The Influence of Management Control Systems and Balanced Scorecard on Strategic Decision Making: The Moderating Role of Information Technology (A Study of Private Universities in Medan City)

Martin[1] Ayu Andira[2] Mardiah Hasanah Nasution[3]
Management Lecturer, Universitas Mahkota Tricom Unggul, Kota Medan, Sumatera Utara[1]
Accounting Lecturer Akademi Akuntansi YPK, Kota Medan, Sumatera Utara[2,3]
Email: m4rt1n.myrafa@gmail.com[1] ayuandira28101997@gmail.com[2] layniezz@gmail.com[3]

Abstract

This study aims to analyze the effect of Management Control Systems (MCS) and Balanced Scorecard (BSC) on Strategic Decision Making (SDM), with Information Technology (IT) as a moderating variable in Private Universities (PTS) in Medan City. The background of this study is based on the need for higher education institutions to adapt to the dynamics of globalization and digitalization, which require performance and information-based governance. A quantitative approach was used with the Partial Least Squares–Structural Equation Modeling (PLS-SEM) method on 251 managerial leaders as respondents. The results show that both MCS and BSC have a significant effect on SDM. MCS has a direct positive effect on PKS, but indirectly through IT, it shows a negative direction, indicating that overly rigid control systems can hinder the utilization of technology. Conversely, BSC has a significant and positive effect on IT and PKS, both directly and indirectly, indicating that BSC is capable of improving the quality of strategic decisions through the strengthening of information systems. In addition, IT proved to be a significant mediating factor in strengthening the relationship between variables, with the model's predictive contribution reaching 95.4%. This study emphasizes the importance of adaptive and integrative management system design, as well as the optimal use of information technology in supporting strategic decision-making in the higher education sector. These findings have theoretical implications for the development of modern management accounting literature and practical implications for PTS leaders to develop data-driven strategies and technological innovations.

Keywords: Management Control Systems, Balanced Scorecard, Information Technology, Strategic Decision Making

INTRODUCTION

Rapid changes in the business and educational environment due to technological developments and globalization have prompted higher education institutions to adapt strategically. Universities, especially private universities (PTS), no longer function solely as academic institutions focused on the three pillars of higher education, but also as modern organizations that are required to have efficient, accountable, transparent, and performance-oriented governance. In the context of global competition and increasingly complex labor market demands, strategic decision-making has become a crucial aspect that determines the direction, competitiveness, and sustainability of higher education institutions. Globalization and advances in information technology have created significant changes in the way universities manage resources, deliver learning, and build relationships with stakeholders. The shift towards digitization and technology-based educational transformation requires university leaders to make quick, data-driven, and adaptive decisions (Fadhila & Mahyudin,

2024). Appropriate strategic decision-making not only affects operational success, but also determines an institution's reputation, public trust, and ability to maintain its existence amid external environmental uncertainty. Private universities face different challenges compared to public universities. Dependence on internal funding, fluctuating student numbers, and pressure to improve accreditation and institutional reputation require private universities to have innovative managerial strategies. Therefore, PTS leaders need to integrate various modern management approaches such as Management Control Systems (MCS) and Balanced Scorecard (BSC) as tools to assist in the strategic decision-making process (Mufrihah Zain et al., 2025). Both systems help management measure performance comprehensively, not only from a financial perspective, but also from the perspective of customers, internal processes, and organizational learning and growth (Hourani & Abdali, 2017).

In addition, advances in information technology (IT) play an important role in strengthening PTS's ability to conduct strategic analysis. Through integrated information systems, leaders can obtain more accurate and real-time data to support evidence-based decision making. IT integration also improves operational efficiency and facilitates the monitoring and evaluation of strategy implementation. Thus, IT is not only an administrative tool, but also a strategic component in supporting effective university governance (Sofyani et al., 2024). In the digital age and global competition, adaptive and innovative capabilities are key for universities to survive and thrive. Effective strategic decision-making must consider external environmental factors such as changes in government policy, the dynamics of industry needs, and public expectations regarding the quality of education (Vale et al., 2022). On the other hand, internal factors such as organizational culture, human resource quality, and management control systems must also be strengthened to align with the institution's vision and mission. Thus, changes in the business and educational environment are not only challenges, but also opportunities for private universities to undergo strategic transformation towards becoming learning organizations that are oriented towards performance and innovation. Strategic decision-making supported by an integrated management system, the use of information technology, and a commitment to good governance will be the main foundations for the sustainability and competitiveness of universities in the future (Mahyudin et al., 2025).

The city of Medan is one of the largest centers of higher education outside of Java, with more than 60 private universities registered under the Higher Education Service Institution (LLDikti) Region I of North Sumatra. Competition among institutions to obtain superior accreditation, enhance reputation, attract new students, and optimize financial and academic performance requires PTS management to have strategic decision-making capabilities based on accurate information and data. In this situation, Management Control Systems (MCS) and Balanced Scorecard (BSC) are important instruments in supporting the effectiveness of strategic decision-making processes. According to the latest study on the evolution of management control, research shows that innovatively designed MCS can enable organizations to respond to dynamic changes and unexpected challenges by providing timely information processing for strategic decisions (Palazzi et al., 2025). In the context of higher education, the concept of Intelligent Management Control System has also been proposed, which combines traditional management control approaches with cognitive abilities and information technology to make control systems more adaptive in the university environment (Dudycz et al., 2022).

