

The Influence of Cascading, E-Planning, and E-Budgeting on the Effectiveness of Budget Absorption in Bekasi City Government Agencies: Human Resource Competence in Financial Management as a Mediating Variable and Budget Planning Quality as a Moderating Variable

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Budget absorption in local government agencies (OPDs) is frequently constrained by implementation delays at the beginning of the fiscal year and spending concentration at year-end, reducing program effectiveness and the quality of public service delivery. This study examines the influence of cascading, e-planning, and e-budgeting on budget absorption effectiveness, with HR competence as a moderating variable and planning and budgeting quality as a mediating variable. The study employed a quantitative approach using Structural Equation Modeling based on SmartPLS. Data were collected through questionnaires distributed to financial management and planning personnel in Bekasi City Government agencies. The outer model results indicate that all constructs are valid and reliable, with factor loadings above 0.70, AVE values above 0.50, composite reliability above 0.80, and HTMT values below 0.90. The structural model demonstrates strong explanatory power, with R² values of 0.68 for budget absorption effectiveness and 0.62 for planning and budgeting quality. HR competence significantly strengthens these relationships, while planning and budgeting quality mediates the relationship between governance systems and budget absorption effectiveness.

Keywords: Cascading; E-Planning; E-Budgeting; HR Competence; Planning and Budgeting Quality; Budget Absorption Effectiveness

INTRODUCTION

Budget absorption remains a recurring issue among local government agencies (OPDs) in Indonesia, both at the central and local government levels. Several studies note that delays in budget absorption and low spending rates at the beginning of the fiscal year often lead to a concentration of spending at the end of the year, thereby risking a decline in the effectiveness of program outcomes. Hiola (2023) emphasizes that the issues of delays and budget absorption rates are phenomena that occur almost every year, while Sudarwati et al. (2017) indicate that the accumulation of payments in the fourth quarter suggests absorption that deviates from the established activity plans.

This accumulation phenomenon is also evident in other studies, which state that ideally, absorption should be evenly distributed across quarters; however, in practice, it is often low at the beginning of the year and increases sharply toward the end of the year. Ramadhani & Setiawan (2019) explain that low absorption at the beginning of the year leads to a backlog of budget absorption toward the end of the year and is problematic because absorption is frequently used as a performance benchmark for local government agencies. In line with this, Fitriany et al. (2015) identified a pattern of budget absorption accumulation toward the end of the fiscal year and argued that delays in planning readiness, administrative processes, and implementation scheduling contributed to uneven expenditure realization and implementation inefficiency.

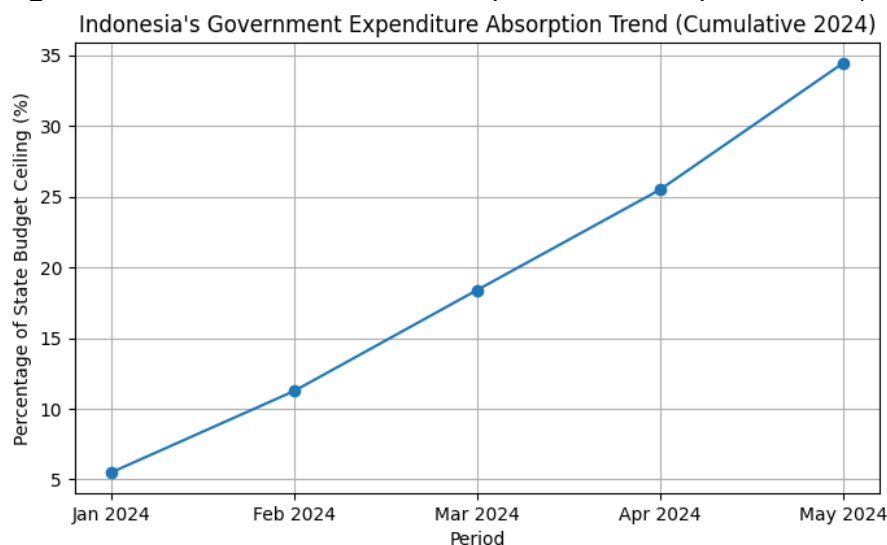
As presented in Table 1 and Figure 1, Indonesia's cumulative government expenditure absorption in 2024 shows a gradual increase throughout the first five months of the fiscal year. However, the absorption rate remained relatively low during the early months, with realization reaching only 5.5% in January and 11.26% in February. The realization increased to 18.4% in March, 25.5% in April, and 34.44% in May. This pattern indicates that expenditure realization accelerated only after several months had passed, reflecting delays in program implementation during the early phase of the fiscal year. Such conditions reinforce concerns regarding uneven expenditure realization and the persistent concentration of budget absorption toward the latter part of the fiscal year.

Table 1. Indonesia's Government Expenditure Absorption (Cumulative, 2024)

Period (End of Month)	Government Expenditure Realization (IDR Trillion)	Percentage of State Budget Ceiling (%)
January 2024	184.2	5.5
February 2024	374.32	11.26
March 2024	611.9	18.4
April 2024	849.2	25.5
May 2024	1,145.27	34.44

Source: Processed Data

Figure 1. Indonesia's Government Expenditure Absorption Trend (Cumulative, 2024)



Source: Processed Data

Data on government spending shows that budget absorption tends to be low at the beginning of the year. By the end of January 2024, government spending had reached only 5.5 percent of the budget ceiling, then increased to 11.26 percent by the end of February and 18.4 percent by the end of March. This pattern indicates delays in the execution of programs and activities during the early phase of the fiscal year. Although realization increased in April (25.5 percent) and May (34.44 percent), these absorption rates still indicate that spending acceleration only gained momentum after several months had passed.

Regarding the causes, the literature identifies human resources (HR), procurement processes, administration, and planning quality as the most frequently cited factors. Anfujatin (2016) noted that in a study of district government agencies in Tuban, HR factors were the dominant cause of low absorption (outpacing procurement and administrative factors), followed by inadequate planning. These findings reinforce the argument that budget absorption is not merely a technical issue of payment, but is also influenced by the quality of civil servants' competencies, the accuracy of schedules, and the maturity of program and activity planning.

In the context of governance reform, the digitization of planning and budgeting processes is viewed as a strategy to improve planning consistency, enhance transparency, and increase accountability. A study by Rahayu et al. (2023) notes that the implementation of e-planning offers advantages such as efficiency and effectiveness, the provision of transparent information, enhanced accountability, and ease of reporting and evaluation, although it still faces challenges such as human resource capacity and policy support. At the implementation level, Mait et al. (2020) also emphasize that the implementation of e-planning can be hindered when the quality of OPD human resources is insufficient, leading to delayed data input and consequently delayed planning documents.

In addition to e-planning, the implementation of e-budgeting is becoming increasingly relevant as it standardizes budget administration processes, enhances access to information, and strengthens control. Sanjaya et al. (2025) demonstrate that e-budgeting in the case study of the City Government of Surakarta enhances the efficiency of administrative processes, strengthens budget transparency, and encourages public participation, with success contingent on the readiness of human resources,

technological infrastructure, and managerial commitment. In line with this, Rafiqi et al. (2021) concluded that the implementation of e-budgeting in Surabaya was effective from the perspective of good governance principles and emphasized the role of adequate infrastructure and human resource development in supporting implementation.

