CARVING THE FUTURE OF EDUCATION: A DATA-DRIVEN AND SWOT STRATEGIC PLAN FOR QUALITY IMPROVEMENT

Shelty Deity Meity Sumual[1]*, Joulanda Altje Meiske Rawis[2], Jeffry Sony Junus Lengkong[3], Yuliana Hartono[4], Jeff Lapian[5]

[12345] Universitas Negeri Manado, Indonesia
*Corresponding Author: sheltysumual@unima.ac.id

Received 17 April 2025; Received in revised form 29 May 2025; Accepted 6 June 2025

ABSTRACT
Sustainable education transformation requires evidence-based and contextually relevant planning strategies. This study explores the integration of data-based planning with SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to improve the strategic planning process in educational institutions. Employing a descriptive qualitative approach through a literature review method, this research examines secondary data obtained from accredited national journals, reputable international journals, and academic books published between 2013 and 2023. The study highlights that the use of valid and measurable data—such as national assessments, satisfaction surveys, and institutional performance indicators—significantly enhances the accuracy of SWOT analysis. This integrative approach enables the formulation of more accurate, reflective, and results-oriented educational strategies. However, the implementation of this model still faces several challenges, including low levels of data literacy among educators, limited access to integrated information systems, and the lack of structured training in strategic planning at the school level. This study contributes to the body of knowledge in education management by offering a conceptual framework that combines data-driven decision-making with SWOT analysis. The implications underline the need to strengthen institutional capacity and promote policy support for data-based planning to ensure adaptive and sustainable improvements in education quality.

Keywords: strategic planning; SWOT analysis; data-driven; education quality; education management

INTRODUCTION

Education serves as a critical instrument for national development, shaping human resources that are intellectually capable, globally competitive, and morally grounded (Fullan, 2007; Abdjul, 2022). In the era of rapid digitalization and globalization, the educational landscape is undergoing unprecedented transformations. These changes bring multidimensional challenges that go beyond classroom instruction, demanding a reorientation of how learning is designed, delivered, and evaluated. Nations worldwide, including Indonesia, are striving to align their education systems with the competencies needed for the 21st century—such as critical thinking, collaboration, creativity, and digital literacy (Apriansyah, 2020; OECD, 2019). Within this context, the Indonesian education system has embarked on numerous reforms aimed at improving quality and equity. Initiatives such as competency-based curricula, national assessment mechanisms, and continuous professional development for teachers are part of these reform agendas (Bala et al., 2023). However, systemic issues persist, especially concerning the implementation and monitoring of these reforms. The fundamental challenge lies in the education system's heavy reliance on reactive, intuition-based decision-making rather than systematic, evidence-driven planning (Mayer, 2009; Mangelep et al., 2023; Mandinach & Gummer, 2016).

The primary issue confronting educational institutions is the disconnection between planning and empirical data. Many school work programs and improvement initiatives are based on general assumptions or routine administrative habits rather than contextualized, data-informed strategies (Sugiono & Haryanto, 2020; Ministry of Education and Culture, 2022). As a result, policies often fail to address the actual needs of students, teachers, or the wider school environment, leading to suboptimal outcomes and widening gaps in education quality across different regions (Telaumbanua, 2023; Mangelep et al., 2024). To overcome these challenges, a shift towards data-driven strategic planning is being recognized as a general solution.

This approach enables schools to develop policies and interventions based on learning assessment data, institutional audits, satisfaction surveys, and other quantifiable indicators (Mandinach & Gummer, 2016; Jimerson & Wayman, 2015). Strategic decisions grounded in data ensure contextual relevance, enable continuous improvement, and foster transparency and accountability in school governance (World Bank, 2020; Mangelep et al., 2023).