In addition, modern management tools such as the Balanced Scorecard (BSC) remain relevant in higher education. The implementation of BSC in educational institutions shows that BSC helps align the vision and mission of the institution with measurable performance indicators (Dariyo et al., 2022). In Indonesia, recent research shows that BSC has been

implemented in Islamic universities to measure performance from the perspectives of finance, customers, internal processes, and learning & growth (Maryani & Nur Wachidah Yulianti, 2023). In addition, educational institutions that use BSC-based evaluation are able to develop more adaptive and innovative policies (Riatmaja et al., 2025). In line with this, research on the relationship between MCS and strategic decision quality shows that broad-scope management control systems can help mitigate the negative effects of crises and improve strategic decision-making capabilities in conditions of uncertainty (Gomez-Conde et al., 2022). However, the effectiveness of MCS and BSC in improving the quality of strategic decisions greatly depends on the organization's ability to utilize information technology.

The development of Information Technology (IT) in the educational environment has brought significant changes in the way universities manage data and make decisions. Academic management information systems (SIAKAD), financial systems (SIMKEU), personnel information systems (SIMPEG), and web-based performance dashboards enable university leaders to obtain real-time information about institutional performance. With the presence of IT as a support, the concept of IT governance using BSC has also emerged as an important approach in higher education institutions (Khristianto, 2020). Thus, IT can act as a moderating variable that strengthens the relationship between MCS and BSC with strategic decision-making. The higher the level of IT utilization, the greater the organization's ability to process and interpret information from control and performance measurement systems to support strategic decisions. Conditions in the field show that not all private universities in Medan are able to utilize performance control and measurement systems optimally. Some still face limitations in data integration, lack of information analysis capabilities, and resistance to digital systems (Fadila et al., 2024). This leads to variations in the quality of strategic decisions among universities, such as in determining budget priorities, opening new study programs, lecturer recruitment policies, and education marketing strategies. Therefore, it is important to examine how MCS and BSC influence strategic decision-making, as well as the extent to which information technology strengthens these relationships in private universities. This research is relevant both theoretically and practically. Theoretically, this research enriches the literature on management accounting and modern management control systems in the context of higher education with a focus on MCS, BSC, and the role of IT as a moderator. Practically, the results of this study can contribute to the leadership of private universities in Medan to develop technology-based control and performance measurement systems so that the strategic decision-making process becomes more effective, efficient, and adaptive to changes in the external environment.

RESEARCH METHODS

This study uses a quantitative approach with an explanatory research design. The main objective of this approach is to explain the causal relationship between variables, namely how Management Control Systems (MCS) and Balanced Scorecard (BSC) influence Strategic Decision-Making with Information Technology (IT) as a moderating variable. The quantitative approach was chosen because this study uses structured instruments in the form of questionnaires, inferential statistical analysis, and hypothesis testing with structural equation modeling. The object of this study is private universities in Medan, North Sumatra Province. Medan City was chosen because it is one of the centers of higher education on the island of Sumatra with the largest number of PTS in western Indonesia. PTS in Medan face high managerial dynamics and competition, so the application of management control systems, strategic performance measurement, and information technology is crucial in decision-making at the university or faculty leadership level. The population in this study is managerial leaders

in private universities in Medan City who are directly involved in the strategic planning and decision-making processes, such as: Rectors and Vice Rectors, Deans and Vice Deans, Heads of Bureaus, Heads of Institutions, and Heads of Study Programs. The target population is estimated to be around 200-250 managerial leaders from 10-12 major private universities in Medan. The sampling technique used is purposive sampling, which is the selection of respondents based on certain criteria, namely: Holding a managerial position (at least head of unit/dean). Involved in the process of planning, supervision, or strategic decision-making. Has worked for at least two years at the institution. The sample size was determined using the formula (Hair et al. 2019) for SEM-PLS, which is a minimum of 10 times the number of paths to the most constructs in the model. Because this model has 4 constructs with 3 main paths, the minimum sample is 30 respondents × 10 = 300 respondents. However, 200–300 respondents are considered sufficient for PLS-SEM analysis (Hair et al., 2021). This study uses primary data, obtained directly from respondents through online and printed questionnaires. In addition, secondary data are used to support the interpretation of the results, in the form of institutional documents such as performance reports, quality manuals, and PTS strategic reports. Data collection methods were carried out by: Distribution of Likert scale questionnaires (1–5) to managerial leaders at private universities. Conducting brief interviews (cross-checking) with several key respondents to strengthen the construct validity and context of MCS and BSC implementation in the PTS environment. Conducting a documentation study to obtain supporting data (e.g., organizational structure, management information systems, campus strategic reports).

RESEARCH RESULTS AND DISCUSSION

Structural Model Analysis (Inner Model)

The inner model measurement is explained by the results of the path coefficient test, goodness of fit test, and hypothesis test.

R Square

Based on data processing using the Smart PLS 3.0 program, the following R-Square values were obtained:

Table 1. Coefficient of Determination (R-Square)

	R Square	R Square Adjusted
Strategic Decision Making (Y)	0,743	0,740
Information Technology (Z)	0,822	0,821

Source: Processed by Researchers (2025)

R Square (Coefficient of Determination) shows how much variation or change in the dependent variable can be explained by the independent variables in the regression model. R^2 values range from 0 to 1: the closer to 1, the better the model is at explaining the variation in the data. The closer it is to 0, the less capable the model is of explaining the variation. Adjusted R Square (R^2 Adjusted) is a version of R^2 that has been corrected so that it is not too "optimistic" when there are many independent variables. This value is more accurate for models with more than one independent variable.

Strategic Decision Making (Y)

R Square = 0.743 This means that 74.3% of the variation in strategic decision-making can be explained by the independent variables in the model (e.g., Management Control Systems and Balanced Scorecard, if those are the independent variables). Adjusted R Square = 0.740 After

adjusting for the number of predictors, the model still explains 74.0% of the variation. Interpretation: This model is strong and reliable, as it explains most of the variation (more than 70%). Only about 26% of the remainder is influenced by other factors outside the model.

