Digital Education in ASEAN: A Strategic Framework for Sustainable Growth

Mohd Imran Khusairi Shafee[1*], Sabiroh Md Sabri[2], Ismalaili Ismail[3], Nur Zainie Abd Hamid[4], Noor Azreen Mohd Khushairi[5]

Faculty of Business and Management, Universiti Teknologi MARA Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis

***Corresponding Author**

DOI: https://dx.doi.org/10.47772/IJRISS.2025.924ILEIID005

Received: 23 September 2025; Accepted: 30 September 2025; Published: 29 October 2025

ABSTRACT

The digital transformation of education in Southeast Asia is a journey of high ambition and significant hurdles. This paper addresses a critical "dual gap," a disparity between in-school and out-of-school technology use and the limited impact of EdTech on productivity and cost reduction. It posits that a successful digital shift depends not just on technology, but on strategic management, human-centred design, and ethical practice. Employing a qualitative research approach, this study synthesises academic literature and analyses key policy initiatives and case studies from Malaysia and the broader ASEAN region, including a critical examination of the failed 1BestariNet project. Findings reveal that project failures often stem from poor business models, pedagogical misalignment, and a neglect of data privacy and compliance. The paper concludes with a strategic framework offering actionable recommendations for policymakers, EdTech innovators, and educational leaders, guiding them to build a resilient and equitable digital ecosystem that moves beyond the cycle of hype to achieve lasting, positive change. This includes adopting agile planning, prioritising product-market fit, and strengthening digital literacy to ensure technology serves all students effectively and ethically.

Keywords: Technology Management, Educational Technology, Marketing, Innovation, Teaching and Learning

INTRODUCTION

The education sector in Southeast Asia faces a critical juncture where the rapid advancement of technology demands a fundamental re-evaluation of traditional teaching models. The integration of technology enhanced learning (TEL) is no longer an option but an imperative for enhancing quality, accessibility, and relevance in a volatile, uncertain, complex, and ambiguous (VUCA) world (Sarac et al., 2025). This imperative is driven by a new wave of innovations, including advancements in AI, Virtual Reality (VR), and Augmented Reality (AR) (Adobe, 2024; New Science Publishers, 2024). These technologies promise to fundamentally transform education by creating dynamic, interactive, and personalised learning experiences. The shift from content delivery to adaptive, immersive, and skills-based learning is poised to reshape the educational landscape, requiring leaders to adapt and continuously learn in order to create a more optimised and connected reality (Sarac et al., 2025).

This paper provides a strategic framework for navigating this complex landscape by examining three core pillars: strategic technology management, multi-stakeholder marketing, and pedagogical innovation within the Malaysian and ASEAN context. This framework is designed to move the conversation beyond a focus on technological features to a nuanced discussion of strategic implementation and human factors, addressing the complex challenges that have historically limited technology's impact in education. By synthesising principles from technology management, marketing, and pedagogical theory, this paper offers a comprehensive perspective for creating sustainable and effective EdTech ecosystems.

LITERATURE REVIEW

The education sector has long been a site of significant investment in technology, leading to many "success stories" (Law et al., 2008). However, this optimism is often tempered by a "dual gap" in educational technology, a "usage gap" and an "outcome gap" (Law et al., 2008). The usage gap highlights the disparity between how students use technology in their daily lives versus in-school environments, where usage is less intensive and extensive. The outcome gap reflects the significantly smaller gains in productivity and cost reduction in education compared to other sectors that have embraced technology (Law et al., 2008). These gaps stem not from technological shortcomings but from management and cultural issues, such as teacher resistance due to a lack of training or a fear of job displacement (Castledown, 2024; eLearningIndustry, 2024). A recurring pattern in EdTech is a cycle of "hype" and promising results from early trials followed by "mixed results" upon widespread adoption. This highlights a fundamental failure to manage the full lifecycle of technology adoption. To scale innovation effectively, the research suggests that commercialisation can be the "fastest and most effective route" for educational innovations (Alicoalition, 2025). This perspective aligns with "open innovation" models, where companies collaborate with external stakeholders like universities to leverage cognitive and financial resources (Hillebrand et al., 2015).

A key challenge in this environment is the complexity of marketing. The education sector is a multistakeholder ecosystem that includes students, teachers, parents, and administrators (Rosica, 2025). Traditional "hub-and-spokes" marketing, which focuses on a single customer, fails to account for this intricate network of influence (Hillebrand et al., 2015). A revised perspective that views these networks as continuous and interrelated is essential for effective engagement (Hillebrand et al., 2015). The adoption of innovations in education also follows Everett Rogers' Diffusion of Innovations theory, which identifies five categories of adopters: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards (Dincer, 2023). This framework is critical for managers, as it explains why early successes do not guarantee broader market penetration.

