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BUILDING EFFECTIVE DIGITAL INFRASTRUCTURE FOR TAXATION IN INDONESIA

Gunawan Widjaja
Senior Lecturer Faculty of Law Universitas 17 Agustus 1945 Jakarta
Email: widjaja_gunawan@yahoo.com

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Abstract

This study discusses efforts to build effective digital infrastructure for taxation in Indonesia through a literature review. Digital transformation in the field of taxation, such as the implementation of e-Filing, e-Billing, and the Core Tax Administration System (Coretax), has brought significant changes in administrative efficiency and increased taxpayer compliance. However, the effectiveness of this digital infrastructure still faces various challenges, including the internet access gap, low digital and taxation literacy, and data security risks. In addition, regulations that are not yet fully adaptive to the development of the digital economy are also a separate obstacle. This study highlights the importance of equal access to technology, digital literacy education and training, strengthening cyber security, and updating responsive regulations as determining factors for the success of tax digitalisation. With the right strategies and cross-sector collaboration, Indonesia's digital tax infrastructure can become the foundation for a more equitable, efficient, and sustainable tax system.

Keywords: ***digital infrastructure, taxation, administrative efficiency, tax compliance, digital literacy, data security, regulation.***

INTRODUCTION

Digital transformation in tax administration has become an inevitable global phenomenon, especially after the Covid-19 pandemic forced many public services to switch to digital platforms. In Indonesia, the implementation of digital taxation systems through various platforms such as e-Filing, e-Billing, and e-Form is part of tax reforms aimed at improving taxpayer compliance and tax administration efficiency(Meilandri, 2025) . This digitalisation is also in line with the government's efforts to improve the quality of public services and adapt to the rapid development of the digital economy. Although the digitisation of the taxation system has been implemented, the level of tax compliance in Indonesia is still not optimal. Data from the Ministry of Finance shows that the tax ratio to Gross Domestic Product at the end of October 2024 only reached 10.02%, a decrease compared to the previous year and still far from the expected target. This indicates a gap between potential and actual tax revenue that needs to be addressed through a more comprehensive approach(et al., 2024) . One of the significant sources of potential tax revenue comes from Micro, Small, and Medium Enterprises (MSMEs). MSMEs play a very important role in the Indonesian economy, but their contribution to the taxation sector is still relatively low due to a lack of digital literacy and limited access to technology-based taxation services. Therefore, building an inclusive digital infrastructure is key to increasing the national tax base (International Tax Review, 2020) .

The Directorate General of Taxes (DJP) has made various breakthroughs in the digital era, such as the development of e-Registration, e-Filing, and e-Billing, which enable taxpayers to register, report, and pay taxes online. These innovations are expected to provide convenience, reduce administrative costs, and increase the transparency and accountability of the national taxation system (Rosengard, 2020) . The digital transformation of taxation in Indonesia formally began in 2015, focusing on five main sectors: organisation, human resources, information technology and databases, business processes, and regulations. One of the important agendas is the integration of taxation data between various government agencies and business entities, which is expected to increase transparency and make it easier for taxpayers to fulfil their tax obligations(Primadini & Gunadi, 2023) . The benefits of tax digitalisation are significant, ranging from the automation of taxpayer reporting data, minimising identity errors through data matching, reducing the use of physical documents, to increasing the efficiency of public services. Digital services also allow taxpayers to access the tax system anytime and anywhere as long as they are connected

to the internet, making the administrative process easier, more organised, and more systematic (KBA News, 2023) . However, despite these benefits, tax digitalisation in Indonesia still faces a number of challenges. One of these is the increased risk of data leaks as the use of digital services becomes more widespread, making the strengthening of cyber security crucial. In addition, limited internet access in some areas and low digital literacy among the public are also major obstacles to the optimisation of the digital taxation system(Directorate General of Taxes, 2024) . Another challenge is the need for rapid adaptation to regulatory and policy changes that continue to evolve in the digital era. These changes require the DGT to continuously evaluate and update its systems to remain relevant and responsive to economic and technological dynamics. Many taxpayers are still reluctant to switch from conventional methods to digital systems due to old habits and distrust of new technologies (Ministry of Finance of the Republic of Indonesia, 2024) .

