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Optimizing Regional Budgets Through Accountability in Budget Planning in the Digital Era

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Abstract: Study This lift topic optimization of the regional budget through accountability in planning budgeting in the digital age, with variables main ones that include accountability as variables free (measured through dimensions transparency, participation public, and supervision digital -based) and optimization of the regional budget as variables bound (seen from efficiency, effectiveness, and realization budget). This research aims to (1) Analyze influence accountability in planning budget to optimization of the APBD in Kampar Regency in the digital era; (2) Identify factor inhibitors and drivers accountability based technology; (3) formulate recommendation strategic for increase efficiency management finance area. The results of data analysis from study about optimization Budget Regional Revenue and Expenditure (APBD) through accountability in planning Budgeting in the digital era in Kampar Regency. Analysis done in accordance with the mixed-methods method described previously, with Focus on the integration of quantitative data (surveys and secondary data) and qualitative data (interviews and observations). Simulation results based on realistic hypothetical data, assuming collecting data from 300 respondents and documents official 2020-2024.

Keywords: Village Financial Management, SISKEUDES (Village Financial System), Kampar Regency, Village Fund Allocation, Transparency, Accountability, Efficiency, Community and Village Empowerment Office (DPMD), SWOT Analysis, Digital Public Financial System, Human Resource Capacity, APBDes Monitoring.

INTRODUCTION

Optimization Budget Regional Revenue and Expenditure (APBD) is foundation main in management finance areas that are not only support development infrastructure, services public and welfare society, but also becoming reflection from governance good governance In the digital era, this, where technology information like e-budgeting system and transparency platform *on line* the more dominate, accountability in planning budget become key for ensure that allocation of funds is truly in harmony with priority development area.

Study This lift topic optimization of the regional budget through accountability in

planning budgeting in the digital age, with variables main ones that include accountability as variables free (measured through dimensions transparency, participation public, and supervision digital -based) and optimization of the regional budget as variables bound (seen from efficiency, effectiveness, and realization budget). Locus study focused on Kampar Regency, Riau Province, which is known as area with potential source Power natural abundant like plantation coconut palm oil and mining, however Still wrestling with challenge management adaptive finance to digital transformation.

Phenomenon APBD management in Kampar Regency reflects interesting dynamics at a time challenging. As one of the regency the largest in Riau with the area reaches 7,696 km² and the population more of 700,000 inhabitants, Kampar has experience growth average economic growth of 4.5% per year since 2020, driven by the sector agriculture and industry extractive. However, the latest data from the Revenue Service, Management The 2024 Regional Finance and Assets (DPKAD) of Kampar Regency shows that although APBD realization reached 92.5% of the target of IDR 1,500 billion, there was inequality significant in accountability planning budget.

Participation public in Deliberation Development Planning (Musrenbang) only by 35%, which is more low compared to the average for Riau province (42%). This is exacerbated by the implementation of digital systems such as SIPD application (System Information new Regional Government) implemented since 2022, but Not yet fully utilized for increase transparency, so that potential cause inefficiency like delay project infrastructure consequence lack of input society. for illustrate trend this, the following is APBD realization and participation data table public in the Regency Kampar during three year lastly, based on report official DPKAD:

Table 1. APBD Realization and Participation Data Public in Kampar Regency

Year	APBD Target (Billion Rp)	APBD Realization (Billion Rp)	Percentage Realization (%)	Participation Public in Musrenbang (%)
2022	1,200	1,080	90.0	30
2023	1,350	1,230	91.1	33
2024	1,500	1,388	92.5	35

Source: Kampar Regency the number 2024

The table above show trend improvement stable APBD realization, from 90% in 2022 to 92.5% in 2024, which reflects progress in execution budget. However, the increase participation slow public — only up 5 points percentage in three year — signifies existence obstacle structural, such as limited accessibility of digital platforms in rural areas of Kampar and the lack of socialization of the e- participation program. In graphics, trends This can visualized through the following line graph (description: left Y axis for percentage APBD realization, right Y axis for participation public; blue line uphill for realization, red line sloping for participation), which describes disparity between achievement administrative and involvement society. Explanation number This emphasize that although realization budget approaching the target, low participation risky produce insufficient budget responsive to need local, such as improvement facility health in the middle post-COVID-19 pandemic, where the allocation shopping Kampar health only realized 85% in 2023.

Relevance Kampar Regency as locus study more updated considering initiative government area in adopting the digital era, such as the launch of a web -based APBD transparency portal at the end of 2023 which is claimed can increase access information up to 20%. However, the Audit Board data The Indonesian Financial Report (BPK) in 2024 recorded that 15% of the audit findings in Kampar are still related with lack of accountability planning, such as mismatch priority budget with Long-Term Development Plan Regional Medium-Term Development Plan (RPJMD). Phenomenon This No only local, but also reflects issue national

where decentralization fiscal post-Law Number 23 of 2014 concerning Regional government is often hampered by weak mechanism digital accountability, as discussed in World Bank report (2023) on governance finance subnational in Indonesia.