Beyond adoption, the rapid integration of technology raises significant ethical and equitable concerns. The "digital divide" remains a persistent challenge, extending beyond mere access to devices and connectivity to include digital literacy and the quality of technology deployment (JFF, 2020). The design of technology itself must be inclusive, offering features like multilingual support and dyslexia-friendly fonts to avoid excluding students. Furthermore, the integration of AI brings profound ethical concerns about data privacy and algorithmic bias, with nearly seven out of ten parents opposing the sharing of student data with AI software (Times of India, 2025). A failure of ethics can directly lead to a failure of trust and, ultimately, a failure of business (Loeb, 2023).

This paper employs a METHODOLOGY

qualitative, desk-based research methodology, synthesising a comprehensive body of academic literature and real-world case studies to develop a strategic framework for technology-enhanced learning. The research draws on concepts from technology management, multi-stakeholder marketing theory, and pedagogical innovation to analyse the complex challenges and opportunities within the EdTech sector.

The framework is built through an analytical review of extant research to identify key trends and persistent challenges, such as the "dual gap" in technology implementation (Law et al., 2008). A critical component of the methodology involves an in-depth analysis of specific EdTech case studies, including prominent failures like Knewton, AltSchool, and Edmodo, as well as a successful integration of iPads in a K-12 school district (EdSurge, 2021; Loeb, 2023; Morelock, 2011). This approach allows for a "value-added modelling" of educational interventions by examining the outcomes of different strategies. The findings from this analysis are then used to formulate actionable recommendations.

The paper's conceptual framework is grounded in established theories, including Everett Rogers' Diffusion of Innovations, to understand adoption patterns (Dincer, 2023), and stakeholder marketing principles to address the multi-faceted nature of the educational ecosystem (Hillebrand et al., 2015). By systematically reviewing and synthesising these diverse sources, this paper offers a comprehensive, evidence-based perspective on creating a more resilient and effective EdTech ecosystem.

RESULTS AND DISCUSSION

The Malaysian Context: Policy and Practice

Malaysia has a history of ambitious, large-scale digital education initiatives, aiming to enhance digital literacy and promote a future-proof learning system (Penang Institute, 2025). The Malaysia Education Blueprint (2013-2025) focused on delivering ICT devices and exploring a "bring your own device" approach (Ministry of Education Malaysia, 2025). The new National Digital Education Policy (2023) further aims to improve infrastructure and integrate AI and gamification into daily lessons, with the DELIMa digital education platform serving approximately 5 million users. However, adoption remains a challenge, with only 36% of students being active users due to device and connectivity gaps (Ministry of Education Malaysia, 2025).

The 1BestariNet project stands out as a critical case study of a large-scale government initiative that failed. The RM4.077 billion project was designed to provide high-speed 4G broadband and an online learning platform, Frog VLE, to 10,000 schools nationwide (LiveatPC.com, 2019; Institute for Democracy and Economic Affairs, 2021). The Ministry of Education terminated the project after eight years, citing its failure to deliver on its promises. The reasons for this failure were multifaceted and highlight the complex interplay of policy, procurement, and pedagogy. Despite the promise of high-speed broadband, many schools, especially in rural areas, continued to experience slow or non-existent internet access, undermining the project's goal of equitable access (LiveatPC.com, 2019; National Union of the Teaching Profession, 2016). The Frog VLE platform was criticised for its "complex nature" and a lack of user-friendliness, which led to low adoption rates and a disconnect from the intended pedagogical goals. The decision to award the contract to a single provider, YTL YES, was also criticised as a "questionable decision" made without proper due diligence (LiveatPC.com, 2019). The failure of 1BestariNet provides a profound lesson that a large-scale, top-down approach is not a guarantee of success and can be counterproductive if it overlooks foundational issues. The project's failure was not merely technical but also a failure in user experience design and transparent procurement practices (LiveatPC.com, 2019). It revealed that for any digital education initiative to succeed, it must be supported by reliable infrastructure, a user-centred platform, and a policy framework that values continuous feedback from the end users.

