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Product Recall and Customer Relationship Recovery: Developing an Integrative Framework through a TCCM-Based Systematic Literature Review

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Abstract:
Product recalls threaten customer trust, satisfaction, loyalty, and brand equity, creating a need to understand how firms can recover relationships after product failures. This study aims to map the literature on product recall and customer relationship recovery, identify research gaps, and develop an integrative conceptual framework. Drawing on crisis management, service recovery, justice, trust repair, organizational capability, and digital communication perspectives, the study conducts a systematic literature review of 40 Scopus-indexed Q1–Q2 articles published between 2016 and 2026. Article selection follows PRISMA 2020, while synthesis applies the theory–context–characteristics–methodology framework. The findings show that crisis management, remedy selection, consumer relational responses, and quantitative archival methods dominate research. In contrast, integrative frameworks, operational capabilities, competitor responses, digital analytics, and mixed methods remain limited. The study proposes a sequential framework linking risk detection, recall decisions, communication, remedies, consumer participation, and relationship recovery, thereby extending theoretical integration and managerial guidance for post-recall recovery.

INTRODUCTION

The European Union's Safety Gate system recorded 4,137 alerts concerning dangerous products in 2024, the highest number reported since the system was established in 2003, indicating that product safety remains a critical challenge for both firms and regulatory authorities (Commission, 2025). The scale of product recalls is further illustrated by the Takata airbag crisis, which involved approximately 67 million units in the United States and was associated with 28 deaths and more than 400 injuries caused by exploding airbag inflators (National Highway Traffic Safety Administration [NHTSA], 2026). Substantial financial consequences were also evident in the Philips Respironics case, in which the company agreed to a USD 1.1 billion litigation settlement and recognized a provision of EUR 982 million in relation to recalled sleep and respiratory care devices (Philips, 2024). These cases demonstrate that product failures extend beyond technical deficiencies and may escalate into safety, legal, financial, and reputational crises that threaten the continuity of firm–customer relationships. Meta-analytic evidence further indicates that product crises generate stronger negative consumer evaluations when the threat is severe, consumer safety is endangered, product performance is compromised, and the crisis occurs in cultures characterized by high uncertainty avoidance (Yang et al., 2022).

Restoring customer relationships following a product recall requires responses capable of preventing loyalty erosion and rebuilding trust, as customers who abandon a brand or product category during a recall period are often difficult to recover (Cleeren et al., 2008). Proportionate compensation, responsive employee behaviour, and fair recovery procedures can strengthen perceptions of justice and improve post-failure satisfaction and loyalty (Gelbrich & Roschk, 2011). Voluntary product recall strategies have also been shown to be more effective than mandatory recalls or inaction in restoring customer perceptions of corporate competence, benevolence, and integrity (Wang et al., 2025). The effectiveness of product-harm crisis management is additionally shaped by organizational response, response timing, corporate social responsibility reputation, external effects, and crisis severity (Vassilikopoulou et al., 2009). Collectively, these findings suggest that service recovery, crisis communication, compensation, and corrective action should be examined as an interconnected set of responses through which firms attempt to restore customer relationships after a product crisis.

Research on product recall and product-harm crises should not be confined to financial losses, litigation costs, or changes in market performance. A more fundamental concern lies in understanding how product crises reshape customer trust, satisfaction, loyalty, repurchase intention, and perceptions of brand equity. Actions such as apologies, compensation, product replacement, refunds, voluntary recalls, corrective measures, and transparent communication have been discussed as recovery mechanisms, yet the relationships among these actions remain insufficiently integrated. Existing studies continue to separate recall characteristics, recovery strategy choices, customers' cognitive and affective evaluations, and relationship recovery outcomes into distinct streams of inquiry. This fragmentation creates a need for a structured synthesis capable of explaining how crisis characteristics, brand strength, and recovery strategies jointly shape the customer relationship recovery process.

Yang et al. (2022), through a meta-analysis covering three decades of research, found that product crises generally reduce consumer evaluations, with stronger adverse effects when threats are severe, failures concern product performance, and consumer safety is compromised. Crises occur in cultures with high uncertainty avoidance. Mafael et al. (2022) demonstrated that full remedies can limit declines in customer satisfaction and accelerate recovery. However, their effectiveness is nonlinearly influenced by pre-crisis brand equity and the severity of the product failure. Freundt & Foschiera (2024) found that loyal customers report stronger perceptions of brand integrity and benevolence than first-time customers when firms adopt passive responses.