The importance of human resource competence in supporting digital governance and organizational effectiveness is also reinforced by several contemporary studies. Amaliyah et al. (2024) demonstrated that employee competencies significantly influence the successful implementation of Geographic Information System (GIS) website digitalization, particularly in improving system utilization and organizational performance. Similarly, Sandroto et al. (2024) emphasized that competencies consisting of knowledge, skills, and behavioral capability are fundamental determinants shaping organizational intention and performance outcomes. Addinna et al. (2018) further argued that organizational competitiveness and performance advantages are strongly influenced by the development of core competencies that support operational effectiveness and strategic implementation. These findings strengthen the argument that the effectiveness of e-planning and e-budgeting systems in public sector organizations depends not only on technological infrastructure but also on the competencies of personnel responsible for operating and managing the systems.

However, improving budget absorption requires more than just digitizing planning and budgeting if performance objectives, programs, activities, and funding are not aligned. At this point, the performance cascading approach becomes crucial as it breaks down performance targets from higher levels to the operational unit level and links them to specific targets, indicators, and the costs required to achieve the desired outcomes. Safriansyah et al. (2023) define performance cascading as a performance statement or agreement between superiors and subordinates to achieve targets aligned with strategic objectives, and emphasize that performance information must also include cost data necessary to achieve activity outcomes.

Research on the Bekasi City Government's OPDs is relevant to test how cascading, e-planning, and e-budgeting influence budget absorption effectiveness, while also assessing whether the competencies of financial management personnel strengthen or weaken these effects. Empirical evidence indicates that HR competencies can positively contribute to budget absorption. For example, Iqbal (Jurnal Akun Nabelo) reported that budget planning and HR competencies have a positive effect on the level of budget absorption, making HR competencies worthy of being positioned as a moderating variable in the research model.

Based on this phenomenon, this study includes Planning and Budgeting Quality as a mediating variable. Planning and budgeting quality is understood as the degree of alignment among priorities, programs, activities, performance indicators, cost requirements, implementation schedules, and compliance with document preparation procedures. High-quality planning and budgeting produce documents that are clear, realistic, consistent across documents, and require minimal revisions, allowing program and activity implementation to begin sooner and making the budget execution process more orderly. Thus, the quality of planning and budgeting is expected to serve as a key mechanism explaining how cascading, e-planning, and e-budgeting can enhance budget absorption effectiveness.

The inclusion of these mediating variables is also supported by the view that delays in budget absorption often originate from the early stages, such as unprepared documents, changes in plans, and repeated budget adjustments. When the quality of planning and budgeting improves, these obstacles can be mitigated and the implementation of

activities becomes more timely. Therefore, this study not only examines the direct effects of cascading, e-planning, and e-budgeting on the effectiveness of budget absorption by Bekasi City Government OPDs, but also examines the indirect effects through the quality of planning and budgeting as mediating variables.

LITERATURE REVIEW

Grand Theory: Good Governance

The grand theory relevant to this study is good governance, as the variables of cascading, e-planning, and e-budgeting directly intersect with the principles of good governance, particularly transparency, accountability, effectiveness, and efficiency. Public financial management reforms at the local government level require planning and budgeting processes that are accountable and produce outputs aligned with community needs (United Nations Development Programme, 1997).

In the context of local financial management, e-planning and e-budgeting are viewed as instruments for strengthening governance because they promote decision traceability, standardization of procedures, and budget transparency. Empirical evidence indicates that e-budgeting can support the principles of good governance, particularly regarding transparency and accountability, although its success still requires human resource readiness and organizational support (Rafiqi & Selviyanti, 2021; Sanjaya et al., 2025).

Theories of Technology Acceptance: The Technology Acceptance Model and UTAUT

To explain how e-planning and e-budgeting can influence the effectiveness of budget absorption, this study can utilize the Technology Acceptance Model. The TAM posits that the acceptance of information systems is influenced by perceived usefulness and perceived ease of use, which in turn influence the intention to use and actual use of the system (Davis, 1989). In the context of OPDs, if e-planning and e-budgeting systems are perceived as useful and easy to use, users are likely to utilize the systems consistently, thereby making the planning and budgeting processes faster and more orderly.

In addition to TAM, a more comprehensive theory is the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT states that the intention and behavior of technology use are influenced by performance expectations, effort expectations, social influence, and facilitation conditions (Venkatesh et al., 2003). This theory is relevant to local governments because the implementation of systems is often influenced by the availability of facilities, leadership support, organizational culture, and infrastructure readiness, which determine the smooth operation of the system.

Theory of Information System Success: The DeLone and McLean Information Systems Success Model

To assess the quality of e-planning and e-budgeting implementations, a widely used model in information systems research is the DeLone and McLean Information Systems Success Model. This model measures system success through the dimensions of system quality, information quality, service quality, usage, user satisfaction, and net benefits (DeLone & McLean, 2003). In this study, the net benefits dimension can be associated with improvements in process efficiency, a reduction in administrative barriers, as well as support for control and reporting, which ultimately have the potential to increase the effectiveness of budget absorption.

Human Capital Theory

The competence of financial managers can be explained through Human Capital Theory, which views education, training, and experience as investments that enhance individual productivity (Becker, 1964). In local government financial management, competence is crucial because the processes of planning, budgeting, administration, and reporting require an understanding of regulations as well as operational skills in applying them. The inclusion of HR competency as a moderating variable in this study is based on the argument that a good digital system does not automatically improve performance if users lack competence. Conversely, competent HR personnel tend to be better able to utilize system features appropriately, reduce input errors, expedite document processing, and maintain consistency between plans, budgets, and implementation.

Public Sector Performance Management Theory and Cascading

Performance cascading is understood as the process of breaking down performance targets and indicators from the strategic level to the operational level so that organizational goals align with programs, activities, and work unit performance metrics. Cascading helps ensure the linkage between performance targets, indicators, and cost information so that program and activity planning has a clear direction and is easier to execute (Safriansyah et al., 2023).

In the context of budget implementation, cascading has the potential to minimize recurring program changes, reduce document revisions, and clarify spending priorities. These conditions can improve the timeliness of implementation and mitigate the phenomenon of budget absorption backlogs at the end of the year.

Budget Absorption, E-Planning, and E-Budgeting

The phenomenon of low budget absorption is often associated with inadequate planning, administrative constraints, procurement implementation, and human resource limitations. One study on local governments indicates that human resources, procurement, administration, and planning are the causes of low budget absorption in SKPDs, with human resources standing out as one of the dominant factors (Anfujatin, 2016).

Regarding e-planning, research indicates that the implementation of e-planning aids the planning process, yet it still faces challenges such as human resource readiness and technical aspects that affect the smoothness of the planning process (Mait et al., 2020). Other studies also confirm that e-planning can be beneficial for local government planning and decision-making, but success requires proper management of implementation barriers (Rahayu et al., 2023).

Regarding e-budgeting, research indicates that e-budgeting can support transparency and accountability and is considered effective in promoting good governance, although its success is influenced by organizational and human resource readiness (Rafiqi & Selviyanti, 2021). Other studies also indicate that e-budgeting supports budget transparency and process efficiency in local governments, with the caveat that success requires managerial support and infrastructure readiness (Sanjaya et al., 2025).

