DIJEFA: Dinasti International Journal of Economics, Finance & Accounting
E-ISSN: 2721-303X
P-ISSN: 2721-3021
https://dinastipub.org/DIJEFA dinasti.info@gmail.com +62 811 7404 455
DOI: https://doi.org/10.38035/dijefa.v7i5.7498
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Received: 10 October 2026 | **Revised:** 02 November 2026 | **Accepted:** 11 November 2026

A Systematic Literature Review of Leadership, Innovation Capabilities, and Technology Adoption for Sustainable School Performance

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Abstract: Sustainable school performance has become a strategic issue in light of technological advancements and the demand for improved educational quality. This study aims to analyze the relationship between leadership, innovation capabilities, technology adoption, and sustainable school performance through a Systematic Literature Review (SLR) approach. The research methodology follows the PRISMA guidelines, utilizing scientific articles indexed published in Scopus between 2016 and 2026. The results indicate that leadership plays a role in establishing a vision, fostering innovation, and facilitating technology adoption. Innovation capabilities strengthen a school's ability to adapt and implement continuous improvement, while technology adoption enhances administrative efficiency, the quality of learning, and data-driven decision-making. The integration of these three factors has the potential to support sustainable school performance. However, research that examines the relationship among all three simultaneously remains limited, particularly in developing countries. This study contributes through a literature synthesis, the identification of research gaps, and the formulation of a research agenda for the development of conceptual models and empirical studies in the field of educational management.

Keywords: Systematic Literature Review, leadership, innovation capabilities, technology adoption, sustainable school performance.

INTRODUCTION

The increasingly dynamic changes in the educational environment require schools to adapt to technological advancements, policy changes, and rising public expectations regarding the quality of educational services. In the era of digital transformation, schools no longer focus solely on academic achievement but are also expected to build sustainable performance. The concept of sustainable school performance refers to a school's ability to maintain and improve the quality of education on an ongoing basis through effective resource management, organizational innovation, the ability to adapt to environmental changes, and leadership capable of guiding organizational transformation.

One factor considered crucial to achieving sustainable school performance is leadership. Leadership is a leader's ability to influence, guide, and motivate the entire school community to achieve organizational goals. In the context of education, leadership plays a role in building a shared vision, creating a positive organizational culture, managing change, enhancing collaboration, and fostering innovation within the school environment. Effective school leaders are able to create a conducive work environment, support teachers' professional development, and ensure that policies and technologies are implemented optimally, thereby contributing to the sustainable improvement of school performance.

In addition to leadership, innovation capability is also a key factor in improving school performance. Innovation capability refers to an organization's ability to generate, develop, and implement new ideas, processes, and practices that can enhance the organization's effectiveness. In the context of schools, innovation capability is reflected in the development of teaching methods, the enhancement of teacher competencies, innovations in school governance, and the school's ability to respond to challenges and opportunities arising from changes in the educational environment. Schools with strong innovation capabilities tend to be more adaptable to change and capable of creating sustainable advantages.

Furthermore, the adoption of technology is also a strategic factor that supports improvements in school performance. Advances in digital technology have transformed various aspects of educational management, ranging from the learning process, school administration, and communication with stakeholders to data-driven decision-making. The implementation of various technologies such as Learning Management Systems (LMS), Artificial Intelligence (AI), cloud computing, and school management information systems provides schools with opportunities to enhance both operational efficiency and the quality of educational services. However, the success of technology adoption is not solely determined by the availability of infrastructure but is also influenced by school leadership, organizational readiness, human resource competencies, and a culture of innovation that thrives within the school environment.

Various previous studies have examined the relationship between leadership, innovation capabilities, technology adoption, and the performance of educational organizations. Most studies indicate that leadership contributes to increased organizational effectiveness through sound decision-making, change management, and the empowerment of human resources. On the other hand, innovation capabilities have been shown to enhance an organization's ability to adapt to change and foster continuous improvement, while technology adoption contributes to improved administrative efficiency, learning quality, and data-driven decision-making. Nevertheless, research on the relationship between these three variables and the sustainable performance of schools still yields mixed results and is generally conducted in a piecemeal manner. Furthermore, most studies focus primarily on the business sector or higher education, while studies specifically addressing schools as educational organizations remain relatively limited.

This situation indicates the existence of a research gap that requires further investigation. To date, there have not been many studies that systematically integrate empirical findings on leadership, innovation capabilities, technology adoption, and sustainable school performance into a single comprehensive study. However, an integrated understanding of the relationships among these variables is crucial for providing an overview of research developments, emerging trends, the theories employed, dominant research methods, and future research opportunities.

To address this gap, this study employs the Systematic Literature Review (SLR) method, which enables the identification, evaluation, and synthesis of the literature to be conducted in a systematic, transparent, and replicable manner. Through this approach, various published studies were comprehensively analyzed to identify patterns of relationships among variables, research trends, methodological characteristics, and directions for future research in the field of educational management. The SLR approach also helps minimize bias in the article selection

process, resulting in a more objective synthesis of scientific evidence compared to a narrative literature review.

Based on this background, this study aims to identify, evaluate, and synthesize the results of previous research on leadership, innovation capabilities, and technology adoption in relation to sustainable school performance. Specifically, this study analyzes trends in publications, research characteristics, theories used, research methods, and key findings related to the relationships among these variables. In addition, this study also aims to identify research gaps and formulate a future research agenda as a basis for the development of conceptual models and empirical research in the field of educational management.

