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**A CROSS-DISCIPLINARY REVIEW OF PRODUCT RECALL RESEARCH: A
STAKEHOLDER-STAGE FRAMEWORK**

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## **ABSTRACT**

Research on product recalls has recently witnessed a sharp increase; however, this stream of research is dispersed within and outside the discipline of management. In the current article, we review this research stream by adopting a stakeholder-stage framework that draws on stakeholder theory and crisis management literature. Specifically, we summarize and integrate the product recall research along two dimensions: the stakeholders involved (e.g., managers, employees, shareholders, consumers, suppliers, competitors, media, and regulators) and the key issues at different stages of a recall (before-recall, during-recall, and after-recall). We find that current research has focused on managers, shareholders, and consumers, but has paid limited attention to other equally important stakeholders such as suppliers, employees, competitors, media, and regulators. Also, researchers have predominantly examined the issues associated with the after-recall stage to minimize the consequences of recalls, while the before- and during-recall stages that prevent recalls and make them more effective are relatively underexamined. To address these gaps and extend the current research, we develop a range of future research opportunities that can make nuanced theoretical contributions and generate implications for practice and policy. By emphasizing the need to adopt a stakeholder management approach and consider recalls as a process, rather than an event, this review paves the way for enriching future research on product recalls.

## **HIGHLIGHTS**

- Current product recall research has focused on managers, shareholders, and consumers, but has paid limited attention to other equally important stakeholders such as suppliers, employees, competitors, media, and regulators.
- Researchers have predominantly examined the issues associated with the after-recall stage to minimize the consequences of recalls, while the before- and during-recall stages that prevent recalls and make them more effective are relatively underexamined.
- Taking an integrative approach to consider various stakeholders and multiple stages of a product recall can help future research generate useful insights for management research and practice.
- Future research should adopt a cross-disciplinary, cross-stakeholder, cross-stage, and cross-organizational view on the management of product recalls.

## INTRODUCTION

A growing number of large-scale product recalls in the recent past have underscored it as a serious concern for managers and other stakeholders (Ball *et al.*, 2018a; Liu *et al.*, 2017; Wowak *et al.*, 2015). For example, in 2007, the toy giant Mattel recalled about 20 million toys that had excess leads in surface paint or contained unsecured magnets that could come loose. Toyota recalled over 10 million automobiles in early 2010 due to an accelerator pedal issue that was deemed responsible for at least five fatal accidents. In the same year, the healthcare giant Johnson & Johnson announced the recall of 43 children's medicines due to flawed manufacturing. Other prominent recalls in recent years include the Samsung Galaxy Note 7 recall in 2016 and the Takata airbags recall in 2017.

Although not all product recalls are large and receive stakeholder attention, product recalls are common, both in the US and around the world. For example, in 2020, the US Consumer Product Safety Commission (CPSC) announced 257 recalls, involving over 20.73 million units of products (figure calculated by authors from the CPSC recall database). In the same year, the National Highway Traffic Safety Administration (NHTSA) announced 786 vehicle recalls, affecting a total number of 31.63 million cars (NHTSA, 2021). In 2020, 199 automobile recalls were announced in China; these recalls involved 6.78 million cars (State Administration for Market Regulation, 2021).

Given the rising recalls, their costs to society, and the involvement of global value chains, management research on product recalls has witnessed a sharp increase, particularly since the global product safety crisis of 2007, which was dubbed the Year of the Recall (Bapuji, 2012). This topic is mainly pursued by management scholars, with articles in business and management disciplinary categories accounting for more than 50% of all articles on the topic. Besides

management and business scholars, product recalls have also been studied by scholars from adjacent disciplines such as finance (Kini *et al.*, 2016), economics (Freedman *et al.*, 2012), accounting (Lee *et al.*, 2015), agricultural economics (Kong *et al.*, 2019), communication (Laufer & Jung, 2010), and ethics (Chang & Chang, 2015).

Despite this large and growing body of work on product recalls, cross-disciplinary dialogues are limited; articles from different disciplines rarely build on one another, even though they examine similar research questions. Therefore, a cross-disciplinary review is needed to synthesize existing findings and provide future research directions because knowledge within a particular disciplinary boundary may not be adequate to understand the complexities associated with recalls and their management (Bapuji & Beamish, 2019).

In view of the cross-disciplinary interest in the topic and the potential insights an expansive and integrative review can generate, we systematically review product recall research in management and related disciplines to derive implications for organizational research and practice. In doing so, we aim to contribute to management research by (i) theoretically consolidating the research findings to date using a stakeholder-stage framework, (ii) identifying new research opportunities, and (iii) pointing to new theoretical insights through facilitating dialogue among researchers in different disciplines.

This review is different from existing reviews on product recalls, i.e., Wowak and Boone (2015) and Cleeren *et al.* (2017), in two ways. First, this cross-disciplinary review has a broader focus; thus, it provides an integrated understanding of the phenomenon and derives wide-ranging implications for research, practice, and policy. With a cross-disciplinary review, we aim to review a larger body of work and integrate it to facilitate a dialogue among researchers in management and adjacent disciplines to enable the cross-fertilization of ideas. Second, we frame

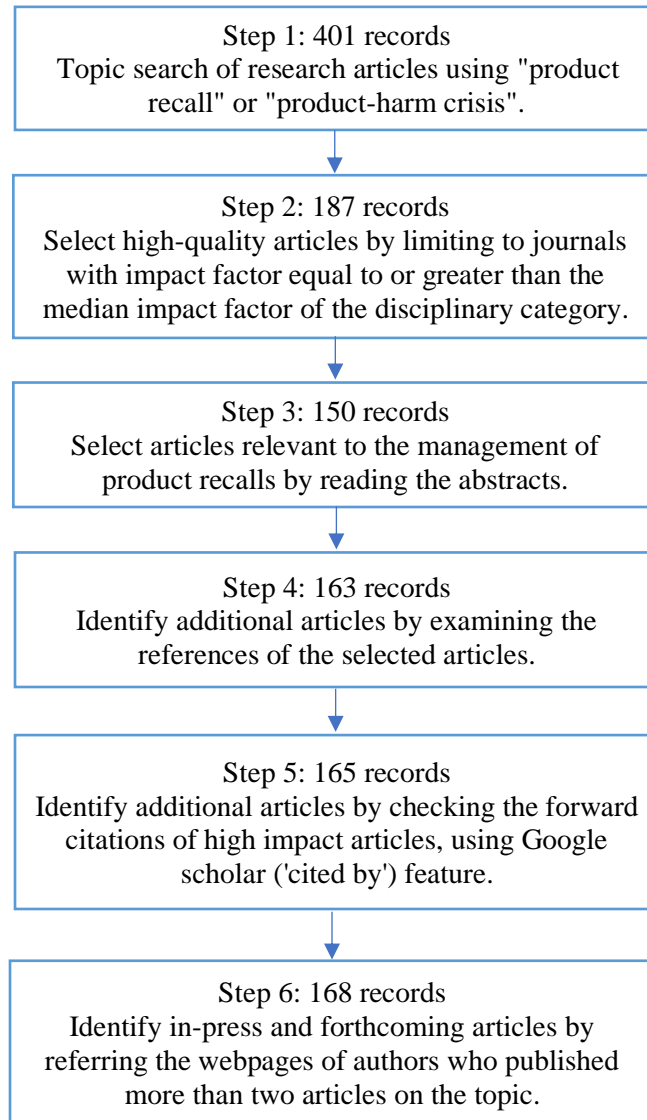
the research findings using a stakeholder-stage framework, which enables both researchers and practitioners to better understand recall processes and address them to improve product safety. The adoption of a stakeholder management framework helps identify all relevant stakeholders, as well as their concerns in the case of a recall, while the adoption of a stage approach views recalls as a process that must be continuously managed rather than addressed only when a product is recalled.

This article is organized as follows. In the next section, we present the review methodology and framework. This is followed by a summary of research findings based on the stakeholder-stage framework. We then discuss research gaps and directions for future research.

## **REVIEW METHODOLOGY AND FRAMEWORK**

### ***Review Method***

We aim to generate new insights for theory and practice by integrating research on product recalls, which is dispersed across multiple disciplinary areas. Accordingly, we chose the *Web of Science* (WOS) databases to access research articles in multiple disciplines. We identified relevant articles by following a six-step procedure, presented in Figure 1, and explained below.



**Figure 1. Search procedure**

First, we searched the WOS database (Web of Science Core Collection) with a topic search (title, abstract, or keywords) for “product recall”, “product harm crisis”, and “product harm crises” (as product recalls are regarded as corrective actions to address product safety issues, also referred to as product harm crises (Hersel *et al.*, 2019)). We limited the results to journal articles and reviews (search performed on April 15, 2022). This step resulted in 401 records. Second, to ensure the quality of articles, we further narrowed down the list to 187

articles by excluding research articles published in journals whose impact factor is lower than the median impact factor of the disciplinary category (Q3 and Q4 journals as identified by WOS, and according to the Journal Citation Report (JCR) 2020). The JCR impact factor, although not the only indicator, is a widely used criterion to evaluate journal quality (Hiebl, 2021). To avoid excluding relevant journals, we retained *Marketing Science*, which has a marginally lower impact than the disciplinary category median but has been regarded as a high-ranking journal in the marketing discipline (Cleeren *et al.*, 2017). We also included the *Management and Organization Review*, given that its special issue about product recalls in China has been widely cited (Meyer, 2008). Third, we read the title and abstract of each article and excluded articles that presented technical details (e.g., of food science, medicine, and engineering), as the aim of this review is to derive implications for management research and practice. We also excluded articles that examined the memory recall of products (e.g., in the context of examining marketing and advertising issues), which is not relevant to the physical recall of products, i.e., the phenomenon in which we are interested. This step yielded a total of 150 articles. Fourth, we downloaded all 150 articles and checked whether the contents are relevant to product recalls. In this step, we excluded articles about brand scandals, crisis management, and sustainability risks, all of which have a broader focus than product recalls. We also reviewed the references in the remaining articles to identify additional articles that might be related to product recalls; this resulted in a total of 163 articles. Fifth, we adopted a forward citation approach in Google Scholar to identify additional relevant articles that cited these articles, resulting in 165 articles. Finally, we identified authors who published more than two papers on product recalls and visited their web pages to identify forthcoming articles.

At the end of the sixth step, we identified a total of 168 articles published in high-impact journals. Out of the 168 articles, 71 were published in FT-50 journals. This list is much more expansive and covers four to five times the number of articles covered by previous reviews, i.e., Cleeren *et al.* (2017) (25 articles) and Wowak and Boone (2015) (34 articles). The discipline category-wise list of the journals covered and the number of articles in each is presented in Table A1 in Appendix 1. The full list of the 168 articles is included in the Online Appendix.