One specific strategic approach widely applied across sectors, including education, is the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). This method helps organizations identify their internal capabilities and external challenges, forming the basis for strategic development (Ghazinoory, Abdi & Azadegan-Mehr, 2011). In education, SWOT analysis is utilized to guide planning by mapping institutional resources and challenges, yet it often suffers from subjectivity when not backed by data (Mangelep et al., 2024). To enhance its effectiveness, integration with data analytics has been recommended. Combining SWOT analysis with data-based evidence creates a comprehensive framework where objective data informs strategic insights, and SWOT provides a structured format to analyze and act on these insights (Puspitasari, Rahayu & Rukmana, 2022). Robbins and Coulter (2018) further emphasized that such an integrated approach facilitates a more accurate understanding of institutional needs and increases the success rate of strategic programs by aligning them with real-world conditions. Empirical studies support the efficacy of this integration. Hartati (2019) and Setiawan & Darmawan (2020) reported improvements in institutional performance and student achievement after implementing data-informed SWOT strategies. Their findings show enhanced resource allocation, faster problem resolution, and improved school accreditation levels. Thus, data-SWOT integration emerges as a promising framework for school-based strategic planning.

While the theoretical advantages of integrating data-driven planning with SWOT analysis are well-documented, several practical gaps remain in the literature. Gunawan (2012) found that many school leaders lack the training and technical capacity to apply evidence-based planning effectively. The absence of robust and user-friendly education management information systems (EMIS) further hampers the process, making it difficult to collect, interpret, and act on educational data meaningfully. Moreover, existing literature tends to treat data-based planning and SWOT analysis as separate strategies rather than as complementary processes. Most studies highlight either the need for better data use or the utility of SWOT but stop short of offering a practical framework for integrating both at the education unit level (Jimerson & Wayman, 2015; Mangelep et al., 2024). This indicates a clear research gap: the need for a conceptual and operational model that bridges data analysis with strategic planning tools like SWOT, specifically tailored to the realities of educational institutions in developing contexts. Additionally, little attention has been given to how school leadership, data literacy, and institutional readiness influence the implementation of integrative strategies. There is limited evidence on how schools, particularly in low-resource environments, can institutionalize this dual approach for long-term quality improvement (Telaumbanua, 2023; Puspitasari et al., 2022). This underscores the necessity for further inquiry that not only conceptualizes but also tests and refines a practical model for integrative, data-based strategic education planning.

This study is driven by the objective to develop and validate a conceptual and practical framework for quality improvement in educational units through an integrated data-based and SWOT analysis approach. The research seeks to answer the following questions: How can educational units systematically integrate data analysis with SWOT frameworks in strategic planning? What are the critical components and conditions necessary to implement this integrative approach effectively? What are the measurable impacts of this integration on institutional performance, decision-making transparency, and quality outcomes? The novelty of this research lies in its effort to synthesize two often independently used strategies—data-driven decision-making and SWOT analysis—into a single, actionable model suitable for education units. Unlike previous studies that focus on either approach in isolation, this study offers a unified methodology grounded in empirical evidence, applicable even in resource-limited settings. The hypothesis posited is that the integration of data-based decision-making with SWOT analysis will lead to more effective, responsive, and sustainable education quality improvement strategies. The scope of the study encompasses: A critical literature review of data-driven educational planning and SWOT application in education. The design of an integrative conceptual framework and its practical adaptation for school-level implementation. The collection and analysis of empirical data to test the feasibility and impact of the proposed model in selected educational units. Ultimately, this research intends to contribute to both academic scholarship and practical

policymaking in education. It aims to provide school leaders, policymakers, and education practitioners with a scalable and adaptive planning tool that can bridge the current gap between data insights and strategic action. As schools around the world navigate the challenges of the post-pandemic era, globalization, and technological disruption, such tools become not just beneficial—but essential.

METHOD

This study adopts a **qualitative literature review approach** aimed at conducting an in-depth analysis, synthesis, and integration of existing knowledge surrounding the use of data-based decision-making and SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis in educational strategic planning. The qualitative literature review method is especially appropriate when the objective is to explore complex theoretical frameworks, evaluate best practices across multiple contexts, and develop a conceptual foundation for future empirical studies (Booth, Papaioannou, & Sutton, 2016). This method is distinct from empirical research, as it does not involve the collection of primary data but rather synthesizes secondary sources to draw analytical conclusions.