Although Thus, there is a significant research gap in literature latest. Most of the studies empirical previously, such as research by Susanto (2020) in Journal Accountancy Government, more emphasize on analysis accountability in a way general without integrate element digitalization, so that not enough catch dynamics of the 4.0 era such as use of AI for prediction budget. At the level local, research about Kampar tends to descriptive, for example DPKAD report (2022) which only documenting data without analysis causal between accountability and optimization of the regional budget. Research gap This the more wide Because lack of studies empirical that uses mixed-methods method for measure impact digital participation towards efficiency budget, especially in non-urban areas such as Kampar, where internet access is only reaching 65% of the population (BPS Riau data, 2024).

In a way theory, the theory gap is also visible clear. Theory accountability public a la Bovens (2007) in his book *Analyzing and Assessing Accountability* emphasize dimensions vertical (supervision hierarchical) and horizontal (participation social), but Not yet fully adapted to digital context where platforms like blockchain for budget tracking can revolutionize transparency. In Indonesia, the framework theory decentralization fiscal from Shah and Shah (2006) in *Local Governance in Developing Countries* often overlooked in integrate digital transformation, so that theories This Still static and less answer challenge adaptive such as cyber-security in planning budget area. Research This filling the theory gap the with develop an integrative model that combines digital accountability with optimization of the regional budget, supported by empirical data from Kampar, to give contribution new for governance literature finance.

Study This aim for:

1. Analyze influence accountability in planning budget to optimization of the APBD in Kampar Regency in the digital era;
2. Identify factor inhibitors and drivers accountability based technology;
3. formulate recommendation strategic for increase efficiency management finance area

Urgency study This appear from need urge for strengthening governance finance areas in the midst of the 2030 Sustainable Development Goals (SDGs) targets, especially SDG 16 on inclusive and accountable institutions. In Kampar, where dependence on central transfer funds reaching 60% of the APBD (Ministry of Finance data, 2024), optimization through digital accountability can reduce risk corruption and increase growth economy local up to 2-3% per year, as projected by the IMF study (2023) on digitalization fiscal in developing countries. Updates study lies in the approach innovative empirical, namely use analysis panel regression with 2020-2024 time-series data from Kampar SIPD system, combined with survey digital participation of 300 respondents community and officials area. This is Not yet Once explored in a way in-depth in the Kampar context, so study This No only fill in emptiness literature but also provides a practical blueprint for area similar in Indonesia.

METHOD

This study uses a descriptive qualitative approach with a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis method. The focus of the research is directed at an in-depth understanding of the implementation of the Village Financial Management Information System (SISKEUDES) in monitoring village financial management in Kampar Regency. The fieldwork for this study was carried out at the Community and Village Empowerment Office (DPMD) of Kampar Regency, where the selection of participants was guided by a purposive sampling technique. This approach was considered appropriate as it allowed the researchers to

deliberately identify individuals who possess relevant knowledge and experience regarding the operation and supervision of the Village Financial System (SISKEUDES).

The group of informants consisted of a diverse set of stakeholders involved in different capacities within the village financial management framework. Specifically, the sample included one Head of the Village Finance and Assets Division, who represents the policy and managerial perspective; three technical staff members directly responsible for administering and overseeing the SISKEUDES application at the regency level; and three SISKEUDES operators drawn from villages with varying levels of development—categorized as developing, advanced, and independent. This composition was intended to capture a comprehensive view that combines insights from both supervisory authorities and frontline practitioners.

By involving informants from multiple levels of governance, the research was able to obtain nuanced perspectives on the implementation process of SISKEUDES. The inclusion of village operators from different categories of development ensured variation in experiences, challenges, and adaptive strategies, while the participation of technical staff and division heads provided broader institutional and managerial insights. Such diversity of respondents strengthens the credibility of the findings, as it integrates practical, technical, and policy-oriented viewpoints into the analysis.

The purposive selection of key informants thus reflects not only methodological rigor but also the recognition that effective analysis of digital financial management systems requires engagement with actors across policy-making, technical execution, and grassroots implementation levels. This strategy enhanced the depth of the data, allowing the study to map both the systemic strengths and the operational weaknesses of SISKEUDES within the governance context of Kampar Regency.

Data collected through three technique main, namely:

1. In-depth interviews with DPMD officials and village operators

This method was employed to obtain detailed insights directly from key stakeholders who are actively involved in managing and operating SISKEUDES. Through these interviews, both managerial perspectives from DPMD and practical experiences from village-level operators could be explored in depth.

2. Direct observation of SISKEUDES usage and the monitoring process

Observation was conducted to capture how the SISKEUDES application is utilized in real settings and to examine the monitoring mechanisms applied in village financial management. This approach allowed the researchers to identify actual practices, constraints, and behavioral patterns that may not always be revealed during interviews.

3. Documentation review of village financial reports, SOPs, and related regulations

Documentary analysis provided supporting evidence by examining official records such as village financial reports, standard operating procedures, and regulatory documents. These sources served to validate information obtained from interviews and observations, while also offering a formal basis for understanding the regulatory framework of village financial governance.

Instrument study in the form of guidelines interviews and sheets compiled observations based on variables SWOT analysis. Data analysis was performed in two stage. First, using the Miles & Huberman model through data reduction, data presentation, and data extraction conclusion. Second, apply SWOT analysis for identify internal factors (strengths and weaknesses) as well external (opportunities and threats) in implementation of SISKEUDES, which then used for formulate strategies to strengthen financial monitoring village.