To achieve these objectives, this study is structured around four research questions (RQs), namely: RQ1: What are the trends in the development of publications on leadership, innovation capabilities, technology adoption, and sustainable school performance in the context of education? RQ2: What theories, research methods, and study characteristics are most commonly used in studies on leadership, innovation capabilities, technology adoption, and sustainable school performance? RQ3: How do empirical findings explain the roles of leadership, innovation capabilities, and technology adoption in improving sustainable school performance? RQ4: What are the research gaps and future research agenda regarding the relationship between leadership, innovation capabilities, technology adoption, and sustainable school performance?

By addressing these four research questions, this study is expected to provide a comprehensive literature synthesis on research developments in this field, identify areas that still require further exploration, and make theoretical and practical contributions to the advancement of research and policy formulation aimed at improving sustainable school performance through the strengthening of leadership, innovation capabilities, and the utilization of technology.

METHODS

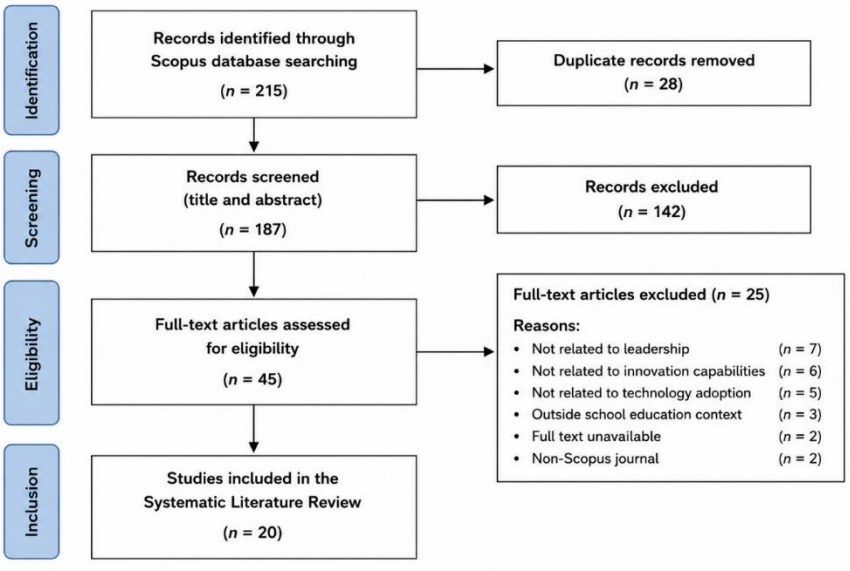


Figure 1: Prisma 2020 Flowchart

Figure 1 illustrates the article selection process using the PRISMA 2020 guidelines. A literature search was conducted in the Scopus database using a combination of keywords related to leadership, innovation capabilities, technology adoption, and sustainable school performance. The selection process consisted of four main stages: identification, screening, eligibility, and inclusion. After removing duplicate articles and screening the titles, abstracts, and full texts based on the inclusion and exclusion criteria, 20 articles that met the requirements were identified and used as the basis for the synthesis in this study.

To provide an overview of the characteristics of the studies analyzed, Table 1 presents information on the authors, the countries of origin of the studies, the research methods, the main theories or concepts used, the variables or research focus, and the samples or research subjects. The presentation of these article characteristics is intended to facilitate the identification of research trends, dominant methodological approaches, and the research contexts that form the basis for the synthesis in the discussion section.

Table 1. Characteristics of the Articles Analyzed in the SLR Study

No.	Author(s) (Year)	Country	Research Method	Main Theory/ Concept	Research Variables/ Focus	Sample/ Research Object
1	Prenger et al. (2022)	Netherlands	Systematic Literature Review	Educational Innovation, Organizational Change	Sustainable Educational Innovation	44 articles
2	Fatmawati et al. (2026)	Indonesia	Bibliometric Analysis	Educational Innovation, SDGs	Educational Innovation, Sustainable Education	190 Scopus-indexed articles
3	Hariyanti et al. (2025)	Indonesia	Bibliometric Analysis	School Leadership	School Leadership, Sustainability	1,119 Scopus-indexed articles
4	Askell-Williams & Koh (2020)	Australia	Literature Review	School Improvement	Sustainable School Improvement	20 success factors for school improvement programs
5	Rorije & Vanlommel (2026)	Netherlands	Scoping Review	Individual Innovative Capacity (IIC)	Teacher Innovation Capability	44 publications
6	Liang et al. (2024)	Australia	Quantitative Study	Technology Adoption	Technology-Enhanced Learning	University students
7	Agasisti et al. (2023)	Italy	Quantitative Study	ICT Adoption	ICT, School Efficiency	School-level data from 23 European countries
8	Escueta et al. (2020)	United States	Literature Review	Educational Technology	Digital Learning	Studies on educational technology
9	Nurjanah et al. (2017)	Indonesia	Case Study	ICT Adoption Framework	ICT Adoption	Indonesian public secondary schools
10	Wang et al. (2021)	Taiwan	Analytical Hierarchy Process (AHP)	Technology Adoption	Communication Technology	Education experts
11	Hekimoğlu et al. (2025)	Türkiye	Mixed-Methods Study	Critical Success Factors (CSFs)	Sustainable School Performance	School principals, teachers, students, and parents
12	Rosliani et al. (2025)	Indonesia	Rapid Appraisal	Triple Bottom Line (TBL)	Sustainable School Performance	Secondary schools
13	Thombs & Prindle (2018)	United States	Panel Study	Green Schools (LEED)	School Sustainability	LEED-certified schools in Ohio
14	Gamarra et al. (2019)	Spain	Case Study	Life Cycle Assessment (LCA)	Environmental Sustainability	Secondary schools
15	Fehr &	Brazil	Benchmarking	Environmental	Sustainable	Elementary schools

