WILL THE USE OF CASHLESS SUBSIDY POTENTIALLY REDUCE ILLEGAL UNDERGROUND ECONOMY ACTIVITY? A CASE STUDY IN INDONESIA

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Abstract. *Purpose* – This study was conducted to understand the potential of cashless subsidy to reduce illegal underground economy activity in Indonesia.

Research methodology – The research was done through a qualitative approach then analyzed based on the content analysis and sentiment analysis using Digital Public Services Index frim Digital Economy and Society Index (DESI) research methodology as base. The data used on this study are Indonesia e-news on kompas.com, detik.com, and tempo.co from March 2021-2022 using two keywords *"subsidi"* (subsidy), *"non-tunai"* (cashless) and *"nirsentuh"* (contactless).

Findings – The result of this study shows illegal underground economy activity can be reduced by implementing cashless subsidy policy.

Research limitations – The data used on the research were big data obtained from e-news because the lack primary reliable respondent. We could not estimate the cashless subsidy after COVID-19 was ended in Indonesia because the declaration of the end of COVID-19 pandemic in Indonesia was on 29 June 2023.

Practical implications – This study also provides two recommendations for those problems: (a) increase digital financial literacy awareness; (b) improve the formal economy activity.

Originality/Value – There still no specific research of cashless subsidy and their practice in shadow economy perspective, especially in developing countries such as Indonesia.

1. Introduction

The evolution of technological progress to support the modern economy delineates the complex and interconnected structure of various networks, such as transport, energy, communication, finance, and others (Berkimbayeva, 2019). Technological is also considered as globalization way of the global south to keep up with global north development, equality, and wellness (Singh, 2013). The global south country always considers technological development and innovation from a multidisciplinary perspective to create, implement, and support their policy. From the finance and economy sectors, one policy that implementing technology is the cashless economy as a nation way to support international trade (Van Klyton et al., 2022), maintain inflation (Titalessy, 2020), and promote tourism (Yakean, 2020), etc, as predicted by old economics before 2000 (Srouji, 2020).

Despite the capability of cashless economic transactions, cash money still dominates the market and society. It is difficult for people to give up using cash (Singh, 2013), because it

requires a change in the patterns and habits established over many years, such as those relating to tracking one spending and the anonymity of transactions (Huterska et al., 2021). From a macro perspective, cash popularity has been blamed for inhibiting financial inclusion. It acts as a regressive tax on the unbanked population, facilitating theft and hindering the effectiveness of monetary policy (Marmora & Mason, 2021).

The way of thinking is starting to change in 2020 due to the COVID-19 virus outbreak. Many organizations such as the United Nations (UN), World Health Organization (WHO) and the G20's Global Partnership promoting to a transition away from cash towards digital payments in various activity (Aji et al., 2020; Marmora & Mason, 2021). It has forced a change in many economic sectors and business strategies as well as in consumer behaviors in different fields, including daily practices of making payments (Ahmed & Sur, 2023; Huterska et al., 2021). This change not only impacted formal economy but also informal economy positively and negatively (Huterska et al., 2021; Yakean, 2020). It increase informal economy activities such unregistered enterprises, registered enterprises conducting a portion of their work on an undeclared basis, informal self-employment, unregistered employment, under-declared employment, and dependent self-employment (McKinsey & Company, 2020). While in exchange, cashless economy will decrease shadow or underground economy activity. It reduce illegal transaction such as money laundering, illegal payment and money hoarding, etc (Ha, 2020; Yakean, 2020).

From institutional perspective, pandemic era mark as new time when messages based on rational arguments can be received differently, and the calculation of transaction costs follows new analytical paths. As a social shocks, its capable to disrupt the old normal behavior pattern of responding to external stimuli and forced non-standard behaviors. People start adopting new, digital technology that influence their daily life for various reason. Such as social concerns about the possibility of the virus being spread through paper money and coins and the result of the need for physical distancing (Ahmed & Sur, 2023; International Labour Organization, 2021; McKinsey & Company, 2020; Yakean, 2020). It's makes cashless economy and habits is accepted more easily by people.

During the shock era, the concept of cashless subsidy is introduced as a branch of cashless economy (Patil et al., 2022), along with others such as cashless transportation (Yakean, 2020) and cashless tax implementation (Olaniyi & Akinola, 2020). A report from World Bank Group (2020) shown 79% of sample countries already implementing cashless subsidy to support people resilience during the pandemic. 80% of them indicates the low of usage of the system continously because of the increasement of scheme activity. It's reported that scheme through QR code is exceed 1 million, and international card payments up to USD 100,000. On the other hand only 30 central banks from 104 countries already issued regulation to enforce the interoperability towards cashless activities and none to cashless subsidy. This phenomenon potentially increase illegal activity and create a long-term shadow economy in the future (Franchuk et al., 2021; Ha, 2020).

Despite the trend and impact, there still no specific research regarding cashless subsidy during COVID-19 era. To support this statement, this research tries to find a similar study using Vosviewer from 2020–2023 using the keywords of cashless subsidy, shadow economy, and digital public policy. As shown in Figure 1, a similar case has never been carried out, and
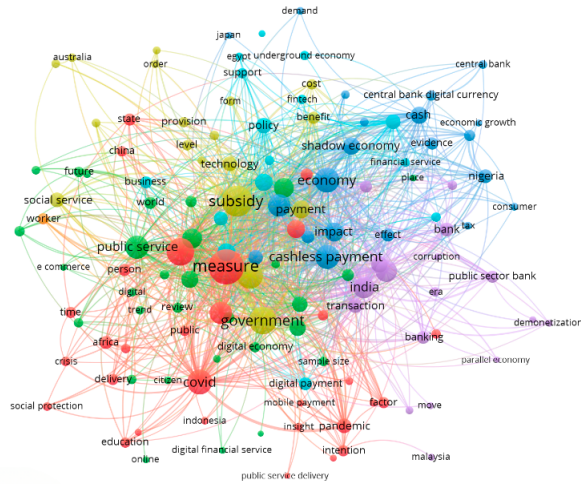
Figure 1. Various related literature in 2020–2023 by Vosviewer

various previous studies indicate cashless subsidy as part of cashless payment or cashless economy research. An example study is done by Patil et al. (2022), Takahashi and Hashimoto (2023).

Therefore, this research aim is to verify the possibility of cashless subsidies to reduce illegal underground economic activity. As a novelty and additional contribution, this research seeks to fill the gap in the economy and financial study research that rarely focuses on cashless subsidies in extreme conditions (COVID-19 pandemic). Indonesia is used as a case study because it fits with the research aim for three reasons. First, Indonesia is a country from the global south that was included in World Bank Group (2020) study of cashless economy transformation during the pandemic. Second, the cashless subsidy policy was born in 2021 as a resilience condition response (see Bank Indonesia, 2023). Lastly, as a G20 member, Indonesia promotes a cashless economy, including cashless subsidy as part of their countermeasure strategy in the new normal era, for the next 20 years nation development strategy known as Indonesia Emas 2045 during G20 Bali Summit in 2022 (G20 Indonesia, 2022; Republic of Indonesia, 2020).