### ***Review Framework***

Building on insights from research on crisis management and product recalls, we developed a stakeholder-stage framework to organize the findings. Specifically, the literature on organizational crisis management has emphasized that managing internal and external stakeholders is critical for a firm to successfully manage a crisis (Bundy & Pfarrer, 2015; Bundy *et al.*, 2017). Stakeholders are defined as “any group or individual who can affect or is affected by the achievement of the organization’s objectives” (Freeman, 1984). External stakeholders, such as customers and suppliers, determine the availability of resources to the firm. The decisions of internal stakeholders, such as managers and employees, affect the achievement of organizational goals. Therefore, responding to stakeholder concerns is critical for the successful management of recall events.

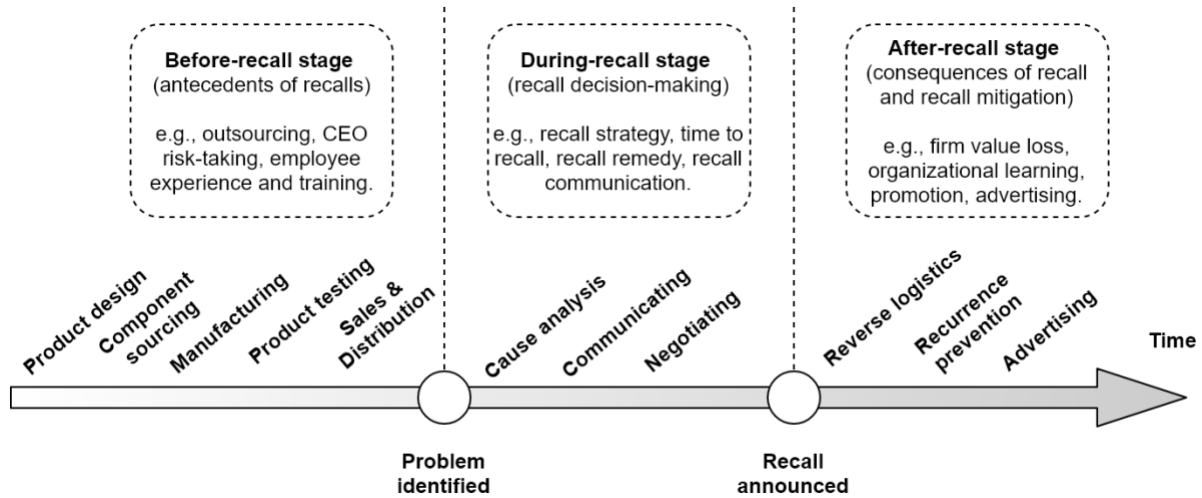
On the other hand, research on product recalls has underscored the notion that effective crisis management should consider the factors leading to the crisis, the management of the crisis, and its consequences (Bundy *et al.*, 2017). This approach is best captured as viewing a recall as a process rather than an event. Viewing recalls as a process, rather than an event, is important for two reasons. First, doing so highlights that the before- and during-recall stages are as important as managing the after-recall stage. Specifically, by paying attention to the before-recall stage,

research and practice can identify the factors leading to a recall so that product recalls can be prevented. By paying attention to the during-recall stage, research and practice can identify the various ways in which recalls can be managed effectively. Attention to these issues reduces the need to attend to after-recall issues, i.e., consequences of recalls, which previous research has predominantly emphasized (Cleeren *et al.*, 2017).

Second, this framework can enhance research and practice by capturing the varying salience of stakeholders during the stages of a recall (Mitchell *et al.*, 1997). For example, the media are not the key determinants of organizational resources and have low moral legitimacy with regard to their claim to a firm (Neville *et al.*, 2011). Consequently, they are less salient than other stakeholders before a recall is issued. However, the media become a salient stakeholder group after the occurrence of a recall, as they shape the opinions of other stakeholders and their blame attributions (Zavyalova *et al.*, 2012). In short, by considering all relevant stakeholders during all stages of a recall, this framework enables a better understanding of recall research and practice.

As discussed above, we organize the findings on two dimensions: the stakeholders involved and the key issues over three different stages of a recall. We coded articles based on the associated stakeholders regarding the study and summarized the research findings associated with internal stakeholders (i.e., managers, employees, shareholders) and external stakeholders (i.e., consumers, regulators, suppliers, competitors, and media). Furthermore, we coded the research findings into three stages: (i) the *before-recall* stage that largely focuses on the factors giving rise to quality risks and product recalls such as managerial characteristics and sourcing from suppliers located in emerging markets; (ii) the *during-recall* stage that focuses on recall-related decisions and their implementation, i.e., whether or not to recall a product, when to recall

a product, and what remedies to offer to customers who return the recalled product; and (iii) the *after-recall* stage that focuses on the consequences of product recalls and organizational strategies to recover from such consequences (see Figure 2 for various issues over time).



**Figure 2. Different stages of a product recall and relevant phenomena**

## A CROSS-DISCIPLINARY SYNTHESIS OF PRODUCT RECALL RESEARCH

In this section, we present an integrated summary of research findings (outlined in Table 1, with recall stages in the columns and stakeholders in the rows). We organized the summary according to the stakeholder-stage framework.

**Table 1. Summary of research findings**

| Stakeholders                 | Before recall (antecedents)                                                                                                                                                                                                                                                                                                                                                                                                                   | During recall (recall decisions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | After recall (consequences)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Internal stakeholders</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Managers                     | <p>Product recalls increase due to:</p> <ul style="list-style-type: none"> <li>Excessive pursuit of value creation, e.g., R&amp;D, efficiency (Shah et al., 2016; Thirumalai &amp; Sinha, 2011).</li> <li>Risk-taking due to (i) CEO narcissism (Kashmiri &amp; Brower, 2016), (ii) a high stock option pay (Wowak et al., 2015).</li> <li>High financial distress in the firm that affects manager decisions (Kini et al., 2016).</li> </ul> | <p>Recall decisions are influenced by:</p> <ul style="list-style-type: none"> <li>CEO and TMT traits, e.g., CEO narcissism (Byun &amp; Al-Shammari, 2021), CEO tenure (Mayo et al., 2021), CEO compensation (Liu et al., 2016), and female board representation (Wowak et al., 2020).</li> <li>Managerial perception, e.g., the source and consequences of recalls (Ball et al., 2018a), perceived resource condition of the firm (Ketchen Jr. et al., 2014), and perceived harm to consumers (Eilert et al., 2017; Liu et al., 2016).</li> </ul> | <p>Managers can mitigate recall consequences by:</p> <ul style="list-style-type: none"> <li>Responsible recall decisions, e.g., proactive recall, swift recall, a full refund remedy (Eilert et al., 2017; Liu et al., 2017).</li> <li>Marketing initiatives, e.g., promotion and advertising (Cleeren et al., 2008; Liu et al., 2017).</li> <li>CSR activities, i.e., donations (Sun et al., 2019).</li> <li>Effective communication, i.e., explain the cause of the defect and ways to fix it (Zavyalova et al., 2012).</li> </ul>                                 |
| Employees                    | <p>Product recalls decrease due to:</p> <ul style="list-style-type: none"> <li>Employee experience (Haunschild &amp; Rhee, 2004).</li> <li>Employee training &amp; communication (Kumar &amp; Schmitz, 2011).</li> <li>Low level of employee unionization (Kini et al., 2021)</li> </ul>                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Recalls motivate employees to learn from recalls and improve product quality (Haunschild &amp; Rhee, 2004; Kalaignanam et al., 2013; Rhee &amp; Haunschild, 2006).</li> <li>The learning effect is stronger for voluntary recalls (Haunschild &amp; Rhee, 2004), recalls caused by internal and supplier factors (Hall &amp; Johnson-Hall, 2017), and firms with a wider product scope (Kalaignanam et al., 2013).</li> </ul>                                                                                                 |
| Shareholders                 | <p>Product recalls decrease due to:</p> <ul style="list-style-type: none"> <li>High managerial and family ownership (Kashmiri &amp; Brower, 2016).</li> </ul>                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>The impact of recalls on shareholder value affected by:</p> <ul style="list-style-type: none"> <li>Recall characteristics (e.g., proactive recall, the delay in recalling) that shape investors' interpretation of product recalls (Chen et al., 2009; Ni et al., 2014; 2016; Thirumalai &amp; Sinha, 2011).</li> <li>Firm characteristics (e.g., supply chain position) that signals the ability of the recalling firm (Ni et al., 2016).</li> <li>The institutional context that affects investor behaviors (Cheah et al., 2007; Zhao et al., 2013).</li> </ul> |
| <i>External stakeholders</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Customers                    |                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Harm to consumers prompts:</p> <ul style="list-style-type: none"> <li>A higher remedy to reduce negative consumer reaction (Liu et al., 2016).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      | <p>Product recalls lead to:</p> <ul style="list-style-type: none"> <li>Consumer uncertainty about product quality (Zhao et al., 2011).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Stakeholders | Before recall (antecedents)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | During recall (recall decisions)                                                                                                                                                                                                                                                                                                                                                                                                                                                              | After recall (consequences)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Delay in recall for the fear of negative consequences (Eilert et al., 2017).</li> </ul> <p>Communication with customers is more effective when:</p> <ul style="list-style-type: none"> <li>• Using imaginary information (Trendel et al., 2017).</li> <li>• Achieving regulatory fit (Avnet &amp; Laufer, 2015).</li> </ul>                                                                                                                          | <ul style="list-style-type: none"> <li>• Losses of sales and market share (Cleeren et al., 2013; Liu &amp; Shankar, 2015).</li> <li>• Spillover effects on other brands belong to the same firm (Lei et al., 2008).</li> </ul> <p>Customers' reaction to recalls is contingent on:</p> <ul style="list-style-type: none"> <li>• Customers' ex-ante evaluation of the recalling brand (Klein &amp; Dawar, 2004).</li> <li>• Customers' loyalty and commitment to the recalling brand (Byun et al., 2020).</li> <li>• Customers' ex-post blame attribution (Munyon et al., 2019).</li> </ul> |
| Suppliers    | <p>Product recalls can be reduced by:</p> <ul style="list-style-type: none"> <li>• Reducing outsourcing and offshoring (Steven, et al., 2014) from emerging markets (Steven &amp; Britto, 2016).</li> <li>• High density and low centrality supply network (Kalaighnam et al., 2017).</li> <li>• Reward and risk-sharing contracts (Chao et al., 2009).</li> <li>• Adopting information technology to increase traceability (Kumar, 2014).</li> <li>• Supplier development (Tse et al., 2019).</li> </ul> | <p>Upstream and downstream complexity increases the uncertainty of recall processes (Wowak et al., 2021).</p> <p>Firms spend longer time to recall when the defect is caused by suppliers (Ni &amp; Huang, 2018). This can be mitigated by:</p> <ul style="list-style-type: none"> <li>• Geographical proximity and industrial relatedness between the firm and suppliers (Lawson et al., 2019).</li> <li>• The adoption of information technologies (Crumbly &amp; Carter, 2015).</li> </ul> | <p>Consequences of recalls are affected by:</p> <ul style="list-style-type: none"> <li>• Traceability developed with suppliers, who are held accountable after recalls (Dai et al., 2015; Piramuthu et al., 2013).</li> <li>• A proper sourcing and production distribution design (He et al., 2020).</li> </ul>                                                                                                                                                                                                                                                                           |
| Competitors  | <p>Product recalls increase due to product competition (relaxation of quality standards) (Ball et al., 2018b).</p>                                                                                                                                                                                                                                                                                                                                                                                        | <p>Firms are more likely to initiate a recall following competitors' product recall announcements (Mukherjee et al., 2021).</p>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Recalls cast doubt on the whole product category and induce a negative spillover effect (Borah &amp; Tellis, 2016; Zou &amp; Li, 2016).</li> <li>• Firms can benefit from competitors' recalls and take advantage of the recall to expand market share (Cleeren et al., 2008; Van Heerde et al., 2007).</li> </ul>                                                                                                                                                                                                                                |
| Media        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>Social media contents, e.g., negative user comments on social media, can help firms to make recall decisions (Zavala &amp; Ramirez-Marquez, 2019; Gao et al., 2021).</p>                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Recalls increase negative media coverage (Zavyalova et al., 2012).</li> <li>• Firms' social media usage reduces the negative consequences of recalls (Lee et al., 2015).</li> </ul>                                                                                                                                                                                                                                                                                                                                                               |
| Regulators   | <p>Product recalls can be predicted by negative regulatory inspections reports (Ball et al., 2017).</p>                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Regulator-initiated digital marketing campaign improves consumer compliance to recalls (Pagiavlas et al., 2021).</p>                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## ***Managers and Recalls***