The main purpose of this qualitative literature review is to: Examine theoretical developments and best practices regarding educational quality improvement strategies. Analyze how the integration of **data-driven approaches** and **SWOT analysis** has been conceptualized and applied in the education sector. Identify research gaps and propose a conceptual model for implementing such integration at the institutional level. This approach enables a broader understanding of the field while avoiding the logistical constraints of primary data collection. It allows for synthesizing knowledge from diverse contexts and time periods, enhancing the generalizability and richness of findings.

Sources of Data

The data sources in this study are exclusively secondary and were obtained through systematic searches of scholarly databases and academic repositories. To ensure the scientific credibility and reliability of the findings, only peer-reviewed and accredited publications were selected. The types of literature used in this research include three main categories. First, national scientific journals accredited and indexed in SINTA (Science and Technology Index) were used to capture the Indonesian context of education quality management. Second, international journals indexed in Scopus and the Directory of Open Access Journals (DOAJ) were reviewed to integrate global perspectives and empirical findings. Third, academic textbooks commonly used in the fields of educational management and strategic planning were examined for foundational theories and conceptual frameworks. To maintain the relevance and currency of the literature, the scope of publication years was limited to a ten-year period, specifically from 2013 to 2023. This time frame was selected based on the rationale that educational strategies and institutional practices have undergone substantial transformations over the past decade, particularly due to the impact of digital technology and globalization. Limiting the review to this range ensures that the study incorporates the most recent and applicable developments in both theory and practice (Snyder, 2019).

Literature Search Strategy

The literature search process was carried out systematically using several academic databases and platforms, including Google Scholar, ScienceDirect, Taylor & Francis, and the Garuda Ristek-BRIN repository. These platforms were chosen for their broad coverage of both national and international scientific publications. To maximize the relevance and quality of the literature retrieved, a carefully constructed combination of keywords was employed. The keywords used in the search included: “education quality improvement strategy,” “education SWOT analysis,” “data-driven education,” and “school strategic management.” These search terms were selected to capture a wide range of literature that addresses both conceptual and practical aspects of strategic planning in education. This strategy enabled the identification of diverse studies originating from various institutional contexts, regions, and methodological traditions, thereby enriching the depth and scope of the analysis (Hartati, 2019; Mandinach & Gummer, 2016). To maintain the rigor and relevance of the literature review, the collected sources were filtered using a set of clearly defined inclusion and exclusion criteria. These criteria served to ensure that only publications directly relevant to the research focus were included in the final analysis.

Table 1. Inclusion and Exclusion Criteria for Literature Selection

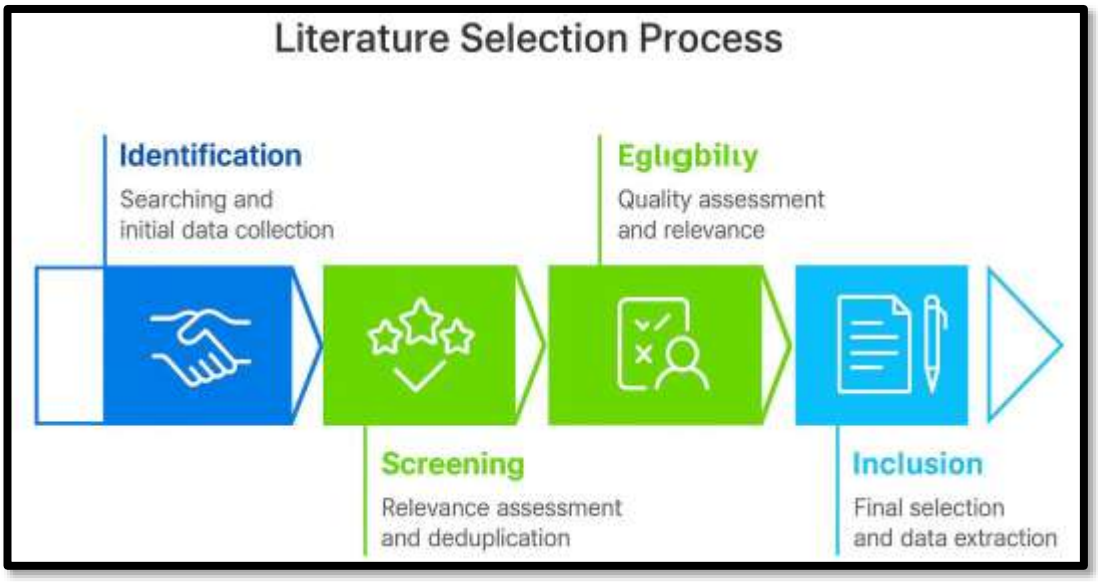
Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles or scholarly books	Opinion pieces, blog posts, and non-scholarly publications
Discuss data-based decision-making or SWOT analysis in educational contexts	Articles not focused on education or irrelevant to the topic
Published between 2013 and 2023	Publications outside the time range
Indexed in recognized academic databases (e.g., SINTA, Scopus, DOAJ)	Unindexed or unverifiable publications
Available in full-text and published by credible institutions or scientific publishers	Abstract-only papers or those with access restrictions

