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Research Article

The Moderating Role Of Bottom-Up Budgeting Approach In The Influence Of Levers Of Control And Information Systems On Managerial Performance

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ABSTRACT

This study aims to investigate the influence of levers of control and information systems on managerial performance in the banking industry, considering the moderating effect of the bottom-up budgeting approach. Drawing from agency theory and the concept of organizational control, this study proposes a theoretical framework that examines how levers of control and information systems affect managerial performance, with the bottom-up budgeting approach moderating this relationship. Data for this study were collected via a survey administered to 473 employees from Indonesian banks registered with the Financial Services Authority. The survey instrument was distributed using a Google form. Path analysis using SmartPLS 3.0 was employed to analyze the data and test the proposed relationships. Results indicate a significant positive effect of both levers of control and information systems on managerial performance. The bottom-up budgeting approach moderated the relationship between these factors and managerial performance. This suggests that the bottom-up budgeting approach enhances the effectiveness of levers of control and information systems in improving managerial performance in the banking industry. The findings of this study have important implications for practitioners in the banking industry. Understanding the impact of levers of control and information systems on managerial performance, as well as the moderating role of the bottom-up budgeting approach, can help banks develop more effective managerial strategies. This research contributes to the existing literature by empirically examining the influence of control and information systems levers on managerial performance in the context of the banking industry while also considering the moderating effect of the bottom-up budgeting approach. The findings provide valuable insights for academia and practitioners seeking to enhance managerial performance in service-oriented organizations.

Keywords: Levers of Control, Information Systems, Managerial Performance, Bottom-Up Budgeting Approach, Banking Industry.

Introduction:

The banking sector drives economic development by efficiently allocating financial resources within nations (Amoah et al., 2020; Khan et al., 2021; Tongurai & Vithessonthi, 2018). As a critical channel, it directs public funds into productive investments, fostering economic growth and development. Furthermore, the banking sector is instrumental in allocating economic resources from depositors to investors, facilitating the efficient deployment of capital across various sectors of the economy (Al-Moulani & Alexiou, 2017; Jokipii & Monnin, 2013).

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In Indonesia, the Coordinating Ministry for Economic Affairs recognizes the indispensable role of the banking sector in promoting economic equality and fostering inclusive growth. Through the provision of essential financial services and support, the banking sector contributes to developing domestic industries and enhances the economic capabilities of entrepreneurs and Micro, Small, and Medium Enterprises (MSMEs) (Fahmi et al., 2017; Muliadi et al., 2020; Rumbogo et al., 2021; Tambunan, 2017). These efforts are crucial for promoting economic empowerment and reducing disparities in wealth and opportunity across various segments of society.

Moreover, the banking sector is a vital funding source for businesses, individuals, and government initiatives, supporting investment activities and stimulating economic growth. Banks facilitate business expansion, job creation, and innovation by enabling access to credit and other financial services. Additionally, access to financial services empowers individuals to pursue entrepreneurial ventures, invest in education and training, and enhance their financial well-being.

Overall, the banking sector's role in directing public funds into productive investments, facilitating the allocation of economic resources, and promoting economic equality underscores its significance in driving economic development and fostering inclusive growth in nations like Indonesia (Setyowati, 2023; Triggs et al., 2019).

Through its Financial Services Authority, the Indonesian government plays a critical role in overseeing the banking sector to ensure its stability and resilience (Triggs et al., 2019). This supervision and regulation are essential for fostering a robust and stable banking environment conducive to sustainable economic growth. By implementing rigorous regulatory measures, such as capital adequacy requirements, risk management guidelines, and prudential regulations, the government aims to mitigate systemic risks and safeguard the financial system's stability.

These regulatory efforts are particularly crucial in Indonesia, where the banking sector is a key driver of economic activity and plays a central role in intermediating funds between savers and borrowers. A stable and resilient banking sector is essential for maintaining confidence in the financial system, attracting domestic and foreign investment, and facilitating the efficient allocation of capital to productive sectors of the economy.