	Andrade (2016)		Study	Performance Indicators	School Performance	
16	Li, Chan, & Hu (2023)	China	Quantitative Study (Structural Equation Modeling)	Instructional Leadership	Principal's Instructional Leadership, Teaching Strategies, Student Academic Achievement	60,419 students, 2,232 teachers, and 506 principals from 231 elementary schools
17	Agirdag & Muijs (2023)	Netherlands	Quasi-Experimental Study	School Leadership Development	School Leadership Development, Professional Learning Communities, Academic Achievement	47 elementary schools, compared with 6,110 schools
18	Ghamrawi (2023)	Qatar	Conceptual Review	School Leadership for SDG 4	School Leadership, Educational Reform, Agenda 2030	School leadership policies and practices aimed at achieving SDG 4
19	Kaya (2023)	Türkiye	Second-Order Meta-Analysis	School Leadership	School Leadership Effectiveness and School Outcomes	Synthesis of 23 meta-analyses from Scopus, Web of Science, and ERIC
20	Gechere, Oumer, & Ouke (2025)	Ethiopia	Mixed-Methods Study	Instructional Leadership	Principals' Instructional Leadership, Teacher Self-Efficacy, Student Performance	369 respondents from 22 secondary schools

Based on Table 1, it can be seen that research on school leadership, innovation capabilities, technology adoption, and sustainable school performance has grown significantly in recent years. The research approaches used are quite diverse, ranging from quantitative research, mixed methods, case studies, literature reviews, systematic literature reviews, scoping reviews, bibliometric analysis, second-order meta-analyses, quasi-experimental studies, the analytical hierarchy process (AHP), to rapid appraisals. The predominance of literature synthesis and bibliometric analysis approaches indicates researchers' growing interest in mapping scientific developments and identifying future research directions in the fields of educational leadership and sustainability.

Geographically, the research is dominated by developed countries such as the Netherlands, Australia, Italy, the United States, Spain, Turkey, China, Taiwan, and Brazil. However, developing countries such as Indonesia are beginning to make increasingly significant contributions through bibliometric research, rapid appraisals, and case studies addressing issues of educational innovation, school leadership, and educational sustainability. In addition, research has also emerged from Qatar and Ethiopia, indicating that attention to school leadership and sustainable educational development has become a global issue involving diverse social, economic, and cultural contexts.

Based on the theories and concepts employed, research in this field remains dominated by various perspectives, such as School Leadership, Instructional Leadership, Educational Innovation, Innovation Capability, Technology Adoption, ICT Adoption, Educational

Technology, School Improvement, School Leadership for SDG 4, Critical Success Factors (CSFs), Triple Bottom Line (TBL), Life Cycle Assessment (LCA), and Environmental Performance Indicators. The diversity of these theories indicates that studies on school sustainability no longer focus solely on improving academic outcomes but also encompass aspects of leadership, organizational innovation, digital transformation, school efficiency, environmental sustainability, and the achievement of the Sustainable Development Goals (SDGs).

The research subjects also vary widely, ranging from elementary schools, middle schools, and colleges to teachers, principals, students, education experts, and syntheses of scientific articles from various international databases. Some studies utilized large-scale data, such as 60,419 students, 2,232 teachers, and 506 school principals from 231 elementary schools in China, school data from 23 European countries, and a bibliometric analysis involving more than 1,100 Scopus publications. This diversity demonstrates that research on school leadership and educational sustainability has evolved in a multidisciplinary manner with an increasingly broad empirical scope.

Nevertheless, based on the results of the literature review, a research gap still exists. Most studies focus only on the direct relationship between school leadership and academic achievement, school improvement, or school sustainability. Other studies place greater emphasis on innovation capabilities, technology adoption, or ICT adoption as standalone variables. To date, there has been very limited research that integrates school leadership, innovation capabilities, technology adoption, and sustainable school performance into a single comprehensive conceptual framework. Therefore, this study aims to fill this gap through a Systematic Literature Review (SLR) approach to produce a scientific synthesis of the interrelationships among these four concepts and to identify opportunities for developing a conceptual model for improving sustainable school performance.

Search Strategy

The literature search was conducted in the Scopus database because it has a broad scope of international publications and provides peer-reviewed scientific articles. The search was conducted using a combination of keywords based on the four main concepts of the study: leadership, innovation capabilities, technology adoption, and sustainable school performance. The keywords were combined using the Boolean operators AND and OR to identify relevant articles. The search strings used are as follows: ("innovation capability" OR "innovation capabilities") AND ("technology adoption" OR "digital technology adoption" OR "educational technology") AND ("leadership" OR "school leadership" OR "educational leadership" OR "instructional leadership" OR "transformational leadership") AND ("school performance" OR "school effectiveness" OR "educational performance" OR "sustainable school performance") a search was conducted for articles published between 2016 and 2026 to gain an overview of research developments over the past ten years.

