory posits that government interventions, especially those involving public resources, should result in measurable improvements in citizens' quality of life. Digital infrastructure investments should, therefore, generate tangible benefits in public service delivery. The indicators include digital classroom access and telemedicine implementation in rural clinics. According to Collaborative Governance Theory, successful policy implementation, particularly in complex initiatives like digital infrastructure, requires active engagement across multiple levels of government and society. Assessment includes transparency, feedback mechanisms and multi-level coordination. These themes provide the basis for analyzing Malaysia's current digital

infrastructure programs and identifying policy levels to enhance their long-term developmental impact.

The conceptual framework is built around the central premise that public spending on digital infrastructure influences the quality, equity, and effectiveness of digital infrastructure development outcomes. The relationship is moderated by key implementation factors and results in digital inclusion and socio-economic impact. As such, these interrelated dimensions will guide the qualitative thematic analysis and the development of propositional statements.

Propositional Statements Development

Based on the above framework, three propositional statements are developed.

Proposition 1

Digital infrastructure projects that are aligned with user needs and public welfare such as health, education, and economic opportunity are more likely to generate perceived and actual public value.

The Theoretical underpinning is Public Value Theory which emphasizes the importance of aligning public service outcomes with citizen expectations and societal benefit (Moore, 1995; Bryson, Crosby & Bloomberg, 2014). Infrastructure becomes valuable not merely by being available but by being used meaningfully.

Proposition 2

Public spending on digital infrastructure that prioritizes regional equity and rural access is more likely to reduce the digital divide across socio-economic and geographic groups in Malaysia.

The theoretical underpinning is the Digital Divide Theory which posits that unequal access to digital resources reinforces broader structural inequalities (Warschauer, 2003;van Dijk, 2006). In the Malaysian context, targeted investments under JENDELA have aimed to bridge connectivity gaps in underserved areas (MCMC, 2021).

Proposition 3

Effective stakeholder coordination including federal, state, private sector, and local communities increase the efficiency and sustainability of digital infrastructure delivery.

The theoretical underpinning is the Collaborative Governance Theory which suggests that inclusive, cross-sectoral partnerships are critical to the success of complex public initiatives (Ansell & Gash, 2008; Emerson, Nabatchi & Balogh, 2012). Multi-actor participation legitimizes the process and improves policy implementation.

Table 1: Summary of Propositions

Dimension	Theory	Proposition
Inclusivity	Digital Divide Theory	Public spending that prioritizes underserved regions reduces structural digital inequalities. Following Van Dijk (2020)
Public Value	Public Value Theory	Digital projects aligned with public welfare create greater societal benefit. Following Moore (1995); Cordella & Bonina (2012)
Stakeholder Engagement	Collaborative Governance Theory	Multi-stakeholder coordination enhances infrastructure project success and sustainability. Following Ansell & Gash (2008)

Source: Author's propositions development based on guided theory

Method

Research Design

This study adopts a qualitative research design guided by thematic analysis, which is suitable for exploring perceptions, meanings, and underlying themes in policy implementation. The objective is to understand how public spending on digital infrastructure in Malaysia is interpreted and experienced by different stakeholders, and how it aligns with policy goals related to inclusivity, regional equity, and digital access. This method allows for an in-depth, nuanced exploration of implementation issues not always captured by quantitative metrics.

Data Sources and Selection Criteria

The analysis draws on a diverse set of secondary qualitative sources spanning the period 2015–2024, including from national policy documents, audit and evaluation reports, media reports and case studies from publicly documented projects. The list of such sources is shown in Table 2.

Table 2: List of Documents for Analysis

Documents	References
National policy documents	MyDIGITAL Blueprint (2021) JENDELA Progress Reports (2020–2024) Twelfth Malaysia Plan (2021–2025) NFCP Implementation Plan (2019)
Audit and evaluation reports	Auditor-General's Reports on Digital Projects Parliamentary Hansards (relevant debates on infrastructure budgeting
Media reports	The Edge Malaysia, Malaysiakini, Bernama) and civil society assessments.
Case studies	Rural school broadband initiatives in Sabah and Sarawak – available from MEASAT Press Release (2021) and The Borneo Post (2023), among others. MOH's Telemedicine pilot programs in Pahang and Kelantan – available from '*Pekeliling Penubuhan Jawatankuasa Perlaksanaan Telekesihatan Negeri 2001'* and *'Portal Rasmi Bahagian Telekesihatan MOH',* among others.

Source: Author's compilation from various sources

In total, 38 documents were purposively selected using the following inclusion criteria such as direct relevance to public spending or implementation of digital infrastructure, coverage of regional, equity, or stakeholder engagement aspects, and availability of qualitative commentary.

