



METaverse DISRUPTION IN PUBLIC SERVICES: OPPORTUNITIES AND CHALLENGES IN BUILDING VIRTUAL GOVERNMENT IN WEST TULANG BAWANG DISTRICT

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Abstract

This study examines the disruption of the metaverse in public services, with a focus on the opportunities and challenges of building a virtual government in Tulang Bawang Barat Regency. The metaverse has emerged as a potential frontier in digital government transformation, offering immersive and interactive platforms for service delivery. However, its adoption in local government contexts, particularly in regions with medium digital maturity, remains underexplored. Using a qualitative approach with descriptive analysis, this study integrates secondary data from SPBE index assessments, demographic statistics, and policy documents, alongside a literature review on metaverse governance. Findings indicate that Tulang Bawang Barat has laid initial foundations for digital government through SPBE implementation. Nevertheless, three major gaps constrain metaverse adoption: digital infrastructure deficits, human resource capability gaps, and the absence of regulatory frameworks for virtual governance. The study concludes that building a virtual government requires a phased approach prioritizing foundational digital transformation before metaverse integration. Strategic recommendations include strengthening digital infrastructure, developing public sector digital competencies, and establishing ethical guidelines for virtual service delivery.

Keywords: Metaverse, Public Service, Virtual Government, Digital Transformation, Local Government, SPBE

INTRODUCTION

The digital era has fundamentally changed public expectations regarding public service delivery. With the continued expansion of internet penetration and the increasingly widespread adoption of digital technology, demands on the government to provide fast, accessible, transparent, and responsive services continue to increase. In Indonesia, the digital transformation of government has been formalized through the Electronic-Based Government System (SPBE) policy, which aims to realize clean, effective, transparent, and accountable governance, as well as high-quality and reliable public services. However, technological developments do not stop at the digitization of conventional services. The metaverse presents a new wave of digital transformation that has the potential to fundamentally disrupt the way governments interact with their citizens. As the next iteration of the internet, the metaverse is a dynamic, ever-evolving realm that connects the digital world with the physical world (Kshetri, Dwivedi & Janssen, 2024). Unlike conventional two-dimensional web interfaces, the metaverse offers an immersive three-dimensional environment where citizens can interact with avatars, attend virtual town halls, access administrative services, and even participate in development planning deliberations in a seemingly real digital space. Several local governments across the world have begun experimenting with the metaverse, including the Seoul Metropolitan Government, which launched the "Metaverse Seoul" platform, and the Dubai Municipality, which is developing a metaverse strategy for its city services.

However, the potential of metaverse in the government sector has not received adequate attention in the academic literature, particularly in the context of local governments in developing countries (Kshetri et al., 2024). Furthermore, there is still insufficient evidence to ensure that metaverse will align with the public character of local governments, particularly in the dimensions of transparency, accountability, and inclusivity (Wan & Ho, 2024). Ironically, instead of increasing inclusivity, metaverse has the potential to exacerbate the digital divide given the high

need for infrastructure and digital literacy (Lnenicka, Rizun, Alexopoulos & Saxena, 2024). This gap becomes even more critical when implemented in regions with a still-developing level of digital maturity, such as regencies outside metropolitan centers. This research focuses on West Tulang Bawang Regency (Tubaba) as the study location. This regency, located in Lampung Province, has a population of 313,193 people in the first semester of 2025 (Population and Civil Registration Office of West Tulang Bawang Regency, 2025). In the context of digital transformation, Tubaba has demonstrated its commitment through the issuance of Regent Regulation Number 67 of 2024 concerning the Electronic-Based Government System and the preparation of the SPBE Architecture and Plan Map for the 2025-2029 period. However, the SPBE index achievement of Tulang Bawang Regency was recorded at 2.85 in 2024, with the highest value in the SPBE Policy domain (3.70) and the lowest value in the SPBE Governance domain (1.00) (Electronic-Based Government System of Tulang Bawang Regency, 2024). This achievement indicates that Tubaba is still in the early stages of digital maturity of government.

