

**THE IMPACT OF PREDETERMINED AND EMERGENT SUPPLY CHAIN
STRATEGIES ON STARTUP E-COMMERCE FIRMS**

ABSTRACT

This study examines the impact of predetermined and emergent supply chain management (SCM) strategies on the performance of startup e-commerce firms. While prior research has extensively explored supply chain strategy in established organizations, limited empirical work has examined how startups navigate strategic trade-offs between planning and adaptability under uncertainty. Drawing on strategy formation theory (deliberate vs. emergent) and the dynamic capabilities perspective, this research investigates how different SCM approaches influence key performance outcomes, including order volume and revenue (GMV).

A mixed-methods research design was employed. Phase 1 utilized a survey of e-commerce supply chain professionals to test hypothesized relationships using regression analysis, incorporating measures of predetermined strategy, emergent strategy, environmental uncertainty, and strategic ambidexterity. Phase 2 adopted a multiple-case study approach, using semi-structured interviews with executives across four startup firms to develop theory through within-case and cross-case analysis grounded in replication logic.

Quantitative results indicate that supply chain strategy alone is not a primary driver of revenue performance. Instead, firm age and product assortment expansion emerged as the strongest predictors of both order volume and GMV. Predetermined strategy demonstrated a positive but only marginal relationship with operational scale (order volume), whereas emergent strategy showed no significant direct effect on performance outcomes. Measures of strategic ambidexterity were not statistically

significant predictors. Overall, support for the superiority of a predetermined strategy was partial, while an emergent strategy was not supported as a primary performance driver.

Qualitative findings provide deeper insight into these results, revealing that predetermined strategies enable operational scaling through standardization and infrastructure development, whereas emergent strategies function as adaptive mechanisms in response to environmental uncertainty. Importantly, cross-case analysis indicates that successful firms tend to exhibit strategic specialization rather than ambidexterity, and that operational scale serves as the primary pathway linking supply chain strategy to financial performance.

The study contributes to theory by reframing supply chain strategy as an enabler of operational scaling rather than a direct determinant of financial outcomes, and by introducing a sequential model that links strategy, scale, and performance. It further challenges the prevailing assumption that strategic ambidexterity is universally beneficial in startup contexts. From a managerial perspective, the findings suggest that startup leaders should prioritize deliberate supply chain planning to support scaling while selectively leveraging emergent strategies to navigate uncertainty.

BACKGROUND AND CONTEXT

Rapid expansion in the e-commerce sector has fundamentally altered how businesses operate, fostering a dynamic and highly competitive environment—one that is particularly conducive to the emergence of new companies (Ketchen & Craighead, 2020). For the purposes of this study, e-commerce refers to consumers purchasing retail goods

through electronic devices (e.g., computers, smartphones, tablets) and having those goods delivered directly to them. Emerging e-commerce companies profit from digital services that allow for quick market entry and broad customer access. However, they also face significant challenges in scaling operations, meeting customer expectations, and securing adequate financial resources (Chen & Nakata, 2015). As a result, supply chain management (SCM) plays a crucial role in such companies' success or failure by directly influencing their operational efficiency, customer satisfaction, and capacity for sustainable growth (Cortes et al., 2021). Unlike well-established companies with supply chains built over time, new e-commerce companies operate amid high uncertainty, investor pressure, and limited resources. Consequently, they require supply chain strategies that are tailored to their unique organizational circumstances and constraints (Pettit et al., 2013).

New companies' supply chain plans can generally be categorized into two strategy types: predetermined or emergent. In this study, predetermined strategies are those developed through deliberate, formal planning processes, drawing on industry best practices and team members' prior experience to optimize efficiency and reduce operational costs. Such strategies emphasize stability, predictability, long-term scalability, and operational efficiency, mitigating operational risk and bolstering investor confidence (Wolf & Floyd, 2017). In contrast, this study considers emergent strategies to be those characterized by adaptability and flexibility—those that evolve in response to real-time market feedback, operational challenges, limited team experience, and broader economic uncertainty. This approach prioritizes innovation and rapid responsiveness,

enabling startups to pivot quickly in volatile and unpredictable environments (Ketchen & Craighead, 2020).

The link between these two strategy types and their effect on the performance of new companies—measured in terms of order numbers, income, venture capital acquisition, and long-term organizational sustainability—has not been sufficiently well explored in the literature.

The evolving nature of e-commerce makes SCM even more difficult for new companies. Sudden improvements in technology, rapid shifts in customer expectations, and increasingly complex fulfillment models compel new companies to constantly re-evaluate and adjust their supply chain plans (Wagner, 2021). For example, omnichannel distribution, innovative last-mile delivery solutions, and data-driven inventory-management systems are reshaping how startups design and implement their supply chain operations (Wagner, 2021).

Additionally, the need to demonstrate scalability and operational reliability to potential investors introduces another level of complexity to strategic choices (Bode & Wagner, 2015). Therefore, a precise understanding of how predetermined and emergent supply chain strategies work in e-commerce startups is necessary for both academic study and practical use.

Although a growing body of research demonstrates the importance of SCM to e-commerce success, this research mostly centers on established businesses and methods, such as Just-in-Time and Lean Manufacturing (Ganesan et al., 2009). While such methods work in stable industries, they often fail to account for the distinctive characteristics of startup e-commerce firms, including rapid scaling, high customer

expectations, data-driven decision-making, and the need to secure venture capital funding (Ramakrishna et al., 2025). This gap between standard supply chain strategies and the rapidly shifting realities of e-commerce startups constitutes a significant challenge for new businesses seeking to maximize order revenue and achieve ongoing growth (Cortes et al., 2021). To address this gap, this research proposes the following hypotheses:

HYPOTHESES

H1. Startup e-commerce firms that utilize a predetermined supply chain strategy are more successful with respect to revenue generation and order volume than e-commerce startup firms that utilize an emergent supply chain strategy.

H2. Startup e-commerce firms that utilize an emergent supply chain strategy are more successful with respect to revenue generation and order volume than e-commerce startup firms that utilize a predetermined supply chain strategy.

H3. Startup e-commerce firms that utilize a combination of predetermined and emergent supply chain strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize a predetermined supply chain strategy.

H4. Startup e-commerce firms that utilize a combination of predetermined and emergent supply chain strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize an emergent supply chain strategy.

H5. Startup e-commerce firms that do not employ any SCM strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize an SCM strategy.

A REVIEW OF THE EXISTING LITERATURE

A review of the existing literature revealed that SCM is a key factor in startup success, affecting customer satisfaction, operational performance, competitive positioning, and, ultimately, firm survival (Sofiah et al., 2022; Wagner, 2021). Supply chain capabilities influence several areas of performance, including order growth, profitability, and venture capital acquisition (Anjum et al., 2022; Wagner et al., 2024). For startups with limited resources operating in competitive markets, an effective supply chain strategy is not merely optimal—it's essential (Purnomo et al., 2023; Valente et al., 2018).