In contrast, voluntary recalls increase trust among both groups and reduce the difference between them. These studies indicate that the consequences of product crises and the effectiveness of recovery efforts are not universal but depend on crisis characteristics, corrective actions, brand strength, and the pre-existing customer–brand relationship. Despite their valuable contributions, these studies continue to examine consumer evaluations, post-recall satisfaction, brand equity, and trust recovery through different research questions, contexts, and analytical models.

Previous studies generally agree that product recalls and product-harm crises damage firm–customer relationships, yet they often examine crisis characteristics, recovery strategies, brand equity, recall severity, and customer responses separately. This fragmented approach leaves unresolved whether brand equity and pre-crisis loyalty protect customer relationships or intensify disappointment and backlash under severe recall conditions (Mafael et al., 2022). The present study addresses this evidence and theoretical gap by synthesizing recall characteristics, service recovery, crisis communication, perceived justice, responsibility attribution, satisfaction, trust repair, and relationship recovery within a unified analytical framework. It also identifies corporate reputation, product category, cultural context, industry characteristics, and pre-crisis loyalty as boundary conditions that may alter the effectiveness of recovery strategies. Accordingly, this study contributes an integrative customer relationship recovery model that explains how recall characteristics and organizational responses shape customer evaluations, satisfaction, trust, loyalty, and brand equity recovery.

The continuing scale of product recalls remains a pressing concern, as the United States Consumer Product Safety Commission conducted 333 voluntary recalls involving approximately 41 million consumer product units during fiscal year 2024 (U.S. Consumer Product Safety Commission [CPSC], 2025). Firms therefore require a stronger knowledge base for determining appropriate combinations of apology and compensation, because the effectiveness of these strategies varies according to the type of trust violation experienced by customers (Cui et al., 2018). Recovery strategies cannot be applied uniformly, as compensation tends to be more effective under low-severity failures, whereas rapid responses become increasingly important as failure severity rises (Liu et al., 2019). The dispersion of product recall research across multiple disciplines, combined with its predominant focus on post-recall outcomes, further highlights the need for a knowledge structure that integrates different stakeholders and stages of the crisis process (Li et al., 2022). The urgency of this study therefore lies in transforming fragmented evidence into a coherent conceptual foundation for theoretical development and managerial decision-making in customer relationship recovery following product crises.

This study aims to map and synthesize the literature on product recall and customer relationship recovery, identify research gaps and patterns of interaction among service recovery strategies, brand equity, and recall severity in maintaining customer satisfaction, and develop an integrative conceptual framework and future research agenda concerning the restoration of trust, loyalty, and brand equity.

RESEARCH METHODS

This study uses a systematic literature review to examine product recall, service recovery strategies, and customer relationship recovery through a transparent and replicable process. The review integrates fragmented multidisciplinary findings, identifies knowledge patterns, and resolves inconsistent evidence across marketing, consumer behaviour, crisis communication, brand management, and operations management (Paul et al., 2021; Vrontis et al., 2021). The study follows the PRISMA 2020 guidelines to document article identification, screening, eligibility assessment, and final inclusion clearly and traceably (Page et al., 2021). It analyzes eligible articles using the theory–context–characteristics–methodology framework to map theoretical foundations, research settings, variable relationships, and methodological approaches (Paul & Rosado-

Serrano, 2019). The search used the Scopus TITLE-ABS-KEY function and combined three conceptual clusters, namely product-crisis phenomena, customer relationship recovery, and corporate response strategies, through Boolean operators to ensure consistent article retrieval and metadata verification.

Table 1. Data Source and Article Selection Criteria

Component	Study Criteria
Database	Scopus
Search fields	Title, abstract, and keywords (*TITLE-ABS-KEY*)
Search string	("product recall" OR "product withdrawal" OR "product-harm crisis") AND ("customer trust" OR "customer satisfaction" OR "customer loyalty") AND ("service recovery" OR "crisis communication" OR "compensation")
Scopus search format	TITLE-ABS-KEY(("product recall" OR "product withdrawal" OR "product-harm crisis") AND ("customer trust" OR "customer satisfaction" OR "customer loyalty") AND ("service recovery" OR "crisis communication" OR "compensation"))
Publication period	2016–2026
Document type	Peer-reviewed journal articles
Language	English
Publication status	Final publication stage
Source quality	Articles published in Scopus-indexed Q1 or Q2 journals
Inclusion criteria	Articles addressing product recall, product withdrawal, or product-harm crises; examining customer trust, satisfaction, loyalty, or customer relationship recovery; discussing service recovery, crisis communication, compensation, or corporate corrective actions; providing an abstract and accessible full text; and demonstrating a direct relationship with the research objective
Exclusion criteria	Articles published outside the 2016–2026 period; articles appearing in journals outside the Q1–Q2 categories; documents without abstracts; reports for which full texts could not be retrieved; document types other than journal articles; and studies concerning brand crises, negative publicity, or general service failures without a direct connection to defective products, product withdrawal, or product-harm crises
Initial records	329 records
PRISMA 2020 process	A total of 151 records were removed before screening, comprising 122 records published outside the specified period, 20 records from journals outside the Q1–Q2 categories, and 9 records without abstracts. No duplicate records were identified. Subsequently, 178 records entered the screening stage, 136 reports could not be retrieved, 42 full-text reports were assessed for eligibility, and 2 reports were excluded following the full-text assessment.
Additional sources	No articles were identified through other databases or supplementary search methods
Final sample	40 articles