The research questions posed are: (1) What are the opportunities that can be utilized by the Tulang Bawang Barat Regency Government in adopting metaverse for public services? (2) What are the main challenges that hinder the development of virtual government in Tulang Bawang Barat Regency? (3) What is the appropriate phased strategy for local governments with medium digital maturity in integrating metaverse into the public service ecosystem? This study aims to comprehensively identify the opportunities and challenges of adopting metaverse in public services in Tulang Bawang Barat Regency and formulate strategic recommendations that are contextual to local conditions.

LITERATURE REVIEW

Metaverse as a Public Service Platform

The metaverse is defined as an immersive, persistent, and interconnected virtual environment where users can interact with each other and with digital objects through avatar representations. In the context of governance, the metaverse offers the potential to revolutionize how local governments interact with their citizens (Wan & Ho, 2024). Kshetri et al. (2024) identified six facilitators and nine barriers and risks to government adoption of the metaverse. They assert that the metaverse offers more than just a virtual presence or a copy of the physical world; significant transformations in governance are required to reap the benefits it offers.

Jobe, Yilmaz, and Ilgin's (2024) study of the Gambia case study identified that the metaverse has the potential to transform sectors such as education, public services, infrastructure development, urban planning, and cultural heritage tourism. However, significant barriers remain, including technical infrastructure readiness, ethical issues, and the need for policy reform. These findings are relevant to the Indonesian context in general and West Tulang Bawang in particular, given its comparable geographic characteristics and level of digital infrastructure development.

Digital Divide and Virtual Governance

The digital divide is one of the most critical issues in the discourse on metaverse adoption in the public sector. Data from the Central Statistics Agency (BPS) shows that by 2024, the computer ownership rate in urban areas will reach 25.23%, while in rural areas it will only be 8.98% (BPS, 2024). This gap encompasses not only access to hardware but also digital literacy and the technical skills necessary to participate in the metaverse ecosystem.

In their systematic review, Lnenicka et al. (2024) identified three general areas that shape how enterprise architecture layer challenges should be addressed in the future metaverse government research agenda: (a) content and data lifecycle management; (b) platforms, tools, and services; and (c) computing infrastructure and resources. The integration of these three areas relates to the four layers of enterprise architecture (technology, application, data, and business) that advance a new meta-stage in e-government maturity. This framework is highly relevant for analyzing West Tulang Bawang Regency's readiness to adopt the metaverse.

SPBE as the Foundation of Virtual Government

In Indonesia, SPBE is the primary policy framework that serves as the foundation for digital government transformation. Based on Presidential Regulation Number 95 of 2018, SPBE encompasses four main domains: internal policies, governance, management, and SPBE services. Implementation of SPBE at the district/city level is a fundamental prerequisite before a region can move to the adoption of more advanced technologies such as the metaverse. Without a strong SPBE foundation, efforts to build a virtual government will be fragile and at high risk of failure. Therefore, in this study, the SPBE framework is used as an analytical lens to assess the readiness of West Tulang Bawang Regency to transform into a metaverse government.

METHOD

This research uses a qualitative approach with descriptive analysis methods. This approach was chosen to deeply understand the disruptive phenomenon of the metaverse in public services in a specific local context and to identify contextual factors influencing the opportunities and challenges of adopting this technology.

Data collection was conducted through two main channels. First, a documentation study of various official documents and relevant secondary data, including: West Tulang Bawang Regent Regulation Number 67 of 2024 concerning SPBE, Tulang Bawang Regency SPBE index data for 2024, demographic and statistical data on population services from the Tubaba Civil Registration Office for the first semester of 2025, as well as the Regional Medium-Term Development Plan (RPJMD) and SPBE planning documents. Second, a systematic literature review of scientific publications related to metaverse governance, virtual government, and the digital transformation of public services published over the past 10 years, with a focus on literature relevant to the context of local government in developing countries.

Data analysis was conducted using thematic content analysis techniques. Data from various sources were categorized into key themes reflecting the opportunities and challenges of metaverse adoption and critically analyzed using the previously outlined theoretical framework. Data validity was strengthened through triangulation of data sources, comparing information from various official documents to ensure consistency and accuracy of the facts.