Information Technology (Z)

R Square = 0.822 82.2% of the variation in information technology is explained by other variables (possibly Management Control Systems and Balanced Scorecard, if Z is a moderator or dependent variable in the submodel). Adjusted R Square = 0.821 Only a small correction, indicating a stable model and no overfitting. Interpretation: This model is very strong, as more than 80% of the variation in information technology can be explained by independent variables. This means that the relationship between variables in this model is statistically and substantively significant.

Predictive Relevance (Q2)

The Q^2 value has a similar meaning to the coefficient of determination (R-Square). If the Q^2 value is > 0, this indicates that the model has good predictive ability, while a Q^2 value < 0 indicates low predictive relevance of the model. Thus, the greater the Q^2 value, the better the model's suitability for the data.
The Q^2 value can be considered as follows:
$Q_2 = 1 - (1-R_1^2) (1-R_2^2) ... (1-R_n^2)$
$Q_2 = 1 - (1-0.743) (1-0.822)$
$Q_2 = 1 - (0.257) (0.178)$
$Q_2 = 1-0,046$
$Q_2 = 0.954$

Based on these results, a Q^2 value of 0.954 indicates that the research model has very strong predictive power. Thus, it can be concluded that all variables in this study, namely Management Control Systems, Balanced Scorecard, Information Technology, and Strategic Decision Making, contribute significantly to the authenticity of the data in the structural model by 95.4%. The remaining 4.6% is influenced by other external factors not included in the model, such as organizational culture, leadership style, and strategic environmental dynamics, which also have the potential to influence the research results.

Uji t-statistic (Bootstrapping)

Direct Impact

The results of the structural model analysis show the relationship between the variables tested, namely Management Control Systems (MCS), Balanced Scorecard (BSC), Information Technology, and Strategic Decision Making (SDM). All relationships between variables have p-values below 0.05, so it can be concluded that all the effects tested are statistically significant. A relationship is considered significant if the p-value is below 0.05, while a p-value equal to or greater than 0.05 indicates an insignificant relationship. At a significance level of 5%, the hypothesis acceptance criteria can also be seen through the t-statistic value, where the hypothesis is accepted if the t-statistic exceeds the t-table of 1.967. Thus, both through the p-value approach and the comparison of t-statistic and t-table, the results that meet these criteria indicate that the hypothesis is supported by the data. The hypothesis test results are presented in the table below:

Table 2. Direct Inpact

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Discription
Balanced Scorecard (X2) -> Strategic Decision Making (Y)	-0,940	-0,941	0,177	5,313	**0,000**	Signigicant
Balanced Scorecard (X2) -> Information Technology (Z)	1,016	1,024	0,066	15,366	**0,000**	Signigicant
Management Control Systems (X1) -> Strategic Decision Making (Y)	0,234	0,209	0,110	2,128	**0,034**	Signigicant
Management Control Systems (X1) -> Information Technology (Z)	-0,281	-0,267	0,127	2,204	**0,028**	Signigicant
Information Technology (Z) -> Strategic Decision Making (Y)	1,551	1,556	0,171	9,052	**0,000**	Signigicant

Source: Processed by Researchers (2025)

1. First hypothesis Based on the results of this study, there appears to be a relationship between Management Control Systems and strategic decision making. From processing 251 sample data using the SmartPLS application, it was found that Management Control Systems directly had a significant effect on strategic decision making. This was evidenced by a significance value of 0.034, which was smaller than 0.05, and a t-value of 2.128, which was greater than the t-table value of 1.967. In addition, the original sample value of 0.234 indicates that the direction of the relationship between Management Control Systems and strategic decision-making is positive, so it can be concluded that the better the implementation of management control systems, the more effective the strategic decision-making process in the organization, thus concluding that the first hypothesis is accepted.
2. Second hypothesis the results of this study indicate a relationship between management control systems and information technology. Based on the processing of 251 sample data using the SmartPLS application, the table above shows that management control systems have a significant direct effect on information technology. This is indicated by a significance value of 0.028, which is smaller than 0.05, and a t-count value that is greater than the t-table (2.204 > 1.967). In addition, the original sample value of -0.281 shows that the direction of the relationship between management control systems and information technology is negative, so it can be concluded that the second hypothesis is accepted.
3. The third hypothesis of this study shows a relationship between balanced scorecards and strategic decision making. Based on the processing of 251 sample data using the SmartPLS application, the table above shows that the balanced scorecard has a significant direct effect on strategic decision making. This is evidenced by a significance value of 0.000, which is less than 0.05, and a t-value greater than the t-table (5.313 > 1.967). In addition, the original sample value of -0.940 indicates that the direction of the relationship between the balanced scorecard and strategic decision-making is negative, so it can be concluded that the third hypothesis is accepted.
4. The fourth hypothesis of this study shows the relationship between the balanced scorecard and information technology. The results of processing 251 data samples using the Smart PLS application show that the balanced scorecard has a significant direct effect on information technology, as shown in the table above. This result is demonstrated and can be explained by a significance value of 0.000, which is less than 0.05, and a t-value greater than the t-table (15.366>1.967). Furthermore, the original sample value of 1.016 shows that the direction of the relationship between the balanced scorecard and information technology is positive, so it can be concluded that the fourth hypothesis is accepted.

5. The fifth hypothesis of this study shows the relationship between information technology and strategic decision making. It was found from the results of processing 251 sample data using the Smart PLS application, where the table above shows that the direct relationship between information technology has a significant effect on strategic decision making. This result is shown and can be explained by a significant value of 0.000, which is smaller than 0.05, and a t-count value that is greater than the t-table (9.052>1.967). Furthermore, the original sample value of 1.551 shows that the direction of the relationship between information technology and strategic decision making is positive, so it can be concluded that the fifth hypothesis is accepted.

Moderation Effect Testing

Moderating effect testing was used to see whether there was a relationship between the variables tested, namely Management Control Systems (MCS) and Balanced Scorecard (BSC), through Information Technology on Strategic Decision Making (SDM). The relationship between the independent variables and the dependent variable through the moderating variable in this study can be seen in the table below.