Source: *Authors' compilation based on the Scopus search and PRISMA 2020 screening process (2026).*

As shown in Figure 1, the study applied the four PRISMA 2020 stages of identification, screening, eligibility assessment, and inclusion to ensure a transparent and traceable selection process (Page et al., 2021). The Scopus search identified 329 records, of which 151 were removed before screening because 122 fell outside the 2016–2026 period, 20 came from journals outside the Q1–Q2 categories, and 9 lacked abstracts, leaving 178 records for screening. Of the 178 reports sought for retrieval, 136 were unavailable, while full-text assessment excluded two of the remaining 42 reports for failing to meet the eligibility criteria. The process therefore produced a final sample of 40 articles, with no additional studies identified through other databases, reference tracking, or alternative methods. This sample provides an adequate foundation for TCCM mapping, integrative framework development, and future research agenda formulation because a domain of approximately 40 relevant articles can indicate sufficient literature maturity when assessed alongside source quality, conceptual coverage, and consistent selection criteria (Paul et al., 2021).

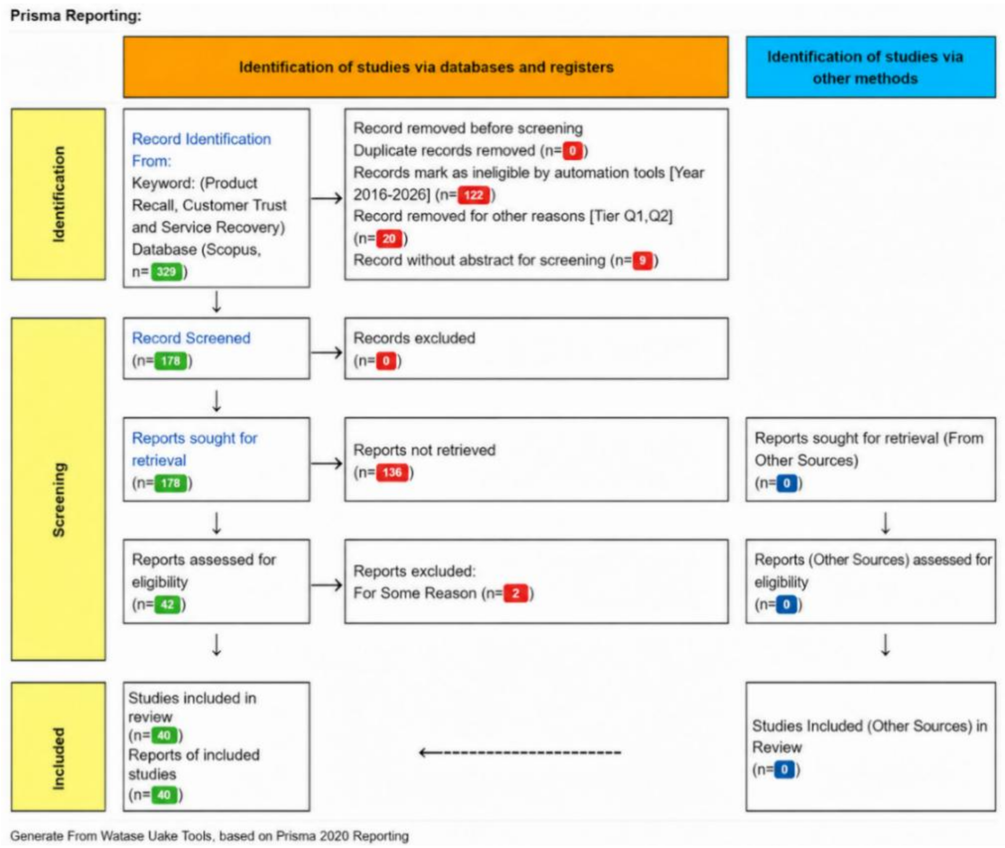

Figure 1. Article Selection Process Based on PRISMA 2020

Source: *Adapted from Page et al. (2021) and generated using Watase Uake Tools based on the authors' article screening process (2026)*

