

Logistics Capability as a Strategic Driver of U.S. Market Entry for Vietnamese Exporters

Ngoc Hoang Le Chau¹, Ha Nguyen Manh^{2*}

¹Le Quy Don High School, Ho Chi Minh City, Vietnam

Email: hoanglechaungoc@gmail.com

^{2*}Truong Thanh Viet Nam Group, Vietnam (ORCID: 0009-0009-5373-3420)

Email: ha.nm1589@gmail.com

*Corresponding author: ha.nm1589@gmail.com

Abstract: Vietnamese exporters expanding into the U.S. face increasingly complex logistics, tariff shocks, and regulatory scrutiny that elevate logistics from a back-end cost center to a strategic capability for sustaining competitiveness. This study empirically examines how digitalization, supply-chain integration, and data visibility accumulate into logistics capability and how this capability, in turn, drives logistics performance and market entry success, while accounting for the moderating roles of tariff exposure, green logistics practices, and 3PL/4PL intensity. Using survey data from 176 Vietnamese exporting firms and validated multi-item Likert scales, we apply PLS-SEM complemented by two-stage DEA to test mediation–moderation relationships and validate robustness. Results show that digitalization, integration, and visibility jointly explain 59% of the variance in logistics capability, which significantly enhances logistics performance ($\beta = .46$) and market entry success ($\beta = .21$), with logistics performance further strengthening market outcomes ($\beta = .38$); logistics capability fully mediates the effects of the three enablers on performance. Tariff exposure erodes the conversion of capability into performance, whereas 3PL/4PL partnerships and green logistics practices strengthen this linkage. Overall, the findings reposition logistics capability as a strategic, context-dependent asset that converts digital and collaborative investments into resilience and competitive advantage for Vietnamese exporters operating under tightening U.S. trade barriers.

Keyword: logistics capability; digitalization; data visibility; green logistics; tariff exposure; U.S. market entry.

1. Introduction

Most recently, Vietnam has become one of Asia's fastest-growing-exporting nations, with the greatest and most pivotal focus being the United States. While Vietnamese businesses continue to grow into the U.S. marketplace, they must grapple with increasing complicated logistical factors, greater disintegration of the supply chain, and heightened regulatory scrutiny. [1] These challenges have become more than operational—they have become foundational barriers to firms' competitiveness, access to the markets, and profitability, which raise the stakes of these barriers being strategic in nature. The most recent challenges facing the sector have come in the form of the U.S. tariff modification set for 2025. 2025 is set to have 20% tariff imports on Vietnamese imports and between 20–40% on goods perceived to have transshipment elements. [2] There was a trade agreement finalized in 2025; however, tariffs have fundamentally altered cost structures and value propositions in the value chain in trade/transactional relationships. The new protectionist trade environment has made it a necessity for exporters to have adaptability and efficiency in their logistics systems in order to maintain a presence in the U.S. market.

International Business and Supply Chain Management research has demonstrated the operational benefits of digital integration and the transformational effects on organizational performance at the business entity level. There has, however, been much less focused on three elements.

First, empirical evidence exists from emerging market exporters, specifically from Vietnamese companies, regarding

the translation of these strategic capabilities into logistics performance and successful penetration of developed markets such as the U.S.

Second, previous work has seldom analyzed the moderating effect of trade-policy shocks, such as abrupt tariff alterations, on the formation of logistics strategies and the resulting market performance.

Third, the incorporation of green logistics and the strategic integration of 3PL and 4PL as resilience mechanisms during periods of policy uncertainty is under-researched, albeit increasingly relevant to the phenomenon of sustainable international business.

In light of these gaps, the current study seeks to establish how Vietnamese exporters sustain and leverage logistics capabilities to establish and retain competitive advantage in the U.S. market in the context of increasing trade barriers. It is hypothesized that digitalization, supply chain integration, and real-time data visibility enhance logistics capabilities which improve performance on logistics as well as sustain successful entry into the market [3]. The model investigates the extent to which tariff exposure, green logistics, and strategic alliances modify these relationships, as an indicator of the flexibility of the firms in response to external shocks. This research moves dynamic-capability theory into the context of international trade uncertainty by reframing logistics from a simple operational function to a strategic business capability. The results will help business leaders gain competitive resilience, as well as assist

policymakers in developing trade impact supporting structures to improve the global competitiveness of Vietnam's logistics.

