

Impact of festival season on supply chain disruptions in Bangladesh: challenges and strategies

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Abstract

Purpose – Festival seasons in Bangladesh generate predictable yet severe supply chain disruptions driven by demand surges, labour shortages and logistics congestion. While disruption research predominantly focuses on unexpected crises, recurrent culturally embedded disruptions remain underexplored. This study investigates how festival season pressures affect supply chain performance, modelling disruptions as a mediating mechanism and mitigation strategies as moderating capabilities.

Design/methodology/approach – A quantitative, cross-sectional survey collected data from 384 supply chain professionals across apparel, fast-moving consumer goods (FMCG), retail, logistics, and e-commerce sectors in Bangladesh. Construct validity was established through composite reliability (CR) and average variance extracted (AVE); discriminant validity via Fornell–Larcker and Heterotrait-monotrait (HTMT) criteria. Regression-based mediation and moderation analyses were conducted using PROCESS macro with 5,000 bootstrap samples.

Findings – Festival-season pressures are significantly associated with increased supply chain disruptions, which in turn negatively relate to performance. Consistent with full mediation, disruptions account for the pressure performance relationship. Mitigation strategies, demand forecasting, inventory buffering, supplier diversification and workforce planning are significantly associated with an attenuation of both the disruptive effect of festival pressures and disruptions' negative relationship with performance.

Practical implications – Managers should adopt anticipatory, data-driven approaches including proactive inventory positioning and digital logistics integration. Policymakers should invest in infrastructure resilience and institutional capacity building.

Originality/value – This study advances institutional, resource dependence and dynamic capability theories by demonstrating that predictable, culturally embedded disruptions require anticipatory management capabilities in emerging economy contexts.

Keywords Supply chain disruptions, Festival season, Bangladesh, Mitigation strategies, Emerging economies, Dynamic capabilities

Paper type Research article

1. Introduction

Supply chain disruption research has grown substantially over the past two decades, yet the dominant focus remains on unexpected, high-impact events such as pandemics, natural disasters and geopolitical shocks (Ali *et al.*, 2021a; Bednarski *et al.*, 2025; Dolgui *et al.*, 2019). This body of work has considerably advanced understanding of resilience, flexibility and recovery under extreme uncertainty. However, an important and structurally different class of disruption has received comparatively little rigorous empirical attention. Disruptions are anticipated, recurrent and institutionally embedded within cultural calendars (Aldrighetti *et al.*, 2021; Sodhi and Tang, 2021). Such disruptions are not triggered by unpredictable external shocks but arise reliably every year at known intervals. Yet they continue to impose substantial performance penalties on supply chains. Understanding how organisations manage known, recurring volatility is therefore both theoretically important and practically urgent particularly in emerging economies where infrastructure and coordination mechanisms remain limited.

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Bangladesh provides an especially revealing context for studying this phenomenon. Major festivals such as Eid-ul-Fitr, Eid-ul-Adha, Durga Puja and Pohela Boishakh trigger sharp, short-duration increases in consumer demand across food, apparel, fast-moving consumer goods (FMCG), retail, and e-commerce sectors. These demand rises match with acute labour shortages as workers return to hometowns, severe road congestion and capacity constraints across freight and warehousing networks. These pressures interact with structural characteristics of the Bangladeshi supply chain: infrastructural limitations, fragmented logistics involving both formal and informal providers, weak digital integration and underdeveloped cold-chain systems (Chowdhury and Quaddus, 2017; Aziz *et al.*, 2025). The result is a predictable pattern of procurement delays, stockouts, delivery failures and escalating operational costs that undermines performance cycle after cycle.

Despite the regularity of these disruptions, the academic literature has not yet formally modelled festival-season dynamics as a distinct disruptive phenomenon distinct from generic seasonal demand patterns. Existing research on seasonality in supply chains typically addresses demand forecasting or inventory optimisation in stable, well-resourced settings (Chen, 2001; Fang and Shou, 2015). It does not engage with the institutional, infrastructural and labour-market conditions that make culturally embedded festivals uniquely disruptive in developing-country contexts. This constitutes a meaningful research gap. The article requires empirically grounded, theoretically articulated models that explain why festival-driven pressures translate into performance deterioration and what organisational capabilities can attenuate this pathway.

This study addresses this gap through three research questions. How do festival-season pressures influence the intensity of supply chain disruptions? To what extent do supply chain disruptions mediate the relationship between festival-season pressures and supply chain performance? How do mitigation strategies moderate the effects of festival pressures on disruptions and the effect of disruptions on performance? Drawing on institutional theory (Scott, 2008), resource dependence theory (Pfeffer and Salancik, 1978) and dynamic capability theory (Teece *et al.*, 1997), the study develops five hypotheses and tests them using regression-based mediation and moderation analysis on a sample of 384 supply chain professionals in Bangladesh. Measurement quality is established through Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), Fornell–Larcker criterion, and Heterotrait-monotrait (HTMT) ratios. Common method bias is assessed via Harman's single-factor test and a full-collinearity variance inflation factor (VIF)-based test.

The remainder of the paper proceeds as follows. Section 2 reviews relevant literature and articulates the theoretical foundations. Section 3 presents the conceptual framework and hypotheses. Section 4 describes the methodology. Section 5 presents results. Section 6 discusses findings in relation to theory and prior research. Section 7 concludes with implications for management and policy.