The study analyzed 40 selected articles using the theory–context–characteristics–methodology (TCCM) framework developed by Paul & Rosado-Serrano (2019). The theory dimension identified formal theories, analytical functions, levels of analysis, and opportunities for theoretical integration. The context dimension mapped geographical, industrial, organizational, product, crisis, and communication settings. In contrast, the characteristics dimension examined recall attributes, recovery strategies, consumer responses, relational mechanisms, and customer-, firm-, and market-level outcomes. The methodology dimension evaluated research designs, data sources, sampling procedures, measurement approaches, time horizons, units of analysis, and analytical techniques. The study compared findings across the four dimensions to identify dominant patterns, theoretical and contextual gaps, methodological weaknesses, and the basis for an integrative conceptual framework and future research agenda.

RESULTS AND DISCUSSION

Results

To examine the development and research attention toward product recall studies, the annual distribution of publications was analyzed over the selected period. The publication trend provides an overview of how scholarly interest has evolved in response to emerging challenges, particularly changes in market conditions, crisis events, technological developments, and shifts in consumer behavior. Figure 2 illustrates the annual publication pattern, highlighting fluctuations in research output and indicating periods of increased or decreased academic engagement with product recall issues.

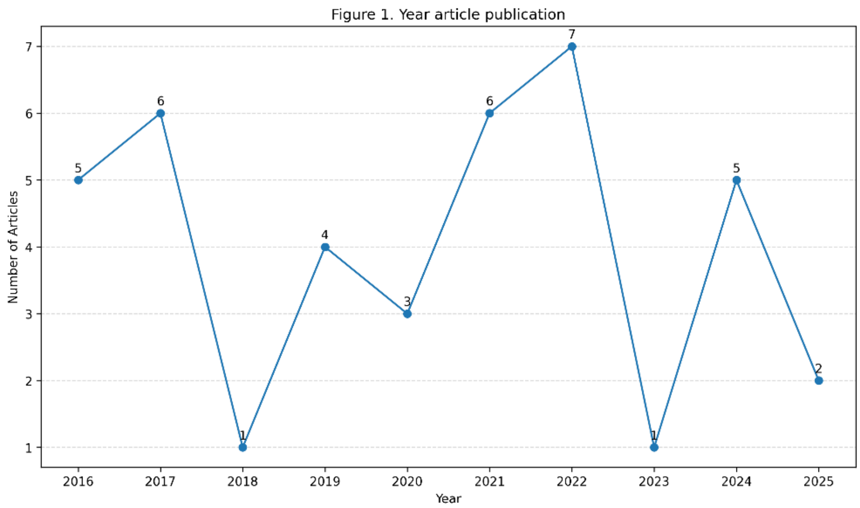

Figure 2. Annual Distribution of Publications

The increase in the number of publications during 2021–2022 can be understood in relation to the COVID-19 pandemic, which heightened scholarly attention to supply chain vulnerability, product safety, market uncertainty, and the need for firms to respond to crises promptly and transparently. Mobility restrictions and growing reliance on digital channels also stimulated research on recall communication, media coverage, consumer compliance, and the dissemination of information through social media (Beattie et al., 2021; Gao et al., 2022; Pagiavlas et al., 2022). However, the figure shows a sharp decline to a single article in 2023, suggesting that this year is better interpreted as a transitional phase following the pandemic-driven surge. Publication output rebounded in 2024, which may reflect the maturation of digitalization through the use of online brand communities, data analytics, dialogic communication, and measures of consumer participation in recall processes (Astvansh et al., 2024; Casey et al., 2024; Raithel et al., 2024). Accordingly, the 2021–2022 surge represents an academic response to pandemic-related crisis pressures, whereas the renewed increase in 2024 signals a shift toward product recall research that is more digital, interactive, and oriented toward customer relationship recovery.

The TCCM analysis shows that product recall research mainly focuses on crisis management, customer relationship recovery, consumer responses, and quantitative archival methods. However, limited attention to integrative frameworks, operational capabilities, competitor responses, digital analytics, and mixed methods indicates that the field remains fragmented.

