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Key Success Factors for Digital Transformation In Indonesia's International Freight Forwarding: Analyzing Barriers For Traditional Freight Forwarders

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ABSTRACT

Indonesia's strategic geographic position makes it a key player in global trade, yet its logistics sector faces significant challenges due to low digital transformation levels. This study aims to identify key success factors to address barriers faced by traditional freight forwarders and accelerate digital adoption. A comprehensive methodology was employed, including a literature review, surveys and questionnaires with 102 industry participants, and case studies of successful digital freight forwarders globally. The novelty of this research lies in its integrated approach, combining theoretical frameworks with empirical validation specific to Indonesia's freight forwarding context, addressing a critical research gap in understanding barriers and opportunities for digital transformation within Southeast Asian logistics sectors. The findings highlight 13 critical KSFs encompassing leadership commitment, strategic planning, workforce empowerment, technological integration, financial incentives, and collaborative efforts. These factors collectively provide a roadmap for overcoming the barriers to digital transformation and enhancing competitiveness in Indonesia's logistics sector. Furthermore, this research opens multiple avenues for future exploration, including examining leadership styles conducive to digital transformation, understanding customer perceptions of digital versus traditional services, and analyzing socio-cultural impacts of digitalization on logistics workforce dynamics and operational practices.

KEYWORDS Digital transformation, freight forwarder, global logistics, Indonesia, key success factor (KSF).

INTRODUCTION

Indonesia holds substantial potential in the global import and export sector due to its strategic geographic position along major international trade routes and its large population. These factors place Indonesia among the top 14 countries globally in terms of container export and import traffic (Atacan et al., 2022; Gençer & Demir, 2019). However, despite these natural and economic advantages, the logistics sector in Indonesia faces persistent challenges, lagging behind neighbouring countries in Southeast Asia, such as Singapore and Malaysia, in terms of efficiency and infrastructure (Gustyana & Ghiffany, 2021; Hakim & Putriandita, 2018). This gap highlights the urgent need for transformation within the logistics industry, not only to remain competitive in the global market but also to capitalize fully on its strategic potential.

Digital transformation offers a promising avenue to address these challenges. Numerous studies have demonstrated that digitalization can enhance competitiveness,

optimize operations, and create new growth opportunities for logistics companies. By integrating digital technologies, businesses can streamline processes, improve transparency, and respond more dynamically to market demands (Apruzzese et al., 2023; Kartsan & Mavrin, 2022; Sun et al., 2022; Weng & Du, 2015; Yu et al., 2024). Furthermore, given the increasing complexity and dynamism of the logistics industry, exploring the role of digital transformation has become increasingly critical.

However, the push for digitalization in Indonesia's logistics sector remains fraught with challenges. Traditional freight forwarders, which constitute a significant portion of the industry, are often reluctant to embrace digital solutions. Many of these players are deeply rooted in conventional methods and perceive the shift to digital operations as unnecessary or overly complex (Kawtar Akoudad, 2018; Nguyen et al., 2021; Rao et al., 2022; Santoso et al., 2021; Weng & Du, 2015). This resistance is compounded by limited awareness of the tangible benefits of digital transformation and the growing pains faced by digital freight forwarders in Indonesia. Instead of widespread acceptance, digital freight forwarders in the country have been met with skepticism, with more complaints regarding service quality than endorsements of their effectiveness.

Previous research has examined digital transformation in logistics contexts globally, with studies by Cichosz et al. (2020) identifying barriers and success factors for digital transformation among logistics service providers in developed markets, while Wan and Cheng (2019) employed Interpretative Structural Modeling to analyze key success factors for logistics enterprises' digital transformation in Chinese contexts. However, limited scholarly attention has focused specifically on Southeast Asian markets, particularly Indonesia, where unique combinations of traditional business practices, infrastructure constraints, regulatory environments, and cultural factors create distinct transformation dynamics. This research gap is particularly pronounced regarding practical strategies enabling traditional freight forwarders—deeply embedded in conventional operational paradigms—to navigate digital transitions effectively while maintaining business continuity and customer relationships.

