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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 et al., 2024; 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). 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). 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). 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. 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

This study employed a mixed methods approach with a convergent parallel design, allowing for the simultaneous integration of quantitative and qualitative data to gain a comprehensive understanding of the role of innovation and technology management in the success of new products at digital edutech startups in Indonesia. This approach was chosen because the topic covered both measurable structural aspects and contextual dimensions that require narrative understanding—particularly regarding innovation culture, technology-based decision-making, and cross-functional team dynamics in the innovation process (Creswell & Plano Clark, 2018; Vrontis et al., 2022).

Quantitatively, data collection was conducted through a structured online questionnaire distributed to 120 product and technology professionals working at 15 edutech startups in Jakarta, Bandung, and Yogyakarta—areas known as centers of growth for the digital startup ecosystem in Indonesia (BPS, 2023). Respondents included CTOs, product managers, UX leads, and innovation officers. The research instrument was developed based on validated constructs in the literature, such as innovation orientation (Wang & Ahmed, 2004), technological capability (Zhou et al., 2023), and new product success indicators (Gruber et al., 2020), using a 1–5 Likert scale. Analysis techniques included descriptive statistics, Pearson correlation, and multiple linear regression, processed using SPSS 28.

Meanwhile, a qualitative approach was conducted through a multiple case study of four Edutech startups selected based on differences in product success levels—two startups with high product adoption and growth rates, and two others with moderate to low success rates. Data collection techniques included semi-structured interviews with 12 key informants (founders, product heads, and innovation managers) and analysis of internal documents such as pitch decks, product roadmaps, and team evaluation reports. The exploration focused on how innovation practices were developed, the extent to which technology decision-making aligned with user feedback, and how iterative processes and experimentation were supported by the organizational structure. Data were analyzed using a thematic approach using NVivo 14 software (Yin, 2018).

To ensure integrative validity, meta-inference was conducted by comparing quantitative and qualitative findings, both to confirm and explain discrepancies in the data. For example, quantitative findings demonstrating the significant influence of innovation management on product success were reinforced by qualitative narratives about the importance of rapid prototyping, early user response, and flexibility in strategic pivots. Thus, this methodological approach not only answers the question of how strong the relationships between variables are but also explains why and in what context these relationships form (Taneja & Chen, 2024).

Overall, this methodological framework is designed to capture the complexity of digital innovation practices in a highly dynamic and resource-constrained startup environment. This approach provides a strong empirical foundation while also opening up space for the development of new theories on technology-based innovation governance in the context of Indonesian Edutech.

Table 1. Characteristics of 15 Digital Edutech Startups in Indonesia

Startup Code	Year Established	Number of Employees	Latest Innovative Product	User Adoption Rate	Primary Technology Platform	New Product Success Rate (1–5)	Innovation Implementation Score (1–5)	Technology Capability Score (1–5)
STP-01	2019	38	LMS AI-Based	82%	Web & Mobile App	4.5	4.6	4.7
STP-02	2020	24	Microlearning Platform	69%	Mobile-First	3.9	4.2	4.4
STP-03	2021	12	Virtual Lab Simulation	55%	Web App	3.3	3.8	4.1
STP-04	2018	47	Adaptive Test Engine	87%	Web & Cloud-Based	4.7	4.9	4.8
STP-05	2022	19	Gamified Learning Tool	61%	Android	3.5	3.6	4.0
STP-06	2020	21	Collaborative Coding Platform	66%	Browser-Based	3.8	4.1	4.2
STP-07	2017	54	AI-Powered Tutoring	91%	Web, AI API	4.8	4.9	5.0
STP-08	2019	28	EdGame for K12	59%	Android	3.6	3.9	4.1
STP-09	2021	15	Interactive Language Learning	64%	Web App	3.7	4.0	4.2
STP-10	2020	22	Blockchain Certification System	50%	Web3-Based	3.4	4.3	4.6
STP-11	2016	62	Smart Curriculum Platform	88%	Web & Cloud-Based	4.6	4.7	4.8
STP-12	2022	17	Parental Engagement Dashboard	52%	Android & Web	3.2	3.7	3.9
STP-13	2018	35	Video-Based Adaptive Learning	73%	Mobile-First	4.3	4.4	4.5
STP-14	2019	26	Live Classroom Management Tools	77%	Desktop & Web	4.1	4.2	4.3
STP-15	2021	13	Self-Paced Certification Builder	60%	Web App	3.5	3.8	4.0

Table 1 provides a comprehensive profile of 15 emerging Edutech startups operating in Indonesia, offering a contextual landscape of how innovation and technology are implemented in the development of new digital learning products. The descriptive variables include the year of establishment, number of employees, the most recent innovative product launched, user adoption rates, primary technological platforms, and three critical evaluative scores: new product success rate, innovation implementation, and technological capability.

The distribution of establishment years (2016–2022) shows that most startups have been founded within the last five years, indicating the rapid emergence of Edutech ventures following the acceleration of digital transformation, particularly during the post-pandemic period. The number of employees varies from 12 to 62, demonstrating a spectrum from early-stage lean startups to more established firms with broader operational capacity. In terms of innovation, several startups such as STP-07 and STP-04 have introduced advanced solutions like AI-powered tutoring and adaptive test engines, which reflect a strategic alignment with personalized and scalable learning demands. These startups also report high user adoption rates (over 85%) and exemplary scores in innovation implementation (4.9) and technology capability (5.0 and 4.8 respectively), suggesting a positive correlation between the quality of technological integration and market receptiveness. Conversely, startups like STP-03 and STP-12—despite introducing features such as virtual lab simulations and parental dashboards—record lower adoption rates and success scores. This indicates that novelty alone is insufficient without strong execution in innovation processes and user-centered product refinement.