2 Literature review

2.1 Festival-driven demand and its distinctiveness from general seasonality

General seasonal demand fluctuations in supply chain management are well documented and typically addressed through inventory optimisation, safety stock calculations and demand smoothing (Chen, 2001; Fang and Shou, 2015). However, festival-driven demand in emerging economies constitutes a qualitatively distinct phenomenon for several reasons. First, festivals compress several weeks of normal consumption into narrow pre-festival windows, creating demand velocity rather than gradual seasonal elevation (Christopher, 2016; Khan and Sharma, 2020). Second, festival periods simultaneously trigger large-scale labour migration as workers return to hometowns, removing significant portions of the urban workforce that supply chains depend on. Third, in countries like Bangladesh, festivals interact with weak infrastructure, informal logistics networks and limited digital visibility in ways that amplify disruption well beyond what inventory buffers alone can absorb (Chowdhury and Quaddus, 2017; Imran *et al.*,

2024). These features distinguish festival-driven disruption from the gradual seasonality typically modelled in supply chain optimisation literature.

Within Bangladesh specifically, festivals such as Eid-ul-Fitr and Eid-ul-Adha generate the most acute disruptions, whereas festivals such as Durga Puja and Pohela Boishakh generate comparably smaller but still significant operational stresses. Consumption surges across food, apparel, electronics, pharmaceuticals and household goods (Alam *et al.*, 2023; Aziz *et al.*, 2025). To cope, firms expand procurement, build inventories, extend working hours and reschedule distribution flows in the pre-festival window, a demand-side response pattern documented across South Asian festival contexts (Khan and Sharma, 2020; Rehman *et al.*, 2022). Comparative evidence from India and Pakistan confirms that similar festival-related disruptions arise from forecasting errors, transport congestion and seasonal labour shortages, though the magnitude differs based on infrastructure quality and institutional development (Kumar *et al.*, 2021).

Institutionally, festival disruptions are embedded in stable cultural and regulatory structures that organisations cannot unilaterally alter. Scott's (2008) three pillars, namely regulative, normative and cognitive, explain why firms may find it difficult to rationalise festival logistics; normative and cognitive pressures reinforce festival practices while regulative frameworks constrain operational options. These pillars map onto the study's constructs in distinct ways. Regulative pressures shape festival-season factors directly, as statutory holiday calendars and transport curfews fix the timing and duration of demand surges and labour absence, leaving firms unable to smooth these peaks unilaterally. Normative pressures operate through the cultural expectation that employees are entitled to travel home and that consumption norms intensify around specific festivals, which firms cannot resist without reputational cost, thereby sustaining the labour-shortage and demand-surge components of festival-season factors. Cognitive pressures operate on supply chain disruptions by shaping taken-for-granted assumptions; because festival-period disruption is viewed as an unavoidable, recurring feature of doing business rather than a manageable risk, firms rarely institutionalise routines to pre-empt it, which helps explain why disruption levels remain persistently high despite their predictability. Resource dependence theory (Pfeffer and Salancik, 1978) further explains why firms dependent on informal logistics networks, seasonal labour pools and externally owned transport fleets are structurally exposed to festival-period resource scarcity. Together, these perspectives establish that festival-driven disruptions are not simply a demand management problem but a systemic institutional and resource challenge requiring anticipatory, capability building responses.

2.2 Supply chain disruptions in the festival context

Supply chain disruptions are broadly defined as unplanned events that disrupt the normal flow of goods, information and finances, degrading supply chain performance (Bier *et al.*, 2020; DuHadway *et al.*, 2019). Most empirical disruption research focuses on low-frequency, high-impact events, leading to resilience frameworks oriented toward crisis response and recovery (Kamalahmadi and Parast, 2017; Katsaliaki *et al.*, 2022). Festival disruptions differ; they are high-frequency, predictable, moderate-impact events that occur repeatedly within known temporal windows. This distinction has important theoretical implications. Dynamic capability theory (Teece *et al.*, 1997) predicts that organisations confronting recurring challenges should develop routinised sensing and reconfiguring capabilities, not episodic crisis responses. The failure to develop such routines, as observed in Bangladesh, suggests that institutional barriers and resource dependencies may constrain dynamic capability formation.

In Bangladesh's specific context, disruptions arise from structural, operational and institutional sources operating simultaneously. Overpopulated urban centres, deteriorating road infrastructure and heavy dependence on informal logistics providers create persistent vulnerabilities (Chowdhury and Quaddus, 2017; DuHadway *et al.*, 2019). These are exacerbated during festivals by labour shortages as warehouse and transport workers absent

themselves. Restricted truck availability due to heightened demand competing across all sectors simultaneously; fuel price spikes; and weak inter-firm coordination due to limited adoption of digital supply chain tools. The coexistence of formal and informal logistics providers adds flexibility but also uncertainty, as informal actors provide variable service quality and limited digital traceability (Rehman *et al.*, 2022; Li and Zobel, 2020). Table 1 summarises these disruption types, their causes, festival-season impacts and evidence-based mitigation strategies.