This selection process was designed to uphold academic integrity and reduce the possibility of bias in the findings (Ghazinoory, Abdi, & Azadegan-Mehr, 2011).

Data Analysis Procedure

The data in this study were analyzed using qualitative content analysis, a method that systematically identifies, categorizes, and synthesizes recurring themes and patterns from the selected literature (Miles & Huberman, 1994; Creswell, 2014). This approach enables researchers to distill complex textual information into meaningful categories that reflect the conceptual landscape of the field under investigation. To structure the analysis, the literature was coded into several thematic categories that emerged during the review process. These categories include: (1) the role of data in educational planning, which explores how data supports evidence-based decision-making; (2) the application and limitations of SWOT analysis within educational institutions; (3) the integration of data-based strategies with SWOT frameworks, which looks at conceptual and practical models combining the two approaches; and (4) the barriers and challenges in implementation, which addresses obstacles related to resources, capacity, and system readiness. The study applied an iterative review process, where themes were refined and expanded as more relevant literature was incorporated. This dynamic approach allowed the identification of relationships between concepts, the synthesis of theoretical and empirical findings, and the development of a comprehensive framework for strategic planning in education. Through this continuous refinement, the analysis provides a robust foundation for understanding both the potential and limitations of integrating data-driven approaches with SWOT analysis in the context of improving educational quality.

Figure 1. Literature Selection Flow Chart in This Study



(Source: Adapted from Snyder, 2019)

Triangulation and Validity

To ensure the validity and credibility of the findings, this study applied methodological triangulation aimed at minimizing interpretation bias and strengthening the reliability of the analysis. This process involved comparing and cross-checking results obtained from various types of literature, including national journals, international peer-reviewed journals, and academic textbooks. By incorporating a diverse range of sources, the study was able to validate emerging themes across different contexts and ensure that the interpretations were not limited to a particular geographic or institutional setting. Additionally, the researcher maintained consistency in the use of analytical categories, terminology, and conceptual frameworks throughout the study. This consistency supports a coherent analysis and ensures that thematic coding remains reliable across different stages of the review. The triangulation process also served to enhance the robustness and generalizability of the study's findings by reinforcing them with multiple lines of scholarly evidence. These steps collectively contribute to the trustworthiness of the review and uphold the standards of scientific rigor, making the study replicable and expandable in future research endeavors (Sugiyono, 2018; Snyder, 2019).