The distinction between predetermined and emergent strategies provides a useful framework through which to examine supply chain approaches in e-commerce startups (Sebastiao & Golicic, 2008; Wagner, 2021). Predetermined strategies, which emphasize systematic planning, standardization, and efficiency, perform well in stable, predictable settings (Ghezzi et al., 2012; Nwani et al., 2024). They allow for better cost performance, greater service consistency, and the ability to straightforwardly scale operations when environmental conditions allow (Lee et al., 2001; Sofiah et al., 2022).

Meanwhile, emergent strategies, which emphasize the ability to change, test, and adapt, tend to perform well in uncertain, rapidly changing environments in which

learning and quick reactions create more value than efficiency (Babayev, 2024; Hong et al., 2023). These strategies facilitate quick responses to market changes, novel ideas in supply chain practice, and adaptation to evolving business models (Saleeshya & Rahul, 2023; Valente et al., 2018). Especially at the outset, as companies are proving their worth and assessing what the market has to offer, approaches that evolve as circumstances demand are very helpful (Hong et al., 2023; Zimmermann et al., 2020).

However, the review also shows that this distinction is somewhat reductive (Sebastiao & Golicic, 2008; Wagner, 2021). In practice, successful startups tend to adopt a blend of the two approaches, demonstrating strategic ambidexterity (Valente et al., 2018; Wagner et al., 2024). This hybrid approach enables them to operate efficiently while remaining adaptable (Hong et al., 2023; Yin et al., 2024).

Several consistent success factors emerged across both approaches (Anjum et al., 2022; Ocicka et al., 2016). A strong customer focus—designing supply chains around service quality—is critical (Luo, 2023; Sofiah et al., 2022). Data-driven decision-making supports forecasting, optimization, and adaptation (Bao, 2025; Wang et al., 2018). Working with suppliers and logistics companies helps with both efficiency and flexibility (Zaremba et al., 2017). Moreover, resilience and risk management enable firms to maintain performance during disruptions (Babayev, 2024; Zimmermann et al., 2020).

Digital transformation also plays a key role in supply chain performance (Bao, 2025; Yin et al., 2024). Technologies like automation, analytics, and digital platforms can bolster firms' efficiency, responsiveness, and scalability (Mikhaylyk et al., 2019; Setiadi et al., 2024). However, adopting technology requires a strategy that is aligned with the

business and its circumstances, the ability to implement the technology, and investment at the right time (Popkova et al., 2021; Wagner, 2021).

The review also highlighted several important gaps in the literature (Purnomo et al., 2023; Wagner, 2021). Longitudinal studies tracking strategy development over time would improve the general understanding of dynamic processes among e-commerce startups (Valente et al., 2018; Wagner et al., 2024). Large-scale quantitative studies on the relationship between strategy and performance would strengthen the evidence base (Anjum et al., 2022; Yin et al., 2024). Finally, research comparing strategies across different contexts would clarify how the optimal strategy varies by situation (Ghezzi et al., 2012; Hong et al., 2023).

Methodological challenges (e.g., data access, survivor bias, measurement issues) remain an important concern (Purnomo et al., 2023; Wagner, 2021). Overcoming these challenges requires innovative research methods, co-operation with industry, and funding for the development of better measurement methods (Ocicka et al., 2016; Wagner et al., 2024). Mixed-methods research—studies that use both qualitative and quantitative methods—could provide a more comprehensive understanding of such complex matters (Hong et al., 2023; Valente et al., 2018).

The results of the review also have implications for entrepreneurs and investors, as they provide important indicators of startup quality and performance (Wagner, 2021; Wagner et al., 2024). The use of these indicators to assess supply chain strategies, capabilities, and performance could inform investment decisions and provide support for companies in the portfolio (Reza-Gharehbagh et al., 2022). Investors should assess not

only current supply chain performance but also the dynamic capabilities to adapt and evolve (Hong et al., 2023; Valente et al., 2018).

SCM is a vital but often overlooked element of e-commerce startups' strategies (Purnomo et al., 2023; Wagner, 2021). Whether a predetermined or emergent approach is chosen—or, more realistically, the precise balance struck between them—greatly influences startup performance across many areas (Anjum et al., 2022; Valente et al., 2018). Successful e-commerce startups demonstrate strategic ambidexterity, balancing planned efficiency with adaptive flexibility and continually developing dynamic capabilities to sense, seize, and transform their opportunities and capabilities in response to shifting markets and organizational contexts (Hong et al., 2023; Wagner et al., 2024). This ambidextrous, dynamic approach to supply chain strategy is the most promising path forward for e-commerce startups seeking to achieve a sustainable competitive advantage and long-term success in increasingly complex and competitive digital markets (Luo, 2023; Wagner, 2021; Yin et al., 2024).

METHODS

A two-phase mixed-methods approach was adopted, consisting of quantitative survey analysis with qualitative interviews with firm executives. The Phase 1 quantitative analysis examined statistical relationships between supply chain strategy, environmental uncertainty, and firm performance outcomes, including order volume and GMV, while the Phase 2 qualitative case study provided deeper insight into how startups' supply chain leaders develop and implement these strategies in practice

Figure 1- Research Design (Mixed Methods Flow)

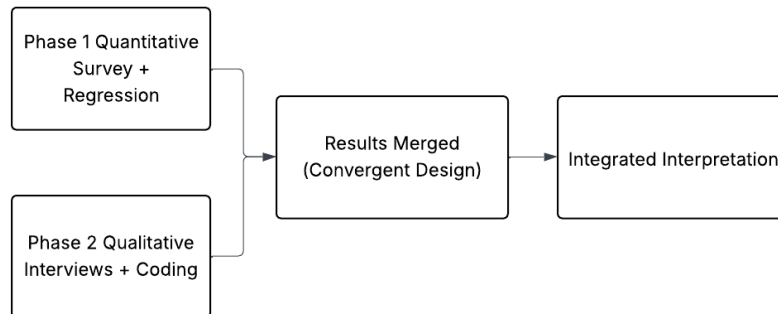
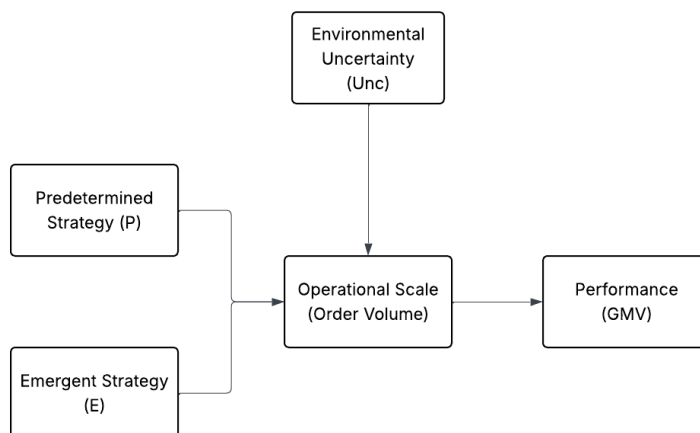


Figure 2- Conceptual Model



Phase 1 Quantitative Methods

Survey Deployment and Sample

Phase 1 involved a cross-sectional survey of e-commerce SCM professionals. The survey was distributed electronically via LinkedIn to approximately 3,000 individuals in

operations, logistics, and supply chain leadership roles at startup e-commerce firms.