This study is organized into five Sections. Section 1 explained the COVID-19 impact on Indonesia, especially in economy sectors, and how Indonesia tries to overcome this situation through cashless subsidy policy. Section 2 provides theoretical support and past studies related to cashless subsidy, financial behavior, Informal and Underground economy in Indonesia and worldwide. Section 3 provides information about research analysis, tools, and the research refers to Digital Public Services Index that included in Digital Economy and Society Index (DESI) methodology, especially Digital public services Index. Digital public services is methode and framework aimed to measure digitalizing public services to support or improving e-government solutions figure prominently across the Recovery and Resilience Plans. This multidisciplinary method and framework of digital public services are particularly suitable for

understanding the digital acceleration phenomenon of the COVID-19 pandemic. It also can increase the transparency and openness of digital public policy implementation and bring out underground economic activity (see Li et al., 2020). Section 4 discussed cashless subsidy impact towards Indonesia underground economy and recommendation to reduce the negative aspect. Section 5 presents the concluding remarks.

2. Literature review

2.1. Cashless subsidy

Historically, cashless transactions were innovated in Britain in 1993 and became a trend during that time (Coyle-Camp, 1994). Research towards a cashless economy started to pop up around that time to enlighten the opportunity and risk of cashless transactions to support a nation economic stability (Hoenig, 1995). Despite the risk and the system being incomplete, U.S.A, Japan, and Europe are still adopting the system (Humphrey et al., 1996). After 2000, cashless transactions and economies became popular and adopted in the global south. In correspondence with this policy, the use of cash for economic transactions has decreased slowly along with the increase in digital schemes in the finance sector (Balling et al., 2002). After 2010, cashless payment became popular in the global south because of simplicity and is considered as modern civilization habit (Satria et al., 2023).

Despite its long existence, there is still no acceptable definition of the cashless economy worldwide. Coyle-Camp (1994) first describes a cashless economy as the economies of integrating a cashless system, substituting physical money for electronic money on a plastic card. In a 2002 study by Cláudia Costa Storti and Paul De Grauwe (in Balling et al., 2002), describe cashless economy as a cashless society with two specific characteristics. First, there are no notes and coins in circulation issued by a central bank. Second, all the money used is issued by private financial institutions (banks and possibly other firms). Book entitle "Globalization and Money: A Global South Perspective" by Singh (2013) describes a cashless economy as conceptual frameworks shift with the social and cultural concept of money at the center of globalization. People no longer talk of the distinction between "real money" and "plastic money" in everyday life, is one of the indication.

In a recent study by, Mamudu and Gayovwi (2019) defined a cashless economy as an economy transaction that allows users to pay through GSM phones with internet facilities. This system increases convenience, create more service options, reduces risk of cash- related crimes and provide cheaper access to banking services and access to credit (Aji et al., 2020; Ude, 2020; Yakean, 2020). It also has macroeconomic benefits by creates an opportunity for the electronic payment industry and imposing a cost on local economies. Cashless economy implementation also helping harmonizing monetary and fiscal policy through various related policies such as cashless subsidy (Immordino & Russo, 2018; Mamudu & Gayovwi, 2019; Oleshko et al., 2018; Van Klyton et al., 2022).

The cashless economy policy in Indonesia was first introduced by the Bank of Indonesia at 2014, while cashless subsidy is introduced in 2020. Both of policy is aimed to increase effectiveness and efficiency of national financial system to support solid, balanced, inclusive and sustainable national economic growth (Bank Indonesia, 2023). Hitachi-UTokyo Laboratory

(2020); Mamudu and Gayovwi (2019); Titalessy (2020) stated that the increased use of cashless payment system is modern lifestyle and predicted as led to society 5.0 because there are clear correlation between the cashless transaction and with the proportion of people banked. Nowadays, people can make payments over the internet, payment at unmanned vending machine, manned point of sale (POS) using mobile device, personal digital assistant (PDA), smart cards and other electronic payment systems, including debit and credit cards (Ahmed & Sur, 2023; Titalessy, 2020; Yakean, 2020).

Through the diffusion of innovation theory (DOI) presepective, cashless subsidy is considered as innovation driven diffusion of technology, financial and fiscal policy implementation (Satria et al., 2023). Mamudu and Gayovwi (2019) defined DOI as a theory that seeks to explain how, why and at what rate new ideas and technology spread through cultures. In this context, diffusion is the spread of cashless payment including cashless subsidy is where consumers seek improved and convenient transaction, while businesses seek new profit opportunities (Givelyn et al., 2022). The role of government is to mediate this needs that aimed of adoption of cashless transactions within the society or community (Kamis et al., 2022; World Bank Group, 2020). The consequences of diffusion in cashless payment depend on how quickly the society is willing to adopt cashless payment through different stages of innovation processes, it may differs in different society (Marmora & Mason, 2021).

The diffusion of cashless subsidy in Indonesia already meets several problems and obstacle especially for food and cash transfer subsidy programs. Most of food and cash transfer subsidy programs was more than the set percentage of the population (Sutiyo, 2022). Surprisingly, when the related stakeholders like chief officers in the district knew about it, sanctions were rarely applied. The same case also happen in social insurance and scholarship programs. This condition was creating illegal underground economy activity tolerated by society. Most of people and government was tolerating incash and cashless subsidy illegal practice. While at the same time, this activity is reducing the subsidy received by poor people (Sutiyo et al., 2018).

The same condition also happens in another country like in Nigeria. Cashless subsidy in Nigeria also maintained by the Central Bank of Nigeria. Ovat (2012) state that a cashless economy will reduce the transaction and transportation costs of cash money. Previously cash money transaction cost was obtained from the entire banking population. But by implementing a cashless economy and cashless subsidy, the entire banking populating was released from that responsibility. While at the same time, the cost of cash money is only charged to those that still using it.

In Japan, policies that promote cashless payments is beneficially to reduce the costs of cash and focus on subsidizing the use of cashless payment methods (Fujiki, 2022). Since 2020, Japan government also distributing subsidy digitally or mixed with in physical subsidy (cross-subsidization). It was aimed as test project and practically launch as an initiative in particular city and roll out in other city. This step was done to reduce digital transformation negative impact or other obstacle while prioritizing public service over profit (Hitachi-UTokyo Laboratory, 2020).