RESULTS AND DISCUSSION

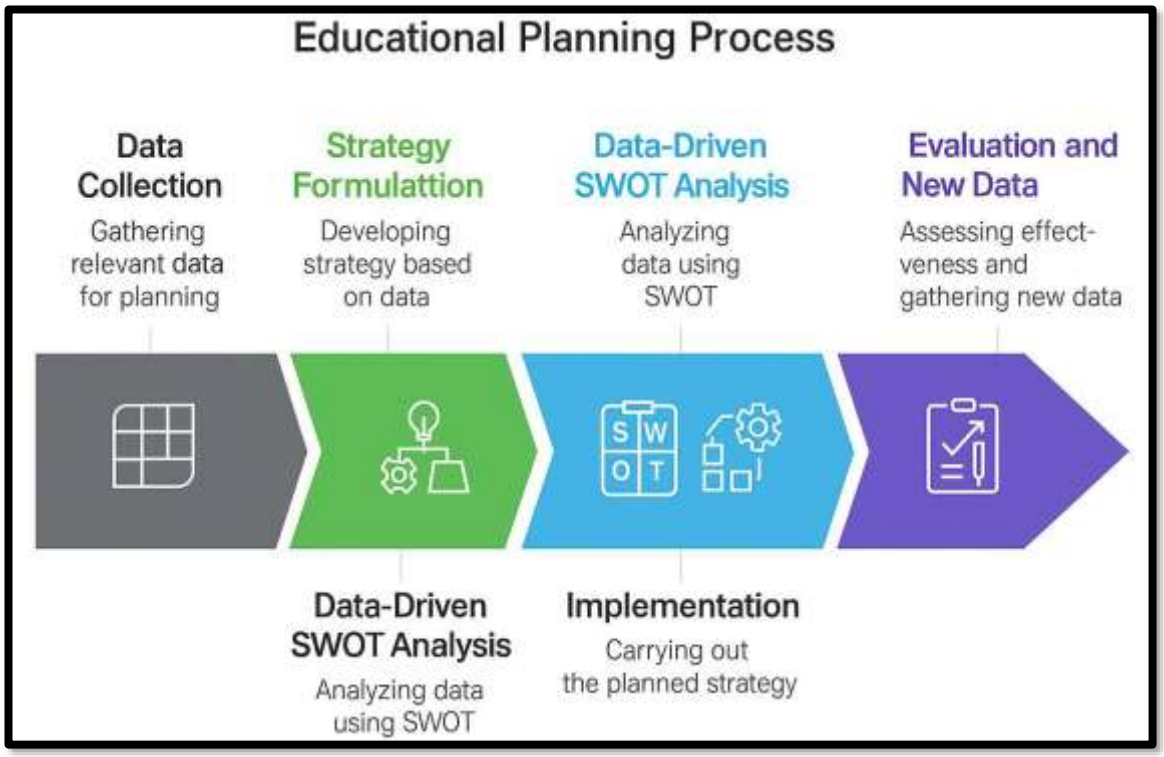
The results of this literature review reveal that the implementation of data-based strategic planning significantly improves the quality of educational management across diverse institutional settings. Data derived from national assessments, student attendance records, satisfaction surveys among students and teachers, and various institutional performance indicators serve as key sources of information in policy formulation and strategic decision-making (Mandinach & Gummer, 2016). Educational institutions that systematically integrate data into their planning processes tend to demonstrate higher accountability, more efficient resource utilization, and improved student learning outcomes. This type of quantitative data provides an objective foundation for setting policy priorities, monitoring program implementation, and conducting ongoing evaluations. In alignment with these findings, SWOT analysis remains a relevant and widely utilized framework in formulating education strategies. The use of SWOT enables educational institutions to comprehensively map internal strengths and weaknesses, along with external opportunities and threats. Strengths such as qualified educators, a supportive academic culture, community engagement, and the availability of learning resources serve as key strategic assets. Conversely, weaknesses—such as inadequate facilities, low parental involvement, or limited instructional innovation—must be addressed through targeted interventions. Similarly, accurate identification of opportunities and threats enables schools to anticipate external shifts, such as new policy regulations or socio-economic changes in their surrounding communities.

Integrating data-driven approaches with SWOT analysis has been proven to enhance the precision and validity of strategic planning in educational contexts. The incorporation of empirical data allows for a more accurate identification of SWOT components, reduces perceptual bias, and strengthens objectivity in situation analysis (Puspitasari, Rahayu, & Rukmana, 2022). Conversely, the SWOT framework helps structure and interpret the data strategically, facilitating the alignment of quantitative insights with institutional planning. This synergy results in strategic decisions that are both evidence-based and contextually appropriate. Empirical evidence of the success of this integrated approach can be observed in the study conducted by Hartati (2019), which showed that schools implementing the model experienced improvements in their accreditation status within a three-year period. The study involved analyzing data on student achievement, teacher attendance, and institutional management performance to identify internal strengths and weaknesses. This information was then embedded in a SWOT framework to formulate strategies aimed at enhancing teacher competencies, revitalizing school facilities, and expanding partnerships with external stakeholders. As a result, the schools demonstrated substantial improvements in both service quality and institutional reputation. This process is illustrated in Figure 2, which presents a visual model of integrating data-driven approaches with SWOT analysis in the educational planning cycle.