RESULTS AND DISCUSSION

Opportunities to Build a Virtual Government in West Tulang Bawang Regency

Research findings indicate that West Tulang Bawang Regency has several opportunities that could serve as a starting point for future virtual government development. These opportunities need to be recognized and strategically utilized given the region's limited resources.

First, political commitment and a regulatory framework for digital transformation have been established. The West Tulang Bawang Regency Government has established Regent Regulation Number 67 of 2024 concerning Electronic-Based Government Systems as the legal basis for the implementation of SPBE within the regional government. This regulation serves as the basis for the development and integration of electronic-based public services. Furthermore, in November 2024, the West Tulang Bawang Regency Government, through the Communication and Informatics Office, held a Focus Group Discussion on the Preparation of the SPBE Architecture and Plan Map as an initial step in developing planning guidelines for improving the implementation of SPBE within the regional government (West Tulang Bawang Regency Communication and Informatics Office, 2024).

Second, the foundations of digital services are already in place, ready for further development. The West Tulang Bawang Regency Population and Civil Registration Office has operated the e-Smile (Electronic Service Information Management System) platform, which recorded a total of 11,658 service requests, with a completion rate of 8,994 documents (West Tulang Bawang Regency Population and Civil Registration Office, 2025). Furthermore, strengthening Digital Population Identity (IKD) and outreach services to the village level have also become priority programs. The existence of these basic digital services demonstrates that a digital service ecosystem has begun to take shape, albeit on a limited scale.

Third, there is the potential for gradual adoption that doesn't require extreme technological leaps. Based on the typology developed by Lnenicka et al. (2024), local governments with a medium level of digital maturity don't need to immediately adopt the metaverse in its most sophisticated form. Instead, a gradual approach can be taken, starting with the virtualization of simple services such as immersive videoconferencing-based public consultation rooms, and gradually increasing the complexity of interactions as infrastructure and human resource capacity increase.

Fourth, there is national policy momentum driving the acceleration of regional digital transformation. The central government has set a target of implementing a national digital government index starting in 2026, which will replace the current SPBE evaluation system. This encourages local governments, including West Tulang Bawang Regency, to seriously accelerate their digital transformation.

The Challenge of Building a Virtual Government in West Tulang Bawang Regency

Although the opportunities are quite promising, this study identified three main challenges that are structural in nature and will significantly limit the ability of West Tulang Bawang Regency to build a virtual government.

Challenge 1: The Fundamental Digital Infrastructure Gap

Based on the 2024 Tulang Bawang Regency SPBE index data, the highest scores were achieved in the SPBE Policy domain (3.70) and the SPBE Service domain (3.69), while the lowest scores were in the SPBE Governance domain (1.00) and the SPBE Management domain (2.10) (Tulang Bawang Regency Electronic-Based Government

System, 2024). This pattern indicates an imbalance between policy aspects (which are relatively easier to implement through regulations) and technical operational aspects (which require significant infrastructure investment and management capacity).

This gap becomes critical when linked to the infrastructure requirements for the metaverse. The metaverse requires high-speed, low-latency internet connectivity, capable hardware (VR/AR headsets, computers with high graphics specifications), and computing systems capable of processing three-dimensional data in real time. The reality on the ground shows that even the most basic digital infrastructure challenges have not been fully addressed. The outreach service, still relied upon by the Tubaba Population and Civil Registration Office (Disdukcapil) to reach communities in remote areas, reflects the limited direct digital access from the community to service centers (Population and Civil Registration Office, West Tulang Bawang Regency, 2025).

Challenge 2: Limited Human Resource Capacity

The second, no less significant challenge is the limited human resource (HR) capacity, both among public service providers and among service users. From the provider's perspective, the low SPBE Management domain score (2.10) indicates weaknesses in digital government system management, including in planning, organizing, developing, and evaluating the system. The low technical and managerial capacity of HR within local governments is a serious obstacle to the adoption of complex technologies like the metaverse.