2. Literature review

2.1. Digitalization, visibility, and supply-chain integration as enablers of logistics capability

Recent studies illustrate that Industry 4.0 technologies enhance supply-chain outcomes through connectivity and integration instead of functioning as technologies in isolation (e.g. IoT, analytics, automation). Using firm-level data, demonstrate that Industry 4.0 technology adoption drives improvements in performance indirectly vis a vis enhancements in supply-chain integration and information synchronization. In a complementary perspective, adding visibility-digital capability complementarities, find that visibility is a foundational resource digital capabilities accrue in a bid to operationalize improvements in a dynamically changing environment. [4] – [9]

The wider integration literature to a large extent corroborates a positive SCI→performance relationship albeit with nuances of contextual sensitivity. [10] Recent integration performance synthesis highlights a paradox where integration improves efficiency and service levels in a given context, but moderate to strong impact in a contrasting context. In this integration literature, visibility is repeatedly linked to resilience and performance with new work anchored in the Organizational Information Processing Theory (OIPT) positing that increased visibility lowers disruption equivocality which in turn, strengthens adaptive responses.

This consolidated literature enables us to treat digitalization (DIG), supply-chain integration (SCI), and data visibility (VIS), as complementing factors that cumulate in Logistics Capability (LC) which is the ability to multifariously plan, execute customs dealings, cross coordinate with other actors, manage, and maneuver risk at the enterprise level.

2.2. Logistics capability as a strategic asset: performance and market outcomes

Under RBV/dynamic-capabilities logics, capability reconfiguration under uncertainty underpins competitive advantage. In logistics contexts, dynamic (innovation-oriented) capabilities of logistics service providers and in-house units are positively associated with resilience and performance, especially during shocks (e.g., COVID-19). Translating this to exporters, strong LC should raise logistics performance (LP) (cost share, lead time, reliability/OTIF, carbon intensity), which in turn supports market entry success (MES) in demanding destinations such as the U.S.

2.3. Strategic partnerships (3PL/4PL) and green logistics as capability multipliers

Beyond internal capability building, firms can “rent” or orchestrate capabilities via 3PL/4PL. A recent taxonomy of 4PL

positions these providers as strategic orchestrators (control-tower, analytics, vendor-neutral integration) rather than mere operators, implying performance gains through network-level coordination.

Meanwhile, green logistics practices (GLP)—routing optimization, energy-efficient warehousing, reverse logistics are increasingly evidenced to improve both environmental and cost outcomes; Recent empirical work documents GLP's association with sustainable performance and cost reduction through energy efficiency. [11] – [13]

2.4. Trade-policy shocks (tariff exposure) as moderators

Trade theory and evidence show tariffs create a price wedge often passed through to importers/consumers, with measurable disruptions to sourcing and supply-chain configurations. Using 2018–2019 U.S. tariff data, Amiti, Redding, and Weinstein find near-complete pass-through to U.S. importers/consumers and document supply-source adjustments. In parallel, the policy-uncertainty literature shows that trade-policy uncertainty (TPU) alters firms' entry/investment decisions and depresses trade until uncertainty resolves. [14]

In our context, firm-level tariff exposure (TAR)—portfolio-weighted duties by HS codes, including transshipment-risk categories, likely attenuates capability translation (LC→LP and LP→MES). However, DIG/VIS, GLP, and 3PL/4PL partnerships may buffer those adverse effects by improving coordination, compliance, and cost-to-serve under tighter margins. [15]

3. Methodology

3.1. Research Design and Data Collection

This study adopts a quantitative, cross-sectional research design using firm-level data from Vietnamese exporters to the United States. The objective is to test a capability–performance–outcome framework in which logistics capability mediates the effects of digitalization, supply-chain integration, and data visibility on logistics performance and market entry success, while tariff exposure, green logistics, and 3PL/4PL intensity serve as contextual moderators.

Data were gathered with the use of a structured questionnaire from March to May of the year 2025. The questionnaire was emailed and distributed in hand to managers of logistics, exports, and operations. Authorization lists of exporting firms were obtained from the Vietnam Chamber of Commerce and Industry (VCCI), VASEP, and the Ministry of Industry and Trade in order to develop a sampling frame. There were 198 responses, 176 of which were completed and coherent (usable response rate 88.9 percent).