In summary, cashless subsidy implementation affects people financial behavior, and it is capable of illicit shadow economy due to their nature is lie in the grey zone, far from formal system monitoring during the implementation.

2.2. Financial behaviours

Finance behavior is a concept to justify society consumption that combines psychology and economy. As an academic concept, it is considered as new to explain how financial market participants make decisions and, in turn, how these decisions affect financial markets (Kim & Nofsinger, 2008). While the idea is already thought by economist before 2000 (Backus et al., 1980; Garman et al., 1996). Anecdotal evidence and media report that the changing shape of money in a cashless shape affects household spending, credit use, and stress levels (Garman et al., 1996). It can affect people's perspective of their money, wealth, and consumption. Due to the lack of information, many people fall into the psychological trap of overconsuming their wealth (Hira & Mugenda, 1999).

Over time, the study of financial behavior has increased along with the spread of cashless economy information that contains the characteristics, risks, and opportunities of cashless transactions. The information can alter individual and organization financial perceptions behavior and satisfaction of cashless transaction, reducing the victim of cashless transactions (Hira & Mugenda, 2000; Xiao, 2008). After 2010, the relationship between the economy and the psychology of the cashless economy became tighter due to technological innovation. The millennial generation can easily adapt to the cashless economy and manage their digital money better than the older generation. Various studies describe demographical variables that mostly consist of the younger generation capable of biased finance behavior (Baker et al., 2019; Cole et al., 2014; Gutter & Copur, 2011).

The strengthening role of technology in supporting the finance sector is considered as revolutionary. Today, financial services are not solely monopolized by the Bank. Non-bank institutions also be able to provide payment services. The number of non-banks providing financial services rose during the COVID-19 pandemic. Evidence from Southeast Asian countries such as Indonesia (Anggraeni et al., 2023), and Malaysia shows that this typical company, fintech (financial technology), has grown rapidly since 2020. They release product like e-wallets or code-based payments to support a cashless economy. Nowadays, fintech in Malaysia has 13 categories, one of which is the most dominant, e-wallet (Adiani et al., 2021; Kamis et al., 2022).

A similar phenomenon also occurred in Japan at the same time. The younger generation financial behaviour started to change because there were increasing level of credit card fraud during the pandemic and the held of the Tokyo 2020 Summer Olympics Games. Actually, it's considered late for highly developed country like Japan (Gorshkov, 2021). This was caused by many reasons, such as language barrier, consumers unique preferences, and local financial behaviour that prefers cash over digital money, especially for small payments like train or bus tickets. A similar condition also happens in Singapore. Many customers and sellers prefer paying using cash instead of digital payment. Because no one used a cashless system for most payments, the seller also needed to pay monthly fee and payment option were limited (Ariffin et al., 2020). By developing the right cashless payment system is easy to change people behaviour towards digital financials (Ng et al., 2021). On the contrary, in Sweden and Swiss, digital financial behaviour became a habit before COVID-19 occurred (Gorshkov, 2021; Ng et al., 2021).

In the case of Indonesia, digital finance behavior, as well as new non-bank companies that provide the services, is accepted with fewer challenges compared to Japan and Singapore. The Central Bank of Indonesia believes it will help support economic inclusivity and introduce a new stimulus of the monetary economy (Bank Indonesia, 2019). By promoting new concepts in financial services and raising global awareness, fintech can change people's financial behavior because consumers tend to seek out services that are simple, easy to use, real-time, and available everywhere (Ahmed & Sur, 2023; Marmora & Mason, 2021). Unfortunately, the rise of fintech uses is followed by a declining role of banking, which reflects the disruptive effect of digital innovation on the Indonesian financial industry (Bank Indonesia, 2019). The replication of financial service business models by fintech (shadow banking) also contributes to people digital financial behavior change. Fintech is easy to use and has already succeeded in disaggregating various other banking services such as lending, mutual funds, and remittances is capable of accelerating people behavior change from traditional finance behavior into digital financial behavior (Ahmed & Sur, 2023; Bank Indonesia, 2019; Ng et al., 2021).

2.3. Informal economy and underground economy

The Informal economy that also known as shadow economy or underground economy refer to the economic activity that is not regulated by the government and thus goes unreported and untaxed (Awasthi & Engelschalk, 2018). Such as "soft" illicit activities ("moonlighting"), illegal work and social deception, and criminal economic activities is also fall as underground economy activity (Lukito et al., 2023). The shadow economy including informal MSMEs can be defined as "all market-based legal production of goods and services that are deliberately concealed from public authorities" to avoid payment of income, social security contributions, and compliance with legal labor market standards and certain administrative obligations (Shinozaki, 2022). The concept and activity is rooted in U.S.A as one of the most disturbing economic subjects for academics and economics (Bayer & Porter, 1984; Joint Economic Committee, 1980).

In practice, the underground economy can have both positive and negative impacts on society at multisectors layers. On the positive side, it can provide employment opportunities for people who may not have access to formal jobs, and it can allow for the provision of goods and services that are not available through legal channels (Awasthi & Engelschalk, 2018; Njaya, 2015). On the negative side, it can contribute to tax evasion, the spread of criminal activity, and can make it difficult for the government to regulate and control certain sectors of the economy (Bayer & Porter, 1984). Underground economics is closely related to people financial behaviour, the phenomenon that shapes underground economic activities is often caused by daily economic and social reality (Štulhofer & Rimac, 2002).

The shadow economy is intrinsically difficult to measure because agents involved in underground economic activities try to stay undetected (Ha, 2020). To bring the quantitative data of shadow economy activity is particularly difficult to keep in track, due to the lack of stakeholders trust towards formal institutions like government (Štulhofer & Rimac, 2002). However, the demand for information on the extent of the shadow economy and its development over time is concerned with its impact on politics and the economy as a whole

(Medina & Schneider, 2018). Because, the size of the shadow economy is an important input for policymakers when making decisions and bringing the shadow economy under control. For example, the number of unemployment wage gap of formal and shadow economy activites (Carillo & Pugno, 2004).

One policy that can be used to reduce the shadow economy is a cashless economy. The abolition of cash will increase the cost of illegal payments and may then reduce the tissue of the shadow economy. Without cash, the shadow economy could be reduced by 10% to 20% (Schneider, 2019). In a study by Gobbi and Zizza (2007), shadow economy activity is believed as an obstacle of people financial behavior to transmigrate from traditional behavior into digital cashless economy behavior. It may pose a threat if it is started digitally (Yip et al., 2012). Based on a monetary point of view, an informal economy, which is defined as high cash usage, results in a lot of money outside the banking system or formal economy. This militates against the effectiveness of monetary policy in managing inflation and boosting economic growth. A cashless economy stands to arrest this (Ovat, 2012).

