“The impact of digital platforms in tax administration services on local government tax revenues: evidence from Indonesia”

AUTHORS	Mujiyati Mujiyati Zulfikar Zulfikar Banu Witono Ichsan Cahyo Utomo

ARTICLE INFO	Mujiyati Mujiyati, Zulfikar Zulfikar, Banu Witono and Ichsan Cahyo Utomo (2024). The impact of digital platforms in tax administration services on local government tax revenues: evidence from Indonesia. *Public and Municipal Finance*, *13*(2), 195-203. doi:10.21511/pmf.13(2).2024.16
DOI	http://dx.doi.org/10.21511/pmf.13(2).2024.16
RELEASED ON	Monday, 16 December 2024
RECEIVED ON	Tuesday, 15 October 2024
ACCEPTED ON	Friday, 06 December 2024

JOURNAL	"Public and Municipal Finance"
ISSN PRINT	2222-1867
ISSN ONLINE	2222-1875
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
39	1	7

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Mujiyati Mujiyati (Indonesia), **Zulfikar Zulfikar** (Indonesia), **Banu Witono** (Indonesia), **Ichsan Cahyo Utomo** (Indonesia)

THE IMPACT OF DIGITAL PLATFORMS IN TAX ADMINISTRATION SERVICES ON LOCAL GOVERNMENT TAX REVENUES: EVIDENCE FROM INDONESIA

Abstract

In Indonesia, digital platforms in tax administration services have been implemented for more than a decade. This study aims to investigate whether digital platforms for motor vehicle tax administration services can increase local government tax revenues. Then, it is continued by testing the moderating role of motor vehicle tax revenue targets and online service information. Data were collected from the Unit Penerimaan Pendapatan Daerah (UPPD) Central Java – Indonesia. Observations focused on motor vehicle tax services carried out during the 2018–2022 period in 37 district and city UPPDs. The analysis uses GLS regression, which was developed with modeling regression analysis (MRA). The study results show that implementation of digital platforms in motor vehicle tax administration services can increase local government tax revenues. This relationship will be further strengthened if there are online information services, both circular and standby. Further investigation results revealed that relying on tax revenue targets to strengthen the relationship between digital platforms in tax administration services and local government tax revenues is not viable.

Keywords digital platforms, tax revenue, circular service, standby service, revenue targets

JEL Classification H21, H25, H26, H27

Received on: 15th of October, 2024
Accepted on: 6th of December, 2024
Published on: 16th of December, 2024

Mujiyati Mujiyati, Graduate, Senior Lecturer, Department of Accounting, Faculty of Economics and Business, Universitas Muhammadiyah Surakarta, Indonesia.

Zulfikar Zulfikar, Dr., Department of Accounting, Faculty of Economics and Business, Universitas Muhammadiyah Surakarta, Indonesia. (Corresponding author)

Banu Witono, Dr., Department of Accounting, Faculty of Economics and Business, Universitas Muhammadiyah Surakarta, Indonesia.

Ichsan Cahyo Utomo, M.Com., Informatics Engineering Department, Universitas Muhammadiyah Surakarta, Indonesia.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

The success of tax administrations is contingent upon their reliance on their ecosystem. The ecosystem under consideration is a complex network consisting of several interconnected entities, including actors, technology, and institutions, which rely on each other for their functioning and survival. The form and implementation of tax administration have seen changes throughout history, although a consistent factor is the ability of effective tax administrations to recognize, comprehend, and use their ecosystem to create revenue (Dluhopolskyi et al., 2023; Niankara, 2023; Santos, 2023). In contemporary times, tax administrations have seen a digital transformation through the utilization of advanced technologies such as Artificial Intelligence, Internet of Things (IoT), Cloud computing, and Blockchain technology (Al-Own et al., 2023; Asokan et al., 1997; Li, 2021; Sanjaya et al., 2021).

The successful implementation of electronic taxation is imperative for governments that prioritize digitalization. This is primarily because taxes are an inevitable aspect of governance, and electronic taxation facilitates extensive engagement between governments and citizens,

transcending demographic boundaries (Dzogbenuku et al., 2022; Miglionico, 2023; Niankara, 2023; Sumaylo et al., 2022). As a result of the widespread adoption of e-commerce and mobile application tools in their daily lives, taxpayers hold elevated expectations regarding the services they anticipate from their respective governments. However, despite the extensive discussion in scholarly works regarding the advantages of enhanced digitalization, such as improved oversight and control of financial spending, reduced instances of corruption, promotion of good governance, and decreased income inequality, it is crucial to avoid making unwarranted assumptions about the realization of these benefits (Dieman & Berg, 2023; Kurnianingrum et al., 2021; Santos, 2023; Singh & Mudang, 2020; Visconti-Caparrós & Campos-Blázquez, 2022).