Hypotheses Development

The Impact of Cascading on Budget Absorption Effectiveness

Performance cascading serves to break down strategic objectives into operational targets, thereby clarifying performance indicators, output targets, and resource requirements. When cascading is implemented effectively, work units have a more measurable and consistent direction for implementation, thereby minimizing delays caused by plan changes and document revisions. Cascading also helps align

performance targets with cost information, ensuring programs and activities are better prepared for execution in accordance with the implementation schedule (Safriansyah et al., 2023). Consequently, cascading is expected to enhance budget absorption effectiveness.

H1: Cascading has a positive effect on budget absorption effectiveness within the Bekasi City Government's OPDs.

The Impact of E-Planning on Budget Absorption Effectiveness

E-planning supports local government planning processes by providing information, integrating proposals, and streamlining workflows. The success of e-planning can be measured through the quality of the system, the quality of information, and the quality of services, which influence usage intensity and user satisfaction, ultimately yielding net benefits in the form of work efficiency and effectiveness (DeLone and McLean, 2003). In practice, e-planning can assist in planning coordination and decision-making; however, its effectiveness also depends on organizational and user readiness (Mait et al., 2020; Rahayu et al., 2023). When e-planning functions effectively, planning becomes more thorough and faster, leading to more timely budget execution and more effective budget absorption.

H2: E-planning has a positive effect on the effectiveness of budget absorption in Bekasi City Government OPDs.

The Impact of E-Budgeting on Budget Absorption Effectiveness

E-budgeting is the digitization of budgeting that strengthens control, account consistency, as well as transparency and accountability. E-budgeting can accelerate administrative processes, support information access, and provide an audit trail that aids in controlling budget implementation (Rafiqi and Selviyanti, 2021; Sanjaya et al., 2025). From the perspective of information system success, the net benefits of a high-quality system will drive process efficiency, reduce administrative barriers, and strengthen governance (DeLone and McLean, 2003). Therefore, the proper implementation of e-budgeting is expected to improve budget absorption effectiveness.

H3: E-budgeting has a positive effect on budget absorption effectiveness in the Bekasi City Government's OPDs.

The Impact of Human Resource Competence on Budget Absorption Effectiveness

Human resource competence is a combination of knowledge, skills, and work attitudes that influence the quality of task performance. Human Capital Theory explains that enhancing competence through training, education, and experience increases productivity (Becker, 1964). In the context of local financial management, human resource competency is crucial because low budget absorption is often attributed to human resource factors, in addition to administrative and planning factors (Anfujatin, 2016). Competent human resources are more likely to prepare documents on time, understand regulations, and resolve implementation challenges, thereby making budget absorption more effective.

H4: The competence of financial management personnel has a positive effect on the effectiveness of budget absorption in Bekasi City Government OPDs.

The Role of Human Resource Competency in Cascading Mechanisms on Budget Absorption Effectiveness

Cascading will be more effective if financial management staff and program implementers are able to translate performance targets into implementation documents,

develop realistic activity plans, and ensure administrative completeness. HR competencies can strengthen the implementation of cascading because HR personnel who understand regulations and work processes will be better able to link indicators to programs and budget needs, thereby promoting timely realization. Thus, HR competencies are expected to strengthen the influence of cascading on absorption effectiveness.

H5: The competencies of financial management HR personnel strengthen the influence of cascading on budget absorption effectiveness in Bekasi City Government OPDs.

The Role of Human Resource Competency in the Relationship Between E-Planning and Budget Absorption Effectiveness

The success of e-planning is determined not only by system features but also by user capabilities. When human resource competency is high, the utilization of e-planning becomes more optimal for example, in terms of data input accuracy, the selection of programs aligned with priorities, and synchronization across documents. These conditions minimize repeated revisions and accelerate document readiness, resulting in faster and more effective budget implementation. Therefore, HR competency is expected to strengthen the influence of e-planning on absorption effectiveness.

H6: The HR competency of financial managers strengthens the influence of e-planning on budget absorption effectiveness in the Bekasi City Government's OPDs.

The Moderating Role of Human Resource Competence in the Relationship Between E-Budgeting and Budget Absorption Effectiveness

E-budgeting provides controls and validation, but its effectiveness is greatly influenced by users' ability to operate the system, understand budget classifications, and follow up on validation and control results. Competent human resources are better able to utilize the system to expedite the orderly process of budget formulation and revision, reduce administrative errors, and accelerate the implementation process. Therefore, human resource competency is expected to strengthen the influence of e-budgeting on budget absorption effectiveness.

H7: The competency of financial management personnel strengthens the influence of e-budgeting on budget absorption effectiveness in the Bekasi City Government's OPDs.

The Impact of Cascading on the Quality of Planning and Budgeting

Performance cascading helps break down strategic objectives into clear operational targets and indicators, thereby making the program planning process, the setting of output targets, and budget requirements more focused and consistent. When cascading is implemented effectively, alignment between objectives, indicators, programs, and funding improves, thereby enhancing the quality of planning and budgeting (Safriansyah et al., 2023).

H8: Cascading has a positive impact on the quality of planning and budgeting within the Bekasi City Government's OPDs.

The Impact of E-Planning on the Quality of Planning and Budgeting

E-planning provides system support for data-driven planning, proposal integration, and coordination among documents. The success of e-planning depends on the quality of the system, the quality of information, and the quality of services that encourage usage and user satisfaction, thereby yielding net benefits in the form of improved efficiency and the quality of work outputs (DeLone and McLean, 2003). Thus, well-functioning e-planning is expected to improve the quality of planning and budgeting because

documents become more organized, more consistent, and require fewer revisions (Mait et al., 2020; Rahayu et al., 2023).

H9: E-planning has a positive effect on the quality of planning and budgeting in Bekasi City Government OPDs.

The Impact of E-Budgeting on the Quality of Planning and Budgeting

E-budgeting enhances control, account consistency, and transparency in the budget preparation process. This system can also reduce administrative errors and improve the traceability of budget changes, making budget documents more accurate and better prepared for implementation. In relation to good governance, e-budgeting promotes transparency and accountability and improves the budgeting process (Rafiqi and Selviyanti, 2021; Sanjaya et al., 2025). Therefore, e-budgeting is expected to improve the quality of planning and budgeting.

H10: E-budgeting has a positive effect on the quality of planning and budgeting in Bekasi City Government OPDs.

The Impact of Planning and Budgeting Quality on Budget Absorption Effectiveness

High-quality planning and budgeting result in documents that are clear, realistic, consistent, and ready for implementation from the start of the year. Well-developed documents can reduce the need for revisions, streamline the procurement process, and accelerate the execution of expenditures, thereby reducing the accumulation of unspent funds at the end of the year. Conversely, weak planning is often one of the factors contributing to low budget absorption (Anfujatin, 2016). Thus, the quality of planning and budgeting is expected to enhance the effectiveness of budget absorption.

H11: The quality of planning and budgeting has a positive effect on the effectiveness of budget absorption in the Bekasi City Government's OPDs.

Conceptual Framework

This study proposes a conceptual framework that explains budget absorption effectiveness through the integration of governance alignment, digital planning systems, digital budgeting systems, human resource competence, and planning and budgeting quality within local government agencies. The framework is developed based on Good Governance Theory, the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the DeLone and McLean Information Systems Success Model, Human Capital Theory, and Public Sector Performance Management Theory.