3. Research methode

This research was done through a qualitative phenomenology approach and analyzed based on content analysis and sentiment analysis. The data processed result will be visualized in picture, graph, or even number. Although there are numbers in the result, this research can't be categorized as quantitative or mixed methode (Maxwell, 2010). Because the contribution of formulas and numbers in this research is to facilitate patterns recognition or to extract meaning from qualitative data, account for all data, document analytic moves, and verify interpretations.

The data was obtained from data mining process in three online news platforms in Indonesia, which are https://www.kompas.com/, https://www.detik.com/, and https://www.tempo.co/ from March 2021–2022 using two keywords *"subsidy"* (subsidy), *"non-tunai"* (cashless), and *"nirsentuh"* (contactless). This period is chosen, because the cashless subsidy distribution in 2021 starting in March until March 2022. The continuation of subsidy distribution caused by the spread of COVID-19 Delta Varian (August – November) and Omnicorn Varian (January – March) in Indonesia.

Data mining is an automated technique used to extract buried or previously unknown piece of information from large databased (European Commission, 2022). The tools used for scraping is Webharvy. The result is there are 220 suitable e-news articles, which categorized as unstructured big data. The reason for choosing e-news because it has more words instead of other similar data such as tweets or chat message or online comments that relatively short. This statement also supported by Fletcher and Nielsen (2018) research.

To obtain research result, data is processed through a few steps. First, data was processed through content analysis, specifically data matching process. Data matching is the large-scale comparison of records or files collected to identifying and to understanding pattern and problem that shown within them (European Commission, 2022). Coding process also included in data matching process. This process really important for research that using big data, especially the unstructured one to make the data more manageable by labelled it into "categories" or "pattern" (Bouncken et al., 2021). The data result of this process will processed into numbers using NVVO and visualized using radar chart.

Table 1. Digital Public Services Index Measurement (source: European Commission, 2022; Li et al., 2020, processed in 2023)

Indicators	Description	Status
e-Government users	Individuals who used the Internet, in the last 12 months, for interaction with public authorities	Not Measured
Pre-filled forms	Amount of data that is pre-filled in public service online forms	Measured
Digital public services for citizens	The share of administrative steps that can be done online for major life events (birth of a child, new residence, etc.) for citizens	Measured
Digital public services for businesses	The indicator broadly reflects the share of public services needed for starting a business and conducting regular business operations that are available online for domestic as well as foreign users. Services provided through a portal receive a more positive response that services which provide only information (but have to be completed offline).	Measured
Open data	This composite indicator measures to what extent countries have an open data policy in place (including the transposition of the revised PSI Directive), the estimated political, social and economic impact of open data and the characteristics (functionalities, data availability and usage) of the national data portal.	Measured

Data matching process was refer to Digital Public Services Index that included in Digital Economy and Society Index (DESI) methodology. DESI is an index to measuring and understand the potential of digital economy and society implementation, and normally used in Europe Union (EU) (European Commission, 2022). However, there have been studies using DESI to measure countries in Asia, including Indonesia (Li et al., 2020). In conclusion, cashless subsidy as part of government digital policy can be properly measured through Digital Public Services Index that included in DESI methodology with some adjustment. This research doesn't included e-government users index because it's not suitable for qualitative research and difficult applied in Indonesia since the implementation of e-government was not evenly distributed. Moreover, the exact data can't published in mass media including e-news because it protected by Indonesia government regulation i.e Indonesia Regulation Number 11 in 2007 regarding Electronic Information and Transaction (*Undang – Undang Nomor 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik* (*ITE*)) (Legal Bureau of Comunications and Information, 2008). The measurement description can be seen in Table 1.

For the second step, the result of the content analysis process will be processed through sentiment analysis. Sentiment analysis is methode to interpret communication based on the expression, creative language negativity, polarization, subjectivity, tone, or valence by labelling them into decided sentiment label of negative, positive, and neutral label (Satria & Wibowo, 2021; Van Atteveldt et al., 2021). Sentiment analysis can be done qualitatively or quantitatively. However, a qualitative sentiment analysis give a better understanding and perceiving of communication expression than a quantitative approach (Gaspar et al., 2016). This research only using two label of using three of them because underground economy can be described better using 2 labels which is positive and negative (Mandroshchenko et al., 2018). Lastly, conclusions and suggestions will be drawn based on research result.
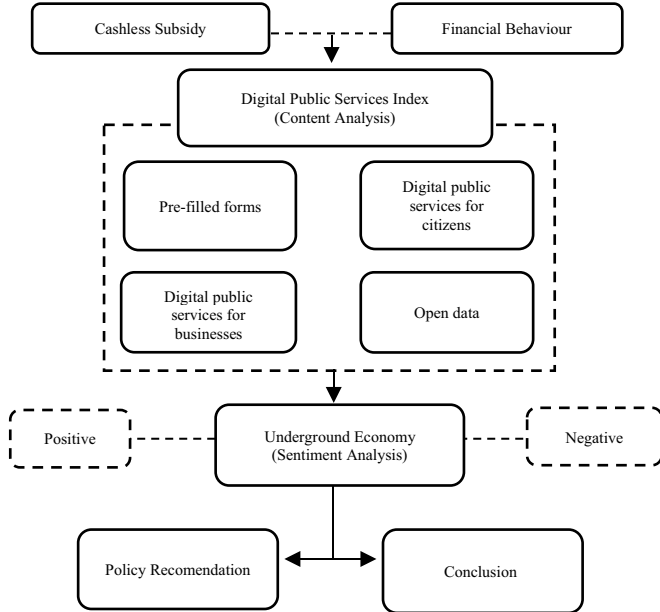
Figure 2. Research framework

The validity and reliability of this research were ensured by following a theory-driven/top-down approach to data coding, analysis, and interpretation based on a well-established framework in the coping literature. This research framework was established based on DESI and related theory in the literature review, as shown in Figure 2.

The third step is visualize the result of content analysis process, the data was converted into the score values (Svi) of digital public services index using formula 1 adapted from Kumar et al. (2019) research. It helped to unveiled strength and weakness of research indicator towards research object.

$$Svi = \frac{\left(\text{Actual } Xi - \text{Min } Xi\right)}{\left(\text{Max } Xi - \text{Min } Xi\right)}, \tag{1}$$

where, Xi is percentage value of an indicator, Min is minimum, Max is maximum and Svi is scale free value. First, the values of every indicator of the four indicators are acquired to be percentage values. Second, indices value ranging 0 to 1 of each indicator are obtained and higher value suggesting greater strength. This is done by subtracting the minimum percentage value from each indicator and then dividing it by the indicator-range i.e. maximum percentage value subtracted by minimum percentage value, for each indicator.