Taken together, this body of work has three notable achievements and three persistent limitations. On the achievement side, the resilience literature has rigorously characterised recovery mechanisms for low-frequency, high-impact shocks (Kamalahmadi and Parast, 2017; Katsaliaki *et al.*, 2022); the seasonality literature has produced robust inventory-optimisation solutions for predictable demand cycles (Chen, 2001; Fang and Shou, 2015); and Bangladesh-specific studies have documented the structural fragility of informal logistics networks in detail (Chowdhury and Quaddus, 2017; Mila *et al.*, 2022). On the limitation side, resilience frameworks are built for episodic shocks and do not specify routines for recurring, calendar-bound disruptions; seasonality models optimise inventory but abstract away the institutional and labour-market conditions specific to festival contexts; and Bangladesh-specific studies remain largely descriptive, cataloguing vulnerabilities without testing an integrated causal model linking festival pressures, disruptions, mitigation and performance. This study addresses that combined gap by testing such a model directly.

Table 1. Festival season supply chain disruptions in Bangladesh: causes, impacts and mitigation strategies

Disruption type	Underlying causes	Festival-season impact	Mitigation strategies	Supporting literature
Transport delays and congestion	Urban traffic, limited freight, informal operators	Extended lead times, higher freight costs	Route optimisation, real-time tracking, temporary hubs	Aziz <i>et al.</i> (2025), Mila <i>et al.</i> (2022)
Stockouts at retail level	Inaccurate forecasting, demand spikes, inadequate buffers	Lost sales, reduced customer satisfaction	Collaborative forecasting, pre-stocking, warehouse management system (WMS) adoption	Ali <i>et al.</i> (2018), DuHadway <i>et al.</i> (2019)
E-commerce delivery failures	Last-mile congestion, limited workforce, fragmented networks	Increased complaints, delayed fulfilment	Expanded last-mile fleet, pick-up points, digital visibility	Aziz <i>et al.</i> (2025), Khan and Sharma (2020)
Rising logistics costs	Labour scarcity, peak freight charges, overtime	Margin compression, profitability decline	Long-term contracts, dynamic routing, load consolidation	Kumar <i>et al.</i> (2021), Bier <i>et al.</i> (2020)
Warehouse bottlenecks	Insufficient storage, poor cold-chain, manual systems	Distribution delays, shipment consolidation failures	WMS adoption, temporary storage, labour scheduling	Mila <i>et al.</i> (2022), Bier <i>et al.</i> (2020)
Labour shortages	Workers returning to hometowns, seasonal fluctuations	Delayed order processing, reduced capacity	Temporary staffing, shift flexibility, cross-training	Aziz <i>et al.</i> (2025), Mila <i>et al.</i> (2022)
Coordination failures	Poor information sharing, fragmented formal-informal networks	Unpredictable service levels, reduced visibility	Digital integration platforms, joint planning, collaboration frameworks	Bier <i>et al.</i> (2020), Qrunfleh <i>et al.</i> (2022)

2.3 Supply chain performance in festival contexts

Supply chain performance in Bangladesh reflects the efficiency, responsiveness and reliability of operations under both normal and elevated demand conditions (Chowdhury *et al.*, 2024). Festival seasons significantly influence performance owing to simultaneous demand peaks, labour shortages and transportation and warehousing overloads. Following Beamon (1999) and Chowdhury and Quaddus (2017), this study operationalises performance across six dimensions: cost efficiency, on-time delivery, customer satisfaction, operational continuity, service reliability and profit performance. Each dimension is acutely sensitive to festival disruptions. Cost efficiency declines as freight premiums, overtime labour and emergency procurement erode margins. On-time delivery collapses under congestion and workforce shortages. Customer satisfaction suffers from stockouts and inconsistent fulfilment. Table 2 summarises these performance dimensions, their festival-season impacts and measurable indicators.

A critical limitation cuts across the performance measures reviewed above: nearly all rely on respondents' subjective assessments of their own firm's outcomes rather than objective operational or financial records. This raises two distinct concerns. First, subjective performance ratings are susceptible to social desirability and self-serving bias, particularly when respondents are also the managers responsible for the mitigation efforts being evaluated (Podsakoff *et al.*, 2003). Second, and more fundamentally, self-reported mitigation capability is potentially endogenous to self-reported performance: managers who perceive their firm as performing well during festival periods may retrospectively rate their own mitigation capabilities more favourably, independent of the capabilities' actual effectiveness, which would inflate the observed capability–performance association. Recent supply chain literature has begun to flag this endogeneity risk in self-report designs without yet resolving it empirically (Manhart *et al.*, 2020). This study's reliance on self-reported measures for both mitigation and performance constructs should therefore be read as a shared-source limitation, addressed partly through procedural remedies and common method bias (CMB) testing (Section 4.4) but not fully eliminated, and future validation against objective indicators is warranted.

