Research Article

An Effectiveness Analysis of Tax Administration Digitalization Reducing the Shadow Economy in Indonesia

Devi Nur Cahaya Ningsih*, Dewi Noor Fatikhah Rokhimakhumullah, Yesika Suryani, and Irfan Isa Mahendra

Business Administration Department, Brawijaya University, Malang, Indonesia

Abstract.

"*Micro, small, and medium enterprises* ("MSMEs")" play an important role in Indonesia's economy but are often difficult to tax due to their informal operations. To address this, the government is promoting digitalization to curb the shadow economy. This study aims to evaluate the effectiveness of digitizing tax administration in reducing the shadow economy, analyze the challenges and solutions associated with this process, and examine its impact on state revenue and taxpayer compliance within the informal sector. Using a qualitative research approach, data were collected through in-depth interviews and direct observations involving MSME actors and officials from the Directorate General of Taxes "("DGT")". The findings indicate that the implementation of tax digitalization, particularly through the core tax system, can be assessed using the balanced e-government model, which consists of four dimensions: benefits, efficiency, transparency, and participation. According to the Information Systems Success Model (ISSM), the digitalization of tax administration has been fairly effective. Nevertheless, challenges remain for the DGT in executing these digital initiatives. Despite these obstacles, tax digitalization is expected to simplify tax compliance for MSMEs, thereby increasing taxpayer adherence, boosting state revenue, and reducing the shadow economy.

Keywords: digitalization, e-government, shadow economy, tax administration

Corresponding Author: Devi Nur Cahaya Ningsih; email: devinurcahaya@ub.ac.id

1. Introduction

The shadow economy has become a central issue in economic and social development because of its far-reaching impact on development efforts. Smith defines the shadow economy as the production of market-based goods and services, both legal and illegal, that escape detection by Gross Domestic Product (GDP) statistics [1]. Certain factors can lead to an increase in the potential of the shadow economy, including the political and social environment, economic structure, and institutional features as reflected in the degree of bureaucracy, government efficiency, law and order, and corruption [2]. Despite the fact that the shadow economy is one of the main obstacles to national economic development, it turns out that the size of the shadow economy in various

countries is still dominant, one of which is Indonesia. Rezky [3] states that for the period 2000–2017, the size of the shadow economy in Indonesia ranged from 18% to 21%. This shows that the strict regulatory tax burden, unemployment rate, and corruption affect the size of the shadow economy [3].

In general, mitigating the shadow economy is an important agenda item for many governments in various countries around the world [4]. In this case, e-government has the potential to ensure inclusion, participation, transparency, and accountability, and limit the informal economy [5]. Through e-government, the government can improve efficiency, institutional quality, regulations, and the detection rate of tax evasion in the informal sector. This enables the digitization of tax administration as one of the e-government services that can improve institutional and regulatory quality, strengthen the rule of law, detect tax evasion, increase efficiency in tax collection, as well as improve the political and social environment and expand economic growth.

One of the drivers of national economic growth is the Micro, Small, and Medium Enterprises (MSME) sector, which is often considered a hard-to-tax sector because most of them operate informally. So far, only 2.31 million, or 3.6%, of MSMEs are registered as taxpayers out of a total of 64.2 million MSME players, where tax compliance has only reached 15% [6]. In this case, government services through the digitalization of tax administration can increase taxpayer compliance. The application of digitalization in tax administration will make it easier for taxpayers to carry out their tax obligations and facilitate supervision by the government. Moreover, it is expected to reduce the level of shadow economies in Indonesia so that its economic potential can be explored more deeply.

Therefore, this study aims to determine the mechanism and effectiveness of tax administration digitalization in reducing the shadow economy in Indonesia, analyze the challenges and solutions to the digitalization of tax administration, and examine its impact on state revenue and taxpayer compliance in the informal sector. This research is useful for several parties, including the government, academics, and taxpayers, and in general can be an overview of the application of tax administration digitalization, which indirectly has implications for state revenue through reducing the shadow economy. The theory used to measure the effectiveness of tax actors in using digitalization is based on a digital government literature review. Based on this theory, success is measured based on the effectiveness of implementation, where technology is enforced by government organizations and is influenced by political, social, economic, and organizational aspects [7].

2. Literature Review

2.1. Compliance theory

One of the compliance theories in the sociology literature described by Tyler in Yap and Mulyani [8] raises two perspectives, namely normative and instrumental. The normative perspective represents what a person believes to be moral even though his interests are against it. The instrumental perspective on the other hand describes behavior that is influenced by personal interests with the encouragement and sanctions that arise from their behavior. In line with this theory, Misra [9], explains that compliance means obeying or obeying all applicable rules and in the context of tax compliance this means carrying out tax obligations in full on the basis of applicable tax regulations.

Misra [9] explains two types of tax compliance, namely formal and material compliance. Formal compliance is a state of taxpayers who fulfill their obligations formally based on the provisions of the applicable tax law. This provision, for example, in terms of the deadline for submitting a tax return, if the taxpayer has submitted before the deadline, it is considered to have fulfilled its formal obligations. Material compliance on the other hand substantively taxpayers fulfill the material provisions of taxation. For example, in filling out the tax return according to the statement in article 3 paragraph (1) of the Law on General Provisions and Tax Procedures, the taxpayer fills it correctly, completely, and clearly.

2.2. Digitalization of tax administration

The important role of tax administration is to determine the effectiveness of a tax system, which according to Rasmini and Ismail [10] has indicators of success including the amount of state revenue, how revenue is obtained, how the impact of taxation on justice, political government, and the level of social welfare. There are three main tasks of tax administration according to Richard Bird in Rasmini and Ismail [10] including identifying potential taxpayers, assessing appropriate taxes, and collecting these taxes. These three tasks are reflected in the main and supporting functions of DGT as an administrator. The main functions as described by Hofir in Saifudin and Rahmawati [11] include services, supervision, and law enforcement, while for supporting functions such as human resources, organization, business processes, regulations, and information technology.