4. Results and discussion

After going through content analysis process the data was processed to sentiment analysis to understand better the potential to reducing underground economy activity in Indonesia. The result of content analysis and sentiment analysis process was shown in Table 2. As shown in the total result isn't match with the total data in research methode (220 e-news).

It was caused during the content analysis process the data is impossible to categorized in one indicator only. Also, it cannot be separated into one or two sentences because it can change the meaning of the news (Wibowo & Hariadi, 2022). On the contrary, on sentiment analysis process, each review that has gone through the coding process only has one label, such as positive, negative or neutral (Bandur, 2016). Table 2 also discover fact that the larger the number of e-news that have gone through the coding process on certain indicators. The larger the indicator influencing Indonesia underground economy activity and vice-verse.

Table 2. Data processed result

Parameters	Total data	Sentiment Analysis	
	(Content Analysis)	+	−
Digital public services for businesses	71	42	29
Digital public services for citizen	270	133	137
Open data	213	131	82
Pre-form filled	127	81	46

The following is an analysis of cashless subsidy in each category that affects underground economy activity in Indonesia.

4.1 Digital public services for business

Digital public services for business is an indicator to explain the implementation of digital public services for business activities both offline and online (European Commission, 2022; Li et al., 2020). Based on the result of Table 2, most on the sentiment regarding of this category are positive (59.15% or 42 e-news). Which means most of the public response to cashless subsidy of the business active was received positively. The data analysis result signifies a few keywords that heavily impacted digital public services for business indicators, which are socialization (3,43%), BPNT (*Bantuan Langsung Non Tunai* or cashless subsidy), and e-waroeng (a small groceries store equipped with digital finance instruments such as EDC machine or QRIS [Quick Response Code Indonesian Standard]) (0.10%).

Most of the keywords refers to cashless subsidy distribution activity to the community. Socialization refers to false information regarding of the uses of cashless subsidy that distributed in bank account can only be spent in designated e-warong. The example e-news content as follows:

> However, based on detikjabar search in Cisujen Village, Takokak District, it was found that the KPM had been dicked and bound to continue to buy to the e-warong. The community is given the food in the form of rice so that the money received is paid directly to the e-warong.

> Even residents also claimed to be afraid if buying food not from e-warongs, later it would be crossed out from the list of BPNT recipients. "Yesterday was suddenly distributed rice, there was one sack to three sacks of rice. Just take it first, pay after BPNT is disbursed, all the same commodities," said the residents with the initials I, one of the KPM in Takokak District, Sunday (27/2/2022).

Dadan (not his real name) claimed residents were forced to buy to the e-warong because it was pressed by RT officials to the village. Even those who do not buy from e-warongs are threatened to be crossed out from the list of recipients in the future.

"Residents want free spending according to the rules, the important thing is the appropriate commodity. But residents are afraid, because they say they will be crossed out if they do not buy it to e-warongs". He said.

E-warong has a high potential to increase underground economic activity for various reason, even if the sentiment in this indicator is mostly positive. First, subsidy recipient supposed to able spending the money anywhere as well as long as it doesn't violate the rules, for example the money was used for gambling. Second, making recipient to spending the subsidies money in designated e-warong is actually a good idea as long as the implementation is done correctly. It supported by Takahashi and Hashimoto (2023) that stated by provide subsidies to SME's it will boost the business growth that lead positively to national economy through multiplier effect. In Indonesia, e-warong also categorized as SME's. By making
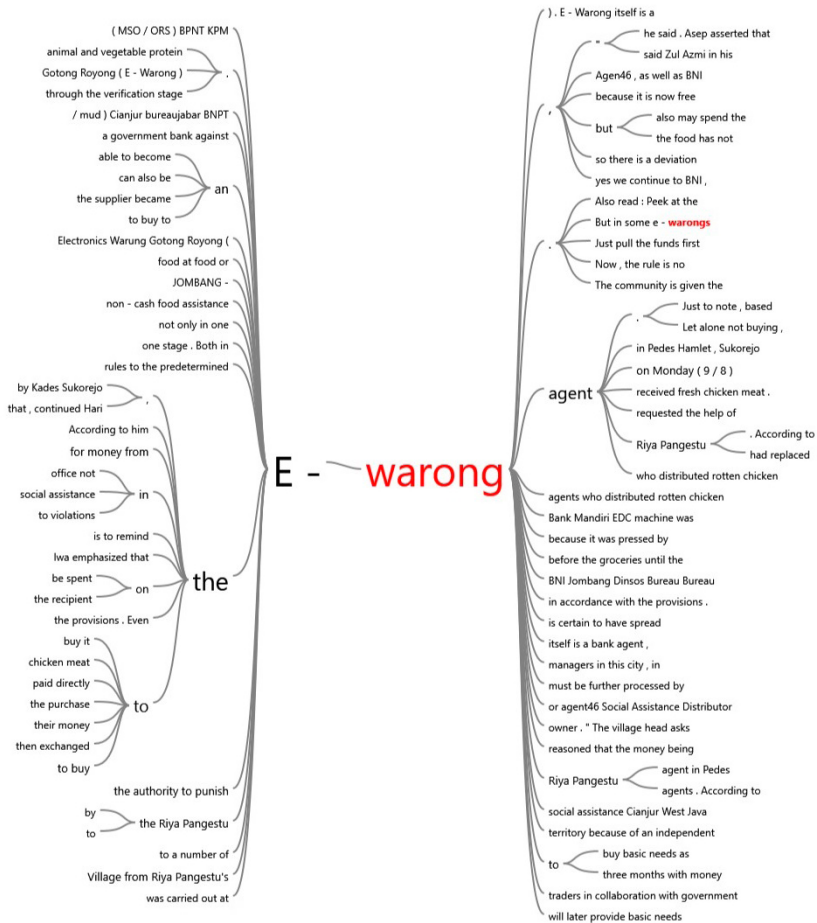

Figure 3. E-warong Word tree

subsidies recipient shop in designated place, some stakeholders hoped to gain some advantages to support local and small business. Unfortunately, many e-warong abuse this policy as shown in Figure 3.

Figure 3 also shows additional information that many e-warong violating many rules when attending the recipient. For example they increase the product price, give them a poor quality groceries that can't be consumed like a rotten chicken, give them an unreasonable amount of product quantity compared to the price they spend, and many more. This activity is a traits of negative underground economy activity (Kristianto et al., 2021).

4.2. Digital public services for citizen

Digital public services for citizen indicator sentiment analysis result was slightly negatively by 50.74% or 137 e-news. In opposite the positive sentiment was 49.26% or 133 e-news. Most of the e-news was talking how the cashless subsidy starting to go digitally such as to find subsidies recipients data on website https://cekbansos.kemensos.go.id/ or time and place to fetch the subsidy. On negative sentiment, the result shown how the data shows that subsidies recipient data is an old data that has not been updated and synchronized online. Especially during the COVID-19 pandemic many people become unemployed, went bankrupt, or lose their income because the working people on family passed away.

