

Financial Management Strategies and Challenges in Malaysian Educational Institutions: A Systematic Review of Educational Technology Integration

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Abstract

The integration of educational technology in Malaysian educational institutions presents significant challenges and opportunities in financial management. This systematic literature review aims to explore the financial management practices adopted by these institutions during the implementation of educational technology, focusing on challenges, effectiveness, and opportunities for optimization. Following the PICOS framework, the review considers educational institutions in Malaysia (Population), the implementation of educational technology (Intervention), comparisons of financial practices before and after technology adoption (Comparison), and the outcomes related to financial effectiveness and sustainability (Outcomes). The study design includes empirical research, case studies, and reviews. Using a comprehensive search strategy across multiple academic databases, the inclusion of studies is guided by PRISMA, ensuring only relevant and high-quality studies are selected. Data extraction and analysis are conducted using SPAR-4-SLR standards to ensure a thorough and systematic synthesis of findings. The review identifies prevalent financial strategies, including budgeting and funding practices, and examines challenges such as financial risks and cost overruns. The impact of educational technology on financial performance, including operational costs and return on investment, is analysed. Additionally, best practices for optimizing financial management, such as strategic financial planning and collaborative funding models, are highlighted. This review provides critical insights into the intersection of financial management and educational technology in Malaysia, offering valuable recommendations for policymakers and educational leaders. The findings underscore the importance of strategic financial management in ensuring the successful and sustainable integration of educational technology, while also identifying areas for future research to address remaining gaps in the literature.

Keywords: Academic, education, education technology, financial management, financial performance, technology

Introduction

In the evolving landscape of the educational sector, effective financial management has emerged as a critical determinant of institutional success. Educational institutions, particularly in countries like Malaysia, face a range of financial management challenges that are further compounded by the need to integrate modern technological solutions into their operations. The increasing emphasis on educational technology (EdTech) integration within institutions brings both opportunities and complexities. As the education sector moves toward a more digital and data-driven model, financial managers are tasked with not only maintaining financial stability but also ensuring that resources are allocated efficiently to support the adoption of technology-driven initiatives. In this context, understanding financial

management strategies becomes essential for addressing the multifaceted challenges faced by Malaysian educational institutions.

In Malaysia, educational institutions are operating in an environment marked by increased expectations for academic quality, infrastructural development, and technological advancements, all of which place considerable pressure on financial management systems. The integration of EdTech encompassing tools such as e-learning platforms, digital classrooms, and administrative technologies requires significant investment. Such investments must be strategically planned and executed to ensure sustainability, given that educational institutions often operate within constrained financial frameworks (Khahro & Javed, 2022).

Financial management strategies within the educational sector can broadly be categorized into resource planning, budgeting, financial control, and investment in infrastructure. The effective application of these strategies is paramount to the success of any institution, particularly when integrating new technologies. However, many educational institutions in Malaysia face hurdles in these areas, from limited financial resources to challenges in maintaining transparency and accountability in the utilization of funds (Mazlan et al., 2022).

This systematic review explores the existing financial management strategies employed by Malaysian educational institutions and the challenges they face in integrating educational technologies. The review draws upon a range of studies, including those that focus on financial sustainability, technological investment, and the broader implications of digital transformation within the educational sector. Through this review, we aim to provide a comprehensive understanding of how financial management practices are evolving in response to the growing reliance on educational technologies, and what barriers exist that may hinder the efficient integration of these technologies (Jin et al., 2022).

One of the primary challenges facing educational institutions in Malaysia is the balancing act between maintaining traditional educational infrastructures while also incorporating modern technology-driven systems. Educational institutions, especially public schools and universities, often rely heavily on government funding, which may be limited or subject to political and economic fluctuations. Consequently, financial managers in these institutions must adopt innovative budgeting strategies that prioritize essential services and infrastructure maintenance while also allocating sufficient resources to EdTech investments (Kamarudin et al., 2023).

The integration of technology in education is not merely a matter of purchasing hardware and software. Institutions must also invest in training staff, maintaining technological systems, and ensuring that digital tools enhance educational outcomes. This requires a forward-thinking financial strategy that takes into account the long-term costs of technology, including maintenance, upgrades, and eventual replacement. Financial managers must navigate these complexities while also ensuring that their institutions remain financially solvent and capable of meeting other operational demands (Izhar et al., 2021).

Additionally, financial transparency and accountability are of paramount importance in ensuring that funds allocated for technological integration are used effectively. Malaysian educational institutions, particularly those funded by the government, are subject to stringent financial regulations that require detailed reporting and auditing of expenditures. However, the complexity of managing large-scale financial operations, especially in the context of integrating cutting-edge technology, often results in inefficiencies and delays. These challenges highlight the need for robust financial management frameworks that can adapt to the changing needs of educational institutions while maintaining financial discipline (Chugh et al., 2023a).

Moreover, financial management in educational institutions also involves navigating external factors such as fluctuating government policies, changes in educational standards, and the global economic environment. For instance, global economic downturns or national budget cuts can severely impact the financial resources available to educational institutions, which in turn affects their ability to invest in educational technology. Financial managers must be prepared to develop contingency plans that allow for flexibility in budget allocations without compromising on essential services or technological advancements (Abuhassna et al., 2023; Dewi Karimah, 2023a).

The new contribution of this review lies in its integrated approach to examining how financial management practices support or hinder the sustainable adoption of educational technology in Malaysian educational institutions. Unlike previous studies that focus on isolated aspects of technology integration or financial management, this review synthesizes current research to provide a holistic understanding of the challenges and opportunities at the intersection of financial sustainability, technological investment, and digital transformation. By analyzing best practices, identifying common barriers, and presenting case studies of successful EdTech integration, this review offers new insights into effective financial strategies that enable educational institutions to thrive in an increasingly digital landscape. Through this comprehensive analysis, the review not only fills a gap in the literature but also provides practical guidance for policymakers, institutional leaders, and financial managers aiming to optimize resource allocation and ensure the long-term sustainability of EdTech initiatives in Malaysia.

Despite these challenges, there are numerous opportunities for Malaysian educational institutions to leverage innovative financial management strategies to enhance their operations. The adoption of performance-based budgeting, for example, can allow institutions to allocate funds more effectively based on measurable outcomes. Additionally, exploring alternative funding sources, such as public-private partnerships or grants from international organizations, can help alleviate the financial burden associated with EdTech investments. By diversifying their funding streams and adopting a more strategic approach to financial management, educational institutions can ensure that they remain competitive and capable of meeting the demands of a technology-driven educational landscape (Adnan et al., 2023a; Jafar et al., 2023).

This systematic review will also explore case studies of educational institutions that have successfully integrated EdTech into their operations through sound financial management practices. These examples provide valuable insights into the strategies that can be employed to overcome financial challenges and highlight the importance of proactive financial planning in the context of educational technology integration (Che Yusof et al., 2023a; Mat Dangi & Mohamed Saat, 2021a).

In conclusion, the financial management of educational institutions in Malaysia is a complex task that requires a delicate balance between maintaining traditional educational infrastructures and embracing the digital transformation brought about by educational technologies. As this review will demonstrate, the successful integration of EdTech requires not only substantial financial investment but also strategic planning, financial discipline, and innovative approaches to budgeting and resource allocation. By examining the financial management strategies and challenges faced by Malaysian educational institutions, this review aims to provide a roadmap for institutions seeking to navigate the complexities of financial management in the era of educational technology.

Research objectives

This systematic review aims to explore and synthesize existing literature on the financial management practices adopted by educational institutions in Malaysia during the implementation of educational technology. The specific objectives are:

1. To identify and categorize the financial management strategies commonly adopted by Malaysian educational institutions in the planning and implementation of educational technology initiatives.
2. To examine the key financial challenges encountered by educational institutions in Malaysia in managing resources for educational technology adoption and integration.
3. To evaluate the impact of educational technology implementation on the financial performance, budgeting patterns, and resource allocation frameworks of Malaysian educational institutions.
4. To propose evidence-based best practices and strategic recommendations for enhancing financial management in support of effective and sustainable educational technology integration.

Financial Management

The purpose of this systematic review is to examine the financial management practices adopted by educational institutions in Malaysia as they implement educational technology (EdTech). Specifically, this review explores how institutions manage their financial resources to support the adoption and ongoing use of EdTech, the challenges they face during this process, the effectiveness of their strategies, and the opportunities available for further optimization. However, for its benefits to be fully realized, educational institutions must navigate a complex landscape of financial management strategies, regulatory requirements, and infrastructural limitations (Pradana & Josiah, 2024). The purpose of this systematic review is to explore the financial management strategies employed by Malaysian educational institutions in the context of integrating educational technology and to identify the challenges they face in doing so.