OECD in tax administration [12], explains that the transition of tax administration management to electronic administration or e-administration to improve tax compliance can be through the utilization of various technological equipment, various data sources, and data analysis processes. The DGT through tax reform is updating the Core Tax Administration System which is regulated in the Decree of the Minister of Finance Number 483 of 2020. This new system utilizes various new technological instruments such as big data, advanced analytics, Artificial Intelligence (AI), and robotics process automation so that it is expected to increase productivity, service quality, and provide valid real time data. With the new system, DGT services will also be digitized and automated so that they can focus on service, supervision, and law enforcement.

2.3. Shadow economy

The term shadow economy is known by various mentions, such as undeclared, gray, subterranean, unreported, hidden, invisible, off the books, unofficial, underground, unrecorded, informal economy, and non-observed [13]. There is no accurate definition of the shadow economy, but in some sources, the term black or shadow economy refers to transactions and the substance of economic activity that is not recorded in the GDP intentionally or not [14]. There are 4 classes of shadow economy activities, namely (1) The Illegal Economy in the form of income that contains violations of legal regulations in its economic activities such as smuggling and piracy, (2) The Unreported Economy or non-reporting of income especially to tax authorities with the aim of avoiding responsibility, (3) The Unrecorded Economy means income that should be included in government statistical records but is otherwise so that there are differences in actual expenditures and income with the existing accounting system, (4) The Informal Economy or income from informal sector economic activities that may not have official licenses, financial credit, or employment agreements [15].

2.4. Based on digital government literature review

Digital government is the application of information technology to optimize efficiency, effectiveness and transparency of various information in government [16]. Several principles need to be applied to achieve the successful implementation of digital government, namely the use of technology as a driver, contemporary reality, and public participation. According to Gil-García and Pardo [17], there are three elements supporting the success

of digital government, including data and information, organizational and managerial, and legal and regulatory. In line with this theory, digital government can be categorized into 8 types, including Government to Citizen (G2C), Citizen to Government (C2G), Government to Business (G2B), Business to Government (B2G), Government to Employee (G2E), Government to Government (G2G), Government to Non-profit (G2N), and Non-profit to Government (N2G).

3. Material and Methods

This study utilized a descriptive method with a qualitative approach. To collect data, in-depth interviews and direct observation of MSME owners in the trade and culinary business sectors were conducted. Additionally, data from the Sub-Directorate of Potential, Compliance, and Revenue, under the DGT, was analyzed to determine the number of taxpayers and tax revenue from the informal sector in Indonesia over the last five years (2018-2022).

The researcher analyzes the data obtained through several stages. The interview data was transcribed into a dialogue format between the researcher and the interviewee and noted as research notes or in the form of a diary. The intent of taking notes or using the research diary method is to prevent the loss of data and understanding acquired in the field. This is followed by data reduction to sort out representative data to answer the research conducted. Furthermore, we ensured the validity of the data through triangulation, cross-referencing documents, photos, news, and interviews. The data was interpreted in a descriptive manner to draw accurate conclusions.

4. Results and Discussion

4.1. Mechanism of tax administration digitalization through the core tax system in reducing shadow economy in Indonesia descriptive

The core tax system is one of the tax reforms carried out by DGT by redesigning and reengineering tax administration business processes through the development of commercial off-the-shelf (COTS)-based information systems and optimizing the tax database [18]. In this case, the core tax system is not only beneficial to taxpayers but also to the DGT. In terms of taxpayers, the core tax system will provide taxpayer accounts

on the DGT portal, improve the quality of service provided by tax authorities, reduce tax disputes, and minimize taxpayer compliance costs. From the DGT side, the core tax system can improve system integration, reduce manual work, increase productivity, and increase capabilities.

To explain how the implementation of tax administration digitalization through the core tax system can be used, one of the measurement models initiated by Stiftung et al., namely balanced e-government, This model combines e-administration-based services with e-democracy to achieve the goal of "balanced e-government" [19]. Long-term planning and the establishment of a responsible central authority are necessary for the development and introduction of e-government so that it can support the goals of improving administrative services, encouraging democratic participation, and improving the relationship between government and citizens. The research will use several measurement dimensions based on the balanced e-government model, including benefits, efficiency, transparency, and participation.

4.1.1. Benefit

The benefit dimension relates to the quality and quantity of services so as to produce benefits obtained by the community from these services [19]. In order for the government to interact, transact, and communicate with the community and other stakeholders, digitization is needed to connect and provide benefits to each other. In this case, there are several indicators in the benefits dimension, including the following:

a. Scope of services that have been implemented

The services referred to in this indicator are services provided by the government so that they can be accessed by the public. This indicator is used to measure the extent to which government services have been implemented and made available online. In addition, this indicator helps measure the positive impact generated by the implementation of e-government, namely the delivery of more efficient, inclusive, and quality services to citizens [20]. The higher the service coverage, the greater the benefits that can be obtained by the public from e-government

Currently, DGT has several services that can be accessed by the public, consisting of websites and applications. In this case, all sources and respondents have utilized the digitization of tax administration. There are several websites that can

be accessed by the public to fulfill their tax obligations, such as Pajak.go.id, e-Filing, and e-Billing. In addition to the website, DGT also has applications that can be accessed by taxpayers, such as DGT Online, e-Faktur, e-Bupot, e-SPT, and e-Registration.

b. Services that can be accessed in One Stop Shop (OSS) from one portal of various service

OSS is defined as a concept in the field of e-government where various government services are united into one integrated portal or platform so that the public can access these various services from one place. One of the OSS accesses in the tax.go.id application is the registration of tax application service providers (PJAP) available in several limited liability companies (PT). In addition to registration, there is also information related to PJAP that can be accessed on the website, such as definitions, types of services, obligations and prohibitions, and PJAP rights. The existence of PJAP access on the tax.go.id website shows that the OSS indicator in the benefit dimension has been implemented by the government to improve services to the community.

c. Ease of use in getting services

This indicator evaluates the extent to which users, both the public and stakeholders, can easily use government electronic platforms to obtain services [21]. In this case, DGT has made it easy for taxpayers through the website pajak.go.id, which can also download tax applications such as e-SPT and e-Faktur. In addition, the website also displays tax information related to tax consultants, tax regulations, customer service, and other information to make it easier for taxpayers to access. This is in accordance with the relevant informant, who stated that he felt it was easy to get tax information just by accessing the DGT website (SGL; ATK, Personal Communication, August 11, 2023). By improving ease of use, the government can increase e-government adoption and provide greater benefits to society.