Despite the promising outcomes, several challenges hinder the optimal implementation of this integrative strategy. One significant barrier is low data literacy among school principals and teachers. Many educational professionals lack the necessary skills to collect, process, interpret, and apply data effectively in their decision-making processes (Gunawan, 2012). This deficiency is often compounded by the absence of comprehensive training in data-based management and strategic planning. Without systematic professional development programs, the full potential of the data-driven and SWOT-based approach cannot

be realized. Another critical challenge is the lack of robust educational management information systems (EMIS), particularly in remote and under-resourced schools. The data available in such contexts is often outdated, fragmented, or not standardized, leading to inaccuracies in the SWOT analysis and, subsequently, in the formulation of strategic plans. The absence of integrated systems restricts the ability of educational institutions to monitor performance in real-time or adapt plans based on updated information. To address these challenges, the literature offers several key recommendations. Bryson (2011) emphasizes the importance of creating an institutional ecosystem that supports effective data usage. This includes providing ongoing training in data literacy, ensuring access to reliable information technology infrastructure, and fostering an organizational culture that values reflection and evaluation. Furthermore, support from government bodies—such as the development of an integrated national EMIS—can significantly accelerate the adoption of this approach. These factors are summarized in Table 2.

Figure 2. Integration Model of Data-Driven and SWOT Approaches in Educational Planning



(Source: Adapted from Puspitasari, Rahayu, & Rukmana, 2022)

Table 2. Supporting and Inhibiting Factors for the Implementation of Integrative Strategies

Aspects	Supporting Factors	Inhibiting Factors
Human Resources	High data literacy, strategic training	Low data literacy, lack of training
Infrastructure	Integrated information system	Inadequate data system
Organizational Culture	Reflective and evaluative culture	Reactive culture, minimal reflection
Policy Support	Evidence-based regulation, supervision programs	Lack of data-driven regulation

(Source: Processed from Gunawan, 2012; Bryson, 2011)

The synthesis of the literature further suggests that integrating data-based decision-making and SWOT analysis improves not only academic performance but also the managerial and institutional capacities of schools. Institutions that successfully adopt this model tend to demonstrate better needs-based planning, more efficient resource management, increased accountability, and stronger adaptive capabilities in

response to external changes. These findings affirm Fullan's (2007) assertion that educational innovation is inseparable from an institution's capacity to reflect systematically and act strategically based on a thorough understanding of its strengths and weaknesses. When supported by the right institutional ecosystem, this integrative approach can drive sustained educational transformation, especially in the current era of technological disruption and globalization. Furthermore, the results of this study align with the work of Mandinach and Gummer (2016), who emphasized the importance of using data as the foundation for rational and objective educational decisions. Data from national assessments, student attendance records, and institutional performance indicators offer a solid empirical base for diagnosing educational problems and developing targeted interventions. Integrating this data with SWOT analysis enhances the accuracy of strategic planning and reduces the speculative nature often found in traditional planning approaches.

The literature by Ghazinoory, Abdi, and Azadegan-Mehr (2011) similarly highlights that conventional SWOT analysis, when not supported by data, tends to be subjective. Thus, strengthening SWOT with empirical evidence is essential to increase its validity. Hartati's (2019) findings support this notion, demonstrating how data-based SWOT analysis can lead to meaningful improvements in teacher training, facilities development, and institutional partnerships—ultimately resulting in better school performance and accreditation outcomes. As noted earlier in Table 2, several factors determine the success or failure of the integrated model. While supportive elements such as high data literacy and policy backing facilitate adoption, obstacles like limited technical capacity and unsupportive organizational culture present serious challenges. Therefore, increasing educators' data literacy—as Mandinach and Gummer (2016) recommend—should be a national priority, alongside investments in EMIS infrastructure and regular professional development. Figure 2 further demonstrates how data collection, SWOT-based analysis, strategy formulation, implementation, and evaluation form a continuous, cyclical process. Each stage depends on the availability and analysis of updated data, reinforcing the principle of continuous improvement, as articulated by Bryson (2011). This model supports the development of adaptive planning strategies that respond effectively to emerging educational demands and environmental shifts.