Table 3. Indirect Effect

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Discription
Balanced Scorecard (X2) -> Information Technology (Z) -> Strategic Decision Making (Y)	1,576	1,586	0,137	11,511	**0,000**	Signigicant
Management Control Systems (X1) -> Information Technology (Z) -> Strategic Decision Making (Y)	-0,435	-0,400	0,170	2,557	**0,011**	Signigicant

Source: Processed by Researchers (2025)

6. The sixth hypothesis of this study shows the relationship between management control systems and strategic decision making through information technology. It was found from the results of processing 251 data samples using the Smart PLS application, where the table above shows that indirectly, management control systems have a significant influence on strategic decision making through information technology. This result is demonstrated and can be explained by a significance value of 0.011, which is smaller than 0.05, and a t-value greater than the t-table (2.557>1.967). Furthermore, the original sample value of -0.435 shows that the direction of the relationship between management control systems and strategic decision-making is negative, so it can be concluded that the sixth hypothesis is accepted.

The seventh hypothesis of this study shows the relationship between balanced scorecards and strategic decision-making through information technology. It was found from the results of processing 251 sample data using the Smart PLS application, where the table above shows that indirectly, balanced scorecards have a significant influence on strategic decision-making through information technology. This result is shown and can be explained by a significant value of 0.000, which is smaller than 0.05, and a t-count value that is greater than the t-table (11.511>1.967). Furthermore, the original sample value of 1.576 shows that the direction of the relationship between the balanced scorecard and strategic decision making is positive, so it can be concluded that the seventh hypothesis is accepted.

Discussion

The Influence of Management Control Systems on Strategic Decision Making

The original sample value of 0.234 with t 2.128 and p 0.034 indicates a positive and significant effect of Management Control Systems (MCS) on Strategic Decision Making at a significance level of 5% ($p < 0.05$). Practically speaking, the coefficient of 0.234 shows a modest effect: an improvement in the quality/implementation of MCS is associated with an improvement in strategic decision-making capabilities, but the magnitude of the effect is not large. Therefore, in addition to statistical significance, management needs to assess practical significance (e.g., changes in expected strategic outcomes). (See the interpretation of statistical significance and the importance of checking effect size in the MCS literature). The most commonly encountered theoretical mechanisms explain why MCS influences strategic decisions: MCS provides relevant financial and non-financial information, reporting structures, and formal channels for monitoring and feedback so that decisions become more rational, data-driven, and aligned with the organization's strategic objectives. Classical frameworks and empirical reviews confirm the role of MCS as a tool for communicating performance signals and facilitating strategic dialogue between management levels (Chenhall, 2003). Empirical and conceptual studies emphasize that how MCS is used is important: diagnostic use (monitoring critical variables) and interactive use (active use for strategic discussion and detection of new issues) contribute differently to strategic capabilities. Interactive use in particular can improve the quality of decision-making in situations of uncertainty and innovation. Therefore, simply having metrics is not enough; how MCS is used (as a control tool vs. a strategic dialogue tool) determines its impact (Henri, 2006). The modern approach suggests viewing MCS as a package (planning, cybernetic, reward, administrative, cultural controls) and adapting it to the organizational/strategic context. For universities: practical recommendations are (1) integrate financial and non-financial KPIs (graduation, research, industry networking), (2) build a real-time dashboard for top management, (3) encourage interactive use so that MCS becomes a means of strategic dialogue between faculties and leaders, and (4) measure the effect size (e.g., f^2) and examine mediators/moderators (organizational culture, IT) before drawing policy implications (Malmi & Brown, 2008). Your results are statistically valid (p=0.034) and consistent with the literature showing that MCS plays a role in improving the quality of strategic decision-making, but organizations need to strengthen the design, interactive use, and measurement of practical effects so that the impact is operationally meaningful (Langfield-Smith & Kim, 1997).

The Influence of Management Control Systems on Information Technology

The results show an Original Sample value of -0.281 with a t-statistic of 2.204 and a p-value of 0.028, which means that the relationship is significant but negative. The interpretation of these results is that the implementation of a management control system that is too rigid or bureaucratic can hinder the adoption of information technology. This may occur because overly strict control systems reduce the flexibility of organizations to innovate or try new technologies. Overly rigid control systems (e.g., strict rules, standard procedures that cannot be modified, excessive bureaucracy) can limit the ability of organizations and individuals to experiment with new technologies. Employees may be reluctant to try alternative solutions for fear of violating procedures, thereby hindering innovation and the adoption of new technologies. In the literature, the concept of "threat-rigidity" suggests that when organizations feel threatened or under pressure, they tend to stick to established work patterns and are reluctant to change, even if it is detrimental in the long run (Mazzei et al., 2025). in addition, (Zeng et al., 2024) mentions that both overly lax and overly strict controls can have a negative

impact on individual innovation because they cause internal friction or a feeling of being restricted. When controls are considered too restrictive, employees may respond negatively, for example by feeling pressured, distrusted, or deprived of autonomy. Such feelings can give rise to psychological resistance to change or new technologies. A study by (Teles et al., 2021) shows that when individuals perceive control as a threat, their affective commitment to the organization declines.

In the context of information technology, adoption often requires quick decisions, iteration, responsiveness to feedback, and continuous experimentation. Highly formal control systems tend to slow down decision-making processes, hindering the organization's ability to respond to technological or environmental changes. In research on "levers of control" and organizational agility (Lill & Wald, 2021), It was found that the use of certain control levers can reduce innovation agility depending on the intensity of control. Although rigid control has a negative impact, the management control literature suggests that organizations should not eliminate control altogether, but rather combine elements of formal and informal control or use more adaptive controls. Research on control systems in innovation (e.g., "Disentangling the Role of Management Control Systems") shows that in the context of innovation, the type and intensity of control must be tailored to the characteristics of the organization and the technological context (Guo et al., 2019). Managers should not apply rigid and uniform management controls across all aspects, but rather consider flexibility, room for experimentation, and tolerance for failure on a limited scale. In the digital transformation process, controls must be balanced to maintain accountability without stifling individual or team initiatives in adopting new IT solutions. Adaptive controls need to be implemented, such as outcome control, which gives freedom in how results are achieved, rather than micro-control of actions. Training, communication, and incentives for adaptive behavior are essential so that employees do not view new technology as an additional burden of control.