From a societal perspective, the state of digital literacy in non-metropolitan areas remains concerning. Statistics Indonesia (BPS) data shows that in 2024, the computer ownership rate in rural areas will only reach 8.98% (Central Statistics Agency, 2024). Furthermore, the 2023 National Socioeconomic Survey (Susenas) shows that internet penetration in rural areas will only reach 35.90%, compared to 64.10% in urban areas (Susenas, 2023). This gap is not simply a matter of access, but also reflects differences in levels of digital literacy, comfort with interacting with technology, and financial ability to access the devices necessary to participate in the metaverse ecosystem. Ironically, the metaverse, which is claimed to be a means of increasing inclusivity, has the potential to widen the gap between digitally literate citizens and those who are digitally disadvantaged.

Challenge 3: Absence of a Regulatory and Ethical Framework for Virtual Governance

The third challenge is suprastructural, namely the lack of a clear regulatory and ethical framework for metaverse governance in the public sector. As identified by Wan and Ho (2024), metaverse governance faces five key issues: increased surveillance risks, regulatory and legal issues, data management, ethical concerns, and implications for individuals.

At the national level, regulations on metaverses for the public sector remain very limited. Presidential Regulation No. 95 of 2018 concerning SPBE, designed to regulate electronic-based government systems within a conventional two-dimensional architecture, fails to address the complexities of metaverse governance, which involves real-time interactions in virtual spaces, digital identities in the form of avatars, transactions with virtual currencies, and data protection in immersive environments. At the regional level, Regent Regulation No. 67 of 2024 also focuses on SPBE in the conventional sense. This lack of a regulatory framework creates legal uncertainty for regional governments attempting to adopt metaverses.

Beyond regulatory aspects, ethical dimensions are also a serious concern. The metaverse, as an immersive virtual environment, has the potential to give rise to new forms of privacy violations, manipulation of citizen behavior through virtual choice architectures, and discrimination based on economic ability to own certain avatars or devices. Local governments lack ethical guidelines to address these risks.

A Phased Strategy for Building a Virtual Government

Based on the analysis of opportunities and challenges above, this study formulates a contextual, phased strategy for West Tulang Bawang Regency. This strategy is based on the premise that the metaverse is not the end goal of government digital transformation, but rather an instrument for improving the quality of public services. Therefore, the primary priority must remain establishing a strong digital foundation before moving on to metaverse adoption.

First Phase (2025-2027): Strengthening the SPBE Foundation

At this stage, the main focus is directed at improving the SPBE domain which is still weak, especially the SPBE Governance domain which currently has a value of 1.00 (very low). The necessary efforts include: (a) establishing an effective SPBE coordination team with clear authority; (b) developing standard operating procedures (SOPs) for all digital services; (c) increasing human resource capacity through continuous technical and managerial training; and (d) developing information security and personal data protection standards in accordance with the mandate of Government Regulation Number 71 of 2019.

Phase Two (2028-2030): Simple Service Virtualization

Once the SPBE foundation is sufficiently solid, local governments can begin experimenting with simple service virtualization. This can begin by: (a) building a virtual public consultation room based on immersive video conferencing that can be accessed through conventional devices (laptops/computers) first, without the need for a VR headset; (b) developing a virtual development planning deliberation (musrenbang) platform where citizens can participate through simple avatars; and (c) providing a virtual town hall for public information services and public complaints. At this stage, the pilot project needs to be carried out on a limited basis in the districts with the highest population densities (Tulang Bawang Tengah and Tumijajar) before being expanded to the entire region.

Phase Three (2031-2034): Gradual Metaverse Integration

At this stage, once digital infrastructure is more widespread and human resource capacity is adequate, local governments can begin to more fully integrate the metaverse into their public service ecosystem. This integration includes: (a) developing end-to-end population administration services within the metaverse environment; (b) providing training and public policy outreach through interactive metaverse platforms; and (c) developing virtual museums and cultural heritage sites as part of regional tourism promotion efforts.