The Indonesian government has also begun implementing digital tax policies, such as imposing an 11% Value Added Tax (VAT) on digital services from foreign companies operating in Indonesia. This policy aims to create equal tax treatment between foreign and domestic digital businesses, as well as to increase state revenue from the rapidly growing digital economy sector (Ministry of Finance of the Republic of Indonesia, 2024) . In addition to VAT, there is a discussion on imposing Income Tax (PPh) on foreign digital companies that earn revenue from users in Indonesia, although there are no specific implementing regulations as of. The government is still awaiting global consensus on digital economy taxation to avoid overlapping policies and ensure fairness in digital tax collection (Radartarakan.jawapos.com, 2024) . Advances in information technology, such as the internet and taxation applications, have brought about major changes in the taxation landscape in Indonesia. The use of advanced technologies such as big data, blockchain, and automation of taxation business processes contributes to improving the effectiveness of tax collection, supervision, and public services. Thus, a strong and adaptive digital infrastructure is essential to support this transformation. Based on the above description, this study aims to examine in depth how to build an effective digital infrastructure for taxation in Indonesia. This study will identify evaluations, factors, and challenges.

METHOD

This study uses a literature review method with a qualitative approach, in which data and information are collected through systematic searching and analysis of various relevant literature sources, such as scientific journals, books, official government reports, laws and regulations, and publications related to tax digitalisation in Indonesia and other countries. The analysis was conducted by identifying key themes, comparing findings from various sources, and elaborating on factors that influence the effectiveness of digital taxation infrastructure, thereby providing a comprehensive overview of the challenges, opportunities, and recommendations for developing an effective digital taxation system in Indonesia (Tranfield et al., 2003).

RESULTS AND DISCUSSION

Evaluation of Current Digital Tax Infrastructure

Tax digitalisation in Indonesia has undergone significant development since the introduction of the e-Filing system in 2004, which makes it easier for taxpayers to report their Tax Returns (SPT) online. This innovation was followed by the launch of e-Billing in 2013 for electronic tax payments, as well as e-Invoicing in 2014, which increased the transparency of Value Added Tax (VAT) reporting. This transformation marks the government's commitment to modernising tax administration through digital technology(Rosdiana, 2020) .In 2025, the Directorate General of Taxes (DGT) launched the Core Tax Administration System (Coretax), a core system that integrates all tax administration processes, from registration, reporting, payment, to supervision in one centralised platform. Coretax is designed to improve automation, efficiency, and comprehensive tax data integration, as well as provide real-time access for taxpayers and tax authorities (Expert Tax Indonesia, 2025) . The implementation of Coretax and other digital systems has had a positive impact on the efficiency of tax administration. Processes that previously required numerous physical documents and manual interactions can now be carried out digitally, thereby reducing time, costs, and the risk of human error. The integration of these business processes also makes it easier for the DGT to conduct supervision and data collection in a more systematic manner(Oktarida Sihaloho, 2025) . The use of digital systems such as e-Filing has been proven to increase the effectiveness of Annual Tax Return reporting. A study in Manado City shows that the effectiveness rate of e-Filing usage has reached 73.7%, which is classified as effective according to DGT standards. This shows that the majority of taxpayers have experienced the convenience and benefits of the digital reporting system. Digitalisation has also had an impact on increasing taxpayer compliance. Data shows an upward trend in the rate of tax return filing through e-Filing from 68.2% in 2016 to 83.4% in 2022(Mahpudin, 2021) . The ease of access and efficiency offered by digital systems encourages taxpayer participation in fulfilling their tax obligations in a timely manner. In addition to improving compliance, digitalisation expands the

tax base by making it easier for the government to identify and monitor digital economic activities, including cross-border transactions and foreign digital businesses. The DGT has also optimised supervision through the appointment of Value Added Tax (VAT) collectors for Electronic Trading Systems (PMSE), which is a response to the growth of the digital economy (Pasu, 2024) . Coretax is supported by big data technology, which enables the DGT to analyse compliance patterns, detect potential tax avoidance, and simplify administrative processes more accurately and quickly. Big data integration is essential for managing large and complex volumes of data, as well as supporting the automatic exchange of information (AEoI) with other jurisdictions. However, tax digitalisation also presents serious challenges, particularly in terms of data security and privacy. The increasing volume and complexity of taxpayer data increases the risk of data leaks, making strengthening cyber security a top priority in the development of digital tax infrastructure (Muttaqin et al., 2021) .