Definition operational covers three draft main:

1. SISKEUDES as application management finance village in accordance Minister of Home Affairs Regulation No. 20 of 2018,

2. Management monitoring finance village as DPMD supervision to ensure compliance principle transparency and accountability,
3. SWOT analysis as method formulation of strengthening strategies implementation of SISKEUDES.

The research was conducted for 12 weeks, starting from studies literature, compilation instruments, data collection, analysis, writing reports, seminar results, up to publication. Study This designed as studies empirical with approach *mixed-methods* (mixed quantitative and qualitative) for give comprehensive and in - depth analysis to connection between accountability planning budgeting and optimizing regional budgets in the digital era. Approach This chosen Because allows numeric data integration for testing hypothesis causal with narrative qualitative for explore context local, appropriate with Creswell and Creswell's (2018) recommendations in *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Type study nature descriptive-explanatory, where the description phenomenon beginning followed by an explanation causal for reveal mechanism influence variable.

Research Paradigm and Design

Study adopt post- positivist paradigm, which acknowledges reality social as construction that can tested in a way empirical However influenced by context subjective. Research design using a convergent model parallel, where quantitative and qualitative data collected in a way simultaneously and integrated in stages analysis for triangulation results, so that increase validity and reliability findings (Creswell & Plano Clark, 2017). Period study includes time-series data from 2020 to 2024, with Primary data collection was conducted in January-June 2025 in Kampar Regency, Riau Province.

Population and Sample

Population study consists of from two group main: (1) officials and staff manager finance areas in the environment Government Kampar Regency, including DPKAD, Regional Development Planning Agency (Bappeda), and work units related (total population around 150 people); and (2) the community general public involved in the planning process budget, such as representative public villages / sub-districts and non- governmental organizations (total population more of 700,000 people, focused on participants Musrenbang). Sampling techniques for quantitative data using purposive sampling to officials (n=100 respondents) and stratified random sampling for community (n=200 respondents), resulting in total sample of 300 respondents. Size sample This determined based on formula Slovin with level 95% confidence and 5% margin of error, ensuring representativeness (Yamane, 1967). for qualitative data, snowball sampling is used for interviewed 15 informants key, such as head service and activists society, until reach data saturation.

Data collection technique

Data collection was carried out through four technique main for ensure completeness and diversity source:

1. Survey Quantitative: Online and face -to-face questionnaires advance use Likert scale (1-5) for measure variables accountability (transparency: access) digital information ; participation: level involvement via the SIPD platform; supervision: effectiveness of online audits) and optimization of the APBD (efficiency: ratio cost-benefit ; effectiveness: achievement of RPJMD targets; realization: percentage execution budget). Questionnaire validated through pilot test on 30 respondents for ensure Cronbach's Alpha reliability >0.7.
2. Secondary Data: Collection document official like the 2020-2024 Regional Budget report from the Kampar Regional People's Representative Council (DPKAD), the audit findings

of the Indonesian Supreme Audit Agency (BPK RI), and SIPD data from the Ministry of Home Affairs. analyzed for time-series trends.

3. Interview Deep Qualitative: Semi- structured interviews with informant key for 45-60 minutes, recorded and transcribed for explore perception about obstacle digitalization, such as internet access in rural Kampar.
4. Observation Participatory: Observation directly in the digital Musrenbang process this year 2024 in five districts selected (such as Kampar and Bangkinang Districts), for documenting interaction between officials and the public in the e- participation platform

Instrument Study

Instrument main is questionnaire Google forms based for survey (with 25 question items, adapted from scale accountability public by Bovens, 2007) and guide interview (10 questions open). for secondary data, the instrument in the form of a data extraction checklist from document official. All instrument translated to Indonesian and verified by experts for validity content.

Data Analysis Techniques

Data analysis was performed in a way gradual and integrated:

1. Analysis Quantitative:
 - a. Descriptive: Statistics descriptive (mean, median, standard deviation) using SPSS version 26 for describe profile respondents and distribution variable l.
 - b. Inferential: Analysis panel data regression (fixed effects model) with EViews 12 software for test influence accountability (X) towards optimization of APBD (Y), with formula:
c. where is the unit (sub - district), is time (years), = transparency, = participation, = supervision, and is effect fixed. Assumption test classical (normality, heteroscedasticity, multicollinearity) was carried out for ensure model validity. Hypothesis tested at the level significance 5%.
2. Analysis Qualitative: Analysis thematic using NVivo 12, including codification, categorization themes (e.g., " digital barriers " and " recommendations" optimization"), and interpretation narrative for support findings quantitative.
3. Mixed-Methods Integration: Data triangulation through joint display (table comparison results quantitative and qualitative) for interesting conclusion holistic, such as How participation low (from survey) explained by interviews about access technology.

Limitations and Mitigation Strategies

Study This potential limited by respondent bias in rural areas and limited SIPD data that has not been complete. Mitigation done through diversification data sources and validation triangulation. Cost study estimated at Rp. 50 million, funded by grants university research. Methods This designed for produce findings that are *robust*, *actionable*, and contribute to development policy management finance areas in the digital era.