4.1.2. Efficiency

According to Tapscott [22], Amit and Zott [23], and Malhotra [24], information and communication technology (ICT) has great potential to contribute to increased efficiency and reduced costs for society. In tax administration, digital services provided by the government have a positive impact on taxpayers. The relevant informants stated that

the digitalization of taxation saves more time so that the remaining time can be used to do things that can support business profitability (ATK, Personal Communication, August 11, 2023). There are several indicators in the efficiency dimension that become the government's reference in providing services to the community, including the following:

a. Availability of process architecture, applications, and databases that run properly when needed

This indicator is one of the main aspects of achieving the expected efficiency of e-government. A good information technology system will provide efficiency in government operations, reduce the time needed to provide public services, and increase productivity in the government environment [25]. So far, the tax website or application provided by the government has been quite good. Although in its implementation there are frequent errors or server downs, it can still run well because taxpayers can use the website or application again when the error has been fixed by the internal DGT.

b. Equitable utilization of information technology platforms

Equitable utilization of information technology platforms is one important aspect of the success of services provided by the government. Technology distribution in each region is used as an indicator to measure the extent to which technology has been utilized by the community [26]. In this case, access to tax administration digitization can be said to have almost entered all regions of Indonesia. This is supported by all MSME resource persons who have businesses spread across several regions of Indonesia that have utilized tax digitalization.

c. Quality and scope of training for staff and employees

This indicator is one of the factors that can affect the quality of a service. This is because staff and employees who are well trained and have relevant knowledge and skills will work more efficiently in the delivery of government services. Currently, the Ministry of Finance [27] has prepared training for 46 thousand tax employees to operate the core tax system. With the training for tax staff and employees, it is expected to provide better services to the public so that they feel comfortable fulfilling their tax obligations.

4.1.3. Transparency

The transparency dimension refers to the openness, accessibility, and provision of clear information by public institutions, especially DGT. Through direct observation by researchers of the information contained in the DGT Online website, the implementation of tax administration digitalization has met the criteria of the transparency dimension of the balanced e-government model. This is reflected in the availability of several menus on the initial appearance of the website. There is a "Public Information" menu that contains various kinds of information, such as budget and budget realization, DGT performance transparency, complaints of abuse of authority, pages for providing speakers, discussants, or moderators, service standards within the DGT, and a collection of information related to Information and Documentation Management Officers. The various information displayed has fulfilled the transparency dimension indicators, such as the existence of clear procedures related to decision-making by the government, in this case DGT, and how the decision is accounted for.

4.1.4. Participation

This dimension relates to the question of whether the service is designed in such a way as to improve political communication and enable higher levels of public participation [19]. This dimension not only describes the provision of facilities and infrastructure but also provides opportunities for the community to convey their aspirations through both criticism, suggestions, and input. The indicator that becomes the dimension of participation is community participation to determine the best decision for services. In this case, DGT has opened taxpayer participation to the obstacles they experience when using tax digitalization. Taxpayers can use the customer service chat feature to submit questions about taxation on the tax.go.id page. In addition, taxpayers also submit their complaints through the DGT telephone number or by accessing the complaint.pajak.go.id website for the unrest they experience

4.2. Effectiveness of tax digitalization

4.2.1. System quality

The system quality measurement dimension refers to the characteristics and attributes of information systems that determine their overall performance and effectiveness. This dimension includes indicators such as usability, availability, and reliability. System quality is one of the two important dimensions of the ISSM theory that assesses the success of information systems in organizations. Together with information quality, these two dimensions contribute greatly to the measurement of overall information system success.

a. Usability

This indicator refers to the ease of use of an information system or website to achieve their goals effectively and efficiently. Based on data from three informants of MSME owners, all three agreed that digital taxation services can be used easily. The owner of CV ATK MSME said that he had a background in taxation, so he was familiar with digital taxation services. The owner of PT SGL also explained that in fulfilling his tax obligations to digital taxation services, he was assisted by two tax employees who worked under his company. In addition, the owner of OYI Buttermilk Chicken MSME stated that carrying out his tax obligations can be done by simply following the steps provided on the website. However, at a certain time, he explained that the steps that must be fulfilled when operating the website in order to access tax return information are things that reduce the essence of ease of access to DGT Online.

b. Availability

The availability indicator refers to the extent to which the information system or website is accessible and operational for users. All interviewees stated that they can use digital taxation services and have never experienced repairs. However, a deeper study is needed regarding the time of use of the DGT Online website because the website concerned and a number of other digital taxation services have been repaired several times so that they cannot be used by users. Based on the statement of the owner of OYI Buttermilk Chicken MSME, when access is done at certain times, for example, in March and April, when user traffic surges, that's when the website takes longer to respond to input from users. In addition,

the owner of CV ATK also experienced problems in the form of "Network Error" notifications that often appear when the application is operated. The cause and solution of this problem are still unknown, although the source concerned has made several attempts to fix it.

c. Reliability

The reliability indicator refers to the consistency and reliability of the information system or website in providing the intended functionality and performance. This indicator measures the system's ability to perform its tasks accurately and consistently over time. In this case, the relevant resource person stated that digital taxation services can be utilized according to the needs of users or taxpayers. This is supported by the availability of various digital taxation service options such as e-Invoicing, e-Biling, e-Filing, e-Form, and various other services that can be utilized as needed.