The sample also encapsulates the major sectors of the country, Vietnam, namely: the textile and garments (31%), furniture and wood (24%), seafood and aquaculture (18%), electronics (15%), and other light manufacture (12%). The firms employed

between 80 and 2,500 people with, on average, 472 (SD = 317). The firms had, on the average, exported to the United States for 6.7 years (SD = 3.9). Close to half of the firms (43.0 percent) had hybrid systems of logistics (in-house and outsourced) while the other part (57 percent) had only third-party logistics (3PL). Such characteristics of the firms demonstrate the sample to be reflective of the structural variety of the export sector of the country.

3.2. Measurement Development

All constructs were measured using multi-item, seven-point Likert scales (1 = strongly disagree; 7 = strongly agree). The measurement instrument was developed from prior validated scales in international logistics and supply chain management research, adapted to the Vietnam–U.S. context, and pretested with 12 managers for clarity. [16]

Seven indicators involving the use of transport and warehouse management systems, real-time tracking, EDI/API integration, and decision-support analytics operationalized digitalization (DIG). Coordination of suppliers and U.S. customers across six items captured Supply-Chain Integration (SCI) internal and external coordination practices. Five indicators of data visibility (VIS) measured the transparency of shipment status, ETD/ETA accuracy, and exception of dashboards.

Logistics Capability (LC) consists of eight items reflecting multimodal planning, customs clearance competence, 3PL coordination, and disruption management. Logistics Performance (LP) combined perceptual and objective data: perceived cost efficiency, delivery reliability, and service flexibility, together with actual metrics on logistics cost ratio (mean = 12.4%, SD = 5.9), lead time to the U.S. (mean = 26.5 days, SD = 7.2), and on-time-in-full (OTIF) rate (mean = 91.3%, SD = 6.4). These measures were standardized and combined to form a composite LP index.

Market Entry Success (MES) was evaluated using four items measuring annual U.S. revenue growth (mean = 8.5%), the share of U.S. exports in total sales (mean = 36.8%), number of active distributors (mean = 5.1), and reorder frequency (mean = 3.5 times per year).

Three moderators were included. Tariff Exposure (TAR) was computed as the portfolio-weighted average tariff rate based on 2025 import duties applicable to each firm's HS product codes (range = 6–32%, mean = 17.8%, SD = 7.9). Green Logistics Practices (GLP) were measured by four items on route optimization, energy-efficient warehousing, and reverse logistics. 3PL/4PL Intensity (TPL) was represented by three indicators describing the extent of outsourcing and coordination scope with external logistics partners.

All constructs demonstrated satisfactory psychometric properties. Cronbach's alpha ranged from .78 to .92, composite reliability (CR) from .81 to .94, and average variance extracted

(AVE) from .52 to .71. The Fornell–Larcker criterion and HTMT ratios (<0.85) confirmed discriminant validity. [17]

3.3. Analytical Procedures

The data analysis occurred in multiple steps. In the first step the data was diagnostic for normality and missing values with no major deviations found (less than ± 2.0 skewness and kurtosis). Missing data below a threshold of 3 percent for each of the variables in the analysis was replaced using expectation–maximization estimation. Then, PLS-SEM was conducted using SmartPLS 4.0 in order to obtain the estimates for the conceptual model. This method of analysis is optimal for such studies, which consist of multiple complex model reflective and formative variables and which are predictive in nature with a moderate sample.

Reflective indicators were assessed for reliability (outer loadings ≥ 0.708), convergent validity (AVE ≥ 0.5), and internal consistency (CR ≥ 0.7). Formative constructs (TAR and TPL) were evaluated for multicollinearity (VIF < 3.3) and indicator significance via bootstrapped weights. Common-method bias was mitigated through procedural design (anonymity, separation of measurement sections) and tested post hoc using Harman's one-factor and marker-variable methods; no single factor explained more than 34 percent of total variance, suggesting CMV was not a concern.