The Influence of the Balanced Scorecard on Strategic Decision Making

The Original Sample (O) value = −0.940, t = 5.313, p = 0.000 indicates a significant but negative effect between the implementation of the Balanced Scorecard (BSC) and Strategic Decision Making (SDM). Theoretically, this finding indicates that BSC implementation does not automatically guarantee improved strategic decision quality; when applied rigidly or out of alignment with the institutional context, BSC can actually distort decision making. The literature review cites two main mechanisms that explain this negative effect: (1) measurement myopia, which is an overemphasis on short-term quantitative indicators that overshadows long-term strategic goals, and (2) the rigidity of BSC governance, which, when imposed, can reduce managerial flexibility and adaptive capacity to changes in the external environment (Tawse & Tabesh, 2023). In the context of higher education, this mechanism occurs when the BSC prioritizes financial metrics and administrative outputs (e.g., number of students, revenue) over indicators of academic quality, research collaboration, or human resource development. As a result, management may be driven to make decisions that optimize short-term BSC scores, e.g., increasing admission quotas or cutting research costs, even though such measures are detrimental to the institution's strategic vision (e.g., academic reputation, research quality). A literature review of the education sector confirms the need to adjust the BSC perspective to make it relevant to the mission of education (Artikel et al., 2023).

Practical recommendations: (1) Recalibrate the BSC perspective to emphasize indicators of educational quality, research impact, and stakeholder satisfaction so that indicators are not solely quantitative and financial; (2) Stakeholder participation: involve faculty, department heads, and students in developing KPIs to reduce resistance and gaming; (3) Flexibility in policy

use the BSC as a strategic guide rather than a rigid operational rule; (4) Risk management integration to detect unintended impacts earlier. This adaptive approach is in line with recent studies that recommend integrating the BSC with risk management practices and contextual evaluation (Huber et al., 2025). A significant negative coefficient is a warning sign, not an inherent flaw in BSC, that the design and implementation of BSC must be personalized to the characteristics of the university in order to support, rather than hinder, mission-oriented strategic decision-making. For further study in Indonesia and BSC practices in universities, see also SINTA-indexed articles and systematic reviews related to BSC implementation in the education sector (De Jesus Alvares Mendes Junior & Alves, 2023).

The Impact of the Balanced Scorecard on Information Technology

The results of the analysis (Original Sample=1,016; t-statistic=15.366; p=0.000) provide strong empirical evidence that the implementation of the Balanced Scorecard (BSC) has a significant positive effect on increasing the use and integration of Information Technology (IT) in organizations. Theoretically, BSC promotes strategic alignment between business objectives and IT capabilities through the Learning & Growth and Internal Process perspectives, two perspectives that encourage investment in infrastructure, data capabilities, and decision support systems so that organizations not only collect data but also integrate it into the managerial cycle. Your statistical findings (large O values and highly significant t values) are consistent with the literature stating that digital transformation and digital-BSC strengthen the relationship between strategy and IT implementation (Qazi et al., 2022). Explanation mechanism: first, BSC creates measurable performance targets that require real-time metrics and dashboards, which drives the adoption of management information and analytics systems. Second, BSC strategy maps often identify IT capabilities as enablers for achieving customer and internal process goals; when IT is positioned in this way, budget allocation, human resource training, and IT governance tend to increase. Third, continuous monitoring facilitated by IT improves accountability and strategic feedback, making IT use a routine part of decision-making (Betto et al., 2022). Practical implications for management: Organizations must include explicit IT metrics in their BSC strategy maps (e.g., data capabilities, system availability, response time), establish KPIs that measure IT's contribution to business results (not just technical metrics), and strengthen governance so that IT investments are directed toward strategic priorities. These steps amplify the positive effects demonstrated by your Original Sample values. Case studies and IT-BSC implementations in the education and healthcare contexts show that this approach improves alignment and operational performance when supported by top management commitment (Khoirotul Fatha et al., 2024).

The Influence of Information Technology on Strategic Decision Making

The test results (Original Sample=1,551; t=9.052; p=0.000) show a positive and significant effect of information technology capabilities and utilization on the effectiveness of strategic decision making. In practical terms, a high t-value and p-value < 0.001 indicate that the relationship is not coincidental: the stronger an organization's IT capabilities (infrastructure, analytical capabilities, and skilled human resources), the greater its contribution to the quality of strategic-level decisions. This finding is consistent with the literature, which states that IT capabilities enable organizations to quickly capture and process environmental signals, thereby supporting responsive and adaptive decisions (Koo & Le, 2024). Explanation of the mechanism: first, IT provides real-time information that reduces latency between events and managerial actions; this real-time data flow increases decision makers' sensitivity to market or operational changes, resulting in more targeted strategic decisions.

Second, analytics and big data technologies improve data accuracy and granularity (reducing noise and sampling bias), making performance indicators and projections more reliable for strategic planning. Third, automation and decision support tools (interactive dashboards, AI-based predictive models) accelerate the analysis process, enabling faster decision-making without sacrificing accuracy. Empirical findings and recent reviews on the role of real-time analytics and AI support these mechanisms (Yu & Zhuo, 2025). The managerial implications of your findings are quite clear. Organizations need to invest not only in hardware and software, but also in developing human capabilities (data literacy), data governance, and information system integration, as these capabilities complement each other to achieve strategic impact. In addition, data regulations and ethics must be strengthened so that increased speed and accuracy do not pose risks (e.g., privacy, non-transparent decisions in AI systems). Recent studies emphasize the importance of balancing accuracy, transparency, and user trust in AI-based decision support systems (Kovari, 2024).