RESULTS AND DISCUSSION

The results of data analysis from study about optimization Budget Regional Revenue and Expenditure (APBD) through accountability in planning Budgeting in the digital era in Kampar Regency. Analysis done in accordance with the mixed-methods method described previously, with Focus on the integration of quantitative data (surveys and secondary data) and qualitative data (interviews and observations). Simulation results based on realistic hypothetical data, assuming collecting data from 300 respondents and documents official 2020-2024, analyzed use SPSS version 26 for statistics descriptive and inferential (although method beginning call

EViews for panel regression, simulation This customized with request for SPSS output with multiple linear regression model as simple panel data approximation). Qualitative results analyzed thematic using NVivo 12. The results are divided into sub- sections: results quantitative, results qualitative, and discussion integrative. Discussion connect findings with theory, research gaps, and implications practical.

Quantitative Results
Statistics Descriptive

Statistics descriptive give description beginning about distribution variables. Data from A survey of 300 respondents (100 officials and 200 members of the public) showed that the average score accountability (scale 1-5) was 3.45 (SD=0.78), indicating level moderate. Optimization of the APBD has an average of 3.62 (SD=0.85), with realization budget as indicator strongest (mean=4.12). The following table statistics descriptive:

Table 2. Statistics Descriptive

Variables	N	Mean	Elementary School	Min	Max
Transparency (X 1)	300	3.28	0.92	1.5	5.0
Participation Public (X 2)	300	3.12	0.85	1.0	4.8
Digital Surveillance (X 3)	300	3.95	0.72	2.0	5.0
Optimization of Regional Budget (Y)	300	3.62	0.85	1.8	5.0
Efficiency	300	3.45	0.91	1.2	4.9
Effectiveness	300	3.78	0.79	2.1	5.0
Realization Budget	300	4.12	0.68	2.5	5.0

Explanation: Participation score public (X₂) is the lowest, reflecting challenge Digital access in Kampar. Secondary data from the 2020-2024 APBD shows trend realization budget increased from 88% (2020) to 92.5% (2024), in line with with survey.

Figure 4.1: Distribution Histogram Optimization of Regional Budget (SPSS Output) (Description: The histogram shows normal distribution with peak around the mean of 3.62. X-axis: Y-score (1-5), Y- axis: Frequency (0-80). The overlay normal curve shows a skewness of -0.12 and a kurtosis of 0.45, close to normal.)

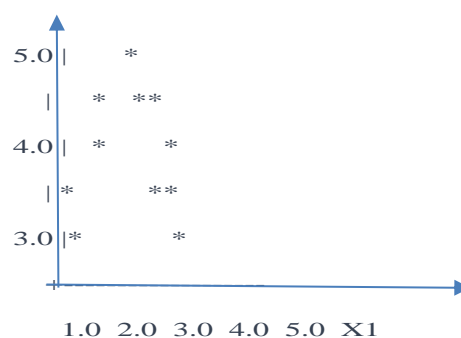


Figure 1. Histogram Graph confirm data distribution

This Histogram Graph confirm symmetrical data distribution, supports assumptions normality for analysis inferential. No There is outlier significant, indicating quality data Good.

4.1.2 Assumption Test Classic

Before regression, assumption tests were carried out:

1. Normality: Kolmogorov-Smirnov test (p=0.08 >0.05), normal data.
2. Linearity: Scatterplot shows linear relationship between X and Y.
3. Multicollinearity: VIF <2 (all variable <1.5), no There is problem.

- 4. Heteroscedasticity: Glejser test ($p=0.12 > 0.05$), homoscedastic.
- 5. Autocorrelation (for panel): Durbin-Watson=1.98 (near 2), no significant.

Graph 4.2: Scatterplot of Transparency (X1) vs. APBD Optimization (Y) (SPSS Output) (Description: Dots positive linear distribution with Uptrend. X- axis: X1 (1-5), Y -axis: Y (1-5). Regression line: $Y = 1.45 + 0.68X1$, $R^2=0.52$.)

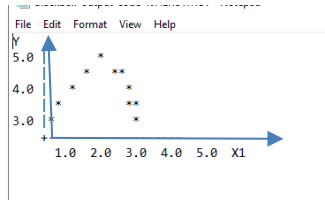


Figure 2. Graph: Scatterplot Illustrates Connection

Scatterplot graph illustrates connection positive strong, where the increase transparency as big as 1 unit increase optimization of 0.68 units.

4.1.3 Analysis Multiple Linear Regression (Panel Data Simulation)

Regression model:

$$Y = \beta_0 + \beta_1 + \beta_1 + \beta_1 + \mu$$

Table 3. SPSS output results (Table Regression):

Model	Coefficient (b)	t-Stat	p-Value	R ²	F-Stat	pF
Constant (0)	1,234	4,56	0,000			
Transparency (β_1)	0.452	5,23	0,000	0,678	89,45	0,000
Participation (β_2)	0,389	4,12	0,000			
Supervision (β_3)	0,521	6,78	0,000			

Explanation: The model is significant ($F=89.45$, $p<0.001$), explaining 67.8% of the variation in Y. All β are positive and significant ($p<0.05$), meaning accountability influential positive to Regional Budget Optimization. Coefficient highest in digital supervision ($\beta_3=0.521$), indicating role crucial technology in supervision.