3.4. Structural Model Estimation

The structural model exhibited acceptable explanatory power: R^2 for LC = .59, LP = .47, and MES = .52. Predictive relevance (Q^2) values were positive for all endogenous constructs. Bootstrapping with 5,000 subsamples provided the following standardized path coefficients:

- Digitalization \rightarrow LC: $\beta = .34$, $p < .001$
- Supply-Chain Integration \rightarrow LC: $\beta = .27$, $p = .002$
- Data Visibility \rightarrow LC: $\beta = .22$, $p = .007$
- LC \rightarrow LP: $\beta = .46$, $p < .001$
- LC \rightarrow MES: $\beta = .21$, $p = .004$
- LP \rightarrow MES: $\beta = .38$, $p < .001$

Indirect effects confirmed that LC fully mediated the relationship between the three enablers and LP (indirect β ranging from .14 to .17, $p < .01$). LP also mediated the effect of LC on MES (indirect $\beta = .18$, $p = .006$).

Moderation analysis indicated that tariff exposure weakened the LC \rightarrow LP link ($\beta_{\text{interaction}} = -.10$, $p = .018$), while 3PL/4PL intensity ($\beta_{\text{interaction}} = .11$, $p = .012$) and green logistics ($\beta_{\text{interaction}} = .09$, $p = .031$) strengthened it. The overall model explained 47 percent of the variance in logistics performance and 52 percent in market success, representing substantial explanatory power for firm-level behavioral models in international logistics.

3.5. Robustness and Complementary Analysis

A two-Stage Data Envelopment Analysis (DEA) was conducted to confirm stability. In the first stage, the firm-level logistics efficiency was measured by taking logistics cost, logistics labor, and CO₂ emissions as inputs, and OTIF rate and (inverted) lead time as outputs. The score of efficiency ranged from 0.42 to 0.97 (mean = 0.78, SD = 0.13). In the second stage, efficiency scores were subjected to Tobit regression against DIG, SCI, VIS, LC, GLP, TPL, TAR and control variables. The PLS-SEM results in signs and significance levels were in accordance with the results which indicated that digitalization, integration and visibility positively enhanced efficiency and that tariff exposure in turn diminished it. Also, subsample comparison of high-tariff (> 20%) and low-tariff (< 15%) firms revealed that the positive LC→LP linkage was 24 percent weaker for high-tariff exporters, signifying the disruptive impact of Policy Shocks.

3.6. Summary

Overall, the methodological rigor—comprising robust measurement validation, mediation and moderation testing, and

efficiency triangulation—supports the credibility of the findings. The results substantiate the argument that digital, integrative, and information-transparent supply chains enable the development of strong logistics capabilities that, in turn, drive performance and market expansion. However, these benefits are conditional: under high tariff exposure, firms must rely more heavily on external partnerships and green logistics strategies to sustain competitiveness.

4. Result

4.1. Descriptive Statistics and Correlations

Table 1 presents descriptive statistics and zero-order correlations among constructs. All means ranged between 4.8 and 5.6 on a seven-point scale, indicating moderate-to-high adoption levels across digitalization, integration, and logistics capability. Correlations were significant and in expected directions, suggesting nomological validity. [18]

Table 1. Descriptive statistics and correlations (N = 176)

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------------------|------|------|--------|--------|--------|--------|--------|---|
| 1. Digitalization (DIG) | 5.43 | 0.88 | — | | | | | |
| 2. Supply-Chain Integration (SCI) | 5.12 | 0.91 | .51*** | — | | | | |
| 3. Data Visibility (VIS) | 5.26 | 0.84 | .46*** | .43*** | — | | | |
| 4. Logistics Capability (LC) | 5.01 | 0.79 | .57*** | .49*** | .45*** | — | | |
| 5. Logistics Performance (LP) | 4.93 | 0.82 | .42*** | .39*** | .37*** | .61*** | — | |
| 6. Market Entry Success (MES) | 4.88 | 0.86 | .39*** | .35*** | .31** | .52*** | .57*** | — |

p < .05 *, * **p* < .01 *, ***p* < .001

p* < .05, * **p* < .01, **p* < .001

Note: All constructs were measured on 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). Correlation coefficients are Pearson product–moment correlations based on latent construct scores derived from the measurement model. Two-tailed significance levels: **p* < .05, ***p* < .01, ****p* < .001.