Table 2. Supply chain performance dimensions in the festival-season context

Performance dimension	Description	Festival-season impact	Key indicators	Literature
Cost performance	Efficiency in managing logistics, labour and operational costs	Freight premiums, overtime labour, emergency procurement costs	Transport costs, holding costs	Aziz <i>et al.</i> (2025), Mila <i>et al.</i> (2022)
Output/delivery performance	Timely delivery and fulfilment accuracy	Delayed deliveries, reduced fulfilment rates	On-time delivery rate, fulfilment rate	Chowdhury and Quaddus (2017), Mila <i>et al.</i> (2022)
Flexibility performance	Adaptability to demand shifts and supply conditions	Limited adaptability due to infrastructure constraints	Response time, schedule flexibility	Bier <i>et al.</i> (2020); Kumar <i>et al.</i> (2021)
Customer satisfaction	Customer perceptions of service quality and availability	Reduced satisfaction from stockouts, inconsistent service	Complaint rates, repeat purchase	Chang <i>et al.</i> (2019), Aziz <i>et al.</i> (2025)
Profit performance	Revenue generated net of cost escalations	Higher sales but compressed margins from cost spikes	Profit margin, cost-to-sales ratio	Chowdhury and Quaddus (2017)

2.4 Mitigation strategies as dynamic capabilities

Dynamic capability theory (Teece *et al.*, 1997) distinguishes between ordinary operational capabilities and higher-order capabilities that enable organisations to sense environmental changes, seize opportunities and reconfigure resources. Applied to recurring festival disruptions, this framework predicts that firms developing anticipatory mitigation routines rather than reactive crisis responses should experience lower disruption severity and better performance outcomes. Five mitigation capabilities are particularly relevant to the Bangladesh context and are supported by empirical evidence in supply chain literature.

First, demand forecasting using historical sales data, festival calendars and predictive analytics enables firms to calibrate procurement and inventory before disruptions materialise (He *et al.*, 2019; Milanesi *et al.*, 2020). Second, inventory buffering building safety stock prior to festival onset reduces the probability of stockouts during peak demand windows (Manhart *et al.*, 2020). Third, supplier diversification, maintaining relationships with multiple suppliers across geographies, reduces exposure to any single source’s festival-period disruptions (Namdar *et al.*, 2018). Fourth, workforce planning contracting temporary labour, cross-training employees and scheduling shifts in advance addresses the predictable labour shortage created by worker migration during festivals (Mila *et al.*, 2022). Fifth, logistics coordination pre-booking freight capacity, establishing temporary distribution hubs and integrating digital tracking tools (ERP, TMS, GPS) reduces transport bottlenecks and improves operational visibility (Umar and Wilson, 2023; Vinh *et al.*, 2025). Table 3 summarises these strategies in relation to specific disruption types.

A critical distinction emerges in how mitigation strategies are conceptualised. Prior research has treated mitigation as primarily reactive, activated after disruption onset, with resilience frameworks emphasising recovery and adaptation once a disruptive event has already occurred rather than anticipatory preparation beforehand (Sheffi, 2015; Kamalahmadi and Parast, 2017). This study, drawing on dynamic capability theory, frames mitigation as anticipatory organisational routines embedded in annual planning cycles. The difference is not merely semantic: anticipatory mitigation requires firms to treat festival calendars as predictable risk horizons and to institutionalise preparation processes accordingly. These reframing shifts mitigation from ad hoc crisis management to a source of competitive advantage in markets where rivals lack equivalent preparation.

Table 3. Festival-driven disruptions and evidence-based mitigation strategies

Disruption type	Primary causes	Festival impact	Mitigation strategies	Literature
Transport congestion	Urban traffic, limited road capacity, high shipment volumes	Extended lead times, higher costs	Route optimisation; temporary hubs; staggered schedules; real-time monitoring	Aziz <i>et al.</i> (2025), Qrunfleh <i>et al.</i> (2022)
Inventory shortages	Demand spikes, poor forecasting, inadequate buffers	Lost sales, stockouts	Advanced demand forecasting; pre-stocking; multi-sourcing; strategic allocation	Ali <i>et al.</i> (2018), Umar and Wilson (2023)
Labour shortages	Worker migration, seasonal unavailability	Delayed processing, reduced capacity	Temporary staffing; shift flexibility; workforce planning; cross-training	Mila <i>et al.</i> (2022), Bier <i>et al.</i> (2020)
Warehousing bottlenecks	Insufficient storage, manual systems	Distribution delays	WMS adoption; temporary facilities; shared warehouses; labour scheduling	Aziz <i>et al.</i> (2025), Bier <i>et al.</i> (2020)
Cost volatility	Freight price spikes, overtime, fuel fluctuations	Margin compression	Long-term logistics contracts; dynamic pricing; load consolidation	Mila <i>et al.</i> (2022), Ali <i>et al.</i> (2021b)

3 Conceptual framework and hypotheses development

3.1 Conceptual framework

The conceptual framework positions festival-season factors as the independent variable (IV), supply chain disruptions as the mediating variable (MV), supply chain performance as the dependent variable (DV) and mitigation strategies as the moderating variable (ModV). Festival-season factors including demand surge, labour shortages, transport pressure and input price fluctuations are hypothesised to increase supply chain disruptions. Disruptions, in turn, reduce supply chain performance. Mitigation strategies moderate two pathways: (1) the relationship between festival pressures and disruptions, and (2) the relationship between disruptions and performance.

Theoretically, this framework integrates three complementary perspectives. Institutional theory explains why festival disruptions are persistent: they are embedded in stable normative and cognitive structures that constrain operational adjustment (Scott, 2008). Resource dependence theory explains the exposure mechanism; firms dependent on scarce seasonal labour, informal transport and constrained warehousing are structurally vulnerable during festival periods (Pfeffer and Salancik, 1978). Dynamic capability theory explains the moderation mechanism; firms that develop anticipatory sensing and reconfiguring routines can systematically weaken the disruptive effects of festival pressures (Teece et al., 1997).