Another challenge is the gap in digital access and literacy among the public. Not all taxpayers, especially MSME players and individuals in remote areas, have the ability or adequate access to use digital systems optimally. This can hinder the equitable distribution of the benefits of digitalisation and cause disparities in tax compliance. In addition, rapid regulatory changes require the DGT to continuously adapt and update its systems. Digital systems must be able to keep pace with the dynamics of taxation policy and developments in information technology, including integration with third-party applications and digital payment platforms (Cahaya Mandalika Journal, 2021) Resistance to change is also still found among taxpayers who are more comfortable with conventional methods. Habit and distrust of new technology are obstacles in themselves, so intensive education and assistance are needed to ensure a smooth transition to the digital system (Expert Tax Indonesia, 2024) . Overall, tax digitalisation in Indonesia has improved efficiency, transparency, and compliance, but it still faces challenges related to data security, access gaps, and regulatory adaptation. Continuous evaluation, improvement of technological infrastructure, and socialisation and education of the public are key to ensuring the success of tax digital transformation in the future.

Determinants of Successful Digital Tax Infrastructure

The success of tax digitalisation is highly dependent on the availability and quality of adequate digital infrastructure. Advances in information technology, such as the expansion of the internet network, cloud computing, and the use of big data, enable the tax administration process to run faster, more accurately, and more efficiently. However, the infrastructure gap between urban areas and 3T (frontier, outermost, and disadvantaged) regions remains a major challenge that needs to be overcome so that all taxpayers can access digital services equally(Sihaloho, 2025) . Adaptive regulations that support digitalisation are crucial to ensure smooth implementation. Central and local governments need to issue clear policies, such as governor or mayor regulations, that encourage the adoption of digital systems in taxation. These regulations must also be responsive to technological developments and community needs, including data protection and information security (Firmansah, 2020) .

The level of digital literacy among the public, especially taxpayers, is a crucial factor. People who understand and are accustomed to using digital technology will find it easier to adapt to the online taxation system. Conversely, low digital literacy can hinder the adoption and optimisation of digital services, especially among MSME players and people in remote areas. The success of digital transformation is also determined by the readiness of human resources, both within the tax authority and among taxpayers. Tax officials must have adequate information technology competencies to manage digital systems, while taxpayers need to be educated and guided so that they can make optimal use of digital services.(Raihandini & Imahda Khoiri Furqon, 2025) . An effective digital system requires data integration and standardisation across various applications and agencies. Without a uniform data architecture, comprehensive tax analysis and monitoring become difficult. This standardisation is also important to support automatic data exchange and the development of big data-based services.(, 2025) .

Cyber security and personal data protection for taxpayers are key concerns. The increasing volume and complexity of digital data heightens the risk of data breaches or misuse. The implementation of robust security systems and strict data protection regulations is essential to build public trust in the digital taxation system. (Digital services must be designed to be inclusive, easy to use by various segments of society, and accessible anytime and anywhere (Rosyid et al., 2024) . Features such as DJP Online and e-Faktur have facilitated tax reporting and payment, but need to be further developed to be more user-friendly and reach all levels of society. The success of tax digitalisation is also determined by good coordination between the DJP and other agencies, such as local governments, banks, and financial institutions. System integration and data exchange between agencies will strengthen supervision, speed up services, and prevent data duplication (Rosengard, 2020) . Tax digitisation is a complex technology project that requires careful management. A phased approach, iteration, and regular system testing are essential to minimise the risk of service disruption, as occurred during the implementation of Coretax. The implementation roadmap must be based on low risk and monitored regularly. Clear communication and ongoing socialisation with all stakeholders, both internal and external, are essential to build understanding and support for