The financial landscape of Malaysian educational institutions is shaped by various factors, including government funding policies, private investments, and institutional income generation strategies. Public educational institutions primarily rely on government allocations, which are often subject to budget constraints and fluctuations depending on national priorities. Private educational institutions, on the other hand, are driven by tuition fees and private investments, which introduce additional layers of complexity regarding financial sustainability (A. A. Ahmad & Zain, 2023). The effective allocation and management of these financial resources are critical, especially when institutions are expected to invest in new educational technologies that require both upfront capital and ongoing maintenance costs.

A key focus of this review is to provide a clear description of how educational technology is being integrated into the educational process in Malaysia. This includes analyzing the various approaches institutions use, the extent to which technology enhances administrative and teaching functions, and the ways it reshapes resource allocation and financial planning. By investigating both successes and obstacles such as limited budgets, infrastructure constraints, and the need for staff training, this review highlights the real-world complexities faced by Malaysian educational institutions.

A key issue in financial management is the balancing act between maintaining operational costs and investing in long-term technological advancements that can enhance educational outcomes. Malaysian educational institutions, particularly those in rural areas, face significant challenges due to limited financial and infrastructural resources (Pradana & Josiah, 2024). The incorporation of educational technology into financial management practices has the potential to reduce operational costs, but only if institutions can overcome initial barriers related to infrastructure, training, and implementation.

Educational technology offers a range of solutions that can streamline financial operations and enhance resource allocation in educational institutions. These include digital tools for budgeting, financial reporting, and resource management, as well as platforms that support online learning and administrative efficiency. By adopting such technologies, institutions can not only improve financial transparency and accountability but also potentially reduce operational costs through more efficient resource utilization (Nahar et al., 2022; Pradana & Josiah, 2024).

However, the integration of educational technology into financial management practices is not without challenges. Many institutions, particularly those in rural or underfunded areas, lack the necessary infrastructure to support the widespread use of digital tools. This includes reliable internet connectivity, access to digital devices, and the technical expertise required to manage these systems effectively. In addition, the cost of purchasing and maintaining educational technologies can strain already limited budgets, particularly for public institutions that rely on fluctuating government funding (A. A. Ahmad & Zain, 2023; Isamail et al., 2023).

One of the major challenges faced by educational institutions in Malaysia is the high cost of implementing and maintaining educational technology systems. The initial investment required for hardware, software, and infrastructure development can be prohibitive, particularly for smaller institutions with limited budgets (Ahmad & Zain, 2023). Moreover, there are ongoing costs associated with technical support, training, and updates to ensure that the technology remains functional and up to date. These costs must be carefully managed within the broader framework of institutional financial strategies, which often prioritize other areas such as staffing, facility maintenance to student services.

Furthermore, this review evaluates the impact of technology implementation on financial aspects, including initial investment requirements, ongoing operational costs, and potential long-term savings. By synthesizing recent studies, the review aims to identify effective financial management strategies that can optimize the use of technology, improve transparency and accountability, and ultimately contribute to the sustainability of educational institutions. The financial management of educational institutions in Malaysia is influenced by a combination of government policies, private sector involvement, and institutional management practices. Public institutions predominantly depend on government funding, which often face limitations due to fiscal constraints and competing national priorities. This reliance on state funding has led to challenges in resource allocation, especially when educational institutions are expected to invest in educational technology to enhance administrative and pedagogical outcomes (A. A. Ahmad & Zain, 2023; Alim & Rashid, 2022). In contrast, private educational institutions rely heavily on tuition fees and private investment to manage their financial needs, presenting a different set of financial challenges, particularly concerning affordability and technological integration.

Technological advancements, particularly in educational management systems, have introduced new opportunities for cost-saving and efficiency. Cloud-based financial management systems, for instance, are increasingly being adopted by institutions to streamline operations and reduce costs associated with maintaining physical infrastructure (Dewi Karimah, 2023; Mat Dangi & Mohamed Saat, 2021). These systems provide real-time financial data, enabling more informed decision-making. However, challenges arise in balancing the immediate costs of implementing these technologies with long-term benefits, a hurdle that many institutions, particularly those with limited budgets, struggle to overcome.

However, the literature reveals several barriers to successful integration, particularly for institutions in rural or underserved regions. Infrastructural limitations, such as poor internet connectivity and insufficient access to digital devices, are prevalent in rural schools, making it difficult for these institutions to fully leverage the benefits of EdTech (Akhmad Ramli et al., 2023a; Rusni et al., 2022). Furthermore, the lack of skilled personnel capable of managing and maintaining these technologies is a significant challenge. For instance, studies have highlighted the importance of ongoing professional development for educators and administrative staff to effectively use these systems (Tasmin et al., 2022a; Waghid, 2023).

Education Technology

The use of educational technology in financial management has been shown to yield positive outcomes in terms of transparency, accountability, and efficiency. Research indicates that institutions that have successfully integrated EdTech into their financial management practices report improved financial oversight and decision-making capabilities (Waghid, 2023). Digital platforms that provide real-time financial data allow administrators to make more informed decisions about resource allocation, budget planning, and financial forecasting. Moreover, the use of technology in financial management can lead to greater transparency, which is essential for building trust with stakeholders such as students, parents, and government agencies (Pradana & Josiah, 2024). For instance, digital reporting systems can provide detailed breakdowns of how funds are being used, allowing for greater accountability and reducing the risk of financial mismanagement.

This is particularly important for public institutions that rely on government funding and are subject to strict financial regulations. Despite these benefits, the literature also highlights the uneven distribution of technological resources across institutions. While some schools, particularly those in urban areas, have successfully implemented advanced financial management systems, rural schools continue to face significant barriers. This disparity in access to technology has led to unequal outcomes in financial management practices across the country (Hartati et al., 2023).

The integration of educational technology in financial management within Malaysian educational institutions presents both opportunities and challenges. While EdTech has the potential to improve transparency, accountability, and efficiency, its successful implementation requires careful planning, significant financial investment, and ongoing support (Chugh et al., 2023a). The literature suggests that institutions must adopt comprehensive financial management strategies that consider both the short-term costs and long-term benefits of technology integration. Furthermore, addressing the infrastructural and regulatory barriers that hinder the adoption of these technologies is essential for ensuring that all educational institutions, regardless of location or financial capacity, can benefit from the advantages of EdTech (Abuhassna et al., 2023).

The principal aim underlying the project and driving this systematic review is: "What are the effects of the financial management practices adopted by educational institutions in Malaysia during the implementation of educational technology?"

So, the specific objectives of this systematic review to answer that research question are as follows:

1. What are the prevalent financial management strategies employed by Malaysian educational institutions in implementing educational technology initiatives?
2. What challenges do Malaysian educational institutions face in managing finances related to the adoption and integration of educational technology?
3. How does the implementation of educational technology affect the overall financial performance and resource allocation within Malaysian educational institutions?
4. What best practices and strategies can be identified to optimize financial management for successful educational technology integration in Malaysian educational institutions?

The implications of these results in terms of both theory and applied practice were undiscovered fully. While a systematic review narratively synthesizes the methodological variations among studies, including differences in measurement tools used and sample characteristics. Through reviewing the previous quality of existing research studies, this research will offer reliable and generalizable conclusions about the impact of transformational leadership and work performance. These evidence-based practices that been justified in this research paper which shows some information that could guide future research directions in this important area of by critically appraising the quality of existing studies. This research studies can offer more reliable and generalizable conclusions about the impact of the financial management practices adopted by educational institutions. This will inform evidence-based practices and guide future research directions in this important area of the education sector.

METHODOLOGY

This systematic review was performed according to the PRISMA. This methodology is a regular framework, which has been employed to enhance openness and persuasion in reviews as well as meta-analysis. PRISMA makes it easier to create reviews that are professionally and entirely replicable and unbiased. The following dimensions are also

discussed with the context of PRISMA, these include the significance of PRISMA, aspects involved in PRISMA process, and the position of PRISMA in research.

PRISMA was initiated based on transparency and explanation in the reporting of systematic reviews and meta-analyses. First introduced by (Moher et al., 2021), PRISMA sets the guidelines to improve reporting standards for such studies. The main aim of PRISMA is to help authors clearly report why the review was conducted, what was done, and what was found. This transparency is important to enable readers to critically appraise the quality and reliability of the findings of the review. To be transparent, a visual method to display the study selection process is through a PRISMA flow diagram, where four phases within the process are given: Identification, Screening, Eligibility, and Included (Hadi & Batara Marpaung, 2023; Kant, 2023; Zahari & Kaliannan, 2023).

The identification, screening, eligibility, and included phases of the study selection process are represented graphically in the PRISMA flow diagram.

1. **Identification:** This stage will involve the identifying the data, through database searching and other sources. The identified number will be recorded to screen in the next stage.
2. **Screening:** It is the stage where the duplicate records are removed, and the remaining records are checked against their abstracts and titles. The number of the records discarded and included for further assessment has to be documented.
3. **Eligibility:** The remaining record full-text articles are assessed for eligibility against predefined criteria. The number of articles that were excluded and the reasons for doing so shall be reported.
4. **Included:** This phase includes the studies that meet inclusion criteria. It shall be represented showing a total number of studies to be included in the qualitative synthesis and quantitative synthesis, meta-analysis.