T — Theory

Table 2. Classification of Theories and Frameworks in Product Recall Research

Theory or framework cluster	Theoretical focus	Articles included in the category	N	%
Crisis management and service recovery	Crisis response strategies, remedy selection, reputation restoration, corporate responsibility, and post-recall recovery	(Casey et al., 2024; Cleeren et al., 2017; Kang et al., 2023; Liu et al., 2016, 2017; Mafael et al., 2022; Muralidharan et al., 2019; Raithel et al., 2021; Robinson & Veresiu, 2021)	9	22.5%
Consumer trust, loyalty, justice, and attribution	Trust formation, loyalty, brand evaluation, responsibility attribution, repurchase intention, and responses to brand transgressions	(Byun et al., 2020; Datta & Mukherjee, 2022; Freundt & Foschiera, 2024; Hussain et al., 2025; Liu et al., 2021; Wang et al., 2025; Yang et al., 2022; Yin et al., 2016)	8	20.0%
Organizational, operational, risk, and capability perspectives	Organizational learning, decision-making, risk management, recall timing, supply chain capabilities, task complexity, and process optimization	(Eilert et al., 2017; Hall & Johnson-Hall, 2017, 2021; Mukherjee & Chauhan, 2021; Wood et al., 2017; Yao & Parlar, 2019; Zhang et al., 2020)	7	17.5%
Spillover, competition, and market signaling	Quality signals, spillover effects on competitors, changes in market value, competitive responses, and shifts in consumer choice	(Borah & Tellis, 2016; Fang et al., 2024; Hao et al., 2022; Topaloglu & Gokalp, 2018; Unsal et al., 2017; Zhou et al., 2019; Zou & Li, 2016)	7	17.5%
Digital media, information, and compliance	Social media amplification, information and publicity effects, digital analytics, media environments, risk communication, and consumer compliance	(Beattie et al., 2021; Gao et al., 2022; Hsu & Lawrence, 2016; Pagiavlas et al., 2022; Raithel et al., 2024; Zavala & Ramirez-Marquez, 2019)	6	15.0%
Conceptual, integrative, and stakeholder frameworks	Conceptual boundary setting for recalls, cross-disciplinary integration, recall stages, and multi-stakeholder relationships	(Astvansh et al., 2024; Khamitov et al., 2020; Li et al., 2022)	3	7.5%
Total			40	100.0%

Source: Authors' compilation (2026)

Crisis management and service recovery constitute the most prominent theoretical cluster, comprising nine articles or 22.5% of the reviewed studies. This pattern indicates that product recalls are primarily conceptualized as crises that require selecting appropriate remedies, calibrating responses to failure severity, and restoring customer relationships (Liu et al., 2016; Mafael et al., 2022; Raithel et al., 2021). The literature therefore places greater emphasis on responsive actions after a failure has occurred than on preventive efforts undertaken before a crisis. In contrast, conceptual, integrative, and stakeholder frameworks form the least represented cluster, accounting for only three articles or 7.5% of the reviewed studies. Astvansh et al. (2024), Khamitov et al. (2020), and Li et al. (2022) have sought to integrate conceptual boundaries, recall stages, and multi-stakeholder relationships, yet empirical tests of these frameworks remain limited. This condition underscores the need for a more comprehensive model that connects crisis management, service recovery, justice, trust restoration, organizational capabilities, and digital communication.

C — Context

To better understand the managerial implications addressed in product recall research, the reviewed articles were classified by their primary managerial decision domains. This classification identifies the key areas in which firms make strategic and operational decisions during recall processes, ranging from customer recovery and recall execution to communication, governance, financial consequences, and competitive responses. The categorization provides an overview of the dominant managerial priorities and highlights research areas that remain relatively limited within the existing literature, as presented in Table 3.