As shown in Figure 1, cascading, e-planning, and e-budgeting are positioned as the primary exogenous variables influencing budget absorption effectiveness. Cascading reflects the alignment between strategic objectives, operational indicators, programs, and budget allocations, thereby improving consistency between planning and implementation. Meanwhile, e-planning and e-budgeting represent digital governance instruments designed to strengthen planning integration, transparency, accountability, administrative efficiency, and financial control within local government financial management.

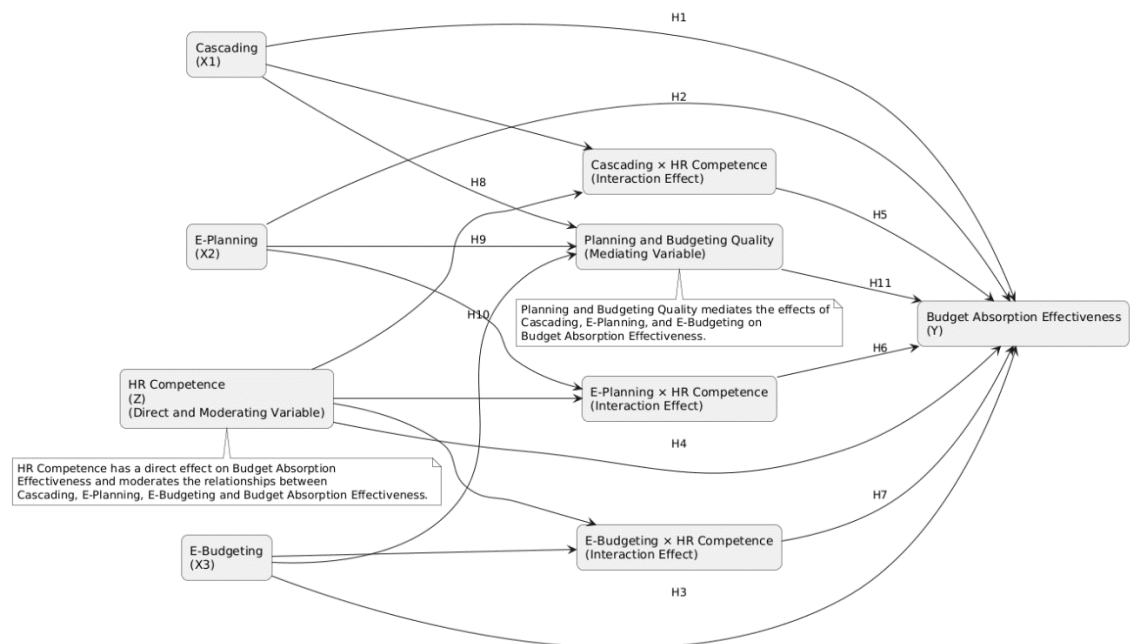
The framework also positions planning and budgeting quality as a mediating variable explaining how cascading, e-planning, and e-budgeting contribute to budget absorption effectiveness. High-quality planning and budgeting are reflected in the consistency of planning documents, realistic scheduling, alignment between programs and budget

allocations, clarity of implementation targets, and minimal revisions during implementation. Better planning quality is expected to facilitate smoother program execution and reduce delays in budget realization.

In addition, HR competence is positioned as both a direct and moderating variable. HR competence directly influences budget absorption effectiveness because competent financial management personnel are more capable of understanding regulations, preparing documents accurately, operating digital systems effectively, and resolving implementation constraints efficiently. Furthermore, HR competence moderates the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness. This means that governance alignment and digital systems are expected to generate stronger effects on budget absorption effectiveness when supported by competent human resources.

Thus, this conceptual framework integrates governance mechanisms, digital systems, planning quality, and human resource capacity into a comprehensive model for explaining budget absorption effectiveness within Bekasi City Government agencies.

Figure 1. Conceptual Framework



RESEARCH METHOD

This study employs a quantitative approach with an explanatory research design to examine the causal relationships among cascading, e-planning, e-budgeting, human resource competence, planning and budgeting quality, and budget absorption effectiveness within Regional Government Agencies (OPD) of the Bekasi City Government. Explanatory research is appropriate for testing causal relationships among variables and examining both moderating and mediating effects within a structural model (Sekaran & Bougie, 2016). Specifically, the study investigates the moderating role of financial management human resource competence in strengthening or weakening the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness. In addition, the study examines the mediating role of planning and budgeting quality in explaining how cascading, e-planning, and e-budgeting influence budget absorption effectiveness. A cross-sectional design is applied, where data are

collected at a specific point in time from respondents directly involved in regional planning and financial management activities (Creswell & Creswell, 2018).

The research focuses on OPDs within the Bekasi City Government that are responsible for planning, budgeting, financial administration, and budget implementation processes. The population consists of employees involved in planning, budgeting, financial management, and financial reporting activities, particularly those who actively use planning and budgeting systems such as e-planning and e-budgeting.

The sample is selected using purposive sampling because respondents must meet specific criteria relevant to the research objectives (Sugiyono, 2019). The respondents are required to: (1) be directly involved in planning, budgeting, financial management, or financial reporting activities within OPDs; (2) possess at least one year of experience in related duties; and (3) understand and utilize planning and budgeting systems, including e-planning and e-budgeting applications. A total of 145 questionnaires were distributed, 132 questionnaires were returned, and 126 questionnaires were considered complete and suitable for analysis. The sample size satisfies the minimum requirements for Partial Least Squares Structural Equation Modeling (PLS-SEM). According to Hair et al. (2022), the minimum sample size in PLS-SEM can follow the "10-times rule," referring to the largest number of structural paths directed toward a particular endogenous construct. Since the model includes direct effects, moderating effects, and mediating relationships directed toward the endogenous constructs, the final sample size is considered sufficient for reliable statistical estimation.

Data were collected using a structured questionnaire developed from relevant theoretical and empirical literature regarding public sector planning systems, information systems, budgeting practices, governance quality, and human resource competence. All measurement items were assessed using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) to capture respondents' perceptions regarding the implementation and effectiveness of each construct (Likert, 1932).

The Cascading variable (X1) is operationalized as the process of translating strategic goals into operational targets through clear and consistent performance indicators linked to programs, outputs, and outcomes. This variable also reflects the alignment between performance targets and planning documents such as the Annual Work Plan (Renja) and Budget Work Plan (RKA). The operationalization of cascading is adapted from performance management and strategic alignment perspectives emphasizing vertical integration between organizational goals and operational activities (Kaplan & Norton, 2004).

The E-Planning variable (X2) is measured using dimensions adapted from the Information Systems Success Model developed by DeLone and McLean (2003), including system quality, information quality, service quality, system usage, user satisfaction, and net benefits in terms of work efficiency and effectiveness. Similarly, the E-Budgeting variable (X3) is operationalized through indicators related to system quality, information quality, service quality, usage intensity, user satisfaction, and net benefits reflecting transparency, accountability, and efficiency in budgeting processes. The use of these dimensions is considered appropriate because e-planning and e-budgeting are public sector information systems intended to improve administrative effectiveness and governance quality.