Targeted respondents included founders, C-suite executives, vice presidents, directors, and senior managers responsible for supply chain decision-making.

Respondents were asked to report information on their firm's supply chain strategy, operational characteristics, and performance outcomes. Of the 3,000 individuals targeted, 704 opened the survey participation invitation. After screening for eligibility and removing incomplete responses, the final dataset used for statistical analysis included 102 valid responses, yielding a completed survey response rate of 14.51%.

Measurement of Constructs

Predetermined Supply Chain Strategy

A predetermined strategy in SCM reflects deliberate planning and structured decision-making processes. Consistent with the causation orientation developed by Chandler et al. (2011) and the deliberate strategy framework of Mintzberg and Waters (1985), this construct was measured using survey items assessing formal planning, forecasting-based decision-making, and structured governance processes.

Questions B1–B4 captured this construct along a seven-point Likert scale, with higher values indicating greater reliance on a predetermined supply chain strategy.

- B1 - We maintain a formal, written 12–24-month supply chain roadmap with milestones.

- B2 - Major supply chain initiatives (e.g., 3PL changes, WMS/TMS, network design) are fully planned before testing.
- B3 - We start with specific performance targets (e.g., OTIF, cost per order, returns) and develop plans to reach them.
- B4 - Deviation from the established plan requires formal approval and governance.

Emergent Supply Chain Strategy

Emergent strategy represents adaptive and experimental approaches to supply chain decision-making. This construct was also adapted from Chandler et al.'s (2011) causation/effectuation framework, as well as the emergent strategy theory proposed by Mintzberg and Waters (1985).

Questions C1–C4 measured respondents' reliance on experimentation, iterative learning, and opportunity-driven operational decisions.

- C1 - We pilot new fulfillment options (e.g., on-demand 3PL nodes, carrier programs) and scale what works.
- C2 - We prioritize small, reversible bets with limited downside.
- C3 - We revise targets as we learn from demand signals and operational feedback.
- C4 - Supply chain choices are opportunity-driven (e.g., pop-up node near a marathon expo or creator drop).

Environmental Uncertainty

Environmental uncertainty here refers to volatility in demand conditions, supplier reliability, competitive actions, and logistics network constraints. The construct was measured using questions E1–E3 adapted from prior research on supply chain strategy by Qi, Zhao, and Sheu (2011).

- E1 - Demand volatility in our category is high (volume and mix swing week-to-week).
- E2 – Competitors’ actions (e.g., pricing, drops, promotions) are unpredictable.
- E3 - Technology (e-commerce stack, WMS/TMS, marketplaces) changes rapidly, affecting operations.

As environmental uncertainty is conceptually multidimensional, the items were subjected to exploratory factor analysis (using principal axis factoring in SPSS) to validate the construct and generate a composite factor score.

Sampling adequacy and factor suitability were assessed using the Kaiser–Meyer–Olkin (KMO) statistic and Bartlett’s test of sphericity.

The results indicate that the data were appropriate for factor analysis. The KMO value was 0.715, suggesting acceptable sampling adequacy, while Bartlett’s test of sphericity was statistically significant ($p < 0.001$), confirming that the items were sufficiently correlated.

The analysis produced a single dominant factor explaining approximately 79.8% of the total variance, indicating that the uncertainty items represent a single underlying

construct. Factor scores generated by SPSS were retained and used as the “environmental uncertainty” variable in subsequent regression models.

Dependent Variables

Two dependent variables were used to capture firm performance.

- Gross merchandise value (GMV): Measure of revenue performance
- Order volume: Measure of operational scale, reflecting the firm’s ability to process and fulfill customer demand

Including both measures enabled the analysis to distinguish between revenue performance and operational throughput.

Control Variables

To account for structural differences across firms, several control variables were included:

- Firm age
- Product type
- Number of new stock-keeping units (SKUs) introduced in the past year
- Number of order channels used

These variables capture firm maturity, product complexity, and operational diversity, all of which may influence performance outcomes.

Regression Models

Multiple linear regression models were estimated in SPSS to examine the relationships between supply chain strategy and firm performance.

Two sets of regression models were estimated using GMV and order volume as dependent variables.

Baseline Model

The baseline regression model included only control variables:

$$Y_i = \beta_0 + \beta_1(FirmAge_i) + \beta_2(ProductType_i) + \beta_3(NewSKUs_i) + \beta_4(OrdersByChannel_i) + \epsilon_i$$

Where:

- Y_i represents firm performance (GMV or order volume)
- $FirmAge$ captures firm maturity
- $ProductType$ captures product category characteristics
- $NewSKUs$ measures product assortment expansion
- $OrdersByChannel$ reflects the diversity of order channels

Strategy Model

The second model introduced the primary explanatory variables representing supply chain strategy.

$$\begin{aligned}
Y_i = & \beta_0 + \beta_1(FirmAge_i) + \beta_2(ProductType_i) + \beta_3(NewSKUs_i) \\
& + \beta_4(OrdersByChannel_i) + \beta_5(ZP_i) + \beta_6(ZE_i) + \beta_7(Uncertainty_i) \\
& + \epsilon_i
\end{aligned}$$

Where:

- ZP_i is the predetermined supply chain strategy factor
- ZE_i is the emergent supply chain strategy factor
- $Uncertainty_i$ is the environmental uncertainty factor

These variables facilitated an evaluation of the independent effects of each strategy on firm performance.

Moderation Analysis

To determine whether environmental uncertainty moderates the relationship between strategy and firm performance, interaction terms were introduced:

$$\begin{aligned}
Y_i = & \beta_0 + \beta_1(FirmAge_i) + \beta_2(ProductType_i) + \beta_3(NewSKUs_i) \\
& + \beta_4(OrdersByChannel_i) + \beta_5(ZP_i) + \beta_6(ZE_i) + \beta_7(Uncertainty_i) \\
& + \beta_8(ZP_i \times Uncertainty_i) + \beta_9(ZE_i \times Uncertainty_i) + \epsilon_i
\end{aligned}$$

These interaction terms were entered into the regression models to test whether environmental uncertainty strengthens or weakens the relationship between strategy and firm performance.

Statistical Diagnostics

Several diagnostic tests were conducted to ensure model validity.

Multicollinearity

Variance inflation factor (VIF) values were examined for all predictors. All VIF values were below the commonly accepted threshold of 5, indicating no problematic multicollinearity.