Table 3. Classification of Contexts by Managerial Decision Domain

Managerial decision Context	Contextual Focus	Articles Included in the Category	N	%
Remedy selection and customer relationship recovery	Determination of compensation, recovery justice, satisfaction, trust, loyalty, and post-recall repurchase intention	(Byun et al., 2020; Freundt & Foschiera, 2024; Hussain et al., 2025; Liu et al., 2016, 2021; Mafael et al., 2022; Muralidharan et al., 2019; Raithel et al., 2021; Wang et al., 2025)	9	22.5%
Recall timing, compliance, and execution capabilities	Recall timing, consumer compliance, organizational learning, traceability, supplier coordination, and product withdrawal effectiveness	(Eilert et al., 2017; Gao et al., 2022; Hall & Johnson-Hall, 2017, 2021; Pagiavlas et al., 2022; Raithel et al., 2024; Yao & Parlar, 2019; Zhang et al., 2020)	8	20.0%
Digital communication, media, and public engagement	Communication channel selection, social media monitoring, digital analytics, media coverage, online brand communities, and advertising responses	(Beattie et al., 2021; Borah & Tellis, 2016; Casey et al., 2024; Hsu & Lawrence, 2016; Robinson & Veresiu, 2021; Zavala & Ramirez-Marquez, 2019)	6	15.0%
Consumer evaluation, brand positioning, and brand resilience	Management of consumer perceptions, blame attribution, brand meaning, negative publicity, corporate responsibility, and post-crisis resilience	(Datta & Mukherjee, 2022; Hao et al., 2022; Kang et al., 2023; Topaloglu & Gokalp, 2018; Yang et al., 2022; Yin et al., 2016)	6	15.0%
Strategy, governance, and recall process integration	Conceptual boundary setting for recalls, integration of crisis strategies, cross-stage management, and multi-stakeholder coordination	(Astvansh et al., 2024; Cleeren et al., 2008; Khamitov et al., 2020; Li et al., 2022)	4	10.0%
Management of financial consequences and market value	Strategic responses to declines in firm value, share prices, reputational risk, advertising, and the long-term consequences of recalls	(Liu et al., 2017; Mukherjee & Chauhan, 2021; Unsal et al., 2017; Wood et al., 2017)	4	10.0%

Competitor response and competitive spillover	Assessment of recall effects on competitors, customer equity, changing market opportunities, and competitive promotional strategies	(Fang et al., 2024; Zhou et al., 2019; Zou & Li, 2016)	3	7.5%
Total			40	100.0%

Source: Authors' compilation (2026)

Remedy selection and customer relationship recovery constitute the most prominent managerial decision context, encompassing nine articles (22.5% of the reviewed studies). This finding indicates that firms primarily focus on compensation, perceived justice, and the restoration of customer trust and loyalty. The success of a product recall therefore depends not only on removing the affected product from the market but also on the firm's ability to align the remedy with the severity of the failure, brand strength, and customer characteristics. Competitor response, by contrast, is the least examined context, represented by only three articles or 7.5% of the reviewed studies. Existing research indicates that product recalls can influence competitors' market value, customer equity, and promotional intensity, but these competitive effects remain underexplored. The literature continues to emphasize firm–customer relationship recovery more strongly than the broader implications of recalls for competitive dynamics and market structure.

C — Characteristics

To provide a deeper understanding of the dominant themes and analytical orientations within product recall research, the reviewed studies were further classified based on their main research characteristics. This classification highlights the primary dimensions examined by previous scholars, including consumer responses, recall strategies, digital communication, market consequences, conceptual development, and organizational capabilities. The analysis enables the identification of prevailing research emphases as well as underexplored dimensions that require further investigation, as summarized in Table 4.

Table 4. Classification of Research Characteristics in Product Recall Studies

Characteristic Category	Characteristic Focus	Articles Included in the Category	N	%
Relational and behavioral consumer responses	Trust, satisfaction, loyalty, attribution, brand evaluation, perceived risk, forgiveness, and repurchase intention	(Byun et al., 2020; Casey et al., 2024; Datta & Mukherjee, 2022; Hao et al., 2022; Hussain et al., 2025; Kang et al., 2023; Liu et al., 2021; Topaloglu & Gokalp, 2018; Yang et al., 2022; Yin et al., 2016)	10	25.0%
Recall strategy, remedies, and corrective actions	Compensation selection, recall timing, failure severity, consumer participation, voluntary recall, and trust restoration	(Eilert et al., 2017; Freundt & Foschiera, 2024; Liu et al., 2016; Mafael et al., 2022; Muralidharan et al., 2019; Raithel et al., 2021, 2024; Wang et al., 2025; Yao & Parlar, 2019)	9	22.5%

Digital communication, media, and information dynamics	Social media, digital campaigns, publicity, data analytics, media bias, advertising, and crisis-information diffusion	(Beattie et al., 2021; Borah & Tellis, 2016; Gao et al., 2022; Hsu & Lawrence, 2016; Pagiavlas et al., 2022; Robinson & Veresiu, 2021; Zavala & Ramirez-Marquez, 2019)	7	17.5%
Financial, market, and competitive consequences	Firm value, share prices, abnormal returns, profitability, competitive spillover, customer equity, and competitors' promotional responses	(Fang et al., 2024; Liu et al., 2017; Mukherjee & Chauhan, 2021; Unsal et al., 2017; Wood et al., 2017; Zhou et al., 2019; Zou & Li, 2016)	7	17.5%
Conceptual frameworks and cross-stage integration	Conceptual boundaries of recalls, integration of service recovery and product-harm crises, recall stages, and multi-stakeholder relationships	(Astvansh et al., 2024; Cleeren et al., 2008; Khamitov et al., 2020; Li et al., 2022)	4	10.0%
Organizational capabilities and operational effectiveness	Organizational learning, traceability, supplier qualification, task complexity, recall capability, and product recovery	(Hall & Johnson-Hall, 2017, 2021; Zhang et al., 2020)	3	7.5%
Total			**40**	**100.0%**