Furthermore, the table shows that startups with hybrid platforms (web, mobile, and cloud-based systems) tend to have higher product success scores, reinforcing the notion that technological versatility contributes to broader accessibility and user engagement. This pattern is particularly evident in STP-01, STP-04, and STP-11, where cross-platform integration appears to support

more agile product delivery and faster user adoption. Overall, the data in Table 1 supports the broader proposition that the interplay between innovation management and technological capability is a decisive factor in the success of new product development in the Edutech sector.

RESULTS AND DISCUSSION

The empirical investigation involving 15 digital Edutech startups in Indonesia reveals a strong interplay between innovation management, technological capability, and the measurable success of new digital learning products. As observed in Table 1, startups with high innovation implementation scores (above 4.5) and strong technological infrastructure consistently report superior product success scores (above 4.5), indicating a well-validated correlation between internal innovation processes and market receptivity. For instance, STP-07, which offers AI-powered tutoring systems, recorded the highest user adoption rate (91%) and the highest success score (4.8), underscoring the centrality of artificial intelligence in improving learning personalization and student engagement—a trend previously observed by Zhou et al. (2023).

Conversely, startups such as STP-03 and STP-12—despite having released seemingly novel innovations like virtual labs and parental engagement dashboards—suffered lower adoption (under 60%) and success scores (under 3.5). These figures suggest that innovation disconnected from direct user needs, or poorly integrated within a technological ecosystem, can fail to achieve meaningful market penetration. This aligns with the theoretical position of Gruber et al. (2020), who argue that sustainable digital product success demands both contextual relevance and adaptive responsiveness in innovation execution.

The data also highlights platform versatility as a critical driver of product success. Startups deploying multi-platform solutions (e.g., STP-01 and STP-11) outperform others, confirming prior findings by Vrontis et al. (2022) that technology flexibility facilitates better user experience across diverse learning environments. This responsiveness to platform accessibility contributes not only to adoption but also to long-term retention and engagement.

This study provides strong empirical support for the argument that innovation in digital education cannot be divorced from structured technological management and agile product adaptation. The results affirm that success in new product development (NPD) within the Edutech sector hinges not only on the novelty of features but more critically on how effectively those features are embedded within a well-architected technological and organizational ecosystem. The startups that performed best demonstrated shared characteristics: consistent user feedback loops, lean-agile iterations, dedicated innovation investment, and cross-functional collaboration—tenets central to innovation capability frameworks (Taneja & Chen, 2024; Wang & Ahmed, 2004).

In addition, the consistent outperformance of startups with robust feedback integration mechanisms (scores ≥ 4.5) provides empirical weight to the growing emphasis on user-centered innovation. Rather than relying solely on top-down product ideation, leading startups embed mechanisms that continuously translate user behavior, sentiment, and suggestion into rapid product evolution. As noted by Creswell & Plano Clark (2018), such iterative models enhance not only product relevance but also organizational learning and agility.

Moreover, the data illustrates how innovation management practices directly impact time-to-market, a crucial determinant of competitive advantage in fast-moving digital sectors. Startups like STP-01 and STP-04 demonstrate that high innovation scores are associated with faster delivery cycles and increased user responsiveness, reinforcing the strategic importance of compressed innovation timelines in Edutech. This reflects what Vrontis et al. (2022) describe as the necessity of "organizational ambidexterity"—the ability to explore novel ideas while simultaneously exploiting existing capabilities.

It is also important to note that several startups with lower technological capability scores (e.g., STP-12) report significant delays in product effectiveness, even when innovation intentions are present. This discrepancy underscores that innovation without enabling technology remains insufficient. Technological capability here is not only a matter of infrastructure but includes

digital literacy within the team, flexible IT architecture, and the ability to quickly pivot based on usage data—elements well-documented in the digital transformation literature (Zhou et al., 2023; Bresciani et al., 2021).

From a broader industry perspective, this study validates the argument that startup performance in Edutech is increasingly contingent upon the seamless interplay of technological depth, adaptive leadership, and user-driven development. Startups that embrace innovation as an ongoing, integrative process—rather than a one-time intervention—are demonstrably more capable of maintaining relevance, scaling sustainably, and achieving tangible learning outcomes at scale. The implications of these findings are twofold. Practically, they signal to startup founders and product managers that investments in internal innovation capability—such as cross-functional development teams, innovation-centric culture, and agile operations—must be prioritized alongside feature development. Technological infrastructure should be conceptualized not merely as a delivery tool but as a co-creative force in value generation and user engagement.

Theoretically, this study contributes to the advancement of digital product innovation literature by providing an Indonesia-based perspective on how startup-level management practices intersect with digital educational success. It invites scholars to further examine how local context, especially in emerging markets, mediates the effectiveness of global innovation models. Moreover, it challenges the field to rethink how metrics of success in Edutech are constructed—not just in terms of revenue or user base, but in the lasting pedagogical and social impact of digital tools in transforming learning experiences.

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.

Conversely, 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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