PRISMA is the essential tool that authors use to carry out and disclose a systematic review and meta-analysis. The checklist, coupled with the flowchart, is extensive enough to ensure transparent, repeatable, and completeness of the review. The application of PRISMA principles, when adhered to by the researchers, guarantees enhanced quality of their reviews and minimizes bias that provides more valid data on which to base their decisions. Without the adoption of PRISMA, research and practice in different domains will not be advanced due to the fact that high-quality evidence is needed, which will continue to increase. The papers obtained are checked against the requirements set by the researcher to determine whether they satisfy the criteria for inclusion in the Systematic Literature Review. These are only available in full-text PDF form and limited to years from 2018 through 2024. These materials, comprising mainly open access journals, provide an overview of the study the financial management practices adopted by educational institutions in Malaysia during the implementation of educational technology, identifying challenges, effectiveness, and opportunities for optimization to enhance educational outcomes and institutional sustainability from sources such as Scopus and Google Scholar.

The initial stage was the identification of keywords to be used in the search process. Identification entails searching for synonyms, related terms, and variations of the main keywords for this study. This will give options that are wider in terms of trying to find more relevant articles for review. These keywords as shown in Table 1, are formulated based on the research question proposed by (Okoli, 2015). This was done with the aid of an online thesaurus, keywords used in previous similar studies, some keywords suggested by Scopus itself, and involvement of experts.

Table 1

Keywords Used in This Study

Databases	Keywords Used
Scopus	<ul style="list-style-type: none"> • Financial Management • educational technology
Google Scholar	<ul style="list-style-type: none"> • educational institutions • implementation • funding strategies • cost management • technology integration

Table 1 presents the core keywords utilized to guide the initial stages of the systematic literature search. These keywords were selected based on the main concepts derived from the research objectives, namely financial management, educational technology, and institutional integration practices. The selected terms were applied in both Scopus and Google Scholar databases to ensure comprehensive coverage of relevant academic literature. The variation in keyword combinations across the two platforms allowed the researchers to capture a broader range of studies by accounting for indexing differences and search capabilities unique to each database. These keywords were further refined using Boolean operators, phrase searching, truncation, and wildcard techniques, as elaborated in Table 2.

Table 2

Search String Used in This Study

Database	Search String
Scopus Google scholar	ALL ("financial management" OR "financial strategies" OR "budgeting" OR "funding") AND ("educational technology" OR "digital learning" OR "ICT integration" OR "technology adoption") AND ("educational institutions" OR "schools" OR "universities" OR "colleges") AND ("Malaysia")

The second stage involved screening the articles. The goal of the first screening stage was to eliminate duplicate articles. In this process, 3 duplicate articles were removed, leaving 397 articles to be evaluated using specific inclusion and exclusion criteria:

- Only journal research articles were included because they provide related article topics. Excluded publications included book series, books, book chapters, meta-analyses, systematic reviews, and conference proceedings.
- Only English-language publications were considered.
- In order to meet the goals of the review, the emphasis was on studies conducted in the field of research study.

These criteria allowed for the exclusion of 397 papers (see Table 3), leaving 96 articles suitable for review.

The whole articles were examined at the third step, which was the eligibility check. At this point, the writers went through the remaining pieces by hand to make sure they fulfilled the requirements. Reading the abstracts and titles was required for this stage. Because this study will concentrate on financial management practices in educational institutions related to educational technology, 301 articles were consequently eliminated. In the end, a mere 96 articles fulfilled the requirements and were chosen for additional examination as per shown in Figure 1: PRISMA.

Table 3.

The Inclusion and Exclusion Criteria.

Criteria	Inclusion	Exclusion
Nature of study	<ul style="list-style-type: none"> • The article addresses the similar topic • Studies related and focused on financial management practices in educational institutions related to educational technology 	<ul style="list-style-type: none"> • The article addresses another topic • Studies not related and do not focus on financial management practices in educational institutions related to educational technology
Document Type	<ul style="list-style-type: none"> • Journal Article 	<ul style="list-style-type: none"> • Non journal article papers for example books, thesis paper, conference paper and magazine
Language	<ul style="list-style-type: none"> • English 	<ul style="list-style-type: none"> • Non-English
Timeline	<ul style="list-style-type: none"> • >2018 	<ul style="list-style-type: none"> • <2018

The process of data extraction and analysis in the SPAR-4-SLR (Systematic Protocol for Academic Research - Stepwise Literature Review) as described involves a systematic and structured approach to reviewing the literature for answering research questions (Paul et al., 2021). Other articles were carefully gone through and analyzed based

on the ones that best addressed the formulated research questions. Data extraction began by reading the abstracts, after which some relevant themes and sub-themes were identified by reading the full articles. All 38 articles as shown in Table 4 were analyzed in this study, especially in their abstract, result, and discussion parts. Data relevant for answering the research questions were identified and tabulated. Subsequently, the researcher conducted a thematic analysis, which identified patterns, clusters, and relationships within the data. A similarity or relationship between ideas had to be noted in order for the main themes and sub-themes to be established. Data extraction was done with the help of a standard form capturing the important details of the study:

Study characteristics: authors, countries, year of publication, study design, sample size.

- Study characteristics: Authors of the papers, countries of publication, year of publication, used of study design, sample size that use, and other relevant research designs focused on financial management and educational technology in educational institutions.
- Population details: Educational institutions in Malaysia for example universities, colleges and schools.
- Intervention details: Implementation of educational technology, for example digital learning platforms, online resources, ICT infrastructure.
- Comparison details: Financial management practices before and after the integration of educational technology, or comparisons between institutions with varying levels of technology adoption.
- Outcome measures: Effectiveness and sustainability of financial management practices, challenges encountered, and overall impact on educational and institutional outcomes.

The research study also showed the key findings and conclusions to ensure understandability and consistency of the research, two reviewers independently extracted data, resolving any discrepancies through discussion or consultation with a third reviewer (Page et al., 2021).

Findings and discussions

The systematic review process yielded a total of 36 articles that fulfilled all eligibility criteria after full-text screening. These articles spanned the period from 2013 to 2023 and were derived from both Scopus and Google Scholar databases. The studies selected were examined across four core themes aligned with the research objectives: financial strategies, challenges in financing educational technology, impact on institutional finances, and best practices in financial governance.

1. Prevalent Financial Management Strategies

Several financial strategies emerged as commonly adopted by Malaysian educational institutions in implementing educational technology initiatives. These include:

- Activity-Based Budgeting (ABB) to align resources with specific digital learning goals.
- Public-Private Partnerships (PPPs) and government-funded grant schemes such as the Digital Education Transformation Plan (2020).
- Performance-Based Funding linked to digital learning outcomes and adoption benchmarks.

Most institutions emphasized cost-benefit analysis before investing in learning management systems (LMS), smart classrooms, and EdTech platforms to justify long-term value.

2. Challenges in Financial Management

Common challenges reported include:

- Inconsistent budget allocations due to changing government priorities.
- Lack of financial forecasting tools for EdTech ROI (Return on Investment).
- Limited digital finance expertise within administrative teams, resulting in inefficient allocation.
- Infrastructure gaps in rural areas making technology implementation more expensive.

Some studies also cited bureaucratic delays in fund disbursement as a barrier to timely adoption.

3. Financial Impact and Resource Allocation

The integration of educational technology has had mixed impacts on institutional finances:

- Short-term financial strain due to high capital investment in infrastructure.
- Mid-to-long-term efficiencies gained through reduced paper costs, automation, and virtual learning environments.

- A shift from fixed to variable costs, especially where cloud services or subscription models were used (for example Google Workspace for Education).

Studies indicated that institutions with strategic financial planning experienced better alignment between EdTech goals and fiscal outcomes.

4. Best Practices for Financial Optimization

The review identified several best practices:

- Establishment of dedicated EdTech financial planning units to handle procurement and cost optimization.
- Use of Total Cost of Ownership (TCO) frameworks to assess ongoing maintenance, training, and upgrade costs.
- Stakeholder engagement, especially with academic staff and IT departments, to prevent financial misalignment.

These practices contributed to improved budgeting accuracy and more sustainable technology integration.

Systematic review analysis was performed on the manifested contents of included literature to identify the themes. The purpose of the analysis was to answer the research questions and corroborate the findings. The second stage of analysis used the PRISMA quality checklist to analyze the literature (Page et al., 2021). This stage gave attention to the introduction, methods, results, and discussion sections of literature. There are three questions of interest pertaining to leadership and sustainability as discussed below.

1. What are the prevalent financial management strategies employed by Malaysian educational institutions in implementing educational technology initiatives?

Malaysian educational institutions employ a range of financial management strategies to support EdTech initiatives. Budget planning serves as the foundation for EdTech integration, where institutions anticipate both initial and recurring costs including infrastructure, software, maintenance, and human capital development. Performance-based funding models are increasingly adopted, linking financial support to measurable educational outcomes and technology adoption (A. R. Ahmad et al., 2023). This aligns funding with institutional priorities and promotes the sustainable use of technology.