Inclusion and Exclusion Criteria

The article selection process was conducted based on inclusion and exclusion criteria to ensure that the articles analyzed were relevant to the research objectives and focus. The inclusion criteria encompass articles published between 2016 and 2026 in Scopus-indexed international journals, written in English, and addressing leadership, innovation capabilities, technology adoption, and/or sustainable school performance in the context of education. Additionally, articles must be available in full text to allow for a comprehensive analysis.

Meanwhile, exclusion criteria were applied to articles published as conference proceedings, books, book chapters, editorials, or non-systematic reviews, as well as articles that were not relevant to the research focus. Duplicate articles and articles not available in full text

were also excluded from the selection process. The application of these two criteria aims to ensure the relevance, quality, and consistency of the literature sources used as the basis for analysis in this study.

Study Selection

The article selection process followed the PRISMA 2020 guidelines. During the identification stage, all articles retrieved from Scopus were collected based on predetermined keywords. Next, duplicate articles were removed. The screening stage involved reviewing the titles, abstracts, and keywords to ensure alignment with the research focus. Articles that met the criteria then proceeded to the eligibility stage, which involved a comprehensive assessment of the article's content (full-text review). In the final stage (inclusion), articles that met all criteria were selected as the final sample for analysis.

Data Extraction and Analysis

Data from each article were extracted using a pre-designed data extraction form. The information collected included the author's name, year of publication, country of research, research objectives, theories used, research methods, variables examined, analytical instruments, and the study's main findings. Next, the data were analyzed using descriptive and thematic analysis approaches. Descriptive analysis was used to identify trends in publications, country distribution, research methods, theories employed, and article characteristics. Meanwhile, thematic analysis was used to group and synthesize research findings based on key themes related to leadership, innovation capabilities, technology adoption, and sustainable school performance. The results of this synthesis were then used to address each Research Question (RQ), identify research gaps, and formulate a future research agenda.

Quality Assessment

To ensure the quality of the articles analyzed, each article was evaluated based on several indicators: alignment with the research objectives, clarity of methodology, validity of the analysis, and relevance of the findings to the research topic. Only articles that met these quality criteria were included in the final synthesis process, ensuring that the study's results possess a higher level of validity and reliability.

RESULTS AND DISCUSSION

Trends in Publications on Innovation Capabilities, Leadership, Technology Adoption, and Sustainable School Performance

Based on the literature screening process guided by the PRISMA guidelines, 20 articles met the inclusion criteria and were selected for further analysis. These articles were published between 2016 and 2026 and appeared in various reputable international journals indexed in Scopus, including Sustainability, Computers & Education, Omega, Benchmarking: An International Journal, Frontiers in Education, Journal of Educational Change, and School Effectiveness and School Improvement.

In general, publication trends indicate growing attention to educational innovation, school leadership, and digital transformation over the past decade. Earlier studies primarily focused on measuring school performance, evaluating the effectiveness of information technology use, and examining leadership practices to improve educational quality. Between 2020 and 2026, the research focus shifted toward the development of innovation capabilities, leadership, particularly instructional leadership and transformational leadership, technology adoption, digital transformation, and sustainable school performance. This shift indicates that school sustainability is no longer viewed solely in terms of academic achievement but also in terms of an organization's ability to develop effective leadership, adapt to environmental changes, foster innovation, and

optimize the use of technology.

In addition to the increasing number of publications, research themes have also become more multidisciplinary. Various studies integrate perspectives from organizational management, educational leadership, information technology, organizational innovation, and sustainable development, particularly the Sustainable Development Goals (SDGs). This indicates that sustainable school performance is a complex concept that requires an integrated approach linking leadership, organizational, innovation, technological, and environmental factors.

Dominant Theories, Research Methods, and Characteristics of Previous Studies

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RQ3. The Role of Leadership, Innovation Capabilities, and Technology Adoption in Improving Sustainable School Performance

The synthesis results indicate that leadership is a fundamental factor in improving sustainable school performance. Visionary, transformational, and adaptive leadership can establish strategic direction, foster a collaborative organizational culture, and promote a school environment that is open to change. School leaders play a crucial role in formulating a vision, allocating resources, facilitating teacher competency development, and building the commitment of all school stakeholders to achieving sustainable educational goals. Therefore, leadership serves as a key driver of innovation and organizational transformation in schools.

Furthermore, innovation capabilities play a crucial role in strengthening schools' ability to respond to changes in the educational environment. Innovation capabilities foster an adaptive organizational culture, continuous learning, teacher creativity, and the development of new strategies to improve educational quality. Schools with strong innovation capabilities tend to be better equipped to maintain the quality of educational services over the long term than schools that focus solely on short-term innovation. Effective leadership also contributes to strengthening innovation capabilities by empowering teachers, supporting experimentation, and fostering a sustainable culture of innovation.

On the other hand, technology adoption contributes to improving school administrative

efficiency, the effectiveness of teaching and learning processes, communication quality, and data-driven decision-making. Various studies indicate that the implementation of Learning Management Systems (LMS), Artificial Intelligence (AI), cloud computing, and school information systems can enhance organizational productivity when supported by infrastructure readiness, school policies, teacher competencies, and leadership commitment to promoting digital transformation.