1. LITERATURE REVIEW

Active tax systems are commonly believed to generate income from a broad range of taxpayers, with the aim of strengthening government legitimacy, promoting equitable distribution of financial burdens, and stimulating national progress. The primary governing body responsible for overseeing tax systems in numerous countries is the revenue authority of the respective nation, as stated by Fjeldstad et al. (2009) and Haggard and Webb (1993). Revenue agencies are commonly perceived as playing a crucial role in generating cash to support social services by collecting taxes from a diverse range of taxpayers.

Hence, digital taxation can be considered a system that aligns with the ecosystem model, as it relies significantly on stakeholders outside the revenue authority to achieve its objectives. The rationale behind this assertion stems from the extensive influence that taxation can exert on several aspects of the economy, encompassing alterations in taxpayer behavior, the facilitation of business operations, disparities in wealth distribution, levels of poverty, and the formulation and implementation of fiscal policies (Chen & Ren, 2022; Kasri et al., 2022; Kurnianingrum et al., 2021; Mavlutova et al., 2023; Sanjaya et al., 2021).

The study on the benefits of digital tax payments as presented earlier raises an investigative question that has never discussed before: what is the effect on tax revenue for tax-collecting institutions? Moreover, do online service information and tax targets support this relationship?

The adoption of digital tax payment systems is proliferating in several business sectors, such as banking, the marketplace, investment, subscription billing, transportation, staycations, travel, etc. The development of this system aims to facilitate service and increase efficiency and effectiveness. For institutions developing digital tax payments, it will facilitate and speed up the collectability of revenue receipts (Demidova et al., 2023). Furthermore, management can use it to assess the company's tax revenue (Son et al., 2023).

Tax collection by government agencies is planned based on potential tax items. The government is conducting a study of luxury goods that are subject to tax. This study aims to impose a reasonable amount of tax. Tax revenue planning ends with setting achievement targets. Previous research has documented the relationship between tax planning and tax revenue budgets (Canepa, 2022; Kurdi et al., 2023). The development of digital tax administration encourages the government to optimize tax revenue (Scarcella, 2021). However, the problems related to the set tax achievement targets are not critical for taxpayers (Aris et al., 2020).

Digital tax payment systems cannot stand alone and be separate from other systems; rather, they depend on each other. Digital tax administration requires the support of an information system that is integrated with online service centers. The institution provides online service information for its customers so that their accounts are carefully validated. Customers need operational information services online at a time and place that are easily accessible. Previous studies related to customer satisfaction concluded that sustainable information services have an impact on customer loyalty to the institution (Aulia & Zulfikar, 2022).

This study aims to investigate whether digital platforms for motor vehicle tax administration services can increase local government tax revenues.

http://dx.doi.org/10.21511/pmf.13(2).2024.16

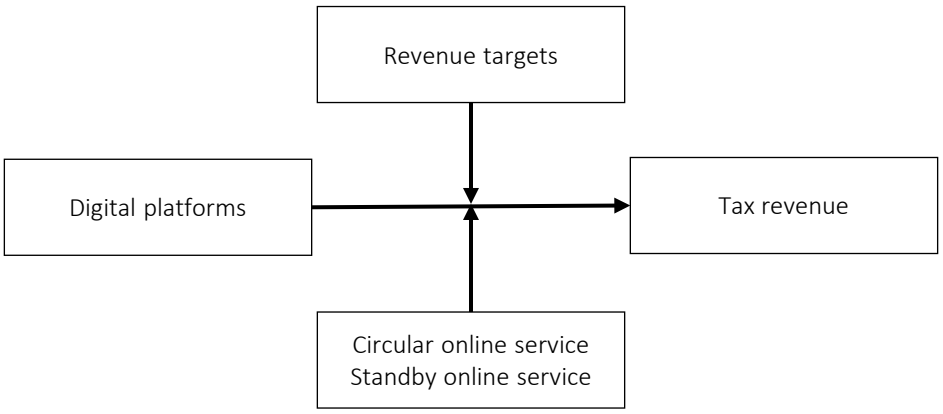

Figure 1. Research framework

Then, it is continued by testing the moderating role of motor vehicle tax revenue targets and online service information. This study formulates a research framework (Figure 1) based on problem disclosure, research gaps compiled, previous related work, and the development of structured hypotheses.