Understanding barriers hindering traditional freight forwarders' transitions to digital operations is critical for unlocking digital transformation potential within Indonesia's logistics sector. Beyond merely identifying these obstacles, it is equally important to systematically examine strategies and key success factors enabling traditional players to navigate this transition effectively, maintaining competitive relevance while adapting to technological imperatives. Such exploration provides evidence-based roadmaps for embracing digital tools not merely as modernization imperatives but as strategic approaches for sustaining relevance in increasingly competitive, technology-driven markets where customer expectations continuously evolve toward greater transparency, speed, and cost-effectiveness.

The novelty of this study lies in its comprehensive, contextually grounded approach specifically addressing Indonesia's freight forwarding sector through multiple methodological lenses. Unlike previous research focusing predominantly on developed market contexts or isolated technological dimensions, this study integrates: (1) theoretical frameworks from Key Success Factors literature and digital transformation theory; (2) empirical validation through substantial primary data collection from diverse industry stakeholders; (3) comparative analysis of successful international digital freight forwarders; and (4) specific attention to barriers and enablers within Indonesia's unique institutional, infrastructural, and cultural context. This integrated approach generates actionable insights bridging theoretical understanding with practical implementation

strategies, offering contributions relevant for traditional freight forwarders, digital platform developers, policymakers, and industry associations seeking to accelerate logistics sector modernization.

This study seeks to address these complex dynamics by identifying actionable insights that can help traditional freight forwarders embrace digitalization. The research draws on a comprehensive approach, combining a review of existing literature, surveys, and comparative case studies of successful digital freight forwarders both locally and internationally, as well as an evaluation of industry best practices. The ultimate goal is to bridge the gap between traditional and digital logistics operations, fostering a competitive, efficient, and resilient logistics ecosystem in Indonesia. Such efforts are pivotal not only for the survival of individual businesses but also for the broader growth and sustainability of Indonesia's trade and economic development.

METHOD

This study employed a mixed-methods approach to explore key success factors for digital transformation in Indonesia's international freight forwarding sector, focusing on overcoming barriers faced by traditional freight forwarders.

The literature review concentrated on key success factors, freight forwarders, and digital transformation in logistics. These topics guided the selection of relevant academic articles, industry reports, and case studies to develop a comprehensive understanding of the subject.

In the context of digital transformation in Indonesia's international freight forwarding industry, identifying key success factors was vital. These factors helped traditional freight forwarders recognize critical areas requiring attention to transition successfully to digital operations. By focusing on relevant success factors, freight forwarders could develop strategies addressing specific challenges and opportunities within Indonesia's logistics sector, enhancing their competitiveness in the global market.

Traditional freight forwarders organize the transportation of goods on behalf of shippers by coordinating various logistics services, managing documentation, and ensuring regulatory compliance. They typically operated through established relationships and manual processes, relying on personal communication and paper-based documentation. In contrast, digital freight forwarders used technology platforms to automate and enhance shipping processes, offering real-time tracking, instant quoting, and online document management. This digital approach increased transparency, efficiency, and speed, giving shippers greater control and visibility over their shipments.

In Indonesia's international freight forwarding sector, the transition from traditional to digital operations presented both opportunities and challenges. Many traditional players resisted digital solutions, perceiving the shift as unnecessary or overly complex, especially when existing methods appeared adequate. Meanwhile, digital freight forwarders faced difficulties gaining widespread acceptance, as customers frequently expressed concerns about reliability and trust. These contrasting dynamics underscored the challenges of integrating digital solutions into a traditionally operated industry and the need for strategies bridging traditional practices and digital innovation.

Over recent decades, the logistics sector experienced significant digital transformation, evolving from manual, paper-based processes to sophisticated digital systems. Initial automation began with mainframe computers managing inventory data efficiently. The pace accelerated recently, driven by demands for greater efficiency, transparency, and customer-centricity. The COVID-19 pandemic further highlighted

digital solutions' importance as e-commerce growth necessitated rapid adaptation. Digital supply chain platforms with real-time control and automated processes shifted from advantageous to essential in managing disruptions and meeting consumer expectations.

Despite global progress, Indonesia lagged behind regional and global benchmarks in digital logistics transformation. Traditional practices still dominated much of the industry. While awareness of digitalization's potential to improve efficiency and reduce costs existed, many logistics providers—particularly smaller and traditional freight forwarders—remained reluctant to adopt new technologies. Resistance stemmed from preferences for familiar workflows and concerns about costs and technical expertise. As a result, digital freight forwarders experienced slow market acceptance, highlighting the need for targeted efforts to bridge this gap and make digital transformation more accessible and appealing across Indonesia's logistics ecosystem.