3.2 Hypothesis development

H1. Festival-season factors have a significant positive effect on supply chain disruptions.

Research across South Asia documents that festival-driven demand surges, labour migration and transport congestion systematically increase operational disruptions in supply chains operating under infrastructure constraints (Mila et al., 2022; Khan and Sharma, 2020). Institutional theory predicts that normative pressures which make festival-period resource scarcity both predictable and difficult to circumvent perpetuate this relationship (Scott, 2008). Resource dependence theory reinforces it; firms that depend on seasonal labour pools and informal logistics networks are structurally exposed to scarcity precisely when demand peaks (Pfeffer and Salancik, 1978). Unlike generic seasonal demand patterns, festival pressures create simultaneous, multi-node disruptions that overwhelm capacity buffers and coordination mechanisms. Although no prior study has formally tested this relationship in Bangladesh's festival context, the evidence base from South Asian supply chains and developing-economy logistics strongly supports a positive effect.

H2. Supply chain disruptions have a significant negative effect on supply chain performance.

The disruption performance relationship is well established in supply chain literature. Ivanov and Dolgui (2020) demonstrate that disruptions degrade supply chain viability by reducing capacity utilisation and adaptability. Bier et al. (2020) and Katsaliaki et al. (2022) document that disruptions increase lead times, raise costs and reduce service reliability across multiple performance dimensions. In Bangladesh's festival context, these effects are compounded by weak inter-firm coordination and limited digital visibility, which prevent firms from responding rapidly to disruption signals. The expected negative effect is thus grounded in both established disruption theory and the specific institutional conditions of the Bangladeshi supply chain.

H3. Supply chain disruptions mediate the relationship between festival-season factors and supply chain performance.

Mediation hypotheses require justification of the causal mechanism. The proposed mechanism is as follows: festival pressures do not degrade performance directly; rather, they increase disruption intensity procurement delays, stockouts, transport bottlenecks and workforce gaps.

It is these operational disruptions that change pressure into performance deterioration. This process-based explanation is consistent with the disruption literature's emphasis on intermediate operational mechanisms (Aldrighetti *et al.*, 2021; Kamalahmadi and Parast, 2017) and extends it to the specific case of culturally embedded, recurring disruptions in developing economies. Unlike unexpected crises, where performance effects may be more direct, festival-driven effects are expected to be fully mediated through disruption intensity because firms have time to prepare for the demand event itself, even if they lack the capabilities to prevent the operational disruptions it triggers.

- H4. Mitigation strategies moderate the relationship between festival-season factors and supply chain disruptions, such that the positive effect of festival pressures on disruptions is weaker when mitigation capabilities are stronger.

Dynamic capability theory predicts that firms with well-developed sensing and seizing routines are better positioned to absorb environmental shocks (Teece *et al.*, 1997). When applied to festival disruptions, firms employing proactive forecasting, pre-positioned inventory, multi-source supplier strategies and pre-booked logistics capacity should experience fewer operational disruptions during festival periods. This moderation hypothesis differs from a direct-effect argument. It does not claim mitigation eliminates festival pressure, but that it attenuates the conversion of pressure into disruption. Evidence from supply chain resilience research supports this mechanism (Kamalahmadi and Parast, 2017; Manhart *et al.*, 2020).

- H5. Mitigation strategies moderate the relationship between supply chain disruptions and performance, such that the negative effect of disruptions on performance is weaker when mitigation capabilities are stronger.

Even when disruptions occur, firms with robust mitigation capabilities are better positioned to respond, recover and maintain acceptable performance. This is consistent with Sheffi's (2015) resilience theory, which distinguishes absorption capacity from recovery capacity. Digital tracking tools, workforce contingency plans and pre-arranged alternative logistics routes provide firms with absorptive and restorative capabilities that limit the performance consequences of disruptions. This moderation pathway thus reflects the adaptive and reconfiguring dimensions of dynamic capability.

4 Methodology

4.1 Research design

This study adopts a post-positivist quantitative design rooted in explanatory inference. A cross-sectional survey captured supply chain professionals' perceptions and experiences during major festival periods, appropriate for testing hypothesised mediation and moderation relationships in supply chain research (Hair *et al.*, 2019; Voss *et al.*, 2002). Cross-sectional data carry inherent temporal limitations in establishing causality; the mediating and moderating pathways are therefore theoretically grounded and tested using bootstrap-based inference rather than treated as definitive causal proof (Preacher and Hayes, 2008).

4.2 Population, sampling and data collection

The target population comprised supply chain professionals in sectors with high exposure to festival-driven demand volatility in Bangladesh: apparel manufacturing, FMCG, retail, logistics and transport, and e-commerce, selected for documented sensitivity to festival-season disruption (Mila *et al.*, 2022; Khan and Sharma, 2020).

Sample size was determined via G*Power analysis (Faul *et al.*, 2009; $f^2 = 0.15$, power = 0.95, $\alpha = 0.05$), yielding a minimum of 138, and Hair *et al.*'s (2019) 10:1 item ratio (250 minimum). Accounting for an anticipated 65% response rate, 600 invitations were

distributed; 412 responses were received, and 384 were useable after removing incomplete or patterned responses (64%), exceeding both thresholds.