Managers are the most direct stakeholders associated with a recall. As decision-makers within an organization, managers are key to the achievement of organizational goals (Hambrick *et al.*, 2015). This achievement, in turn, affects managers' benefits in terms of compensation and reputation (Quigley *et al.*, 2020). In recall events, managers shape the organization's strategic focus (e.g., organizational culture and attention to product quality risks), which influences product recalls. Also, as the key decision-makers in product recalls, their characteristics affect recall decision-making, which in turn affects the consequences of recalls.

*Before-recall.* Building on the corporate governance literature, which suggests that top management team (TMT) characteristics determine strategic choices and organizational outcomes (Carpenter *et al.*, 2004), product recalls are viewed as negative outcomes of increased managerial risk-taking and a lack of quality awareness of the part of the CEOs and the TMT. First, risk-taking managers, e.g., narcissistic CEOs and CEOs with a high percentage of stock option pay, tend to pay more attention to upside potential and underestimate product quality and safety risks, making firms more susceptible to product recalls (Kashmiri *et al.*, 2017; Wowak *et al.*, 2015). Second, product recalls may arise due to a lack of attention to quality management within the TMT. In firms with low managerial ownership, managers are more likely to pursue short-term goals and tend to pay less attention to quality risks, thereby leading to more product recalls (Kashmiri & Brower, 2016). On the contrary, firms with Chief Supply Chain Officers in the TMT are more vigilant to quality issues and are less prone to product recalls (Körber & Cotta, 2021). Finally, managers in firms with higher financial leverage face more financial stress, which motivates them to cut discretionary investments, such as those in quality assurance and control, to increase current cash flows. The lack of investment in quality may make firms less

vigilant to quality risks and increase the likelihood of product recalls (Kini *et al.*, 2016; Luo, 2008).

*During-recall.* When faced with product defects that pose harm to consumers, managers are required by law to communicate the issue to regulators and make recall decisions such as whether and when to recall products, how to inform the consumers, and what remedies to offer to retrieve the hazardous products. These decisions are critical for removing hazardous products from the market to reduce harm to consumers (Hall & Johnson-Hall, 2021; Mao *et al.*, 2021), and are affected by the social and cognitive characteristics of managers and the TMT. First, managers are more likely to recall a defective product when they understand the root causes of the defects, and thus are more capable of predicting the potential costs associated with the recall (Ball *et al.*, 2018a).

Second, recall decisions tend to be affected by factors shaping CEOs' motivation to recall products. For example, narcissistic CEOs are concerned that product recalls may lead to loss of admiration, and hence, firms with narcissistic CEOs are less likely to initiate product recalls (Byun & Al-Shammari, 2021). Similarly, CEOs in their early tenure are more likely to recall defective products as they can attribute the responsibility for such recalls to their predecessors (Mayo *et al.*, 2021). CEOs with a low percentage of equity incentives and a high percentage of cash pay in their compensation structure are more concerned about the firm's short-term (rather than long-term) benefits. As a result, they are less likely to offer a full refund remedy to consumers, as this might reduce the firm's short-term earnings (Liu, Liu, & Luo, 2016).

Finally, TMT and board composition also affect recall decisions. Specifically, higher female board representation tends to create a rule-following culture and heightened consideration of the hazards to consumers in the firm's decision-making, and would thus prompt societally

beneficial recall decisions, such as a speedy recall of products that pose severe hazards (Wowak *et al.*, 2021a). Similarly, board members with a greater sense of ownership are more likely to preserve the firm's reputation and long-term benefits; as a result, they tend to initiate voluntary recalls (Oh *et al.*, 2019).

*After-recall.* Research shows that recalls give rise to financial distress for the recalling firm and change managers' behaviors. Recalling defective products induces a negative impression on consumers and makes them doubt the recalling firm's legitimacy (Liu *et al.*, 2019). To overcome the loss of legitimacy and retain customer purchase intentions, managers in recalling firms may act opportunistically to engage in income-increasing earnings management to project a better financial image, e.g., discretionary accruals (Zhang *et al.*, 2019).

The negative consequences of product recalls can be reduced by managerial actions. First, voluntary recalls, prompt responses to product defects, and higher-level remedies are regarded as signals concerning the recalling firm's commitment to protecting consumer welfare. Accordingly, these recall decisions can reduce the firm's reputation and firm value loss (Eilert *et al.*, 2017; Liu *et al.*, 2017). However, managers should be cautious about recall strategies because strategies that exceed stakeholder expectations may be perceived as suspicious and may signal that more serious consequences are impending (Chen *et al.*, 2009). According to Bundy and Pfarrer (2015), firms' responses to crises should conform to stakeholder attributions. When stakeholders attribute responsibility to the recalling firm, an accommodative strategy (i.e., the firm takes responsibility) is preferred. In contrast, when stakeholders perceive that the firm is not responsible for the recall, an accommodative strategy may incur an overconforming impression and may result in a greater loss of social approval. Consistent with this rationale, Raithel and Hock (2020) find that recall remedies should be consistent with the recall strategies to reduce

firm value loss. For proactive (reactive) recalls, a partial (full) remedy conforms to stakeholder expectations, leading to fewer losses in shareholder value. Similarly, Mafael *et al.* (2021) find that full remedy can help low and high brand equity firms to retain customer satisfaction, but not the firms with medium levels of brand equity. This partially explains why socially responsible decisions, such as a preventive recall strategy and a full refund remedy to customers, lead to a greater loss in firm value (Chen *et al.*, 2009; Davidson & Worrell, 1992). Accordingly, these studies point to the need to align recall decisions with firm reputation and consumer expectations.

Second, managers can initiate advertising and promotion campaigns to mitigate the negative consequences of recalls (Avnet & Laufer, 2015; Cleeren, 2015; Mukherjee & Chauhan, 2021; Rubel *et al.*, 2011). Increasing pre-recall advertising can signal managers' confidence in the firm's prospects (Liu *et al.*, 2017) and reduce the information asymmetry between investors and managers (Gao *et al.*, 2015a). As a result, brand advertising can soften the firm value loss caused by recalls. Managers can also retain customers by adjusting their product prices and using promotion strategies (Cleeren *et al.*, 2013; Rubel, 2018; Xie & Keh, 2016). However, managers should be cautious about these marketing initiatives, given that advertising elevates customer expectations (Gao *et al.*, 2015a), and promotions may enhance the impression that the product is of low quality (Liu *et al.*, 2017). As a result, the effectiveness of marketing initiatives is contingent on the recall and firm characteristics (Cleeren *et al.*, 2013). Advertising is more effective when (i) consumers need additional information to interpret a recall, e.g., recalls of newly introduced products (Gao *et al.*, 2015a); (ii) the blame attribution of the recall is unclear, e.g., when firms have not identified where the source of the problem is and which agency is

responsible for it (Cleeren *et al.*, 2013); (iii) the recalling brand has a strong reputation that can mitigate consumers' blame attribution (Carvalho *et al.*, 2015; Cleeren *et al.*, 2008).

Finally, managers can build a good corporate social responsibility (CSR) reputation to mitigate the negative consequences of product recalls (Chang & Chang, 2015; Cheah *et al.*, 2007; Kong, 2012; Kong *et al.*, 2019). A good CSR reputation can signal a firm's goodwill to protect stakeholder benefits and mitigate the negative consequences of product recalls. CSR activities, such as philanthropy, can reduce negative perceptions from external stakeholders and divert their attention to more positive organizational actions, which can reduce the loss of legitimacy caused by recalls (Noack *et al.*, 2019; Sun *et al.*, 2019). However, recalls by firms with high CSR ratings tend to generate more negative responses from customers because over-investment in CSR may increase shareholders' expectations, leading to higher expectation violations (Liu *et al.*, 2019).

*In summary*, as decision-makers of product recalls, managers are at the core of many product recall studies. These studies have shown that product recalls occur when managers do not provide adequate attention to product quality management or engage in risky expansion strategies, both of which make organizations less vigilant to quality issues. Further, research has shown that managerial decisions during recalls are affected by managers' incentives and cognitions, as recall decisions have negative consequences for the firm as well as for the managers deciding on the recalls. Finally, to reduce the negative impact of recalls, managers can make responsible recall decisions and increase CSR activities to signal their goodwill to address product problems and can direct stakeholder attention to responsible firm actions. Also, managers can increase advertising to reduce information asymmetry with external stakeholders.

However, it is important to note that advertising is effective only when it is designed appropriately by taking into consideration the recall, firm, and customer characteristics.

### ***Employees and Recalls***

Employees are regarded as the key stakeholders of a firm and an important source of its competitive advantage, e.g., employee job satisfaction and commitment are key determinants of firm performance (Becker *et al.*, 1996). Employees are responsible for relevant firm operations, such as designing and manufacturing (or overseeing) products, thus ensuring product quality and minimizing production errors. Also, employees are agents for organizational learning and shape how firms learn from product recall events. Previous recall studies have mainly examined employees at the before- and after-recall stages.

*Before-recall.* The quality management literature suggests that experienced employees and a quality-oriented organizational culture are essential for improving product quality because well-trained employees are less likely to make mistakes (Flynn *et al.*, 1994). As a reflection of this, Haunschild and Rhee (2004) find that firms with more cumulative production experience are less vulnerable to product recalls because experienced employees can detect and reduce errors. In a similar vein, unionization of the labor force might impair a firm's quality culture and decrease its attractiveness to skilled employees. As a result, firms with a higher unionization rate tend to experience more product recalls (Kini *et al.*, 2021). Further, from an operational perspective, in firms with high levels of product variety, employees are frequently required to switch between different tasks, leading to a reduction in task proficiency. Similarly, high levels of resource utilization tend to put employees under pressure, which reduces the accuracy of product assembly and inspection. As a result, firms with high levels of product variety and utilization tend to have more manufacturing-related product recalls (Shah *et al.*, 2016).