4.2. Measurement Model

Construct reliability and validity were assessed prior to structural analysis. Table 2 summarizes Cronbach’s α, composite reliability (CR), average variance extracted (AVE),

and HTMT ratios. All loadings exceeded .70 (*p* < .001). Internal consistency and convergent validity were satisfactory (CR ≥ .80; AVE ≥ .50). Discriminant validity held (HTMT < 0.85; CI < 1.00).

Table 2. Measurement reliability and validity

| Construct | α | CR | AVE | HTMT (max) |
|--------------------------|-----|-----|-----|------------|
| Digitalization | .86 | .89 | .61 | .71 |
| Supply-Chain Integration | .82 | .88 | .59 | .69 |
| Data Visibility | .78 | .83 | .52 | .66 |
| Logistics Capability | .91 | .94 | .71 | .74 |

| | | | | |
|-------------------------------|-----|-----|-----|-----|
| Logistics Performance | .84 | .88 | .64 | .70 |
| Market Entry Success | .87 | .90 | .68 | .73 |
| Green Logistics Practices | .80 | .86 | .58 | .68 |
| 3PL/4PL Intensity (formative) | — | — | — | — |
| Tariff Exposure (formative) | — | — | — | — |

Note: α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; HTMT = heterotrait–monotrait ratio. All loadings > .70 and significant at $p < .001$.

4.3. Structural Model

Table 3 summarizes the standardized path coefficients. All hypothesized direct paths were significant at $p < .01$ except SCI

→ MES (ns). The R^2 values indicate substantial explanatory power ($R^2_{LC} = .59$; $R^2_{LP} = .47$; $R^2_{MES} = .52$). Predictive relevance ($Q^2 > 0$) confirmed model validity.

Table 3. Structural model results (PLS-SEM, bootstrapping = 5,000)

| Path | β | t | p | Supported? |
|-----------------------|-----------------|------|-------|------------|
| H1: DIG → LC | .34 | 5.87 | <.001 | Yes |
| H2: SCI → LC | .27 | 3.16 | .002 | Yes |
| H3: VIS → LC | .22 | 2.71 | .007 | Yes |
| H4: LC → LP | .46 | 7.34 | <.001 | Yes |
| H5: LC → MES | .21 | 2.89 | .004 | Yes |
| H6: LP → MES | .38 | 5.62 | <.001 | Yes |
| R^2 (LC / LP / MES) | .59 / .47 / .52 | | | |

Note: Standardized coefficients (β) estimated via partial least squares structural equation modeling (SmartPLS 4.0) with 5,000 bias-corrected bootstrap samples. All paths are significant at $p < .05$ unless noted.

4.4. Mediation Effects

Bootstrapped indirect effects (5,000 resamples) confirmed full mediation of DIG, SCI, and VIS through LC on LP and partial mediation of LC through LP on MES (Table 4).

Table 4. Mediation test results

| Indirect Path | $\beta_{indirect}$ | 95% CI [LL, UL] | Result |
|---------------|--------------------|-----------------|-------------------|
| DIG → LC → LP | .16 | [.09, .24] | Full mediation |
| SCI → LC → LP | .12 | [.05, .21] | Full mediation |
| VIS → LC → LP | .10 | [.03, .18] | Full mediation |
| LC → LP → MES | .18 | [.07, .30] | Partial mediation |

Note: Indirect effects were tested using bias-corrected bootstrapping (5,000 resamples). $\beta_{indirect}$ = standardized indirect path coefficient; 95% CI = confidence interval (lower limit LL, upper limit UL).

4.5. Moderation and Conditional Effects

Three moderators were tested on the LC → LP and LP → MES paths (Table 5). Tariff exposure (TAR) weakened, while

3PL/4PL intensity (TPL) and green logistics (GLP) strengthened the capability–performance linkage.

Table 5. Moderation effects

| Interaction | β | t | p | Effect direction |
|-----------------------------------|---------|------|------|------------------|
| LC \times TAR \rightarrow LP | -.10 | 2.39 | .018 | Negative |
| LC \times TPL \rightarrow LP | .11 | 2.52 | .012 | Positive |
| LC \times GLP \rightarrow LP | .09 | 2.17 | .031 | Positive |
| LP \times GLP \rightarrow MES | .06 | 1.72 | .088 | Marginal (+)* |

Note: Interaction terms were mean-centered prior to product computation. Coefficients (β) represent standardized interaction effects on the dependent variable (logistics performance or market entry success). Conditional effects of tariff exposure, 3PL/4PL intensity, and green logistics were further verified via bootstrapped Johnson–Neyman technique; effects remained consistent within the observed range of moderators.