The Influence of Management Control Systems on Strategic Decision Making through Information Technology

The results of path X1 (Management Control Systems) on Y (Strategic Decision Making) Z (Information Technology) showing Original Sample=−0.435 with T=2.557 (p=0.011) indicate a significant but negative mediating role of IT. Practically, this finding suggests that the form or design of the management control system implemented tends to reduce the ability of IT to support strategic decision making rather than strengthen it. This statement is consistent with the literature showing that controls that are highly diagnostic, rigid, and bureaucratic can reduce organizational agility and narrow the space for experimentation or adaptive use of new technologies (Dávila et al., 2024). There are several explanatory mechanisms that are reasonable both theoretically and empirically. First, overly structured MCS (diagnostic controls, rules & tight metrics) incentivizes compliance and minimizes risk, making decision makers reluctant to try IT solutions that are not yet "proven," or delaying the adoption of analytical features that require experimentation and iteration. This hinders IT assimilation and the integration of IT into strategic decision-making processes. Empirical studies and organizational resilience reviews emphasize the importance of MCS that supports information system integration so that IT is effective in times of crisis and change (Roffia & Dabić, 2023).

Second, the misalignment between MCS measurement objectives and IT utilization objectives creates contradictory organizational signals: KPIs that emphasize short-term efficiency or compliance can cause IT investments to be directed toward routine reporting rather than strategic analytical capabilities (scenario planning, predictive analytics). The levers-of-control literature emphasizes the need for a balance between diagnostic (monitoring) and interactive (strategic dialogue) controls to keep organizations adaptive and able to leverage IT strategically. MCS recalibration: reduce over-prescription on metrics that constrain experimentation; add indicators that measure learning, experimentation, and decision-making speed. (based on levers-of-control literature). Strengthen enabling IT governance: use IT governance/COBIT/ITIL principles that balance control (security & compliance) with data architecture and access that facilitates analytical experimentation. Facilitate boundary spanners: place people/roles that bridge control units and IT teams (e.g., data product owners) so that strategic needs can be mapped to IT initiatives without bureaucratic obstacles. Controlled trials: adopt small-scale pilots with learning KPIs (not just financial outcomes) to prove IT value before full scale. This approach reduces resistance to strict MCS.

The Influence of Balanced Scorecard on Strategic Decision Making through Information Technology

The Original Sample Value (O)=1.576, T-Statistics=11.511 and p=0.000 indicate that the indirect effect of the Balanced Scorecard (BSC) on Strategic Decision Making through the intermediary of Information Technology (IT) is not only positive in direction but also strong and statistically significant. Conceptually, this means that the application of BSC not only directly affects organizational outcomes (e.g., financial performance or internal processes), but also strengthens the organization's strategic achievements through improved IT capabilities, such as the implementation of performance dashboards, inter-unit data integration, and business intelligence systems, which in turn improve the quality of information available to decision makers. These findings are consistent with the literature that positions BSC as a framework for aligning strategic objectives and performance metrics so that operational and strategic data become more integrated and available for analysis (Madsen, 2025). The mediation mechanism most likely to work in the context of private universities is: (1) BSC encourages the definition of strategic indicators (e.g., student retention, graduate quality, research) which are then translated into data requirements and KPIs; (2) institutions strengthen their IT infrastructure (academic information systems, ERP, dashboards) to measure and report on these KPIs; (3) the availability of structured, real-time KPI data improves the ability of leaders to make evidence-based, rapid, and measurable strategic decisions. Studies mapping BSC to data capabilities and metric design show that BSC can be a "driving framework" for organizations to maximize the value of data and analytics in decision making (Pierce, 2022).

For private universities in particular, the implications are practical and managerial. First, institutions must view BSC implementation not merely as the installation of indicators, but as a transformation project that encompasses data architecture, management dashboards, IT governance, and decision-maker training. Second, IT budget allocation should be directed towards modules that support strategic metrics (e.g., graduate KPI tracking, research monitoring systems, student admission analytics) so that the mediating effect of BSC IT strategic decisions is truly realized. The literature on BSC adaptation in the education sector emphasizes that success requires strong IT integration and strategic leadership (Muda, 2025). Methodologically, the magnitude of the O and T-Statistics values you reported also signals that the mediating effect (indirect effect) is not a sampling error; with $p<0.001$, these results are worthy of being used as a basis for internal policy recommendations. However, it is still necessary to pay attention to the research design criteria: whether the model tests full or partial mediation, what control variables are used (institutional size, age of the university, previous level of digitization), and whether longitudinal data is available to confirm the direction of causality. Bibliometric literature also suggests further research using a mixed approach (quantitative, case studies) to explain 'how' and 'why' IT mechanisms mediate BSC effectiveness (Liangyan et al., 2024).

CONCLUSION

This study proves that Management Control Systems (MCS) and Balanced Scorecard (BSC) have a significant effect on strategic decision-making in private universities in Medan. MCS has been proven to increase the effectiveness of strategic decisions by providing relevant information, although if implemented in an overly bureaucratic manner, it can hinder organizational flexibility. Meanwhile, BSC has been proven to be more consistent in strengthening the effectiveness of strategic decisions by providing an integrated and long-term performance measurement framework. The findings show that Information Technology plays

an important role as a mediating variable in strengthening the relationship between management control systems and strategic decisions. The use of IT enables real-time data integration and analytics that support evidence-based decision making. However, the effectiveness of IT is highly dependent on the alignment of control system design and organizational culture that encourages digital innovation. In practical terms, this study confirms the need to recalibrate control and performance measurement systems to make them more adaptive to changes in the external environment. PTS is advised to integrate MCS and BSC with an IT platform connected to a single data-based management system. This approach will strengthen the institution's ability to respond to global dynamics and increase competitiveness through accurate, efficient, and sustainable strategic decision-making.