Model Fit

Overall model significance was evaluated using F-statistics, while explanatory power was assessed using R^2 and adjusted R^2 values.

Analytical Approach to Hypothesis Testing

The hypotheses were evaluated by examining the relative magnitude and statistical significance of the regression coefficients for the predetermined and emergent strategy variables.

The following criteria were used: A hypothesis was considered supported when the relevant coefficient was statistically significant and aligned with the predicted direction.

Comparisons between strategies were evaluated using standardized beta coefficients and significance levels.

Phase 2 Qualitative Methods

In the second phase, a case study of four e-commerce startups was conducted to investigate differences between predetermined and emergent SCM strategies. Four companies were selected to represent the following criteria:

1. A firm with a predetermined SCM strategy that was successful in generating revenue, raising venture capital, or both.
2. A firm with an emergent SCM strategy that was successful in generating revenue, raising venture capital, or both.
3. A firm with a predetermined SCM strategy that was unsuccessful in generating revenue, raising venture capital, or both
4. A firm with an emergent SCM strategy that was unsuccessful in generating revenue, raising venture capital, or both.

Data-Collection Methods

Data were collected through eight semi-structured interviews (60–90 minutes) with key team management members. Participants included:

- Senior manager
- Director
- Senior director

- Vice president
- Senior vice president
- C-suite (CEO, COO, CMO, CSCO, and CFO)
- Founder or co-founder

The interviews focused on the following core topics:

- Strategy formulation (predetermined vs. emergent adaptation)
- Key decisions (roadmaps, pilots, and forecasting vs. experimentation)
- Performance outcomes (metrics and funding)
- Environmental conditions (volatility and funding climate)
- Reflections on failures (unsuccessful cases)

Interviews were audio-recorded, transcribed verbatim, and lightly edited for clarity without altering meaning. All procedures complied with Institutional Review Board requirements.

Qualitative Coding and Data Analysis

Data analysis followed an iterative and inductive qualitative approach to identify patterns in how supply chain strategies were developed and implemented among these startups in the e-commerce field. The analysis progressed through three primary stages:

1. Within-case analysis, in which each interview transcript was examined individually to develop a detailed understanding of the firm's strategic and operational context

2. Cross-case comparison, in which codes and emerging concepts were compared across interviews to identify recurring patterns, similarities, and contrasts between cases
3. Conceptual abstraction, in which first-order indicators derived from the interview data were progressively grouped into second-order concepts and, ultimately, into aggregate thematic dimensions

This approach was consistent with qualitative analysis techniques commonly used in management research, reflecting the Gioia methodology for building concepts inductively from qualitative data (Gioia et al., 2013).

Conceptual Foundation for Case Classification

This study adopted a qualitative, theory-building multiple-case design. Consistent with Wacker's (2004) theory of formal conceptual definitions, the objective of case selection and outcome classification was not to operationalize performance metrics *ex ante* but to ensure that empirical classification followed deductively from clearly specified conceptual constructs. This approach ensured that case categorization was theoretically driven, with empirical indicators treated as interpretive manifestations of—rather than substitutes for—underlying constructs.

In line with Eisenhardt (1989), cases were selected to enable theoretical insight rather than statistical generalization. Moreover, in line with Yin (2018), replication logic—rather than sampling logic—guided both case selection and cross-case

comparison. Wacker's framework reinforced this approach by providing the conceptual discipline necessary to ensure that this replication logic was grounded in construct validity rather than post hoc outcome labeling.

Case-Classification Dimensions

Firms were classified along two orthogonal dimensions:

1. SCM strategy
 - Predetermined
 - Emergent
2. Observed organizational outcome
 - Successful
 - Unsuccessful

Figure 3- Performance Matrix

	Predetermined SCM Strategy	Emergent SCM Strategy
Successful	Firm A Online Curated-Goods Retailer	Firm D Online Meal Kit Company
Unsuccessful	Firm B Online Specialty Media Retailer	Firm C Online Flash-Sale Marketplace

Strategy reflects differences in strategy-formation logic, not differences in performance or effectiveness. Organizational outcomes were classified retrospectively based on executive assessments triangulated with observable organizational evidence. Importantly, outcome classification was not based on researcher-imposed performance thresholds (e.g., revenue growth, profitability), as that would embed theoretical assumptions into measurement and violate Wacker’s principles of formal conceptual definition.

Conceptual Status of Success and Failure

Following Wacker (2004), “success” and “failure” are treated not as primitive constructs or directly measurable variables but as higher-order abstract conditions, inferred through the convergence of multiple interpretive properties. This approach

avoids tautological reasoning, through which outcomes are defined by the same criteria used to explain them.

These indicators function as informal, interpretive properties of the underlying constructs rather than direct measures of performance.

Success: Classification Thresholds

A firm was classified as “successful” only upon meeting all four success thresholds, reflecting saturation across multiple interpretive properties rather than reliance on a single indicator.

- S1: Organizational continuity: Evidence of sustained operations beyond early startup instability or successful scaling without distress-driven restructuring
 - This threshold captures organizational viability as a necessary condition for success without equating success with the magnitude of growth or profitability.
- S2: Strategic coherence over time: Evidence that the core SCM strategy (predetermined or emergent) remained internally consistent over time, with adaptations framed as refinements rather than reversals of strategic intent
 - This threshold distinguishes between adaptive learning and strategic drift.
- S3: Institutionalized learning: Evidence that operational experience was converted into durable processes, routines, metrics, or governance mechanisms, such that learning persisted beyond individual managers or isolated crisis episodes

- This threshold reflects learning accumulation as a core organizational capability.
- S4: Executive attribution of enablement: Senior leaders' explicit attribution of organizational performance or scalability to the enacted SCM strategy.
 - Executive attribution is treated as an interpretive indicator of theoretical salience rather than causal proof.

Failure: Classification Thresholds

A firm was classified as “unsuccessful” if it met two or more failure thresholds. This asymmetric rule reduces the risk of over-classifying firms based on isolated issues and aligns with Wacker’s emphasis on construct convergence.

- F1: Breakdown of organizational viability: Persistent performance decline, operational breakdown, or inability to scale core activities, often accompanied by strategic retrenchment or the loss of competitive position linked to supply chain dysfunction
- F2: Strategic drift or rigidity: Evidence of an inability to revise predetermined plans despite negative feedback, or excessive experimentation without convergence or stabilization.
 - Drift and rigidity are treated as distinct manifestations of governance failure rather than strategy failure.

