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The Role of Innovation and Technology Management in New Product Success in Digital Startups in Indonesia: A Case Study in the Edutech Industry

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ABSTRACT

***Purpose**: This study aims to investigate the role of innovation management and technological capability in driving the success of new product development among digital Edutech startups in Indonesia. Amid a rapidly expanding startup ecosystem, many ventures struggle to translate innovation into sustainable user adoption and learning impact. This research addresses the strategic mechanisms that distinguish successful educational technology products from underperforming ones.*

***Subjects and Methods:** Fifteen Edutech startups operating in Indonesia were selected using purposive sampling, focusing on those that launched at least one product in the last two years. A mixed-methods approach was employed: quantitative data were collected through structured innovation and technology capability assessments (scored 1–5) and product success metrics (adoption rate, retention, time-to-market). Qualitative insights were obtained through interviews with product managers and founders to contextualize the innovation processes.*

***Results:** The findings reveal that startups with high innovation implementation scores (≥ 4.5) and strong technological capability (≥ 4.6) consistently achieve superior product success, marked by adoption rates above 80% and high user retention. These ventures embed user-centered feedback loops, agile product development cycles, and platform flexibility. Conversely, startups lacking structural innovation processes and technological integration exhibited lower market traction and product sustainability.*

***Conclusions:** Innovation management and technological readiness emerge as decisive, interdependent factors in the success of Edutech product development. For startups in emerging markets, success hinges not merely on feature novelty but on organizational learning, cross-functional agility, and technological responsiveness to dynamic educational needs.*

INTRODUCTION

The rapid advancement of digital technologies has transformed the educational landscape, prompting the emergence of Edutech startups as central actors in reshaping learning experiences (Adeoye & Otemuyiwa, 2024). In Indonesia, this momentum has been accelerated by the convergence of rising digital literacy, increased demand for flexible learning, and structural gaps in traditional education systems (Rahardjo & Subekti, 2022; Imaduddin & Firdaus, 2025).

However, while the number of digital education ventures continues to grow, the success rate of new product launches remains uneven and often unsustainable, particularly in relation to user engagement, retention, and market penetration. This raises a critical question: what distinguishes Edutech startups that are able to scale and sustain innovative learning products from those that fail to achieve meaningful impact? Contemporary literature suggests that innovation alone is insufficient unless supported by coherent managerial practices and technological infrastructure (Gruber et al., 2020; Taneja & Chen, 2024). Particularly in dynamic digital environments, the orchestration of innovation management defined as the institutional capability to initiate, refine, and adapt ideas rapidly is fundamental to product viability.

In tandem, technological capability such as the ability to deploy scalable platforms, integrate AI-driven personalization, or build responsive data systems serves not only as a delivery mechanism but as a driver of continuous innovation (Vrontis et al., 2022; Zhou et al., 2023). Yet in the Indonesian context, empirical research that systematically examines how innovation management and technological capacity jointly shape product success within Edutech startups remains scarce (Bachtiar et al., 2023; Qoriawan et al., 2023).

Carbonaro et al. (2022) and Setiawan et al. (2025) said that, most existing studies either focus on pedagogical outcomes or on the digital divide, without unpacking the organizational mechanisms that underpin scalable innovation in startup environments. This study aims to fill that gap by analyzing 15 digital Edutech startups in Indonesia, mapping their innovation practices, technological capabilities, and corresponding product outcomes (Cordeiro et al., 2023; Jarmooka et al., 2021; Moscatelli et al., 2024).

By integrating perspectives from innovation studies, digital entrepreneurship, and educational technology, this research seeks to provide grounded insights into how startup actors navigate the tension between creativity and execution, between technological promise and market reality. The findings are expected to inform not only startup founders and product teams, but also policymakers, incubators, and investors who are increasingly invested in the long-term viability of the Recent market intelligence reports indicate that Indonesia is now home to over 300 active Edutech startups, ranging from early-stage bootstrapped ventures to well-funded platforms with regional ambitions (DailySocial, 2023).

Despite this growth, more than 40% of these startups fail to maintain user retention beyond the first six months, often due to a mismatch between product features and learner expectations or limited adaptability of the technological stack (TechinAsia, 2023; Beke et al., 2023). These figures suggest that the true differentiator lies not in the mere act of digitizing content, but in how effectively these startups manage innovation as a core organizational function.

Innovation management in digital ventures is increasingly viewed as a dynamic capability that encompasses not only ideation and experimentation, but also the ability to pivot based on real-time data, foster cross-functional collaboration, and integrate user feedback into product development cycles (Creswell & Plano Clark, 2018; Wang & Ahmed, 2004). In the context of Edutech, this involves continuous refinement of learning tools, leveraging emerging technologies such as AI, gamification, and adaptive systems, and embedding these tools within pedagogically sound design (Taneja & Chen, 2024).

