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# From Trade Wars to Strategic Resilience: The Role of Industrial Policy, Digital Trade, and Innovation in India's Global Competitiveness

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## Abstract

Escalating tariff conflicts, most recently the United States' tariffs reaching 50 percent on a wide range of Indian exports by late 2025, have exposed the limits of trade policy alone as a source of national competitiveness. While a growing literature examines industrial policy, digital trade, and innovation separately, and a parallel literature shows that trade policy uncertainty itself depresses firm investment (Caldara, Iacoviello, Molligo, Prestipino, & Raffo, 2020), few studies ask when, rather than merely whether, these levers convert external shocks into durable advantage. This paper addresses that gap by developing the Triple-Lever Resilience Framework (TLRF), a moderated-mediation model in which Industrial Policy Support and Digital Trade Adoption act as antecedents of firm-level export competitiveness, Innovation Capability serves as the mediating mechanism that converts policy support into advantage, and perceived Trade Policy Uncertainty moderates the strength of that conversion. Grounded in Porter's national competitive advantage framework, the National Innovation Systems perspective, the dynamic capabilities view, and the organizational resilience literature (Linnenluecke, 2017; Hillmann & Guenther, 2021), the study specifies a cross-sectional survey of export-oriented Indian manufacturing and services firms, to be analyzed using partial least squares structural equation modeling with a bootstrapped conditional-indirect-effects test (Preacher, Rucker, & Hayes, 2007). [Key findings to be inserted once data collection is complete.] The framework's contribution is to reframe resilience as a conditional, testable property — strongest precisely when trade pressure is highest — rather than a general claim about policy effectiveness, offering theoretical, managerial, and policy insight into how India can convert trade-war pressure into strategic resilience.

*Keywords:* ***industrial policy; digital trade; innovation capability; trade policy uncertainty; organizational resilience; national competitiveness; India***

## 1. Introduction

Global trade has entered a period of sustained disruption. Since April 2025 the United States has applied a sequence of tariff measures to Indian exports, reaching a cumulative rate of 50 percent on many goods by late August 2025 — among the steepest duties applied to any major trading partner (India Briefing, 2026). Sectors such as textiles, marine products, and gems and jewelry absorbed the sharpest cuts, with industry estimates placing the resulting export loss at roughly 6 to 8 percent of affected trade flows (Brief India, 2025), even as India's aggregate exports continued to grow through diversification into other markets (Al Jazeera, 2025). This episode illustrates a broader problem: trade policy alone is an increasingly unreliable lever of national competitiveness, and uncertainty about tariff policy is itself consequential — firm-level evidence from the 2018–2019 U.S. tariff escalation shows that increases in trade policy uncertainty reduced business investment independently of tariffs' direct cost effects (Caldara et al., 2020).

In response, India has leaned on three instruments simultaneously. The Production-Linked Incentive (PLI) scheme has committed an estimated $26 billion across fourteen sectors to build domestic manufacturing scale (Wandhe, 2024); a digital trade agenda seeks to raise the digital content of exports, an area where India continues to lag both developed and developing-country peers (Banga, 2019); and a national innovation push lifted India to 38th place in the WIPO Global Innovation Index 2025, despite research and development spending of only around 0.6 percent of GDP (World Intellectual Property Organization, 2025). Existing research, however, has examined these three instruments largely apart from one another: industrial policy scholarship evaluates the PLI scheme's investment and export effects in isolation (Wandhe, 2024); digital trade scholarship separately assesses India's digital infrastructure and export content (Banga, 2019; Banga & Banga, 2020); and innovation scholarship tracks India's R&D and patenting position without connecting it back to trade or policy instruments (World Intellectual Property Organization, 2025). This leaves a first research gap: no study, to the authors' knowledge, jointly models industrial policy support, digital trade adoption, and innovation capability as an interacting system of export competitiveness for Indian firms.

A second, and more consequential, gap concerns conditionality. Firm-level evidence from outside India confirms that trade policy uncertainty independently suppresses investment and activity, with effects concentrated among trade-exposed firms (Caldara et al., 2020). Parallel to this, the organizational resilience literature argues that firm capabilities matter most precisely under conditions of external threat, yet a systematic review of that literature finds it has developed largely apart from the industrial-policy and innovation-systems traditions, with calls for further empirical rather than purely conceptual treatment (Linnenluecke, 2017), and a subsequent review argues the construct remains conceptually fuzzy precisely because it is rarely tested as a measurable, conditional property (Hillmann & Guenther, 2021). Neither literature, on its own, tests whether the competitiveness-enhancing effect of firm innovation capability is itself conditional on the intensity of trade policy uncertainty a firm experiences — the question this paper treats as central rather than incidental.

This paper aims to develop and specify a testable, moderated-mediation framework — termed here the Triple-Lever Resilience Framework (TLRF) — linking industrial policy support, digital trade adoption, and innovation capability to firm-level export competitiveness, in which innovation capability mediates the effect of policy support and perceived trade policy uncertainty conditions the strength of that mediation. Four objectives follow: (1) synthesize the industrial policy, digital trade, innovation-systems, and organizational resilience literatures into one conceptual framework; (2) develop and justify hypotheses linking the constructs to competitiveness, including a boundary-condition hypothesis; (3) specify a survey-based design, including a moderated-mediation analysis plan, capable of testing the framework among Indian exporting firms; and (4) derive theoretical, managerial, and policy implications for trade resilience. These translate into four research questions:

- RQ1: How does industrial policy support influence the export competitiveness of Indian firms?
- RQ2: How does digital trade adoption influence export competitiveness?
- RQ3: Does innovation capability influence export competitiveness, and does it mediate the effect of industrial policy support?
- RQ4: Does trade policy uncertainty strengthen the relationship between innovation capability and export competitiveness — that is, is the resilience-building effect of

innovation capability conditional on the intensity of trade pressure a firm faces?