4.2.2. Information quality

The measurement dimension of information quality refers to the characteristics and attributes of information determined by a number of indicators, such as completeness, relevance, understandability, and currency, for decision-making and problem-solving purposes. This dimension is measured separately from other dimensions such as system quality and service quality as it has a direct impact on user satisfaction and subsequent system usage.

a. Completeness

The completeness indicator refers to the extent to which information is comprehensive and includes all the necessary details and elements. This certainly helps in avoiding gaps or missing information that can lead to incomplete or inaccurate conclusions. In this case, all interviewees agreed that the tax information presented, especially through the DGT Online website, is complete and can answer or fulfill the need for the information needed. Although there may be some information that has not been included, based on the explanation of the CV ATK owner, tax information is currently available in various sources, such as news or regulations online, which can be easily accessed by users or taxpayers.

b. Relevance

The indicator of relevance refers to the significance and applicability of information for a particular context or purpose. It is aligned with the user's goals, objectives, and context, ensuring that the information provided is meaningful and applicable. In this case, all relevant informants agreed that the information displayed in the digital taxation service system is relevant and useful as needed. This can be seen from the existence of a menu that contains a collection of other information that is differentiated based on corporate or individual tax subjects. In each of these menus, there is various information, such as "Register," which contains TIN registration requirements, registration flow and channels, changes in taxpayer data, deletion of TIN, confirmation of PKP, and revocation of PKP confirmation. In addition, there is also other information such as "Calculate", "Report", "Pay" and "Rights and Obligations," which contain a collection of various information related to the menu name itself.

c. Understandability

The understandability indicator refers to the clarity and understanding of information, ensuring that the information can be easily understood by users. Based on interview data from three MSME owners, the information presented in the DGT Online digital tax service system can be easily understood. However, it is also necessary to consider the background of the resource person and the responsibilities carried out. As stated by the owner of OYI Buttermilk Chicken MSME, the information presented on the website is indeed complete through the menu categories listed. However, the information is still too general, which contradicts when taxpayers with low levels of knowledge carry out reporting or other obligations. When carrying out these obligations, it is not uncommon that files, data, or other information will be needed that have not previously been explained or displayed as requirements, so that taxpayers feel confused due to a lack of preparation.

d. Currency

The currency indicator refers to the timeliness and relevance of information in relation to the present time. Current information tends to be more accurate and reliable so it can help users make informed decisions and stay informed about the latest trends and developments. Based on the information provided by two of the three resource persons who own MSMEs, they agree that the information is up-to-date and relevant to current developments. One of the interviewees gave

the answer "don't know" on the basis that the person concerned does not always use or access the relevant website. Based on the researcher's observation of the DGT Online website, the information presented has met the currency indicator, especially information such as regulations, interest rates, and programs currently being run by the DGT. However, there is some information presented without any updates, such as information on DGT's expenditure realization that ended in 2017 only.

4.2.3. Use

This dimension measures the actual use or adoption of the system by either individual users or organizations. The use dimension is related to user satisfaction because the more positive the experience that arises, the greater the satisfaction, which can lead to an increase in the intention to use the system. Based on the data from the answers of the three MSME owners, all three of them revealed that the digital taxation service system has been able to be utilized as needed. The utilization of the digital taxation service system through the DGT Online website is not only limited to carrying out obligations such as depositing and reporting but also broader than that, such as participating in tax education programs run by the DGT and enriching tax knowledge through the information menus presented.

4.2.4. User satisfaction

The user satisfaction measurement dimension refers to the level of satisfaction or fulfillment experienced by users when using a system or technology. Based on interview data from three MSME owners, two of them expressed satisfaction while utilizing digital taxation services; even the owner of CV ATK felt very satisfied. According to the interviewees, this satisfaction is not only built based on the previous measurement indicators. This is because the person concerned has always been involved in every development of taxation services, starting from manual to digital as it is now. However, the owner of MSME OYI Buttermilk Chicken expressed dissatisfaction while utilizing the digital taxation service system. This is related to the previous measurement indicators, such as the fact that the information displayed on the DGT Online page is still considered too general, thus reducing the simplicity value of the digital tax service system.

4.2.5. Organizational impact

This dimension measures the extent to which the system contributes to the achievement of organizational goals, performance, and overall success. Based on data from interviews with three MSME owners, the interviewees stated that the existence of this digital taxation service can increase efficiency and effectiveness by cutting time spent carrying out tax obligations. This has implications for better business productivity because it indirectly supports the profitability of the business itself. The indicator of the effect of the application of digital taxation services on business competitiveness also obtained similar answers. This digital service has helped MSME owners comply with the rules so as to minimize the risk of sanctions and fines from the tax authorities and even business closure, which will have an impact on additional costs and brands, resulting in weakening business competitiveness.

4.3. Challenges and solutions in the implementation of tax administration digitalization

The rapid digitalization era certainly has an impact on various aspects of life, one of which is the tax system. In this case, DGT has provided the concept of digitizing tax administration by establishing several websites and tax applications to improve services, reduce costs, and increase taxpayer compliance [28, 29]. The digitalization of tax administration can create a mutual relationship between tax authorities and taxpayers, both in terms of increasing compliance and maximizing revenue. Apart from this, the implementation of digitalization in tax administration certainly has its own challenges.

First, not all taxpayers understand technology, so they find it difficult to use the available website or application. Although the growth of the internet in Indonesia has grown rapidly, in fact, there are still areas that are less touched by technology [30]. The difficulty in using the available tax website or application is due to geographical factors in rural areas, which can lead to tax fraud, both tax avoidance and tax evasion [28]. In this case, the government needs to prioritize digital infrastructure in rural areas and provide training for the community to take advantage of technology. The OECD emphasizes that the tax system must be able to transform continuously with technological advances and digitalization [31]. DGT needs to conduct regular monitoring and evaluation of the implementation of tax administration digitalization in all regions of Indonesia.

Second, the mindset of taxpayers who think that tax policy is complex Indonesia has many convoluted tax regulations, which can confuse taxpayers [32]. Taxpayers will still find it difficult to carry out their tax obligations if they have the mindset that the tax system is complicated [33]. Even though the DGT has facilitated digital tax administration, everything still returns to the perception of each taxpayer. This can be seen from MSME taxpayers who state that it is complex when opening the website; they are treated to tax regulations that are not simple (OYI, Personal Communication, August 11, 2023). In this case, the government needs to simplify tax regulations, provide clear and comprehensive guidance on the DGT website, and effectively socialize policy changes.

Third, there are taxpayers who are reluctant to open tax applications due to low taxpayer understanding. This is evidenced by one of the MSME taxpayers who stated that not everyone understands tax reporting, starting from the types of taxes and reporting mechanisms, so they need a more practical system (OYI, Personal Communication, August 11, 2023). This can certainly make taxpayers too lazy to open the website or application because they do not know what they have to do when they are logged in. In this case, the DGT needs to create a module related to tax calculation, deposit, and reporting mechanisms that can be accessed on the DGT website and can refer directly to the tutorial link to make it easier for taxpayers to practice.