*After-recall.* Building on organizational learning research, previous research has shown that product recalls are negative events that disrupt organizational inertia and motivate employees to search for and correct potential problems causing recalls and improve operational and marketing capabilities, which lead to an increase in product reliability and a reduction in future recalls, i.e., the learning effect (Chakravarty *et al.*, 2021; Haunschild & Rhee, 2004; Kalaiganam *et al.*, 2013; Rhee, 2009; Thirumalai & Sinha, 2011). The learning effect can be direct (derived from internal failures) or indirect (derived from suppliers or industry failures) (Hall & Johnson-Hall, 2017), and is stronger when i) there is less resistance within the organization such as when the recall is voluntary (Haunschild & Rhee, 2004), and ii) the product knowledge is more transferable within the organization, e.g., having a wider product scope and more shared product assets (Haunschild & Rhee, 2004; Kalaiganam *et al.*, 2013).

*In summary,* previous research has examined two aspects of employees in product recalls. First, experienced employees can detect potential product quality problems and reduce the number of product recalls. Second, product recall events motivate employees to learn and search for ways to improve product reliability and reduce product recalls in the future via organizational learning. The degree of organizational learning is influenced by both recall and firm characteristics such as the types of recalls, causes of recalls, shared product assets, and prior product quality reputation.

### ***Shareholders and Recalls***

As owners of the firm and bearers of firm risk, shareholders are the primary stakeholders, whose aspirations (as well as monitoring of the managers) directly affect firm operations (Berman *et al.*, 1999). Also, recalls might threaten the long-term viability of the firm, and hence affect shareholder wealth maximization, which is largely seen as the firm's main objective.

Accordingly, previous research has examined the role of shareholders with respect to issues at the *before-* and *after-recall* stages. In particular, the research has paid more attention to the shareholder consequences of recalls.

*Before-recall.* Agency theory suggests that governance structures that align the interests of the shareholders (principals) with the actions of managers (agents) reduce opportunistic behavior by managers (Eisenhardt, 1989). Consistent with this rationale, firms with high managerial and family ownership are less prone to agency problems and will be more vigilant to threats that might harm the long-term viability of the firm, e.g., quality risks. As a result, firms with high managerial and family ownership are less likely to encounter product recalls (Kashmiri & Brower, 2016).

*After-recall.* Product recalls lower a firm's future profitability and growth prospects and lead to shareholder value losses. Product recall announcements make investors pessimistic about the recalling firm's prospects, lower analyst expectations of the firm's future performance, and prompt investors to devalue the recalling firm's stock, thus leading to negative abnormal returns to the firm following a recall (Cheah *et al.*, 2007; Chen *et al.*, 2009; Ni *et al.*, 2016). By conducting the very first study to address this question, Jarrell and Peltzman (1985) opened a rich stream of literature involving the effect of product recall announcements on shareholder wealth. Their research showed that product recalls in the automobile and pharmaceutical industries were penalized by the stock market. They found that the indirect costs of the recalls (as reflected in firm value losses) exceeded the direct costs such as repairing the defective products. However, a later study that excluded overlapping events (i.e., a rival firm's recall events) found that automobile recall announcements were not significantly related to shareholder value losses (Hoffer *et al.*, 1988).

The inconsistent results attracted further research on how product recalls affect a firm's shareholder value. This stream of research has predominantly shown that product recalls are considered risk factors, which lead to shareholder value losses (Zhang *et al.*, 2022). This effect is significant across different industries, i.e., consumer products (Chen *et al.*, 2009; Coleman, 2011; Ni *et al.*, 2016), medical devices (Thirumalai & Sinha, 2011), food (Kong *et al.*, 2019; Pozo & Schroeder, 2016), and automobiles (Liu & Shankar, 2015). Also, the shareholder value loss is significant both in the short term, i.e., a five-day event window, and in the long term, i.e., a one-year event window (Liu *et al.*, 2017). Further, this effect is significant both in the US and Chinese stock markets (Kong *et al.*, 2019; Zhao *et al.*, 2013). In short, these studies have shown that product recalls result in shareholder value losses, irrespective of the context – industry and geography – or length of the time period.

Although a considerable number of studies have shown the negative effect of recalls on shareholder value, some studies show that not all recalls are related to shareholder value loss. For example, investors may factor some recalls into their return expectations on non-severe recalls in some industries. Confirming this view, non-severe recalls are not associated with negative abnormal returns in the automobile industry (Rhee & Haunschild, 2006). Similarly, food recalls that involve less severe hazards are not significantly associated with firm value loss, as consumers might view these recalls as responsible actions from manufacturers, which may generate goodwill for the recalling firm (Thomsen & McKenzie, 2001). In short, depending on the type of industry, non-severe recalls might not affect the recalling firm's stock price.

Recent studies find that the degree of shareholder value loss also depends on factors that shape investors' interpretation of a recall with respect to its impact and the firm's ability to address the problem. First, stakeholders rely on recall decisions as a signal to evaluate the impact

of product recalls. For example, compared to a reactive recall strategy, a preventive strategy is perceived as a signal of severe impending consequences, leading to more shareholder value loss (Chen *et al.*, 2009; Ni *et al.*, 2014). Similarly, a refund remedy to consumers is associated with higher shareholder value loss, as it is perceived as being costlier than offering product repairs to consumers (Davidson & Worrell, 1992; Ni *et al.*, 2014). Further, a delay in announcing a recall is perceived as a lack of motivation and capability to cope with product safety problems, thus incurring more shareholder value losses (Eilert *et al.*, 2017). Second, recalls also signal a firm's ability to control its product quality. For example, toy recalls initiated by retailers or distributors and small companies result in more shareholder value losses because such recalls are seen as a signal that these companies lack control over the supply chain, which forms a major part of a firm's success, given the heavily outsourced nature of toy production (Ni *et al.*, 2016).

Investor reactions to product recalls are also dependent on the institutional context. For example, recalls induce more firm value loss in China than in the US because there is a higher level of information asymmetry in the Chinese stock market, which leads investors to perceive recalls as signals of more severe consequences (Kong *et al.*, 2019; Zhao *et al.*, 2013). Cheah *et al.* (2007) also suggested that investors in the UK pay more attention to CSR than investors in the US. After product recall announcements, investors in the US penalize recalling firms according to the severity of the defects, while investors in the UK are indifferent regarding the severity of the recalls. In addition, investors in the UK reward product recalls initiated by non-CSR active firms, as they consider such recalls as unexpected but responsible behaviors by those firms. In contrast, investors in the US punish non-CSR active firms in the case of product recalls (Cheah *et al.*, 2007).

*In summary*, previous research with respect to issues involving shareholders has mainly focused on the before- and after-recall stages. First, firms with higher managerial and family ownership tend to be more vigilant to quality risks, and thus are less vulnerable to product recalls. Second, product recalls lower a firm's future profitability and damage its growth prospects, leading to shareholder value losses. The degree of shareholder value losses depends on the severity of the hazard, recall strategies that signal the likely impact on the firm, and the supply chain position of the recalling firm, which signals the firm's ability to control product quality.

### ***Consumers and Recalls***

Consumers are a firm's core stakeholders (Ogden & Watson, 1999). Not only are they the key source of firm revenue, but also the most valuable resource that determines a firm's reputation and future revenue streams. At the same time, customer well-being is determined by the quality of the products supplied by the firm. As such, hazardous products might threaten customers' well-being (Eilert *et al.*, 2017). Therefore, firms not only recall defective products to protect customer well-being, but also make recall decisions (e.g., time to recall, remedy, communication) to appeal to consumers.

*During-recall*. Customer well-being is a key concern when making recall decisions. To mitigate reputation losses, consumer product companies offer to refund customers the product's full purchase price when the defect causes severe harm to consumers (Liu *et al.*, 2016). This approach improves the effectiveness of recalls, as more consumers are likely to participate in the recall and return the hazardous product if they receive a refund, as opposed to an offer to replace and repair the product (Muralidharan *et al.*, 2019). However, when a product hazard poses the potential to cause severe harm to consumers, firms tend to be more cautious in recalling that

product to avoid reputation losses. As a result, firms take a longer time to recall defective products when they cause severe harm to consumers (Eilert *et al.*, 2017). Further, research has shown that firms with prior recall experience take longer to issue recalls that cause severe harm to consumers (compared to those that cause less severe harm) as well as when such severe harm is associated with design flaws in products, rather than manufacturing flaws (Muralidharan *et al.*, 2022).

Due to the importance of customer well-being, feedback from consumers can be regarded as key information for recall decisions (Mukherjee & Sinha, 2018). In particular, companies pay more attention to influential consumers in making recall decisions. For example, Ball *et al.* (2018a) find that medical device firms are more likely to recall a product if influential physicians express concerns about the defects in a medical device.

Communicating with consumers is important during a recall because it helps provide the necessary safety information to consumers, allay stakeholder concerns, and explain the steps taken to prevent the recurrence of product safety issues (Zhu *et al.*, 2014). As such, to make recall communication effective, previous studies have examined the central role of a regulatory fit, i.e., the match between the nature of a message to consumers and consumers' regulatory orientation, which can be promotion-focused (motivated by achievement) or prevention-focused (motivated by avoiding threats). Creating a regulatory fit can increase consumers' compliance with recall requests to return defective products to avoid harm (Laufer & Jung, 2010). However, creating such a regulatory fit reduces consumers' future purchase intentions, as this would strengthen customers' negative impressions (Avnet & Laufer, 2015). The nature of the messages (visual or textual) also plays a role in influencing consumers' implicit and explicit attitudes. Particularly, imagery is more effective than textual information in warning consumers about

product recalls (Trendel *et al.*, 2018). The position of the spokesperson who delivers the message (i.e., CEO or not) to consumers also affects their reactions to product-harm crises (Wang & Wang, 2014). Specifically, consumers with high levels of power distance are less likely to reduce their purchase intention when the firm uses a CEO as the spokesperson after product-harm crises (Laufer *et al.*, 2018)

*After-recall.* Consumer attitudes are a key reflection of the successful management of product-harm crises (Siomkos & Shrivastava, 1993). Severe product recalls violate consumers' prior expectations regarding the product's quality and perceived risk associated with the recalling brand (Pennings *et al.*, 2002; Zhao *et al.*, 2011). Recalls also update consumers' quality reference points and lower their quality expectations of the recalled product, leading to a reduction in their willingness to buy products from the recalling brand (Byun *et al.*, 2020; Byun & Dass, 2015; Dong *et al.*, 2021; Yu *et al.*, 2018). This reduces baseline sales (Freedman *et al.*, 2012; Topaloglu & Gokalp, 2018; Van Heerde *et al.*, 2007), and thus depletes the market share (Cleeren *et al.*, 2013; Rhee & Haunschild, 2006) across product categories, i.e., consumer products (Cleeren *et al.*, 2013), food (Li *et al.*, 2017; Shang & Tonsor, 2017; Taylor *et al.*, 2016), and automobiles (Topaloglu & Gokalp, 2018). Further, the negative effect of a recall on sales can spread beyond the recalling brand to other brands due to the spillover effect (Koschate-Fischer *et al.*, 2019; Lei *et al.*, 2012; Lei *et al.*, 2008; Liu & Shankar, 2015; Van Heerde *et al.*, 2007). For example, the recall of Toyota automobiles hurt the sales of Lexus, which is a luxury brand of Toyota, and Honda (i.e., a competitor of Toyota).