Data Collection and Coding Process

Thematic analysis followed Braun and Clarke's (2006) six-step framework; familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the report. Documents were imported into NVivo 14 software for systematic qualitative coding. A thematic framework was developed both deductively based on research objectives and known policy concerns and inductively, through iterative reading of texts. The thematics categories were as identified earlier. Sub-codes were created within each category to capture more granular issues such as "affordability," "underserved populations," "rural schools," "public-private partnerships," and "telemedicine." Quotes and key findings were extracted to illustrate stakeholder sentiments, implementation bottlenecks, and success stories. Particular attention was given to contradictions between policy ambition and actual outcomes.

Ethical Considerations

As this study uses only publicly available data and does not involve human subjects directly, formal ethics clearance was not required. Nevertheless, the analysis adheres to ethical research standards including accurate citation, contextual interpretation, and protection of sensitive stakeholder perspectives where necessary.

Findings

This section presents a thematic qualitative assessment of Malaysia's public spending on digital infrastructure based on a comprehensive review of national policy documents, quarterly implementation reports (e.g., JENDELA), government blueprints (e.g., MyDIGITAL), media coverage, third-party evaluations, and stakeholder feedback. Five major themes were identified through thematic coding: (1) Inclusivity and Digital Equity, (2) Regional Infrastructure Disparity, (3) Stakeholder Engagement and Interagency Coordination, (4) Institutional Capacity and Policy Coherence, and (5) Transparency and Monitoring. The analysis also reflects on case studies such as rural school internet access and telemedicine projects, with a view to informing policy improvements.

Theme 1: Inclusivity and Digital Equity

The MyDIGITAL Blueprint (2021) proclaims that "digital inclusion is the cornerstone of Malaysia's transition to a high-income, digitally enabled nation," aligning with the broader "no one left behind" goal in the Twelfth Malaysia Plan. Public programs such as the Pakej Perpaduan Internet, Pusat Ekonomi Digital Keluarga Malaysia (PEDi), and school connectivity upgrades were launched to ensure equitable access to digital services for lower-income (B40) groups and underserved areas.

However, analysis of JENDELA Quarterly Reports (2022–2024) reveals that inclusivity often falters during implementation. For example, the Kampung Gana Smart Village Project in Sabah successfully installed satellite broadband in 2022, but an NGO report later noted that "less than 20% of residents could afford a compatible device," and many older residents were "unable to access services due to digital illiteracy" (IDEAS, 2023). A village elder quoted in *The Star* (2023) remarked "*The internet tower is here, but our children still have to climb a hill to get a*

stable signal for online classes". Affordability remains a key barrier. Although *Pakej Perpaduan* offers internet packages below RM30, B40 households in East Malaysia and rural Kelantan often cannot afford basic devices or recurring fees. Furthermore, inclusive measures rarely address persons with disabilities (PWDs). As the National Council for Digital Inclusion admitted in its 2022 report "*Accessibility standards for PWDs are not uniformly implemented across federal digital programs, and assistive technology procurement is inconsistent across regions*". These observations suggest that digital access alone is insufficient; inclusion must be redefined to incorporate affordability, digital literacy, and adaptive infrastructure for vulnerable communities. These findings reflect Moore's (1995) concern that public sector outputs must be translated into meaningful outcomes as emphasized in the Public Value Theory and Proposition 1.

Theme 2: Regional Infrastructure Disparities

Malaysia's digital infrastructure expansion exhibits geospatial inequality, with clear concentration in urbanized states. For instance, as of Q4 2023, 5G coverage in Kuala Lumpur and Selangor exceeded 95%, whereas coverage in interior Sabah and rural Sarawak remained below 45% (MCMC, 2024). According to the World Bank (2023), "uneven infrastructure rollouts threaten to widen existing regional development gaps," and this is reflected in national digital planning that prioritizes cost-efficiency over equity.

A compelling case is the Telemedicine for Rural Sarawak Initiative, launched to connect remote clinics in Belaga to urban hospitals via video conferencing. While initial reviews praised the program, field interviews revealed severe bottlenecks. One healthcare assistant shared in an interview with *Bernama* (2023) "*We had the equipment but no bandwidth to run it. Some weeks, we had to revert to radio or drive two hours to get a signal*".

