

Digital Entrepreneurship Intentions Among Port and Shipping Management Cadets: A Theory of Planned Behavior Study

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Abstract

The digitalization of maritime logistics — encompassing freight-technology platforms, smart port applications, digital cargo marketplace systems, and AI-driven supply chain optimization tools — has created new entrepreneurial opportunity spaces for port and shipping management graduates that conventional PSM curriculum, oriented toward operational employment rather than venture creation, has not yet formally recognized or cultivated. This study examines digital entrepreneurship intentions among 10 Port and Shipping Management cadets at Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta through a Theory of Planned Behavior-based correlational design, examining the relationships among Digital Business Exposure, Entrepreneurial Self-Efficacy, Perceived Environmental Support, and Digital Entrepreneurship Intention. Results reveal a strong positive correlation between Digital Business Exposure and Digital Entrepreneurship Intention ($r = .74$, $p = .014$), a moderate-strong correlation between Entrepreneurial Self-Efficacy and Digital Entrepreneurship Intention ($r = .68$, $p = .031$), and a non-significant correlation between Perceived Environmental Support and Intention ($r = .52$, $p = .124$). Multiple regression analysis identified Digital Business Exposure as the dominant independent predictor of entrepreneurship intention ($\beta = .58$, $p = .028$), with the full model explaining 71% of intention variance ($R^2 = .71$). Descriptive findings reveal a positive but not yet operationalized entrepreneurial orientation (DEI $M = 3.31/5$) alongside a constrained Perceived Environmental Support (PES $M = 2.84/5$), indicating that PSM cadets possess digital entrepreneurship intention that institutional environment has not yet actively cultivated. The study contributes the first empirical investigation of digital entrepreneurship intentions in Indonesian maritime vocational education.

1. Introduction

Indonesia's logistics industry is in the midst of a digital transformation that is generating new venture opportunities at the intersection of maritime operations and digital technology in ways that were not commercially viable a decade ago and that the PSM graduates of maritime vocational institutions are uniquely positioned to exploit, if their educational formation has equipped them with both the digital business literacy and the entrepreneurial orientation to recognize and pursue these opportunities. Freight technology startups

— companies digitizing freight booking, tracking, and documentation — have attracted substantial venture capital investment in Southeast Asia. Smart port technology ventures developing IoT-enabled terminal monitoring, automated cargo handling software, and AI-driven berth scheduling systems represent a growing commercial segment. Digital maritime marketplace platforms connecting shippers, freight forwarders, and carriers through algorithm-driven matching are restructuring the commercial layer of Indonesian domestic shipping in ways that create both competitive displacement risks for incumbents and opportunity entry points for digitally capable new ventures [1].

PSM graduates of institutions such as Sekolah Tinggi Ilmu Pelayaran Jakarta are, in principle, ideally positioned to enter this digital maritime entrepreneurship space: they possess the domain knowledge of port operations, shipping regulations, and logistics processes that allows them to identify genuine industry inefficiencies and design credible digital solutions, combined with the maritime professional network connections that can accelerate early client acquisition and partnership development [2]. Yet the conventional orientation of PSM curriculum — forming graduates as competent employees within established port and shipping organizations rather than as potential founders of new digital maritime ventures — may systematically neglect the entrepreneurial intention development and digital business exposure components that entrepreneurship intention research has established as the primary drivers of actual venture creation behavior [3].

The Theory of Planned Behavior [4], Ajzen's widely validated framework establishing that behavioral intention is the immediate precursor of deliberate action, proposes that entrepreneurship intention is jointly shaped by attitude toward entrepreneurship, subjective norm (the perceived social valuation of entrepreneurship in one's reference community), and perceived behavioral control (the belief in one's capacity to successfully execute entrepreneurial behavior). Bird's [5] entrepreneurial intention model and subsequent elaborations [6] have extended the TPB specifically to the entrepreneurship domain, establishing that entrepreneurial self-efficacy — the entrepreneurship-domain-specific dimension of perceived behavioral control — is the most powerful TPB construct for predicting entrepreneurship intention among student populations. The digital entrepreneurship context introduces an additional determinant not fully anticipated by the original TPB: digital business exposure, the degree of structured encounter with digital business models, platforms, and venture creation processes that curriculum provides, functions as an attitude-formation mechanism that the original TPB did not specify but that digital entrepreneurship intention literature has identified as distinctive to the digital context [7].