Consumer responses to product recalls are contingent on their *ex-ante* expectations regarding the recalling brand and their commitment to the brand (Tao, 2018). First, customers with high-quality expectations about a brand are more likely to attend to the crisis information

related to the brand (Dawar & Pillutla, 2000) and tend to respond more negatively due to the violation of their expectations (Rhee & Haunschild, 2006). As a result, good reputation becomes a liability during product recalls, as it magnifies the negative consequences of product recalls (Rhee & Haunschild, 2006). Similarly, consumers rely on tangible product attributes to evaluate a functional product. Therefore, recalls of such products violate expectations regarding the product's functionality, and thus result in more sales losses (compared to products with a luxury brand image) (Topaloglu & Gokalp, 2018).

While a firm's quality reputation seems to go against the firm in the case of recalls, the firm's reputation for CSR acts as insurance to mitigate the negative consequences of product recalls. This is because stakeholders tend to attribute blame for the recall to external factors when the recalling firm is known for its CSR (Klein & Dawar, 2004). Therefore, consumers tend to act less negatively toward the firm and are more likely to purchase products from the recalling firm after a product-harm crisis if they perceive the recalling firm to be socially responsible (Assiouras *et al.*, 2013; Lin *et al.*, 2011). This effect is even stronger for consumers who attach more importance to CSR (Assiouras *et al.*, 2013).

Second, customers' loyalty and commitment to the recalling brand will affect their interpretation of the recall announcements. Consumers with high brand commitment tend to be more resistant to negative information regarding the brand. In other words, customers' brand commitment can serve as a "reservoir of goodwill" that attenuates negative responses to product recalls (Byun *et al.*, 2020). Also, positive consumer experiences with a product reduce their risk perceptions about the recall and induce less negative reactions to recalls (Wei *et al.*, 2016). However, customers' brand commitment may also become a liability in the case of high-severity product recalls, which are regarded as a betrayal of customers' commitment. Accordingly, high-

severity recalls result in more negative responses from customers with high brand commitment (Germann *et al.*, 2014).

Finally, a key determinant of consumers' reactions to recalls involves to whom they attribute blame for the recall. This blame attribution is mainly shaped by customers' perceptions of where the product defect originated from and whether the firm had control over it. Consumers are more likely to attribute blame and responsibility to the recalling firm and express lower purchase intentions if the consumers perceive that the recalling firm is the source of (or is aware of) the product's defect (Munyon *et al.*, 2019). However, consumers' blame attributions are subject to cognitive biases, particularly with respect to the country-of-origin image of the recalled product (Barbarossa *et al.*, 2016). Consumers attribute more blame to manufacturers, especially when they are not familiar with the brand and when the manufacturer is located in a country with an unfavorable reputation for quality (Carvalho *et al.*, 2015).

In addition to the direct impact on product sales due to consumer perceptions, recalls also affect consumers' receptivity to the marketing initiatives (e.g., promotion and advertising) of the recalling firm, while increasing their receptivity to rival firms' marketing. In other words, customers will be less likely to be affected by the recalling brand's marketing initiatives (Liu & Shankar, 2015) and will be more likely to be attracted by competitors' (unaffected brands) promotion and advertising activities after a recall (Van Heerde *et al.*, 2007). This is mainly because recalls hurt consumer loyalty and make them classify the recalling brand in a lower-quality tier. This impact is stronger for recalls that receive greater media coverage, particularly recalls that can cause severe harm to consumers (Liu & Shankar, 2015).

*In summary*, prior recall research has mainly focused on customers at two stages of a recall. First, at the during-recall stage, customer feedback can be regarded as a reference for

recall decisions, and firms tend to pay more attention to feedback from influential customers. Moreover, the prospect of severe harm to consumers forces managers to issue a swift recall and offer a full remedy to reduce losses to the brand's equity. However, firms with prior recall experience may take longer to issue recalls that pose severe hazard, just as they do for severe recalls involving design flaws. Second, at the after-recall stage, product recalls increase consumers' uncertainty about the product's quality and reduce consumers' evaluations of a brand, leading to a reduction in the sales and market share of the recalling firm. Further, recalls render the advertising of a firm less effective, but enhance the effectiveness of rival firms. Customer reactions to product recalls are influenced by their prior evaluations of the brand, commitment to the brand, and blame attribution of the recalling brand.

### ***Suppliers and Recalls***

As supply chains have become increasingly global, suppliers are a key player in firm operations and affect the sustainability risks of the firm (Fan *et al.*, 2021). Suppliers provide the materials and services needed for the production and delivery of products, and thus are critical for achieving high firm performance (Flynn *et al.*, 2010). The quality management literature suggests that the quality of raw materials is an important determinant of product quality (Powell, 2006; Sousa & Voss, 2002; Steven *et al.*, 2014). As raw material providers, suppliers not only affect the likelihood of product recalls, but also a firm's responsiveness to product recalls by working with the recalling firm to provide a remedy or redesigning materials and processes.

*Before-recall.* The increasingly long and globalized supply chains reduce the visibility of the supply chain and give rise to monitoring and coordination challenges, along with subsequent quality risks. Following this rationale, outsourcing and offshoring increase the number and likelihood of product recalls (Steven *et al.*, 2014), especially when the suppliers are located in

emerging markets (Steven & Britto, 2016) and in distant locations (Bray *et al.*, 2019). However, the effect of offshoring on product recalls appears to be contingent on product categories. While offshoring increases product recalls in consumer products (Steven *et al.*, 2014), it does not increase the number of recalls in the pharmaceutical industry (Bruccoleri *et al.*, 2019).

Other than sourcing strategies, the structure of the supply network affects the coordination between manufacturers and their suppliers, which further determines quality outcomes. For example, firms that are central to the supply network tend to have more power to influence their suppliers and may stifle suppliers' autonomy and creativity, which hinders quality improvements. As a result, firms with a less dense supply network and high network centrality tend to have low-quality products, and thus more recalls (Kalaignanam *et al.*, 2017).

To mitigate the quality risks caused by suppliers, firms can design appropriate governance mechanisms to reduce supplier opportunism and cooperate with suppliers to improve the traceability of errors and failures in the supply chain. First, proper supply chain governance mechanisms and reward schemes that facilitate trust among supply chain partners, such as sharing the recall costs, risks, and rewards with suppliers, can reduce product quality risks and the likelihood of product recalls (Chao *et al.*, 2009; Dai *et al.*, 2015a; Dai *et al.*, 2015b; Tse *et al.*, 2018; Xie *et al.*, 2021; Yoo & Cheong, 2018). In addition, providing explicit rules and enhancing supervision, as well as relying on relational rather than contractual governance mechanisms, reduces recalls (Berman & Swani, 2010; Lyles *et al.*, 2008). Adopting supplier development can also facilitate coordinated quality improvement within the supply chain and can reduce quality risks (Tse *et al.*, 2019). Second, adopting manufacturing information technologies, such as hazard analysis and critical control point (HACCP) and radio frequency identification

(RFID), can increase the traceability within the supply chain and prevent product recalls (Kumar, 2014; Kumar & Budin, 2006; Kumar & Schmitz, 2011).

*During-recall.* Suppliers play an important role in recall decisions. First, upstream complexity would increase the uncertainties associated with recall processes (Wowak *et al.*, 2021b). Therefore, collaboration with suppliers can reduce the time to respond to product defects (Sumukadas, 2021). Automobile firms spend more time issuing a recall when the defect is caused by suppliers, given that suppliers' operations are less visible and require more specific knowledge to detect the root problem of the recalls (Ni & Huang, 2018). To mitigate the information asymmetry and reduce the time needed for a recall, firms can adopt IT tools in supply chain management to increase information visibility and enable the detection of potential issues within the supply chain (Crumbly & Carter, 2015).

Second, outsourcing from local suppliers, rather than offshoring from foreign suppliers, can increase the responsiveness to product problems, as local suppliers have intimate knowledge about the local market (Majid & Bapuji, 2018). Also, geographic proximity and industrial relatedness can enhance information sharing and communication among firms. As a result, the time to issue a recall will be shorter when suppliers and the recalling firm are located in the same geographic area and when they adopt similar operational technology and routines (Lawson *et al.*, 2019).

*After-recall.* The negative impact of recalls can also extend to suppliers. For example, meat recalls caused by contamination reduce the future price of live cattle, which negatively affects meat suppliers' revenues (Moghadam *et al.*, 2013). In light of the impact of product recall events on the entire supply chain, collaboration with suppliers can improve the effectiveness of product recalls and can reduce the negative impact of such product recalls (He *et al.*, 2020;

Hosseini-Motlagh *et al.*, 2020). First, building traceability with suppliers can increase the effectiveness of product recalls (Pouliot & Sumner, 2013) and reduce the impact on consumer health, brand image losses, and financial impacts (Dai *et al.*, 2021; Hall & Johnson-Hall, 2021; Wowak *et al.*, 2016). For example, RFID can help firms identify the source of a recall and avoid recalling unaffected products, as well as avoid attributing blame to innocent parties (Piramuthu *et al.*, 2013); this reduces the costs associated with the recalls. Also, supplier qualification and involvement can improve information accuracy within the supply chain, leading to increased traceability and enhanced product recall capability, thereby reducing the negative impact of product recalls (Zhang *et al.*, 2020). Second, a proper sourcing and production distribution design can reduce supply chain disruptions caused by product recalls. When there is a high product recall risk and a moderate disruption risk, dual sourcing and a dedicated production distribution are optimal for reducing disruptions caused by product recalls (He *et al.*, 2020).

*In summary*, suppliers are key stakeholders who play important roles in the *before-*, *during-*, and *after-recall* stages. First, outsourcing and offshoring give rise to supply chain complexity and contribute to product recalls. To overcome this complexity, firms can design governance mechanisms to share recall risks with the suppliers and implement information technologies that increase traceability in the supply chain. Second, adopting information technologies and a proximate supply base can reduce information asymmetry and increase recalling firms' responsiveness to product defects. Finally, building traceability with suppliers helps firms to locate product defects and minimize the negative consequences of product recalls.

### ***Competitors and Recalls***

The competitors of a firm are those firms that offer comparable products to a targeted market (Gur & Greckhamer, 2019). Intensive competition has been regarded as a major factor

that jeopardizes a firm's competitive advantage (Chen *et al.*, 2010). According to competitive dynamics theory, firms' actions are shaped by the anticipation of whether competitors would retaliate. For competitive actions that receive a lesser response from competitors, firms can gain more expected benefits and higher performance (Chen & Miller, 2012). Based on this rationale, competitor reactions indirectly affect recalling firms' recall decisions after product defects are reported. At the same time, competitors will be indirectly affected by product recalls, given the visibility of the industry and the potential backlash from customers and other stakeholders against not only the recalling firm, but the industry itself.