At first in 2020 people need to registering theirself to the local government as cashless subsidies recipient. It shown at Figure 4, which the keyword government (1.74%), receipents (1.99%), and check (0.95%) was in big size and heavily impacted the digital public services for citizen. But nowadays, in 2023 all the administration step can be done digitally including subsidy recipient registration using through the website or using "Cek Bansos Kemensos" Apps which can be downloaded in google store (Dinas Sosial Kota Banda Aceh, 2023).

On the contrary, in positive sentiment the dominating keywords was "pos" that refers to PT. Pos Indonesia. PT. Pos Indonesia is state owned enterprise engaged in delivery, logistics, and financial transaction to support state owned Bank and local government to distribute cashless subsidy to recipients as stated in President Republic Indonesia Statue Number 63 in 2017 concerning The Distribution Cashless Subsidy (*Peraturan Presiden Republik Indonesia*

Figure 4. Digital public services for citizen word cloud

Nomor 63 Tahun 2017 Penyaluran Bantuan Sosial Secara Non-Tunai) (Ministry of National Development Planning of Republic of Indonesia, 2017).

After registering digitally as recipient, individuals need to collect the subsidy in form of BPNT or subsidy card in nearby state-owned Bank (BRI, BNI, BTN, or Mandiri) or in nearby PT. Pos Indonesia. Most of e-news stated it's easier to collect the subsidy in PT Pos Indonesia has more office that evenly distributed nationally than state owned Bank. The officer also help the recipient that eligible to receive a subsidy but still not registered yet. They also help organize the queues to reduce the risk of contracting COVID-19 among the recipients and officer. All the evidence of PT. Pos Indonesia activity to support cashless subsidy can be found in Figure 5.

In opposite of PT Pos Indonesia, cashless subsidy distribution through state owned Bank encountered many obstacle. One of kind was the blocking of bank accounts received by subsidy recipients. People can't immediately used the money in bank account or withdraw cash money in to buy their necessity. It become biggest concern for the people with low financial literacy in Indonesia dan and created many protests against related stakeholders as shown in e-news example bellow.

> Solo – Thousands of accounts recipients of the Family Hope Program (PKH) program in Solo Raya were blocked. Minister of Social Affairs (Social Minister) Tri Rismaharini ensured that only 85 beneficiary families (KPM) were still blocked.
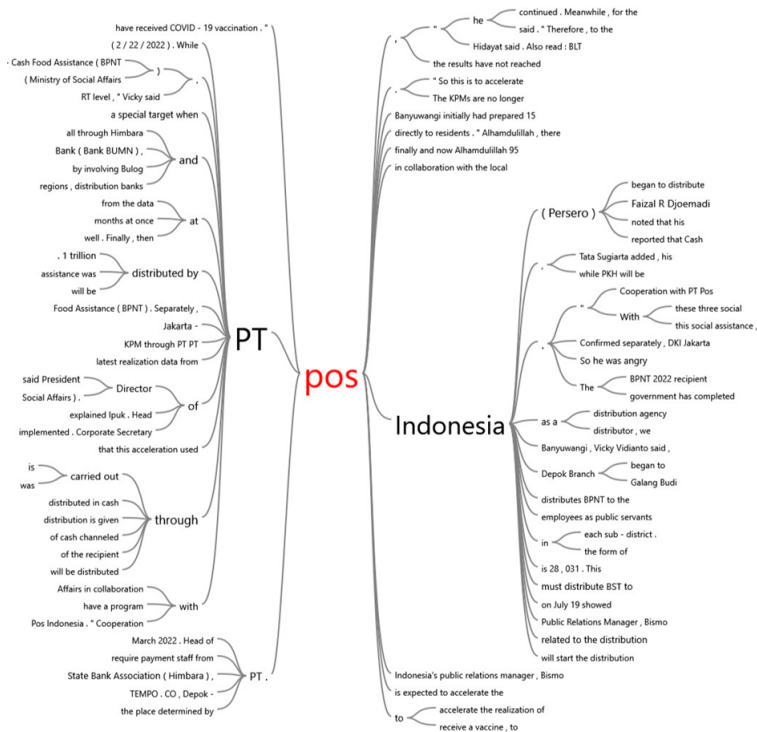

Figure 5. PT Pos Indonesia word tree (source: Primary data, processed 2023)

"There have been 2,780 PKH recipients. There are still 85 PKH recipients who have not been opened," Risma said after inaugurating the Center for Social Rehabilitation Assistance Creations (Attention) of the Soeharso Center at the Manahan RC Workshop Building, Solo, Monday (8/30/2021).

Risma said that 85 people were residents from Solo, Sragen and Wonogiri. According to him, the opening of the blocking after Risma coordinated last week.

4.3. Open data

Open data indicator sentiment analysis result was high positvely by 62.08% or a3a e-news. Most of the e-news was talking how convenience to find out the cashless subsidy recipient digitally or the qualify to registered as one. It shown in Figure 6 the keywords that affecting open data indicators was recipient (1.75%), data (1.56%), ministry (1.49%) and government (1.34%) (refers to Ministry of Affairs Republic Indonesia), KPM (*Keluarga Penerima Manfaat* or subsidies family recipient), and program (1.28%). It's crucial in 2020 to go digitally, because people was obliged to reduce physical interaction and implementing health protocol. On the contrary, it's create some difficulties for the local government to record and update the subsidy recipient.

As shown in Figure 6, the data not only limited to recipient candidate list and how to registered as one. The cashless subsidy have many programs that depends on condition and qualify that needed. The subsidy not only limited to individual, there also for whole family or for small business. The site also give many information for each subsidy. It's really important and reduce the corruption activity that arise during the distribution.

Not only that, the police found alleged deduction of the PKH social assistance value received by residents in the amount of Rp 100,000. One of the residents claimed to have received PKH assistance only Rp. 500 thousand per 3 months.

"In 2021 PKH (Family Hope Program) recipients, one of which received PKH assistance only received Rp 500 thousand per 3 months," explained Rachim.

Figure 6. Open data word cloud

Based on the data, there are still opportunities for corruption even though it has been reduced. In example news above, there are illegal levies called plastic bag fee that reduce the amount of subsidies. The amount of illegal levies also variated depends on the area and the party do the distribution. The evidence of this activity was bellow:

> SULSEL – Police are educating indications of deviations in the distribution of Non-Cash Food Assistance (BPNT) of the Ministry of Social Affairs. There are four regions in South Sulawesi which are concerned, namely Sinjai, Bulukumba, Bantaeng, and Takalar Regencies.