In response to the regulatory environment, banking employees must proactively manage their performance and contribute to the sector's growth. They are tasked with ensuring compliance with regulatory requirements, implementing risk management practices, and maintaining high customer service and operational efficiency standards. Moreover, they must adapt to the industry's dynamic challenges, such as technological advancements, changing consumer preferences, and evolving regulatory landscapes.

Within the intricate framework of the banking sector, managers emerge as pivotal figures responsible for driving organizational objectives and operational efficiency (Aguilera et al., 2024; Mai et al., 2022). Their role is multifaceted, encompassing tasks ranging from strategic decision-making to day-to-day operations management. As they navigate the complexities inherent in the industry, managers are tasked with ensuring the achievement of overarching goals and maintaining optimal performance across diverse functions.

Managers' performance is paramount in the banking sector due to the industry's dynamic and fast-paced nature. They must possess a deep understanding of market trends, regulatory requirements, and technological advancements, enabling them to make informed decisions aligned with the organization's strategic objectives. Their ability to effectively manage resources, mitigate risks, and capitalize on opportunities directly impacts the bank's performance and long-term viability.

Given their central role, managers' performance remains a focal point in the banking sector's relentless pursuit of sustained success and development. Effective management and leadership by managers are indispensable components of the industry's overall strategy. They are responsible for fostering a culture of innovation, collaboration, and continuous improvement, driving organizational growth, and ensuring competitiveness in the ever-evolving financial landscape.

Moreover, managers serve as role models for their teams, inspiring and motivating employees to perform at their best. Their leadership style sets the tone for the organizational culture, influencing employee engagement, morale, and productivity.

Literature Review and Hypothesis Development:

Resource-based theory proposes that a company can achieve enduring competitive superiority when its managers utilize company resources efficiently and effectively (Borchert, 2008). Managerial abilities are essential for carrying out these duties, encompassing the capacity to optimize the use of company resources in producing output, thereby driving future company performance (Inam Bhutta et al., 2021; Lee et al., 2018; Yung & Chen, 2018). Managers leverage their abilities to enhance financial and non-financial performance (Al Mawaali et al., 2024; J. Chen & Chen, 2020; Sun, 2017). The measurement of this skill is referred to as managerial performance. While the measurement of managerial performance extends beyond managing company resources, effective managerial abilities are still reflected in high managerial performance. This is because managerial abilities can also enhance the effectiveness of the company's internal control system (S. Chen et al., 2021; García-Sánchez & García-Meca, 2018; Ghaderi et al., 2019) and enable managers to take higher risks and engage in value-adding activities (Davis et al., 2010; Engelen et al., 2015; Putniņš & Sauka, 2020).

Managerial performance is a series of managerial behavioral processes aimed at defining, measuring, motivating, and developing desired employee performance, impacting both employee and organizational performance (Aguinis et al., 2012). Another definition by Dickinson (2013) and Clausen et al. (2008) links managerial performance to individual performance, emphasizing its role in motivating and encouraging employees to work more effectively and accurately while outlining employees' responsibilities and contributions to the organization. Additionally, Managerial performance provides employee feedback, motivating them by articulating desired consequences if set goals are achieved (Aguinis et al., 2012; Mone & London, 2018). In this context, managerial performance measurement becomes crucial in management efforts to enhance performance (Korhonen et al., 2023). Consequently, it can be inferred that managerial performance is integral to organizational performance and can significantly influence its overall performance. Thus, companies must identify factors that can enhance managerial performance.

Numerous studies have investigated the factors influencing managerial performance. However, in contrast to previous research, this study addresses and integrates three distinct cores. These cores include management control systems, information systems, and budgeting approaches.