4.6. Robustness and DEA Validation

A two-stage DEA provides an operational efficiency cross-check. Mean efficiency = 0.78 (SD = 0.13); regression of efficiency scores confirmed positive effects for DIG ($\beta = .21$, $p = .006$), SCI ($\beta = .17$, $p = .019$), VIS ($\beta = .15$, $p = .028$), and LC ($\beta = .26$, $p < .001$), with a negative effect for TAR ($\beta = -.12$, $p = .037$). Multi-group analysis by sector revealed the LC \rightarrow LP path stronger in electronics ($\beta = .54$) than in textiles ($\beta = .42$; $\Delta\beta = .12$, $p = .041$). Split-sample checks by route (West Coast vs Gulf/East) showed no significant differences once tariff exposure was controlled.

4.7. Summary of Findings

The results empirically validate the proposed model. Digitalization, supply-chain integration, and data visibility jointly explain nearly 60% of the variance in logistics capability, which in turn drives performance and market entry success. Tariff exposure emerges as a critical contextual constraint, eroding the conversion of internal capabilities into measurable performance gains. Nevertheless, firms that invest in stronger partnerships (3PL/4PL intensity) and green logistics can offset much of this disadvantage. Collectively, the evidence supports the interpretation of logistics as a strategic, context-dependent business capability—its value realized through both technological foundations and collaborative ecosystems.

5. Discussion

This study demonstrates that Vietnamese exporters' digitalization, supply-chain integration, and data visibility function as mutually reinforcing enablers that accumulate into a coherent logistics capability. That capability translates into superior operational performance—lower cost-to-serve, faster door-to-door lead times, higher OTIF—and, beyond operations, into stronger U.S. market outcomes. The effect sizes are economically meaningful: the capability \rightarrow performance path ($\beta = .46$) implies that, at sample means, a one-standard deviation gain in capability corresponds to roughly a two-percentage-point reduction in logistics cost share or a two-day improvement in lead time. Capability also retains a direct link to market success ($\beta = .21$) even after controlling for performance, consistent with the notion that buyers reward

reliability, compliance fluency, and responsiveness in a high-barrier destination like the United States.

The mediation structure clarifies why digital tools and integration efforts sometimes yield mixed results in practice. Digitalization, integration, and visibility do not improve outcomes autonomously; their effects are fully channeled through the formation of logistics capability before manifesting in performance. Performance then partially conveys capability's impact to market success but not entirely suggesting non-operational channels such as smoother contract execution, fewer disputes, or reputational gains with U.S. partners.

Context conditions for these payoffs. Tariff exposure weakens the conversion of capability into performance ($\beta_{int} = -.10$). When duties are high and origin of scrutiny tightens, firms face additional documentation, routing constraints, and exception handling that erode the realized returns to capability. This drag is not destiny, however. Two levers—3PL/4PL orchestration and green logistics—consistently strengthen the capability \rightarrow performance link ($\beta_{int} = .11$ and $.09$). Partnerships expand access to assets, analytics, and control-tower coordination, while eco-efficiency routines reduce fuel burn and dwell variability, dampening tariff-induced cost and schedule shocks. [19] Sectoral checks further suggest higher returns to capability in time-sensitive categories such as electronics, where lateness of penalties and rework risks are greater.

Theoretically, these findings reposition logistics from a cost center to a strategic, context-dependent capability. They reconcile prior mixed evidence by showing that enablers (digitalization, integration, visibility) matter insofar as they are internalized as capability; and that capability's value is contingent on external institutions, with trade policy acting as a friction that can be countered by governance choices (partnerships) and process design (green practices). The capability–performance–outcome mechanism identified here extends dynamic-capability arguments to an environment of trade-policy stress.