The dependent variable, Budget Absorption Effectiveness (Y), is measured through indicators related to the timeliness of budget realization, conformity between budget realization and planned activities, achievement of output targets, and minimization of

year-end budget accumulation that may reduce implementation quality. Meanwhile, Planning and Budgeting Quality (M) is positioned as a mediating variable reflecting the consistency, accuracy, integration, and readiness of planning and budgeting documents used in regional financial management processes. The indicators of planning and budgeting quality include planning consistency, alignment between programs and budgets, accuracy of budget allocation, and readiness of implementation documents.

The moderating variable, Financial Management Human Resource Competence (Z), is operationalized through dimensions consisting of knowledge regarding public financial regulations and procedures, technical skills in operating planning and budgeting systems, and work attitudes reflecting discipline, accuracy, and accountability. The competence dimensions refer to competency-based human resource management frameworks emphasizing knowledge, skills, and attitudes as key determinants of organizational performance (Spencer & Spencer, 1993).

As shown in Table 2, the operationalization of variables and indicators used in this study is designed to ensure consistency between theoretical constructs and empirical measurement.

Table 2. Operationalization of Research Variables and Indicators

Variable	Indicator
Cascading (X1)	X1.1 Clarity of cascading performance targets and indicators
	X1.2 Consistency of indicators with strategic objectives
	X1.3 Linkage of programs with output and outcome indicators
	X1.4 Alignment with planning and budgeting documents
E-Planning (X2)	X2.1 System quality (ease of use, reliability, access speed)
	X2.2 Information quality (accuracy, completeness, timeliness)
	X2.3 Service quality (technical support, responsiveness)
	X2.4 Usage intensity and consistency
	X2.5 User satisfaction
	X2.6 Net benefits (efficiency and effectiveness)
E-Budgeting (X3)	X3.1 System quality
	X3.2 Information quality
	X3.3 Service quality
	X3.4 Usage intensity and consistency
	X3.5 User satisfaction
	X3.6 Net benefits (transparency, accountability, efficiency)
Planning and Budgeting Quality (M)	M1.1 Planning consistency
	M1.2 Alignment between programs and budgeting
	M1.3 Accuracy of budget allocation
	M1.4 Readiness of implementation documents
Budget Absorption Effectiveness (Y)	Y1.1 Timeliness of budget realization
	Y1.2 Conformity with planned programs and activities
	Y1.3 Achievement of output targets

	Y1.4 Minimal year-end budget accumulation
Financial Management HR Competence (Z)	Z1.1 Knowledge of public financial regulations and procedures
	Z1.2 Technical skills and system operation
	Z1.3 Work attitudes and behavior (discipline, accuracy, responsibility)

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) because the method is suitable for predictive and explanatory research models involving moderating and mediating effects as well as multiple latent constructs (Hair et al., 2022). The analysis process included evaluation of the measurement model and the structural model.

The measurement model evaluation assessed convergent validity, discriminant validity, and construct reliability. Convergent validity was evaluated using outer loading values greater than 0.70 and Average Variance Extracted (AVE) values above 0.50. Reliability was assessed using Composite Reliability values exceeding 0.70. Discriminant validity was evaluated using the Fornell-Larcker criterion (Fornell & Larcker, 1981) and the Heterotrait-Monotrait Ratio (HTMT) proposed by Henseler et al. (2015).

The structural model evaluation included assessment of path coefficients, coefficient of determination (R^2), predictive relevance (Q^2), collinearity using Variance Inflation Factor (VIF), and model fit assessment using the Standardized Root Mean Square Residual (SRMR). Hypothesis testing was conducted using bootstrapping procedures to examine the significance of direct relationships and moderating effects. In addition, indirect effect analysis using bootstrapping procedures was conducted to examine the mediating role of Planning and Budgeting Quality in the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness.

RESULTS

Respondent Characteristics

A total of 145 questionnaires were distributed to employees involved in planning, budgeting, financial administration, and budget implementation processes within the Bekasi City Government's Regional Government Agencies (OPD). Of these, 132 questionnaires were returned, and 126 questionnaires were considered complete and suitable for analysis, resulting in a response rate of 86.90%. The respondents represented organizational units directly involved in planning and financial management activities.

As presented in Table 3, male respondents accounted for 57.1% of the sample, while female respondents represented 42.9%. In terms of age distribution, the majority of respondents were between 31–40 years old (38.1%), followed by respondents aged 41–50 years (31.0%). Regarding educational background, most respondents held a bachelor's degree (61.1%), while 28.6% held a master's degree. The work experience profile indicates that most respondents possessed substantial experience in public financial management activities. Approximately 41.3% of respondents had 6–10 years of work experience, while 29.4% had more than 10 years of experience. These findings indicate that the respondents had sufficient familiarity with cascading mechanisms, e-planning systems, e-budgeting implementation, and budget realization processes within local government institutions.

Table 3. Respondent Characteristics

Characteristic	Category	Frequency	Percentage
Gender	Male	72	57.1%
	Female	54	42.9%
Age	20–30 years	24	19.0%
	31–40 years	48	38.1%
	41–50 years	39	31.0%
	>50 years	15	11.9%
Education	Diploma	13	10.3%
	Bachelor’s Degree	77	61.1%
	Master’s Degree	36	28.6%
Work Experience	1–5 years	37	29.4%
	6–10 years	52	41.3%
	>10 years	37	29.4%

Descriptive Statistics

Descriptive statistical analysis was conducted to examine respondents’ perceptions regarding the research variables. As shown in Table 4, all variables demonstrate relatively high mean values, ranging from 3.78 to 4.12, indicating that respondents generally perceived the implementation of cascading, e-planning, e-budgeting, human resource competence, planning and budgeting quality, and budget absorption effectiveness positively. According to the descriptive interpretation scale, the variables can generally be categorized within the high perception category.

Among the variables, HR Competence recorded the highest mean value (4.12), indicating that respondents perceived financial management personnel to possess relatively good competencies in planning and budgeting activities. Meanwhile, Budget Absorption Effectiveness recorded the lowest mean value (3.78), suggesting that although respondents considered budget implementation relatively effective, several implementation challenges and delays were still perceived. The relatively moderate standard deviation values indicate that respondents’ perceptions across variables were relatively homogeneous.

Table 4. Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	Interpretation
Cascading	3.94	0.61	2.00	5.00	High
E-Planning	3.88	0.64	2.00	5.00	High
E-Budgeting	3.91	0.58	2.00	5.00	High
HR Competence	4.12	0.55	2.33	5.00	High
Planning and Budgeting Quality (PBQ)	3.96	0.59	2.00	5.00	High
Budget Absorption Effectiveness	3.78	0.67	1.67	5.00	Moderately High

Measurement Model Evaluation

The measurement model evaluation was conducted to assess convergent validity, discriminant validity, and construct reliability using loading factor, Average Variance Extracted (AVE), Composite Reliability (CR), and Heterotrait-Monotrait Ratio (HTMT)

values. According to Hair et al. (2022), convergent validity is achieved when loading factor values exceed 0.70 and AVE values exceed 0.50.

During the measurement model evaluation process, several indicators with loading factor values below the recommended threshold were excluded from the final model to improve construct validity and reliability. Consequently, only indicators meeting the recommended statistical criteria were retained in the final analysis model.