To complement the literature review, surveys and questionnaires gathered empirical data from stakeholders in Indonesia's international freight forwarding sector, including traditional freight forwarders, digital freight forwarders, and industry experts. In total, 102 participants contributed: 57 managers from traditional freight forwarding companies, 23 from digital freight forwarder startups, and 22 logistics experts or policy advisors. The sampling focused on medium and large-scale operators, aiming to capture insights from key decision-makers involved in digital transformation initiatives.

The survey contained 20 closed-ended questions designed to quantify industry patterns, addressing topics such as digital adoption levels, types of digital technologies implemented, perceived benefits and drawbacks, leadership support for digital initiatives, and challenges encountered. The questionnaires included 10 open-ended questions to collect qualitative insights on barriers, success stories, and the perceived role of government and industry associations in facilitating digitalization.

Digital freight forwarders across various regions offered valuable examples for Indonesia. In Southeast Asia, Singapore-based Fr8Labs led freight forwarding digitization by providing tailored software-as-a-service solutions addressing regional needs. The Singaporean government supported this effort with initiatives like the National Trade Platform (NTP) and grants encouraging adoption among traditional forwarders. Similarly, China promoted digital logistics integration through government incentives, public-private partnerships, and subsidies mitigating resistance among traditional forwarders. India's experience showed how collaborative programs between digital players and traditional operators eased transitions, driven largely by e-commerce growth pressures.

In developed markets like the United States, companies such as Flexport redefined freight forwarding with end-to-end digital platforms that automated compliance and data consolidation. Resistance to digital adoption was addressed through strategic partnerships blending traditional expertise with digital innovation, supported by strong customer demand for transparency and efficiency.

Across these regions, common strategies effectively addressed resistance among traditional freight forwarders. Government incentives, training programs, and supportive regulations encouraged digital adoption. User-friendly platforms minimized the learning curve, while collaborative models demonstrated tangible benefits by integrating traditional and digital approaches. These global case studies provide actionable insights and practical strategies for Indonesia to bridge its digital transformation gaps, helping unlock new efficiencies in its logistics sector.

RESULTS AND DISCUSSION

The findings from the combined literature review, surveys and questionnaires, and case studies highlight the key success factors (KSFs) necessary for successful digital transformation and provide insights into managing resistance among traditional freight forwarders.

The Interpretative Structural Model (ISM) is a structured methodology used to identify and analyze key success factors (KSFs) in complex systems. Originally proposed by Warfield in 1974, ISM decomposes a system into interconnected sub-elements and organizes them hierarchically to clarify their relationships. For evaluating the importance of KSFs, the ISM formula assigns weighted values to different levels of importance, such as "very important," "important," "general," and "irrelevant." These weights reflect the perceived significance of each factor as determined by expert evaluations. By aggregating the weighted responses from experts, the formula calculates an importance value for each factor, providing a quantitative basis to prioritize critical areas for action. Only factors meeting or exceeding a predefined threshold are considered key, ensuring that focus is placed on the most impactful elements in the digital transformation process.

The results from the surveys and questionnaires are categorized into four primary areas: Strategic Foundation, Technological Enablement, Operational Excellence, and Collaborative Ecosystem. Each category is further detailed with secondary focus areas, such as Leadership Commitment and Technological Readiness, and actionable steps like Top-level Advocacy and Network Improvements.

$X = \{X_1, X_2, X_3, X_4\}$ = {very important, important, general, irrelevant} = {0.8, 0.6, 0.4, 0.2} represents the framework employed in the ISM methodology to evaluate the importance of key success factors (KSFs). Each level of importance is assigned a corresponding numerical weight, with 0.8 for "very important," indicating the highest level of significance, followed by 0.6 for "important," reflecting substantial relevance. A weight of 0.4 is given to "general," signifying moderate relevance, and 0.2 is assigned to "irrelevant," representing minimal importance.