Source: Authors' compilation (2026)

Relational and behavioral consumer responses constitute the most prominent characteristic, encompassing 10 articles (25.0% of the reviewed studies). This pattern indicates that trust, satisfaction, loyalty, attribution, and repurchase intention are the primary measures used to assess how product recalls affect customer relationships. Recall effectiveness is therefore increasingly evaluated through consumers' actual responses rather than solely through firms' decisions and corrective actions. Organizational capabilities and operational effectiveness, by contrast, represent the least examined characteristic, with only three articles (7.5% of the reviewed studies). Existing research indicates that organizational learning, traceability, supplier quality, task complexity, and recall capability influence the effectiveness of product withdrawal. However, operational characteristics remain underexplored, highlighting the need to connect firms' internal capabilities with response strategies, communication, consumer participation, and customer relationship recovery.

M — Methodology

To examine how product recall phenomena have been investigated empirically and theoretically, the reviewed studies were classified by methodological approach. This classification identifies the dominant research designs, analytical techniques, and data sources used to generate insights into recall strategies, consumer reactions, market consequences, and organizational responses. By mapping methodological patterns, the analysis reveals the prevailing empirical orientations and highlights opportunities for methodological diversification through more integrated, longitudinal, digital, and mixed-method approaches, as presented in Table 5.

Table 5. Classification of Methodological Approaches in Product Recall Research

Methodological Category	Methodological Focus	Articles Included in the Category	N	%
Archival, longitudinal, and econometric data	Testing relationships using recall data, firm characteristics, recall timing, sales, media, and market behavior through regression, panel models, moderation analysis, and survival analysis	(Beattie et al., 2021; Eilert et al., 2017; Gao et al., 2022; Hall & Johnson-Hall, 2017, 2021; Liu et al., 2016; Mafael et al., 2022; Muralidharan et al., 2019; Raithel et al., 2021, 2024; Topaloglu & Gokalp, 2018; Zhou et al., 2019)	12	30.0%
Surveys, experiments, and experimental evaluations	Testing consumer responses, trust, loyalty, attribution, brand evaluations, compliance, and repurchase intention through surveys, scenario experiments, group comparisons, SEM, and mediation and moderation analyses	(Byun et al., 2020; Datta & Mukherjee, 2022; Freundt & Foschiera, 2024; Hao et al., 2022; Hussain et al., 2025; Kang et al., 2023; Liu et al., 2021; Pagiavlas et al., 2022; Robinson & Veresiu, 2021; Wang et al., 2025; Yin et al., 2016)	11	27.5%
Event studies and market analysis	Measurement of share-price reactions, abnormal returns, firm value, and the financial consequences of recalls for focal firms and competitors	(Fang et al., 2024; Hsu & Lawrence, 2016; Liu et al., 2017; Unsal et al., 2017; Wood et al., 2017; Zou & Li, 2016)	6	15.0%
Conceptual, systematic, integrative, and meta-analytic reviews	Synthesis of prior findings, conceptual boundary setting, development of integrative frameworks, identification of research gaps, and estimation of aggregate effect sizes	(Astvansh et al., 2024; Cleeren et al., 2008; Khamitov et al., 2020; Li et al., 2022; Yang et al., 2022)	5	12.5%
Digital and computational analytics	Analysis of social media conversations, detection of product disruptions, mapping of information patterns, and visualization of digital responses	(Borah & Tellis, 2016; Zavala & Ramirez-Marquez, 2019)	2	5.0%
Analytical modeling and optimization	Development of decision models for recall timing, advertising strategies, cost–risk trade-offs, and competitive consequences	(Mukherjee & Chauhan, 2021; Yao & Parlar, 2019)	2	5.0%
Mixed methods	Integration of case studies with quantitative surveys, mapping of consumer response journeys, and thematic analysis of online communities	(Casey et al., 2024; Zhang et al., 2020)	2	5.0%
Total			**40**	**100.0%**

Source: Authors' compilation (2026)

Archival, longitudinal, and econometric designs constitute the most prevalent methodological category, accounting for 12 articles (30.0%) of the reviewed studies. This dominance indicates that product recall research has relied heavily on observed recall events, firm characteristics, recall timing, sales, media exposure, and market behavior to estimate relationships through regression, panel models, moderation analysis, and survival analysis. Survey, experimental, and quasi-experimental studies form the second-largest category, comprising 11 articles or 27.5%, and reflect a parallel emphasis on consumer-level mechanisms such as trust, loyalty, attribution, compliance, and repurchase intention. By contrast, digital and computational analytics, analytical modeling, and mixed-method designs remain limited, with only two studies (5.0%) in each category. This methodological concentration underscores the need for longitudinal mixed-method research that integrates archival records, digital trace data, organizational evidence, and consumer responses to capture the recall process more comprehensively.