Fund allocation is another critical component, requiring the prioritization of technology investment amidst competing operational needs. Institutions diversify funding sources combining government grants, private investment, and internal revenue to manage the high initial and operational costs associated with EdTech. Additionally, marketing and brand management strategies are leveraged to attract external funding and reinforce the institution's technological profile, thereby increasing financial inflows for reinvestment in EdTech (Suhariyani & Ahmad, 2023) (Hakim et al., 2024). Thus, institutions can source funds from different sources in order to tackle the financial responsibilities incurred by the integration of technologies into the educational environment, since these generally include high initial costs, as well as operational costs affecting the day-to-day functioning of the learning process. Apart from funding strategy, marketing and brand management are equally important tools that have an impact on the development of financial sustainability in educational institutions. Such activities are not only focused on enrolling students, but at the same time on finding more funds that can be invested in the development of educational technologies (Dewi Karimah, 2023). Advertising institutions' technological competence and image assists in creating synergies and funding for the institution's technological agenda.

Another crucial factor that has to be implemented in this area is efficient brand equity management. Schools and other educational organizations that can continue to manage their image will improve the possibilities of attracting more interested learners and partners, which in return results in better cash inflows. This additional revenue can then be reinvested in technology enhancement for the institution to support constant enhancement of quality education delivered to learners. It is in this regard that the management of brand equity acts as a financial as well as reputational tool that helps institutions to sustain competitive advantage as education goes digital. Hence, their effectiveness in improvement of education and or teaching and learning in Malaysian institution also depends on sound institutional support frameworks. Self-organizing technologies These factors of perceived usefulness, ease of use as well as social influence have a considerable influence on both the educators and students towards the acceptance of new technological solutions (Haron et al., 2021; Mat Dangi & Mohamed Saat, 2021). Hence, the leadership in these institutions has the responsibility of offering the necessary support in the form of ICT funding, support in the form of training and other resources to ensure that technology is supported in the learning process.

Institutional support mechanisms, such as dedicated ICT funding and training programs, are crucial for successful technology integration. These strategies are supplemented by cost control measures, such as community financing and careful monitoring of technology-related expenses, to maintain financial discipline and sustainability (Hartanto et al., 2022).

2. What challenges do Malaysian educational institutions face in managing finances related to the adoption and integration of educational technology?

Malaysian educational institutions face significant challenges in managing finances for EdTech adoption. Infrastructure limitations including inadequate internet connectivity and outdated hardware are prevalent, particularly in rural areas, requiring substantial investment to overcome (Che Yusof et al., 2023). Limited and inconsistent funding, coupled with the high cost of technology acquisition and maintenance, further constrains the ability of institutions to implement and sustain EdTech initiatives. Managerial capacity and financial literacy among administrators can also hinder effective resource allocation and long-term planning. The COVID-19 pandemic highlighted gaps in digital readiness, forcing institutions to make rapid, unplanned investments in online learning tools without comprehensive financial strategies. Institutional support, such as training and professional development for educators and managers, is often lacking, exacerbating challenges in technology adoption (Mohamad et al., 2023). Equity in access remains a pressing issue, with disparities in resource allocation affecting students and educators in underprivileged regions. Partnerships with industry and government support are essential to bridge funding gaps and ensure equitable technological access across all educational settings (Mohamad et al., 2023; Rahman et al., 2023).

Furthermore, it is clear that there is institutional support which in a way helps in the implementation of educational technologies among the educators. Thus, when the institutional support is not available, it constrains applies to technology utilization and distorts resource, financial flow that in turn impact the overall financial management of institutions (Mat Dangi & Mohamed Saat, 2021). Hence, enhancing the skills of managers and enhancing the institutional support base are necessary so that efficient and effective use of funds is made for supporting educational technologies. These issues are not unique, and they are not necessarily insurmountable, and we shall see them as we progress in this article. Possible solutions that may reduce such issues include correct funding priorities which should be geared towards such institutions, orientations and workshops for teachers and professors, as well as supportive services and resources for the postsecondary institutions (Dewi Karimah, 2023). Further, the utilization of affiliations with the industries and obtaining government support might contribute to the acquisition of significant funds required for the effective implementation of educational technology. These are issues that can be addressed effectively to by Malaysian educational institutions in order to be ready to address issues of technology integration and improve the education quality of students (Jafar et al., 2022).

3. How does the implementation of educational technology affect the overall financial performance and resource allocation within Malaysian educational institutions?

The integration of educational technology has led to substantial changes in resource allocation and financial performance within Malaysian educational institutions. While EdTech can reduce long-term operational costs by minimizing reliance on physical infrastructure and streamlining administrative processes (Che Yusof et al., 2023) (Akhmad Ramli et al., 2023), the initial investment in technology, staff training, and ongoing maintenance is considerable, and ongoing maintenance is considerable. Institutions are reallocating a larger share of their budgets to technology-related expenditures, reflecting a shift in strategic priorities. This includes investment in digital infrastructure, professional development, and student support services. The shift requires robust financial performance evaluation, using tools such as cost-benefit analysis and ROI assessments, to determine the effectiveness of EdTech investments.

On the other hand, though the use of technology in education might provide long-term savings, the initial technological infrastructure investment is really huge. Most institutions have to invest much in buying new tools, training educators, and technology maintenance (Haron et al., 2021). It therefore goes without saying that institutions have to balance these initial costs against the long-term benefits accruing from educational technologies. With the shift to digital platforms, for instance, educational institutions have been forced to reconsider their resource allocation methods. A more significant share of the budget is now spent in acquiring and maintaining a technology infrastructure. This shift also includes investment in student training, especially in digital financial literacy programs that become very important to be able to handle online transactions and find their way through digital platforms effectively. Resource reallocation reflects the institutional shift in priorities that has emerged from adaptation pressures linked to the digital age. However, persistent challenges related to equity and institutional readiness affect the extent of these

impacts. Institutions with strong financial and administrative frameworks are better positioned to leverage EdTech for improved efficiency and educational outcomes, while those lacking such frameworks may struggle to realize these benefits.

In addition to investments in technology, institutions also have to invest in human resources. For the effective integration of technology, the professional development of educators has to be an ongoing process. In this regard, while maximum benefits can be derived from the digital tools and platforms, educators need training in their usage. This is not only costly but also time-consuming and hence increases the institutional load (Akhmad Ramli et al., 2023; Mat Dangi & Mohamed Saat, 2021). Resource allocation in educational technologies hence involves more than just investment in infrastructure to include human capital development. Despite these benefits of adopting educational technology, it is still considerable that glaring challenges are evident to this day, especially issues of equity of access (Mohd Rahim et al., 2022). Particularly, Malaysia does have some pressing issues on the digital divide, some institutions, especially in rural settings, have not been able to access the technological infrastructure. This leads even further to inequalities in the different ways students and educators can access various digital tools, thereby hindering these students and educators from benefiting fully from educational technology. Equitable distribution of the required resources in the implementation of technology by all institutions is of paramount importance for closing the gap in offering equal learning opportunities to all students.

Institutional readiness is another barrier. Not all institutions are equally ready to accept and integrate the usage of educational technologies. Some of them lack infrastructural, support system, and institutional frameworks to permit smooth transition to digital learning. This could result in detrimental implications on elements such as financial performance and operational efficiency and limit the complete benefits of technology (Chugh et al., 2023; Salin et al., 2023). Institutional preparedness and support thus become important in terms of the success of technology adoption. While there are several benefits associated with the integration of educational technology, institutions need to be very cautious about the challenges that come along with it. While lowering money and enhancing learning outcomes are actual possibilities, these potential benefits need to be evaluated against the significant investments required for the adoption and maintenance of technologies. (Che Yusof et al., 2023). The effective adoption of learning technology depends not only on the availability of financial resources but also on the receptivity of teachers, learners, and institutional frameworks to innovation. As these institutions continue to evolve with technology, continual review and adaptation will be important in the ongoing quest for effective use of such technologies to improve educational outcomes. In a word, educational technology has changed both the financial outcomes and resource management of educational institutions in Malaysia.

4. What best practices and strategies can be identified to optimize financial management for successful educational technology integration in Malaysian educational institutions?

In any case, optimal financial management for the successful integration of educational technology in Malaysian educational institutions will require a holistic and multi-dimensional approach. Such approaches would involve strategic funding, use of financial technology, enhancement of digital financial literacy, and institutional support. It is in the adoption of best practices and strategies that educational institutions will be capacitated with resource management skills for efficiency towards improvement in learning outcomes and overall institutional performance. The sections below underscore the necessary strategies extracted from the findings of the research. In a nutshell, strategic financial investment forms part of the key elements in effective educational technology integration. The Malaysian Ministry of Higher Education has integrated a new funding formula geared toward aligning the provided finances to institutional performance outcomes. This initiative involves the development of strategies to ensure long-term funding that caters to the sustenance of technology advancements and the improvement of performance in institutions. On this basis, strategic funding will help strike a balance between performance and financial sustainability, something quite crucial for the performance of an institution in the long run.