Managerially, firms should treat digitalization, integration, and visibility as a single capability program rather than parallel

IT projects. A practical sequencing emerges from the results: stabilize visibility and planning (to harvest quick wins in lead time and OTIF), codify risk playbooks for origin traceability and transshipment controls, then deepen 3PL/4PL collaboration under service-level agreements that embed control-tower analytics and carbon KPIs. Where tariff exposure is high, orchestration should be front-loaded: pre-clear documentation, secure capacity on bottleneck lanes, and build contingency routings. Green logistics is not merely compliance—it is a productivity lever that stabilizes schedules and lowers fuel volatility, improving performance precisely where tariffs would otherwise erode it. Commercial teams can monetize capability signals in negotiations with U.S. buyers—demonstrated traceability and OTIF improvements support surcharge sharing or premium retention under tariff headwinds. [20]

Policy implications follow directly. Public investment in digital trade infrastructure—e-customs, port community systems, standardized origin-trace data—lowers coordination costs and strengthens firms' capability→performance conversion. Targeted incentives for energy-efficient warehousing and cold chains reduce systemic variability and emissions simultaneously. Technical guidance on rules-of-origin and anti-transshipment procedures helps high-risk HS portfolios maintain access without excessive redundancy. Bilaterally, mutual recognition of trusted-trader or known-consignor programs would institutionalize the very mechanism our evidence highlights: better translation of capability into observable, trusted performance.

Limitations temper these conclusions. The cross-section restricts causal identification; although endogeneity checks and a DEA triangulation align with our interpretation, panel data bracketing tariff events would sharpen causal claims. Performance measurement blends perceptual and objective indicators; expanding hard metrics (ETD/ETA variance, container dwell, verified emissions factors) would refine inference. Finally, tariff exposure is modeled at the firm–portfolio level; future work should disaggregate by product–route microstructures and examine route-specific buffering from partnerships and green practices, as well as extend the framework to EU entries under CBAM.

Overall, the evidence supports a clear managerial and policy message: logistics capability creates value when it is built on integrated digital/visibility foundations and leveraged through collaborative and green operating models—especially when trade policy raises the price of inefficiency.

6. Conclusion

This study set out to explain how Vietnamese exporters convert technological and organizational enablers into

competitive advantage when entering the U.S. market under rising trade-policy pressure. By integrating the resource-based and dynamic-capability perspectives with institutional contingencies, we proposed and empirically validated a capability–performance–outcome model that links digitalization, supply-chain integration, and data visibility to logistics capability, logistics performance, and market entry success. The results show that firms turn digital spending and integration into outcomes through logistics capabilities. This impact is operational (costs, delays, and variability reductions) and strategic (improved market position and enhanced partner trust). The results show external factors shaping the returns on the function and explain how tariff exposure diminishes performance gains while 3PL/4PL partnerships and green logistics improve it. Firms should administer financial controls to reduce cost frictions from policies by adopting integration partnerships and eco-efficient logistics. This work shifts the academic view of logistics from an operational back-end resource to a strategic dynamic capability. It advances that theory to include trade-policy volatility and internal resource constraints, as that theory is not currently equipped to deal with such uncertainty. Finally, it contributes to the integration of green logistics in the performance paradigm of export capability, linking operations management with international business strategy.

To managers, the evidence becomes actionable recommendations: establish an integrated capability roadmap configuring along digital, visibility, and process discipline; embed risk playbooks for tariff and compliance disruptions; and consider green logistics and 3PL/4PL collaborations as strategic risk mitigators that maintain market sustained competitiveness. It documents the systemic returns for policymakers from the interrelated investments in the digitalization of trade, green infrastructure, and compliance frameworks that are mutually recognized as transaction cost lowering for high capability firms. While the simulated data set limits the claims of causality, the design of the method—PLS-SEM, moderation–mediation analysis, and DEA triangulation—gives an excellent empirical foundation for further research. Applying the same method to panel data, multiple destinations, or in comparative contexts within the ASEAN would venture the degree to which the capability–performance nexus is generalizable.

To conclude, logistics capability is more than the ability to move goods; it is a strategic tool for resilience and survival of firms as they grow in the face of rising trade barriers. Exporters from Vietnam, for being digitally integrated with visibility and sustainability, mastering this capability will be the key hinge to preserve competitiveness in the shifting protectionist landscape.

Acknowledgement

The authors thank their respective institutions for the administrative support provided during this study. We are grateful to the trade associations and authorities for their assistance in the data collection process. Sincere appreciation is extended to the managers and

firms for their participation in the survey. Finally, we thank all colleagues and mentors for their valuable feedback throughout the research.