Fourth, there is limited digital literacy among taxpayers. Although the DGT has facilitated tax administration as much as possible, it will be difficult to increase compliance if taxpayers are still lacking in digital literacy. MSME taxpayers stated that it is more convenient to see information on red lights or large billboards than to access the DGT website, which is full of complex regulations (OYI, Personal Communication, August 11, 2023). To overcome this, the government can provide training and education programs to optimize digital literacy among taxpayers. Through the optimization of digital literacy, it is expected that taxpayers can understand tax regulations so as to increase taxpayer compliance.

Fifth is the threat of cybercrime. No matter how sophisticated the system is, it must have the potential for hacking in its implementation [34]. The impact of weak security can create the risk of lost or exposed data. There are doubts in the community about the security and confidentiality of the reported tax return data. In this case, the government needs to develop a strong security system and involve cybersecurity experts to protect tax data from outside attacks. The government needs to implement strong cyber security measures, such as encryption and multi-factor authentication, to protect taxpayer data.

Sixth, the server is down. Any system or application has most likely experienced an error or server down, including the tax website or application [35]. This certainly affects the psychology of taxpayers toward carrying out tax obligations digitally. One of the obstacles often experienced by taxpayers in accessing information online is errors (ATK, Personal Communication, August 11, 2023). There are taxpayers who state that paying taxes manually is easier than digitally, especially if the website or application error causes taxpayers to be penalized for not being able to access and report their taxes. In this case, the DGT must periodically monitor and evaluate the digital taxation system to ensure taxpayer convenience. If taxpayers feel comfortable using the website or application, it will certainly affect their psychology toward the easy implementation of tax administration digitalization.

Seventh, the complexity of the tax digitalization system This is evidenced by one MSME taxpayer who stated the complexity of the digital taxation system in terms of tax reporting and, moreover, having to input data one by one so that it takes a long time (OYI, Personal Communication, August 11, 2023). In this case, the government needs to innovate the tax administration digitalization system to make it easier for taxpayers, such as other applications that are often used. The government needs to optimize the internal control system (SPI) as an analytical tool to find and map the problems that occur. In addition, the government also needs to survey the obstacles and problems that are still often experienced by taxpayers as a solution to the problems of tax digitalization.

Apart from some of the challenges and solutions above, the government must periodically continue to carry out training, mentoring, socialization, and education, both offline and online, using available media, in an effort to provide good service to taxpayers so that the target number of taxpayers is always met. The government needs to hold workshops as well as provide training and guidance to tax authorities in conducting optimal monitoring and periodic evaluation of the development of the application of tax administration innovation.

In addition, the government must also improve learning standards regarding taxation in schools and universities according to the times. In this case, the digitization of tax administration can be informed through seminars or webinars or through the college Tax Center by visiting the campus as a target for new taxpayers after graduation and work. This is done not without reason but for the convenience of taxpayers in carrying out tax obligations. The more taxpayers understand the tax system and the more comfortable they are with reporting their taxation, the higher the level of taxpayer compliance, and of course, it will have an impact on increasing state revenue [36].

4.4. The impact of the shadow economy on state revenue and tax-payer compliance informal sector taxpayer compliance

The existence of shadow economy activities in a country has attracted the attention of economists and sociologists, including in Indonesia. From a micro perspective, the shadow economy builds unfair competition in various sectors by avoiding taxes, thereby reducing state revenue [37]. When viewed from the APBN side, tax revenue in Indonesia has increased every year, except in 2020, which experienced a drastic decline compared to the previous year [38]. However, this does not necessarily mean that the state has reaped a lot of income in terms of taxes. In fact, the tax revenue obtained each year still does not meet the predetermined target. This means that there is still tax revenue that is lost every year, so the set target does not reach 100%.
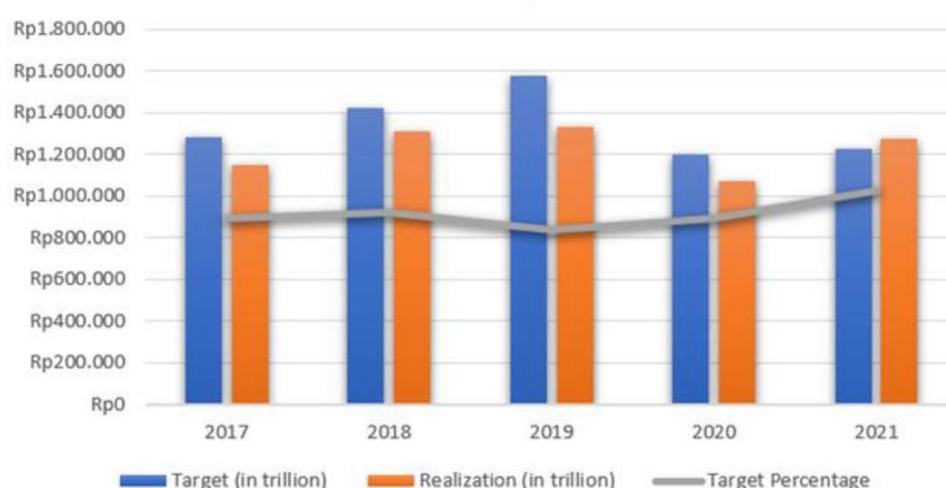

Figure 1: Target and realization of tax revenue (2017-2021). Source: DGT Annual Report; data processed.

Based on the diagram above (Figure 1), in 2017, the state received tax revenue of Rp1,151.03 trillion, which reached 89.67% of the previous year's target. Then it increased to Rp1,313.32 trillion in 2018 and Rp1,332.66 trillion in 2019, with an average target realization of 88.35%. However, in 2020, there was a significant decrease in tax revenue to Rp1,072.11 trillion, reaching 89.43% of the target. However, this did not last long because in 2021 tax revenue increased again by 103.99% of the target of IDR 1,278.65 trillion, although this revenue did not exceed 2019 and 2018.

Apart from this, the reality is that there are still tax revenues that do not meet 100% of the target that has been set in recent years. This means that there is still an amount of income that is not reported to the tax authorities from the economic activities carried out. This is, of course, closely related to the shadow economy, where

there are economic activities carried out but no income is reported. In many cases, shadow economy activities imply direct or indirect tax avoidance, leading to reduced state revenue [3]. The more shadow economy activities develop the greater the state losses in terms of tax revenue [14].