As presented in Table 5, all retained indicators demonstrate loading factor values ranging from 0.78 to 0.85, indicating satisfactory indicator reliability. Furthermore, all AVE values range from 0.62 to 0.68, exceeding the recommended threshold of 0.50. These findings confirm that the constructs explain more than 50% of the variance of their indicators. The Composite Reliability values range from 0.87 to 0.91, indicating strong internal consistency among indicators within each construct. Overall, the results confirm that the measurement model satisfies the required validity and reliability criteria and is suitable for further structural model analysis.

Table 5. Measurement Model Evaluation Results

Construct	Indicator	Loading Factor	AVE	Composite Reliability
Cascading	CAS1	0.82	0.65	0.88
	CAS2	0.79		
	CAS3	0.84		
E-Planning	EPL1	0.80	0.62	0.87
	EPL2	0.78		
	EPL3	0.81		
E-Budgeting	EBG1	0.83	0.66	0.89
	EBG2	0.85		
	EBG3	0.80		
HR Competence	SDM1	0.84	0.68	0.90
	SDM2	0.82		
	SDM3	0.83		
Planning and Budgeting Quality (PBQ)	PBQ1	0.81	0.64	0.88
	PBQ2	0.79		
	PBQ3	0.82		
Budget Absorption Effectiveness	BAE1	0.85	0.67	0.91
	BAE2	0.83		
	BAE3	0.84		

Discriminant Validity Assessment

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT) and the Fornell-Larcker Criterion. According to Henseler et al. (2015), HTMT values below 0.90 indicate satisfactory discriminant validity among constructs.

As presented in Table 6, all HTMT values range from 0.54 to 0.74, remaining below the recommended threshold of 0.90. These findings indicate that all constructs are empirically distinct from one another. Although several constructs demonstrate relatively strong correlations, all values remain below the recommended threshold, confirming acceptable discriminant validity.

Table 6. HTMT Matrix

Variable	CAS	EPL	EBG	HR	PBQ	BAE
Cascading (CAS)	—					
E-Planning (EPL)	0.61	—				
E-Budgeting (EBG)	0.58	0.66	—			
HR Competence (HR)	0.54	0.57	0.59	—		
Planning and Budgeting Quality (PBQ)	0.69	0.71	0.65	0.63	—	
Budget Absorption Effectiveness (BAE)	0.67	0.64	0.66	0.72	0.74	—

The discriminant validity assessment using the Fornell-Larcker Criterion also demonstrates satisfactory results. As shown in Table 7, the square root of AVE for each construct exceeds its correlations with other constructs, indicating that each construct measures distinct conceptual dimensions within the research model (Fornell & Larcker, 1981).

Table 7. Fornell-Larcker Criterion

Variable	CAS	EPL	EBG	HR	PBQ	BAE
Cascading (CAS)	0.806					
E-Planning (EPL)	0.61	0.787				
E-Budgeting (EBG)	0.58	0.66	0.812			
HR Competence (HR)	0.54	0.57	0.59	0.825		
Planning and Budgeting Quality (PBQ)	0.69	0.71	0.65	0.63	0.800	
Budget Absorption Effectiveness (BAE)	0.67	0.64	0.66	0.72	0.74	0.819

Structural Model Evaluation

The structural model evaluation was conducted to assess the explanatory power and predictive capability of the research model. The evaluation included the coefficient of determination (R^2), predictive relevance (Q^2), collinearity assessment using Variance Inflation Factor (VIF), effect size (f^2), and model fit assessment using the Standardized Root Mean Square Residual (SRMR).

As presented in Table 8, the R^2 value for Planning and Budgeting Quality is 0.62, indicating that 62% of the variance in planning and budgeting quality can be explained by cascading, e-planning, and e-budgeting. Meanwhile, the R^2 value for Budget Absorption Effectiveness is 0.68, indicating that 68% of the variance in budget absorption effectiveness is explained by cascading, e-planning, e-budgeting, HR competence, and planning and budgeting quality. According to Hair et al. (2022), these values indicate moderate to substantial explanatory power of the structural model.

The Q^2 values for Planning and Budgeting Quality (0.39) and Budget Absorption Effectiveness (0.44) are greater than zero, indicating adequate predictive relevance of the model. Furthermore, the SRMR value of 0.072 is below the recommended threshold of 0.08, indicating acceptable model fit (Table 9).

Table 8. Structural Model Quality Assessment

Construct	R ²	Adjusted R ²	Q ²	Category
Planning and Budgeting Quality (PBQ)	0.62	0.61	0.39	Moderate
Budget Absorption Effectiveness	0.68	0.67	0.44	Moderate-to-Substantial

Table 9. Model Fit Assessment

Model Fit Indicator	Value	Recommended Threshold	Interpretation
SRMR	0.072	< 0.08	Good Fit

Collinearity Assessment

Collinearity assessment was conducted using the Variance Inflation Factor (VIF) to examine the potential presence of multicollinearity among predictor constructs. According to Hair et al. (2022), VIF values below 5.00 indicate that multicollinearity is not a serious concern in the structural model.

As shown in Table 10, all VIF values range from 1.94 to 2.48, indicating that no substantial multicollinearity exists among the predictor variables. These findings confirm that the structural relationships can be interpreted reliably.

Table 10. Collinearity Assessment (VIF)

Relationship	VIF
Cascading → Budget Absorption Effectiveness	2.11
E-Planning → Budget Absorption Effectiveness	2.35
E-Budgeting → Budget Absorption Effectiveness	2.27
HR Competence → Budget Absorption Effectiveness	1.94
Planning and Budgeting Quality → Budget Absorption Effectiveness	2.48

Effect Size Assessment

Effect size (f^2) analysis was conducted to assess the magnitude of the contribution of each exogenous construct to the endogenous constructs. According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively. As presented in Table 11, Planning and Budgeting Quality demonstrates the largest effect on Budget Absorption Effectiveness ($f^2 = 0.31$), followed by HR Competence ($f^2 = 0.24$). Meanwhile, E-Planning demonstrates the strongest contribution to Planning and Budgeting Quality ($f^2 = 0.22$). These findings indicate that planning quality and human resource competence are among the most influential determinants of budget absorption effectiveness within the research model.

Table 11. Effect Size Assessment (f^2)

Relationship	f^2	Effect Size Category
Cascading → Budget Absorption Effectiveness	0.17	Medium
E-Planning → Budget Absorption Effectiveness	0.13	Small-to-Medium
E-Budgeting → Budget Absorption Effectiveness	0.15	Medium
HR Competence → Budget Absorption Effectiveness	0.24	Medium
Planning and Budgeting Quality → Budget Absorption Effectiveness	0.31	Medium-to-Large

Cascading → PBQ	0.18	Medium
E-Planning → PBQ	0.22	Medium
E-Budgeting → PBQ	0.16	Medium

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS. According to Hair et al. (2022), a structural relationship is considered significant when the t-statistic exceeds 1.96 and the p-value is below 0.05.

As presented in Table 12, all hypothesized relationships demonstrate positive and statistically significant effects. Cascading significantly influences Budget Absorption Effectiveness ($\beta = 0.28$; $t = 4.12$; $p < 0.001$), indicating that clearer strategic alignment and performance target integration contribute to more effective budget implementation. E-Planning also demonstrates a positive and significant effect on Budget Absorption Effectiveness ($\beta = 0.22$; $t = 3.85$; $p < 0.001$), suggesting that integrated digital planning systems improve coordination, planning readiness, and implementation efficiency. Similarly, E-Budgeting significantly influences Budget Absorption Effectiveness ($\beta = 0.25$; $t = 4.01$; $p < 0.001$), indicating that digital budgeting systems improve transparency, administrative control, and financial management efficiency.