Further research is recommended to add organizational culture and strategic leadership variables as moderating or mediating variables to deepen understanding of the relationship between Management Control Systems, Balanced Scorecard, and Strategic Decision Making. An adaptive organizational culture can strengthen the effectiveness of control systems and information technology implementation, while strategic leadership plays an important role in directing vision and data-based strategy implementation. In addition, the innovation capability variable can also be considered to explain the extent to which organizations are able to transform information into competitive advantage in the context of dynamic higher education.

BIBLIOGRAPHY

Artikel, R., Aini, L., #1, , Riyanti, S., #2, H., & #3, F. (2023). Balanced Scorecard Implementation in Indonesia's Universities: Systematic Literature Review. Jurnal Teknik Informatika Dan Sistem Informasi, 9(1), 54-68–54 – 68. https://doi.org/10.28932/JUTISI.V9I1.5712

Betto, F., Sardi, A., Garengo, P., & Sorano, E. (2022). The Evolution of Balanced Scorecard in Healthcare: A Systematic Review of Its Design, Implementation, Use, and Review. International Journal of Environmental Research and Public Health, 19(16), 10291. https://doi.org/10.3390/IJERPH191610291

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. Accounting, Organizations and Society, 28(2–3), 127–168. https://doi.org/10.1016/S0361-3682(01)00027-7

Dariyo, A., Uwes, S., & Tumanggor, R. O. (2022). The Implementation of the Balanced Scorecard for Improving Quality of Education. Nidhomul Haq : Jurnal Manajemen Pendidikan Islam, 7(3), 451–464. https://doi.org/10.31538/NDH.V7I3.2625

Dávila, A., Derchi, G. B., Oyon, D., & Schnegg, M. (2024). External complexity and the design of management control systems: a case study. Management Accounting Research, 63, 100875. https://doi.org/10.1016/J.MAR.2023.100875

De Jesus Alvares Mendes Junior, I., & Alves, M. D. C. (2023). The balanced scorecard in the education sector: A literature review. Cogent Education, 10(1). https://doi.org/10.1080/2331186X.2022.2160120

Dudycz, H., Hernes, M., Kes, Z., Mercier-Laurent, E., Nita, B., Nowosielski, K., Oleksyk, P., Mieczyslaw, L. O., Palak, R., Pondel, M., & Wojtkiewicz, K. (2022). A conceptual framework of Intelligent Management Control System for Higher Education. https://arxiv.org/pdf/2201.06969

Fadhila, Z., & Mahyudin, M. (2024). Information Technology Support and Accounting Digitalization on Business Development Potential with Knowledge Management as an Intervening Variable in Micro, Small and Medium Enterprises in Deli Serdang Regency. Jurnal Akuntansi Hukum Dan Edukasi, 1(2), 583–593. https://www.rayyanjurnal.com/index.php/jahe/article/view/3843

Fadila, Z., Mahyudin, M., & Martin, M. (2024). Efektivitas Penerapan E-Commerce Dalam Perkembangan Usaha Mikro Kecil dan Menengah di Kota Medan. Innovative: Journal Of Social Science Research, 4(4), 10245–10256. https://doi.org/10.31004/INNOVATIVE.V4I4.14384

Gomez-Conde, J., Lopez-Valeiras, E., Rosa, F. S., & Lunkes, R. J. (2022). The effect of management control systems in managing the unknown: Does the market appreciate the breadth of vision? Review of Managerial Science, 17(8), 1. https://doi.org/10.1007/S11846-022-00601-0

Guo, B., Paraskevopoulou, E., & Santamaría Sánchez, L. (2019). Disentangling the Role of Management Control Systems for Product and Process Innovation in Different Contexts. European Accounting Review, 28(4), 681–712. https://doi.org/10.1080/09638180.2018.1528168

Henri, J. F. (2006). Management control systems and strategy: A resource-based perspective. Accounting, Organizations and Society, 31(6), 529–558. https://doi.org/10.1016/J.AOS.2005.07.001

Hourani, M., & Abdali, S. (2017). Performance Evaluation for Private Higher Education institutions Using Balanced Scorecard. Al-Balqa Journal for Research and Studies, 20(1), 59–91. https://doi.org/10.35875/1105-020-001-010

Huber, C., Kraus, K., & Meidell, A. (2025). Integrating the balanced scorecard and enterprise risk management: Exploring the dynamics between management control anchor practices and subsidiary practices. Management Accounting Research, 66, 100924. https://doi.org/10.1016/J.MAR.2024.100924

Khoirotul Fatha, M., Dewi, A., Wulansari, A., Studi, P., Informasi, S., Komputer, I., & Timur, J. (2024). Pemanfaatan Framework IT-BSC Dalam Pengukuran Kinerja Sistem Informasi Manajemen Rumah Sakit (SIMRS): Systematic Literature Review. TeknoIS : Jurnal Ilmiah Teknologi Informasi Dan Sains <eISSN 2597-8918>, 14(1), 74–79. https://doi.org/10.36350/JBS.V14I1.233

Khristianto, W. (2020). Using It Governance Balanced Scorecard And Importance-Performance Analysis For Developing It Governance In Higher Education Institution (An Empirical Study In East Java, Indonesia). Politico, 20(1), 44–57. https://doi.org/10.32528/POLITICO.V20I1.3427

Koo, K. J., & Le, L. (2024). IT capability and innovation. Technological Forecasting and Social Change, 203, 123359. https://doi.org/10.1016/J.TECHFORE.2024.123359