digitalisation(Primadini & Gunadi, 2023) . Public education and training for taxpayers must be an integral part of the implementation strategy. The success of tax digitalisation requires the full support and commitment of agency leaders, both at the central and regional levels. Visionary leadership will accelerate digital transformation and ensure aequate resource allocation (KBA News, 2023) . Finally, the digital taxation system must be evaluated regularly and be able to adapt to changes in technology, regulations, and community needs. This evaluation is important to identify weaknesses, improve the system, and ensure that the digital infrastructure truly supports increased compliance, efficiency, and transparency in taxation in Indonesia.

Challenges to the Effectiveness of Digital Infrastructure in Improving Tax Compliance and Administrative Efficiency

The digital infrastructure gap between urban areas and 3T (frontier, outermost, disadvantaged) regions hinders taxpayers' access to systems such as Coretax. Data from the Central Statistics Agency (2023) shows that only 66.48% of the population has access to the internet, with significant disparities between Western and Eastern Indonesia. In Southwest Sumba, limited internet connectivity makes digital tax reporting difficult to implement. Multiple technical challenges with the Coretax system, such as server disruptions, difficulties integrating with other applications (e-Invoicing/e-Billing), and a complex interface, add to the administrative burden on taxpayers. Instead of simplifying the process, this system increases the risk of reporting errors and uncertainty(Directorate General of Taxes, 2024) .

Cyber security risks that have not been comprehensively addressed pose a serious threat. Personal data leaks of taxpayers are likely to occur due to weak encryption and authentication, while data protection regulations have not been able to keep pace with the complexity of digital threats. Low digital literacy among the public (index 3.54/5.00) is a major obstacle, especially for MSMEs and the elderly. Surveys show that 43% of taxpayers earning more than Rp4 million per month do not have an NPWP, reflecting a weak understanding of tax rights and obligations (Ministry of Finance of the Republic of Indonesia, 2024) . There is an imbalance in human resource capacity on both the tax authority and taxpayer sides. DJP employees often face difficulties in handling technical issues with Coretax, while taxpayers in remote areas lack guidance in navigating the system. The lack of regulatory preparedness hinders the response to the dynamics of the digital economy. For example, the 11% VAT rule for digital transactions is not matched by technological system updates, causing confusion among business actors (Ministry of Finance of the Republic of Indonesia, 2023) .

Weak law enforcement against cross-border digital transactions. Foreign companies such as e-commerce platforms often escape tax monitoring due to the complexity of identification and the absence of a specific tax framework for the digital economy. Cultural resistance to system change. Many taxpayers are reluctant to switch from conventional methods to digital due to distrust of new technology and a preference for face-to-face interaction. High maintenance costs for digital systems reduce the budget allocation for innovative feature development. Security and server updates for Coretax, for example, drain funds that could be allocated to taxpayer education (Enforcea.com, 2021) . The rate of tax return filing via e-Filing (83.4%) still leaves 16.6% of taxpayers using manual methods. The main factors are distrust of the system and unresolved technical issues. Administrative inefficiencies arise due to *legacy* systems that are not integrated. The data reconciliation process between agencies takes 30% longer than in countries with mature infrastructure, hindering real-time monitoring. Additional burden on MSMEs: Small businesses in rural areas complain that the digital system adds complexity without clear benefits. They find it difficult to allocate extra time/energy to navigate the technicalities (Radartarakan.jawapos.com, 2024) .

Accelerating the development of 4G/5G networks in 3T areas and providing free internet access at tax offices are priorities. Infrastructure equality is the main foundation of system inclusivity. Implementing *blockchain* for data encryption and developing *AI-based fraud detection* can mitigate cyber risks. Collaboration with BSSN (National Cyber and Crypto Agency) is needed to strengthen protection. Community-based digital literacy programmes, specifically targeting MSMEs and vulnerable groups, need to be intensified(Rosdiana, 2020) . Socialisation must emphasise the direct benefits of digital systems for business convenience. The formulation of an adaptive long-term policy *roadmap* for the digital economy, including special taxes on cross-border transactions and simplification of procedures, is key to reducing regulatory gaps (Expert Tax Indonesia, 2024) .