- F3: Non-institutionalized learning: Repeated problem-solving without accumulation of organizational knowledge, with learning remaining individual, episodic, or crisis-driven rather than embedded in routines or systems
- F4: Executive attribution of constraint: Executives' retrospective identification of the SCM strategy as a limiting factor (e.g., "slowing us down," "locking us in," "creating chaos")

Replication Logic and Cross-Case Pattern Matching

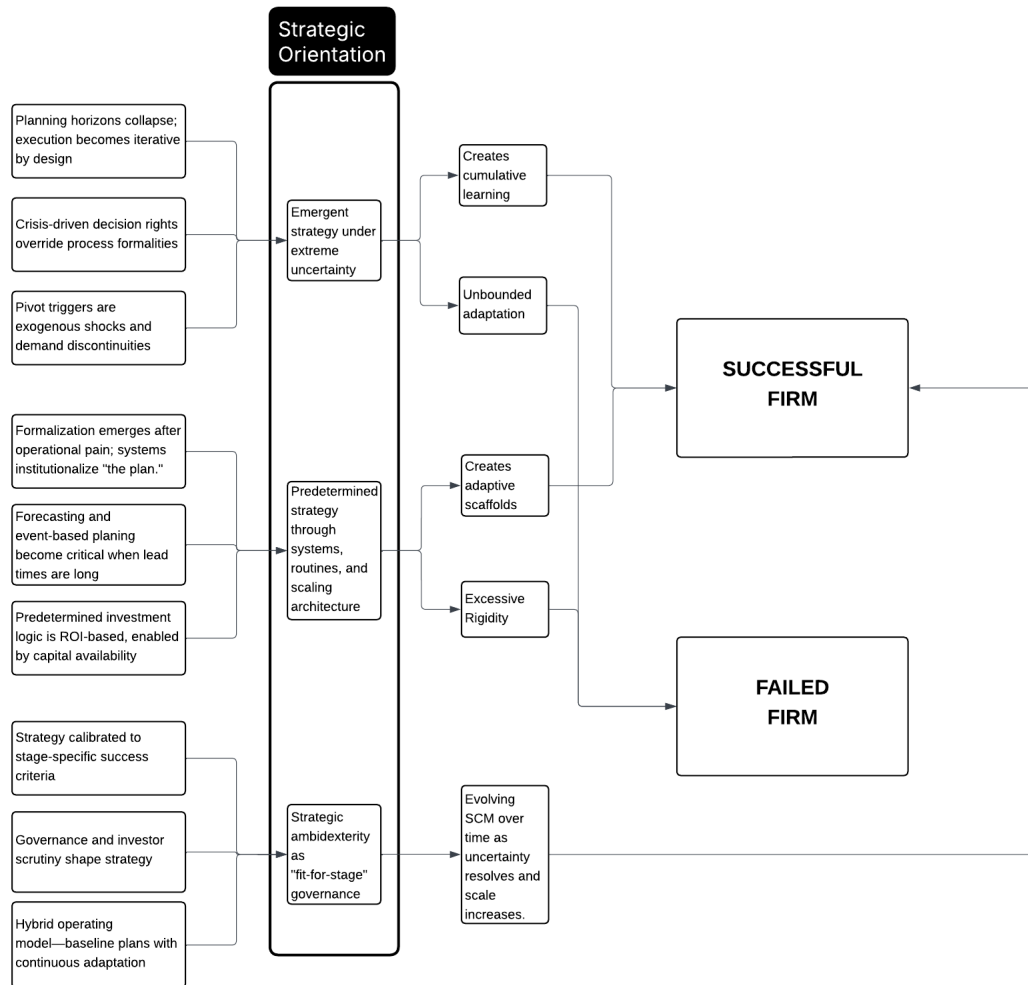
Consistent with Yin (2018), this study employed theoretical replication rather than literal replication. Cases were selected to populate all four cells of the 2×2 matrix formed by SCM strategy (predetermined vs. emergent) and organizational outcome (successful vs. unsuccessful). This design enabled the replication of underlying theoretical mechanisms across contrasting conditions rather than the estimation of effect sizes.

Cross-case comparison was guided by Eisenhardt's (1989) pattern-matching logic. Thresholds were used to identify recurring configurations of governance, learning, and strategic enactment that systematically differentiated successful cases from unsuccessful cases within and across strategies.

Threshold–Theme Mapping as Construct Validation

To further strengthen construct validity, each classification threshold was explicitly mapped to aggregate theoretical themes (e.g., strategic intentionality versus rigidity, learning accumulation, governance–adaptation trade-offs, lifecycle alignment). This mapping served as a conceptual validity check rather than an empirical result, ensuring internal consistency between constructs, indicators, and emergent theory.

Figure 4- Thematic Map



Integration of Quantitative and Qualitative Data (Convergent Design)

This study employed a convergent mixed-methods design, in which quantitative and qualitative data were collected and analyzed in separate phases and subsequently integrated during interpretation. In accordance with this design, the quantitative analysis

conducted in Phase 1 was merged and compared with the qualitative analysis conducted in Phase 2 to develop a comprehensive understanding of the relationship between supply chain strategy and startup performance (Creswell & Plano Clark, 2017).

The purpose of this integration was threefold.

First, the study examined how quantitative patterns identified in the survey data manifested within qualitative case narratives. Relationships observed in the regression analyses—such as the effects of predetermined and emergent supply chain strategy orientations on performance outcomes—were evaluated against the empirical experiences described by interview participants. This enabled the identification of convergence between statistical results and observed organizational behavior.

Second, the qualitative case analysis was used to explain the mechanisms underlying the quantitative findings. While the survey results identified whether relationships existed between strategy and performance, the case narratives provided insight into how these relationships developed in practice. For example, qualitative evidence was used to examine how emergent strategies enabled rapid operational adaptation under uncertainty, and how predetermined strategies contributed to operational structure and investor confidence.

Third, the integration process involved the direct comparison of findings across methods to identify areas of convergence, complementarity, and divergence. This comparative approach strengthened the validity of the findings by triangulating evidence

across independent data sources while also allowing each method to contribute distinct insights.

Consistent with the convergent design framework, the integration occurred at the interpretation stage, where results from both phases were brought together to generate a unified explanation of the role of supply chain strategy in startup e-commerce firms (Creswell & Plano Clark, 2017). This approach enabled the study to move beyond isolated quantitative or qualitative insights and instead develop a more complete and theoretically grounded understanding of the phenomena under investigation.

RESULTS

Phase 1 Quantitative Results

Factor Analysis

Exploratory factor analysis (with principal axis factoring used as the extraction method) was conducted to validate the measurement structure of the environmental uncertainty construct used in the regression models.

The factor analysis's sampling adequacy was assessed using the KMO statistic, which yielded a value of 0.715, exceeding the commonly accepted 0.60 threshold. Bartlett's test of sphericity was statistically significant ($\chi^2 = 158.104$, $p < .001$), indicating that the correlation matrix was suitable for factor analysis.

The factor solution revealed a single dominant factor that explained approximately 79.8% of the total variance, indicating that the items measuring environmental uncertainty loaded strongly onto a single underlying construct. Communalities for the uncertainty items ranged from 0.517 to 0.670, indicating that a substantial portion of the variance in each item was explained by the extracted factor.

Factor scores generated from this analysis were standardized and included in subsequent regression models as the uncertainty factor (Unc) score.