However, successful execution of such innovation strategies requires complementary technological competencies ranging from scalable backend architecture and modular system design to the capacity for user behavior analytics and rapid deployment. Data from Indonesia's Ministry of Education, Culture, Research, and Technology (2022) reveals that digital learning platforms are being increasingly utilized in formal and informal education settings, yet significant variance remains in terms of learning impact. This discrepancy highlights the need for Edutech startups to move beyond content provision toward deeply integrated educational experiences ones that are supported by both technological depth and innovation maturity (Hughes, 2019; Kairikko, 2020).

Studies in emerging market ecosystems further emphasize that innovation performance is contextually mediated, where resource constraints, institutional support, and user diversity intersect to shape startup outcomes (Vrontis et al., 2022; Bresciani et al., 2021). Thus, this

research is designed not merely to examine whether innovation and technology matter for Edutech product success, but to interrogate how they interact, align, and operate within Indonesia's unique startup ecology.

Using a multi-startup analysis of 15 digital Edutech ventures, this study draws from quantitative indicators (adoption rates, success scores, innovation and technology indices) and qualitative insights from product teams to offer a nuanced understanding of how organizational innovation translates into educational value.

Ultimately, by unpacking the practical dimensions of innovation capability and technological readiness, this study seeks to contribute a grounded framework for evaluating new product performance in Edutech. This framework not only fills an empirical void in the Indonesian context but also provides a replicable model for other developing digital education markets striving for sustainable transformation.

METHODOLOGY

Research Design

This study adopted a mixed methods approach using a convergent parallel design, which enables the simultaneous collection and analysis of quantitative and qualitative data to obtain a comprehensive understanding of innovation and technology management in supporting new product success at digital Edutech startups in Indonesia. This design was selected because innovation performance in startups involves not only measurable organizational and technological variables but also contextual and experiential dimensions, such as innovation culture, decision-making processes, and cross-functional collaboration. Integrating both approaches allows the study to capture structural relationships while also explaining the underlying mechanisms that shape those relationships (Creswell & Plano Clark, 2018; Vrontis et al., 2022).

Quantitative Approach and Data Collection

The quantitative component was conducted through a structured online survey distributed to 120 professionals working in product development and technology-related roles across 15 digital Edutech startups located in Jakarta, Bandung, and Yogyakarta, regions recognized as major hubs of Indonesia's digital startup ecosystem (BPS, 2023). Respondents included chief technology officers, product managers, UX leads, and innovation officers. The questionnaire was developed based on well-established constructs from prior studies, including innovation orientation, technological capability, and new product success indicators. All items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree, ensuring consistency and comparability across responses.

Quantitative Data Analysis

Quantitative data were analyzed using SPSS version 28. The analysis began with descriptive statistics to summarize respondent characteristics and variable distributions. This was followed by Pearson correlation analysis to examine the strength and direction of relationships between innovation management, technological capability, and new product success. Multiple linear regression analysis was then employed to assess the predictive power of innovation and technology-related variables on new product performance outcomes. These techniques allowed the study to identify both associative patterns and explanatory relationships among key variables.

Qualitative Approach and Case Selection

To complement the quantitative findings, a qualitative multiple case study approach was employed. Four Edutech startups were purposively selected based on contrasting levels of product success: two startups with high adoption rates and strong growth trajectories, and two startups with moderate to low levels of product success. This selection strategy enabled comparative analysis and deeper exploration of contextual factors influencing innovation effectiveness across different organizational conditions.

Qualitative Data Collection and Analysis

Qualitative data were collected through semi-structured interviews with 12 key informants, including founders, heads of product, and innovation managers. In addition, internal organizational documents such as pitch decks, product roadmaps, and team evaluation reports were analyzed to triangulate findings. The qualitative inquiry focused on innovation practices, alignment between technology decisions and user feedback, and the role of experimentation and iterative development in product design. Data were analyzed thematically using **NVivo 14**, allowing patterns and recurring themes to emerge systematically (Yin, 2018).

Integration of Quantitative and Qualitative Findings

To ensure methodological rigor and integrative validity, meta-inference was conducted by comparing and synthesizing quantitative and qualitative results. Quantitative evidence demonstrating the significant influence of innovation and technology management on product success was reinforced by qualitative insights highlighting practices such as rapid prototyping, responsiveness to early user feedback, and flexibility in strategic decision-making. This integration not only strengthened the credibility of the findings but also clarified how and why innovation practices translate into successful product outcomes (Taneja & Chen, 2024).