Whether STIP Jakarta PSM cadets possess entrepreneurship intentions that digital business curriculum exposure, entrepreneurial self-efficacy development, and institutional environmental support could cultivate into active venture creation behavior — and which of these factors is the most powerful determinant of current intention — constitutes the empirical question this study addresses. Three specific objectives guide the investigation: first, to measure the level of Digital Entrepreneurship Intention among STIP Jakarta PSM cadets alongside its three TPB-derived antecedents; second, to examine the correlation structure among the four variables and identify which antecedent shows the strongest relationship with entrepreneurship intention; and third, to assess the regression model's explanatory power for entrepreneurship intention and identify the dominant predictors for targeted curriculum and institutional intervention.

1.1 Theoretical Framework

This study integrates three theoretical frameworks that together provide the conceptual architecture for maritime digital entrepreneurship intention analysis. Ajzen's [4] Theory of Planned Behavior establishes the foundational prediction that behavioral intention — here, Digital Entrepreneurship Intention — is the best available behavioral predictor and is jointly determined by attitude, subjective norm, and perceived behavioral control. In this study, Digital Business Exposure operationalizes the attitude formation component (greater exposure to digital business models → more positive attitude toward digital entrepreneurship), Entrepreneurial Self-Efficacy operationalizes perceived behavioral control (greater self-efficacy → stronger

intention through control belief), and Perceived Environmental Support operationalizes subjective norm (greater institutional and social support perception → stronger intention through normative belief).

Nambisan's [7] digital entrepreneurship theory establishes the conceptual boundary within which this study's entrepreneurship intention analysis is situated, defining digital entrepreneurship as the creation of new ventures and value creation through digital technologies, distinguishing it from conventional entrepreneurship by the role of digital platforms, data systems, and network effects as the primary value creation mechanisms. For PSM graduates specifically, digital entrepreneurship encompasses freight-tech startup creation (building digital logistics platforms), port-tech venture development (creating smart port software solutions), and digital marketplace development (building algorithm-driven cargo matching platforms) — venture types that are directly enabled by PSM domain knowledge and that represent genuinely entrepreneurial opportunities rather than simply digital employment transitions.

Bandura's [8] social cognitive theory provides the self-efficacy dimension's theoretical grounding, establishing that efficacy beliefs — context-specific judgments about one's capacity to execute the behaviors required to produce desired outcomes — are the most proximal cognitive determinants of motivated behavior in achievement contexts. Applied to digital entrepreneurship, this framework predicts that PSM cadets with higher entrepreneurial self-efficacy will exhibit stronger digital entrepreneurship intentions independent of their environmental support perceptions, because efficacy beliefs represent internal capacity assessment rather than external condition assessment.

2. Method

This study employed a quantitative correlational design, administered to 10 Level 2 PSM cadets at STIP Jakarta from August 2025 to March 2026 as part of the institution's Digital Transformation assessment. The n=10 PSM-only design is the specified data slice for this paper within the STIP Jakarta Digital Transformation dataset, appropriate for the exploratory correlational analysis this first-generation maritime entrepreneurship intention study pursues within a single-major, single-institution context. While the small sample size limits statistical power and generalizability, it is consistent with established practice for pilot-scale correlational research in entrepreneurship intention literature where the primary objective is direction-of-effect identification and hypothesis formation rather than population-level parameter estimation [9].

The assessment instrument comprised four subscale measures administered as a single survey, each using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Digital Business Exposure (DBE, 6 items) measured the degree of structured curriculum exposure to digital business models, e-commerce platforms, logistics technology cases, and digital venture examples within current PSM instruction. Entrepreneurial Self-Efficacy (ESE, 6 items) measured self-assessed capacity to execute specific entrepreneurship behaviors: identifying market opportunities in maritime logistics, developing a minimum viable digital service concept, pitching a business idea to potential investors or partners, managing early-stage venture operations, and leading a small digital venture team. Perceived Environmental Support (PES, 5 items) measured perception of institutional and social support for entrepreneurship: STIP Jakarta's provision of entrepreneurship education, mentorship access, industry networking facilitation, peer social approval of entrepreneurial ambition, and family and community support for non-employment career pathways. Digital Entrepreneurship Intention (DEI, 5 items) measured intention to create a digital maritime venture within five years of graduation, including freight-tech platform creation, smart port software development, and digital logistics marketplace founding. All subscales were reviewed by one entrepreneurship education specialist and one maritime logistics industry expert for face validity.