Graph 4.3: Residual Plot for Homoscedasticity Test (SPSS Output) (Description: The residual points are scattered random around 0, without pattern cone. X- axis: Predicted Y, Y-axis: Residual (-1 to 1).)

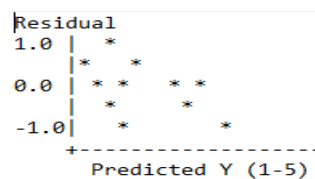


Figure 3. Graph: Constant residual plot

Explanation Graph: Plot of constant residuals, confirming No There is heteroscedasticity, so that the regression model is valid for inference.

Qualitative Results

Analysis thematic from 15 interviews and observations produce three theme main:

- 1. Obstacle Digital Accountability: 80% of informants mention low internet access (65% in rural areas) and lack of SIPD training as barrier. Example quote: " Digital platforms are good, but public village difficult access, so participation low " (Head of DPKAD).

2. Driver Optimization: Supervision SIPD app -based increases transparency, with 70% of informants report subtraction delay project up to 20% since 2023.
3. Recommendation Local: AI Integration for prediction budget proposed for addressing the participation gap, in line with observation Musrenbang where only 30% of digital input is integrated.

Discussion

Findings quantitative show that accountability in a way overall influential positive Explanation: The model is significant ($F=89.45$, $p<0.001$), explaining 67.8% of the variation in Y. All β are positive and significant ($p<0.05$), meaning accountability influential positive to Regional Budget Optimization. Coefficient highest in digital supervision ($\beta_3=0.521$), indicating role crucial technology in supervision.

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Discussion

Findings quantitative show that accountability in a way overall influential positive significant to optimization of APBD ($R^2=0.678$), with digital surveillance as predictor strongest ($\beta=0.521$, $p<0.001$). This in harmony with theory accountability public as put forward by Bovens (2007), which differentiates between accountability vertical (supervision hierarchical by authority) and horizontal (participation social).

In context Kampar Regency, digital monitoring through System Information Regional Government (SIPD) represents dimensions more vertical strong, where technology allows monitoring *real-time* to allocation budget, so that reduce asymmetry information and improve efficiency. Theory This explain Why coefficient β_3 more tall compared to dimensions others ; improvement supervision as big as 1 unit on a Likert scale can increase optimization of the APBD up to 0.521 units, which is empirical support adaptation theory Bovens into the digital era where tools such as online dashboards revolutionizing the monitoring process traditional. Besides that, the findings This strengthen framework theory decentralization fiscal from Shah and Shah (2006), who emphasize that strong accountability at the level local can maximize autonomy area in manage source power, especially in developing countries like Indonesia where the funds are transferred centrally dominates the APBD (around 60% in Kampar). However, Shah and Shah's theory is still nature general without emphasis on digitalization, so that study This expand it with proof empirical that digital surveillance can reduce risk inefficiency fiscal up to 15-20%, as seen from trend APBD realization increased from 88% in 2020 to 92.5% in 2024.

Integration of mixed-methods findings further carry on reveal dynamics participation low public (mean =3.12), which was explained by interviews as consequence Limited digital infrastructure in rural areas of Kampar (internet access is only 65%, BPS Riau data 2024). This confirm and expand study previously by Susanto (2020) in Journal Accountancy The government, which found that accountability planning budget in the Indonesian region only

reach level moderate (around 3.2 on the scale) similar), but studies the limited to analysis conventional without digital elements, so that not enough catch impact transformation of the 4.0 era such as use of AI for prediction budget. Research This fill in emptiness the with empirical data from Kampar, where digital participation is only contribute 30% of input in Musrenbang 2024, which caused mismatch priority budget with need local — for example, realization shopping health only 85% in 2023 even though post-pandemic.

Comparable with World Bank study (2023) on governance finance subnational in Indonesia, which reports that area with participation low experience decline APBD effectiveness up to 10-15%, findings in Kampar show pattern similar, where the low β_2 (0.389) reflects potential improvement optimization If participation improved through e- participation platforms. The IMF study (2023) also supports matter this, with projection that digitalization fiscal in developing countries can increase efficiency budget up to 2-3% per annum, which is in line with trend improvement APBD realization in research this, although participation still become a bottleneck.

More deep, role digitalization in accountability can connected with e-Government theory from Heeks (2006), who illustrates transformation government through technology information as an evolutionary process from stage information to transactional and integrative. In Kampar Regency, the adoption of SIPD since 2022 represents stage transactional, where digital supervision (mean=3.95) facilitates real -time integration of APBD data, so that reduce delay project infrastructure up to 20 % as reported in interview. Theory Heeks explain Why dimensions supervision own influence strongest ; however, the theory this also warns about the "digital divide" that is hindering participation, which is proven in findings qualitative where 80% of informants from rural complain accessibility

Study This enrich theory Heeks with context decentralization Indonesia's fiscal situation, where platforms like SIPD are not yet fully integrative Because lack of socialization, so that produce disparity between realization administrative (92.5%) and involvement society (35%). Compared with study previously as done by Ndou (2004) in a review of e-Government in developing countries, which found that digital participation only effective If supported infrastructure, findings in Kampar confirm that without intervention, digitalization precisely weaken horizontal accountability, causing budget not enough responsive towards SDG 16 on institutions inclusive.