Global Failures and Regional Lessons

An analysis of global EdTech failures offers crucial lessons for Southeast Asia. Three notable examples are AltSchool, Knewton, and Edmodo, all of which failed for reasons highly relevant to the developing EdTech market. AltSchool, a US-based startup, failed due to its high-cost business model that was difficult to scale, highlighting a disconnect between a tech-first mentality and the slow-moving reality of the education sector (EdSurge, 2021). Knewton, an adaptive learning pioneer, failed due to a flawed pedagogical design. Student feedback revealed a frustrating user experience where mistakes resulted in extra, unrelated homework, demonstrating that the quality of pedagogy has a more significant impact on student outcomes than the technology itself. Edmodo's failure was a direct result of an ethical and legal failure to comply with data privacy laws. The company was fined $6 million by the US Federal Trade Commission (FTC) for violating the Children's Online Privacy Protection Act (COPPA) by illegally collecting and using children's data for advertising without proper parental consent (Loeb & Loeb LLP, 2023; FTC, 2023). This case is a critical warning for companies in ASEAN with evolving data protection frameworks like Malaysia's Personal Data Protection Act (PDPA), underscoring that ethical governance is a fundamental requirement for building trust.

The Ethical and Equitable Imperative

The successful digital transformation of education in Malaysia and the broader ASEAN region hinges on addressing a complex set of challenges that go beyond simple technology deployment. A persistent and significant barrier is the "digital divide" within Southeast Asia (Southeast Asian Ministers of Education Organisation, 2025). In rural and remote areas, nearly 30% of students lack reliable internet access, and only 56% of rural schools have high-speed internet, compared to 85% in urban centres (Southeast Asian Ministers of Education Organisation, 2025). The problem extends beyond connectivity to a lack of access to essential devices

and digital literacy, with nearly 40% of teachers in Southeast Asia reporting insufficient training in using digital technologies in the classroom (Southeast Asian Ministers of Education Organisation, 2025; Rosli et al., 2024).

The rapid integration of AI into education brings with it profound ethical concerns, particularly around data privacy and algorithmic bias (Times of India, 2025; UNESCO, n.d.). A PDK poll reveals significant parental opposition to sharing student data with AI software, highlighting a crisis of trust that must be addressed through transparent communication and robust policy frameworks (Times of India, 2025). A study on AI ethics in Malaysian public universities highlights three primary concerns: data privacy, academic integrity, and algorithmic bias (Omar et al., 2025). The use of AI systems requires access to vast amounts of personal data, raising significant concerns about potential breaches and unauthorised access (Omar et al., 2025). A sound ethical framework is not just a moral obligation but a strategic imperative. EdTech companies and educational institutions must embed ethical considerations at the core of their operations to build the trust necessary for sustainable growth (EPAM, 2024).

The Role of Digital Literacy and Pedagogy

A core challenge to EdTech adoption is the "usage gap," where in-school technology use is far less intensive and extensive than students' use outside of school (Law et al., 2008). This disparity points to a fundamental gap between the availability of technology and its effective integration into the curriculum. A UNESCO report on Southeast Asia highlights that nearly 40% of teachers in the region report insufficient training in using digital technologies in the classroom (Southeast Asian Ministers of Education Organisation, 2025; Rosli et al., 2024).

Overcoming this resistance requires a multi-faceted approach that prioritises the teacher's role and experience. EdTech solutions must be framed as a means to achieve a pedagogical outcome, such as improved student engagement or learning, rather than as an end in itself. Training should be consistent, practical, and delivered in incremental steps to avoid overwhelming teachers (Castledown, 2024; eLearningIndustry, 2024).

The framework as illustrated in Figure 1 shows that sustainable digital education requires balanced attention to management, market fit, and pedagogy, reinforced by ethical safeguards and capacity building. It serves as a guide for policymakers, EdTech innovators, and educational leaders to move beyond technology hype toward practical, human-centred solutions.