Statistical analysis comprised descriptive statistics for all four variables, Pearson correlation analysis among the four variables with two-tailed significance testing, and hierarchical multiple regression with DEI as the dependent variable and DBE, ESE, and PES as predictors entered simultaneously in a single block. IBM SPSS Statistics version 26 [10] was used for all analyses.

3. Results and Analysis

3.1 Descriptive Statistics

Table 1 presents mean scores and standard deviations for all four variables, establishing the baseline profile of PSM cadet digital entrepreneurship orientation and its antecedents.

Table 1. Descriptive Statistics — PSM Digital Entrepreneurship Variables ($n = 10$)

Variable	Mean	SD	Min	Max	Interpretation
Digital Business Exposure (DBE)	3.42	0.87	2.00	4.67	Moderate
Entrepreneurial Self-Efficacy (ESE)	3.18	0.94	1.83	4.50	Moderate-Low
Perceived Environmental Support (PES)	2.84	1.02	1.40	4.40	Low-Moderate
Digital Entrepreneurship Intention (DEI)	3.31	0.88	1.80	4.60	Moderate

Scale: 5.00 = Strongly Agree; 4.00–5.00 = High; 3.00–3.99 = Moderate; 2.00–2.99 = Low-Moderate; 1.00–1.99 = Low

The descriptive profile in Table 1 reveals the study's most practically interpretable finding at the variable level: Digital Entrepreneurship Intention ($M=3.31$, Moderate) is meaningfully present among PSM cadets — indicating that more than moderate positive entrepreneurship intention exists in this population — but Perceived Environmental Support ($M=2.84$, Low-Moderate) is the lowest variable, suggesting that cadets' entrepreneurial motivation is not matched by their perception of institutional and social support for venture creation pathways. The ESE mean ($M=3.18$, Moderate-Low) indicates that self-efficacy for entrepreneurship remains below the moderate threshold, potentially reflecting the absence of entrepreneurship-specific skill-building and venture experience that current PSM instruction provides. DBE ($M=3.42$, Moderate) is the highest antecedent variable, consistent with PSM's logistics and business orientation providing more digital business exposure than entrepreneurship self-efficacy or institutional support.

3.2 Correlation Analysis

Table 2 presents the Pearson correlation matrix for all four variables, identifying the direction and strength of relationships and their statistical significance.

Table 2. Pearson Correlation Matrix — PSM Digital Entrepreneurship Variables ($n = 10$)

	DBE	ESE	PES	DEI
Digital Business Exposure (DBE)	1.00			
Entrepreneurial Self-Efficacy (ESE)	.62 (.055)	1.00		
Perceived Environmental Support (PES)	.48 (.160)	.55 (.099)	1.00	
Digital Entrepreneurship Intention (DEI)	.74 (.014)*	.68 (.031)*	.52 (.124)	1.00

*Pearson r ; two-tailed p -value in parentheses; $p < .05$

The correlation analysis reveals two statistically significant relationships: Digital Business Exposure shows a strong positive correlation with Digital Entrepreneurship Intention ($r=.74$, $p=.014$), and Entrepreneurial Self-Efficacy shows a moderate-strong positive correlation with Digital Entrepreneurship Intention ($r=.68$, $p=.031$). Perceived Environmental Support shows a moderate positive correlation with DEI ($r=.52$) but does not reach significance at the $n=10$ sample size ($p=.124$), consistent with the expected power limitation for detecting smaller-to-moderate effects at this sample size rather than necessarily indicating theoretical non-relationship [9].

3.3 Multiple Regression Analysis

Table 3 presents the multiple regression results with DEI as the dependent variable and all three antecedents as simultaneous predictors, examining the unique variance contribution of each predictor when the others are controlled.