Digital transformation in taxation has the potential to improve compliance and efficiency, but infrastructure disparities, data security vulnerabilities, low digital literacy, and non-adaptive regulations remain major obstacles. Public-private collaboration on equal access, cyber security innovation, and ongoing support is needed to ensure that digital infrastructure truly becomes a solution, not a new burden.(Sihaloho, 2025) . Thus, tax digitisation in Indonesia is a major step that brings many benefits, ranging from increased efficiency and transparency to easier access for all taxpayers. Digital taxation systems such as e-Filing, e-Billing, and Coretax have accelerated administrative processes and enabled taxpayers to report and pay taxes more conveniently without having to visit the tax office. However, the

effectiveness of this digital infrastructure still faces a number of fundamental challenges that need to be addressed immediately in order to achieve the goals of optimising tax revenue and increasing compliance. The main challenge faced is limited infrastructure, particularly in rural and remote areas, where internet access is still uneven and unstable. This prevents some members of the community from making optimal use of digital taxation services(Oktarida Sihaloho, 2025) . In addition, many taxpayers still do not understand how to use the digital system due to low digital literacy and tax literacy, especially among MSMEs and individuals who are not familiar with technology. The lack of socialisation and education from the tax authorities exacerbates this situation, resulting in high resistance to the shift from conventional to digital methods among the public.(Mahpudin, 2021) .

Data security is also a serious concern, given that digital systems store sensitive information that is vulnerable to cyber attacks and data leaks. Strengthening cyber security and protecting taxpayers' personal data is essential to maintain public trust in the digital taxation system. In addition, rapid regulatory changes that are not yet fully adaptive to developments in the digital economy often cause confusion among businesses and taxpayers (Pasu, 2024) . The technical complexity of system integration, as well as legal uncertainty in the digital tax sector, also pose obstacles to the optimisation of the digital taxation system in Indonesia. To overcome these challenges, strategic efforts are needed, including the development of a more extensive and equitable internet infrastructure, increased education and socialisation of tax and digital literacy, strengthened system security, and the formulation of more adaptive and clear regulations. Collaboration between the government, the private sector, and the community is essential to accelerate innovation and ensure that the digital taxation system is truly inclusive and reliable. The development of user-friendly mobile-based services , as well as continuous evaluation and improvement of the system, are also key to ensuring that tax digitalisation runs effectively and is widely accepted by the community (Muttaqin et al., 2021) . Overall, tax digitalisation in Indonesia has had a positive impact on improving taxpayer compliance and administrative efficiency, despite still facing various complex challenges. With the right policy support, infrastructure improvements, ongoing education, and security enhancements, digital taxation systems can be the optimal solution for building a fairer, more efficient, and sustainable taxation system in the future.

CONCLUSION

Building effective digital infrastructure for taxation in Indonesia is a strategic step in improving administrative efficiency, transparency, and taxpayer compliance. Digitalisation through systems such as e-Filing, e-Billing, and Coretax has simplified the process of tax reporting and payment, while strengthening supervision and integration of taxation data. This innovation also enables the government to respond to the increasingly complex dynamics of the digital economy. However, the effectiveness of digital taxation infrastructure still faces a number of challenges, such as the internet access gap in remote areas, low digital and tax literacy among the public, and evolving data security risks. In addition, regulatory changes that are not yet fully adaptive to technological developments and digital business models require more responsive and inclusive policy updates. Therefore, the success of digital tax infrastructure development in Indonesia greatly depends on equal access to technology, improved digital education and literacy, strengthened cyber security, and cross-sector collaboration in drafting adaptive regulations. With continuous efforts in these areas, tax digitalisation can become the foundation for a more equitable, efficient, and sustainable tax system in the future.

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