Discussion

Building upon the findings from the TCCM analysis and the identified research gaps, an integrative conceptual framework was developed to explain how firms manage product recalls and transform crisis responses into customer relationship recovery. The framework synthesizes key dimensions identified across previous studies, including risk assessment, recall decision-making, communication strategies, remedy implementation, consumer participation, and post-recall relationship restoration. This perspective emphasizes that recall effectiveness depends on the alignment of managerial decisions, execution, stakeholder engagement, and recovery strategies. The proposed framework is presented in Figure 3.

Figure 3. Integrative Conceptual Framework of Product Recall and Customer Relationship Recovery

The proposed framework positions product recall as a sequential process involving risk detection, recall decision-making, communication, remedy implementation, consumer participation, and relationship recovery. Firms must assess product-failure severity, root causes, consumer risks, financial costs, legal consequences, and operational capacity before determining the timing and scope of a recall (Eilert et al., 2017; Liu et al., 2016; Yao & Parlar, 2019). Effective recall execution also requires clear recall boundaries and sufficient organizational capabilities (Astvansh et al., 2024; Zhang et al., 2020). Firms must communicate promptly and transparently through traditional and digital channels, while using digital analytics to detect problems and prevent crisis escalation (Borah & Tellis, 2016; Gao et al., 2022; Zavala & Ramirez-Marquez, 2019). They must also provide fair remedies, simplify return procedures, and encourage consumer participation because these factors determine satisfaction, trust, and recall compliance (Liu et al., 2021; Mafael et al., 2022; Pagiavlas et al., 2022; Raithel et al., 2024).

Customer relationship recovery represents the outcome of the recall process and includes restored trust, satisfaction, loyalty, repurchase intention, and brand reputation. Fair, consistent, and accountable responses can reduce negative evaluations and encourage consumers to maintain their relationships with affected brands (Byun et al., 2020; Kang et al., 2023; Wang et al., 2025). Successful recovery also promotes positive word of mouth, repeat purchases, reputational resilience, and sustainable customer relationships (Freundt et al., 2024; Hussain et al., 2025). Recall outcomes may also influence firm value, market performance, and competitors through positive or negative spillover effects (Liu et al., 2017; Unsal et al., 2017; Fang et al., 2024). Firms should therefore use recall outcomes to strengthen data systems, traceability, supplier quality, operating standards, and preparedness for future product failures (Hall & Johnson-Hall, 2017; Hall & Johnson-Hall, 2021).

Future research should empirically test the proposed integrative framework through longitudinal and mixed-method designs that connect actual recall data, corporate decisions, digital conversations, consumer perceptions, product return rates, and market performance within a unified temporal sequence. Subsequent studies should also examine consumer participation, perceived justice, responsibility attribution, and trust restoration as mediating mechanisms between recall strategies and post-crisis loyalty, while considering failure severity, brand equity, remedy type, and product characteristics as moderators. The contextual scope should be extended to regulators, suppliers, digital platforms, and online communities because these actors have received substantially less attention than consumers and firms. Cross-industry and cross-national comparisons are also needed to explain how culture, consumer protection systems, and the maturity of digital infrastructure shape recall effectiveness. Finally, artificial intelligence, real-time data analytics, and traceability technologies warrant investigation as mechanisms for improving risk detection, communication personalization, consumer compliance, and the speed of customer relationship recovery.

CONCLUSION

This study shows that product recall research is primarily grounded in crisis management and service recovery. In contrast, recall effectiveness depends on integrating timely decisions, recovery justice, transparent communication, consumer participation, operational capabilities, and trust restoration across the stages of risk detection, recall implementation, and relationship recovery. However, the findings are limited to 40 Scopus-indexed Q1–Q2 articles published between 2016 and 2026 and to classifying each article according to its dominant analytical category. Future research should validate the proposed framework across industries and countries, expand the database and publication coverage, strengthen coding validation, and examine organizational capabilities, competitor responses, and digital analytics.

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