Strategy Variables and Ambidexterity Measures

Predetermined and emergent SCM strategies were operationalized using standardized factor scores derived from their respective survey items.

To assess whether the simultaneous use of both strategic orientations produced additional performance benefits, two measures of strategic ambidexterity were constructed:

1. **Ambi_Product** - The multiplicative interaction between standardized predetermined and emergent strategy scores ($ZP \times ZE$), representing the joint intensity of both strategies
2. **Ambi_Balance** - The absolute difference between the two standardized scores ($|ZP - ZE|$), representing the degree of balance between predetermined and emergent strategies.

These measures follow established approaches in the ambidexterity literature for testing both interaction effects and balance effects.

Regression Analysis

Two regression models were estimated to examine the relationship between supply chain strategy and firm performance.

The first model used order volume as the dependent variable to capture operational scaling effects. The second model used GMV to capture revenue performance.

Both models included the following predictors:

- Predetermined strategy factor (ZP)
- Emergent strategy factor (ZE)
- Environmental uncertainty factor score
- Ambidexterity measures (Ambi_Product and Ambi_Balance)

Control variables included:

- Firm age
- Product type
- New SKU introduction rate
- Order channel structure

Variance inflation factors were examined to assess multicollinearity. All VIF values were below commonly accepted thresholds, indicating that multicollinearity was not a concern.

Order Volume Results

The first regression model examined the relationship between supply chain strategy and operational scale, measured by order volume, see Table 1.

Model Fit

The model exhibited strong explanatory power:

- $R^2 = .697$
- Adjusted $R^2 = .668$
- $F = 23.54$
- $p < .001$

These results indicate that the included strategic and operational variables explained approximately 69.7% of the variance in order volume across the sampled firms.

Key Predictors

Two variables emerged as statistically significant predictors of order volume:

Variable	Standardized Beta	Significance
Firm age	.745	$p < .001$
New SKU introduction rate	.241	$p < .001$

These results indicate that organizational maturity and expansions of product assortment represent primary drivers of operational throughput among startup e-commerce firms.

Among the strategy variables, predetermined strategy exhibited a positive but marginally significant relationship with order volume ($\beta = .188$, $p = .069$). In contrast, emergent strategy exhibited no significant relationship with order volume ($\beta = .015$, $p = .878$).

Neither ambidexterity measure produced statistically significant effects

Variable	Beta	p
Ambi_Product	.115	.122
Ambi_Balance	.049	.497

Moreover, environmental uncertainty did not appear to have a significant direct effect on order volume.

GMV Results

A second regression model was estimated using GMV as the dependent variable to evaluate revenue outcomes, see Table 1.

Model Fit

The model exhibited strong explanatory power:

- $R^2 = .746$
- Adjusted $R^2 = .721$
- $F = 30.063$
- $p < .001$

These results indicate that the model explained approximately 74.6% of the variance in GMV across the sampled firms.

Key Predictors

Two variables again emerged as statistically significant predictors of revenue performance:

Variable	Standardized Beta	Significance
Firm age	.785	$p < .001$
New SKU introduction rate	.255	$p < .001$

These results indicate that firm maturity and expansions of product assortment are strongly positively associated with revenue performance in startup e-commerce firms.

In contrast, the strategy variables did not exhibit statistically significant relationships with GMV:

Variable	Beta	p
Predetermined Strategy (ZP)	.142	.132
Emergent Strategy (ZE)	.076	.382
Ambi_Product	.067	.321
Ambi_Balance	.017	.793

Notably, environmental uncertainty was not a significant predictor of GMV.

Table 1- Regression Results

Regression Results Predicting SCM Strategy

Variable	Order Volume		GMV	
	β	SE	β	SE
(Constant)	---	(0.371)	---	(0.377)
Firm Age	0.745*	(0.096)	0.785*	(0.098)
Environmental Uncertainty (Unc)	0.052	(0.071)	-0.96	(0.073)

Variable	Order Volume		GMV	
	β	SE	β	SE
Predetermined Strategy (ZP) Factor	0.188 [†]	(0.113)	0.142	(0.114)
Emergent Strategy (ZE) Factor	0.015	(0.107)	0.076	(0.109)
Ambidexterity (Product)	0.115	(0.079)	0.067	(0.080)
Ambidexterity (Balance)	0.049	(0.179)	0.017	(0.182)
Product Type	-0.083	(0.072)	-0.061	(0.073)
New Skus	0.241*	(0.075)	0.255*	(0.077)
Orders By Channel	-0.002	(0.085)	-0.014	(0.086)
R ²	0.697		0.746	
ΔR^2	0.668		0.721	
n	102		102	

Notes: Values are standardized regression coefficients (β). Standard errors are in parentheses. [†] $p < .10$, * $p < .001$.

Hypothesis Testing

The results of the quantitative analysis were evaluated regarding the study's hypotheses.

Hypothesis	Result
H1: Startup e-commerce firms that utilize a predetermined supply chain strategy are more successful with respect to revenue generation and order volume than e-commerce startup firms that utilize an emergent supply chain strategy.	Partially supported
H2: Startup e-commerce firms that utilize an emergent supply chain strategy are more successful with respect to revenue generation and order volume than e-commerce startup firms that utilize a predetermined supply chain strategy.	Not supported
H3: Startup e-commerce firms that utilize a combination of predetermined and emergent supply chain strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize a predetermined supply chain strategy.	Not supported
H4: Startup e-commerce firms that utilize a combination of predetermined and emergent supply chain strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize an emergent supply chain strategy.	Not supported
H5: Startup e-commerce firms that do not employ any SCM strategies are more successful with respect to revenue generation and order volume than startup e-commerce firms that utilize an SCM strategy.	Not supported

Evidence for H1 emerged primarily from the positive marginal relationship between predetermined strategy and order volume, suggesting that deliberate supply chain planning may contribute to operational scaling in startup firms.

However, ambidexterity effects were not supported, indicating that the simultaneous use of predetermined and emergent strategies did not provide additional performance benefits.

Summary of Quantitative Findings

Overall, the Phase 1 quantitative results point to a sequential relationship between supply chain strategy, operational scale, and financial performance.

Predetermined supply chain strategies appeared to contribute to operational scaling, as reflected in higher order volumes. Operational scale and firm maturity, in turn, appeared to drive revenue outcomes, as measured by GMV.

Emergent strategy appeared more closely associated with environmental conditions rather than direct performance outcomes, while strategic ambidexterity did not appear to produce additional measurable benefits.

These findings lay the quantitative foundation for the Phase 2 qualitative case study, which further explores how startups navigate the balance between predetermined and emergent supply chain strategies amid environmental uncertainty.

Phase 2 Qualitative Results

Overview

Phase 2 employed a qualitative case study approach to explore how startup e-commerce firms develop and implement supply chain strategies in practice. While Phase 1 examined statistical relationships between supply chain strategies and firm performance, Phase 2 sought deeper insights into the mechanisms through which predetermined and emergent strategies shape operational outcomes.