Kovari, A. (2024). AI for Decision Support: Balancing Accuracy, Transparency, and Trust Across Sectors. Information 2024, Vol. 15, Page 725, 15(11), 725. https://doi.org/10.3390/INFO15110725

Langfield-Smith, & Kim. (1997). Management control systems and strategy: A critical review. Accounting, Organizations and Society, 22(2), 207–232. https://ideas.repec.org/a/eee/aosoci/v22y1997i2p207-232.html

Liangyan, M. A., Ali, H., & Said, R. M. (2024). Pakistan Journal of Life and Social Sciences A Bibliometric Analysis of Balanced Scorecard Research with Higher Education by Vosviewer. Pak. j. Life Soc. Sci, 2, 22. https://doi.org/10.57239/PJLSS-2024-22.2.00825

Lill, P. A., & Wald, A. (2021). The agility-control-nexus: A levers of control approach on the consequences of agility in innovation projects. Technovation, 107, 102276. https://doi.org/10.1016/J.TECHNOVATION.2021.102276

Madsen, D. Ø. (2025). Balanced Scorecard: History, Implementation, and Impact. Encyclopedia 2025, Vol. 5, Page 39, 5(1), 39. https://doi.org/10.3390/ENCYCLOPEDIA5010039

Mahyudin, Nazah, K., & Agustina, A. (2025). Analysis of Digital Transformation Challenges in Mediating Accounting Digitalization and Electronic Commerce (E-Commerce) on Technology- Based Entrepreneurship in Micro, Small and Medium Enterprises in Medan City. JAMPARING: Jurnal Akuntansi Manajemen Pariwisata Dan Pembelajaran Konseling, 3(1), 299–311. https://doi.org/10.57235/JAMPARING.V3I1.4993

Maryani, A., & Nur Wachidah Yulianti. (2023). Penerapan Balanced Scorecard untuk Pengukuran Kinerja Perguruan Tinggi Islam. Jurnal Riset Dan Aplikasi: Akuntansi Dan Manajemen, 6(3). https://doi.org/10.33795/JRAAM.V6I3.001

Mazzei, M. J., DeBode, J., Gangloff, K. A., & Song, R. (2025). Old Habits Die Hard: A Review and Assessment of the Threat-Rigidity Literature. Journal of Management, 51(6), 2154–2181. https://doi.org/10.1177/01492063241286493

Muda, F. P. (2025). Implementation of the Balanced Scorecard in Higher Education Performance Management: A Comparative Study Between Indonesia and International Cases. Klabat Journal of Management, 7(1), 1. https://doi.org/10.60090/KJM.V7I1.1333.1-22

Mufrihah Zain, E., Jamil, A., Firda Sari, R., Jein Andjar, F., & Muhammadiyah Sorong, U. (2025). Balanced Scorecard Analysis On Private University Performance (Study At Economic Faculty Of Muhammadiyah Sorong University). EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 13(1), 221-234–221–234. https://doi.org/10.37676/EKOMBIS.V13I1.6807

Palazzi, F., Sentuti, A., & Sgrò, F. (2025). The institutionalisation of a new management control system: a focus on situated rationality. Journal of Management and Governance, 1–38. https://doi.org/10.1007/S10997-025-09753-Z/FIGURES/2

Pierce, E. (2022). A Balanced Scorecard for Maximizing Data Performance. Frontiers in Big Data, 5, 821103. https://doi.org/10.3389/FDATA.2022.821103

Qazi, A., Yang, Y., Lu, Y., & Fabac, R. (2022). Digital Balanced Scorecard System as a Supporting Strategy for Digital Transformation. Sustainability 2022, Vol. 14, Page 9690, 14(15), 9690. https://doi.org/10.3390/SU14159690

Riatmaja, D. S., Jeprianto, J., & Buana, A. N. H. (2025). Implementation Of Balanced Scorecard Based Educational Management Evaluation Model. Jurnal Ilmiah Edukatif, 11(1), 213–223. https://doi.org/10.37567/JIE.V11I1.3707

Roffia, P., & Dabić, M. (2023). The role of management control and integrated information systems for the resilience of SMEs. Review of Managerial Science, 18(5), 1. https://doi.org/10.1007/S11846-023-00657-6

Sofyani, H., Utami, T. P., & Yani, I. (2024). Management Control System in Higher Education Institutions and Its Role on Performance: Does Gender Matter? APSSAI ACCOUNTING REVIEW, 4(2), 162–177. https://doi.org/10.26418/APSSAI.V4I2.116

Tawse, A., & Tabesh, P. (2023). Thirty years with the balanced scorecard: What we have learned. Business Horizons, 66(1), 123–132. https://doi.org/10.1016/J.BUSHOR.2022.03.005

Teles, J., Lunkes, R. J., & Mendes, A. C. A. (2021). Efeitos interativos dos controles gerenciais, das avaliações cognitivas e reações emocionais no comprometimento afetivo. Revista de Educação e Pesquisa Em Contabilidade (REPeC), 15(3). https://doi.org/10.17524/repec.v15i3.2762

Vale, J., Amaral, J., Abrantes, L., Leal, C., & Silva, R. (2022). Management Accounting and Control in Higher Education Institutions: A Systematic Literature Review. Administrative Sciences, 12(1). https://doi.org/10.3390/ADMSCI12010014

Yu, L., & Zhuo, X. (2025). Real-Time Data Analysis in Enterprise Information-Based Intelligent Manufacturing. Procedia Computer Science, 261, 879–886. https://doi.org/10.1016/J.PROCS.2025.04.417

Zeng, X., Cao, M., Hu, J., & Zhang, W. (2024). The impact of informal control on the innovation performance of female technology professionals from the perspective of role pressure. Frontiers in Psychology, 15, 1378056. https://doi.org/10.3389/FPSYG.2024.1378056/FULL