Thus, the research hypotheses are as follows:

H1: Digital platforms in tax administration services can increase local government tax revenues.

H2: Tax revenue targets strengthen the relationship between digital platforms in tax administration services and local government tax revenue.

H3: Circular online services strengthen the relationship between digital platforms in tax administration services and local government tax revenue.

H4: Standby online services strengthen the relationship between digital platforms in tax administration services and local government tax revenue.

2. METHODS

The study collected secondary data available at Badan Pendapatan Daerah (BAPENDA) in the Central Java Regional Revenue Agency. The data were collected from district and city Regional Revenue Collection Units (UPPDs) in Central Java. Observations were conducted during 2018–2022 at 37 UPPDs in districts and cities. Samples were identified based on ownership of motorized vehicles with 2-3 wheels and ≥ 4 wheels. Table 1 shows the percentage of motorized vehicle owners who are users of digital tax payment applications. Table 2 presents the description of the study variables.

Table 1. Percentage of users based on type of motorized vehicle

Year	2-3 wheels	≥ 4 wheels	Total users
2018	6.4	1.4	7.8
2019	7.8	1.7	8.15
2020	8.2	2.3	10.5
2021	9.3	2.8	11.11
2022	10.4	3.2	13.6

To test the effect of tax administration services using digital platforms on local government tax revenue, the following regression equations are needed:

$$TR_t = a + b_0 DP + dX_t, \quad (1)$$

$$TR_t = a + b_1 DP + Sb_2 RT \cdot DP + Sb_3 COS \cdot DP + Sb_4 SOS \cdot DP + b_5 Size + b_6 Taxe_t, \quad (2)$$

where α = constant; β_0-β_6 = the estimated coefficient; ε = error term.

To investigate the consistency of test results, the first regression equation was developed using a phased testing model as shown in Table 3. Meanwhile, the second regression equation was developed using a simultaneous testing model.

Table 2. Definition and measurement of variables

Variable	Definition	Measurement
Dependent variable		
TR	Tax revenue in district and city UPPDs of Central Java	Ratio of tax revenue realization to the tax revenue budget
Independent variable		
DP	Digital platforms refer to tax administration services using digital platforms	Ratio of tax administration using a digital platform to total taxpayers
Moderating variables		
RT	Revenue targets set by district and city UPPD	$(Target_o - Target_{n-1})/Target_{o-1}$
COS	Circular online services refer to services based on an uncertain schedule	Number of circular online services in districts and cities
SOS	Standby online services refer to services that do not change in one place	Number of standby online services in districts and cities
Control variables		
Size	Size refers to the number of motorized vehicles in the district and city UPPDs	The natural logarithm of motorized vehicles
Tax	Tax refers to the tax accumulation of each district and city UPPD	The natural logarithm of total vehicle tax revenue

Table 3. Variables tested in each model

Model	Dependent	Independent	Moderating	Control
I	TR	DP	–	Size and Tax
II	TR	RT	DP · RT	Size and Tax
III	TR	COS	DP · COS	Size and Tax
IV	TR	SOS	DP · SOS	Size and Tax
V	TR	DP, RT, COS, SOS	DP · RT, DP · COS, DP · SOS	Size and Tax

Note: TR = Tax Revenue, DP = Digital Platform, RT = Revenue Targets, COS = Circular Online Services, SOS = Standby Online Services.

3. RESULTS AND DISCUSSION

Table 4 shows statistical values for each variable. The analysis of the average value, maximum-minimum value, and standard deviation shows the strength of each type of digital tax administration platform. There are more digital platforms available for vehicle types with 2-3 wheels than for vehicle types > 4. However, revenue collection for vehicle types with 2-3 wheels is not more than for vehicles with > 4 wheels. This can be explained that the tax value of vehicles > 4 wheels can reach more than ten times that of vehicles with 2-3 wheels.

The statistical values of the correlation matrix for all variables are shown in Table 5. The analysis of the correlation values and variant inflation factor (VIF) does not show any multicollinearity. These results explain that the correlation value (< 80) for each independent variable will not be related to each other. Other observations can also be made at a VIF value of no more than 2.