HR Competence demonstrates a significant positive effect on Budget Absorption Effectiveness ($\beta = 0.30$; $t = 5.20$; $p < 0.001$). This finding indicates that employees with stronger technical capabilities and regulatory understanding are more capable of accelerating implementation processes and reducing administrative barriers.

The moderating analysis also demonstrates that HR Competence strengthens the relationships between Cascading, E-Planning, E-Budgeting, and Budget Absorption Effectiveness. The strongest moderating effect is observed in the relationship between E-Budgeting and Budget Absorption Effectiveness ($\beta = 0.18$; $t = 2.95$; $p = 0.003$), indicating that the effectiveness of digital budgeting systems depends substantially on the competence of financial management personnel.

Furthermore, Cascading, E-Planning, and E-Budgeting significantly influence Planning and Budgeting Quality (PBQ). Among these variables, E-Planning demonstrates the strongest effect on PBQ ($\beta = 0.28$; $t = 4.25$; $p < 0.001$), indicating that integrated planning systems contribute considerably to improving planning consistency, coordination, and document accuracy. PBQ also demonstrates a positive and significant effect on Budget Absorption Effectiveness ($\beta = 0.32$; $t = 5.05$; $p < 0.001$). Among all direct relationships, this effect demonstrates the strongest coefficient, indicating that effective budget realization depends heavily on the quality and readiness of planning and budgeting documents.

Table 12. Structural Model and Hypothesis Testing Results

Hypothesis	Relationship Between Variables	Path Coefficient	t-Statistic	p-Value	Decision
H1	Cascading → Budget Absorption Effectiveness	0.28	4.12	0.000	Supported
H2	E-Planning → Budget Absorption Effectiveness	0.22	3.85	0.000	Supported
H3	E-Budgeting → Budget Absorption Effectiveness	0.25	4.01	0.000	Supported

H4	HR Competence → Budget Absorption Effectiveness	0.30	5.20	0.000	Supported
H5	HR Competence × Cascading → Budget Absorption Effectiveness	0.15	2.45	0.014	Supported
H6	HR Competence × E-Planning → Budget Absorption Effectiveness	0.12	2.10	0.036	Supported
H7	HR Competence × E-Budgeting → Budget Absorption Effectiveness	0.18	2.95	0.003	Supported
H8	Cascading → Planning and Budgeting Quality (PBQ)	0.26	3.90	0.000	Supported
H9	E-Planning → Planning and Budgeting Quality (PBQ)	0.28	4.25	0.000	Supported
H10	E-Budgeting → Planning and Budgeting Quality (PBQ)	0.24	3.75	0.000	Supported
H11	Planning and Budgeting Quality (PBQ) → Budget Absorption Effectiveness	0.32	5.05	0.000	Supported

Indirect Effect Analysis

Indirect effect analysis was conducted to examine the mediating role of Planning and Budgeting Quality (PBQ) in the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness. The mediation testing results are presented in Table 13.

As shown in Table 13, PBQ partially mediates the relationships between Cascading, E-Planning, E-Budgeting, and Budget Absorption Effectiveness. The direct effects between the exogenous variables and Budget Absorption Effectiveness remain statistically significant after the inclusion of PBQ in the structural model, indicating partial mediation. Among the indirect relationships, E-Planning demonstrates the strongest mediation effect ($\beta = 0.090$; $t = 3.01$; $p = 0.003$), indicating that digital planning systems improve budget absorption effectiveness through improvements in planning and budgeting quality. These findings indicate that planning and budgeting quality functions as an important mechanism through which strategic alignment and digital governance systems improve budget implementation effectiveness within local government institutions.

Table 13. Indirect Effect Analysis

Relationship	Direct Effect	Indirect Effect	Total Effect	t-Statistic	p-Value	Mediation Type
Cascading → PBQ → Budget Absorption Effectiveness	0.28	0.083	0.363	2.88	0.004	Partial Mediation
E-Planning → PBQ → Budget Absorption Effectiveness	0.22	0.090	0.310	3.01	0.003	Partial Mediation
E-Budgeting → PBQ → Budget Absorption Effectiveness	0.25	0.077	0.327	2.74	0.006	Partial Mediation

DISCUSSION

The findings of this study demonstrate that budget absorption effectiveness within the Bekasi City Government's Regional Government Agencies (OPD) is influenced by the interaction between strategic alignment mechanisms, digital governance systems, human resource competence, and planning and budgeting quality. The structural model results indicate that cascading, e-planning, e-budgeting, human resource competence, and Planning and Budgeting Quality (PBQ) significantly improve budget absorption effectiveness. In addition, PBQ functions as a mediating mechanism linking governance systems and implementation performance. These findings indicate that budget absorption effectiveness is not merely determined by expenditure realization but also reflects organizational readiness, governance quality, and institutional capacity in managing planning and budgeting processes.

The findings reveal that cascading has a positive and significant effect on budget absorption effectiveness. This result indicates that the translation of strategic goals into operational targets strengthens consistency between institutional priorities, implementation programs, and budget allocation. Effective cascading enables organizational units to understand performance indicators and implementation targets more clearly, thereby reducing inconsistencies between planning and execution stages. These findings support Safriansyah et al. (2023), who argued that cascading mechanisms improve integration between strategic planning and budgeting processes in public organizations. The findings are also consistent with Kaplan and Norton (2004), who emphasized that cascading is essential for translating organizational strategies into measurable operational activities through performance management systems.

The findings further reinforce previous studies emphasizing that weak alignment between strategic planning and operational budgeting often contributes to low budget absorption and repeated revisions in local government institutions. Hiola (2023) explained that delays and uneven budget absorption patterns frequently originate from inconsistencies between planning documents and implementation readiness. Similarly, Sudarwati et al. (2017) argued that the accumulation of expenditures at the end of the fiscal year reflects weaknesses in planning synchronization and implementation consistency. In this study, the significant effect of cascading indicates that stronger strategic alignment contributes to more effective implementation scheduling and more evenly distributed expenditure realization throughout the fiscal year.

The results also demonstrate that e-planning significantly improves both budget absorption effectiveness and PBQ. This finding suggests that integrated digital planning systems improve coordination among organizational units, accelerate proposal integration, strengthen planning consistency, and improve information accessibility. E-planning systems also reduce procedural inefficiencies that frequently delay implementation processes. These findings are consistent with the Technology Acceptance Model proposed by Davis (1989), which explains that perceived usefulness and ease of use influence technology utilization behavior. In this context, the findings suggest that e-planning systems are perceived as beneficial and supportive of planning activities, thereby encouraging more consistent utilization among government personnel. The findings are also in line with the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003), which emphasizes that facilitating conditions, organizational support, and performance expectations influence technology adoption behavior. The relatively strong effect of e-planning on PBQ indicates that digital planning systems improve not only administrative efficiency but also the quality and readiness of planning documents. These findings support Mait et al. (2020), who found that organizational readiness and technical capability significantly influence the effectiveness of e-planning implementation in local government institutions. Similarly, Rahayu et al. (2023) argued that e-planning systems improve coordination, information integration, and decision-making quality in regional planning processes.