Interestingly, the findings of this review reveal that leadership, innovation capabilities, and technology adoption are complementary factors in achieving sustainable school performance. Leadership provides strategic direction and creates an environment that supports change, innovation capabilities enable organizations to generate and manage innovation, while technology adoption serves as a means of implementing such innovations in everyday school activities. The synergy among these three factors enables schools to improve learning quality, governance effectiveness, operational efficiency, and their ability to adapt to changes in the educational environment. Therefore, sustainable school performance is determined not only by a school's ability to adopt technology or innovate but also by leadership that can integrate organizational resources and strategies in a sustainable manner.

RQ4. Research Gaps and Future Research Agenda

The findings of this review reveal several research gaps that require further attention in future studies. First, most existing studies examine leadership, innovation capabilities, and technology adoption separately. Research integrating these three variables into a single conceptual model to explain sustainable school performance remains relatively limited. Second, previous studies have predominantly focused on higher education institutions or business organizations, while research specifically addressing primary and secondary schools remains relatively scarce. Third, most studies employ a cross-sectional approach, which limits their ability to explain how leadership, innovation capabilities, and technology adoption develop and interact over time. Therefore, longitudinal research is needed to better understand the dynamics of sustainable organizational transformation in schools.

Fourth, the measurement of sustainable school performance varies considerably across studies. Some studies employ indicators of academic performance, organizational effectiveness, and learning quality, whereas others adopt the Triple Bottom Line approach, Critical Success Factors, or educational sustainability indicators. To date, there is no widely accepted, integrated measurement model, particularly one that connects the dimensions of leadership, innovation, technology, and school sustainability.

Based on these research gaps, future studies should develop a conceptual model that integrates leadership, innovation capabilities, and technology adoption as key determinants of sustainable school performance. Furthermore, empirical research in primary and secondary schools in developing countries should be expanded to develop models that better reflect the characteristics of educational systems in these regions. The use of mixed-methods and longitudinal approaches is also recommended to provide a more comprehensive understanding of how leadership fosters innovation capabilities, accelerates technology adoption, and improves sustainable school performance.

The table presents the characteristics and summarized findings of fifteen articles that met the inclusion criteria for this Systematic Literature Review (SLR). The summary includes the authors, publication year, journal, and key findings related to leadership, innovation capabilities, technology adoption, and sustainable school performance. Subsequently, the synthesis analyses for RQ1, RQ2, RQ3, and RQ4 are developed based on the identification, evaluation, and synthesis of these articles to address each of the formulated Research Questions (RQs).

Table 2. Summary of Previous Studies.

No.	Authors and Year	Journal	Research Findings
1	Prenger, R., Tappel, A. P. M., Poortman, C. L., & Schildkamp, K. (2022)	*Frontiers in Education*	A systematic literature review of 44 articles indicates that the sustainability of educational innovation is influenced by school organizational characteristics, innovation, individual factors, and contextual factors. Innovation sustainability can be achieved by adaptively integrating innovations into organizational routines, thereby maintaining or improving educational performance.
2	Fatmawati, N. S. D., Wulandari, W., & Irawan, N. (2026)	*Indonesian Journal on Learning and Advanced Education (IJOLAE)*	A bibliometric analysis of 190 Scopus-indexed articles indicates that educational innovation, digital transformation, teacher quality improvement, and inclusive education policies play important roles in reducing educational disparities and supporting sustainable educational development under Sustainable Development Goal 4 (SDG 4).
3	Hariyanti, R. A. M., Pahrudin, A., Akmansyah, M., & Fauzan, A. (2025)	*European Journal of Sustainable Development Research*	A bibliometric analysis of 1,119 Scopus-indexed articles indicates that research on school leadership has evolved toward themes of professional development, instructional leadership, digital transformation, sustainability, and well-being, which are important factors in improving school effectiveness and sustainable performance.
4	Askell-Williams, H., & Koh, G. A. (2020)	*School Effectiveness and School Improvement*	The study indicates that sustaining improvements in school performance requires a systems approach integrating goals, processes, evaluation, and innovation implementation. Twenty success factors were identified as determinants of the sustainability of school improvement programs.
5	Rorije, H. M., & Vanlommel, K. (2026)	*Journal of Educational Change*	A scoping review of 44 publications examined teachers' Individual Innovative Capacity (IIC) in promoting complex educational change. The findings indicate that teachers' innovative capacity consists of four core competencies: entrepreneurship, creativity, resilience, and inquisitiveness. These competencies provide an important foundation for teachers to lead change, improve the effectiveness of school innovation, and support sustainable school development.
6	Liang, Y. (Danni), Chen, S., Abeysekera, R., O'Sullivan, H., Bray, J., & Keevill-Savage, I. (2024)	*Computers and Education Open*	The findings indicate that technology adoption in learning can improve educational performance when supported by user readiness and an appropriate learning environment. Conversely, technostress and low user readiness can hinder technological effectiveness and negatively affect sustainable performance.
7	Agasisti, T., et al. (2023)	*Omega*	The study demonstrates that the effective use of information and communication technology (ICT) can improve school operational efficiency and the quality of teaching and learning processes. Technology adoption supported by school policies, infrastructure, and human resource competencies contributes to improved school performance over the long term.
8	Escueta, M., et al. (2020)	*Computers & Education*	The findings indicate that implementing digital technologies in teaching and learning can improve student learning outcomes when the technologies are appropriately used and supported by effective