In this context, the implementation of this integrative model is closely tied to the broader movement toward evidence-based educational management. According to Snyder (2019), schools that embrace evidence-based approaches are more adaptive, more efficient in resource use, and better positioned to navigate change. With a data-driven SWOT framework, educational institutions can formulate strategies that are not only internally efficient but also externally competitive. Nonetheless, the study indicates that successful implementation requires deep institutional reform. As Fullan (2007) points out, real transformation involves changing not just rules and procedures but also organizational culture. A reflective, data-centered culture must be fostered, where data serves as the backbone of all planning, monitoring, and evaluation processes.

Support from external actors—such as ministries, universities, and professional organizations—is equally vital. The World Bank (2020) notes that successful education reform in various countries often hinges on national policies that promote data-based decision-making, enhance the professional capacity of school leaders, and ensure access to robust information systems. In the Indonesian context, initiatives like education data transparency programs, national training in data literacy, and performance-based funding could serve as strategic levers to foster adoption. Finally, sustaining this integrative model requires ensuring the quality and integrity of the data used. Incomplete, outdated, or irrelevant data can lead to misleading analyses and poorly informed decisions. Therefore, investing in data validation, verification processes, and training for data operators, along with integrating reporting systems across education governance levels, becomes essential. This supports Snyder's (2019) view that the success of data-based management is highly dependent on the accuracy, availability, and usability of the data being employed.

CONCLUSION

This study reveals that the integration of data-based strategic planning and SWOT analysis constitutes an effective and highly relevant approach to improving educational quality and institutional performance. By utilizing valid, measurable, and contextually appropriate data, educational institutions can formulate strategies that are more accurate, targeted, and responsive to real needs. The use of SWOT analysis complements this process by offering a structured and reflective framework that facilitates the identification of internal and external factors influencing institutional performance. The combination of these two

approaches fosters the development of strategies that are evidence-based, contextual, and results-oriented. However, the study also highlights several challenges in implementing this integrative approach. These include low levels of data literacy among school leaders and educators, inadequate educational information system infrastructure—particularly in underdeveloped or remote areas—and a general lack of training in data-based strategic management. The implications of these findings emphasize the need for systemic support from multiple stakeholders, including initiatives to strengthen human resource capacities through professional development, investment in integrated and user-friendly information systems, and the cultivation of a reflective, data-driven organizational culture that supports continuous evaluation and improvement. From a theoretical and practical standpoint, this study contributes to the growing body of knowledge in the field of educational management by offering a conceptual and applicative framework for integrating data-based approaches and SWOT analysis into the strategic planning processes of educational units. This contribution not only enriches academic discourse on the strategic use of data in educational decision-making but also offers concrete guidance for institutional leaders seeking to enhance their responsiveness and effectiveness in a rapidly changing educational landscape. For future research, it is recommended to explore the application of this integrative model across different geographical regions and levels of education, from primary schools to higher education institutions. Additionally, future studies should consider examining how emerging technologies—such as big data analytics and artificial intelligence—can further strengthen the accuracy, timeliness, and predictive value of educational strategic planning. These directions will help ensure that educational institutions continue evolving toward adaptive, data-informed, and innovation-driven practices capable of meeting 21st-century challenges.

REFERENCES

Abdjul, A. (2022). Penerapan model discovery learning dalam meningkatkan hasil belajar siswa. Jurnal Pendidikan dan Pembelajaran, 12(3), 45–53.

Apriansyah, R., Hasanah, A., & Firmansyah, D. (2020). Video animasi sebagai media pembelajaran untuk meningkatkan pemahaman konsep IPA. Jurnal Inovasi Pendidikan IPA, 6(2), 123–130.

Bala, R., Sutrisno, & Wahyuni, S. (2023). Efektivitas model discovery learning dalam meningkatkan hasil belajar siswa. Jurnal Pendidikan Indonesia, 11(1), 25–36.

Booth, A., Papaioannou, D., & Sutton, A. (2016). Systematic approaches to a successful literature review (2nd ed.). SAGE Publications.