As an integral component of the internal control system, managerial performance must maintain a close relationship with the management control system. The four levers within the management control system, known as levers of control, serve as essential instruments for managers involved in planning, budgeting, analysis, measurement, and evaluation of pertinent information crucial for effective decision-making (Bianchi et al., 2018; Cosenz & Noto, 2015; Pešalj et al., 2018; Ruiz-Palomo et al., 2019). Establishing mechanisms for management control has become imperative for business managers aiming to strike the appropriate balance between growth and profitability. Consequently, there are high expectations regarding how levers of control can enhance managerial performance.

The concept of levers of control posits that a company's strategic uncertainties and risks play a crucial role in establishing the hierarchy of priorities when selecting control systems, ultimately influencing the effectiveness of those controls (Martyn et al., 2016; Tessier & Otley, 2012). Strategic risks refer to unexpected events or circumstances that could negatively impact a manager's ability to execute a strategy. In contrast, strategic uncertainties encompass unknowns and potential contingencies that threaten or undermine a company's strategic plan. Senior managers use leverage of control to implement their intended strategy successfully. Numerous studies have shown that effective implementation of levers of control improves performance (Baird et al., 2018, 2019; Baird & Su, 2018). Although there is more research on levers of control concerning organizational performance, there is also evidence that levers of control affect managerial performance. Findings from Hermawan et al. (2021) confirm the critical role of belief systems in levers of control, concluding that companies could achieve good managerial performance if strong belief systems are implemented.

Digital transformation has significantly impacted the business landscape, forcing companies to accelerate their digital initiatives. This transformation has particularly affected the banking industry, where a survey conducted in Indonesia concluded that most customers prefer conducting banking activities via cell phones without the need to visit a physical bank branch. Consequently, banks must innovate significantly to meet customer expectations and needs amidst fierce business competition. Having the right resource support is crucial for banks, with information systems emerging as superior resources essential for navigating the digital era.

As per the resource-based theory by Borchert (2008), companies can achieve a competitive advantage by leveraging their resources. Fachri & Sarjana (2022), Isik et al. (2010), and Dennis et al. (2008) similarly advocate for efforts to develop company resources to improve performance. Information systems have become unique resources that can differentiate a company's products and services, protecting them from imitation by competitors. However, companies cannot solely depend on information systems assets, as they are easy to imitate by competitors (Pearlson & Saunders, 2010; Stroumpoulis et al., 2021; Wade & Hulland, 2004). Instead, companies need qualified capabilities, such as information systems experts who can generate knowledge from high-level data management processes. Carlucci et al. (2004), Carlucci et al. (2004), and Abubakar et al. (2019) emphasize the importance of knowledge and the skill to apply it proficiently to maximize firm performance. Knowledge derived from information systems impacts institutional strategy and is crucial in delivering readily available knowledge for strategic decision-making and strategy formulation (Suknunan & Maharaj, 2019).

This study aims to investigate the relationship and influence of levers of control, information systems, and the bottom-up budgeting approach on managerial performance. Additionally, it seeks to determine whether the bottom-up budgeting approach can moderate the influence of levers of control and information systems on managerial performance. Apart from prior studies, this research integrates previously introduced variables (Urbach & Müller, 2012). Furthermore, the research model is modified by introducing the bottom-up budgeting approach as a moderating variable. This adjustment is motivated by significant findings from past research, particularly the recognition of the bottom-up budgeting approach as a crucial factor that enhances the influence on managerial performance. Belief systems, as one of the control levers, significantly influence managerial performance (Hermawan et al., 2021). DeLone & McLean designed a successful information systems model that affects the net benefits obtained by the company (Urbach & Müller, 2012). The bottom-up budgeting approach has many advantages over the top-down one, which can affect performance (Kramer &