Semi-structured interviews were conducted with supply chain and operational leaders from startups in the e-commerce field. Interview participants held various roles, including chief operating officer, head of supply chain, and vice president of operations. These individuals were selected due to their direct involvement in supply chain decision-making within rapidly scaling e-commerce organizations.

Interview transcripts were analyzed using an iterative thematic coding process conducted in ATLAS.ti. Coding followed three stages of analysis: first-order coding, second-order thematic development, and aggregate theoretical dimensions. This approach facilitated the identification of recurring patterns across cases while preserving the unique language and perspectives of the interview participants.

The analysis revealed several themes pertaining to how supply chain strategies are developed and how they influence operational performance among startups in the e-commerce field.

Theme 1: Predetermined Strategy Enables Operational Scaling

One of the most prominent themes to have emerged from the interviews was the importance of deliberate supply chain planning for supporting operational scale.

Participants consistently described structured planning of fulfillment networks, inventory positioning, and logistics partnerships as key to predetermined strategies.

Executives, for instance, reported that early-stage firms often begin with relatively simple logistics arrangements before eventually transitioning toward more formalized supply chain planning as order volumes increase. Such planning frequently features decisions about warehouse network design, relationships with 3PLs, and inventory-allocation strategies.

Several participants also emphasized that scaling an e-commerce business requires deliberate infrastructure planning in advance of demand growth. As one interviewee noted, “Once order volume starts to accelerate, you can’t improvise your way through fulfillment operations.” Instead, firms must develop structured plans for capacity expansion, inventory management, and shipping operations.

These insights align closely with the Phase 1 quantitative findings, which indicated that predetermined strategy was positively related to operational scale (as measured by order volume). The qualitative findings suggest that this relationship may reflect the role of deliberate supply chain planning when it comes to enabling firms to build the operational capabilities required to process increasing transaction volumes.

Theme 2: Emergent Strategy as an Adaptive Response to Uncertainty

A second theme that emerged was the role of emergent supply chain strategies as adaptive responses to environmental uncertainty. Participants frequently described situations in which firms adopted experimental or opportunistic approaches to supply chain decision-making in response to rapidly changing market conditions.

Examples included testing new 3PLs, experimenting with alternative fulfillment models, and piloting new technologies for warehouse operations. In many cases, these experiments were conducted on a limited scale before being expanded across the organization.

Executives described this process as “learning through experimentation,” particularly in environments characterized by frequent demand volatility or supplier disruptions. Thus, rather than relying exclusively on long-term planning, firms often adjusted supply chain configurations dynamically in response to real-time operational feedback.

This theme corresponds with the Phase 1 findings, which revealed emergent strategy to be associated with environmental uncertainty but showed no direct relationship with revenue performance. Here, the qualitative results suggest that emergent strategies function primarily as mechanisms for responding to uncertainty rather than drivers of operational scale or financial outcomes.

Theme 3: Operational Scale as the Primary Driver of Revenue Growth

A third theme that emerged from the interviews was the central importance of operational scale in driving revenue performance. Participants repeatedly emphasized that an e-commerce startup's ability to efficiently process increasing order volumes is a key determinant of its revenue growth among startup e-commerce firms.

Executives described scaling fulfillment operations as one of the most significant challenges faced by rapidly growing e-commerce companies. Firms that successfully expanded their warehouse networks and logistics partnerships were able to support higher order volumes and capture additional market demand. In contrast, firms that struggled to expand their operational capacity often experienced fulfillment delays, increased shipping costs, and customer dissatisfaction, ultimately limiting their revenue growth.

These observations align closely with the quantitative findings from Phase 1, which revealed a strong relationship between order volume and GMV. Together, these findings indicate that operational throughput plays a central role in driving revenue performance among startup e-commerce firms.

Theme 4: Strategic Specialization Over Ambidexterity

A fourth theme drawn from the interview findings was that, instead of simultaneously pursuing both approaches, firms tend to rely more heavily on either predetermined or emergent strategies depending on their operational context.

Participants frequently noted that their supply chain strategies evolve over time. Early-stage firms often rely more heavily on emergent experimentation as they explore

different operational configurations. As firms scale, however, many executives reported transitioning toward more structured planning processes to manage rising complexity.

This observation helps to explain the Phase 1 finding that strategic ambidexterity did not produce statistically significant performance benefits. Indeed, rather than combining the two strategies, firms appear to emphasize different strategic approaches at different stages of organizational development.

Cross-Case Comparison

Comparing patterns across the considered cases revealed a consistent distinction between two strategic pathways.

The first pathway involves deliberate supply chain planning aimed at building operational infrastructure that can support growth. Firms that follow this pathway emphasize network design, logistics partnerships, and operational efficiency.

The second pathway involves adaptive experimentation in response to environmental volatility. Firms that follow this pathway frequently adjust their logistical arrangements, test new order-fulfillment models, and respond dynamically to supply chain disruptions.

These pathways correspond closely with the two strategic orientations examined in the Phase 1 quantitative analysis.

Summary of Phase 2 Findings

Overall, the qualitative findings reinforce and extend the quantitative results from Phase 1. The interview results suggest that predetermined supply chain strategies play a key role in enabling operational scaling, while emergent strategies function primarily as adaptive responses to environmental uncertainty.

Together, these findings indicate that predetermined and emergent strategies serve distinct but complementary roles among startups in the e-commerce field. Predetermined strategies support the development of the operational infrastructure necessary for scaling, while emergent strategies enable firms to adapt to shifting environmental conditions.

These insights provide important context with which to interpret the statistical relationships observed in the quantitative phase and contribute to a more comprehensive understanding of how supply chain strategies influence performance among e-commerce startups.

Integrated Interpretation of Quantitative and Qualitative Results

The mixed-methods design employed in this study enabled a more nuanced interpretation of the findings. While the quantitative analysis identified statistical relationships between strategy and performance, the qualitative findings provided insight into the mechanisms behind these relationships.

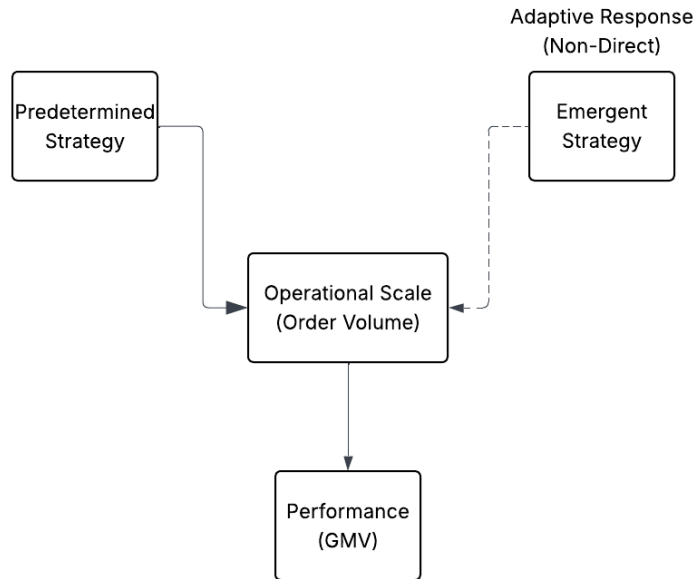
The quantitative results suggest that predetermined strategies contribute to operational scaling, while emergent strategies have no direct effect on performance. The qualitative interviews provided a potential explanation for this pattern. Many executives

described predetermined strategies as involving structured planning processes behind fulfillment network design, negotiations over logistics partnerships, and capacity expansion in anticipation of future demand growth—processes that support the operational infrastructure required for scaling e-commerce operations.