The efficiency of innovation and improvement of performance indicators such as profitability and organizational sustainability also pertains to effective financial management practices. Educational institutions should rather focus on those financial practices that would lead to becoming more innovative and performing valuably. These are practices that ensure the institution's appropriate resource utilization, enhance efficiency in its operations, and lay ground for the continuous integration of technology within the institution. Technology, according to the discussion carried out by (Akhmad Ramli et al., 2023) supports the incorporation of a number of resources. Fintech has huge potential for contributing toward better financial management in educational institutions. Fintech could further streamline financial transactions, better manage savings and investments, and improve institutional financial behavior in general. Equipped with the tools of fintech, an institution can automate processes, reduce the administrative cost of

activities, and enhance financial management to provide support for educational technology ventures. Such usage of Fintech eventually contributes to better financial stability and furthers the long-term goals of educational technology integration. With increased incorporation of technology aspects, the management of the financial side is becoming increasingly important, hence the need for digital financial literacy. In addition, the factors of financial knowledge, social media influences, and peer networks influence digital financial literacy to enable better financial management of educational technologies (Adnan et al., 2023). The other important component of financial literacy involves awareness of financial counseling. Supportive institutional environments positively influence the acceptance of technology by educators and its integration into their teaching. Institutional support consists of making the resources available for educators and the provision of the training programs required in a technologically able environment. As such, educational institutions should establish supportive mechanisms that further reinforce educators in using technology. Besides this, they also need to provide training programs which increase educators' digital competency (Celeste & Osias, 2024).

Moreover, marketing strategies and brand equity management could attract resources and add to the good reputation of educational institutions. With an appropriate marketing strategy, including product, price, location, promotion, people, physical evidence, and process, the institution will be able to achieve good brand equity. Greater brand visibility enables them to attract more resources and partnerships to help with technology integration. While these strategies serve as a concrete foundation for optimizing financial management and integrating educational technologies, specific challenges, for example, detection of fraud cases in the transactions, have to be dealt with. Advanced technologies, such as data mining and machine learning, can be applied to aid a given institution in assessing and minimizing fraud instances that help in promoting integrity and safety in financial resource usage (Mohd Zuki & Mohamed Fisol, 2023). If integrated with such technologies, then the institution can safeguard its financial system and make appropriate allocations. Furthermore, the management of big data strategies will facilitate strategic planning along with the operational functioning of the institutional environment. Large scale data sets analyzed in institutions facilitate informed decision-making, which helps management to use resources in an effective way, thereby justifying the institutional integration of educational technology as stated by (Tasmin et al., 2022).

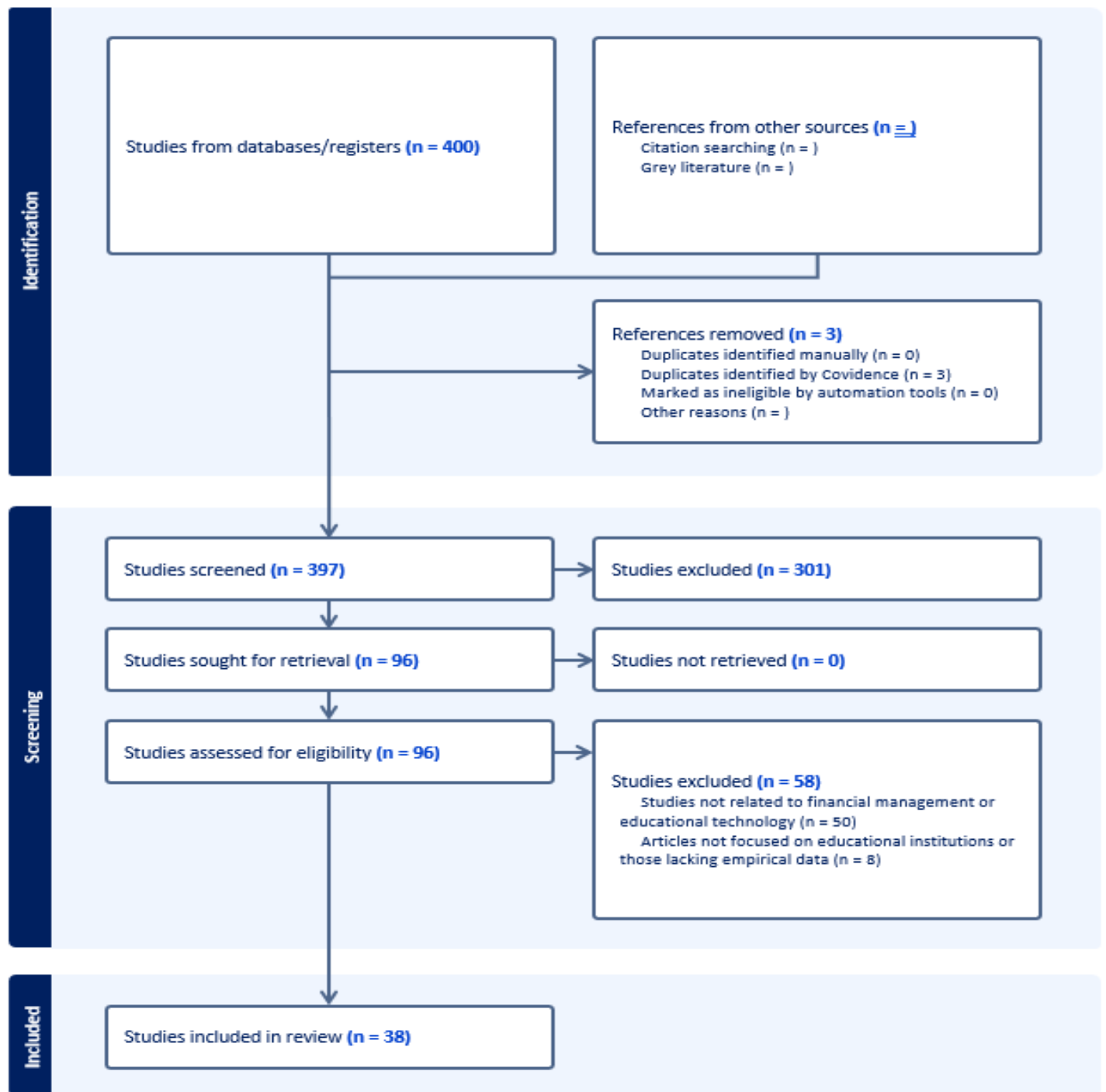


Figure 1

PRISMA

Table 4.

Summary of The Selected Studies

No	Published Year	Title
1	2023	Successful Implementation Of A Financial Information System at Hasanuddin University: Development of The Financial Information System Technology Adoption
2	2023	The Best Practices of Financial Management in Education: A Systematic Literature Review
3	2023	Studying The Factors That Influence the Adoption of Educational Technology in Mogadishu Secondary Schools Using UTAUT Model
4	2021	Promising Digital Schools: An Essential Need for An Educational Revolution.
5	2018	Factors Influencing Principals Leadership for ICT Integration in Public Secondary Schools Management in Bungoma County, Kenya
6	2023	Factors Affecting Technology Integration in Colleges of Education
7	2020	Information And Communication Technology (ICT) Skills and Efficient Management of Educational Resources in Public Secondary Schools.
8	2023	Integration Of Information Communication Technology in Managing Technical Training Institutions in Nairobi and Nyeri Counties, Kenya
9	2018	Technology Adoption in Online Tutorial
10	2023	Examining Technologies Used In K-12 School Districts: A Proposed Framework for Classifying Educational Technologies
11	2020	ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education.
12	2020	Can Internet in Schools and Technology Adaption Stimulate Productivity in Emerging Markets?
13	2020	Determinants Of Information and Communication Technology Integration in Teaching-Learning Process at Aksum University
14	2023	Factors Influencing In-Service Teachers' Technology Integration Model: Innovative Strategies for Educational Technology
15	2021	Maximizing the Adoption of Educational Technology for Learning in OTKP Competencies in the Post-Covid-19 Digital Era
16	2021	Knowledge Management System Adoption to Improve Decision-Making Process in Higher Learning Institutions in the Developing Countries: A Conceptual Framework
17	2022	The Impact of External Factors on The Acceptance of Educational Technology Among the Indonesian Junior School Teachers
18	2024	The Challenges and Solutions of Technology Integration in Rural Schools: A Systematic Literature Review
19	2022	Key Challenges In 21st Century Learning: A Way Forward Towards Sustainable Higher Educational Institutions
20	2020	Learning Management Systems, An Overview
21	2022	Revising Technology Adoption Factors for IOT-Based Smart Campuses: A Systematic Review
22	2020	Pandemics And Education in Sub-Saharan Africa: Invest in Education Technology
23	2020	Facilitating Student Engagement in Higher Education Through Educational Technology: A Narrative Systematic Review in The Field of Education
24	2019	Revisiting Five Decades of Educational Technology Research: A Content and Authorship Analysis of The British Journal of Educational Technology
25	2019	The Role of School Administration in Implementation of ICT in Human Resources Administration in Public Secondary Schools
26	2019	Adapting ICT in Higher Education in The Developing World: Influencing Dynamics
27	2023	Systematic Review on Digital Transformation Among Teachers in Public Schools