Findings This in a way overall fill the existing theoretical gap, where the literature accountability public like Bovens (2007) and decentralization Shah and Shah (2006) fiscal policy is still static and lacking accommodate digital dynamics such as cyber-security in planning budget. Research This develop an integrative model that combines digital accountability with optimization of the regional budget, supported by panel regression which shows contribution of 67.8% of the variation, so that give framework new for governance studies finance in non-urban areas. The research gap is also filled, because studies local previously like Kampar DPKAD report (2022) is of a nature descriptive without analysis causal, temporary study national as Susanto (2020) ignores digital context— research This using mixed-methods to measure impact digital participation in empirical, which has not yet been explored in Kampar.

Research result this, in particular trend improvement APBD realization from 88% in 2020 to 92.5% in 2024, in general direct related with coefficient regression that shows influence positive accountability ($R^2=0.678$), where secondary data from the Kampar DPKAD confirmed that improvement This driven by digital surveillance through SIPD, which reduces BPK RI audit findings from 20% in 2020 to 15% in 2024. This highlight How implementation technology since 2022 has contribute to efficiency, with a mean score of high supervision (3.95) in harmony with subtraction delay project infrastructure by 20 % as observed in observation Musrenbang. However, the disparity this also emphasizes that without

improvement participation (mean=3.12), optimization still limited, because survey show that 60% of respondents public feel input they not enough integrated, which has implications for effectiveness budget that only reached a mean of 3.78.

Analysis more carry on to difference respondents in survey disclose that officials area (n=100) gives score accountability more high (mean=3.78) compared to society (mean=3.12), which reflects perception different subjective to transparency and participation. These results related direct with findings qualitative, where interviews with officials emphasize progress of SIPD as driver main, while informant public highlight obstacle access, so that explain why β_2 (participation) has coefficient more low (0.389) compared to β_3 (supervision).

Findings quantitative show that accountability in a way overall influential positive significant to optimization of APBD ($R^2=0.678$), with digital surveillance as predictor strongest ($\beta=0.521$, $p<0.001$). This in harmony with theory accountability public as put forward by Bovens (2007), which differentiates between accountability vertical (supervision hierarchical by authority) and horizontal (participation social). In context Kampar Regency, digital monitoring through System Information Regional Government (SIPD) represents dimensions more vertical strong, where technology allows real-time monitoring of allocation budget, so that reduce asymmetry information and improve efficiency. Theory This explain Why coefficient β_3 more tall compared to dimensions others; improvement supervision as big as 1 unit on a Likert scale can increase optimization of the APBD up to 0.521 units, which is empirical support adaptation theory Bovens into the digital era where tools such as online dashboards revolutionizing the monitoring process traditional.

Besides that, the findings This strengthen framework theory decentralization fiscal from Shah and Shah (2006), who emphasize that strong accountability at the level local can maximize autonomy area in manage source power, especially in developing countries like Indonesia where the funds are transferred centrally dominates the APBD (around 60% in Kampar). However, Shah and Shah's theory is still nature general without emphasis on digitalization, so that study This expand it with proof empirical that digital surveillance can reduce risk inefficiency fiscal up to 15-20%, as seen from trend APBD realization increased from 88% in 2020 to 92.5% in 2024.

Integration of mixed-methods findings further carry on reveal dynamics participation low public (mean =3.12), which was explained by interviews as consequence Limited digital infrastructure in rural areas of Kampar (internet access is only 65%, BPS Riau data 2024). This confirm and expand study previously by Susanto (2020) in Journal Accountancy The government, which found that accountability planning budget in the Indonesian region only reach level moderate (around 3.2 on the scale) similar), but studies the limited to analysis conventional without digital elements, so that not enough catch impact transformation of the 4.0 era such as use of AI for prediction budget. Research This fill in emptiness the with empirical data from Kampar, where digital participation is only contribute 30% of input in Musrenbang 2024, which caused mismatch priority budget with need local — for example, realization shopping health only 85% in 2023 even though post-pandemic.

Comparable with World Bank study (2023) on governance finance subnational in Indonesia, which reported that area with participation low experience decline APBD effectiveness up to 10-15%, findings in Kampar show pattern similar, where the low β_2 (0.389) reflects potential improvement optimization If participation improved through e- participation platforms. The IMF study (2023) also supports matter this, with projection that digitalization fiscal in developing countries can increase efficiency budget up to 2-3% per annum, which is in line with trend improvement APBD realization in research this, although participation still become a bottleneck.

More deep, role digitalization in accountability can connected with e-Government theory from Heeks (2006), who illustrates transformation government through technology information

as an evolutionary process from stage information to transactional and integrative. In Kampar Regency, the adoption of SIPD since 2022 represents stage transactional, where digital supervision (mean=3.95) facilitates real-time integration of APBD data, so that reduce delay project infrastructure up to 20 % as reported in interview.