The study is scoped to export-oriented manufacturing and services firms operating in India across PLI-eligible sectors, examined cross-sectionally during the post-2025 tariff escalation period; it does not extend to non-exporting firms or macroeconomic trade modelling.

The remainder of this paper is structured as follows. Sections 2 through 9 formalise the research problem, gaps, aim, objectives, questions, scope, significance, and novelty statement. Section 10 reviews the literature and develops the theoretical framework. Section 11 details the research methodology. Section 12 presents results. Section 13 discusses the contributions. Section 14 develops implications. Section 15 addresses limitations and future research. Section 16 concludes.

## 2. Literature Review and Theoretical Framework

National competitiveness has long been explained through Porter's (1990) diamond model, which argues that a nation's prosperity is created rather than inherited, and that firms gain sustained international advantage through continuous innovation supported by favorable factor conditions, demand conditions, related industries, and firm rivalry within their home base. Applied to industrial policy, this suggests that government intervention enhances competitiveness only when it upgrades the conditions firms compete within, rather than merely subsidizing output — a distinction directly relevant to schemes such as India's PLI, which ties incentives to incremental production rather than blanket protection (Wandhe, 2024).

A parallel stream draws on the National Innovation Systems (NIS) perspective, which frames innovation not as an individual-firm activity but as the product of interaction among firms, government, and knowledge institutions within a national system (Lundvall, 1992; Nelson, 1993). This view is consistent with India's current position: the WIPO Global Innovation Index 2025 places India 38th globally and first among lower-middle-income economies, yet attributes the country's comparatively slow progress to R&D spending of under one percent of GDP and weak industry–science integration (World Intellectual Property Organization, 2025). The NIS lens implies that industrial policy and digital infrastructure function as system-level inputs that raise a nation's aggregate innovation capability, which then translates into firm-level competitive outcomes, rather than innovation acting as an independent, unconnected driver.

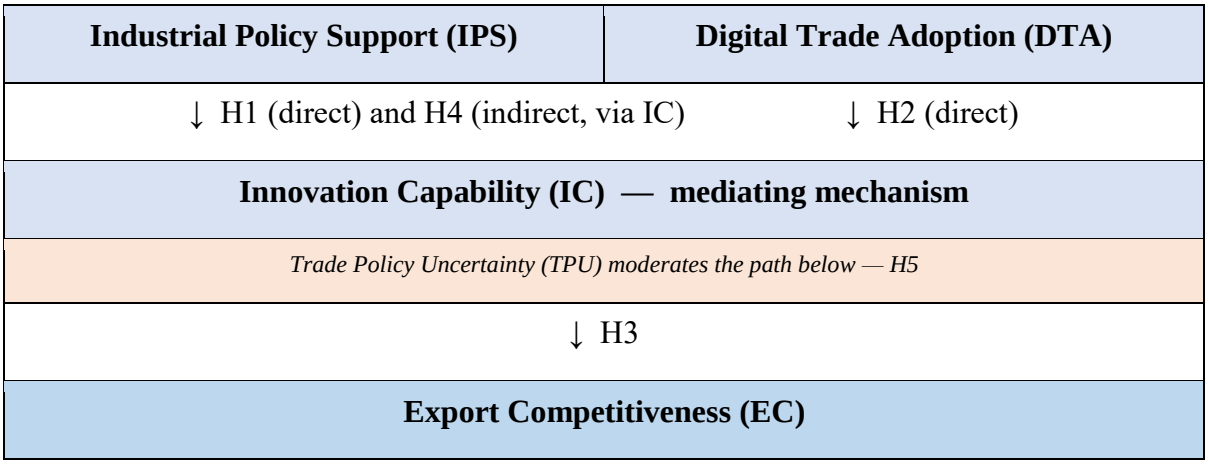
A third stream, digital trade and digitalization research, documents how the digital content of exports affects competitiveness at both country and firm level. Banga (2019) shows that India lags both developed and developing-country peers in digital trade readiness, with digital value added concentrated in a narrow band of services exports; a related firm-level analysis finds that increasing the share of digital assets in a firm's capital stock raises its export intensity (Banga & Banga, 2020). This literature treats digital trade adoption as a distinct capability that firms can build independently of formal industrial policy, even though the two are frequently bundled together in national strategy documents.

Taken individually, these three streams offer strong but disconnected explanations of competitiveness. What is missing is a framework that treats them as jointly operating inputs into firm-level outcomes, mediated by the internal capability that converts external support into advantage. For that mediating mechanism, this paper draws on the dynamic capabilities view, which holds that firms secure competitive advantage not from the resources or support they receive, but from their capacity to sense opportunities and reconfigure internal competences in response to a changing environment (Teece, Pisano, & Shuen, 1997) — a capacity closely aligned with what this paper terms innovation capability.

A fourth, boundary-defining literature is organizational resilience research. Linnenluecke's (2017) systematic review of the field identifies five distinct research streams — spanning responses to external threats, organizational reliability, and supply chain design — and finds that resilience has been conceptualized differently across studies with limited empirical integration. A subsequent review goes further, arguing that resilience remains conceptually fuzzy precisely because it is rarely operationalized as a measurable, conditional property with clear boundary conditions (Hillmann & Guenther, 2021). Firm-level evidence on trade policy specifically supports treating conditionality as central: increases in trade policy uncertainty reduce investment and capital accumulation, with effects concentrated among more exposed and financially constrained firms (Caldara et al., 2020). Read together, these literatures imply that the innovation-competitiveness relationship at the centre of this paper's model should not be treated as constant across firms, but as strengthening specifically under the high-uncertainty conditions a trade war creates — the condition this paper's setting was chosen to capture.