Table 1. Gradual Strategy for Building Virtual Government in West Tulang Bawang Regency

Stage	Period	Main Focus	Success Indicators
Strengthening the SPBE Foundation	2025-2027	Improving the SPBE Governance and SPBE Management domains; digital HR capacity	SPBE Governance Domain ≥ 3.00 ; SPBE Management Domain ≥ 3.50 ; at least 60% of OPDs have a functional SPBE team
Simple Service Virtualization	2028-2030	Virtual public consultation room; virtual musrenbang; virtual town hall	Availability of at least 5 public services on a virtual platform; citizen participation in virtual musrenbang increased by 20%
Gradual Metaverse Integration	2031-2034	End-to-end administration services; interactive training and outreach; virtual tourism promotion	Metaverse service coverage reaches at least 10 sub-districts; virtual service user satisfaction level $\geq 85\%$

Source: Processed from research analysis results, 2025

Comparison of Readiness Between SPBE Domains

Figure 1 presents a comparison of values between SPBE domains in West Tulang Bawang Regency in 2024. This visualization emphasizes the disparity between the Policy (2.60) and Service (3.05) domains which are relatively good with the Management (1.45) and Governance (2.10) domains which are still very low.

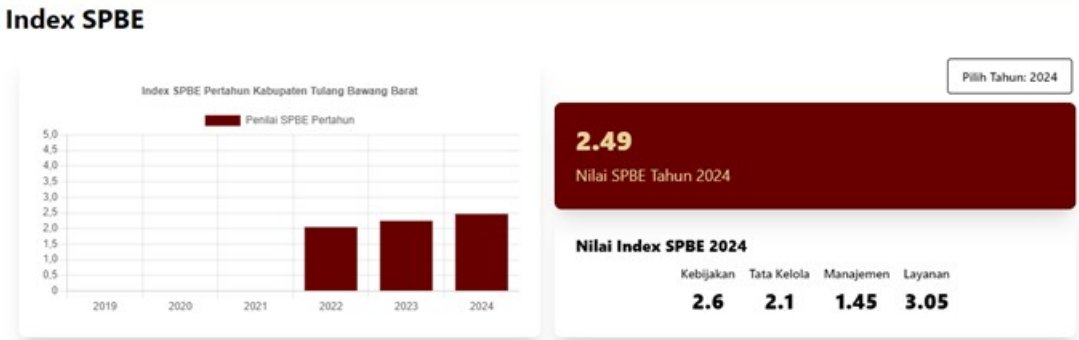


Figure 1. Comparison of SPBE Domain Values in West Tulang Bawang Regency in 2024

Source: spbe.tubaba.go.id

As seen in Figure 1, the sharp disparity in scores across domains indicates that the relatively good policy and service outcomes are not yet supported by adequate governance and management. This situation reflects the phenomenon of digital policies being "hanging" on top of regulations and services, yet governance and management, the "muscles" of SPBE implementation, remain very weak. In the context of metaverse adoption, which requires cross-sector coordination and complex project management, weaknesses in the Governance domain will be the most serious obstacle.

Structural Digital Divide in Indonesia

To provide a macro perspective on the challenges of metaverse adoption at the national level, Table 2 presents a comparison of internet penetration and computer ownership between urban and rural areas in Indonesia.

Table 2. Comparison of Internet Penetration and Computer Ownership: Urban vs. Rural in Indonesia (2024)

Indicator	Urban	Rural	The gap
Internet Penetration (age ≥ 5 years)	79.13%	63.71%	15.42%
Computer Ownership per Household	25.23%	8.98%	16.25%

Source: Central Statistics Agency (2024); Susenas (2024), processed

The data in Figure 2 shows that although national internet penetration has reached 79.13% in urban areas, computer ownership, one of the primary access devices to the metaverse, remains very low, particularly in rural areas (only 8.98%). West Tulang Bawang Regency, as a largely rural regency and ranked fourth among the most remote areas in Lampung Province by population (Lampung Province Central Statistics Agency, 2025), likely faces a more severe gap than the national average. This underscores the importance of a metaverse adoption strategy in Tubaba, as it cannot ignore existing socio-economic and geographic realities.

The Necessary Transformation: From E-Government to Meta-Government

The analysis of the above findings leads to one important conclusion: adopting the metaverse in the public sector is not simply about adding a new layer of technology to an existing system. Kshetri et al. (2024) emphatically state that the metaverse offers more than just a virtual presence or a copy of the physical world; significant transformations in governance are required to reap the benefits it offers.