Hartmann, 2014).
This study constructs a theoretical framework connecting levers of control, information systems, the bottom-up budgeting approach, and managerial performance (refer to Figure 1). Consequently, the literature review either supports or investigates the significance of identifying factors that enhance organizational effectiveness, focusing on managerial performance. Managerial performance is an important organizational effectiveness measurement in the internal system approach (Lucianetti et al., 2019; Sparrow & Cooper, 2014). The best indicators in measuring organizational effectiveness through the internal system approach include strong organizational culture and a positive work climate, group cooperation, effective communication between superiors and subordinates, a decision-making process based on information resources that the company can provide, as well as a reward system for managers who have shown good performance, leading to growth as a result of effective teamwork (Cameron & Whetten, 2013). Building on this and supported by the results of previous research, this study explicitly highlights the effect of levers of control, information systems, and the bottom-up budgeting approach on managerial performance moderation. This research establishes the following hypotheses based on the conceptual framework outlined in Figure 1:

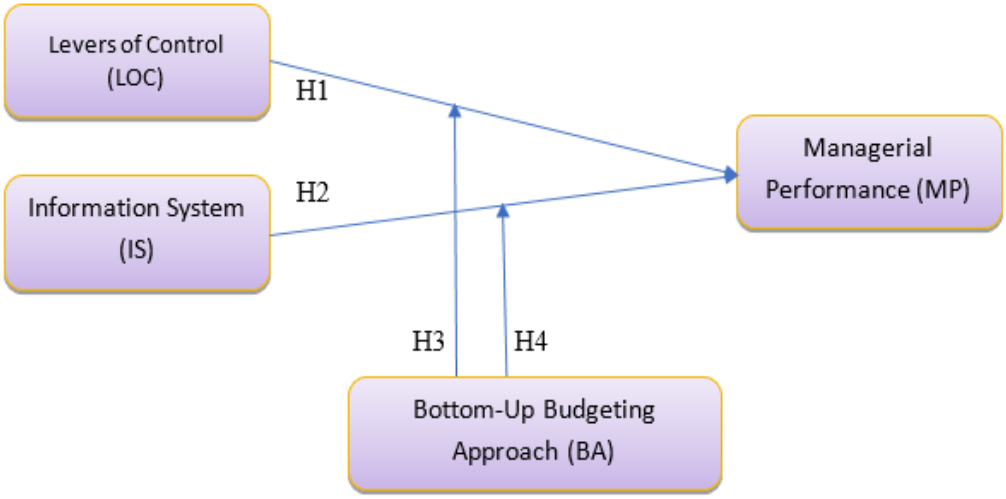

Figure 1: Conceptual Framework

H1 & H2: Levers of control and information systems positively affect managerial performance.
H3 & H4: The Bottom-Up Budgeting Approach has strengthened the effect of levers of control and information systems on managerial performance.

Hypotheses H1 and H2 propose that levers of control and information systems positively influence managerial performance. This suggests that effective implementation and utilization of levers of control, such as strategic planning systems, performance measurement systems, and boundary systems, along with well-designed and integrated information systems, can lead to improved managerial performance. Managers who have access to comprehensive information through information systems and can effectively utilize levers of control are better equipped to make informed decisions, set and achieve goals, monitor performance, and adapt to changing circumstances, ultimately enhancing their overall performance within the organization.

Hypotheses H3 and H4 posit that the Bottom-Up Budgeting Approach enhances the impact of levers of control and information systems on managerial performance. This hypothesis implies that the bottom-up budgeting approach, characterized by involvement and input from lower-level managers and employees in the budgeting process, strengthens the effectiveness of levers of control and information systems in influencing managerial performance. By actively involving frontline managers and employees in the budgeting process, organizations can enhance accountability, improve communication, foster a sense of ownership and commitment, and increase alignment between organizational goals and individual objectives. This, in turn, amplifies the positive impact of levers of control and information systems on managerial performance, leading to better outcomes for the organization as a whole.

Methodology:

This research adopts a quantitative approach, utilizing structured questionnaires with items rated on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). The questionnaires were distributed using Google Forms and disseminated through email and WhatsApp with the assistance of colleagues, friends, and relatives who have connections with employees in the banking sector.