*Before-recall.* Competition is a critical factor affecting firm actions that can result in conditions that are conducive to recalls. Ball *et al.* (2018b) found that intense product competition leads pharmaceutical companies to improve the price competitiveness of their products by aggressively reducing costs and improving manufacturing efficiency, e.g., hiring less experienced employees, lowering equipment maintenance frequency, and relaxing quality standards. Such aggressive cost-cutting initiatives increase manufacturing-related recalls.

*During-recall.* There is a recall clustering effect such that firms are more likely to initiate similar recalls after competitors' recall announcements. This can mitigate the firm's value losses caused by product recall announcements as external stakeholders tend to attribute more blame to firms that make the first recall announcement (Mukherjee *et al.*, 2021).

*After-recall.* Research involving the effect of recalls on competitors can be categorized into two streams. One stream focuses on the competition effect, suggesting that competitor firms can expand their market share by exploiting the recalling firm's vulnerability. For example, after a product recall, the recalling firm will be more vulnerable to competitors' marketing actions and will be less capable of attracting customers from its competitors using marketing initiatives (Van

Heerde *et al.*, 2007). Therefore, competitor firms can take advantage of the negative publicity that a recalling firm receives by increasing advertising spending (Cleeren *et al.*, 2008) and introducing promotion initiatives (Zhou *et al.*, 2019) to increase their market share. However, this competition effect is short-lived (Zhao *et al.*, 2011) and marketing initiatives during competitors' product-harm crises, such as advertising, might backfire (Cleeren *et al.*, 2013). For example, when there is a high level of negative publicity about a recalling firm and its products, increasing advertising spending by competitors may leave a bad impression on customers. Consistent with this rationale, He *et al.* (2018) suggested that competitors tend to increase defensive marketing to communicate with customers to retain their market share loss and reduce offensive marketing to promote purchases and increase their market share.

The other stream focuses on the impression effect, suggesting that product recalls will cast consumer doubt on the safety of an entire product category. This negative spillover effect is rooted in the accessibility–diagnosticity perspective, which suggests that when consumers perceive Brand A to be informative of Brand B, they tend to transport their impression of Brand A to Brand B (Roehm & Tybout, 2006). Based on this rationale, one firm's product recall would likely make stakeholders act negatively toward its competitors (Liu & Varki, 2021). For example, China's melamine milk incident in 2008 caused widespread concern in the Chinese food industry and induced firm value losses in all publicly listed food companies (Gao *et al.*, 2013; Kong, 2012; Zou & Li, 2016). Similarly, negative appraisals caused by the recall announcements of a firm may lead to negative chatter on social media (Borah & Tellis, 2016), negative media coverage (Zavyalova *et al.*, 2012), and sales reductions (Freedman *et al.*, 2012) of other companies within the same industry. This negative spillover effect is stronger when the competitor shares high levels of similarity with the recalling brand, and when the recalling firm

is representative of the product category (Gao *et al.*, 2015b; Roehm & Tybout, 2006). To mitigate the spillover effect, when recalls from a firm in the industry are anticipated, competitor firms can act in advance to engage in defensive marketing to reduce the potential spillover effect (Bala *et al.*, 2017). Also, adopting information technologies that improve traceability at the industry level can help stakeholders target the origin of the product and reduce industry-wide reputation loss caused by one firm's product recall (Pouliot & Sumner, 2013).

*In summary*, previous research on competitors has examined competition as an antecedent of product recalls and in terms of how competitors will be affected by such product recalls. This research shows that intense competition forces firms to act aggressively to cut costs, which may give rise to quality risks and product recalls. Further, competitors may benefit from the recalling firm's negative exposure due to competition effects; however, recalls might also negatively impact competitors due to impression effects. Net effects are contingent on the similarity between the recalling firm and competitors in terms of whether the recalling firm is typical in the industry, as well as the traceability of the industry.

### ***Media and Recalls***

Media are also key stakeholders of a firm, as they act as external observers and influence consumers' evaluations of firm actions. Positive media coverage can be regarded as a resource that helps firms gain more social approval, and thus achieve their organizational goals (Graf-Vlachy *et al.*, 2020). The role of media becomes more salient when firms encounter negative events, as media coverage of corporate social irresponsibility shapes stakeholder sanctions (Kölbel *et al.*, 2017). In product recalls, the tone of media reports would affect stakeholders' interpretations of and reactions to such product recalls. At the same time, firms can take media sentiment as input for recall decision-making.

*During-recall.* When consumers are unsatisfied with a product, they might post negative comments about the product on social media, e.g., Facebook and Twitter. Severe product defects tend to result in more negative posts about a product. Firms access these social media posts and study their sentiment to evaluate the severity of the product defects and assess the need for product recalls (Mukherjee & Sinha, 2018). As a result, more social media discussions about the adverse medication reactions of a drug result in a higher likelihood of the drug being recalled and a shorter time to recall, i.e., being recalled swiftly (Gao *et al.*, 2021). Firms can rely on the visualization of consumer sentiment on social media and can prepare themselves for recalls and recall management to reduce the costs related to these recalls (Zavala & Ramirez-Marquez, 2019). Firms can also use media to attribute blame to foreign manufacturers, particularly when they have low reputation for institutional quality, as Mattel and other toymakers blamed China by hiding information about design flaws that contributed to recalls (Beamish & Bapuji, 2008; Carvalho *et al.*, 2015).

*After-recall.* Product recalls result in negative publicity (Zavyalova *et al.*, 2012), which reduces the effectiveness of post-crisis advertising and product price adjustment initiatives. Under massive negative media coverage, the affected brands will be less likely to boost their sales through brand advertising and price adjustments (Cleeren *et al.*, 2013). This effect is strengthened with the development of social media. Hsu and Lawrence (2016) find that the volume, valence, and growth rate of online word of mouth magnify the firm value losses caused by product recalls, while the breadth of online word of mouth reduces the firm value losses.

Social media is also a major channel for recalling companies to communicate with consumers to mitigate the negative impact of recalls. For example, Lee *et al.* (2015) found that the use of interactive social media, such as corporate blogs, Rich Site Summary (RSS),

Facebook, and Twitter, can reduce firm value losses caused by product recalls. However, such benefits of using social media are contingent on the firm's control over the social media content. Corporate blogs and RSS, over which firms have high control, are more effective than Facebook and Twitter, over which the firms have low control.

*In summary*, previous studies have mainly examined two aspects of the role of media in product recalls. First, firms can make use of social media to predict the necessity of a recall and then make proactive plans to minimize the cost of recalls. Also, firms can use media to shift blame to foreign manufacturers. Second, product recalls result in negative media coverage that exposes negative information about the firm to more individuals. At the after-recall stage, recalling firms can communicate with external stakeholders through social media to mitigate the negative consequences of recalls.

### ***Regulators and Recalls***

Regulators design the “rules of the game” and shape the institutional context in which firms operate. They determine not only the goals that firms should pursue, such as environmental and social sustainability goals, but also the ways through which these goals can be pursued (Linton *et al.*, 2007). Regulators also determine the legitimacy of firms and can be regarded as the most powerful stakeholders (Mitchell *et al.*, 1997). Breaching of regulations will threaten the firm's legitimacy and will be penalized by regulators. Therefore, regulators, such as the Food and Drug Administration (FDA), Consumer Product Safety Commission (CPSC), and National Highway and Transportation Safety Administration (NHTSA) in the US, represent a mandatory force that influences recall decisions and consequences of recall events.

*Before-recall.* In recent years, regulators, such as the FDA, have increased their inspection of manufacturing plants to ensure compliance with quality standards. The outcomes of

inspections from regulators are signals of quality control in manufacturing plants and are predictive of future product recalls. Ball *et al.* (2017) found that favorable inspection outcomes are associated with lower hazard risks (i.e., a lower likelihood of product recalls). However, this association is contingent on the site-specific experience of the inspector. The authors found that inspectors with more site-specific experience tend to be complacent and may miss potential misconduct in manufacturing plants (Ball et al., 2017).

*During-recall.* Regulators also affect consumer compliance during the recall. A recent study shows that regulator-initiated digital marketing campaigns, e.g., the “Safe Cars Save Lives” campaign initiated by the NHTSA, significantly improved consumers’ awareness of recalls and improved the correction rate of defective products (Pagiavlas *et al.*, 2021). This effect is more salient for recalls that receive greater media coverage, recall of older products, and when the defective component takes a shorter time to repair.

*In summary,* previous research has mainly examined the effect of regulator inspections on product recalls, but this effect is contingent on inspector characteristics. Also, regulator-initiated digital marketing campaigns can improve consumer compliance and thus reduce further harm to consumers.

### ***Additional Insights from Recalls Studies***

In this paper, we adopted a stakeholder-stage framework to synthesize previous research on product recalls because such theoretical synthesis can help advance product recalls research. However, not all research studies and their findings fit into the stakeholder-stage framework as not all studies focus on stakeholders. We believe the findings that do not fit into our framework are equally important to advance scholarly understanding of product recalls. To underscore this

point and to draw attention to the richness of the product recalls research, we briefly discuss three research streams, with a few illustrative examples.

Firm characteristics affect the likelihood of product recalls and recall decision making. Accordingly, one stream of research focused on these factors, which cannot be attributed to a single stakeholder. For example, firms with high financial pressures and product variety are more likely to reduce investments in quality and safety, and thus increase the likelihood of product recalls (Kini *et al.*, 2016; Shah *et al.*, 2016). Similarly, firms with more share repurchases tend to focus on short-term goals and are more prone to product recalls (Bendig *et al.*, 2018).

Firm characteristics are also important determinants of recall decisions and their consequences. For example, the resource scenarios (i.e., combinations of resource endowment and resource orchestration) of a firm will affect its ability to recall products from the market. Firms in a resource harmony scenario (i.e., adequate resource endowment and adequate resource orchestration ability) can initiate precise recalls. In contrast, firms in a resource disorder scenario (i.e., inadequate resource endowment and inadequate resource orchestration ability) tend to initiate incomplete recalls that might incur further harm to consumers by recalling fewer products than necessary (Ketchen Jr *et al.*, 2014). Furthermore, the reputation of a firm might act as a liability and incur more negative consequences after product recalls due to the violation of expectations (Dawar & Pillutla, 2000; Laufer & Coombs, 2006; Ma *et al.*, 2014; Rhee & Haunschild, 2006). In short, this research has highlighted the importance of considering firm characteristics (e.g., financial pressures, resource scenarios, and reputation) in product recall research.