This transformation encompasses three main dimensions. *The first dimension* is business process transformation. The public service model, which has historically focused on physical locations (service offices), must shift to one focused on the citizen experience in virtual spaces. This requires overhauling workflows, service standards, and identity verification mechanisms. *The second dimension* is institutional capacity transformation. Local governments must develop new technical capabilities, such as managing 3D virtual environments, developing public service avatars, and ensuring cybersecurity in a much more complex environment. *The third dimension* is the transformation of bureaucratic culture and mindset, from one focused on administrative procedures to one focused on the user experience (citizen experience) within a dynamic digital ecosystem.

Of these three dimensions of transformation, West Tulang Bawang Regency still needs to work hard on the first and second dimensions, while the third dimension requires time and a longer process of cultural change. In other words, developing a virtual government is not a short-term project, but rather a transformational journey that will take a decade or more, beginning with strengthening the most fundamental digital foundations.

CONCLUSION

This research examines the metaverse's disruption in public services, focusing on the opportunities and challenges of building a virtual government in West Tulang Bawang Regency. Based on the analysis, four main conclusions emerge.

First, West Tulang Bawang Regency has a number of strategic opportunities to build a virtual government, including: (a) the political commitment manifested in Regent Regulation Number 67 of 2024 concerning SPBE and the preparation of the 2025-2029 SPBE Architecture; (b) the availability of the embryo of digital services such as e-Smile and Digital Population Identity; (c) the potential for gradual adoption that does not require extreme technological leaps; and (d) the momentum of national policies that encourage the acceleration of regional digital transformation.

Second, there are three main structural challenges: (a) a fundamental digital infrastructure gap reflected in the low scores in the SPBE Governance (score 1.00) and SPBE Management (score 2.10); (b) limited human resource capacity on the part of both service providers and users, as reflected in the low level of computer ownership in rural areas (8.98%) and limited internet penetration; and (c) the absence of a regulatory and ethical framework for metaverse governance in the public sector.

Third, a three-phased strategy (Strengthening the SPBE Foundation 2025-2027, Simple Service Virtualization 2028-2030, and Gradual Metaverse Integration 2031-2034) is needed to build a virtual government realistically and contextually, while still prioritizing strengthening the digital foundation before moving on to more complex metaverse adoption.

Fourth, theoretically, this research strengthens the argument that the metaverse is not simply a technological tool that can be added to existing systems, but rather a catalyst that demands fundamental transformation in governance across dimensions (business processes, institutional capacity, and bureaucratic culture). Without this transformation, metaverse adoption risks becoming a symbolic project that lacks a substantive impact on the quality of public services.

Recommendation

Based on the conclusions above, this study recommends the following things for the West Tulang Bawang Regency Government:

1. **Prioritize strengthening the SPBE Governance and Management domain** as a primary foundation before adopting more complex technologies. This can be achieved by establishing a permanent, cross-regional SPBE coordination team, developing integrated standard operating procedures (SOPs), and conducting regular information technology governance audits.
2. **Invest significant resources in increasing the digital capacity of civil servants**, including technical training on cybersecurity, data management, and digital platform operations, as well as managerial training on managing digital transformation.
3. **Conduct mapping and addressing the digital divide in the region** by paying special attention to sub-districts with low population density (Pagar Dewa and Gunung Terang) and plantation/industrial areas that have different access characteristics.
4. **Building strategic partnerships with universities, the private sector, and the central government** to obtain technical support, funding, and knowledge transfer, given significant internal capacity limitations.
5. **Making citizen experience the primary measure of digital transformation success**, rather than simply the number of digital services launched or the adoption rate of a particular technology, to ensure that digital innovation truly improves people's quality of life.

For further research, it is recommended to conduct empirical studies on the level of citizen readiness and acceptance of metaverse-based public services in districts with diverse demographic and geographic characteristics, as well as to develop a measurable and comprehensive evaluation model of the impact of metaverse adoption on the quality of public services.

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