A total of 473 respondents completed the questionnaire, comprising banking staff (292 respondents, 61.73%),

supervisors (38 respondents, 8.03%), assistant managers (6 respondents, 1.27%), and managers (137 respondents, 28.95%). All respondents are bank employees representing various banks registered with the Financial Services Authority of the Indonesian Government. This includes central banks, public and Sharia banks, as well as those owned by both private and government entities. Bank Nasional Indonesia, one of the largest government-owned banks, accounted for the majority of responses at 19.03%, while Bank Central Asia, the largest private bank, constituted 18.18%. The remaining percentage was distributed among 49 other banks. The criteria for respondents include:

- Banking employees from various levels of job titles, ranging from the lowest to the highest, have experience in interacting with information systems that are continuously being improved and are involved in preparing company budgets.
- Banking employees from various levels of job positions across different company divisions, such as finance, operations, information technology, research & development (R&D), strategy, credit, and marketing.

The dependent variable in this study is managerial performance, which is measured using an eight-item instrument named the Overall Performance Measurement (Tessier & Otley, 2012). This instrument captures a subjective estimate of an individual's capabilities across various dimensions. It assesses a leader's performance in guiding subordinates toward achieving the company's strategic goals.

Indicators developed by Robert Simons are utilized for the levers of control (Martyn et al., 2016; Tessier & Otley, 2012). These indicators are employed to gauge the effectiveness of control mechanisms implemented within the organization.

A scale adapted from the three independent dimensions of the information systems success model (Urbach & Müller, 2012) is employed regarding information systems. This measurement encompasses three dimensions with 13 indicators assessing the quality of systems, information, and services. Additionally, a new dimension, collaboration, is introduced in this study. The indicators for this collaboration dimension are constructed based on criteria presented by The Economist Intelligence Unit (2012). These indicators are developed to measure the benefits that companies derive from collaborative activities and consist of four items, including improving profit margins by enhancing operational efficiency and productivity, problem-solving capabilities, knowledge sharing, and competitive differentiation.

Levers of control and information systems are considered independent variables within this framework. The bottom-up budgeting approach (Heinle et al., 2014) is a moderating variable, utilizing indicators from (Kramer & Hartmann, 2014).

For the analysis, this research employs the partial least squares (PLS) approach for structural equation modeling to evaluate the proposed effects. PLS calculates the structural model, which includes connections between latent constructs indirectly measured by multiple indicators, through an iterative procedure akin to ordinary least squares regression. Data analysis is conducted to assess the validity and reliability of measures and evaluate the causal model's suitability.

According to Hair et al. (2013), data validity is confirmed if the Average Variance Extracted (AVE) value exceeds 0.50 in the convergent validity test and the outer loading value is above 0.70. A construct is deemed reliable regarding reliability testing if the composite reliability value and Cronbach's alpha are above 0.70 (Ghozali, 2016).

The conceptual framework presented in Figure 1 forms the basis for the regression model, incorporating the following equations:

Model 1: $MP = \beta 0 + \beta 1LOC + \beta 2IS + \varepsilon$ (1)

Model 2: $MP = \beta 0 + \beta 1LOC + \beta 2IS + \beta 3BA + \beta 4LOC*BA + \beta 5IS*BA + \varepsilon$ (2)

Where:

MP = managerial performance

LOC = levers of control

IS = information systems

BA = bottom-up budgeting approach

$\beta 0$-$\beta 5$ = constants

ε = error.