continued

28	2023	Teachers 'factors Influencing Adoption and Integration of Information and Communication Technology into Teaching and Learning
29	2022	The Effect of Financial Literacy, Cost of Technology Adoption, Technology Perceived Usefulness, and Government Support on MSMEs' Business Resilience, GATR-Global.
30	2020	Shaping Behaviours Through Institutional Support in British Higher Educational Institutions: Focusing on Employees for Sustainable Technological Change
31	2022	An Investigation of Contextual Factors for ICT Adoption and Utilization by Administrators And Managers of Basic Schools.
32	2020	Facilitating Student Engagement Through Educational Technology in Higher Education: A Systematic Review in The Field of Arts and Humanities
33	2022	School Heads' Technological Leadership and Teachers' ICT Integration in Instruction in The Public Elementary Schools in The Division of Quezon
34	2023	Digital Learning and Digital Institution in Higher Education
35	2020	Determinants Of Big Data Adoption for Higher Education Institutions in Malaysia
36	2020	Factors Affecting ICT Integration During Teaching Practices: A Multiple Case Study of Three Indonesian Universities
37	2023	Investing in imagined digital futures: the techno-financial featuring of edtech investors in higher education
38	2019	The Challenges of Implementing Information and Communications Technology (ICT) Based Online Learning in Chinese Independent High Schools in Malaysia

Figure 2 illustrates the yearly trend of author publications from 2018 to 2024. It reveals a notable increase in publications starting in 2020, with a peak observed in 2021 and 2023, each recording 11 publications. This pattern may indicate a growing academic interest in the topic during those years, possibly driven by the increased adoption of educational technology during and after the COVID-19 pandemic. The slight decline in 2024, where only one publication was recorded, suggests either a temporary shift in research priorities or a delay in publication cycles. The data highlights fluctuations in scholarly output, reflecting how global events and research funding priorities can affect the consistency of research publication over time. The dataset shows only two publications at the beginning 2018. This first figure indicates a comparatively low degree of research effort. There is a minor increase in the number of publications the next year, 2019, to four. The beginning of a more active phase in scholarly output is indicated by this modest increasing trend. Based on the chart above, shown the increase in pattern of publication which 11 in year 2020. The increasing indicates that the rising in academic activity, also influenced by various external factors such as global events or changes in research priorities. The next following is in year 2021, is three. This explain that the decline in the number of publications. The publication activity is very important to ensure that the continuous of research has been active from time to time.

However, in 2022 it is registered that the increase and reaches 6 pieces of publications. This increase implies there is a continuous period in writing or a comeback in academia as much as publishing is concerned. These trends are best captured in the line chart, which is shown alongside this data, one that shows a sharp spike in the year 2020, a considerable drop in publication during that year. It is such fluctuations that could be indicative of one or the other external factors that might underpin the publication rates. The outcomes of the analysis of the given dataset are the following to mention and all these points to the fact that academic publishing has been through diverse changes in the recent past. The next 2023 remain 11 of publication of research on the specific research. In 2024, it shows that only one publication could be able to slow down the number of research publications.

Figure 2

Year of Publication

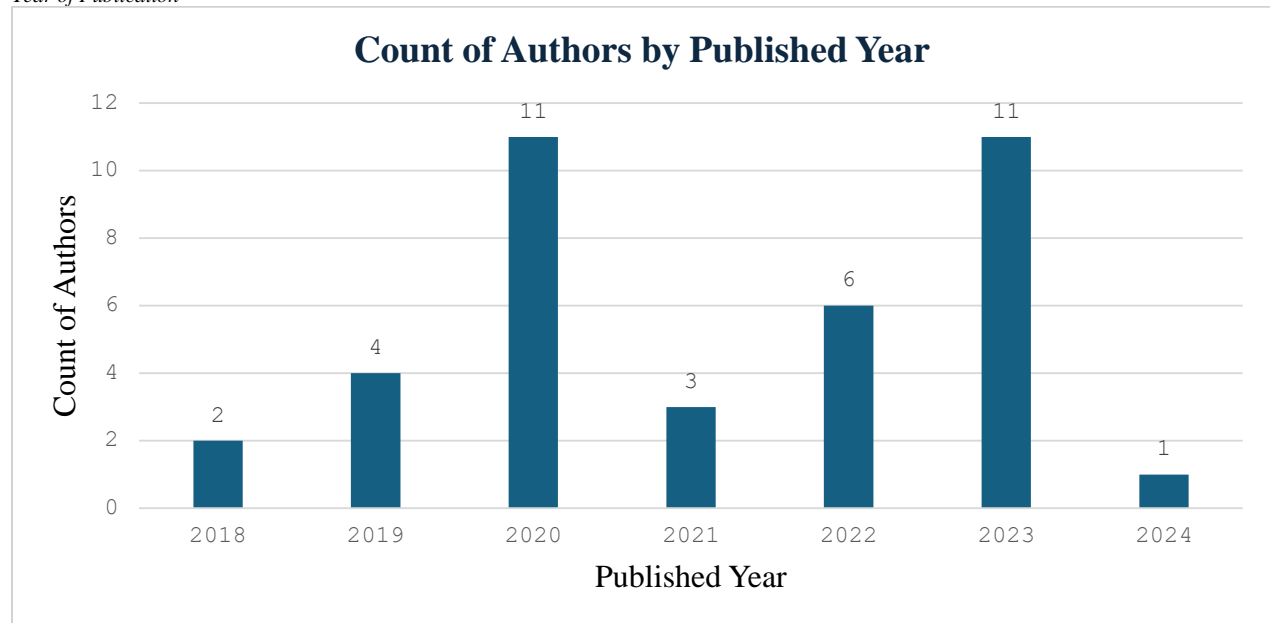


Figure 3 presents a geographical heat map showing the frequency of publications by country. The highest number of publications originated from Malaysia and Indonesia, indicating strong research productivity on financial management and educational technology in these countries. Other active contributors include Nepal, India, the Philippines, and China. Developed countries such as the USA, UK, and Australia also show moderate engagement. The visual distribution emphasizes regional research strengths, especially in Southeast Asia. It serves as a useful reference for identifying regions with active academic involvement, potential collaborators, and comparative gaps in global research coverage on the subject. As the increasing in the publication of research, one of increasing one of it will be the proposing the new ideas of research publication to able for further research publication. It may therefore be of some benefit to the researchers and policy makers to try and identify what may have driven this rise. For the purpose of comprehension of the changes in the field of interest and change in the status of the various publications they are seen in the light of such patterns. To scholars and academics, such an understanding is very useful in the process of arriving at a decision of where to submit their research papers. Some other forms of periodical publication seem to afford scholars greater visibility and relevance in revitalized disciplines.

Thus, the indicated evaluation of the years of publication articles and focusing of the choice of journals will make it possible to define the focused areas in the development of academic research and the process of publications. The following study shows not only the fact that the amount and variety of production is growing constantly, but also provides guidance for further research, and publication activity. With regard to the geographical area considered (Figure 3), one gets a clear idea regarding the number of published authors from different countries. The number of authors is also quite spread out of with a total of 38 publication contributing to this edition.