Another research stream focuses on recall characteristics as determinants of recall decisions as well as the consequences of recalls. For example, research has shown that the

number of products recalled is positively related to the firm value loss after automobile recalls (Liu *et al.*, 2017). More severe product harms motivate firms to offer a higher remedy (i.e., refund compared to replacement and repair) to consumers (Liu *et al.*, 2016). For recalling more expensive products, firms are less likely to offer a high remedy and take longer to recall (Muralidharan *et al.*, 2022). In addition, the time to recall is longer when recalling design-related (as compared to manufacturing-related) product flaws (Hora *et al.*, 2011; Muralidharan *et al.*, 2022). In short, this research stream underscored the importance of examining the effect of recall characteristics (e.g., recall size, hazard severity, recall cost, and flaw-type) on recall decisions and their consequences.

In addition to the above, another notable research stream is focused on studying product recalls using analytical modeling and simulation approaches (Mao *et al.*, 2021; Yao & Parlar, 2019). For example, based on the Bass diffusion model, Mao *et al.* (2021) found that firms are more likely to delay a recall when 1) the problems are identified early, 2) recalls have a more severe impact on sales due to media exposure, and 3) the product has a high profit margin. Based on an agent-based simulation approach, DuHadway and Narasimhan (2020) found that opportunistic behaviors might spread and cluster within the supply network, leading to an increase in product recalls. The analytical modeling and simulation approaches, although not well discussed in this review, are important research methods to understand product recalls.

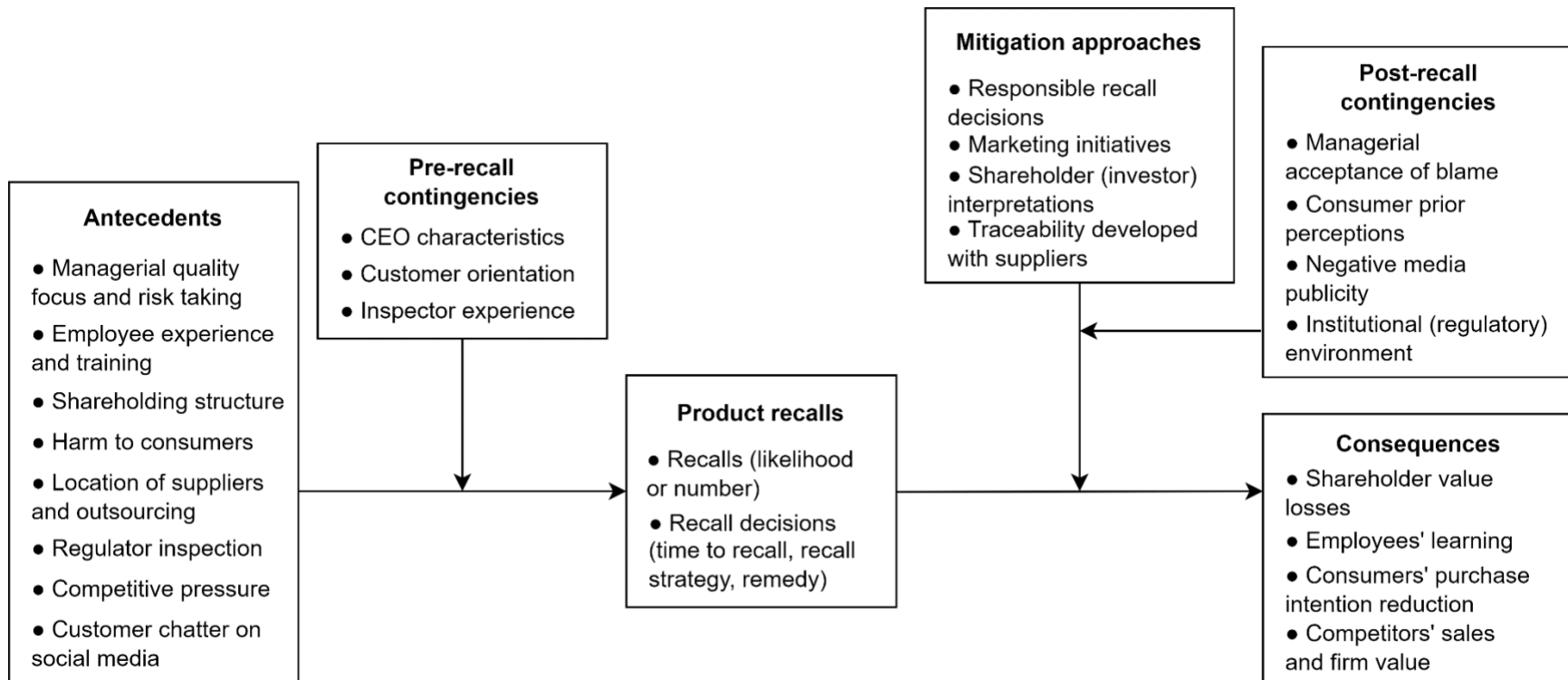
The research streams discussed above (as well as those we could not discuss here due to space constraints) are important for better understanding product recalls and their management. Therefore, future literature reviews can extend this review by adopting other perspectives to review product recalls research and integrate the findings.

### ***Mapping Research Findings***

Based on the research findings summarized above, we map current studies about product recalls in Figure 3. We map the findings based on 1) the antecedents of product recalls, i.e., factors that contribute to product recalls; 2) contingencies of antecedents, i.e., contextual factors that moderate the relationships between antecedents and product recalls; 3) the consequences of product recalls; 4) mitigation approaches, i.e., initiatives that can be leveraged to mitigate the negative consequences of product recalls; and 5) contingencies of mitigation approaches, i.e., contextual factors that affect the effectiveness of mitigation approaches.

To summarize, the likelihood (or number) of product recalls is associated with a managerial quality focus and risk-taking, employee experience and training, the firm's ownership structure, location of suppliers, sourcing strategy, negative regulator inspection reports, competitive pressures, and negative chatter of consumers on social media. The impact of these antecedents is influenced by contingent factors such as inspector experience, customer orientation of the firm, and CEO characteristics.

As for consequences, product recalls elicit negative consumer reactions and reduce consumers' purchase intentions, leading to a reduction in sales and market share. These are perceived as threats to the recalling firm's future cash flow, which leads to the loss of shareholder value. Moreover, product recall events disrupt prior routines, motivate employee learning, and reduce future product recalls. Further, managers can mitigate the negative consequences of product recalls through responsible recall decisions and marketing initiatives. However, the effectiveness of these initiatives depends on consumers' *ex-ante* brand evaluation and *ex-post* blame attribution.



**Figure 3. Mapping of research findings**

## FUTURE RESEARCH DIRECTIONS

We develop future research directions by focusing on (i) research gaps in terms of stakeholders and recall stages, i.e., empty cells in Table 1, and stakeholders not currently researched such as industry associations, i.e., relevant new rows; (ii) research opportunities in terms of building on current research, i.e., populated cells in Table 1; and (iii) potential theoretical insights that future research can generate. We present these research opportunities in Table 2 and describe more salient opportunities in the following paragraphs.

**Managers.** Previous research on managers has examined the effect of managers on recall management and recall consequences, but has limited the examination of recall antecedents to CEO characteristics. This limitation presents an opportunity to extend the research in two ways. First, future research can build on the research involving CEO characteristics to examine how such characteristics (e.g., gender, tenure, collectivist culture, socio-economic background) of relevant decision-makers (e.g., the TMT, quality managers, and recall managers) on recalls, recall management, and recall consequences. For example, women leaders are less risk-taking and are less likely to engage in misconduct (Gupta *et al.*, 2020). Thus, future research can examine whether organizations with a greater presence of women, and other demographically underprivileged groups, in leadership roles make more socially responsible decisions, i.e., issuing faster recalls, offering higher-level remedies, and communicating effectively.

Second, future research should extend the research on the relationship between CEO characteristics and recalls to examine the effect of CEO (as well as TMT) characteristics on socially responsible recall decisions, and their effect on the consequences of product recalls. For example, researchers can study whether CEO leadership and communication style moderate the negative consequences of recalls.

**Table 2. Summary of future research directions**

| <b>Stakeholders</b>   | <b>Before-recall<br/>(Factors leading to product recalls)</b>                                                                                                                                                                                | <b>During-recall<br/>(Effective decisions and implementation)</b>                                                                                                                                                                                            | <b>After-recall<br/>(Recall consequences and mitigation)</b>                                                                                                                                                                                                                                                |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Managers              | <ul style="list-style-type: none"> <li>• What cultural, social, and political factors affect managers' actions that lead to product recalls?</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>• What CEO/TMT characteristics (e.g., gender, tenure, culture, socio-economic background) will be associated with effective recall decisions, e.g., faster recall, higher remedy, rich communication</li> </ul>       | <ul style="list-style-type: none"> <li>• How would product recalls affect CEO/TMT turnover?</li> <li>• What actions can managers take to turn product recalls into opportunities for learning and innovation?</li> </ul>                                                                                    |
| Employees             | <ul style="list-style-type: none"> <li>• What types and characteristics of organizational culture lead to quality failures and thus, product recalls?</li> <li>• How are quality failures normalized, leading to product recalls?</li> </ul> | <ul style="list-style-type: none"> <li>• How do employees affect product recall decisions?</li> <li>• What types of organizational culture enable effective recall decisions and implementation?</li> </ul>                                                  | <ul style="list-style-type: none"> <li>• What effect does a product recall has on employees' commitment to the organization and employee turnover?</li> </ul>                                                                                                                                               |
| Shareholders          | <ul style="list-style-type: none"> <li>• What types of shareholders emphasize product safety, leading to fewer recalls?</li> </ul>                                                                                                           | <ul style="list-style-type: none"> <li>• What shareholder characteristics affect recall decisions?</li> </ul>                                                                                                                                                | <ul style="list-style-type: none"> <li>• What can shareholders do to mitigate the negative consequences of recalls?</li> </ul>                                                                                                                                                                              |
| Customers             | <ul style="list-style-type: none"> <li>• Does customer involvement in new product development reduce product recalls?</li> </ul>                                                                                                             | <ul style="list-style-type: none"> <li>• What communication and recall processes affect the return rate of recalled products?</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>• What can the firm do to re-engage with the firm?</li> </ul>                                                                                                                                                                                                        |
| Suppliers             | <ul style="list-style-type: none"> <li>• What supply network characteristics influence product recalls?</li> </ul>                                                                                                                           | <ul style="list-style-type: none"> <li>• What role do suppliers and supplier-relations play in recall decisions?</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>• Do recall consequences spillover to suppliers (as they do to competitors), and what factors would affect such spillover?</li> </ul>                                                                                                                                |
| Competitors           | <ul style="list-style-type: none"> <li>• How do competitor strategies (e.g., low-cost vs. differentiation) affect recalls?</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>• How do competitors respond to the focal firms' product recalls? And what competitor characteristics account for the variability in their responses?</li> </ul>                                                      | <ul style="list-style-type: none"> <li>• What factors cause the spillover effect of product recalls to competitors?</li> <li>• How do industry characteristics (e.g., industry concentration) affect competitors' response to product recalls?</li> </ul>                                                   |
| Media                 | <ul style="list-style-type: none"> <li>• Does social media chatter pressure firms to recall more products?</li> </ul>                                                                                                                        | <ul style="list-style-type: none"> <li>• How does social media sentiment affect managers' product recall decisions?</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>• How does social media sentiment affect the relationship between product recalls and firm value loss?</li> </ul>                                                                                                                                                    |
| Regulators            | <ul style="list-style-type: none"> <li>• What features of the institutional environment reduce product recalls?</li> <li>• What actions can regulators take to reduce massive recalls?</li> </ul>                                            | <ul style="list-style-type: none"> <li>• How can regulators work with companies to increase recall effectiveness?</li> <li>• How are the recall decisions of multinational enterprises (MNEs) affected by country and regulatory characteristics?</li> </ul> | <ul style="list-style-type: none"> <li>• Does the regulatory environment influence the negative consequences of product recalls?</li> <li>• What can regulators do to increase learning from recalls (e.g., research and dissemination) and prevent their recurrence (e.g., revising standards)?</li> </ul> |
| Industry Associations | <ul style="list-style-type: none"> <li>• How do characteristics of an industry association (e.g., number, leadership, role in standard-setting) affect recalls?</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>• How can industry associations work with companies and regulators to enhance recall effectiveness?</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>• How can industry associations facilitate learning from recalls, and improve standards to improve product safety?</li> </ul>                                                                                                                                        |