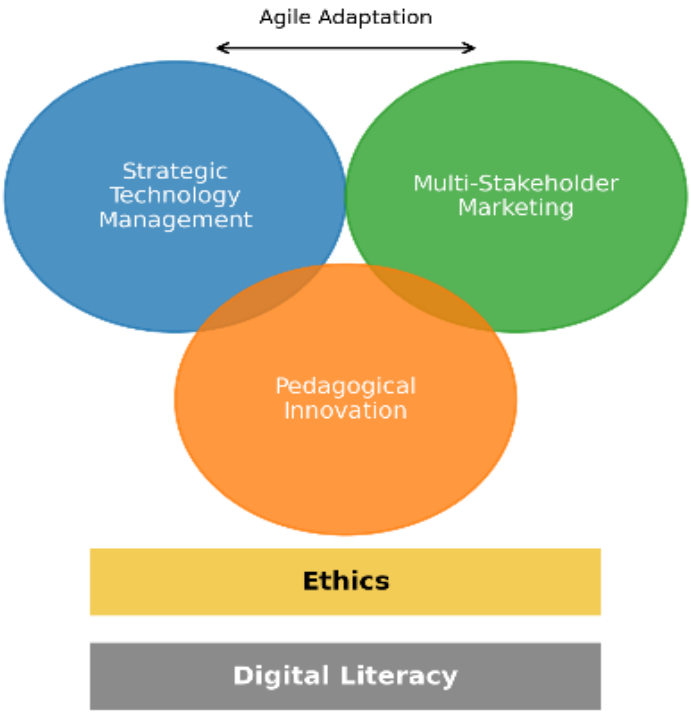

Figure 1. Strategic Framework for Sustainable Digital Education in ASEAN

CONCLUSION

The future of technology-enhanced learning is not determined by the pace of innovation but by the quality of its strategic management, the nuance of its marketing, and the strength of its ethical foundation. The persistent "dual gap" in educational technology is not a sign of its failure but rather an indication of the complexity of the human and operational factors involved in its implementation. By holistically integrating sound management principles, a stakeholder-centric marketing approach, and a deep commitment to equity and ethics, the education sector in Malaysia and ASEAN can move beyond the current cycle of hype and mixed results. Only then can it truly harness technology's potential to create a more equitable, engaging, and effective learning environment for all, turning challenges into opportunities and transforming education for the 21st century and beyond.

REFERENCES

1. Adobe. (2024). The future of learning: Revolutionizing education through VR and AR integration. eLearning Industry. https://elearning.adobe.com/2024/04/the-future-of-learning-revolutionizingeducation-through-vr-and-ar-integration/

2. American Bar Association. (2022). Data privacy in the ASEAN region. International Law News. https://www.americanbar.org/groups/international_law/resources/international-law-news/2022spring/data-privacy-asean-region/

3. Castledown. (2024). Why teachers may hesitate to use technology. https://castledown.online/2024/01/20/why-teachers-may-hesitate-to-use-technology/

4. Dincer, N. (2023). Diffusion of innovation in education. https://nazmidincer.com/blog/diffusion-ofinnovation-in-education/

5. EdSurge. (2021). The edtech company formerly known as AltSchool sold its tech. So what's left? https://www.edsurge.com/news/2021-01-15-the-edtech-company-formerly-known-as-altschool-sold-itstech-so-what-s-left

6. eLearningIndustry. (2024). Why some teachers struggle with EdTech and how we can help them. https://elearningindustry.com/why-some-teachers-struggle-with-edtech-and-how-we-can-help-them

7. EPAM. (2024). How EdTech companies can overcome AI challenges & build a smarter future. https://www.epam.com/insights/blogs/how-edtech-companies-can-overcome-ai-challenges-and-build-asmarter-future

8. FTC. (2023). FTC says Ed Tech provider Edmodo unlawfully used children's personal information for advertising and outsourced compliance to school districts. Federal Trade Commission. https://www.ftc.gov/news-events/news/press-releases/2023/05/ftc-says-ed-tech-provider-edmodounlawfully-used-childrens-personal-information-advertising

9. Hillebrand, B., Driessen, P. H., & Koll, O. (2015). Stakeholder marketing: Theoretical foundations and required capabilities. Journal of the Academy of Marketing Science, 43(4), 411-428.

10. Law, N., Pelgrum, H., & Plomp, T. (2008). Bridging the gap: Technology trends and use of technology in schools. ResearchGate.

11. Loeb & Loeb LLP. (2023). What EdTech companies can learn from the FTC's action against Edmodo. https://www.loeb.com/en/insights/publications/2023/06/what-edtech-companies-can-learn-from-the-ftcsaction-against-edmodo

12. Ministry of Education Malaysia. (2025). National Digital Education Policy to be implemented soon, Fadhlina. BERNAMA. https://www.bernama.com/en/news.php?id=2380804

13. Omar, A. K., et al. (2025). Navigating AI ethics in Malaysian universities: Addressing privacy, integrity, and bias. Journal of Technology and Higher Education, 8(1), 121-135.

14. Penang Institute. (2025). Bridging the digital divide in Malaysian education.

15. Rosli, N. M., et al. (2024). Digital literacy and transformation in ASEAN. ASEAN Socio-Cultural Community Policy Brief.

16. Sarac, V., et al. (2025). Towards Energy Efficiency at Induction Motors-Technical and Economic Aspects. TEM Journal, 14(3), 1917-1927.