In contrast, emergent strategies were frequently described as responses to uncertainty and operational disruption. Firms reported experimenting with new logistics providers, adjusting fulfillment configurations, and piloting alternative supply chain technologies in response to unexpected demand fluctuations or external constraints. Notably, while these actions enhance flexibility and responsiveness, they do not appear to translate directly into improved financial performance.

Taken together, the findings suggest that supply chain strategy among startup e-commerce firms may operate through two distinct strategic pathways. Predetermined strategies enable operational scaling through the development of structured logistics infrastructure, while emergent strategies support adaptation within environments characterized by volatility and uncertainty.

Figure 5- Integrated Findings Model



Managerial Implications

Deliberate Supply Chain Planning Supports Operational Scaling

One of the most important managerial implications of this study is that predetermined supply chain strategies play a key role in enabling operational scaling. The quantitative analysis revealed a positive relationship between predetermined strategy and order volume, suggesting that the deliberate planning of supply chain infrastructure contributes to the operational capacity necessary to support firm growth.

For managers of e-commerce startups, this finding highlights the importance of investing in structured supply chain planning earlier in the growth cycle than is often assumed. While early-stage startups tend to emphasize experimentation and flexibility,

the results suggest that firms must eventually transition toward more deliberate operational planning if they are to scale fulfillment operations successfully.

The insights from the qualitative phase reinforce this point. The interviewed executives emphasized that decisions related to warehouse network design, inventory allocation, and logistics partnerships often require significant lead times and capital commitments. Firms that delay such planning decisions may encounter operational bottlenecks as demand grows. Therefore, managers should consider developing formal supply chain roadmaps that anticipate future capacity needs and logistical infrastructure requirements.

Operational Scale Is a Key Driver of Revenue Performance

A second managerial implication concerns the relationship between operational scale and revenue performance. The regression results indicate that order volume is strongly associated with GMV, suggesting that the ability to efficiently process rising transaction volumes is a central driver of revenue growth among startup e-commerce firms.

This finding suggests that managers should view supply chain development as a core growth enabler rather than a mere support function. Investments in fulfillment capacity, logistics technology, and supply chain partnerships may, therefore, directly impact a firm's ability to capture market demand.

In practical terms, managers should prioritize operational capabilities that enable scalable fulfillment processes, including warehouse automation, distributed inventory

networks, and data-driven demand-forecasting systems. Firms that fail to expand operational capacity alongside demand growth may encounter order-fulfillment delays, increased shipping costs, and customer dissatisfaction, which can ultimately limit revenue growth.

Emergent Strategies Provide Flexibility Amid Uncertainty

This study's results also highlight the importance of emergent SCM strategies as mechanisms with which to adapt to uncertainty. Although emergent strategy did not exhibit a direct relationship with revenue or order volume in the quantitative analysis, the qualitative findings indicate that executives frequently rely on experimental approaches to effectively respond to environmental volatility.

E-commerce startups frequently operate in environments characterized by fluctuating demand, rapidly shifting consumer preferences, and unpredictable logistical constraints. In such environments, managers may benefit from adopting flexible supply chain practices, such as pilot programs with alternative logistics providers, short-term contracts with third-party fulfillment partners, and experimentation with alternative fulfillment models.

Such adaptive practices enable firms to learn from operational experiments while limiting their exposure to large capital commitments. Therefore, managers should view emergent strategies not as substitutes for deliberate planning but as complementary mechanisms that enable firms to respond effectively to market uncertainty.

Strategic Specialization May Be More Effective Than Strategic Ambidexterity

Finally, this study's findings suggest that strategic specialization may be more effective than strategic ambidexterity when it comes to SCM among startups. Critically, the statistical analysis did not indicate that firms simultaneously pursuing both predetermined and emergent strategies achieve superior performance outcomes. Rather, the results suggest that firms may benefit from emphasizing different strategic approaches based on their unique operational context. For example, in periods of rapid growth, firms may prioritize predetermined strategies that support operational scaling, whereas in periods of uncertainty or disruption, firms may rely more heavily on emergent strategies that allow for adaptive experimentation.

For managers, this implies that supply chain strategy should not necessarily aim to simultaneously balance multiple strategic orientations. Rather, effective supply chain leadership may involve recognizing when to emphasize deliberate planning and when to rely on adaptive experimentation.

CONCLUSION

The purpose of this study was to examine how predetermined and emergent SCM strategies influence the performance of e-commerce startups. As digital commerce continues to expand and supply chain complexity continues to increase, understanding how entrepreneurial firms design and manage their supply chain strategies has become increasingly important. However, while prior research has examined SCM strategy in the context of large, established organizations, relatively little empirical attention has been

paid to how SCM strategies operate within early-stage firms experiencing rapid growth and environmental uncertainty.

To address this gap, the present study employed a two-phase mixed-methods research design combining quantitative survey analysis with qualitative interviews with firm executives. The Phase 1 quantitative analysis examined statistical relationships between supply chain strategy, environmental uncertainty, and firm performance outcomes, including order volume and GMV, while the Phase 2 qualitative case study provided deeper insight into how startups' supply chain leaders develop and implement these strategies in practice.

The findings suggest that predetermined supply chain strategies play an important role in supporting operational scaling among startup e-commerce firms. The quantitative analysis indicated that predetermined strategy exhibited a positive relationship with order volume, suggesting that the deliberate planning of supply chain infrastructure contributes to the operational capacity required for firm growth. At the same time, firm maturity and expansions of product assortment emerged as strong predictors of revenue performance. Together, these results indicate that a firm's ability to efficiently process rising transaction volumes represents a critical driver of its revenue growth in digital commerce environments.

In contrast, emergent supply chain strategy did not exhibit a direct relationship with performance outcomes in the quantitative models. However, the qualitative findings suggest that emergent strategies still play an important role as adaptive responses to environmental uncertainty, enabling firms to experiment with logistical arrangements, fulfillment models, and operational processes in response to changing market conditions.

Moreover, the analysis did not find evidence that strategic ambidexterity—the simultaneous pursuit of predetermined and emergent strategies—produces additional performance benefits among startups in the e-commerce field.

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