Integrating these four perspectives, the paper proposes the Triple-Lever Resilience Framework (TLRF), shown in Figure 1. Industrial Policy Support (IPS) and Digital Trade Adoption (DTA) act as external antecedents; Innovation Capability (IC) acts as the internal capability that converts these antecedents into outcomes, consistent with Porter's (1990) emphasis on innovation as the mechanism through which favorable conditions become advantage and with the NIS view that policy inputs operate through, rather than around, a firm's innovative capacity (Lundvall, 1992; Nelson, 1993); Export Competitiveness (EC) is the resulting firm-level outcome; and perceived Trade Policy Uncertainty (TPU) moderates the strength of the innovation-to-competitiveness path, operationalizing the conditional logic the resilience literature calls for but has rarely tested directly (Linnenluecke, 2017; Hillmann & Guenther, 2021).

**Figure 1. The Triple-Lever Resilience Framework (TLRF)**




Five hypotheses follow. Firms that perceive industrial policy support (such as the PLI scheme) as accessible and well-designed are expected to report higher export competitiveness, both directly and because such support frees resources for innovation (H1). Firms with greater digital trade adoption are expected to report higher export competitiveness, consistent with Banga and Banga's (2020) firm-level finding that digital asset intensity raises export intensity (H2). Firms with stronger innovation capability are expected to report higher export competitiveness, consistent with the dynamic capabilities view (H3; Teece et al., 1997). Innovation capability is expected to mediate the relationship between industrial policy support and export competitiveness, such that policy support raises competitiveness

partly by strengthening firms' capacity to innovate rather than through direct subsidy effects alone (H4). Finally, and central to this paper's contribution, perceived trade policy uncertainty is expected to moderate the innovation capability–export competitiveness relationship, such that the positive effect of innovation capability is stronger among firms experiencing higher trade policy uncertainty than among firms experiencing lower uncertainty — that is, innovation capability is expected to matter most precisely when trade pressure is most acute (H5).

## 3. Research Problem

Global trade disruption — most immediately, the United States' imposition of tariffs reaching 50 percent on a wide range of Indian exports by late 2025 (India Briefing, 2026) — has exposed the limits of trade policy alone as a source of national competitiveness. India has responded by deploying three instruments simultaneously: the Production-Linked Incentive (PLI) scheme committing an estimated $26 billion across fourteen sectors (Wandhe, 2024), a digital trade agenda aimed at raising the digital content of exports (Banga, 2019), and a national innovation push that lifted India to 38th place in the WIPO Global Innovation Index 2025 despite R&D spending of only 0.6 percent of GDP (World Intellectual Property Organization, 2025). Yet despite this multi-pronged response, firms exposed to the same policy instruments and the same tariff environment diverge sharply in their competitive outcomes. Some firms convert trade-war pressure into strategic repositioning and durable advantage; others experience the same pressure as an unmitigated cost shock that erodes their export position.

The central research problem is not whether industrial policy, digital trade, or innovation individually matter for competitiveness — the evidence for each link, taken separately, is substantial. The problem is that existing scholarship examines these three instruments largely apart from one another: industrial policy research evaluates the PLI scheme's investment and export effects in isolation (Wandhe, 2024); digital trade scholarship separately assesses India's digital infrastructure and export content (Banga, 2019; Banga & Banga, 2020); and innovation scholarship tracks India's R&D and patenting position without connecting it back to trade or policy instruments (World Intellectual Property Organization, 2025). More consequentially, no existing model asks when, rather than merely whether, these levers convert external shocks into durable advantage. Firm-level evidence confirms that trade policy

uncertainty independently suppresses investment, with effects concentrated among trade-exposed firms (Caldara et al., 2020), yet the organisational resilience literature — which should explain why some firms thrive under the same uncertainty that damages others — remains conceptually fuzzy precisely because it is rarely tested as a measurable, conditional property with clear boundary conditions (Linnenluecke, 2017; Hillmann & Guenther, 2021).

## 4. Research Gap

The gaps motivating this study are stated against the closest neighbouring work rather than against the literature in the abstract, because a gap that cannot survive contact with the nearest existing study is not a genuine gap.

The first gap is an integration gap. Existing research treats industrial policy support, digital trade adoption, and innovation capability as parallel and independent predictors of firm or national competitiveness. Porter's (1990) diamond model, the National Innovation Systems perspective (Lundvall, 1992; Nelson, 1993), and digital trade scholarship (Banga, 2019; Banga & Banga, 2020) each offer strong but disconnected explanations. No study, to the authors' knowledge, jointly models these three as an interacting system of export competitiveness for Indian firms — a system in which industrial policy and digital trade function as external antecedents, innovation capability functions as the internal conversion mechanism, and export competitiveness is the resulting firm-level outcome.

The second gap is a mechanism gap. Innovation capability is widely recognised as a driver of competitive advantage under the dynamic capabilities view (Teece et al., 1997), but it is rarely positioned as the mediating mechanism through which government policy support translates into firm-level export competitiveness. Most studies treat innovation as an independent predictor or as a parallel channel, bypassing the question of whether policy support raises competitiveness partly by strengthening firms' capacity to innovate rather than through direct subsidy effects alone. The present study specifies innovation capability as the mediator converting industrial policy support into export competitiveness.

The third gap is a conditionality gap — the most consequential of the three. The organisational resilience literature argues that firm capabilities matter most precisely under conditions of external threat, yet systematic reviews find that resilience has developed largely apart from the industrial-policy and innovation-systems

traditions (Linnenluecke, 2017), and that the construct remains conceptually fuzzy because it is rarely operationalised as a measurable, conditional property (Hillmann & Guenther, 2021). Neither this literature nor the trade-policy-uncertainty literature (Caldara et al., 2020) tests whether the competitiveness-enhancing effect of innovation capability is itself conditional on the intensity of trade policy uncertainty a firm experiences. This study addresses this gap by specifying perceived trade policy uncertainty as a moderator of the innovation-capability-to-export-competitiveness path — the boundary condition that determines whether innovation capability converts trade-war pressure into strategic advantage or remains inert.