Table 4. Descriptive statistics of variables

Variables	2-3 wheels				≥ 4 wheels			
	Min	Max	Mean	SD	Min	Max	Mean	SD
TR	0.232	0.473	0.341	0.071	0.522	0.856	0.718	0.092
DP	0.025	0.118	0.063	0.004	0.013	0.037	0.026	0.008
RT	0.662	0.873	0.792	0.283	0.743	0.826	0.796	0.329
COS	1	16	3.231	0.472	1	16	3.231	0.472
SOS	1	12	3.362	0.378	1	12	3.362	0.378
Size	0.073	0.095	0.086	0.178	0.029	0.047	0.036	0.027
Tax	0.187	0.194	0.191	0.024	0.136	0.247	0.178	0.046

Note: TR = Tax Revenue, DP = Digital Platform, RT = Revenue Targets, COS = Circular Online Services, SOS = Standby Online Services.

http://dx.doi.org/10.21511/pmf.13(2).2024.16

Table 5. Pearson correlation matrix for all variables

Variables	TR	DP	RT	COS	SOS	Size	Tax
TR	1	–	–	–	–	–	–
DP	0.581	1	–	–	–	–	–
RT	0.634	0.523	1	–	–	–	–
COS	0.353	0.335	0.464	1	–	–	–
SOS	0.617	0.527	0.546	0.635	1	–	–
Size	0.438	0.362	0.281	0.329	0.418	1	–
Tax	0.522	0.629	0.478	0.582	0.637	0.573	1
VIF	1.278	1.739	1.693	1.572	1.821	1.768	1.857

Note: TR = Tax Revenue, DP = Digital Platform, RT = Revenue Targets, COS = Circular Online Services, SOS = Standby Online Services.

This study aims to investigate the relationship between digital tax administration platforms and tax revenue. Further investigation tests the effect of online service information and revenue targets on the relationship between digital platforms in tax administration services and tax revenue. Table 6 shows the estimated coefficient values for each variable.

The first hypothesis, digital platforms in tax administration services influence tax revenue, is supported by the estimated positive and significant coefficient value. This support is obtained from all models developed (models I-V in Table 6). These results indicate that digital tax administration platforms (all types of motorized vehicles) improve local government tax revenue.

Digital platforms are products developed to facilitate services for taxpayers. Tax administration is limited by place, but it can be completed wherever the taxpayer is located (Aurazo & Vega, 2021; Pal et al., 2021). The convenience provided to taxpayers encourages fast tax administration services so that tax payments can be made immediately. Previous study findings document that the more taxpayers use digital tax payment systems, the faster tax bill collection will be (Danchev et al., 2020; Scarcella, 2021).

Model II tests the second hypothesis, which states that the effect of digital platforms in tax administration services on local government tax revenue will be high at high revenue targets. However, model II reports that the estimated coefficient for the revenue target variable is insignificant as an independent variable. Model II also reports insignificant revenue target estimation coefficients when interacting with digital platforms.

The government sets a target revenue each year when preparing the budget. The results of determining budget revenue targets have not been pub-

Table 6. GLS regression with the random impacts analysis for vehicle performance

Variables	I		II		III		IV		V	
	W 2-3	W ≥4	W 2-3	W ≥4	W 2-3	W ≥4	W 2-3	W ≥4	W 2-3	W ≥4
Constant	0.831[b]	1.538[b]	0.679[b]	1.867[b]	0.786[c]	2.167[c]	0.934[c]	2.543[c]	0.972[c]	2.625[c]
Variable Testing										
DP	0.285[c]	2.673[c]	0.361[c]	2.875[c]	0.478[a]	3.284[a]	0.583[a]	3.729[a]	0.653[b]	3.886[a]
RT	–	–	0.474	3.492	–	–	–	–	0.481	3.683
COS	–	–	–	–	0.795[b]	3.957[b]	–	–	0.817[c]	3.217[c]
SOS	–	–	–	–	–	–	0.865[b]	3.983[c]	0.639[b]	3.421[b]
DP • RT	–	–	1.375	4.738	–	–	–	–	0.643	3.869
DP • COS	–	–	–	–	2.186[a]	4.276[a]	–	–	0.696[b]	5.128[b]
DP • SOS	–	–	–	–	–	–	0.527[b]	5.391[b]	0.684[a]	4.387[a]
Size	0.263	1.745	0.472	2.435	0.518	3.074	0.629	4.287	0.736	4.683
Tax	0.279	1.836	0.519	2.183	0.496	3.198	0.675	3.958	0.732	5.743
Adjusted R^2	0.182	0.248	0.193	0.274	0.214	0.318	0.295	0.341	0.319	0.383
F-Statistics	6.821	6.498	5.849	7.378	8.725	8.493	7.826	7.251	9.754	10.769

Note: a, b, and c indicate significance at 1%, 5%, and 10%, respectively. TR = Tax Revenue, DP = Digital Platform, RT = Revenue Targets, COS = Circular Online Services, and SOS = Standby Online Services.