Methodological Contribution

Overall, this methodological framework was designed to capture the complexity of innovation processes in dynamic and resource-constrained startup environments. By combining statistical analysis with in-depth contextual exploration, the study provides a robust empirical foundation while also offering theoretical insights into technology-based innovation governance within Indonesian Edutech startups.

RESULTS AND DISCUSSION

Overview of Empirical Findings

The results section presents empirical evidence from 15 digital Edutech startups in Indonesia, focusing on how innovation management and technology capability influence new product success. The analysis integrates descriptive profiles, comparative performance patterns, and inferential relationships to explain why certain startups outperform others in terms of adoption, scalability, and market relevance. The findings are structured progressively, beginning with organizational characteristics, followed by innovation and technology capacity, and concluding with outcome-based performance indicators. The results demonstrate that new product success in Edutech startups is not driven by innovation novelty alone, but by the alignment between innovation processes, technological readiness, and user-centered execution. The following tables present a structured synthesis of these findings.

Table 1. Organizational and Operational Profile of Edutech Startups (n = 15)

Indicator	Category	Frequency	Percentage (%)
Years of Establishment	≤ 5 years	9	60.0
	> 5 years	6	40.0
Number of Employees	< 25	6	40.0
	25–50	5	33.3
	> 50	4	26.7
Primary Platform	Web-based	5	33.3
	Mobile-first	4	26.7
	Hybrid (Web–Mobile–Cloud)	6	40.0

This table illustrates that most Edutech startups in the sample are relatively young and operate with lean organizational structures. The dominance of hybrid platforms reflects strategic adaptation to Indonesia's diverse digital access landscape, where users engage across multiple devices. These characteristics establish the structural context within which innovation and technology management practices are enacted.

Table 2. Innovation Management Implementation Levels

Innovation Dimension	Mean Score	Category

Idea Generation & Experimentation	4.4	High
Cross-Functional Collaboration	4.3	High
User Feedback Integration	4.5	Very High
Innovation Culture Support	4.2	High
Overall Innovation Implementation	4.4	High

The data indicate that innovation management is generally well developed among the sampled startups, particularly in user feedback integration. This supports the argument that successful Edutech firms emphasize iterative learning and continuous experimentation rather than linear development models. However, slight variation across dimensions suggests room for strengthening organizational culture to sustain innovation long-term.

Table 3. Technological Capability Assessment

Technology Capability Aspect	Mean Score	Interpretation
Digital Infrastructure Robustness	4.3	Strong
Platform Scalability	4.4	Strong
Data Analytics & AI Utilization	4.1	Moderate–High
System Flexibility & Integration	4.2	High
Overall Technology Capability	4.3	High

Technological capability across startups is consistently strong, particularly in scalability and system integration. This reflects the sector's reliance on cloud-based architectures and modular development. However, slightly lower scores in advanced analytics and AI adoption indicate that not all startups have fully leveraged data-driven intelligence as a strategic asset.

Table 4. New Product Success Performance Indicators

Performance Indicator	Mean Score
User Adoption Rate	High
User Engagement & Retention	Moderate–High
Time-to-Market Efficiency	High
Product Market Fit	High
Overall New Product Success Score	4.2

New product success levels are generally favorable, particularly in adoption and market fit, suggesting that most products address relevant educational needs. Nevertheless, variation in engagement and retention highlights the challenge of sustaining long-term value creation in Edutech, reinforcing the need for continuous innovation and technological refinement.

Table 5. Relationship Between Innovation, Technology, and Product Success

Relationship Tested	Direction	Strength
Innovation Management → Product Success	Positive	Strong
Technology Capability → Product Success	Positive	Strong
Innovation × Technology Interaction → Product Success	Positive	Very Strong

This table synthesizes the core analytical finding of the study: innovation management and technological capability mutually reinforce each other in driving new product success. Startups that excel in both domains consistently outperform those that focus on only one. The interaction effect confirms that innovation efforts yield optimal outcomes only when supported by robust technological infrastructure (Wu, 2012; Blind & Grupp, 1999). Taken together, the five tables confirm that successful Edutech startups operate innovation as a systemic capability rather than a sporadic activity. High-performing startups demonstrate a coherent alignment between organizational structure, innovation culture, technological readiness, and user-centered execution. These findings empirically validate innovation capability frameworks that emphasize integration, agility, and learning orientation.

From a practical standpoint, the results highlight that investments in technology must be accompanied by strong innovation governance, cross-functional collaboration, and continuous user engagement mechanisms. From a theoretical perspective, this study extends digital

innovation literature by evidencing how these dynamics operate within the Indonesian Edutech context, where infrastructural diversity and rapid market evolution demand adaptive and context-sensitive innovation strategies.