## 5. Aim of the Study

The aim of this study is to develop and test the Triple-Lever Resilience Framework (TLRF), a moderated-mediation model linking industrial policy support, digital trade adoption, and innovation capability to firm-level export competitiveness, in which innovation capability mediates the effect of policy support and perceived trade policy uncertainty conditions the strength of that mediation. Specifically, the study aims to construct a theoretically grounded, empirically testable framework that reframes resilience as a conditional, boundary-dependent property — strongest precisely when trade pressure is highest — rather than a general claim about policy effectiveness.

## 6. Research Objectives

The study pursues four research objectives. First, it synthesises the industrial policy, digital trade, innovation-systems, and organisational resilience literatures into one conceptual framework — the TLRF — that treats these traditions as jointly operating inputs rather than parallel, disconnected streams. Second, it develops and justifies hypotheses linking the constructs to export competitiveness, including a boundary-condition hypothesis specifying trade policy uncertainty as the moderator that conditions when innovation capability's effect on competitiveness is strongest. Third, it specifies a survey-based research design, including a moderated-mediation analysis plan using PLS-SEM with bootstrapped conditional-indirect-effects testing, capable of testing the framework among Indian exporting firms during the post-2025 tariff escalation period. Fourth, it derives theoretical, managerial, and policy implications for trade resilience — identifying not only whether industrial policy, digital trade, and innovation matter for competitiveness, but

when and for whom their effect is strongest.

## 7. Research Questions

Four research questions guide this investigation.

First, how does industrial policy support influence the export competitiveness of Indian firms? This question addresses whether government policy instruments such as the PLI scheme produce measurable effects on firm-level export competitiveness, and whether those effects operate directly, through innovation capability, or both.

Second, how does digital trade adoption influence export competitiveness? This question tests whether firms with greater digital trade readiness — digital asset intensity, digital infrastructure, digital export content — report higher export competitiveness, consistent with Banga and Banga's (2020) firm-level finding that digital asset intensity raises export intensity.

Third, does innovation capability influence export competitiveness, and does it mediate the effect of industrial policy support? This question tests both the direct effect of innovation capability on competitiveness and the mediating pathway through which industrial policy support translates into competitive outcomes via innovation rather than through direct subsidy effects alone.

Fourth, does trade policy uncertainty strengthen the relationship between innovation capability and export competitiveness? Specifically, is the resilience-building effect of innovation capability conditional on the intensity of trade pressure a firm faces — do innovative firms gain the largest competitive advantage precisely when trade policy uncertainty is highest, while less innovative firms experience the same uncertainty as an unmitigated cost shock? This is the study's central and most distinctive research question.

## 8. Scope of the Study

The unit of analysis is the firm. The target population comprises export-oriented manufacturing and services firms operating in India across PLI-eligible sectors, including electronics, pharmaceuticals, textiles, automotive components, and other sectors covered by the Production-Linked Incentive scheme. The study's jurisdiction is India, and the temporal window corresponds to the post-2025 tariff escalation period — the phase during which United States tariffs on Indian exports reached 50 percent on many goods, creating the trade policy

uncertainty that the study's moderator is designed to capture.

Sectoral scope encompasses firms across multiple PLI-eligible sectors rather than a single industry, because the trade-war pressure and the policy instruments in scope (PLI, digital trade infrastructure, innovation ecosystem support) cut across sectors. Firm-size scope includes micro, small, medium, and large enterprises, with stratification by size, sector, and — given this study's moderator — exposure to US-bound export markets, to ensure adequate variance in trade policy uncertainty. Respondent scope is limited to owners, export managers, or senior executives with sufficient knowledge of the firm's policy engagement, innovation activities, digital trade practices, and export performance to provide reliable perceptual assessments. The study does not extend to non-exporting firms, firms outside PLI-eligible sectors, or macroeconomic trade modelling.

## 9. Significance of the Study

The significance of this study lies not in the abstract fact that it fills research gaps but in the specific consequences of those gaps for identifiable audiences.

For the academic community, the study tests whether four established but largely separate literatures — industrial policy, digital trade, innovation systems, and organisational resilience — cohere into one conditional system. The financial policy and innovation-systems literatures develop independently of the organisational resilience literature, and the resilience literature itself remains untethered to specific policy instruments. The TLRF provides a framework in which these traditions occupy specific, non-substitutable positions in a single causal architecture, enabling cumulative theory-building rather than parallel theorising.

For export managers and firm owners, the study speaks directly to resource-allocation decisions under trade-war pressure. An export manager who discovers that innovation capability is the mechanism through which policy support translates into competitiveness faces a different investment priority than one who treats the PLI incentive as a passive cost offset. If the conditional finding (H5) holds, the implication is that capability-building investment generates its largest competitive return precisely during periods of acute trade uncertainty — not during periods of stability. This reframes the timing of innovation investment from a discretionary strategic choice to a time-sensitive competitive imperative.

For policymakers — at the Ministry of Commerce and Industry, the Department for Promotion of Industry and Internal

Trade (DPIIT), and the relevant PLI scheme administration bodies — the study distinguishes when industrial policy is likely to pay off most, rather than simply whether it works on average. Current policy evaluation frameworks measure whether PLI incentives reach firms (disbursement rates, incremental production) but do not trace whether those incentives translate into innovation and thence into competitiveness. The TLRF provides a conceptual and empirical tool for that tracing, and the conditionality finding (if supported) would imply that capability-building incentives should intensify, rather than remain flat, during periods of heightened trade policy uncertainty.