			instructional strategies. These findings emphasize that technology adoption is an important factor in improving educational quality and supporting sustainable school performance.
9	Nurjanah, S., Santoso, H. B., & Hasibuan, Z. A. (2017)	*Journal of Physics: Conference Series*	The study developed an ICT adoption framework for schools that emphasizes the importance of organizational readiness, policy support, technological infrastructure, and teacher competencies. These factors determine the success of technology implementation, ultimately supporting improved school management effectiveness and sustainable school performance.
10	Wang, X. Y., et al. (2021)	*Sustainability*	The study indicates that the adoption of communication technologies in education contributes to improving teaching and learning effectiveness, collaboration, and decision-making. Sustainable technology implementation enables schools to improve educational service quality, organizational efficiency, and institutional competitiveness over the long term.
11	Hekimoğlu, İ., Özgen, D., & Şen, C. (2025)	*Sustainability*	The study developed a measurement model for Sustainable School Performance by identifying Critical Success Factors (CSFs) involving school principals, teachers, students, and parents. The model can be used as a tool for evaluating school sustainability.
12	Rosliani, E., Muhafidin, D., Rusli, B., & Sumaryana, A. (2025)	*Sustainability*	The study assessed school sustainability performance using the Triple Bottom Line (TBL) approach, which encompasses economic, social, and environmental dimensions. The findings indicate that TBL indicators are effective for evaluating school performance from a sustainability perspective.
13	Thombs, R. P., & Prindle, A. (2018)	*Sustainability*	The study examined the influence of green school buildings certified under the Leadership in Energy and Environmental Design (LEED) system on academic performance. The findings indicate that green buildings do not necessarily produce significant improvements in academic scores but offer sustainability benefits and a better learning environment.
14	Gamarra, A. R., Herrera, I., & Lechón, Y. (2019)	*Science of the Total Environment*	The study developed a Life Cycle Assessment (LCA) method to measure the sustainability of secondary school activities. Transportation and mobility were identified as the largest contributors to the environmental impacts of schools.
15	Fehr, M., & Andrade, V. S. C. S. (2016)	*Benchmarking: An International Journal*	The study developed objective indicators for measuring school environmental performance through energy consumption, water use, waste management, and the behavior of school stakeholders. These indicators can be used to assess the environmental dimension of sustainable school performance.
16	Li, Chan, & Hu (2023)	*Educational Management Administration & Leadership*	A quantitative study using Structural Equation Modeling (SEM) indicates that school leadership positively influences innovation capabilities and promotes technology adoption in teaching and learning. Innovation capabilities serve as a mechanism for improving school organizational effectiveness and supporting the achievement of

			sustainable school performance.
17	Agirdag & Muijs (2023)	*School Effectiveness and School Improvement*	A quasi-experimental study indicates that effective instructional leadership practices can improve teacher collaboration, teaching and learning quality, and the implementation of school innovations. Strong leadership accelerates organizational change and positively contributes to sustainable improvements in school performance.
18	Ghamrawi (2023)	*Educational Management Administration & Leadership*	The conceptual study explains that innovative leadership is a key factor in developing an organizational culture that supports continuous learning, collaboration, and digital transformation. Leadership is positioned as a primary driver of innovation capabilities development and the successful implementation of educational innovations.
19	Kaya (2023)	*Educational Research Review*	A second-order meta-analysis indicates that school leadership has a consistently positive effect on school effectiveness through improvements in organizational capacity, teacher professionalism, and innovation culture. These findings reinforce the role of leadership as an important determinant of sustainable improvements in school performance.

Leadership in Improving Sustainable School Performance

The literature synthesis indicates that leadership is one of the strategic factors supporting the achievement of sustainable school performance. Of the fifteen articles analyzed, most studies emphasize that visionary, transformational, and change-oriented leadership plays an important role in improving school organizational effectiveness. School leaders are responsible not only for establishing the organization's direction and vision but also for fostering a collaborative culture, building commitment among all school stakeholders, and promoting continuous innovation. Effective leadership enables schools to adapt to changes in the educational environment while improving the quality of teaching and learning and school governance.

These findings are supported by Li, Chan, and Hu (2023), who demonstrated that school leadership positively influences the development of innovation capabilities and promotes the successful implementation of organizational change. Their findings indicate that leaders who empower teachers, facilitate collaboration, and support professional development can strengthen schools' innovation capacity. Furthermore, Agirdag and Muijs (2023) found that effective instructional leadership practices can improve teaching and learning quality, teacher collaboration, and the effectiveness of innovation implementation in schools, thereby contributing to sustainable improvements in school performance.

In addition, Ghamrawi (2023) explained that innovative leadership serves as a key driver in developing an organizational culture that supports continuous learning, creativity, and digital transformation. These findings are reinforced by Kaya (2023), whose second-order meta-analysis demonstrated that school leadership has a consistently positive influence on school effectiveness through improvements in organizational capacity, teacher professionalism, and innovation culture. Meanwhile, Gechere, Oumer, and Ouke (2025) revealed that successful school transformation is strongly influenced by the synergy between leadership, innovation capabilities, and the utilization of educational technology in supporting organizational adaptation to change.