Table 7. Robustness testing

Variables	A	B	C	D	E
Constant	2.894	3.187	3.514	3.849	4.219
Variable Testing					
DP	0.374[b]	0.583[b]	0.727[a]	0.849[a]	0.572[c]
RT	–	0.395	–	–	0.584
COS	–	–	0.593[c]	–	0.597[c]
SOS	–	–	–	0.826[c]	0.679[c]
DP • RT	–	0.488	–	–	0.653
DP • COS	–	–	0.721[c]	–	0.694[c]
DP • SOS	–	–	–	0.947[c]	0.752[c]
Size	0.842	0.749	0.693	0.925	0.765
Tax	0.973	0.752	0.684	0.937	0.782
Adjusted R^2	0.217	0.276	0.297	0.347	0.318
F-Statistics	4.287	6.398	7.392	6.784	8.493

Note: a, b, and c indicate significance at 1%, 5%, and 10%, respectively. TR = Tax revenue, DP = Digital Platform, RT = Revenue targets, COS = Circular Online Services, and SOS = Standby Online Services.

lished (Zasko et al., 2021). Taxpayers know that their tax assessments are limited to the amount of bills they have to pay. For these reasons, tax achievement targets have no effect on the number of tax bills collected by government institutions. This finding is in line with Zasko et al. (2021), who concluded that taxpayers only focus on the taxes they have to pay without caring about tax collection achievement targets.

The third hypothesis uses model III (Table 6) to test the coefficient of estimation of the circular online service point variable. Model III reports statistical values with a positive and significant direction both as independent (vehicles with 2-3 wheels $\beta = 0.795$ and significant at the $\alpha = 5\%$ level; vehicles with > 4 wheels $\beta = 3.957$ and significant at the $\alpha = 5\%$ level) and when interacting with digital tax payment (vehicles with 2-3 wheels $\beta = 2.186$ and significant at the $\alpha = 1\%$ level; vehicles with > 4 wheels $\beta = 4.276$ and significant at the $\alpha = 1\%$ level). The reported results of model III support the statement of hypothesis 3. These results conclude that the more circular online service points, the higher the local government tax revenue. These results also conclude that when interacting with digital platforms, the more circular online service points there are, the more local government tax revenue will increase.

Hypothesis 4 states that the effect of digital tax administration platforms on local government tax revenue will increase when there are more standby online service points. Model IV in Table 6 supports this statement based on the statistical value of the estimated coefficient, both as independent (vehicles with 2-3 wheels $\beta = 0.865$ and significant at the $\alpha = 5\%$ level; vehicles with > 4 wheels $\beta = 3.983$ and significant at the $\alpha = 10\%$ level) as well as its interaction with the digital tax payment (vehicles with 2-3 wheels $\beta = 0.527$ and significant at the $\alpha = 5\%$ level; vehicles with > 4 wheels $\beta = 5.391$ and significant at the $\alpha = 5\%$ level).

Taxpayers need ease of service in completing their tax administration. A digital platforms system is one of the solutions to speed up the service process (Canepa, 2022; Kurdi et al., 2023; Sengupta & Shastri, 2019). However, this system requires online service information support to handle the validation process and any disruptions that occur. Online service information support is required by taxpayers (Eskindarov et al., 2019; Li et al., 2022; Ligon et al., 2019; Yao et al., 2022).

This study validates the robustness of all analytical models using the robustness testing method, gradually giving certain treatments to models I to V (Table 6). The treatment for all models includes combining data groups and changing the type of regression testing (Deng et al., 2023; Miasnikof et al., 2023; Wang & Chen, 2023; Zhang et al., 2023). The results of this treatment are shown in Table 7. The estimated coefficient values in Table 7 produce the same character, which is positive and significant in the variables tested before. Robustness testing indicates directional stability and significance value when the I-V models in Table 6 change to the A-E models in Table 7.

http://dx.doi.org/10.21511/pmf.13(2).2024.16

CONCLUSION

This study investigates the effect of digital platforms in tax administration services on local government tax revenue. Digital platform users are classified into two groups, namely the taxpayer group of 2-3-wheeled vehicles and ≥ 4-wheeled vehicles. Tax revenue is represented by the actual vehicle tax collected compared to the set tax target. This study found that more digital tax payment users will improve tax revenue. Subsequent investigations were carried out to analyze the role of revenue targets, circular online service points, and standby online service points. The results of the investigation failed to prove the role of revenue target achievement in the effect of digital tax administration platforms on local government tax revenue. These results indicate that digital platform users do not know or do not even care how much of the vehicle tax target must be collected by the authorities. This investigation proves the role of circular online service points and standby online service points in strengthening the effect of digital tax payment on tax revenue. These results indicate that digital tax payment users need support from the facilities provided in the form of online service places, both circular and standby.