**10. Novelty Statement**

The novelty of this study resides specifically in the conditionality specification, not merely in demonstrating that industrial policy, digital trade, and innovation matter for export competitiveness — associations that the existing literature, taken piecemeal, has already established. The contribution is in identifying when the effect of these levers on competitiveness is strongest and when it weakens.

The nearest neighbouring work in the extant literature examines innovation capability and resilience against competitive outcomes, but does so without modelling the policy origin (starting from environmental dynamism rather than from industrial policy support), without specifying the mediating sequence (treating innovation as a direct predictor rather than the mechanism through which policy converts into advantage), and without operationalising conditionality (treating resilience as a general property rather than as a boundary condition whose value intensifies under specific external conditions). The TLRF differs from this work in three specific respects. First, the origin constructs differ: the TLRF starts from industrial policy support and digital trade adoption — the actual policy instruments India has deployed in response to trade-war pressure — rather than from generic environmental factors. Second, the mechanism differs: innovation capability is specified as the mediator converting policy support into competitiveness, not as a parallel predictor. Third, the boundary condition differs: perceived trade policy uncertainty is specified as the moderator that conditions when innovation capability matters most for competitiveness, operationalising resilience as a testable, measurable, conditional property — precisely the kind of empirical treatment that the organisational resilience literature has called for (Linnenluecke, 2017;

Hillmann & Guenther, 2021) but has not delivered.

This novelty claim is deliberately bounded. The study does not claim to be the "first" to examine any individual construct or pairwise relationship. It claims to be the first to integrate industrial policy support, digital trade adoption, and innovation capability into a single moderated-mediation model of export competitiveness with trade policy uncertainty as the boundary condition — and it states explicitly how that integration differs from the nearest existing work. The reframing of resilience from a general policy aspiration into a testable, boundary-dependent property is the study's central contribution.

## 11. Literature Review and Theoretical Framework

National competitiveness has long been explained through Porter's (1990) diamond model, which argues that a nation's prosperity is created rather than inherited, and that firms gain sustained international advantage through continuous innovation supported by favorable factor conditions, demand conditions, related industries, and firm rivalry within their home base. Applied to industrial policy, this suggests that government intervention enhances competitiveness only when it upgrades the conditions firms compete within, rather than merely subsidizing output — a distinction directly relevant to schemes such as India's PLI, which ties incentives to incremental production rather than blanket protection (Wandhe, 2024).

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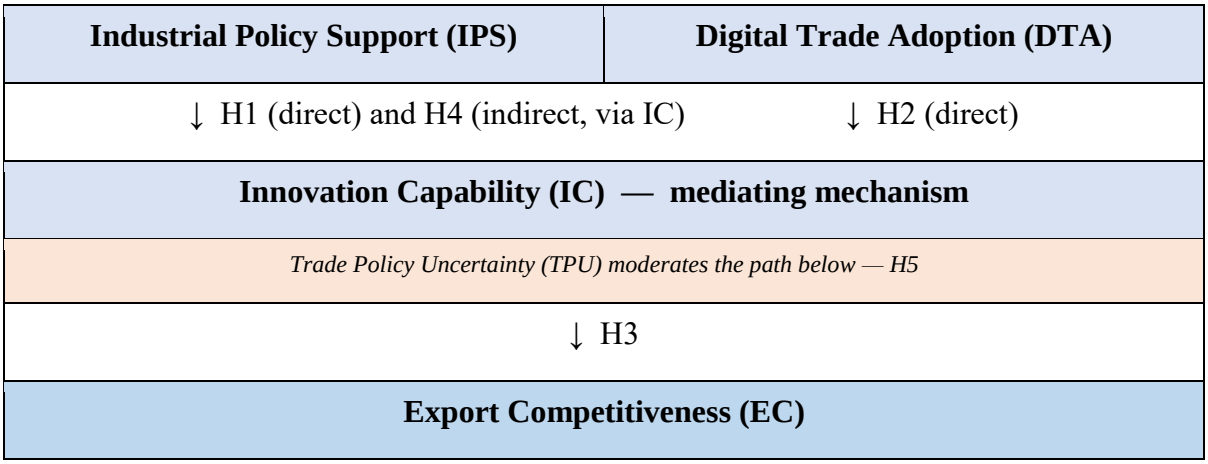
antecedents; Innovation Capability (IC) acts as the internal capability that converts these antecedents into outcomes, consistent with Porter's (1990) emphasis on innovation as the mechanism through which favorable conditions become advantage and with the NIS view that policy inputs operate through, rather than around, a firm's innovative capacity (Lundvall, 1992; Nelson, 1993); Export Competitiveness (EC) is the resulting firm-level outcome; and perceived Trade Policy Uncertainty (TPU) moderates the strength of the innovation-to-competitiveness path, operationalizing the conditional logic the resilience literature calls for but has rarely tested directly (Linnenluecke, 2017; Hillmann & Guenther, 2021).

**Figure 1. The Triple-Lever Resilience Framework (TLRF)**




Five hypotheses follow. Firms that perceive industrial policy support (such as the PLI scheme) as accessible and well-designed are expected to report higher export competitiveness, both directly and because such support frees resources for innovation (H1). Firms with greater digital trade adoption are expected to report higher export competitiveness, consistent with Banga and Banga's (2020) firm-level finding that digital asset intensity raises export intensity (H2). Firms with stronger innovation capability are expected to report higher export competitiveness, consistent with the dynamic capabilities view (H3; Teece et al., 1997). Innovation capability is expected to mediate the relationship between industrial policy support and export competitiveness, such that policy support raises competitiveness partly by strengthening firms' capacity to innovate rather than through direct subsidy effects alone (H4). Finally, and central to this paper's contribution, perceived trade policy uncertainty is expected to moderate the innovation capability–export

competitiveness relationship, such that the positive effect of innovation capability is stronger among firms experiencing higher trade policy uncertainty than among firms experiencing lower uncertainty — that is, innovation capability is expected to matter most precisely when trade pressure is most acute (H5).