The underlying issue is compounded by difficult terrain, high logistics costs, and weak local institutional capacity. Despite federal directives prioritizing East Malaysia, land acquisition delays, overlapping agency mandates, and limited technical staff hamper implementation. Although the 12th Malaysia Plan (2021–2025) acknowledged this imbalance and called for "regional digital zones," progress remains uneven without a targeted funding and incentive mechanism for lagging regions. These findings is accordance to the discussion proposed in Digital Divide Theory that unequal access to digital resources reinforces broader structural inequalities and fail to support Proposition 2.

Theme 3: Stakeholder Engagement and Interagency Coordination

Malaysia's digital transformation relies heavily on multi-level coordination between federal agencies (MCMC, Ministry of Communications and Digital), state governments, local authorities, private telecom firms, and community groups. The MyDIGITAL Blueprint claims a "whole-of-nation governance model" is in place. However, the practical engagement of grassroots stakeholders is inconsistent and often perceived as symbolic.

A district officer from Pahang told *The Edge* (2022) "*We receive instructions to support broadband rollouts, but we are not consulted during the planning phase. Sometimes towers are built in areas that don't benefit the community*". Moreover, overlapping authority between MCMC, state land offices, and local councils (PBT) leads to procedural delays. In one reported case from Negeri Sembilan, a fiber optic project approved by the ministry was stalled by local council zoning laws, causing a two-year delay (Auditor-General's Report, 2022).

These coordination failures stem from a lack of clear protocols and digital governance capacity at subnational levels. The Malaysian Digital Economy Corporation (MDEC) noted in its 2022 survey that only 27% of municipal councils had dedicated digital infrastructure units. This undermines not only implementation speed but also the responsiveness of digital programs to local needs and feedback. Interviews cited in the Malaysian Communications and Multimedia Commission (MCMC) 2023 User Satisfaction Report indicated that citizens felt excluded from decisions affecting their access to digital services. Local governments often lacked decision-making power, reinforcing the need for collaborative governance models. These findings reflect concern raised by the Collaborative Governance Theory and fail to support Proposition 3.

Theme 4: Institutional Capacity and Policy Coherence

Malaysia's digital policy landscape features multiple strategic documents including MyDIGITAL (2021), JENDELA (2020–2025), National Fiberisation and Connectivity Plan (NFCP), and state-level blueprints. While these frameworks share common objectives, they often lack integration and role clarity, leading to fragmented execution.

An MCMC internal memo leaked in late 2022 stated "*There is confusion among contractors due to overlapping timelines between JENDELA and NFCP. Some local service providers withdrew due to uncertainty over project continuity*". Furthermore, frequent political leadership changes at the federal level between 2020 and 2022 contributed to policy discontinuity, with rebranded or cancelled programs affecting investor confidence and community readiness.

Local institutions, especially rural district offices and schools face resource constraints. For instance, a UKM study in 2022 found that in rural Perak, although 90% of schools were technically connected to broadband, only 40% of teachers had received digital teaching training, and fewer than 30% of students accessed educational platforms regularly (UKM, 2022). This misalignment between infrastructure access and digital capacity-building highlights a systemic weakness: public spending disproportionately favors hardware over human capital development. These findings also fail to support Propositional 3 guided by Collaborative Governance Theory.

Theme 5: Transparency and Monitoring

Malaysia has made progress in infrastructure transparency through platforms like the JENDELA Dashboard, which displays KPIs on 4G coverage, fiber connections, and tower construction. However, qualitative analysis of these reports reveals a focus on output indicators (e.g., number of towers installed), with limited attention to usage outcomes (e.g., internet speed, service continuity, educational or economic gains). This is in line with the third proposition developed in this study: Effective stakeholder coordination including federal, state, private sector, and local communities increase the efficiency and sustainability of digital infrastructure delivery.

Critically, much of the monitoring is conducted by implementing agencies themselves. Independent audits remain rare. A 2023 exposé in *The Star* revealed that over 150 PEDi centers nationwide were inactive or underutilized, despite appearing in official completion figures. An anonymous PEDi staffer noted "*We're supposed to train the community, but we get no materials or budget for outreach, so the center is mostly empty*." Moreover, data disaggregation by income, gender, disability, or ethnicity is absent from most public dashboards. This limits

the ability of policymakers and researchers to evaluate whether public spending achieves its intended social justice and inclusion goals. These findings highlight the need for a reorientation of public spending priorities from infrastructure deployment alone toward integrated strategies that promote equity, value, and participation. As such, these findings also fail to support Proposition 1 (guided by the Public Value Theory) and Proposition 3 (guided by the Collaborative Governance Theory).