This study conducted a validation test to ensure the stability of the attributes in the model and the robustness of the consistent findings. This method requires repeated treatment of the variables in all models used. The treatment included merging the two data groups into one group and entering control variables. Testing of the model was carried out repeatedly, so inconsistent results were found. However, the test results did not reveal any inconsistencies.

AUTHOR CONTRIBUTIONS

Conceptualization: Mujiyati Mujiyati, Zulfikar Zulfikar.
Data curation: Mujiyati Mujiyati, Banu Witono.
Formal analysis: Zulfikar Zulfikar, Banu Witono.
Funding acquisition: Zulfikar Zulfikar.
Investigation: Mujiyati Mujiyati, Banu Witono.
Methodology: Zulfikar Zulfikar.
Project administration: Mujiyati Mujiyati, Banu Witono.
Resources: Zulfikar Zulfikar.
Software: Ichsan Cahyo Utomo.
Supervision: Mujiyati Mujiyati, Banu Witono, Ichsan Cahyo Utomo.
Validation: Mujiyati Mujiyati, Banu Witono, Ichsan Cahyo Utomo.
Visualization: Ichsan Cahyo Utomo.
Writing – original draft: Mujiyati Mujiyati, Zulfikar Zulfikar, Banu Witono, Ichsan Cahyo Utomo.
Writing – review & editing: Mujiyati Mujiyati, Banu Witono, Ichsan Cahyo Utomo.

ACKNOWLEDGMENT

This study is supported by the Direktur Riset, Teknologi dan Pengabdian Masyarakat (DRTPM) based on decree number 108/E5/PG.02.00.PL/2024 and contract number 007/LL6/PB/AL.04/2024, 196.43/A.3-III/LRI/VI/2024.

REFERENCES

1. Al-Own, B., Saidat, Z., Kasem, J., & Qasaimeh, G. (2023). Impact of digital payment systems and blockchain on economic growth. *2nd International Conference on Business Analytics for Technology and Security, ICBATS 2023*. Dubai, United Arab Emirates. https://doi.org/10.1109/ICBATS57792.2023.10111140
2. Aris, M.A., Wijayanti, A., & Fatchan, I.N. (2020). Local tax revenue before and after the implementation of online local tax monitoring to increase the

local government revenue (PAD) of Surakarta. *Riset Akuntansi dan Keuangan Indonesia*, *5*(3). https://doi.org/10.23917/reaksi.v5i3.13596

3. Asokan, N., Janson, P. A., Steiner, M., & Waidner, M. (1997). The state of the art in electronic payment systems. *Computer, 30*(9), 28-35. https://doi.org/10.1109/2.612244

4. Aulia, C., & Zulfikar, Z. (2022). The Influence Of Sakpole Apps Digitalization On Automobiles Revenue Performance. *International Journal of Scientific and Research Publications, 12*(9), 43-46. https://doi.org/10.29322/IJSRP.12.09.2022.p12905

5. Aurazo, J., & Vega, M. (2021). Why people use digital payments: Evidence from micro data in Peru. *Latin American Journal of Central Banking, 2*(4), Article 100044. https://doi.org/10.1016/j.latcb.2021.100044

6. Canepa, A. (2022). The role of payment services in the development of the big tech ecosystem. *European Business Law Review, 33*(7), 1003-1020. https://doi.org/10.54648/EULR2022043

7. Chen, B., & Ren, J. (2022). Does the adoption of digital payment improve the financial availability of farmer households? Evidence from China. *Agriculture, 12*(9), Article 1468. https://doi.org/10.3390/agriculture12091468

8. Danchev, S., Gatopoulos, G., & Vettas, N. (2020). Penetration of digital payments in Greece after capital controls: Determinants and impact on VAT revenues. *CESifo Economic Studies, 66*(3), 198-220. https://doi.org/10.1093/cesifo/ifz019

9. Demidova, S., Svetlichnyy, S., Misbakhova, C., & Miroshnikova, T. (2023). Digital financial inclusion in a decentralised financial environment. In I. Ilin, M. M. Petrova, & T. Kudryavtseva (Eds.), *Digital Transformation on Manufacturing, Infrastructure & Service* (pp. 257-264). Cham: Springer. https://doi.org/10.1007/978-3-031-32719-3_19