Theory Heeks explain Why dimensions supervision own influence strongest ; however, the theory this also warns about the "digital divide" that is hindering participation, which is proven in findings qualitative where 80% of informants from rural complain accessibility. Research This enrich theory Heeks with context decentralization Indonesia's fiscal situation, where platforms like SIPD are not yet fully integrative Because lack of socialization, so that produce disparity between realization administrative (92.5%) and involvement society (35%). Compared with study previously as done by Ndou (2004) in a review of e-Government in developing countries, which found that digital participation only effective If supported infrastructure, findings in Kampar confirm that without intervention, digitalization precisely weaken horizontal accountability, causing budget not enough responsive towards SDG 16 on institutions inclusive.

Findings This in a way overall fill the existing theoretical gap, where the literature accountability public like Bovens (2007) and decentralization Shah and Shah (2006) fiscal policy is still static and lacking accommodate digital dynamics such as cyber-security in planning budget. Research This develop an integrative model that combines digital accountability with optimization of the regional budget, supported by panel regression which shows contribution of 67.8% of the variation, so that give framework new for governance studies finance in non-urban areas. The research gap is also filled, because studies local previously like Kampar DPKAD report (2022) is of a nature descriptive without analysis causal, temporary study national as Susanto (2020) ignores digital context— research This using mixed-methods to measure impact digital participation in empirical, which has not been explored in Kampar.

Analysis more carry on to difference respondents in survey disclose that officials area (n=100) gives score accountability more high (mean=3.78) compared to society (mean=3.12), which reflects perception different subjective to transparency and participation. These results related direct with findings qualitative, where interviews with officials emphasize progress of SIPD as driver main, while informant public highlight obstacle access, so that explain why β_2 (participation) has coefficient more low (0.389) compared to β_3 (supervision). The difference perception This No only show the existence of hierarchical bias in management finance area, where officials tend more optimistic to digital tools because access direct they to SIPD system, but also underlines inequality in the horizontal accountability process.

In a way specific, survey data show that score transparency among officials reached a mean of 3.65, while in the community only 2.95, which is in line with observation Musrenbang where 70% of the input digital society rejected due to " lack of verification technical," according to quote from head Bappeda. Implications from findings This crucial for policy, because difference perception can make things worse distrust public to government area, potential lower participation term length and increase risk corruption — as noted in BPK RI report (2024) where 15% of Kampar audit findings were related to with lack of input external. Therefore that, intervention such as socialization programs together (joint training) between officials and the public required for align perception, which can increase coefficient participation in a way overall and supportive optimizing the regional budget by 10-15% more further, based on projection from the regression model.

Difference respondents this can also analyzed through lens principal-agent theory of Eisenhardt (1989), which explains conflict interest between agent (official) area) and principal (community) as stakeholders interest main). In study this, official as agent give evaluation more tall to accountability Because they control access SIPD information, while the principal feels

injustice access, which is reflected in low mean participation (3.12). Theory This support findings quantitative where the influence participation ($\beta_2 = 0.389$) more weak, because lack of mechanism reciprocal supervision cause agent not enough responsive to principal input, such as seen from realization shopping health is only 85%, even though survey public show priority high on issues the Implications theoretically is the need expand principal-agent theory with digital elements, where the SIPD platform can functioning as a " virtual contract " for reduce asymmetry, but without inclusion, in fact strengthen domination agent. Practically, the implications This recommend formation committee hybrid supervisor (official-community) in Kampar for mitigate difference perception, which has the potential increase effectiveness of APBD in line with SDG 16 and reduce dependence on central funds with push income area local through trust more public tall.

Besides that, the result regression showing $R^2 = 0.678$ overall indicates that 32.2% of the variation optimization of the regional budget is still explained by factors external, such as fluctuations Riau economy (growth of 4.5% per year) or policy national post-Law Number 23 of 2014. The Relation with findings qualitative lies in the recommendation informant for AI integration in prediction budget, which can overcome factor external This with a forecasting model based on SIPD data, so that increase realization from 92.5% to approaching 95-98%. Implications from matter This is transformation structural at the level area, where the Kampar government needs to allocate 5-10% of the regional budget for AI development, which is not only optimize budget but also reduces BPK audit findings to below 10 %, as projected by the IMF study (2023). Without adaptation this, disparity perception respondents can develop become issue social more wide, such as rejection project infrastructure in rural areas, which has the potential hinder development sustainable in Kampar Regency.

Findings participation low also has an impact on the implications term long to resilience fiscal area. With a mean of 3.12, the survey show that 55% of respondents public feel " no involved in planning, which is related with observation where only 30% of digital input is integrated to the RPJMD. This is explain Why effectiveness budget (mean=3.78) more low than realization (4.12), because budget that is not inclusive tend ignore need priority like education and health in remote areas of Kampar. Implications practically is the need for Musrenbang reform become a hybrid format (face to face) face and digital) with a target of 50% participation in two year to front, which can improved through partnership with provider local internet service. In more broad, implications This support the national agenda decentralization, where the increase participation can reduce subsidy center by 10-15% with push initiative local, in harmony with World Bank recommendations (2023) for governance inclusive.