Activity	Type of Transactions			
	Monetary Transactions		Non-Monetary Transactions	
Illegal	- Trade in stolen goods; - Narkotic; - Prostitutions; - Gambling; - Fraud; - Money Laundry; - Smunggling; Embezzlement.		Drug bartering and theft	- Theft for personal use; - Production of illegal drugs for personal consumption
	Tax Evasion	**Tax Avoidance**	**Tax Evasion**	**Tax Avoidance**
Legal	Unreported income by workers, both wages, salaries, and assets	Worker discount and allowance	Service exchanges and legal goods	Self-directed work

Figure 2: Classification of shadow economy activities. Source: Lippert and Walker [39].

If seen from the Figure 2, one of the legal activities classified in the shadow economy is income that is not reported to the tax authorities, either in the form of wages, salaries, or assets. Directly, this certainly reduces tax revenue because activities that should be recorded by taxes do not enter the state treasury. This is, of course, also related to taxpayer compliance in fulfilling their tax obligations. The lower the level of tax compliance, the lower the level of tax revenue [40]. This means that the shadow economy directly implies the existence of tax evasion and tax avoidance, which indicates the low compliance of taxpayers and has an impact on reducing state revenue. The higher the level of the shadow economy, the higher the level of taxpayer non-compliance, and the higher the loss of tax revenue that should be obtained.

In this case, one of the economic activities that has the potential to reduce tax revenue can come from the drivers of national economic growth, namely the MSME sector. On the one hand, MSMEs are one of the sectors that contribute to the level of GDP in Indonesia. According to data from the Ministry of Cooperatives and SMEs, the MSME sector has contributed up to 60.5% of the national GDP [41]. This shows that MSMEs in Indonesia have great potential to be developed because they contribute greatly to state revenue. However, on the other hand, MSMEs are considered a difficult sector to capture in terms of taxation because most of them operate informally, which is difficult for tax authorities to reach. This can be seen from the level of compliance of MSME taxpayers in fulfilling their tax obligations. Based on data from the Ministry of Cooperatives and SMEs, there are 65.4 million MSMEs in Indonesia until 2019 [27]. However, the DGT stated that only 2.3 million MSMEs paid taxes out of the total of all MSMEs in Indonesia

[42]. This means that although MSMEs are the drivers of the country's economic growth, on the other hand, they are also the actors in shadow economy activities that reduce state revenue.

Muliawati [43] states that the existence of the shadow economy is motivated by three dominant motives, namely the cost motive, profit motive, and complexity motive. First, the cost motive is the urge to minimize the tax burden or other business costs. When viewed from the perspective of the impact of the shadow economy on MSME taxpayer compliance, the cost motive has a close relationship with shadow economy activities. In terms of profit, taxes certainly reduce profits for MSME actors (SGL, Personal Communication, August 11, 2023). This means that the existence of the shadow economy in terms of cost motives is directly proportional to the non-compliance of MSME taxpayers because it can reduce their profitability so that they have the potential to minimize the tax burden.

Second, the profit motive stems from the offer of lucrative benefits that encourage someone to get them even if they have to break the law. MSME actors who are highly motivated by money will have a great interest in money and view tax fraud as an acceptable action to take [44]. Third, the complexity motive arises when a person is reluctant to deal with mechanisms that are considered complicated. This can be seen from the existence of business actors who prefer to enter the informal sector because they are reluctant to take care of licenses that are considered complicated [6]. Similarly, the taxation system is considered complicated and time-consuming for MSME actors, which reduces productivity (OYI Personal Communication, August 11, 2023).

Judging from these three motives, shadow economy activities are certainly detrimental to state revenue due to taxpayer non-compliance. In this case, MSMEs are one form of shadow economy in Indonesia, with the ease of tax registration, payment, and reporting facilities provided by the DGT (DGT, Personal Communication, September 13, 2023). To slow down the growth of the shadow economy, DGT takes tactical steps by improving and innovating the digitalization of tax administration [45]. The digitalization of taxation, such as the creation of NPWP electronically, electronic tax return reporting through e-filing, and electronic tax payments through billing codes, should have an impact on reducing the shadow economy in Indonesia (DGT, Personal Communication, September 13, 2023). Through the optimization of tax administration digitalization, MSME taxpayers are expected to be able to more easily fulfill their tax obligations, so that the potential shadow economy in Indonesia can be reduced.

A more efficient administrative process can certainly increase taxpayer compliance so that it has an impact on increasing tax revenue [46]. One MSME taxpayer stated that the digitization of tax administration can cut the time to do tax administration so that he can use the rest of his time to employ other things that can support profitability (ATK, Personal Communication, August 11, 2023). In the process, taxpayers prefer to use digital administration rather than having to manually come to the Tax Service Office (ATK, Personal Communication, August 11, 2023).

Improving the quality of services through information technology has become the main innovation carried out by the DGT by implementing an electronic system in the hope of improving the quality of services that are fast, easy, and efficient and increasing the effectiveness of monitoring taxpayer compliance. With digitalization, the provision of information and government services directly to the community allows citizens to continue to receive the latest tax information and report tax returns on time. This is also evidenced by all questionnaire respondents having utilized tax administration digitization services, such as DJP Online, e-Biling, e-SPT, e-Invoicing, and so on (data processed, 2023). This means that with the digitalization of tax administration, taxpayers can more easily carry out their tax obligations so as to increase tax revenue.

5. Conclusion

In looking at the implementation of tax digitalization through the core tax system, we can use the balanced e-government model, which consists of four dimensions: benefits, efficiency, transparency, and participation. Based on the theory of the information systems success model (ISSM) used in this study, the implementation of tax digitalization has been quite effective. The fulfillment of the existing indicators also affects the level of user satisfaction, where the majority of system users, namely MSME owners, claim to be quite satisfied while utilizing digital taxation services. Digitalization of tax administration has its own challenges for DGT in its implementation. However, through the optimization of tax administration digitalization, taxpayers, especially MSME players, are expected to be able to more easily fulfill their tax obligations. The higher the level of taxpayer compliance, which, of course, will have an impact on increasing state revenue and minimizing the shadow economy.

References

[1] Smith P. The underground economy: Global evidence of its size and impact. Choice Reviews Online. 1997;35(3).