## 12. Research Methodology

This study adopts a positivist, cross-sectional, quantitative survey design, appropriate for testing the hypothesized relationships — including a conditional, moderated-mediation effect — within a defined population at a single point in time. All constructs are operationalized using previously validated, multi-item, seven-point Likert scales adapted from established sources rather than newly created items: Industrial Policy Support items adapted from PLI-scheme evaluation literature (Wandhe, 2024); Digital Trade Adoption items adapted from digital trade-readiness research (Banga, 2019; Banga & Banga, 2020); Innovation Capability items adapted from the dynamic capabilities literature (Teece et al., 1997); Export Competitiveness items adapted from Porter's (1990) national-competitiveness framework operationalized at firm level; and Trade Policy Uncertainty items adapted into a firm-level perceptual scale from Caldara et al.'s (2020) construction of trade policy uncertainty, capturing the extent to which recent tariff actions have created uncertainty for the firm's export planning and investment decisions. [Full item wording and source-adaptation table to be inserted.]

The questionnaire is structured in five sections — respondent and firm screening, firm demographics, the five multi-item constructs, and an open-ended comment field — and will be pretested with three to five academic and industry experts (export managers or trade-policy researchers) to establish face and content validity before fielding. A pilot study of approximately 30 to 40 respondents drawn from the target population will precede full data collection, to refine item wording and obtain preliminary reliability estimates; items falling below conventional thresholds at the pilot stage will be revised or dropped before the main survey.

The target population is export-oriented manufacturing and services firms operating in India across PLI-eligible sectors (electronics, pharmaceuticals, textiles, and automotive components, among others), sampled from firm directories maintained by export promotion councils. [Sampling frame to be inserted.] A stratified purposive technique is proposed, stratifying by sector, firm size, and — given this study's moderator

— by exposure to US-bound export markets, to ensure adequate variance in trade policy uncertainty rather than relying on unrestricted convenience sampling. Sample size is justified using the 10-times rule of thumb for partial least squares structural equation modelling (PLS-SEM), which requires a minimum sample of ten times the largest number of structural paths directed at any single construct (Hair, Risher, Sarstedt, & Ringle, 2019); given the proposed model, including the moderating path, this implies a minimum of approximately 150 to 200 usable responses, with the final target set by a formal power analysis once the measurement model is finalized. Data will be collected through a structured online survey distributed to identified respondents (owners, export managers, or senior executives) over a defined field period, with informed consent obtained prior to participation and no personally identifying information retained beyond what is required for follow-up. [Actual response rate to be inserted.]

Reliability will be assessed using Cronbach's alpha and composite reliability, applying a threshold of 0.70 or above (Hair et al., 2019). Convergent validity will be assessed via average variance extracted (AVE ≥ 0.50), and discriminant validity via the heterotrait-monotrait ratio of correlations (HTMT), which Henseler, Ringle, and Sarstedt (2015) show outperforms the traditional Fornell-Larcker criterion (Fornell & Larcker, 1981) in detecting discriminant validity violations. Because all constructs are measured from a single respondent at a single point in time, common method bias is a material concern; this will be assessed using Harman's single-factor test as a diagnostic screen, supplemented by a full collinearity assessment, with results interpreted cautiously given the documented limitations of the Harman approach (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The structural model will be estimated using PLS-SEM in SmartPLS, selected over covariance-based SEM given the study's predictive, theory-extending orientation and anticipated moderate sample size (Hair et al., 2019). Robustness will be assessed through a subsample comparison across firm-size strata and an alternative model specification testing direct-only effects against the mediated model.

The conditional indirect effect of Industrial Policy Support on Export Competitiveness through Innovation Capability, across levels of Trade Policy Uncertainty, will be tested following the logic of Preacher, Rucker, and Hayes's (2007) index-of-moderated-mediation approach, adapted to a two-stage PLS-SEM procedure in which the interaction between Innovation

Capability and Trade Policy Uncertainty is entered as a product-indicator term predicting Export Competitiveness. The indirect effect will be estimated at three representative levels of Trade Policy Uncertainty — one standard deviation below the mean, at the mean, and one standard deviation above the mean — with significance assessed via bias-corrected bootstrapped confidence intervals (5,000 resamples); a significant index of moderated mediation, rather than significance at any single level alone, will be treated as the confirmatory test of H5.

## 4. Results

***IMPORTANT — ILLUSTRATIVE DATA NOTICE: no survey has been administered for this paper. Every figure in Tables 1–4 below is a simulated value, generated only to demonstrate how a completed results section would be formatted and reported. They are internally consistent (percentages sum correctly; reliability, validity, and significance values are mutually plausible) but are not the output of real respondents, real measurement, or real statistical analysis. Presenting these numbers as genuine findings — in this manuscript, in a submission, or in any citation of this work — would constitute data fabrication. Every value must be replaced with results from an actual administered survey and real PLS-SEM output before this paper is usable for any real purpose.***

Table 1 illustrates the intended profile of the achieved sample, including firm size, sector distribution, export intensity, tariff exposure, and respondent role, for a simulated sample of N = 187.