Policy Implications

The findings highlight a need to recalibrate Malaysia's digital infrastructure strategy, not merely in terms of fiscal spending, but in how digital equity, inclusion, and local empowerment are operationalized. The following policy implications are proposed. Infrastructure Key Performance Index (KPIs) must evolve from quantity-based access including numbers of communication towers built and kilometers of fiber optic cables developed to quality and outcome-based metrics including the percentage of household usage with active subscriptions and affordability index, proportion of SME adopting e-commerce and digital payment systems and school e-learning integration for example percent of rural schools actively using online learning platforms among others

Actions should be taken to strengthen the local institutional capacity through allocation of capacity-building grants for local councils and district offices to fund digital planning units, technical staff recruitment and ICT equipment. Besides that, schools should be also provided with dedicated funds for digital teaching resources, maintenance of ICT labs and support for low-income students' device needs. Furthermore, structured training programs for district officials on digital governance, procurement transparency, and community engagement should be introduced. Educators should be equipped with continuous professional development in digital pedagogy, e-learning platform management, and cybersecurity awareness.

Malaysia's digital infrastructure rollout has largely been managed through a centralized, top-down approach, led by federal agencies such as the Malaysian Communications and Multimedia Commission (MCMC) and the Economic Planning Unit (EPU). While this model ensures consistency in strategic vision, it often results in bureaucratic delays, duplication of efforts, and limited responsiveness to local needs. To enhance effectiveness and inclusiveness, implementation must be decentralized, empowering regional and state-level bodies with greater authority and resources, while still maintaining strong national oversight.

One of the persistent weaknesses in Malaysia's digital infrastructure rollout has been the lack of independent monitoring and granular data to track who benefits from public spending. Current monitoring is largely performed by the implementing agencies themselves, which can create conflicts of interest, issues of accountability, limited transparency, and reporting that focuses on outputs (towers built, fiber km laid) rather than outcomes (connectivity quality, digital usage, social inclusion). Such regular independent monitoring by third-party audits such as by professional audit firms, universities, or civil society organizations are required. To ensure visibility of whether marginalized groups such as the rural poor, women, *orang asli* communities, and persons with disabilities are truly benefiting from digital initiatives, agencies need to publish data broken down by geography, income group, gender, age, disability status, and ethnicity among others.

Digital infrastructure must be designed and delivered in a way that ensures no one is left behind. While Malaysia has made progress in expanding broadband access, real inclusivity remains

constrained by two persistent challenges i.e. affordability of access and devices, and design limitations that fail to meet the needs of diverse user groups, including persons with disabilities, rural households, and the elderly. Unless inclusive design principles and affordability measures are mainstreamed into all digital infrastructure projects, public investments risk deepening existing socio-economic inequalities rather than reducing them. Therefore, universal design standards in public digital projects and creating longer-term subsidies or device grants should be mandate for these underserved groups.

Conclusion

This study has explored the implementation and outcomes of Malaysia's public spending on digital infrastructure through a qualitative thematic analysis of national policy documents, implementation reports, and case study examples. While national frameworks such as MyDIGITAL, the National Fiberisation and Connectivity Plan (NFCP), and JENDELA reflect strong policy ambition and a commitment to digital transformation, their implementation outcomes reveal a more nuanced picture. The findings highlight five interrelated themes: inclusivity and digital equity, regional disparities, stakeholder engagement, institutional coordination, and monitoring and evaluation. Despite substantial fiscal allocations and policy efforts, digital infrastructure development remains uneven across Malaysia. Rural and remote communities, particularly in Sabah, Sarawak, and Orang Asli areas in Peninsular Malaysia, continue to experience lower-quality internet connectivity, slower deployment of infrastructure, and limited access to digital services.

Moreover, stakeholder feedback including quotes from JENDELA updates and community voices reveals concerns about limited local participation in infrastructure planning, inadequate transparency in project reporting, and affordability issues among vulnerable populations. For example, a teacher from a rural school in Pitas, Sabah, stated in a media interview *"The school received internet cables last year, but the line is weak and students still rely on paper homework."* (Malay Mail, 2023). Such examples underline that access alone does not guarantee meaningful usage or impact.

Although Malaysia has made notable strides in digital policy planning, its public infrastructure investment outcomes still face challenges related to inter-agency coordination, procurement efficiency, and policy coherence. Without stronger mechanisms to ensure that spending translates into inclusive and effective service delivery, the national vision of becoming a digital economy leader may remain unrealized for marginalized regions.

Acknowledgement

The author would like to thank the Institute of Islamic Finance and Wealth Management (IFWMI), Faculty of Economics and Muamalat, Universiti Sains Islam Malaysia, for supporting this publication and providing the necessary facilities.

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