Invitations were distributed via LinkedIn, professional WhatsApp groups and logistics association email lists, with a screening question confirming direct involvement in supply chain operations during a major Bangladeshi festival; 216 of 600 invitees were screened out or did not respond. This non-probability, professional-network sampling was necessary given the absence of a formal sampling frame, but it introduces selection bias I acknowledge at the design stage: reliance on LinkedIn and association-affiliated groups likely over-represents formally registered, digitally connected firms and under-represents informal-sector workers, who are plausibly among the most exposed to festival-period disruption. Findings are therefore most representative of the formal and semi-formal segments studied.

4.3 Measurement instruments

All constructs were measured on five-point Likert scales adapted from validated instruments. Festival-season factors (6 items; [Khan and Sharma, 2020](#); [Aziz et al., 2025](#)) capture demand unpredictability, labour shortages, transport congestion, lead-time extensions and price volatility. Supply chain disruptions (6 items; [Bier et al., 2020](#); [DuHadway et al., 2019](#)) measure procurement delays, stockouts, delivery disruptions, lead-time increases, cost escalations and service-quality decline. Mitigation strategies (7 items; [Kamalahmadi and Parast, 2017](#); [Manhart et al., 2020](#); [Umar and Wilson, 2023](#)) measure buffering, supplier diversification, forecasting, digital tracking, workforce scheduling, logistics pre-coordination and perceived effectiveness, with observable actions separated from effectiveness evaluations to avoid tautological measurement. Supply chain performance (6 items; [Beamon, 1999](#); [Chowdhury and Quaddus, 2017](#)) captures delivery timeliness, reliability, cost control, satisfaction, continuity and overall performance. The discriminant validity was assessed via Fornell–Larcker and HTMT.

Two item pairs warrant clarification given their conceptual proximity. Procurement delays (SCD1) captures the frequency and severity of festival-period delay events, an occurrence measure, whereas on-time delivery (SCP1) captures the firm's aggregate delivery timeliness across the period, an outcome measure; a firm can absorb frequent isolated delays through buffer capacity without its aggregate timeliness suffering, and vice versa. Similarly, rising operational costs (SCD5) captures unplanned cost escalations as they occur, whereas cost control (SCP3) captures overall success in maintaining budget despite such escalations. The disruption items thus measure intervening events; the performance items measure evaluative outcomes. This distinction was verified empirically through discriminant validity testing (Section 5.2), confirming the two constructs load as statistically distinct.

4.4 Common method bias assessment

Because all data were self-reported from a single source, CMB is a potential concern. Procedurally, predictor and outcome items were separated, anonymity was assured and scale anchors were varied. Statistically, Harman's single-factor test yielded a largest factor of 28.3% of variance, below the 50% threshold ([Podsakoff et al., 2003](#)). As Harman's test alone is a comparatively weak diagnostic, it was supplemented with a full-collinearity test ([Kock, 2015](#)): each principal construct was regressed on all remaining constructs, yielding VIFs of 1.42–1.68, well below the conservative 3.3 threshold. Convergent evidence from both tests indicates CMB is unlikely to materially distort the observed relationships.

4.5 Measurement quality assessment and analytical strategy

Reliability was assessed via Cronbach's alpha and CR; convergent validity via AVE; discriminant validity via the Fornell–Larcker criterion and HTMT (<0.85). Hypothesis testing used hierarchical multiple regression in SPSS v.28, with controls entered in Step 1 and focal

predictors in Step 2 (H1, H2). Mediation (H3) was tested via PROCESS macro (Model 4; Hayes, 2018; 5,000 bootstrap samples, 95% bias-corrected CIs); moderation (H4, H5) via PROCESS Model 1 with mean-centred interaction terms. Predictor-level VIFs, a standard regression diagnostic distinct from the full-collinearity CMB VIFs in Section 4.4, were all below 3.5, within the conventional threshold of 5. PROCESS macro version 4.2 was used throughout.

4.5.1 Sample profile and descriptive statistics. The demographic profile of the 384 valid respondents. The sample covers all five target sectors, with FMCG (38.0%) and logistics/transport (26.0%) most represented. Managers constitute the largest occupational group (58.6%), with executives (25.8%) and supervisors (15.6%) comprising the remainder. Most respondents have substantial experience; 46.4% have 3–7 years in supply chain roles, 28.9% have 8 or more years and 24.7% have fewer than three years. This distribution provides a broad range of experiential perspectives on festival-period supply chain management.

Descriptive statistics reveal that festival-season pressures are identified as relatively high ($M = 3.92$, $SD = 0.61$), generating frequent disruptions ($M = 3.85$, $SD = 0.67$). Mitigation strategies are adopted to a moderate extent ($M = 3.71$, $SD = 0.64$), while overall supply chain performance is moderate ($M = 3.45$, $SD = 0.72$). The gap between disruption severity and mitigation adoption highlights the practical pressure of building stronger anticipatory capabilities.

4.5.2 Construct validity and discriminant validity. All AVE values exceed 0.50 (range 0.57–0.63), confirming convergent validity. The Fornell–Larcker criterion was satisfied. The square root of each construct's AVE exceeded all inter-construct correlations. HTMT ratios for all construct pairs fell below 0.85, confirming discriminant validity (Henseler et al., 2015). These results indicate that the two constructs are statistically distinct and properly measured.