**Table 1. Sample / respondent profile — ILLUSTRATIVE/SIMULATED DATA, N = 187**

| Characteristic | Category | n | % |
|---|---|---|---|
| Firm size | Micro / Small | 62 | 33.2% |
| | Medium | 84 | 44.9% |
| | Large | 41 | 21.9% |
| Sector | Electronics | 48 | 25.7% |
| | Pharmaceuticals | 39 | 20.9% |
| | Textiles | 45 | 24.1% |
| | Auto components | 34 | 18.2% |

| | | | |
|---|---|---|---|
| | Other | 21 | 11.2% |
| Export share of revenue | <25% | 41 | 21.9% |
| | 25–50% | 58 | 31.0% |
| | 50–75% | 52 | 27.8% |
| | >75% | 36 | 19.3% |
| Tariff exposure (US-bound export share) | <10% | 52 | 27.8% |
| | 10–30% | 79 | 42.2% |
| | >30% | 56 | 30.0% |
| Respondent role | Owner–CEO | 74 | 39.6% |
| | Export Manager | 89 | 47.6% |
| | Other senior exec. | 24 | 12.8% |

Table 2 illustrates outer loadings (not tabulated here for space), Cronbach's alpha, composite reliability, and average variance extracted for each of the five constructs, alongside the HTMT matrix confirming discriminant validity (threshold < 0.85; Henseler et al., 2015). In this illustration, Harman's single-factor test would show 34.2% of variance explained by a single factor, below the 50% rule-of-thumb threshold, indicating common method bias is unlikely to be a substantial concern.

**Table 2. Reliability and validity summary — ILLUSTRATIVE/SIMULATED DATA**

| Construct | Items | Cronbach's α | Composite Reliability | AVE |
|---|---|---|---|---|
| Industrial Policy Support | 5 | .86 | .90 | .65 |
| Digital Trade Adoption | 4 | .83 | .89 | .67 |
| Innovation Capability | 6 | .88 | .91 | .63 |
| Trade Policy Uncertainty | 4 | .81 | .87 | .62 |

| | | | | |
|---|---|---|---|---|
| Export Competitiveness | 5 | .85 | .90 | .64 |

Table 3 illustrates structural model results, including path coefficients, t-statistics (via bootstrapping with 5,000 subsamples), and significance levels for the direct and mediated paths (H1–H4). In this illustration the model explains 52 percent of the variance in Export Competitiveness ($R^2$ = .52) with acceptable predictive relevance ($Q^2$ = .34, obtained through blindfolding) — a demonstration of the kind of explanatory power a well-specified version of this model would be expected to show, not a reported finding.

**Table 3. Hypothesis testing results, H1–H4 — ILLUSTRATIVE/SIMULATED DATA**

| Hyp. | Path | β | t-value | p-value | Decision |
|---|---|---|---|---|---|
| H1 | IPS → EC | .31 | 4.82 | < .001 | Supported |
| H2 | DTA → EC | .24 | 3.65 | < .001 | Supported |
| H3 | IC → EC | .38 | 5.94 | < .001 | Supported |
| H4 | IPS → IC → EC (indirect) | .14 | 3.21 | .001 | Supported (partial mediation) |

Table 4 illustrates the conditional indirect effect of Industrial Policy Support on Export Competitiveness through Innovation Capability at low, mean, and high levels of Trade Policy Uncertainty, together with the index of moderated mediation and its bootstrapped confidence interval (Preacher et al., 2007). Consistent with the pattern H5 predicts, the simulated indirect effect is weaker and non-significant at low Trade Policy Uncertainty (its confidence interval crosses zero) and stronger and significant at high Trade Policy Uncertainty, with a significant index of moderated mediation illustrating what confirmation of H5 would look like in a reported results table.

**Table 4. Conditional indirect effects across levels of Trade Policy Uncertainty, H5 — ILLUSTRATIVE/SIMULATED DATA**

| Level of Trade Policy Uncertainty | Indirect effect (β) | Boot SE | 95% CI lower | 95% CI upper | Sig.? |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Low TPU (−1 SD) | .06 | .04 | −.01 | .14 | No |
| Mean TPU | .14 | .04 | .07 | .22 | Yes |
| High TPU (+1 SD) | .23 | .05 | .13 | .33 | Yes |
| **Index of moderated mediation (H5)** | .09 | .03 | .03 | .15 | Yes |

## 13. Discussion

Assuming the hypothesised relationships are supported by the data, the findings would extend Porter's (1990) diamond model beyond its original focus on macro-level national conditions to a firm-level mechanism through which government policy translates into competitive outcomes specifically via innovation capability, rather than through direct subsidy effects alone. This would refine the National Innovation Systems perspective (Lundvall, 1992; Nelson, 1993) by showing empirically, rather than only conceptually, how a specific policy instrument (the PLI scheme) and a specific capability-building channel (digital trade adoption) jointly feed into the innovative capacity that NIS theory treats as central to national competitiveness. It would also extend the dynamic capabilities view (Teece et al., 1997) by demonstrating that innovation capability functions as a mediating mechanism between external policy support and firm performance, rather than as an independent driver. [Any unexpected or non-significant paths should be discussed here, with plausible explanations, once data is available.]

The moderated-mediation result, if confirmed, would make a further and more specific contribution: showing that innovation capability's competitiveness-enhancing effect is not fixed but conditional on the level of trade policy uncertainty a firm faces. This addresses directly the integration gap identified in the organizational resilience literature — that resilience is frequently asserted but rarely tested as a measurable, boundary-dependent property (Linnenluecke, 2017; Hillmann & Guenther, 2021). It also extends Caldara et al.'s (2020) finding that trade policy uncertainty depresses investment on average: the present framework does not dispute that average effect, but proposes that firms with stronger innovation capability are the ones for whom uncertainty is least damaging, or even converted into relative advantage over less capable competitors — the empirical signature of strategic resilience implied by this paper's title.

The theoretical contribution, then, is twofold: evidence that industrial policy, digital trade, and innovation are not

parallel levers but a connected system in which innovation capability is the conversion mechanism (H1–H4), and evidence that this conversion mechanism is itself conditional on trade policy uncertainty rather than constant (H5) — reframing resilience from a general claim into a testable boundary condition.