[2] Elbahnasawy NG. Can e-government limit the scope of the informal economy? World Dev. 2021;139:105341.

[3] Rezky NP. Kajian kegiatan shadow economy di Indonesia: Sebuah studi literatur [Study of shadow economy activities in Indonesia: A literature study]. Jurnal Akuntansi Bisnis dan Ekonomi. 2020;6(2):1671-1680. https://doi.org/10.33197/jabe.vol6.iss2.2020.617.. Indonesian

[4] Din BH, Habibullah MS, Hamid BA. Re-estimation and modelling shadow economy in Malaysia: does financial development mitigate shadow economy? International Journal of Business & Society. 2019;20(3):1062–75.

[5] Twizeyimana JD, Andersson A. The public value of e-government – A literature review. Gov Inf Q. 2019;36(2):167–78.

[6] Musqari N, Paramita G, Kisworo Y, Sundawa RD. Peningkatan kapasitas UMKM melalui pelaporan keuangan [Increasing the capacity of MSMEs through financial reporting]. Jurnal Pengabdian Masyarakat Ekonomi, Manajemen dan Akuntansi (JPMEMA). 2022;1(1):41-47. Indonesian

[7] Yuan Q, Gasco-Hernandez M, Gil-Garcia JR. Handbook of theories of public administration and management. Bryer TA, editor. UK: Edward Elgar Publishing; 2021. Chapter 9, Digital government: Analytical models, underlying theories, and emergent theoretical perspective; p. 104-122.

[8] Yap M, Mulyani SD. Pengaruh pelayanan, pengawasan dan pemeriksaan pajak terhadap kepatuhan wajib pajak badan yang dimoderasi digitalisasi administrasi perpajakan [The influence of tax services, supervision and audits on corporate taxpayer compliance moderated by digitalization of tax administration,Indonesian]. Jurnal Magister Akuntansi Trisakti. 2022;9(1):37–54.

[9] Misra F. Tax compliance: Theories, research development and tax enforcement models. Accounting Research Journal of Sutaatmadja. 2019;3(2):189–204.

[10] Rasmini M, Ismail T. Administrasi perpajakan. pengertian pajak, adm. pajak, fungsi, dan syarat pemungutan pajak [Tax administration. Definition of tax, tax administration, function, and requirements for tax collection.]. Jakarta: Universitas Terbuka; 2014. Indonesian

[11] Saifudin S, Rahmawati MA. Digitalisasi administrasi perpajakan: implementasi di KPP Pratama Semarang Selatan [Digitalization of tax administration: implementation at

South Semarang Pratama Tax Office]. Jurnal HUMMANSI (Humaniora, Manajemen, Akuntansi). 2022;5(2):70-80. Indonesian

[12] OECD. Tax Administration 2019: Comparative information on OECD and other advanced and emerging economies. Paris: OECD Publishing; 2019.

[13] Feige EL. Reflections on the meaning and measurement of unobserved economies: what do we really know about the 'Shadow economy'. Journal of Tax Administration. 2016;2016(2):1–50.

[14] Dahlan M. Shadow economy, AEOI, dan kepatuhan pajak [Shadow economy, AEOI, and tax compliance,Indonesian]. Scientax. 2020;2(1):39–56.

[15] Samuda SJ. Underground economy in Indonesia. Bulletin of Monetary Economics and Banking. 2016;19(1):39–56.

[16] Arief A, Abbas MY. Kajian literatur (systematic literature review): Kendala penerapan sistem pemerintahan berbasis elektronik (SPBE) [Literature review (systematic literature review): Obstacles to implementing electronic-based government systems (SPBE)]. PROtek [Indonesian]. Jurnal Ilmiah Teknik Elektro. 2021;8(1):1–6.

[17] Gil-García JR, Pardo TA. E-government success factors: mapping practical tools to theoretical foundations. Gov Inf Q. 2005;22(2):187–216.

[18] Owens J, Pemberton JL. Cooperative compliance: A multi-stakeholder and sustainable approach to taxation. Netherlands: Kluwer Law International B.V.; 2021. 156 pp.

[19] Stiftung B, Hamilton BA. Balanced e-government: Elektronisches regieren zwischen administrativer effizienz und bürgernaher demokratie [Balanced e-government: Electronic governance between administrative efficiency and citizen-oriented democracy]. Gütersloh: Bertelsmann Foundation Publication House; 2002. German

[20] Haning MT. Reformasi birokrasi di Indonesia: Tinjauan dari perspektif administrasi publik [Bureaucratic reform in Indonesia: A review from a public administration perspective]. JAKPP (Jurnal Analisis Kebijakan & Pelayanan Publik). 2019;4(1):25-37. https://doi.org/10.31947/jakpp.v4i1.5902.. Indonesian

[21] Choirunnisa L, Oktaviana THC, Ridlo AA, Rohmah El. Peran sistem pemerintah berbasis elektronik (SPBE) dalam meningkatkan aksesibilitas pelayanan publik di Indonesia [The role of electronic-based government systems (SPBE) in increasing the accessibility of public services in Indonesia]. Sosio Yustisia: Jurnal Hukum dan Perubahan Sosial. 2023;3(1):71-95. https://doi.org/10.15642/sosyus.v3i1.401.. Indonesian

[22] Tapscott D. The digital economy: Promise and peril in the age of networked intelligence. New York: McGraw-Hill; 1996.

[23] Amit R, Zott C. Value creation in e-business. Strateg Manage J. 2001;22(6-7):493–520.

[24] Malhotra Y. Enabling next generation e-business architectures: Balancing integration and flexibility for managing business transformation. Intel e-Strategy White Paper. 2001.