4.5.3 Hypothesis testing. After accounting for control variables, festival-season factors significantly and positively predict supply chain disruptions ($\beta = 0.54$, $p < 0.001$, $\Delta R^2 = 0.28$), supporting H1. Industry sector controls were significant for logistics ($\beta = 0.18$, $p < 0.05$) and e-commerce ($\beta = 0.14$, $p < 0.05$) relative to FMCG, confirming that disruption intensity differs meaningfully across sectors and that sector effects are appropriately partitioned from the focal relationship. Supply chain disruptions significantly and negatively predict supply chain performance ($\beta = -0.51$, $p < 0.001$, $\Delta R^2 = 0.24$), supporting H2. Firm size and experience were not significant predictors of performance after controlling for disruptions and sector.

Mediation analysis (H3) using PROCESS Model 4 with 5,000 bootstrap samples revealed a significant indirect effect of festival-season factors on supply chain performance via supply chain disruptions (indirect effect = -0.28 , 95% BCI [-0.38 , -0.19]). The direct effect of festival-season factors on performance, controlling for disruptions, was not significant ($\beta = -0.09$, $p = 0.18$), indicating full rather than partial mediation. These results support H3: disruptions serve as the complete mediating mechanism translating festival pressures into performance deterioration.

Moderation analysis (H4) using PROCESS Model 1 revealed a significant interaction between festival-season factors and mitigation strategies in predicting supply chain disruptions ($\beta = -0.21$, $t = -3.45$, $p = 0.001$). At high levels of mitigation capability (+1 SD), the effect of festival-season factors on disruptions was substantially weaker than at low levels (−1 SD), confirming H4. Moderation analysis (H5) revealed a significant interaction between supply chain disruptions and mitigation strategies in predicting performance ($\beta = 0.19$, $t = 2.98$, $p = 0.003$), with high mitigation capability attenuating the negative disruption performance relationship, confirming H5.

5 Finding and discussions

5.1 Festival seasons as a distinct disruptive phenomenon

The confirmation of [H1](#) establishes empirically that festival-season pressures demand surges, labour shortages and logistics congestion, significantly amplifying supply chain disruption intensity in Bangladesh. This finding builds on and extends prior South Asian evidence ([Minhus and Huie, 2021](#); [Kumar et al., 2021](#)) by providing controlled, multi-sector empirical evidence from a substantially larger sample. The significant sector-level variation is itself an important finding. It suggests that disruption exposure is not uniform across industries, and that sector-specific structural characteristics shape vulnerability. E-commerce firms face last-mile exposure during festivals because demand spikes concentrate in narrow delivery windows with limited workforce availability. Logistics firms face capacity constraints as freight demand surges simultaneously across all client sectors.

Crucially, festival disruptions in Bangladesh differ from general seasonal demand patterns in ways that matter theoretically and practically. Unlike Christmas retail seasonality in developed economies where infrastructure is robust and digital integration is high, formal logistics providers operate at scale festival disruptions in Bangladesh are amplified by institutional misalignment and infrastructural fragility. This validates the institutional theory perspective. The resolution of festival disruptions reflects not merely operational failure but systemic embeddedness that requires institutional-level as well as firm-level responses. Policymakers, as well as supply chain managers, have roles to play in reducing festival-period vulnerability.

5.2 Disruptions as the primary performance mechanism

The full mediation result ([H3](#)) is particularly significant theoretically. It indicates that festival pressures do not impair supply chain performance directly; firms can manage elevated demand, as evidenced by the fact that sales typically increase during festivals but only through the operational disruptions they trigger. This finding extends [Ivanov and Dolgui \(2020\)](#) and [Kamalahmadi and Parast \(2017\)](#) by demonstrating that the disruption performance pathway applies specifically to recurring, culturally embedded disruptions, not only to unexpected crises. The full mediation pattern suggests that if firms could eliminate festival-triggered disruptions through superior mitigation, festival pressures would not reduce performance at all. This is an important practical implication; the problem is not festivals, but the operational disruptions that inadequate preparation allows festivals to trigger.

The strong negative disruption performance coefficient ($\beta = -0.51$) is consistent with the broader disruption literature and reflects the compounding nature of festival-period failures in the Bangladeshi context. Delay procurement extends lead times, which reduces stock availability, increases customer complaints and erodes service reputation, while simultaneously escalating costs through emergency sourcing and overtime. These cascading effects explain why performance remains moderate even as festival sales increase cost and reliability dimensions deteriorate faster than revenue improves.

5.3 Mitigation strategies as anticipatory dynamic capabilities

The moderation results ([H4](#), [H5](#)) confirm that mitigation strategies operate as effective buffers at two distinct points in the causal chain. [H4](#)'s confirmation indicates that proactive mitigation implemented before festival onset reduces the severity of disruptions that festival pressures trigger. This is consistent with dynamic capability theory's prediction that routinised sensing and reconfiguring capabilities attenuate environmental shocks ([Teece et al., 1997](#)). The practical insight here is specific to the Bangladesh context, practices such as pre-booking freight capacity, building safety stock well in advance, engaging temporary staffing agencies before festival labour migration begins. Pre-qualifying backup suppliers are not generic supply chain improvements but contextually targeted responses to the predictable structure of festival disruptions.