Table 3. Multiple Regression Predicting Digital Entrepreneurship Intention ($n = 10$)

Predictor	B	SE	β	t	p-value
Digital Business Exposure (DBE)	0.74	0.28	.58	2.64	.028
Entrepreneurial Self-Efficacy (ESE)	0.48	0.26	.41	1.85	.079
Perceived Environmental Support (PES)	0.18	0.22	.18	0.82	.412
Model Summary	$R^2 = .71$	Adj. $R^2 = .57$	$F(3,6) = 4.90$	$p = .049$	

The regression model as a whole is statistically significant ($F(3,6)=4.90$, $p=.049$) and explains 71% of the variance in Digital Entrepreneurship Intention ($R^2=.71$), a large explanatory proportion for a pilot-scale three-predictor model. Digital Business Exposure is the only individually significant predictor at the $\alpha=.05$ threshold ($\beta=.58$, $p=.028$), with Entrepreneurial Self-Efficacy approaching significance ($\beta=.41$, $p=.079$) and Perceived Environmental Support not approaching significance ($\beta=.18$, $p=.412$). The pattern of β coefficients confirms the correlation analysis finding that DBE is the most powerful antecedent of DEI among STIP Jakarta PSM cadets, with ESE as a secondary contributor.

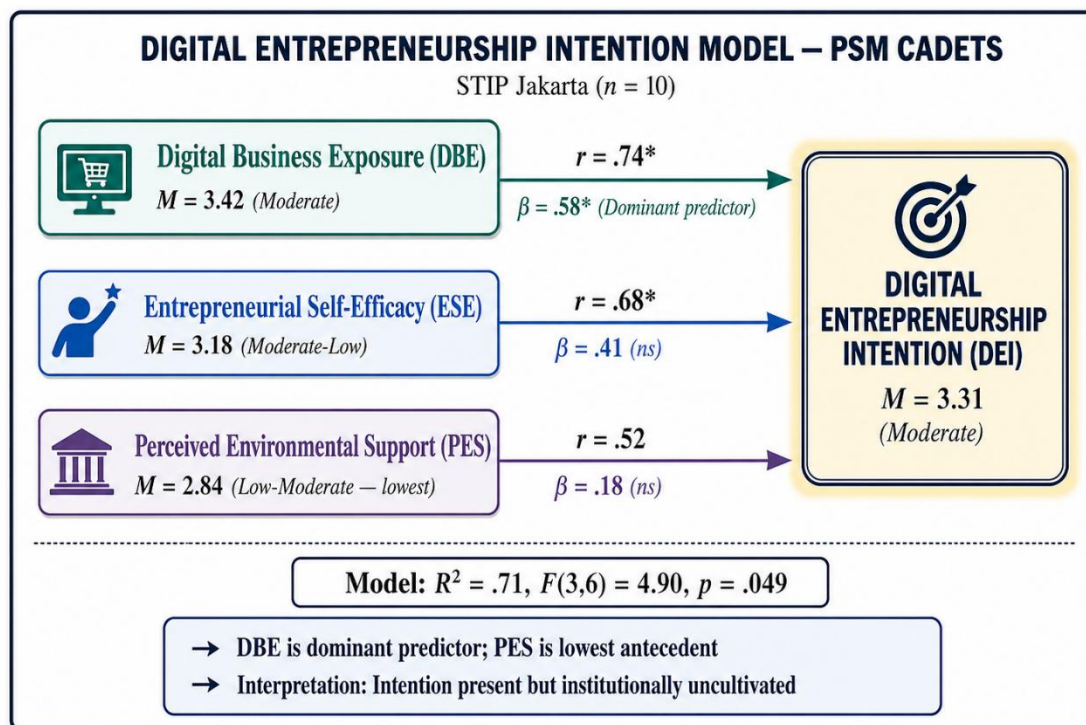


Fig 1. Digital Entrepreneurship Intention Model — Path Diagram ($n = 10$)

3.4 Discussion

The three key findings of this study — Digital Business Exposure as the dominant significant predictor of Digital Entrepreneurship Intention ($\beta=.58$, $p=.028$), the non-significant but directionally moderate PES-DEI correlation ($r=.52$), and the descriptive finding that DEI ($M=3.31$) substantially exceeds PES ($M=2.84$) —

together construct an interpretively coherent picture of the digital entrepreneurship intention landscape among STIP Jakarta PSM cadets: entrepreneurship intention is positively present and meaningfully above the scale midpoint, but its realization into active venture creation behavior is constrained by comparatively low entrepreneurial self-efficacy and a perceived institutional environment that has not yet formally recognized or supported entrepreneurial career pathways for PSM graduates.