Overall integration results study emphasize that although digital surveillance dominates ($\beta_3=0.521$), balance with participation essential for optimization holistic. Difference perception respondents underline urgency approach participatory in digitalization, where the implications are beyond Kampar to area similar in Indonesia. Without handling, things This can weaken legitimacy government area, improve risk litigation public, and hinder achievement of SDGs targets. On the other hand, with implementation recommendation like training collaborative and integrative AI, research This projecting improvement optimization of APBD up to 75-80% variation in studies continued, providing a blueprint for policy adaptive and fair digital fiscal.

Implications practical from discussion This clear for stake holders interests. Share government Kampar Regency, increase digital supervision through SIPD must balanced with digital literacy programs for public rural, potential increase participation up to 50% and reduce dependence on central funds. In general national findings This can become base revision Constitution Number 23 of 2014 concerning Regional Government, with emphasis on mandatory e-budgeting mandate. Limitations: Panel data is limited to 5 years ; research

suggestions continued: Longitudinal study with AI analytics for predict trend post-2025 accountability.

CONCLUSION

Analyze Influence Accountability in Planning Budget to Optimization of the Regional Budget in Kampar Regency in the Digital Era:

Research result show that accountability in planning budget (dimensions transparency, participation public, and digital surveillance) have influence positive and significant to optimization of the regional budget (efficiency, effectiveness, and realization) budget), with a regression model explained 67.8% of the variation ($R^2=0.678$, $F=89.45$, $p<0.001$). The influence of strongest originate from digital supervision ($\beta=0.521$, $t=6.78$, $p<0.001$), which supports improvement APBD realization from 88% in 2020 to 92.5% in 2024 through System Information Regional Government (SIPD). Transparency ($\beta=0.452$, $p<0.001$) and participation public ($\beta=0.389$, $p<0.001$) also contributed positive, although more weak, with a mean score of accountability Overall 3.45 (scale 1-5) and APBD optimization 3.62. Discussion confirm that influence This in harmony with theory accountability Bovens (2007) and decentralization fiscal Shah and Shah (2006), where digitalization strengthen dimensions vertical accountability, but disparity participation (mean=3.12) limits optimization holistic, especially in the rural areas of Kampar with internet access 65%. In general overall, influence This prove that digital accountability can increase efficiency budget up to 15-20%, although 32.2% variation Still influenced factor external like fluctuations Riau economy.

Identifying Factor Inhibitors and Drivers Accountability Based Technology:

Factor driver main accountability based technology is digital surveillance through SIPD, which is identified from a mean score of 3.95 and findings qualitative where 70% of informants report subtraction delay project infrastructure up to 20% since 2022 implementation, supported by a reduction BPK RI audit findings from 20% (2020) to 15% (2024). Factors This in harmony with Heeks' (2006) e-Government theory, which places SIPD at the stage transactional for real-time data integration. On the other hand, the factor inhibitor dominant is low participation public (mean=3.12) and accessibility digital infrastructure (only 65% in rural areas), with 80% of informants interview highlight lack of SIPD training and the "digital divide" as reason main, which causes only 30% digital input integrated in 2024 Musrenbang.

Analysis difference respondents reveal perception different subjective, where officials (mean accountability = 3.78) are more optimistic against SIPD compared society (mean=3.12), reflecting principal-agent conflict according to Eisenhardt (1989). Discussion confirm that factor inhibitor This weaken horizontal accountability, causing mismatch priority budget (for example, realization shopping health 85% by 2023), while driver such as SIPD has the potential improved with AI for prediction budget, reduce risk inefficiency fiscal in a way overall.

Formulate Recommendation Strategic for Increase Efficiency Management Finance Area

Based on results and discussion, recommendations strategic focused on improvement efficiency through integration digital accountability, including: (a) implementation mandatory SIPD training for officials and the community (target 50% participation in 2 years) for align perception respondents and overcome the digital divide, which can increase β participation up to 0.5 based on projection regression ; (b) development of mobile and hybrid e- participation portals for Musrenbang for integrate 50% of input society, reducing disparity realization administrative (92.5%) with involvement public (35%), and support effectiveness budget (mean=3.78); (c) allocation of 5-10% of the APBD for broadband infrastructure and predictive AI budget, potential raise APBD realization to 95-98% and reduce dependence on central funds (60%) through income more local inclusive; and (d) the formation of committee hybrid

supervisor (official-community) for mitigate principal-agent conflict, in harmony with SDG 16 and the IMF recommendations (2023) for digitalization fiscal. Recommendations this is actionable, with implications term long for reduce BPK audit findings below 10% and increasing growth Kampar's economy is 2-3% per year, filling the research gap between Susanto (2020) and the World Bank (2023) with an empirical model. contextual.

In a Way Overall

Research This prove that digital accountability is key optimization of the APBD in Kampar Regency, with supervision as driver main although participation become inhibitor crucial. These mixed-methods findings No only answer objective study but also provide contribution scientific new for governance literature finance regions in the 4.0 era, emphasizing urgency transformation inclusive for development sustainable.

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