10. Deng, X., Yan, J., Zhang, S., Yan, J., & Zhang, J. (2023). Variable-strength combinatorial testing of exported activities based on misexposure prediction. *Journal of Systems and Software, 204,* Article 111773. https://doi.org/10.1016/j.jss.2023.111773

11. Dieman, R. V., & Berg, C. V. D. (2023). A review of the adoption of digital payments by Spaza shops in Cape Town. *2023 IST-Africa Conference, IST-Africa 2023* (pp. 1-10). Tshwane, South Africa. Retrieved from https://ieeexplore.ieee.org/document/10187756

12. Dluhopolskyi, O., Pakhnenko, O., Lyeonov, S., Semenog, A., Artyukhova, N., Cholewa-Wiktor, M., & Jastrzębski, W. (2023). Digital financial inclusion: COVID-19 impacts and opportunities. *Sustainability, 15*(3), Article 2383. https://doi.org/10.3390/su15032383

13. Dzogbenuku, R. K., Amoako, G. K., Kumi, D. K., & Bonsu, G. A. (2022). Digital payments and financial wellbeing of the rural poor: The moderating role of age and gender. *Journal of International Consumer Marketing, 34*(2), 113-136. https://doi.org/10.1080/08961530.2021.1917468

14. Eskindarov, M. A., Maslennikov, V. V., & Maslennikov, O. V. (2019). Risks and chances of the digital economy in Russia. *Finance: Theory and Practice, 23*(5), 6-17. Retrieved from https://ideas.repec.org/a/scn/financ/y2019i5p6-17.html

15. Fjeldstad, O.-H., Katera, L., & Ngalewa, E. (2009). *Outsourcing revenue collection to private agents: Experiences from local authorities in Tanzania* (REPOA Special Paper No. 28). Dar es Salaam: REPOA. Retrieved from http://hdl.handle.net/11250/2474644

16. Haggard, S., & Webb, S. (1993). What do we know about the political economy of economic policy reform? *The World Bank Research Observer, 8*(2), 143-168. Retrieved from https://www.jstor.org/stable/3986530

17. Kasri, R. A., Indrastomo, B. S., Hendranastiti, N. D., & Prasetyo, M. B. (2022). Digital payment and banking stability in emerging economy with dual banking system. *Heliyon*, *8*(11), Article 11198. https://doi.org/10.1016/j.heliyon.2022.e11198

18. Kurdi, B. A., Ahmad Antouz, Y., Alshurideh, M. T., Hamadneh, S., & Alquqa, E. K. (2023). The impact of digital marketing and digital payment on tax revenue. *2nd International Conference on Business Analytics for Technology and Security, ICBATS 2023* (pp. 1-5). Dubai, United Arab Emirates. https://doi.org/10.1109/ICBATS57792.2023.10111143

19. Kurnianingrum, D., Mulyani, M., & Luckieta, M. (2021). Understanding the digital payment services through user experience during the pandemic era. *Proceedings of the 11th International Conference on Industrial Engineering and Operations Management* (pp. 5560-5568). https://doi.org/10.46254/AN11.20210943.

20. Li, C., Li, D., He, S., Sun, S., Tian, Y., & Wang, Z. (2022). The effect of big data-based digital payments on household healthcare expenditure. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.922574

21. Li, L. (2021). Redesigning digital peer-to-peer payments for social connections. *Proceedings of the ACM Conference on Computer Supported Cooperative Work (CSCW)* (pp. 263-266). https://doi.org/10.1145/3462204.3481790

22. Ligon, E., Malick, B., Sheth, K., & Trachtman, C. (2019). What explains low adoption of digital payment technologies? Evidence from small-scale merchants in Jaipur, India. *PLoS ONE, 14*(7). https://doi.org/10.1371/journal.pone.0219450

23. Mavlutova, I., Spilbergs, A., Verdenhofs, A., Natrins, A., Arefjevs, I., & Volkova, T. (2023). Digital transformation as a driver of the financial sector sustainable development: An impact on financial inclusion and operational efficiency. *Sustainability, 15*(1), Article 207. https://doi.org/10.3390/su15010207

http://dx.doi.org/10.21511/pmf.13(2).2024.16

24. Miasnikof, P., Shestopaloff, A. Y., & Raigorodskii, A. (2023). Statistical power, accuracy, reproducibility and robustness of a graph clusterability test. *International Journal of Data Science and Analytics, 15*(4), 379-390. https://doi.org/10.1007/s41060-023-00389-6