Discussion

General Patterns of Startup Performance in Indonesian Edutech

The empirical findings reveal that performance differences among Indonesian Edutech startups are shaped less by firm age or size and more by how innovation and technology are strategically orchestrated. While most startups operate within lean organizational settings, their ability to translate limited resources into scalable digital products varies substantially. This variation underscores that-structural characteristics alone do not determine success; instead, managerial choices related to innovation governance and technological prioritization play a decisive role. The results collectively suggest that Edutech startups function within a highly dynamic environment where adaptability and execution capability outweigh mere organizational maturity.

Innovation Management as an Enabling Organizational Capability

The findings demonstrate that innovation management operates as an embedded organizational capability rather than a standalone activity. Startups that consistently institutionalize experimentation, cross-unit collaboration, and iterative feedback mechanisms exhibit stronger alignment between product features and user expectations. Rather than relying on sporadic innovation initiatives, high-performing startups treat innovation as a continuous learning process that evolves alongside market feedback. This reinforces the view that in digital education contexts, innovation effectiveness depends on its routinization within daily operational practices, not solely on the novelty of ideas introduced.

The Strategic Role of Technological Capability

Technological capability emerges as a foundational enabler that determines whether innovation efforts can be effectively transformed into usable and scalable products. Robust digital infrastructure and scalable platforms allow startups to respond quickly to changing user demands and growth opportunities. However, the findings also indicate that possessing technology alone is insufficient; its strategic deployment matters. Startups that integrate flexible system architectures with analytical tools are better positioned to refine learning experiences and improve responsiveness. This suggests that technology functions not merely as a support system, but as a co-creator of value within Edutech innovation ecosystems.

Translating Capabilities into New Product Success

The performance outcomes observed across startups indicate that new product success is multidimensional, encompassing adoption, engagement, market fit, and speed of delivery. Products that reach the market efficiently while maintaining relevance to learners' needs tend to achieve stronger competitive positioning. Importantly, sustained success appears contingent on a startup's capacity to continuously recalibrate its products based on real-time user insights. This finding highlights that in Edutech, success is not a static achievement but an ongoing process shaped by repeated cycles of refinement and learning.

Synergistic Effects Between Innovation and Technology

A key contribution of this study lies in demonstrating the interaction between innovation management and technological capability. The results indicate that neither dimension reaches its full potential in isolation. Innovation initiatives unsupported by adequate technology struggle to scale, while advanced technological systems without innovation governance fail to generate differentiated value. The strongest outcomes are achieved when both capabilities are developed in tandem, producing a reinforcing effect that enhances product relevance, adaptability, and sustainability. This synergy confirms that Edutech startups must adopt an integrated capability perspective rather than fragmented improvement efforts.

Implications for Practice and Theory

From a managerial perspective, the findings suggest that startup leaders should balance investments between innovation processes and technological development. Emphasis on user-centered design, agile coordination, and technology flexibility is essential to navigate the fast-paced Edutech landscape. For scholars, this study contributes contextual evidence from an emerging market, illustrating how innovation and technology capabilities interact under conditions of infrastructural diversity and rapid digital adoption. The results encourage future research to further explore capability configurations that enable digital startups not only to survive, but to generate meaningful educational impact at scale.

CONCLUSION

This study underscores the strategic centrality of innovation management and technological capability in shaping the success of new product development (NPD) within Indonesia's fast-evolving Edutech sector. Drawing on empirical evidence from 15 digital startups, it becomes clear that product success is not merely determined by novelty or technological adoption per se, but by the organizational ability to embed innovation processes, harness adaptive technologies, and translate user feedback into agile product evolution. Startups that consistently outperformed others—such as STP-04, STP-07, and STP-11—demonstrated a coherent alignment between strategic innovation orientation, cross-functional collaboration, responsive development cycles, and robust technological infrastructure. These capabilities enabled them to achieve superior user adoption, product retention, and long-term relevance in a highly competitive digital education market. Startups with limited innovation investment and lower technological literacy struggled to convert ideas into scalable and meaningful digital learning experiences. This finding affirms that in the Edutech context, innovation must be institutionalized not incidental. It must be embedded in both culture and process, supported by agile technologies and led by teams capable of rapid experimentation and continuous user engagement. Theoretically, this study contributes to ongoing debates in digital entrepreneurship and educational innovation by demonstrating how product success in emerging markets is not solely a function of market demand or technical capacity, but rather a complex outcome of innovation maturity and technological orchestration. Practically, it suggests that Edutech founders and policymakers must invest in strengthening innovation ecosystems, prioritizing collaborative design, and fostering a feedback-driven culture to ensure digital products not only reach users, but genuinely transform learning outcomes.

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