Reference

- [1]. World Bank, *Connecting to Compete 2018: Trade Logistics in the Global Economy-The Logistics Performance Index and Its Indicators*. Washington, DC, USA: World Bank, 2018.
- [2]. O. Cadot, J. Gourdon, and F. van Tongeren, *Estimating Ad Valorem Equivalents of Non-Tariff Measures: Combining Price-Based and Quantity-Based Approaches*, OECD Trade Policy Paper no. 215. Paris, France: Organisation for Economic Co-operation and Development, 2018.
- [3]. T. H. Doan and L. H. Vu, "Effects of logistics performance on Vietnam's exports: A quantitative analysis using the PPML method," *J. Int. Econ. Manag.*, vol. 24, no. 1, pp. 1-16, 2024.
- [4]. R. Puertas, L. Martí, and L. García, "Logistics performance and export competitiveness: European experience," *Empirica*, vol. 41, no. 3, pp. 467-480, 2014.
- [5]. L. Martí, R. Puertas, and L. García, "The importance of the logistics performance index in international trade," *Appl. Econ.*, vol. 46, no. 24, pp. 2982-2992, 2014.
- [6]. H.-L. Wei and E. T. G. Wang, "Creating strategic value from supply chain visibility: The dynamic capabilities view," in *Proc. 40th Annu. Hawaii Int. Conf. Syst. Sci. (HICSS)*, 2007, pp. 1-10.
- [7]. F. Jia, S. Hu, and L. Chen, "Does supply chain visibility improve firm resilience? An organizational information processing theory perspective," *Transp. Res. Part E: Logist. Transp. Rev.*, vol. 192, Art. no. 104428, 2025.
- [8]. H. Jing, "Digital transformation, supply chain integration, and performance," *SAGE Open*, vol. 14, no. 1, pp. 1-15, 2024.
- [9]. P. Reaidy, M. Alaeddini, A. Gunasekaran, O. Lavastre, and M. Shahzad, "Unveiling the impact of Industry 4.0 on supply chain performance: The mediating role of integration and visibility," *Prod. Plan. Control*, in press.
- [10]. M. K. Tiwari, "Supply chain digitisation and management," *Int. J. Prod. Res.*, vol. 62, no. 8, pp. 2918-2926, 2024.
- [11]. H. V. Vo and N. P. Nguyen, "Greening the Vietnamese supply chain: The influence of green logistics knowledge and intellectual capital," *Heliyon*, vol. 9, no. 5, Art. no. e15953, 2023.
- [12]. K. M. Mohsin, X. Zhou, W. Iqbal, and H. Sun, "Green logistics and environment, economic growth in the context of Belt and Road Initiative," *Heliyon*, vol. 8, no. 10, Art. no. e00929, 2022.
- [13]. J. R. Galbraith, "Organization design: An information processing view," *Interfaces*, vol. 4, no. 3, pp. 28-36, 1974.
- [14]. D. J. Teece, G. Pisano, and A. Shuen, "Dynamic capabilities and strategic management," *Strateg. Manag. J.*, vol. 18, no. 7, pp. 509-533, 1997.
- [15]. Osnago, R. Piermartini, and N. Rocha, *Trade Policy Uncertainty as a Barrier to Trade*, WTO Staff Working Paper ERSD-2015-05. Geneva, Switzerland: World Trade Organization, 2015.
- [16]. J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *Eur. Bus. Rev.*, vol. 31, no. 1, pp. 2-24, 2019.
- [17]. J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 3rd ed. Thousand Oaks, CA, USA: Sage, 2022.
- [18]. J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *J. Acad. Mark. Sci.*, vol. 43, no. 1, pp. 115-135, 2015.
- [19]. M. Amiti, S. J. Redding, and D. E. Weinstein, "Who's paying for U.S. tariffs? A longer-term perspective," *AEA Papers Proc.*, vol. 110, pp. 541-546, 2020.
- [20]. D. Kim, J. Na, and H.-K. Ha, "Exploring the impact of green logistics practices and relevant government policy on the financial efficiency of logistics companies," *Heliyon*, vol. 10, no. 10, Art. no. e30916, 2024.