Based on this synthesis, it can be concluded that leadership constitutes a fundamental foundation for achieving sustainable school performance. Effective leadership not only guides the organization toward achieving its strategic objectives but also fosters a culture of innovation, strengthens organizational capacity, and creates an environment that supports continuous learning. Therefore, leadership serves as a driving force that enables schools to maintain the

quality of educational services while enhancing their competitiveness and the sustainability of organizational performance amid the changing dynamics of the educational environment.

Innovation Capabilities in Enhancing Sustainable School Performance

The literature synthesis indicates that innovation capabilities are among the key factors supporting the achievement of sustainable school performance. Of the fifteen articles analyzed, most studies emphasize that schools' ability to generate, implement, and sustain innovation provides a foundation for improving the effectiveness of educational organizations. Prenger et al. (2022) explained that the sustainability of innovation is determined not only by the innovation itself but also by organizational characteristics, individual factors, and the school environmental context that support continuous change. These findings are reinforced by Askell-Williams and Koh (2020), who stated that the success of school improvement programs depends on integrating innovation into organizational systems, culture, evaluation, and implementation processes.

Furthermore, Rorije and Vanlommel (2026) found that teachers' innovative capacity, which comprises creativity, resilience, entrepreneurship, and inquisitiveness, is an important factor in addressing increasingly complex educational changes. These findings indicate that innovation is not solely associated with the use of technology but also involves the ability of human resources to develop new ideas that can improve the quality of educational services. Therefore, innovation capabilities can be regarded as a strategic organizational capability that enables schools to maintain their competitiveness while enhancing the sustainability of their performance.

Technology Adoption as a Driver of Sustainable School Performance

A synthesis of the research also shows that the adoption of technology contributes significantly to improved school performance. Various studies explain that the use of digital technology can improve the efficiency of school administration, the quality of the learning process, communication among stakeholders, and data-driven decision-making. Liang et al. (2024) found that the success of technology implementation is greatly influenced by user readiness and a supportive learning environment, while technostress is one of the main barriers to the optimal use of technology.

These findings align with the research by Agasisti et al. (2023), which demonstrated that the use of ICT improves school operational efficiency across various European countries. Research by Wang et al. (2021) also indicates that modern communication technologies can strengthen collaboration, learning effectiveness, and the quality of decision-making. In Indonesia, Nurjanah et al. (2017) emphasize that the successful adoption of technology is influenced by organizational readiness, policy support, teacher competence, and the availability of infrastructure. Thus, the implementation of technology requires more than just providing digital devices; it also necessitates organizational readiness and human resources.

Sustainable School Performance

Based on the findings of this study, the concept of sustainable school performance has evolved significantly. Early studies primarily measured school success through academic achievement, whereas more recent research has begun to integrate economic, social, and environmental dimensions as indicators of school sustainability.

Hekimoğlu et al. (2025) developed a measurement model based on Critical Success Factors (CSFs) that involves school principals, teachers, students, and parents. Meanwhile, Rosliani et al. (2025) adopted the Triple Bottom Line approach, which integrates economic, social, and environmental dimensions in evaluating school performance. Research by Fehr and Andrade (2016) as well as Gamarra et al. (2019) also indicates that environmental aspects such as energy consumption, waste management, and school mobility play a crucial role in assessing school

sustainability. This suggests that the measurement of school performance has shifted toward a more comprehensive approach.

A Synthesis of the Relationship Between Innovation Capabilities, Technology Adoption, and Sustainable School Performance

Based on the overall analysis of the articles, there appears to be a complementary relationship between leadership, innovation capabilities, and technology adoption in enhancing sustainable school performance. Leadership serves as a strategic guide that shapes the vision, organizational culture, and commitment to change. Through visionary and transformational leadership, schools are able to create an environment conducive to the development of innovation capabilities—that is, the organization's ability to generate, implement, and sustain innovation over time. Furthermore, technology adoption serves as a means to accelerate the implementation of innovation into daily school activities, whether in the learning process, administration, or data-driven decision-making.

The results of the analysis also indicate that the relationship among these three variables is mutually reinforcing. Effective leadership fosters a culture of innovation, enhances collaboration, and facilitates the development of teachers' competencies, thereby strengthening the organization's innovation capabilities. High innovation capabilities, in turn, enhance schools' readiness to effectively adopt various educational technologies. Thus, technology adoption depends not only on the availability of infrastructure but also on the quality of leadership and the school's innovation capabilities.

Nevertheless, most studies still examine leadership, innovation capabilities, and technology adoption separately. Research on leadership generally focuses on leadership styles or the effectiveness of school principals; research on innovation capabilities emphasizes individual and organizational capacities; while research on technology adoption primarily addresses the implementation of ICT, information systems, and learning technologies. Only a few studies have simultaneously integrated these three variables to explain sustainable school performance, particularly at the elementary and secondary levels in developing countries. This situation indicates a significant research opportunity to develop a conceptual model linking leadership, innovation capabilities, and technology adoption as the primary determinants of sustainable school performance, thereby providing a more comprehensive understanding of the factors that support the sustainability of school performance.