Results and Discussion:

The data in this study have successfully passed the validity test, with the Average Variance Extracted (AVE) value exceeding 0.5 and the outer loading value surpassing 0.7. Since managerial performance does not have distinct dimensions, the loading factor value is determined based on the loading factor value per indicator, as illustrated in Figure 2. Additionally, the data meets the reliability testing criteria, with composite reliability values and Cronbach's alpha exceeding 0.70. These findings are summarized in Table 1:

Table 1. Loading Factor, AVE, Cronbach Alpha, Composite Reliability for Managerial Performance, Levers of Control, Information Systems, and Bottom-Up Budgeting Approach

Variables	Dimensions	Loading Factor	AVE	Cronbach Alpha	Composite Reliability
Managerial Performance	-	-	0.740	0.948	0.957
Levers of Control	Belief system	0.926	0.687	0.973	0.975
	Boundary system	0.928			
	Diagnostic control system	0.949			
	Interactive control system	0.941			
Information Systems	System quality	0.927	0.707	0.980	0.981
	Information quality	0.947			
	Service quality	0.948			
	Collaboration	0.860			
Bottom-Up Budgeting Approach	Issuance of Guidelines	0.933	0.697	0.946	0.954
	Development of the initial budget proposal	0.955			
	Budget negotiation	0.932			

Source: Processing Results of SmartPLS 3.0.

The loading factor values of the research construct dimensions and indicators used are presented in Figure 2 below.

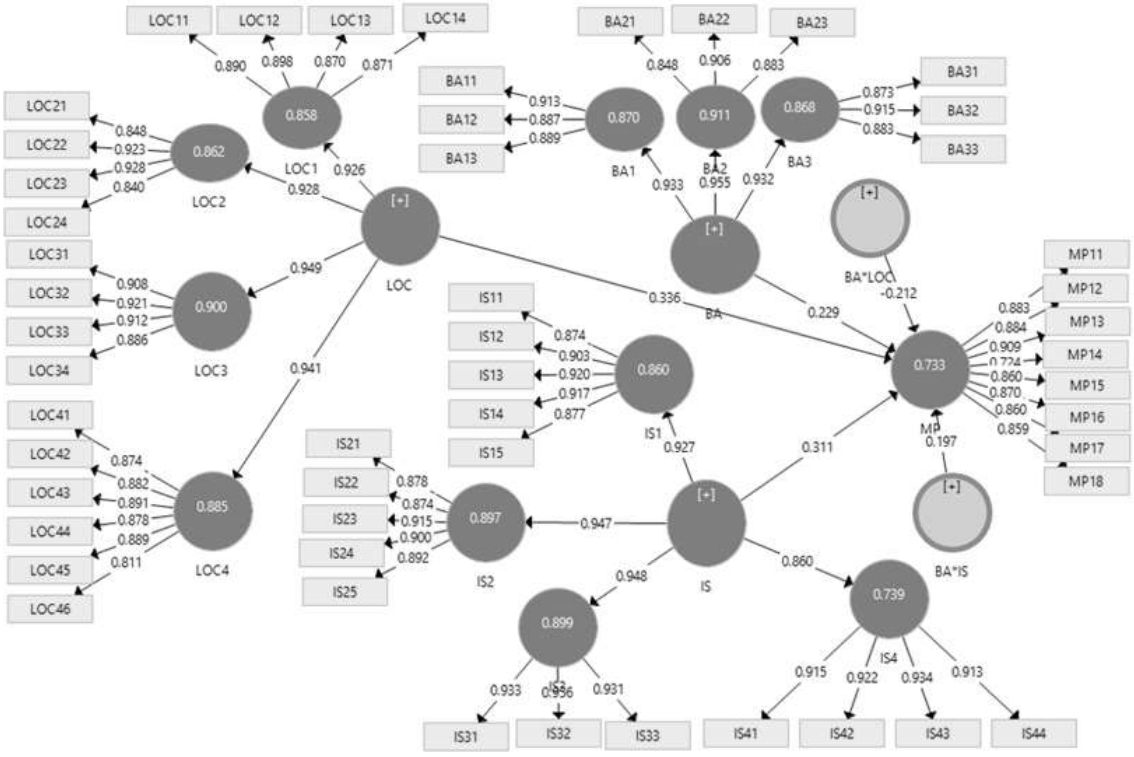

Figure 2: The loading factor values of the research constructs

Table 2 presents the descriptive statistics for the variables as follows:

Table 2: Descriptive Statistics

Variable	N	Min	Max	Mean	Std. Deviation
MP (Managerial Performance)	473	4.8224	5.1586	5.0626	0.9009
LOC (Levers of Control)	473	4.9281	5.3362	5.1393	0.9248
IS (Information Systems)	473	4.9768	5.0867	5.0231	0.9513

BA (Bottom-Up Budgeting Approach)	473	4.6681	4.9429	4.8125	1.0524

Source: Processing Results of SmartPLS 3.0.

Description: Managerial Performance (MP), Levers of Control (LOC), Information Systems (IS), and Bottom-Up Budgeting Approach (BA).

In Table 2, the mean value for all variables is around 5, indicating that respondents generally agree on the importance of levers of control and information systems in supporting high managerial performance in the company. The average value suggests that each dimension of levers of control and information systems holds almost equal significance, indicating that none of these dimensions is superior to the others. Similarly, system quality, information quality, service quality, and collaboration in information systems exert comparable influence on respondents. However, the average bottom-up budgeting approach value of 4 suggests that some respondents are less inclined to agree on the significance of the bottom-up budgeting approach.

Table 3. Hypotheses Testing for Model 1 where MP = f(LOC, IS)

Hypotheses		Relationship between Variables	Predictive Direction	Coefficient	P-Values	Statistical Conclusion
1.	H1	LOC→MP	+	0,463	0,0000**	H1 is accepted
2.	H2	IS→MP	+	0,242	0,0000**	H2 is accepted

Source: SmartPLS 3.0 Processing Results

Note: ** The testing results for influence between variables are significant at α = 5%.

Description: Managerial Performance (MP), Levers of Control (LOC), and Information Systems (IS).

Table 3 presents the results of testing H1 and H2, where, based on the p-value, each obtained a value of 0.0000 < α = 5%, indicating that H1 and H2 are accepted. This table explains Model 1, where levers of control and information systems significantly affect managerial performance. Furthermore, based on the sign and value of each coefficient, which is positive (0.463 and 0.242, respectively), it can be interpreted that each increase in levers of control and information systems leads to a corresponding increase in managerial performance by 46.3% and 24.2%, respectively. This finding supports the initial assumption that levers of control and information systems positively influence managerial performance.

The coefficient value of levers of control, being greater than that of information systems, suggests that, in the banking industry in Indonesia, levers of control, serving as the company's management control system, have a more significant impact on achieving high managerial performance than information systems. This implies that a system capable of controlling employee behavior holds more importance than a facility that enhances productivity.

Table 4: Hypotheses Testing for Model 2 where MP = f(LOC, IS, LOC*BA, IS*BA)

Hypotheses	P-Values	Conclusion	f-square	R-square	Q-square
3. H3: LOC*BA	0.0000**	Accepted	0.048	0.733	0.533
4. H4: IS*BA	0.0000**	Accepted	0.038		

Source: SmartPLS 3.0 Processing Results

Note: ** The results of testing the influence between variables are significant at α = 5%.

Description: Levers of Control (LOC) and Information Systems (IS).

Table 4 presents the test results of model 2 in this study. The objective of model 2 is to examine the moderating role of the bottom-up budgeting approach in the relationship between levers of control and information systems on managerial performance. The findings support hypotheses H3 and H4, indicating that the bottom-up budgeting approach strengthens the influence of levers of control and information systems on managerial performance. This is evidenced by the significant p-values obtained, which are 0.0000 < α = 5%.

The results suggest that higher managerial performance is contingent on implementing effective control and advanced information systems and facilitating a bottom-up approach in budget preparation.