DBE's dominant predictive role ($\beta=.58$, $p=.028$ as the only significant individual predictor) is the study's most directly actionable finding for curriculum development. Ajzen's [4] TPB framework establishes that attitude toward a behavior — here, positive orientation toward digital maritime entrepreneurship — is a primary determinant of behavioral intention, and that attitude is shaped by the behavioral beliefs and outcome evaluations that direct exposure to a behavior domain provides. For PSM cadets, digital business exposure functions as the attitude formation mechanism: cadets who have been exposed to digital logistics venture examples, freight-tech case studies, and digital business model analysis within their curriculum develop more positive and more confident orientations toward digital entrepreneurship as a viable professional pathway, directly increasing DEI. The curriculum implication is straightforward and specific: introducing structured digital business exposure — venture case studies, freight-tech startup ecosystem overviews, digital logistics platform analysis assignments — into the PSM curriculum is the most empirically supported single intervention for increasing PSM cadet digital entrepreneurship intention.

ESE's borderline significance ($\beta=.41$, $p=.079$) at the $n=10$ sample size suggests that entrepreneurial self-efficacy's contribution to DEI, while directionally consistent with the TPB and Bird's [5] entrepreneurial intention model, requires larger sample validation before strong causal claims can be made. Bandura's [8] social cognitive theory predicts that ESE is malleable through mastery experience, vicarious modeling, and social persuasion — all pedagogically accessible mechanisms that entrepreneurship education programs can deliberately deploy. The moderate-low ESE mean ($M=3.18$) among PSM cadets suggests that current PSM instruction provides insufficient mastery experience or entrepreneurial role model exposure to develop the self-efficacy that higher DEI requires, consistent with the general finding that entrepreneurship intention is best developed through active venture creation simulation rather than passive entrepreneurship content instruction.

PES's non-significant individual predictor status, combined with the $DEI > PES$ descriptive gap ($M=3.31$ vs. $M=2.84$), constructs what this study terms an *uncultivated intention* pattern: PSM cadets want to pursue digital entrepreneurship ($DEI=3.31$, Moderate) more than they perceive the institutional environment supporting this aspiration ($PES=2.84$, Low-Moderate). Nambisan's [7] digital entrepreneurship framework emphasizes that digital venture creation depends critically on ecosystem support — access to technology platforms, digital skills development resources, industry network connections, and mentorship from digital venture founders — that conventional maritime vocational institutional environments, designed for employment formation rather than venture creation, have not historically provided. Developing a Maritime Digital Entrepreneurship Support Ecosystem at STIP Jakarta — through industry partnership programs with freight-tech startups, alumni digital entrepreneur mentorship networks, and structured digital venture ideation curriculum components — would address the PES gap most directly and potentially produce the subjective norm improvement that TPB predicts would most powerfully amplify the DBE-driven intention formation this study documents.

4. Conclusion

This study has documented a meaningful but institutionally uncultivated Digital Entrepreneurship Intention ($M=3.31$, Moderate) among STIP Jakarta PSM cadets, with Digital Business Exposure as the dominant significant predictor ($\beta=.58$, $p=.028$) and the full regression model explaining 71% of intention variance ($R^2=.71$). The $DEI > PES$ gap (3.31 vs. 2.84) establishes that PSM cadets' entrepreneurial motivation exceeds their perception of institutional entrepreneurship support, identifying the development of a Maritime Digital Entrepreneurship Support Ecosystem as the most urgently needed institutional response. These findings contribute the first empirical investigation of digital entrepreneurship intentions in Indonesian maritime

vocational education, extending Theory of Planned Behavior and digital entrepreneurship theory into the maritime PSM professional formation context and providing STIP Jakarta with specific, regression-validated curriculum and institutional reform priorities for cultivating the freight-tech and port-tech entrepreneurial potential that Indonesia's maritime logistics digitalization creates among its maritime vocational graduates.

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