25. Miglionico, A. (2023). Digital payments system and market disruption. *Law and Financial Markets Review, 16*(3), 181-196. https://doi.org/10.1080/17521440.2023.2215481

26. Niankara, I. (2023). The impact of financial inclusion on digital payment solution uptake within the Gulf Cooperation Council Economies. *International Journal of Innovation Studies, 7*(1), 1-17. https://doi.org/10.1016/j.ijis.2022.09.004

27. Pal, A., Herath, T., De', R., & Raghav Rao, H. (2021). Why do people use mobile payment technologies and why would they continue? An examination and implications from India. *Research Policy, 50*(6), Article 104228. https://doi.org/10.1016/j.respol.2021.104228

28. Sanjaya, R., Hastuti, T. D., & Freddy Koeswoyo, G. (2021). Accounting-based digital payment systems for SMEs. *Proceedings – 2021 International Conference on Computer & Information Sciences (ICCOINS)* (pp. 226-229). Kuching, Malaysia. https://doi.org/10.1109/iccoins49721.2021.9497201

29. Santos, A. R. (2023). The rise of digital payments: Transforming the financial landscape in the Philippines. *International Journal of Applied Engineering and Technology, 5*(2), 22-27. Retrieved from https://romanpub.com/resources/ijaet%20v5-2-2023-04.pdf

30. Scarcella, L. (2021). The implications of adopting a European Central Bank Digital Currency: A tax policy perspective. *EC Tax Review, 30*(4), 177-188. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4013013

31. Sengupta, D., & Shastri, N. (2019). Digital payments through PFMS – Facilitating digital inclusion and accelerating transformation to a "Digital Economy." *ICEGOV'19: Proceedings of the 12th International Conference on Theory and Practice of Electronic Governance* (pp. 196-201). https://doi.org/10.1145/3326365.3326391

32. Singh, A. K., & Mudang, T. (2020). Digital payment system and the millennial in a smart city: An antecedent to technopreneurship. In P. K. Mallick, P. Meher, A. Majumder, & S. K. Das (Eds.), *Electronic Systems and Intelligent Computing* (pp. 109-118). Singapure: Springer. https://doi.org/10.1007/978-981-15-7031-5_11

33. Son, J., Ryu, D., & Webb, R. I. (2023). Central bank digital currency: Payment choices and commercial bank profitability. *International Review of Financial Analysis, 90,* Article 102874. https://doi.org/10.1016/j.irfa.2023.102874

34. Sumaylo, A. M. G., Babon, C. M. S., Bayaras, M. L., Pedrigal, E. M. E., Pening, A. K. S., Teodosio, M. J. C., & Susada, J. S. (2022). Digital finance on stability among Philippine banks. *Recoletos Multidisciplinary Research Journal, 10*(2), 63-73. https://doi.org/10.32871/rmrj2210.02.07

35. Visconti-Caparrós, J. M., & Campos-Blázquez, J. R. (2022). The development of alternate payment methods and their impact on customer behavior: The Bizum case in Spain. *Technological Forecasting and Social Change, 175,* Article 121330. https://doi.org/10.1016/j.techfore.2021.121330

36. Wang, L., & Chen, S. (2023). Stability evaluation and statistical test of Bayesian gravity adjustment algorithm. *Huazhong Keji Daxue Xuebao (Ziran Kexue Ban)/Journal of Huazhong University of Science and Technology (Natural Science Edition), 51*(3), 92-99. https://doi.org/10.13245/j.hust.230305

37. Yao, B. H., Shanoyan, A., Schwab, B., & Amanor-Boadu, V. (2022). Mobile money, transaction costs, and market participation: Evidence from Côte d'Ivoire and Tanzania. *Food Policy*, *112,* Article 102370. https://doi.org/10.1016/j.foodpol.2022.102370

38. Zasko, V., Sidorova, E., Komarova, V., Boboshko, D., & Dontsova, O. (2021). Digitization of the customs revenue administration as a factor of the enhancement of the budget efficiency of the Russian Federation. *Sustainability, 13*(19), Article 10757. https://doi.org/10.3390/su131910757

39. Zhang, Y., Duan, Q., Li, G., & Wu, J. (2023). Robustness quantification method for network intrusion detection models. *Physical Communication*, *58,* Article 102025. https://doi.org/10.1016/j.phycom.2023.102025