Figure 3

Geographical Area Covered

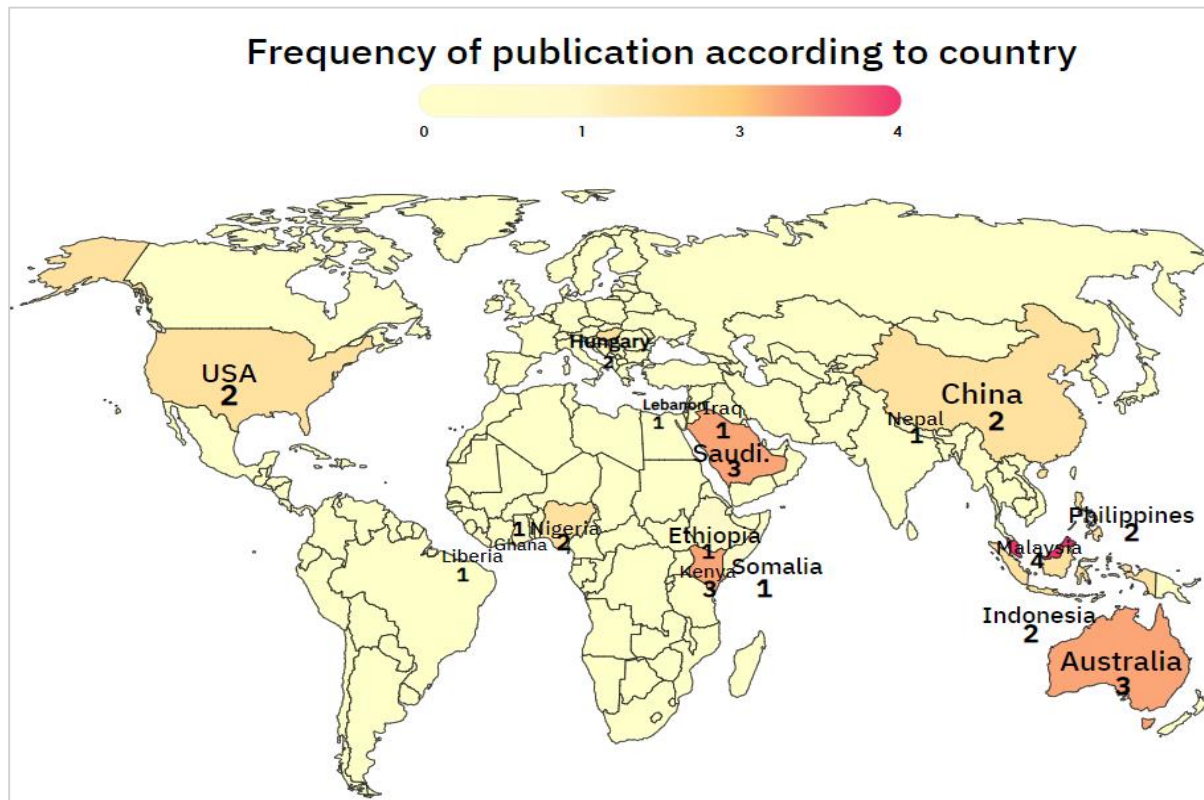


Figure 4 presents a pie chart illustrating the distribution of research titles by country. The largest portion of titles originates from Malaysia and Indonesia, highlighting their prominent role in contributing to the academic discourse on financial management in educational technology. Other notable contributors include India, the Philippines, Saudi Arabia, and Nigeria, indicating strong engagement from Southeast Asia and selected Middle Eastern and African countries. In contrast, countries such as Somalia, Lebanon, Kenya, Iraq, and Ethiopia represent the lowest counts of research titles, suggesting limited but emerging academic activity. The chart serves as a visual tool for understanding the geographical distribution of scholarly output, enabling researchers to identify active regions, underrepresented areas, and potential opportunities for international collaboration and knowledge sharing. As illustrate in Figure 4, by having 38 published authors, the country with the largest number of publications is Indonesia and Malaysia, which is also revealing a rising in academic productivity of this state. Based on the pie chart given below, it is possible to analyze the comparative nature of the completed research in different countries as the count of titles is measured.

This means that each of the wedges of the pie chart represents a country, and the area of the wedge is proportional to the research titles produced by the research of that country. The topline analysis of the chart shows that in recent years, Malaysia, Indonesia, and Nepal are most active and contributed most to the research and among them, the Malaysian's contributed the highest number of titles. The United Kingdom, Saudi Arabia and Australia also show a fair amount of research activity. On the other hand, such countries as Somalia, Ethiopia, and Iraq are among the few countries that produce least amount of research. The chart also indicates variety in geographical distribution of research activity as well. While the major parts are presented by the Asian and African nations, participation of the developed nations like the United Kingdoms and United States of America are also evident making it clear that research efforts are universal. Therefore, the pie chart allows one to obtain an idea about the distribution of the research activity between the countries. It is a tool to display the geographical distribution of research outputs and help to find areas of cooperation and knowledge sharing.

Figure 4.

Title by Country

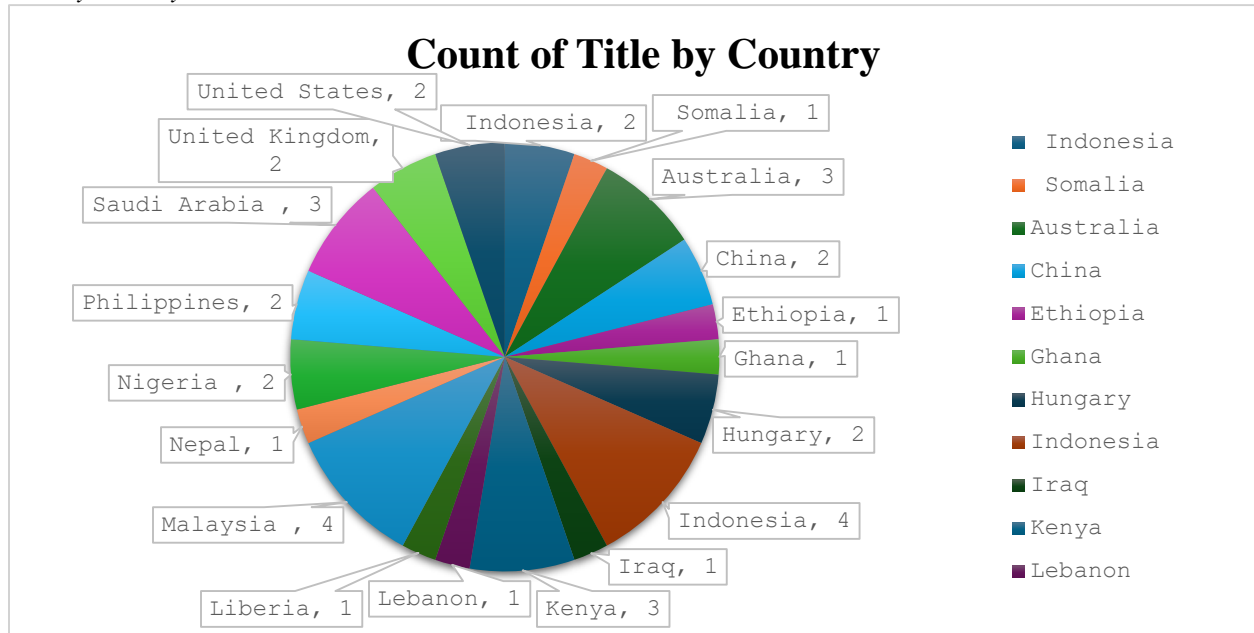


Table 5 provides a detailed distribution of the 38 articles analyzed in this review, categorized according to the journals in which they were published and the corresponding publication year (2018 to 2024). The table reveals a growing trend in scholarly interest on financial management practices and educational technology integration in Malaysian educational institutions. A clear increase in publications is evident from 2020 onward, with peaks in 2021 and 2023 (11 articles each). This rise coincides with the global shift towards online learning solutions triggered by the COVID-19 pandemic. The journals are listed according to the first letters of the name, while the number of publications in each year is given in the columns. The table provides certain indications regarding the shifts in the academic concern regarding these problems and can be seen as an expression of the emerging awareness of the roles of the technology education application in the management of the financial systems in educational organizations. The table analyzed above reveals variability of the research production in the given time period. As can be seen in the figures above, the number of publications in the field was not very high in, with only two publications in 2018 and four in 2019. However, there seems to be more focus on this field from 2020 with 11 articles in 2021 and 2022 showing the researchers' interest in this area during these years. This can be blamed for the global transition toward digital solutions for education triggered by the COVID-19 outbreak. There is little publication activity in 2023 and also 2024; however, 2024 is the current year and it is still possible to notice new publications by the end of this year.

The range of journals shown by subject areas economics, education, technology, and business evident the interdisciplinary nature of the literature on financial management strategies and educational technology. Daily journals like British Journal of Educational Technology & Malaysian Online Journal of Educational Technology touch on the technical part while, economical part is covered by economical or sociological journals like Economics & Sociology and Research in World Economy regarding the financial management in educational institutions. Journal articles that are from the social sciences like the International Journal of Evaluation and Research in Education show that such financial and technological changes are not limited to the institutions only but have effects on society in general. It gives the current researchers the subject of financial management and, in particular, the integration of educational technologies into education important information. The general rise in the number of publications in recent years is indicative of growing efforts to meet finance issues through technology solutions. The nature of the issues expressed in these journals is not narrow, which is evident from the staking of the interdisciplinary field of the journals that range in educational theory and economic policy and technological innovation.