Conceptual Framework of the Study

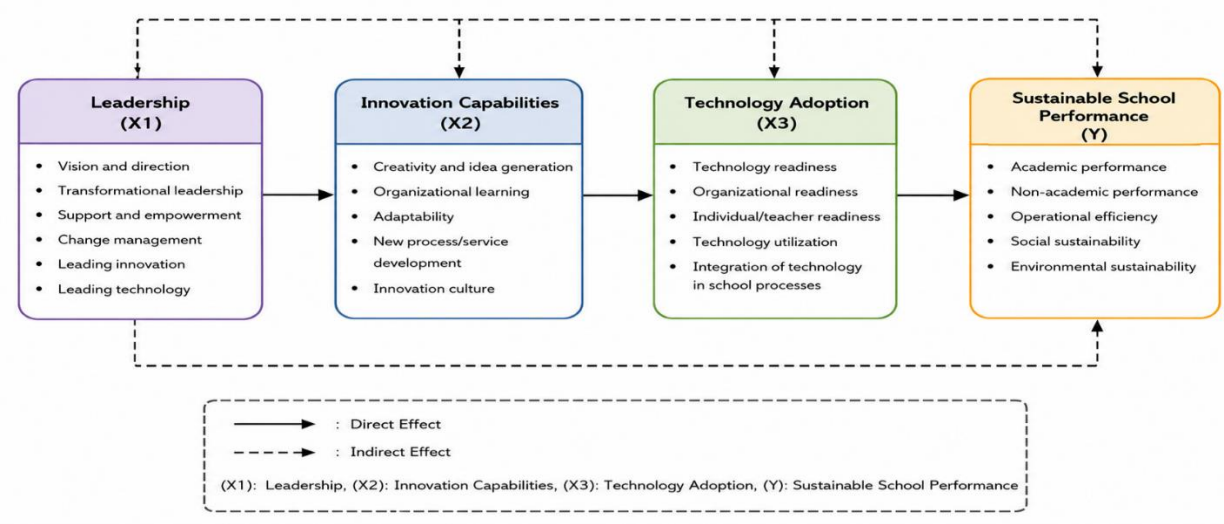


Figure 2: Conceptual Framework of the Study

The conceptual framework of this study, shown in Figure 2, is the result of a synthesis of the 20 articles analyzed in this research. The framework indicates that leadership and innovation capabilities are the primary factors driving the success of technology adoption, which in turn contributes to improved sustainable school performance. In addition, the results of the literature synthesis also show that leadership and innovation capabilities can have a direct impact on sustainable school performance, as effective leadership is capable of creating a vision, supporting a culture of innovation, and guiding school transformation, while schools with a culture of innovation, adaptability, and strong organizational learning tend to be able to improve the quality of educational services in a sustainable manner. The relationships between the variables in this conceptual framework can be explained as follows.

1. **Leadership → Innovation Capabilities**
   Leadership serves as a driving force behind the development of innovation capabilities in schools. Effective leadership can establish a vision, manage change, empower human resources, and foster an organizational culture that supports creativity, learning, and innovation, thereby enhancing the school's ability to adapt to change.
2. **Innovation Capabilities → Technology Adoption**
   Innovation capability reflects a school's ability to create, develop, and implement innovations through creativity, organizational learning, a culture of innovation, and the ability to adapt to change. Schools with high innovation capability will be better prepared to adopt, implement, and utilize technology in both the learning process and school management.
3. **Technology Adoption → Sustainable School Performance**
   The effective adoption of technology supports improvements in school operational efficiency, the quality of the learning process, communication among stakeholders, and data-driven decision-making. Thus, the use of technology contributes to the sustainable improvement of school performance, both in academic and non-academic areas.
4. **Innovation Capabilities → Sustainable School Performance**
   In addition to the adoption of technology, innovation capabilities also contribute directly to sustainable school performance. A culture of innovation, teacher creativity, organizational learning, and adaptability enable schools to implement various improvements in governance, learning processes, and the quality of educational services, thereby enhancing the sustainability of school performance.

Based on this literature review, this study proposes that leadership serves as the primary factor driving the development of innovation capabilities, which in turn enhance the success of technology adoption in supporting sustainable school performance. Thus, effective leadership, the strengthening of innovation capabilities, and the integrated implementation of technology are key strategies for creating schools that are adaptive, effective, innovative, and sustainable.

CONCLUSION

Leadership, innovation capabilities, and technology adoption are three strategic factors that make important contributions to improving sustainable school performance. The synthesis of 20 Scopus-indexed articles indicates that leadership plays a role in establishing a vision, fostering a culture of innovation, and directing organizational transformation in schools. Innovation capabilities enable schools to become more adaptive to change through the development of creativity, organizational learning, and a sustainable culture of innovation. Meanwhile, technology adoption enhances school management efficiency, teaching and learning quality, communication, and data-driven decision-making when supported by organizational readiness, human resource competencies, and adequate infrastructure.

This review also indicates that the concept of sustainable school performance has evolved from outcome-oriented academic measurements toward a more comprehensive approach that

considers economic, social, and environmental dimensions. Nevertheless, research that simultaneously integrates leadership, innovation capabilities, and technology adoption to explain sustainable school performance remains relatively limited, particularly in the context of primary and secondary schools in developing countries. This limitation constitutes a research gap and creates opportunities for future empirical studies to develop a conceptual model that explains the relationships between these three variables and sustainable school performance.

In practical terms, the findings of this review suggest that strengthening leadership, fostering a culture of innovation, improving teacher competencies, and implementing integrated technologies should be prioritized in school development policies. Theoretically, this study provides a synthesis of the literature that can serve as a foundation for developing research models concerning leadership, innovation capabilities, technology adoption, and sustainable school performance in future studies.

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