H5's confirmation indicates that even when disruptions materialise despite mitigation efforts, firms with stronger mitigation capabilities experience smaller performance penalties. This reflects the absorptive and restorative dimensions of resilience (Sheffi, 2015). Digital tracking tools provide visibility enabling faster response. Pre-established contingency logistics routes reduce recovery time; cross-trained employees enable rapid redeployment. These capabilities transform firms' relationship with disruption from reactive firefighting to managed adaptation consistent with Sheffi's (2015) distinction between resilient and merely efficient supply chains.

The moderating effects are not uniform across all mitigation practices. Demand forecasting and inventory buffering showed stronger effects on H4, while digital tracking and logistics coordination showed stronger effects on H5. This differentiation provides more actionable guidance than the generic recommendation to "improve mitigation". Firms should invest in forecasting and inventory before festivals and in digital infrastructure and logistics contingency plans throughout the year.

5.4 Theoretical contributions

This study makes three primary theoretical contributions. First, it formally establishes festival-driven disruptions as a theoretically distinct class of supply chain disruption recurring, institutionally embedded and culturally anchored that requires analytical frameworks beyond conventional crisis-oriented resilience models. This distinction is empirically supported by the full mediation finding and the sector-specific variation, which would not be expected if festival disruptions were merely a variant of general seasonal demand. Second, the study integrates institutional, resource dependence and dynamic capability theories to provide a multi-level causal explanation. Institutional structures make festival disruptions persistent; resource dependencies make firms structurally exposed; and mitigation capabilities attenuate both exposure and impact. This integration produces a more complete theoretical account than any single theory could provide. Third, the study extends dynamic capability theory by demonstrating that anticipatory, routinised mitigation rather than reactive crisis response is the appropriate capability configuration for managing recurrent, predictable disruptions.

5.5 Managerial implications

Specific implications follow from these findings. First, for perishable goods and FMCG firms, the priority intervention is demanding forecasting combined with pre-positioned inventory near consumption centres. Festival-period stockouts in these categories are particularly damaging because demand cannot be deferred. Second, for apparel manufacturers, the critical vulnerability is procurement delays as suppliers face the same festival-period pressures simultaneously. Multi-source supplier engagement and advanced purchase orders placed 8–12 weeks before major festivals represent a targeted mitigation strategy. Third, for e-commerce firms, last-mile delivery capacity is the binding constraint during festival periods. Pre-contracting additional delivery agents, establishing temporary pick-up points and integrating informal delivery networks through digital platforms are contextually appropriate responses. Fourth, for all sectors, informal logistics providers should be treated as strategic partners, not supplementary resources requiring proactive relationship management and integration into digital tracking systems before festival periods begin. Excluding informal networks from advance planning creates coordination gaps precisely when coordination is most critical.

For policymakers, the persistence of festival disruptions despite their predictability indicates systemic failures that individual firm mitigation cannot fully correct. Infrastructure investments such as road expansion, dedicated freight corridors and public logistics hubs would reduce the baseline congestion that festivals amplify. Digital infrastructure investments broadband penetration; logistics platform interoperability standards would enable the digital visibility that effective mitigation requires that many Bangladeshi firms currently absence.

6. Conclusions, limitations and future research

This study provides empirically grounded, theoretically articulated evidence that festival seasons in Bangladesh generate a predictable but institutionally entrenched cycle of supply chain disruptions that systematically degrade performance. Disruptions fully mediate the festival pressure performance relationship, and mitigation strategies attenuate both the pressure-to-disruption and disruption-to-performance pathways. The findings establish festival-driven disruptions as a theoretically distinct phenomenon warranting dedicated research attention, and offer a multi-theory framework integrating institutional, resource dependence and dynamic capability perspectives that advances understanding of recurrent, culturally embedded disruptions in emerging economies.

Several limitations should be noted. The cross-sectional design prevents causal inference; experimental designs would improve causal claims. Although the sample size meets established thresholds, the purposive and snowball sampling approach limits external validity to the population of supply chain professionals engaged in these professional networks. All constructs are measured through self-report, which is also susceptible to social desirability bias given that respondents evaluate the effectiveness of mitigation efforts they themselves helped implement. Future research should incorporate objective secondary data, such as audited financial statements, logistics-provider delivery records or firm-level operational cost data, to validate self-reported mitigation effectiveness against actual disruption costs incurred during festival periods. The study treats Bangladesh as a homogeneous institutional context; important variation exists across regions and between formal and informal sector firms that future research should explore. While industry controls were included, more detailed multi-group analysis would provide richer sector-specific insights.

Future research should pursue several directions. Longitudinal studies tracking supply chain performance across multiple festival cycles within the same organisations would establish whether mitigation capabilities improve over time through organisational learning, as dynamic capability theory predicts. Comparative studies across South Asian and Southeast Asian economies, where similar festival dynamics operate under varying institutional conditions, would establish the boundary conditions of these findings. Finally, research examining the role of platform-mediated integration of informal logistics actors during festival periods would address a theoretically interesting and practically significant gap; how digital platforms can extend supply chain coordination to actors who currently operate outside formal systems.

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