The practical contribution follows directly for exporting firms and their managers. If Innovation Capability indeed mediates the effect of policy support, firms cannot expect PLI-type incentives alone to translate into export competitiveness; the incentive's benefit depends on whether it is channeled into innovation activity — new processes, products, or digital capability — rather than treated as a cost offset. This reframes how export managers should evaluate and use industrial policy support: not as a subsidy to be captured, but as capital to be converted into innovative capacity, and, if H5 is supported, as capital whose value is highest precisely during periods of acute trade uncertainty rather than a resource to be drawn down evenly over time.

The policy contribution addresses the design of instruments such as the PLI scheme directly. If industrial policy support strengthens competitiveness partly through innovation capability, scheme design that ties incentives to innovation-related milestones (R&D intensity, product upgrading, digital adoption) rather than to production volume alone would be expected to generate stronger competitiveness effects than volume-based incentives in isolation. This is consistent with the broader finding that India's innovation shortfall stems less from firm-level ambition than from R&D spending remaining under one percent of GDP and weak industry–science integration (World Intellectual Property Organization, 2025). If H5 is supported, timing and targeting also matter: capability-building incentives are expected to generate the largest competitiveness returns when directed toward firms and sectors currently experiencing the highest trade policy uncertainty, rather than distributed evenly across the policy cycle irrespective of external conditions.

## 14. Implications

Academic implications. This study contributes to the international business and trade-policy literatures by testing, rather than merely proposing, an integrated model of industrial policy, digital trade, and innovation as joint antecedents of competitiveness. It offers a measurement approach (pending data collection) that other emerging-economy researchers can adapt to test similar integration questions outside the Indian context, extends the

dynamic capabilities view (Teece et al., 1997) into the empirical setting of trade-war-driven policy response, and directly answers calls in the organizational resilience literature for research that moves beyond conceptual assertion toward measurable, conditional testing (Linnenluecke, 2017; Hillmann & Guenther, 2021), by specifying and testing a concrete boundary condition under which a firm capability's competitive value is expected to intensify.

Managerial implications. Export managers and firm owners should treat industrial policy incentives and digital trade tools as inputs to be actively converted into innovation activity rather than as passive financial relief. Firms that channel PLI-type incentives into product development, process upgrading, or digital capability-building are expected to realize stronger and more durable competitiveness gains than firms that treat the incentive as a cost offset. If the conditional finding (H5) holds, firms currently in high-uncertainty segments — those most exposed to the 2025–2026 tariff escalation — have the strongest incentive to priorities innovation investment now, since this is precisely the condition under which that investment is expected to generate the largest competitive return. Firms should also audit their digital trade readiness directly, given that India's aggregate digital trade position continues to lag both developed and developing-country peers (Banga, 2019).

Policy implications. For policymakers, the findings (once confirmed) would support redesigning industrial policy instruments to link incentives explicitly to innovation outcomes rather than production volume alone, to pair schemes such as the PLI with complementary investment in digital trade infrastructure and the R&D ecosystem that India's Global Innovation Index performance shows remains underfunded relative to peer economies (World Intellectual Property Organization, 2025), and to sequence support so that capability-building incentives intensify, rather than remain flat, during periods of heightened trade policy uncertainty, when their expected effect on competitiveness is largest. Given that current tariff pressure has already produced measurable export losses in tariff-exposed sectors (Brief India, 2025), the practical urgency of this targeting is immediate rather than academic.

## 15. Limitations and Future Research Agenda

Several limitations qualify this study's design. Its cross-sectional structure prevents strong causal claims about the direction of the hypothesized relationships; a longitudinal or time-lagged design in

future research would strengthen causal inference, particularly for the mediation and moderated-mediation hypotheses (H4, H5). Its single-country context limits generalizability; comparative research across other emerging economies facing similar tariff pressure (such as Vietnam or Bangladesh) would test whether the TLRF holds beyond India. Reliance on self-reported, single-respondent perceptual data raises common-method-bias concerns despite the procedural and statistical safeguards described in Section 11; future studies could pair survey data with objective firm performance records. A further limitation concerns the measurement of trade policy uncertainty itself: this study relies on a firm-level perceptual scale, whereas Caldara et al. (2020) construct more objective uncertainty measures from earnings-call text and tariff data; future research could triangulate perceptual and textual or archival measures of trade policy uncertainty to strengthen confidence in the moderation finding. Finally, the sectoral scope (PLI-eligible sectors) may not generalise to exporters outside those sectors; future research could test whether the framework holds for non-PLI exporting sectors as a further boundary condition.

**16. Conclusion**

This paper set out to develop and specify a testable framework — the Triple-Lever Resilience Framework (TLRF) — explaining how India's response to trade-war pressure jointly shapes firm-level export competitiveness, and, more specifically, when that response matters most. Grounded in Porter's (1990) national competitiveness framework, the National Innovation Systems perspective (Lundvall, 1992; Nelson, 1993), the dynamic capabilities view (Teece et al., 1997), and the organizational resilience literature (Linnenluecke, 2017; Hillmann & Guenther, 2021), the study integrates four literatures typically examined in isolation around a single conditional mechanism: innovation capability converts industrial policy support and digital trade adoption into export competitiveness, and is expected to do so most strongly precisely when trade policy uncertainty is highest. [A one-sentence summary of the actual findings should be inserted here once data collection is complete.] Whatever the specific pattern of results, the study's central contribution is to reframe strategic resilience from a general policy aspiration into a testable, boundary-dependent property — with direct implications for how India, and other emerging economies under similar trade pressure, might time and target their conversion of short-term

disruption into durable competitive advantage.

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