The R-square value of 73.3% < 75% suggests that the variables of levers of control, information systems, and their interaction with the bottom-up budgeting approach moderately explain managerial performance (Hair et al., 2013). Additionally, the f-square value indicates the reduction in R-square if the interaction between independent and moderating variables is removed. Specifically, the R-square would decrease by 0.048 if the interaction between levers of control and the bottom-up budgeting approach is removed or by 0.038 if the interaction between information systems and the bottom-up budgeting approach is removed. Although the f-

square value is ≥ 0.02, indicating weak effect size according to Cohen (2013), the significance level (P-value < 0.05) suggests that the bottom-up budgeting approach strengthens the influence of levers of control and information systems on managerial performance.
The Q-square value, representing predictive relevance, determines whether the model has predictive relevance. This study's Q-square value of 0.533 > 0 indicates that the research model is well-constructed and has predictive relevance. Therefore, it can be concluded that levers of control and information systems, moderated by the bottom-up budgeting approach, can effectively predict managerial performance in the banking industry.

Table 5: Sensitivity Test of the Collaboration Dimensions' Effect on Managerial Performance

Test	3 dimensions of IS	4 dimensions of IS
f-square of IS	0.033	0.064
f-square of IS*BA	0.030	0.038
R-square of MP	0.726	0.733
Q-square of MP	0.528	0.533

Source: Processing Results of SmartPLS 3.0.

Description: Managerial Performance (MP), Levers of Control (LOC), and Information Systems (IS).
In addition to testing the levers of control and information systems and the interaction effect with the bottom-up budgeting approach as moderation on managerial performance, this study contributes by incorporating the collaboration dimension into the information systems success model (Urbach & Müller, 2012). Table 5 presents the sensitivity analysis of this measurement. The new measures demonstrate an increase in all tests: the f-square of information systems has increased by 0.031, the f-square of the interaction of the moderating effect of the bottom-up budgeting approach with information systems has increased by 0.008, the R-square of managerial performance has increased by 0.007, and the Q-square of managerial performance has increased by 0.005. This indicates that the inclusion of an additional collaboration dimension in the information systems variable plays a significant role in explaining managerial performance, enhances the influence of information systems on managerial performance, and exhibits good predictive power. Collaboration in information systems is, therefore, fundamental. As technology continues to evolve, additional dimensions will likely be discovered, further enhancing the usefulness of information systems in achieving high company performance.
Respondents acknowledge the benefits of collaboration in the information systems of banking companies in Indonesia, as it can increase efficiency and productivity, offer solutions to various problems, facilitate knowledge sharing derived from data analysis, and enhance company competitiveness. This aligns with the resource-based theory, where sophisticated information systems, equipped with advanced technology and robust analytical capabilities, empower businesses to efficiently manage their operations and contribute to enhanced decision-making by providing accurate and current information.

CONCLUSION

This study aimed to investigate the impact of levers of control and information systems on managerial performance in the Indonesian banking industry and the moderating role of the bottom-up budgeting approach. The findings indicate that both levers of control and information systems significantly affect managerial performance in Indonesian banking industries. Moreover, the bottom-up budgeting approach is crucial in strengthening the influence of control and information systems levers on managerial performance. Additionally, the study underscores the importance of effective collaboration in enhancing the impact of information systems.
Based on these findings, several conclusions can be drawn. Firstly, the study contributes to understanding how levers of control and information systems impact broad performance metrics such as firm or organizational performance and influence more specific measures like managerial performance. It highlights the importance of considering individual perspectives and user satisfaction in assessing the effectiveness of these systems. Secondly, the research demonstrates that the influence of levers of control and information systems on managerial performance is contingent upon the budgeting approach employed. The results suggest that companies should carefully consider the implications of their budgeting approach. While many Indonesian banking industries currently follow a top-down budgeting approach, this study suggests that transitioning to a bottom-up approach may yield different effects on managerial performance. From a theoretical standpoint, these findings suggest that the process characteristics of budgeting can complement traditional perspectives on budgetary approaches in explaining target performance.

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