[25] Rachmadi T. Pengantar teknologi informasi [Introduction to information technology]. Bandar Lampung: TIGA Ebook; 2020. Indonesian

[26] Prasetyowati H, Panjawa JL. Teknologi dan distribusi pajak mendukung kualitas pembangunan manusia [Technology and tax distribution support the quality of human development]. Transekonomika: Akuntansi, Bisnis dan Keuangan. 2022;2(2):23-36. https://doi.org/10.55047/transekonomika.v2i2.113.. Indonesian

[27] Ministry of Finance. Wamenkeu: Kumpulkan pajak untuk menjaga dan menumbuhkan ekonomi indonesia [Deputy Minister of Finance: Collect taxes to maintain and grow the Indonesian economy,Internet]. Jakarta: Ministry of Finance; 2023 [cited 2023 Nov 3]. Available from: https://www.kemenkeu.go.id/informasi-publik/publikasi/berita-utama/Kumpulkan-Pajak. Indonesian

[28] Mufidah IF, Hasanah A. Kupas tuntas peran digitalisasi perpajakan [A thorough analysis of the role of tax digitalization,Indonesian]. JIMEK: Jurnal Ilmiah Mahasiswa Ekonomi. 2023;6(1):89–97.

[29] OECD. OECD Economic surveys: Indonesia 2021 [Internet]. Paris: OECD; 2021 [cited 2023 Nov 3]. Available from: https://www.oecd-ilibrary.org/content/publication/fd7e6249-en

[30] Widianto E. Pemanfaatan media pembelajaran berbasis teknologi informasi [Utilization of information technology-based learning media,Indonesian]. J Educ Teach. 2021;2(2):213–24.

[31] OECD. Tax administration 2017 [Internet]. Paris: OECD; 2021 [cited 2023 Nov 3]. Available from: https://www.oecd-ilibrary.org/content/publication/tax_admin-2017-en

[32] Kundalini P. Pengaruh kesadaran wajib pajak dan pelayanan pegawai pajak terhadap kepatuhan wajib pajak pada Kantor Pelayanan Pajak Pratama Kabupaten Temanggung tahun 2015 [The influence of taxpayer awareness and tax officer services on taxpayer compliance at the Temanggung Regency Primary Tax Service Office in 2015,Bachelor's thesis on the Internet]. Yogyakarta: Universitas Negeri Yogyakarta; 2016 [cited 2023 Nov 3]. Available from: https://eprints.uny.ac.id/33437. Indonesian

[33] Nugraheni AP, Sunaningsih SN, Khabibah NA. Peran konsultan pajak terhadap kepatuhan wajib pajak [The role of tax consultants in taxpayer compliance,Indonesian]. Jurnal Akuntansi Terapan Indonesia. 2021;4(1):49–58.

[34] Wibowo A. Internet of things (IoT) dalam ekonomi dan bisnis digital [Internet of things (IoT) in the digital economy and business]. Semarang: Yayasan Prima Agus Teknik; 2023. Indonesian

[35] Sulistiyantoro D, Nusa GH. Analisis pengaruh digitalisasi pajak terhadap pajak penghasilan di masa pandemi [Analysis of the impact of tax digitalization on income tax during the pandemic]. Bilancia [Indonesian]. Jurnal Ilmiah Akuntansi. 2023;7(2):540–56.

[36] Muhnia N, Alam S, Shaleh M. Kesadaran wajib pajak, pengetahuan perpajakan dan kepatuhan wajib pajak [Taxpayer awareness, tax knowledge and taxpayer compliance]. Paradoks [Indonesian]. Jurnal Ilmu Ekonomi. 2023;6(2):117–27.

[37] Kristianto AH, Dedy D, Fentura B. Underground economy dalam sebuah perspektif [Underground economy in perspective]. Business [Indonesian]. Economics and Entrepreneurship. 2020;2(2):1–8.

[38] Firdausy CM. Optimalisasi dan penguatan perpajakan Indonesia [Optimization and strengthening of Indonesian taxation]. Jakarta: Yayasan Pustaka Obor Indonesia; 2021. Indonesian

[39] Lippert O, Walker M. The underground economy: Global evidence of its size and impact. Vancouver, B. C.: The Fraser Institute; 1997.

[40] Suryadi TL, Subardjo A. Pengaruh kepatuhan wajib pajak, penagihan pajak dan pemeriksaan pajak terhadap penerimaan pajak [The influence of taxpayer compliance, tax collection and tax audits on tax revenues]. Jurnal Ilmu dan Riset Akuntansi (JIRA). 2019;8(4):1-22. Indonesian

[41] Kementerian Koperasi dan UKM. Perkembangan data usaha mikro, kecil, menengah (UMKM) dan usaha besar (UB) tahun 2018 – 2019 [Cooperatives and SMEs. Development of micro, small, medium enterprises (MSMEs) and large enterprises (UB) data in 2018 – 2019]. Jakarta: Kementerian Koperasi dan UKM; 2021. Indonesian

[42] Palupi ME, Arifin J. Kepatuhan wajib pajak UMKM di Indonesia: Faktor internal dan eksternal [Tax compliance of MSMEs in Indonesia: Internal and external factors]. Proceeding of National Conference on Accounting & Finance. 2023;5:336-346. https://doi.org/. Indonesian

[43] Muliawati NG. Shadow economy [Internet]Jakarta: Direktorat Jenderal Pajak; 2020.[[cited 2023 Nov 3]], Available from http://pajak.go.id/id/artikel/shadow-economy

[44] Hakki TW, Simanungkalit J, Siat M. Pengaruh tax self-assessment system, money ethics, dan religiusitas terhadap tax evasion [The influence of tax self-assessment system, money ethics, and religiosity on tax evasion]. Jurnal Analisa Akuntansi dan Perpajakan. 2023;7(2):160-171. https://doi.org/10.25139/jaap.v7i2.7007.. Indonesian

[45] Aini NQ, Nurhayati N. Pengaruh kebijakan insentif pajak penghasilan bagi UMKM dan digitalisasi pajak terhadap kepatuhan wajib pajak [The impact of income tax incentive policies for MSMEs and tax digitalization on taxpayer compliance,Indonesian]. Bandung Conference Series: Accountancy. 2022;2:341–6.

[46] Kowel VAA, Kalangi L, Tangkuman SJ. Pengaruh pengetahuan wajib pajak, kesadaran wajib pajak dan modernisasi administrasi perpajakan terhadap kepatuhan wajib pajak kendaraan bermotor di Kabupaten Minahasa Selatan [The influence of taxpayer knowledge, taxpayer awareness and modernization of tax administration on motor vehicle taxpayer compliance in South Minahasa Regency]. Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi. 2019;7(3):4251-4260. https://doi.org/https://doi.org/10.35794/emba.v7i3.25060.. Indonesian