> "The four regions were found alleged state losses reaching IDR20 billion," said South Sulawesi Regional Police Chief Dirkrimsus Senior Commissioner Widoni Fedri, Friday (3/18/2022).

> Widoni revealed, the mode of the BPNT distribution deviation is by reducing the value of community assistance. The Beneficiary Family (KPM) should receive IDR200 thousand, but when it is distributed the value is IDR150 thousand.

4.4. Pre-form filled

Pre-form filled was an indicator to understand the amount of data pre-filled in the public services online form. The result showed data for subsidiary recipients is obtained from two sources: online and offline. The data was obtained from local government and published online in https://cekbansos.kemensos.go.id/. The individual can registering their self if meet the qualify through the same site or using apps, so they can get the subsidies.

While there are some problems of subsidy recipient data synchronization and registration in the beginning of implementation in 2020. But nowadays, people are happier of online pre-form filled because they can registering or checking theirself in site to obtain the subsidy.
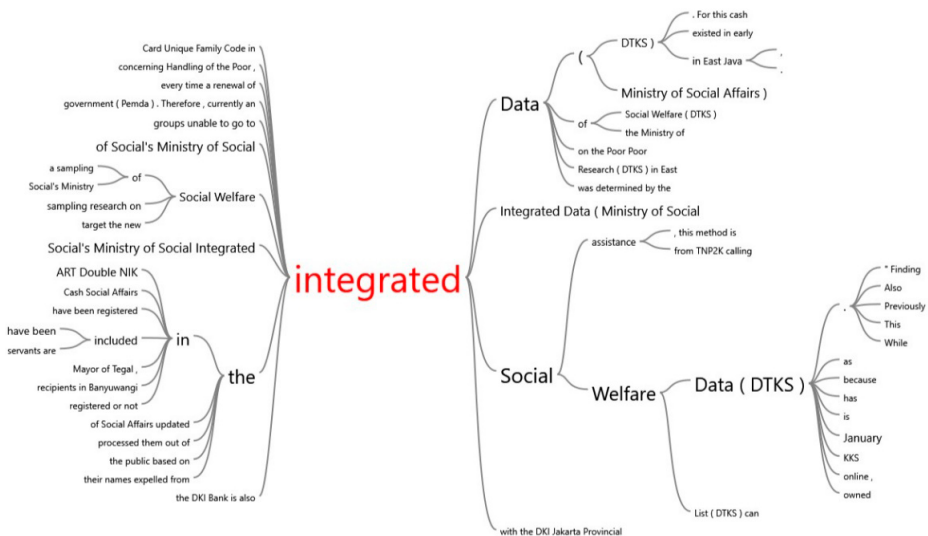

Figure 7. Integrated word tree

People or local government also can recomending their neighbour and helping them registered as subsidy recipient as long as the individu was willing, aware, and qualified. It supported the high positive sentiment of pre-form filled category by 63.78% or 81 e-news. The Figure 7 show the word "integrated" affecting the subsidy recipient data managed by online system supervized by Ministry of Social Affairs Republic Indonesia.

The integration and online registration of cashless subsidies reduce the chance to do a negative underground economy activity. First, the advance synchronized system reduce the recipient to obtain subsidy more than one in different places in Indonesia. Many people of Indonesia don't have an identification card, and its make subsidy has higher chance leaked and less targeted (Banerjee et al., 2018). But when the people especially in rural area known that they need identification card to get the cashless subsidy and the other social relief. Many people starting to make the identification data and registered online to get the subsidies. It makes the cashless subsidy less leaked, more targeted, distributed evenly, and prevent the same people to get subsidy twice in the same time or same social aids program. It shown the registration that synchronizing digitally have a big role to reduce negative undeground economy activity, improves public order, and increases the understanding of e-government implementation in Indonesia.

5. Implementation cashless subsidy potential to reduce underground economy activity in Indonesia

To understand cashless subsidy potential to reduce underground economy the result of content analysis process was converted into the score values of digital public services index are diagrammatically represented by tetragon chart (Figure 8). Figure 8 unveil the most impacted indicator of cashless subsidy implementation in Indonesia is digital public services for citizen (0.102), followed by open data (0,078), and pre-form filled (0.053). Whereas the last impacted indicator is digital public services for businesses (0.042).
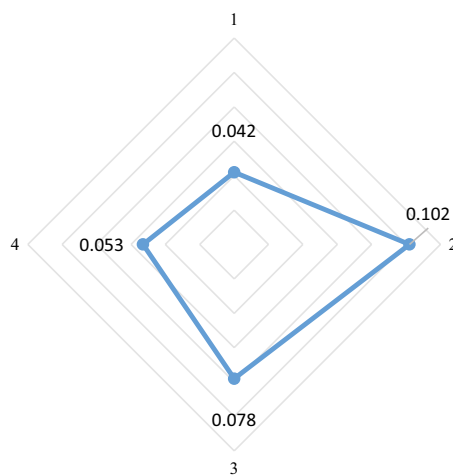

Figure 8. Digital public services of cashless susidity in Indonesia

Digital public services for business as an indicator represent evidence of underground economy activity occurring during the BPNT is distributed. The cashless economy system implementation to support subsidy activity raises the occurrence of negative underground economy activity at informal sectors, particularly SMEs (e-warong). This result is the opposite of Givelyn et al. (2022), Mamudu and Gayovwi (2019), and the government of Indonesia aim (Bank Indonesia Provinsi Sumatera Utara, 2021). In this context, the diffusion of technology in cashless subsidy system spreads becomes an opportunity of informal business performers as a new profit opportunity to create an underground economy. While the sentiment of the result is different, this evidence is in line with the study of Givelyn et al. (2022). Most of the victims in this matter are people or families from middle to low-income enlisted as subsidy recipients.

In the case of digital public services for citizens, the result shows that it become more evenly distributed, right on target, efficient, and reduces the spread of virus among the recipient. The evidence also acknowledges that some people are still worthy to receive the subsidy due to the rush of system implementation. Most people are unfamiliar with bank or fintech systems managed by state-owned banks (BNI, BRI, BTN, and Mandiri). In extreme cases, the recipient lives in rural areas like Papua province that are not exposed to the Bank or digital system, which is accommodated by PT Pos Indonesia in a traditional way. The unequal treatment of subsidy distribution is proof of the importance of equality in digital infrastructure development and the integration of citizen data in digital form as a precaution if a disaster event happens (Uddin et al., 2021). The responsibility of this is lie on the Indonesia government as refer in Ministry of Communication and Information Technology (2024) of the Republic of Indonesia Regulation Number 4 in 2024 Concerning Implementation of Concurrent Government Affairs in the field of Communication and Informatics (*Peraturan Menteri Komunikasi dan Informatika Republik Indonesia Nomor 4 Tahun 2024 tentang Penyelenggaraan Urusan Pemerintahan Konkuren Bidang Komunikasi dan Informatika*) and Ministry of National Development Planning of Republic of Indonesia (2020) Regulation Number 17 in 2020 Concerning Management of "Portal Satu Data" Indonesia (Peraturan Menteri Perencanaan Pembangunan Nasional/ Kepala Badan Perencanaan Pembangunan Nasional Nomor 17 Tahun 2020 Tentang Pengelolaan Portal Satu Data Indonesia).