Bryson, J. M. (2011). Strategic planning for public and nonprofit organizations: A guide to strengthening and sustaining organizational achievement (4th ed.). Jossey-Bass.

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. Applied Developmental Science, 24(2), 97–140. https://doi.org/10.1080/10888691.2018.1537791

Fullan, M. (2007). The new meaning of educational change (4th ed.). Teachers College Press.

Ghazinoory, S., Abdi, M., & Azadegan-Mehr, M. (2011). SWOT methodology: A state-of-the-art review for the past, a framework for the future. Journal of Business Economics and Management, 12(1), 24–48. https://doi.org/10.3846/16111699.2011.555358

Gunawan, I. (2012). Manajemen pendidikan: Perspektif strategis. Bumi Aksara.

Hartati, S. (2019). Implementasi perencanaan strategis berbasis data di sekolah dasar. Jurnal Manajemen Pendidikan, 10(1), 67–76.

Jimerson, J. B., & Wayman, J. C. (2015). Professional learning for using data: Examining teacher needs and supports. Teachers College Record, 117(4), 1–36.

Kemendikbudristek. (2022). Kebijakan transformasi pendidikan berbasis data. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Mandinach, E. B., & Gummer, E. S. (2016). Data literacy for educators: Making it count in teacher preparation and practice. Teachers College Press.

Mangelep, N. O., Tarusu, D. T., Ester, K., & Ngadiorejo, H. (2023). Local instructional theory: Social arithmetic learning using the context of the monopoly game. Journal of Education Research, 4(4), 1666–1677.

Mangelep, N. O., Mahniar, A., Nurwijayanti, K., Yullah, A. S., & Lahunduitan, L. O. (2024). Pendekatan analisis terhadap kesulitan siswa dalam menghadapi soal matematika dengan pemahaman koneksi materi trigonometri. Jurnal Review Pendidikan dan Pengajaran (JRPP), 7(2), 4358–4366.

Mangelep, N. O., Mahniar, A., Amu, I., & Rumintjap, F. O. (2024). Fuzzy simple additive weighting method in determining single tuition fees for prospective new students at Manado State University. Innovative: Journal of Social Science Research, 4(3), 5700–5713.

Mangelep, N. O., Pongoh, F. M., Sulistyaningsih, M., Mandolang, E., & Mahniar, A. (2024). Social arithmetic learning design using the sociodrama method with the PMRI approach. MARISEKOLA: Jurnal Matematika Riset Edukasi dan Kolaborasi, 5(2).

Mangelep, N. O., Runtu, P. V., Rumintjap, F. O., Tarusu, D. T., & Kambey, A. N. (2025). Improving the quality of research and publications in Scopus journals for lecturers and students. Community Development Journal: Jurnal Pengabdian Masyarakat, 6(1), 985–990.

Mayer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge University Press.

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded sourcebook (2nd ed.). SAGE Publications.

OECD. (2019). Trends shaping education 2019. OECD Publishing. https://doi.org/10.1787/trends_edu-2019-en

Puspitasari, R., Rahayu, D., & Rukmana, D. (2022). Integrasi analisis SWOT dan data-driven decision making dalam perencanaan pendidikan. Jurnal Ilmiah Manajemen Pendidikan Indonesia, 7(2), 121–134.

Robbins, S. P., & Coulter, M. (2018). Management (14th ed.). Pearson.

Setiawan, D., & Darmawan, I. (2020). Pengaruh penerapan perencanaan strategis berbasis data terhadap mutu pendidikan. Jurnal Pendidikan dan Kebudayaan, 25(3), 45–56.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of Business Research, 104, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Sugiono, & Haryanto, D. (2020). Strategi manajemen mutu pendidikan. Alfabeta.

Sugiyono. (2018). Metode penelitian kombinasi (Mixed Methods). Alfabeta.

Telaumbanua, Y. (2023). Pengaruh model discovery learning terhadap kemampuan berpikir kritis siswa. Jurnal Pendidikan dan Pengajaran, 56(2), 211–222.

World Bank. (2020). Realizing the future of learning: From learning poverty to learning for everyone, everywhere. The World Bank.