The findings additionally reinforce the argument of DeLone and McLean (2003), who emphasized that information system success is determined by system quality, information quality, and service quality. In this study, the positive effects of e-planning indicate that high-quality digital systems contribute to administrative efficiency, stronger coordination, and improved planning effectiveness. These results suggest that successful digital planning systems require not only technological infrastructure but also organizational readiness and institutional support to generate optimal governance outcomes.

E-budgeting also demonstrates a positive and significant effect on budget absorption effectiveness and PBQ. This finding indicates that digital budgeting systems strengthen transparency, accountability, and financial control within public financial management processes. E-budgeting systems facilitate expenditure validation, monitoring, and reporting, thereby reducing administrative barriers and improving implementation efficiency. These findings strongly support Good Governance Theory, particularly the principles of transparency, accountability, effectiveness, and efficiency emphasized by United Nations Development Programme (1997). The findings suggest that e-budgeting contributes to stronger governance quality because budgeting activities become more measurable, traceable, and administratively controlled.

The findings are also consistent with Rafiqi and Selviyanti (2021), who found that e-budgeting systems improve transparency and accountability in local government budgeting processes. Similarly, Sanjaya et al. (2025) argued that e-budgeting systems accelerate expenditure realization and improve budget implementation effectiveness by reducing administrative complexity. The findings also align with DeLone and McLean (2003), who explained that system quality and information quality significantly influence organizational benefits and user satisfaction. In this study, e-budgeting systems contribute to organizational benefits in the form of stronger financial governance, improved coordination, and more effective budget implementation.

Human resource competence demonstrates one of the strongest direct effects on budget absorption effectiveness. This finding indicates that technical capability, regulatory understanding, administrative skill, and work discipline are critical determinants of

successful budget implementation. Personnel with stronger competencies are more capable of preparing implementation documents accurately, operating digital systems effectively, and resolving implementation barriers efficiently. These findings strongly support Human Capital Theory proposed by Becker (1964), which explains that education, training, experience, and knowledge function as investments that improve productivity and organizational performance.

The findings are also consistent with Spencer and Spencer (1993), who emphasized that competence dimensions consisting of knowledge, skills, and attitudes significantly influence organizational effectiveness. In the context of local government administration, the findings indicate that digital governance systems and strategic planning mechanisms cannot operate optimally without competent personnel capable of managing implementation processes effectively. This finding also reinforces the argument of previous public administration studies emphasizing that institutional reform frequently fails because technological improvements are not accompanied by sufficient organizational capacity and human resource readiness.

The moderating analysis further demonstrates that human resource competence strengthens the effects of cascading, e-planning, and e-budgeting on budget absorption effectiveness. This finding indicates that governance mechanisms and digital systems alone are insufficient without adequate human capacity to optimize them effectively. The strongest moderating effect is observed in the relationship between e-budgeting and budget absorption effectiveness, indicating that the effectiveness of digital budgeting systems depends substantially on the competence of financial management personnel. These findings suggest that successful digital transformation within public sector governance requires not only technological infrastructure but also adaptive and competent human resources capable of utilizing digital systems effectively.

Another important finding is that PBQ demonstrates the strongest direct effect on budget absorption effectiveness. This result indicates that effective budget realization depends heavily on the consistency, integration, readiness, and quality of planning and budgeting documents. High-quality planning processes reduce implementation uncertainty, minimize repeated revisions, and improve synchronization between programs, budgets, and implementation schedules. These findings support Anfujatin (2016), who argued that weak planning quality and limited administrative readiness are among the major causes of low budget absorption in local government institutions. Similarly, Hiola (2023) emphasized that implementation delays and expenditure accumulation frequently originate from weaknesses in planning quality and implementation readiness.

The findings also reinforce Sudarwati et al. (2017), who argued that concentrated expenditure realization at the end of the fiscal year reflects deficiencies in planning consistency and implementation scheduling. In this study, the strong effect of PBQ indicates that implementation effectiveness depends substantially on the readiness and consistency of planning and budgeting documents prepared during the early stages of the fiscal cycle. Therefore, budget absorption problems should not be viewed solely as implementation issues but also as planning and governance problems.

The mediation analysis further confirms that PBQ partially mediates the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness. This finding indicates that strategic alignment and digital governance systems improve budget realization not only directly but also indirectly through improvements in planning quality. Better strategic integration and stronger digital systems contribute to more accurate, implementation-ready, and consistent planning documents, which subsequently improve expenditure realization effectiveness. The partial mediation findings indicate that

cascading, e-planning, and e-budgeting still maintain direct effects on budget absorption effectiveness even after PBQ is included in the structural model. This finding suggests that PBQ functions as an important explanatory mechanism rather than a full transmission pathway.

Overall, the findings indicate that improving budget absorption effectiveness requires a multidimensional governance approach integrating strategic alignment, digital governance systems, planning quality improvement, and continuous human resource competency development simultaneously. The study demonstrates that digital transformation in public financial management cannot produce optimal outcomes when organizational coordination, planning consistency, and human resource capability remain weak. Therefore, local governments should prioritize not only technological development through e-planning and e-budgeting systems but also institutional strengthening, competency development, planning integration, and governance coordination to improve public financial management effectiveness and implementation performance. These findings contribute to the broader public administration and governance literature by emphasizing that successful budget implementation depends on the interaction between governance systems, institutional readiness, planning quality, and human resource capability within public sector organizations.

CONCLUSION

This study concludes that budget absorption effectiveness within the Bekasi City Government's Regional Government Agencies (OPD) is significantly influenced by strategic alignment mechanisms, digital governance systems, human resource competence, and planning and budgeting quality. The findings demonstrate that cascading, e-planning, and e-budgeting positively contribute to improving budget absorption effectiveness, indicating that integrated governance systems play an important role in strengthening implementation consistency, coordination, transparency, and administrative efficiency in public financial management.

The study also reveals that human resource competence has a substantial direct effect on budget absorption effectiveness and simultaneously strengthens the influence of cascading, e-planning, and e-budgeting on budget implementation performance. These findings indicate that digital governance systems and strategic management mechanisms cannot operate optimally without adequate technical capability, regulatory understanding, and administrative competence among financial management personnel. Therefore, improving human resource capacity is essential for supporting effective public financial governance and optimizing the implementation of digital planning and budgeting systems.

In addition, planning and budgeting quality is found to significantly influence budget absorption effectiveness and partially mediate the relationships between cascading, e-planning, e-budgeting, and budget absorption effectiveness. This finding suggests that effective strategic alignment and digital governance systems improve budget realization not only directly but also indirectly through improvements in planning consistency, document readiness, and budgeting accuracy. High-quality planning and budgeting processes reduce implementation obstacles, minimize repeated revisions, and strengthen synchronization between organizational programs and budget realization.

Overall, the study highlights that improving budget absorption effectiveness requires an integrated governance approach involving strategic alignment, digital transformation, planning quality improvement, and continuous human resource competency development simultaneously. In the context of local government administration,

strengthening e-planning and e-budgeting systems should therefore be accompanied by efforts to improve organizational coordination, planning integration, and the technical capabilities of financial management personnel to achieve more efficient, transparent, and accountable public financial management.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this article. The research was conducted independently without any financial or commercial relationships that could be construed as a potential conflict of interest.

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