The data openness indicators problem is similar to the case of digital public services for citizens. The opportunity for corruption of subsidy funds or goods happens during registration. The authorized person who records data manually to speed up the registration process replaces the subsidy candidate with their friends or family. Many of them also ask for bribes in the form of subsidy money or goods deductions. This evidence is not only unethical but also opposes the concept of subsidy itself. Subsidy, as defined by Banerjee et al. (2018) is a charity policy based on a communist economic system to ensure the equality of citizen. The underground economy activity, in particular corruption is defeats the purpose.

Lastly, pre form-filled indicator data results showed the cashless subsidy update in response of people needs over time. The implementation of cashless subsidy is an immature policy implementation that never being tested previously. By creating a more comprehensive database that is easily accessed by people through websites and apps. It's a data and policy transparency movement that can be monitored by relevant stakeholders, both government

and citizens of Indonesia. The website also helped to support Ministry of National Development Planning of Republic of Indonesia Regulation Number 17 in 2020 Concerning Managengt of "Portal Satu Data" Indonesia (Peraturan Menteri Perencanaan Pembangunan Nasional/ Kepala Badan Perencanaan Pembangunan Nasional Nomor 17 Tahun 2020 Tentang Pengelolaan Portal Satu Data Indonesia) policy in aspect of data synchronization. Data transparency and synchronization are a few indicators of a good e-government system, as stated by Cahyadi (2016) study.

In summary, the research result showed cashless subsidy impacted underground economy activity in Indonesia both positively and negatively and this result was fit with Awasthi and Engelschalk (2018) research. On the positive side, it increases the understanding of digital financial literature and cashless activity, reduces the chance of subsidies getting leaked and corrupted physically, increases government data transparency digitally and supporting e-government implementation, and boosts national economy resilience and efficiency. As a whole, the positive impact of cashless subsidy is that it reduces the size of underground economy activity, especially the negative activity. This result and evidence are also supported by Ha (2020) research that stated cashless activity improves the legal activity while reducing the illegal one. In the near future, cashless activity is expected to become the national economy culture instead of urban area and modern economy culture in Indonesia as stated in Titalessy (2020) paper. On the negative side, cashless subsidies still raise some criminal activity, especially fraud and corruption both digitally and physically. An example was bank account illegal levies for a cashless subsidy, increasing product price, or decreasing the quality and quantity of grocery products purchased using subsidy money. This study result aligns with Ovat's (2012) research entitled "The central Bank of Nigeria's Cashless Policy in Nigeria and Challenges". While the cashless policy tries to reduce the physicall fraud, it increases the danger and chance of digital scheme fraud by indiscriminate deductions from bank accounts because of the high rate of financial illiteracy. It's likely also happen in Indonesia because the uneven of financial literacy education in Indonesia (Satria et al., 2023).

6. Policy recommendations

There are some problem rising while implementing cashless subsidy di Indonesia which is: uneven and low Indonesia digital financial literacy and infrastructure, limitation of digital bank instrument that not active immediately, the inconsistency of government policy and instrument, and the rise of digital financial risk that not followed the appropriate precautions and penalties. There are policies that can be implemented to reduce negative impact of cashless subsidy implementation as follows:

1. Increase digital financial literacy

    Awareness Evenly in Indonesia International Labour Organization (2021) stated informality is the result from formal institutional failings that lead to the non-alignment of the laws and regulations (state morale) with what populations view as acceptable (civic morale). It also applied to underground economic activity. Therefore, educational and awareness-raising campaigns must be pursued to align civic and state morale. The example activity of this recommendation was by promoting the application of

modern technology that supporting cashless subsidy in Indonesia such as QRIS. It's also important to ensure people safety to peak their interest of cashless subsidy system by providing various information of function, fiture, and solution in case something happens in future.

2. Improve the formal economic activity

The acceptance of informality is unlikely to change without improvements in the formal institutions. In this research case, broader inclusive structural transformation policies and infrastructure was required to nurture formal economic culture. It's necessary to expand the network, system, and infrastructure to avoid the case of misused authority on site. On the other hand, the state and related stakeholders, especially state-owned enterprise and Bank, should control the upgrade and maintenance of the system, and avoid the software at the payment locations that fail, resulting in loss of money and customer data. They also need to quickly issue breakthrough regulations and policies for cashless subsidy that link every instrument used previously. It also included e-wallet, QRIS, PT. Pos Indonesia system, bank account, https://cekbansos.kemensos.go.id/ site and apps into one canal digital system for efficiency and cost sake.

7. Conclusions

Will the use of cashless subsidies reduce the frequency of illegal underground economic activity? Using Indonesia e-news data, this paper examines the potential of cashless subsidy to reduce the frequency of underground economic activity. While there are some negative impacts and problems that need to be addressed, the data and analysis result showed that cashless subsidies could potentially reduce illegal underground economy activity in Indonesia. With some following measurements as mentioned in the policy recommendation: 1) Increase digital financial literacy awareness evenly in Indonesia; 2) Improve the formal economic activity. The digital public services for citizens indicator is strongly suggested as a fundamental indicator during the policy design due to its high influence towards cashless subsidy and capability to affect other indicators (Digital public services for business, open data, and pre-form filled).

This study also enlightens the capability of cashless subsidy towards digital financial literature and cashless activity by supporting e-government policy application of digital data transparency and boosting the national economy in a new normal era. The sudden investment of a data synchronization platform during COVID-19 can be used as a demographical foundation to determine Indonesia people needs based on the new normal trend.

Lastly, this research met some difficulties as follows. First, the data used in the research were big data obtained from e-news because of the lack of primary reliable respondents. We could not estimate the cashless subsidy after COVID-19 ended in Indonesia because the declaration of the end of the COVID-19 pandemic in Indonesia was on 29 June 2023. Second, this study is incapable to measure e-government user indicators due to data restrictions. We suggest future research to continue this study by obtaining data after COVID-19 was ended, obtain primary respondent, and filled the gap of indicators to broaden the cashless subsidy and underground economy activity phenomenon futhers.

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Author contributions

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