Table 1. Alternative success factors

Primary Indicators	Secondary Indicators	Tertiary Indicators
Strategic Foundation	Leadership Commitment	1 Top-level Advocacy 2 Regular Reviews 3 Long-term Adjustments
	Clear Digital Strategy	4 Roadmap Creation 5 Communication Strategy
	Stakeholder Engagement	6 Stakeholder Surveys
Technological Enablement	Technological Readiness	7 Network Improvements 8 Hardware Updates
	Employee Training and Development	9 Workshops 10 Certifications
	System Integration	11 Data Standardization 12 IT Support 13 Compatibility Checks
Operational Excellence	Government Support	14 Regulatory Audits 15 Permit Simplification
	Financial Incentives	16 Grants

Primary Indicators	Secondary Indicators	Tertiary Indicators
		17 Private Equity Involvement
	Policy Alignment	18 Alignment with National Goals 19 Compliance Frameworks 20 Policy Advocacy
Collaborative Ecosystem	Collaboration with Digital Partners	21 Industry Sharing Forums 22 Partner Training
	Vendor Ecosystem Development	23 Supplier Mapping 24 Onboarding Protocols 25 Long-term Contracts

The weights allow the aggregation of qualitative judgments into a numerical score, facilitating quantitative analysis. These values are used in the formula:

$$y_i = \frac{\Sigma_{j=1}^{4} d_{ij} \times x_j}{d_a}$$

Where:

- y_i = The importance evaluation value for factor i.
- d_{ij} = The number of experts who selected the j-th importance level for factor i.
- x_j = The weight of the j-th importance level.
- d_a = The total number of evaluators.

Each factor is assigned a number for identification, and the responses are categorized into four levels: Very Important (V. Important), Important, General, and Irrelevant. Table 2 quantifies how many respondents rated each factor within these categories, and a weighted calculation is applied to derive the evaluation value (y_i) for each factor. The y_i values indicate the overall importance of each factor, with higher values reflecting greater relevance. In this research, after calculating y_i for all factors, those with values less than 0.7 are excluded, narrowing the list to the most critical key success factors. The remaining factors with high evaluation values are identified as the most significant for digital transformation.

Table 2. Evaluation values

Number	Importance				Evaluation Value (y_i)
	V. Important	Important	General	Irrelevant	
1	7	2	1	0	0,72
2	6	3	1	0	0,7
3	5	4	1	0	0,68
4	8	1	1	0	0,74
5	7	2	1	0	0,72
6	6	3	1	0	0,7
7	5	4	1	0	0,68
8	6	3	1	0	0,7
9	7	2	1	0	0,72

Number	Importance				Evaluation Value (y_i)
	V. Important	Important	General	Irrelevant	
10	5	4	1	0	0,68
11	6	3	1	0	0,7
12	7	2	1	0	0,72
13	5	4	1	0	0,68
14	4	4	1	1	0,62
15	3	3	2	0	0,5
16	7	2	1	0	0,72
17	5	4	1	0	0,68
18	6	3	1	0	0,7
19	8	1	1	0	0,74
20	4	4	1	0	0,6
21	5	3	2	0	0,66
22	6	2	2	0	0,68
23	7	2	1	0	0,72
24	5	3	1	0	0,62
25	6	2	1	0	0,64

Table 3 refines these results, listing only the KSFs that met the threshold. It organizes these factors for clarity. Each factor is assigned a unique identifier (SiSi) for easy reference and tracking.

Table 3. Key success factors

Number	Key Factor	S_i
1	Top-level Advocacy	S_1
2	Regular Reviews	S_2
3	Roadmap Creation	S_3
4	Communication Strategy	S_4
5	Stakeholder Surveys	S_5
6	Hardware Updates	S_6
7	Workshops	S_7
8	Data Standardization	S_8
9	IT Support	S_9
10	Grants	S_{10}
11	Alignment with National Goals	S_{11}
12	Compliance Frameworks	S_{12}
13	Supplier Mapping	S_{13}

CONCLUSİON

The identified key success factors provide actionable strategies to overcome barriers faced by Indonesia's traditional freight forwarders, including top-level advocacy for organizational change, strategic roadmapping with regular reviews, and workforce empowerment through surveys, workshops, and IT support to reduce resistance. Infrastructure and process improvements are addressed through hardware investments,

data standardization, and enhanced communication strategies. Externally, financial and regulatory support is secured via grants, national goal alignment, and compliance frameworks, while supplier mapping fosters stronger supply chain collaboration. Future research could explore the practical implementation challenges of these factors in diverse regional contexts within Indonesia to tailor digital transformation approaches more effectively.

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