Table 5.
List of Journals

Row Labels	2018	2019	2020	2021	2022	2023	2024	Grand Total
Advances in Economics, Business and Management Research				1				1
American Journal of Educational Research			1					1
Australasian Journal of Educational Technology			1					1
British Journal of Educational Technology		1						1
Cogent Education			1					1
Critical Studies in Education						1		1
Economics & Sociology			1					1
Education Sciences						1		1
Emerging Educational Innovation						1		1
Encyclopedia of Education and Information			1					1
Frontiers in Psychology			1					1
Global Journal of Business Social Sciences Review					1			1
Information and Knowledge Management	1							1
International Journal of Academic Pedagogical Research					1			1
International Journal of Economic		1						1
International Journal of Educational							1	1
International Journal of Evaluation and Research in Education						1		1
International Journal of Information and Education Technology						1		1
International Journal of Research and Innovation in Social Science						1		1
International Journal of Studies						1		1
International Journal of Technology in Education					1			1
Issues in Technology			1					1
Journal of Advances in Education		1						1
Journal of Educational Technology Systems						1		1
Journal of Research in Business and Management						1		1
Journal of the International Society for Teacher			1					1
Journal of Theoretical and Applied Information Technology				1				1
Malaysian Online Journal of Educational Technology			1					1
Optimizing Open and Distance Learning in Higher Education Institutions	1							1
Pedagogical Research				1				1
Plos One						1		1
Research in Management of Technology and Business			1					1
Research in World Economy		1						1
School Of Education and Social Sciences						1		1
Sustainability					2			2
The Electronic Journal of E-Learning					1			1
The Qualitative Report			1					1
Grand Total	2	4	11	3	6	11	1	38

Conclusions and recommendations

The integration of educational technology into Malaysian educational institutions introduces transformative opportunities to enhance teaching and learning experiences. Simultaneously, this integration presents significant financial management challenges that these institutions must confront. This systematic review of financial strategies offers valuable insights into how these institutions can foster effective management and ensure the sustainable adoption of educational technology.

From a theoretical standpoint, the financial management of educational technology integration necessitates a re-evaluation of traditional models concerning resource allocation and organizational finance. The concept of strategic funding becomes crucial, where funding models are not only based on operational costs but also aligned with performance outcomes. The Ministry of Higher Education in Malaysia has introduced new funding formulas to incentivize higher education institutions to align their financial resources with measurable outcomes or performance indicators. This theoretical shift from static funding structures towards dynamic, performance-based models represents a substantial evolution in the academic discourse on financial management in educational institutions. It prompts questions about the transferability of these models to other nations seeking to ensure sustainability in educational technologies.

The review also highlights financial technology (Fintech) as a conceptual framework for enhancing financial behavior and operational efficiency. The adoption of Fintech solutions in educational institutions streamlines financial transactions and improves overall financial management. This theoretical development suggests that traditional financial management theories, such as those concerning capital allocation and cost control, are evolving in response to digital innovations in finance. The incorporation of Fintech in institutional financial management not only modernizes practices but also mirrors broader trends in financial management theory, which increasingly emphasize digital transformation and efficiency. Furthermore, the conceptual advancement of positioning financial literacy as an institutional attribute reinforces the connections between financial knowledge, institutional support, and technology integration.

From a practical standpoint, the integration of educational technologies presents both opportunities and challenges for the financial management of Malaysian schools. The most significant implication is the need for strategic resource allocation. The shift towards online and blended learning pedagogies necessitates the reallocation of finances towards technology acquisition, capacity building, and maintenance. Consequently, educational institutions must increase investments in infrastructure, digital tools, and professional development to effectively integrate technology into teaching and learning. Institutions must not only invest in technology itself but also in training programs that enhance staff digital competence. This ensures the effective utilization of technology to improve educational outcomes. Institutional readiness, therefore, emerges as a pragmatic challenge that demands financial support and strong leadership commitment.

Finally, this review has brought to light the challenge of the digital divide. Many institutions in Malaysia, particularly in rural areas, encounter substantial barriers to technology access, including inadequate infrastructure and financial support. This disparity results in unequal access to digital tools for students and educators, hindering them from fully benefiting from educational technology. Ensuring equitable distribution of resources for technology implementation across all institutions is crucial for closing the gap and providing equal learning opportunities for all students.

The integration of educational technology into Malaysian educational institutions opens new horizons to improve teaching and learning experiences. At the same time, the change brings a lot of financial management challenges that institutions are forced to face. The theoretical and practical implications gained from the systematic review of financial strategies provide useful insights into how institutions promote effective management and sustainable adoption of educational technology.

Theoretically, the financial management of the integration of educational technologies upholds the need for a rethinking of traditional models in relation to resource allocation and organizational finance. In this regard, the concept of strategic funding becomes important where funding models are based on operational costs but also on alignments towards performance outcomes. As such, new funding formulas have been suggested by the Ministry of Higher Education in Malaysia to spur higher education institutions toward making their financial resources coherent with measurable outcomes or performance indicators. This theoretical shift away from the static structures of funding toward dynamic, performance-based models signifies a serious evolution of the academic discourse in terms of financial management in educational institutions. It raises questions as to how such models could be emulated by other nations in order to ensure sustainability in educational technologies.

The review also focuses on fintech as a conceptual framework towards bringing about an improvement in financial behavior along with operational efficiency. The adoption of fintech solutions in educational institutions has, therefore, facilitated smoother financial transactions along with overall financial management. This might be a theoretical development that suggests the old theories of financial management, such as those on capital allocation and cost control, are changing with these digital innovations in finance. In this respect, the integration of fintech within the conduct of financial management at an institutional level not only modernizes such practices but also reflects wider trends within financial management theory where there is an increasingly wide focus on digital transformation and efficiency. In this conceptual advancement, the positioning of financial literacy as an institutional attribute further strengthens the links between financial knowledge, institutional support, and technology integration.

From the practical perspective, integration of educational technologies also creates opportunities and challenges related to financial management of Malaysian schools. The most significant implications are strategic resource allocation. Online and blended learning pedagogies required re-allocation of finances toward acquiring technology, building capacity, and maintenance. As a result, schools and institutions now have to invest more in infrastructure, digital tools, and professional development for the good integration of technology into teaching and learning. Institutions should invest not only in the technology itself but also in training programs that enhance digital competence among staff (Dangi & Saat, 2021). In this way, the institutions ensure that the technology is put to effective use in upgrading educational outcomes. Thus, institutional readiness becomes a pragmatic challenge that requires financial backing and strong leadership commitment.

Finally, the review has highlighted the challenge of the digital divide. Most of the institutions in Malaysia, especially in rural areas, face immense barriers to technology access, including in infrastructure and financial support. Chinnasamy & Faizal, 2023, highlight that this disparity makes it imperative to press for targeted financial strategies so that equity can be ensured in the use of educational technologies in diverse educational settings. This, in practical terms, would mean that education policies have to strive for a balance between improving the financial management aspect and, equally importantly, ensuring equality in access to digital tools among all students and educators. The integration of ICT in Malaysian educational institutions holds great theoretical and practical implications related to financial management strategies. Theoretically, these range from challenging conventional models of funding and management to emphasizing performance-based funding, Fintech, and digital financial literacy.

This systematic review has highlighted several gaps and future directions for research in financial management strategies and the integration of educational technology within Malaysian educational institutions. As the landscape of educational technology continues to evolve, there is a pressing need for research that supports institutions in adapting to these dynamic changes.

First, future research should focus on developing and evaluating more adaptive and flexible budget management models that enable institutions to respond efficiently to shifting educational technology needs. Such research could examine how budget planning and resource allocation can be made more responsive to rapid technological changes, unexpected crises (such as pandemics), and the need for ongoing technology upgrades and staff development. Second, longitudinal studies are needed to assess the long-term impact of educational technology adoption on the financial performance and sustainability of educational institutions. While current literature often provides a snapshot of initial costs and benefits, more in-depth empirical studies should track financial outcomes over several years, including the cumulative effects of technology upgrades, maintenance, and capacity-building for educators and administrators.

Third, region-specific and comparative research is essential, especially focusing on rural and underfunded schools. These institutions often face unique financial and infrastructural challenges that may not be captured in studies centered on urban or well-resourced settings. Comparative analyses between rural and urban institutions could identify effective strategies for overcoming disparities and improving access to educational technology, including the role of alternative funding sources such as public-private partnerships and international grants. Fourth, there is a need to evaluate the effectiveness of government policies and funding models, such as performance-based budgeting, in supporting sustainable EdTech integration. Future research could explore the adequacy, reliability, and resilience of government funding, and assess the impact of different policy interventions on the financial health and technological advancement of educational institutions.

Finally, the relationship between financial management and educational leadership in technology adoption warrants further investigation. Research could examine how leadership practices shape financial decision-making and resource allocation for EdTech initiatives and identify best practices from institutions that have successfully implemented innovative financial strategies. Case studies highlighting the synergy between effective leadership and financial planning can provide practical models for others to follow. By addressing these research gaps, future studies can offer valuable insights into how Malaysian educational institutions can adopt more equitable, sustainable, and impactful financial management practices to support ongoing technological innovation in education.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Author contribution

Nurul Syafiqah Azman conceptualized and designed the study, performed the systematic search, and led the writing of the manuscript. Affendy Abu Hassan contributed to the development of the methodology, reviewed the data extraction process, and provided critical revisions. Mohd Farid Shamsudin was involved in interpreting the results, refining the discussion, and formatting the final manuscript for submission. All authors have read and approved the final version of the manuscript.

Data availability statement

All data generated or analysed during this study are included in this published article. The full list of articles reviewed, and their coding outcomes are available from the corresponding author upon reasonable request.

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