**Employees.** Previous research has found that employee experience, training, and communication decrease the likelihood of recalls, and that employees learn from recalls; nevertheless, the role of employees in recall decision-making remains unclear. Given the critical role of employees in achieving high product quality (Haunschild & Rhee, 2004; Rhee & Haunschild, 2006), future research can examine how employee-related factors influence product recalls at the three stages. At the before-recall stage, additional research is needed to examine what types of organizational cultures compromise quality and normalize quality failures, which in turn lead to product recalls. For example, would firms with a customer-oriented organizational culture be less prone to product recalls or would firms from collectivist cultures be less prone to recalls?

At the during-recall stage, more research attention is warranted to understand how employees influence product recall decisions. For example, research questions related to the employee reporting of product errors and potential design flaws on the time taken to issue a recall are fruitful areas of inquiry. Product recalls are also negative events that challenge employee attitudes and beliefs about the organization. Therefore, future research can pay more attention to employee-related consequences of recalls, e.g., what effect does a product recall have on employees' commitment to the organization and employee turnover?

**Shareholders.** Previous research has examined the effect of ownership structure on recalls and the loss in shareholder value due to recalls. Thus, future research can examine the effect of ownership type and board characteristics on relevant issues at the three stages of a product recall to understand how shareholder characteristics influence the occurrence of product recalls, as well as recall management (e.g., the time taken to recall a hazardous product, the level of remedy offered to consumers) and recall consequences. Previous research has shown that

responsible recall decisions (e.g., preventive recalls and full-refund remedies) are associated with more short-term firm value loss (Chen *et al.*, 2009; Liu *et al.*, 2017). Consistent with this rationale, it would be interesting to examine how firms balance the pressure from stakeholders and customers in making product recall decisions. For example, what shareholder structures would make firms compromise consumer safety to safeguard shareholder interests?

*Customers.* Prior research on customers has mainly focused on the after-recall stage, which has provided implications for firms to reduce the negative impact caused by recalls. However, research on the impact of customers in the before- and during-recall stages has been scant. Accordingly, we suggest three directions for future research. First, recent research on new product development has emphasized the importance of involving customers in product design. This increased customer involvement can increase new products' adaptability to different use conditions and can increase their reliability. However, it is unclear whether customer involvement in product design reduces product recalls. Future research could examine whether and how customer involvement in new product development reduces product recalls.

Second, during product recalls, returning defective products avoids further harm to consumers. However, unlike automobile dealers, which acquire consumer information and can contact consumers via phone or email, consumer product retailers normally do not have such detailed contact information of their customers and/or end-users of their products. As a result, communication may not reach the consumers and they may not return the recalled products. According to the CPSC, only 6% of all recalled products are returned by consumers (CPSC, 2021), which means that millions of hazardous products remain in use. If consumers are not aware of recall announcements and continue using defective products, their well-being might be

jeopardized. Therefore, researching policies and communication styles that could maximize the return rate is critical for consumer safety.

Third, consumers are at the core of firm recovery from recalls. Due to the disrupted relationship with consumers, firms must come up with ways to rebuild their relationship with customers. Therefore, future research should examine how firms could reengage customers and rebuild their organization's image to overcome the negative impression induced by recalls. In previous research, consumer characteristics have been neglected. However, for different types of customers, re-engagement patterns may be different. Thus, future research is warranted to examine how consumer characteristics (e.g., B2B or B2C, gender, age, social class, and culture) affect patterns of reengagement and what firms need to take to gain reengagement.

**Suppliers.** Suppliers are key players in product recall decision-making. For example, firms may have to cooperate with their suppliers to figure out the root cause of a defect before recalling a product. Further, supplier characteristics and behavior can cause product-harm crises and can also affect product recall decisions. For example, in the automobile industry (from 2009 to 2018), about 47% of the recalls are associated with quality flaws of components supplied by suppliers (Astvansh *et al.*, 2022). However, extant research has not examined their roles in the during- and after-recall stages. In addition, the traceability of the supply chain is a key factor contributing to the security and safety of final products, especially in food supply chains (Shankar *et al.*, 2018). It remains unclear how would the traceability of the supply chain affect product recall decisions.

Also, recent research on supply chain disruptions has shown that negative events disrupt the supply chain as a whole. For example, when Takata filed for bankruptcy after the massive airbag recall, its supply chain partners who used Takata airbags in their cars, such as Honda and

Mazda, had to shoulder the costs associated with those recalls. However, despite such anecdotal evidence, the supply chain-wide impact of product recalls remains unexplored. Therefore, more research is needed to examine research questions such as the following: What supply network characteristics influence product recalls? What roles do suppliers and buyer-supplier relationships play in recall decisions? Do recall consequences spread to suppliers (as they do to competitors), and if so, what factors would affect such spillovers?

**Competitors.** From the competitive dynamics perspective, competition among firms is dynamic and interactive (Chen, 1996; Chen & Miller, 1994). Adopting this perspective, research can view product recalls as an interactive process, i.e., one firm's recall decision is affected by other companies' recall decisions. On the one hand, firm recall decisions take into account competitor responses. On the other hand, competitor responses will be affected by the recalling firm's actions. For example, recent research shows that firms are more likely to recall defective products when their competitors have recalled similar products so that they can "hide in the herd" and receive less public scrutiny (Mukherjee *et al.*, 2021). Therefore, future research can examine the dynamics and interactions between the recalling firm and competitors in recalls, asking questions such as the following: 1) How do competitor strategies (e.g., low-cost vs. differentiation) affect recalls? 2) How do competitors respond to the focal firm's product recalls? What competitor characteristics account for the variability in their responses? and 3) What factors cause the spillover effect of product recalls to competitors?

**Media.** Previous research has examined the role of media at different stages of product recalls. However, it seems that this research stream has mainly taken a static perspective on product recalls and has examined the role of media in facilitating these recalls. However, the revelation of product-harm crises is a dynamic process shaped by stakeholder pressure, as

reflected in the media. For example, in the case of the Samsung Galaxy Note 7, Samsung did not recall the defective product (which posed the risk of self-ignition) until there was a “storm” on social media that threatened Samsung’s reputation. Therefore, future research should take a dynamic perspective to examine the role of media at different stages of product recalls, asking questions such as the following: 1) Does social media chatter pressure firms to recall more products? 2) How does social media sentiment affect managers’ product recall decisions? and 3) How does social media sentiment affect the relationship between product recalls and firm value losses?

**Regulators.** Regulators are key players in recall decisions. However, they have received little attention from previous research, especially with respect to their roles in the before- and after-recall stages. The quality management literature has established that quality culture – both at the organizational and societal level, is a key determinant of product and service quality. Regulators are a major force that shapes the regulatory and institutional context of recall decisions. Therefore, future research can examine the particular features of the institutional environment that reduce product recalls, and the specific actions that regulators can take to reduce massive and severe recalls, not only in their jurisdiction but also around the world via collaborations with other regulators. At the during-recall stage, the return rate is an important indicator of recall effectiveness. Therefore, it is important to develop policies and practices to increase the return of hazardous products.

In contrast to recalling companies, regulators have a stronger influence on consumers; thus, this influence could be leveraged to increase return rates. For example, during the Takata airbag recall in 2019, the Australian government issued many advertisements about the recall in different channels to avoid drivers and passengers from further harm caused by the airbag.

However, the effectiveness of this policy is unknown. Therefore, future research should examine how regulators might make recalls more effective, and also examine how they can work with companies to increase the effectiveness of recalls.

Although previous research has shown that the firm value losses caused by recalls vary across countries, additional research is needed to examine the factors that cause these differences. For example, future research can focus on multinational enterprises (MNEs) and examine how MNEs' recall decisions are affected by country and regulatory characteristics. Taking an international perspective is particularly important because of the rise in global value chains as well as the lack of attention to product recalls in international business scholarship (Bapuji & Beamish, 2019). Further, more research is needed to examine what regulators can do to increase learning from recalls (e.g., research and dissemination, revising standards) and prevent their recurrence.

***Industry associations.*** As product recalls result in losses for the entire industry, industry associations are key stakeholders, but previous research has not paid attention to them. As the negative spillover effect indicates, the recall of one brand or one firm can result in consumer and stakeholder concerns regarding the product quality of the entire product category and the entire industry. Since manufacturers of the same product category might adopt similar procedures and use similar materials, these industry associations need to set standards to hinder aggressive designs that might give rise to product defects. Future research should examine how industry associations and their standard-setting practices affect product recalls. Similarly, research can examine how industry associations can work with companies and regulators to enhance recall effectiveness. Finally, research can explore how industry associations may facilitate learning from recalls and improve standards to improve product safety.

## CONCLUDING REMARKS

Product recalls have attracted research interest from different disciplines because it provides an opportunity to scholars to make an impact on both practice and policy by addressing the grand challenge of public health and safety (Bapuji & Beamish, 2019; Park *et al.*, 2022). Further, product recalls are a complex phenomenon that can be studied from multiple perspectives to generate new insights. As multiple stakeholders are involved at multiple stages of product recalls, taking a comprehensive approach to recalls is useful. Accordingly, this paper reviewed the cross-disciplinary research findings related to product recalls and organized them based on a stakeholder-stage framework.

We find that current research has focused more on managers, shareholders, and consumers, but has paid limited attention to other equally important stakeholders such as suppliers, employees, competitors, media, and regulators. Also, researchers have predominantly examined the issues associated with the after-recall stage to minimize the consequences of recalls, while the before- and during-recall stages that prevent recalls and make them more effective are relatively underexamined. Taking an integrative approach to consider various stakeholders and multiple stages of a product recall can help future research generate useful insights for management research and practice. Based on the findings, we proposed future research directions according to the stakeholder-stage framework. Moreover, we suggest that future research should adopt a cross-disciplinary, cross-stakeholder, cross-stage, and cross-organizational view on the management of product recalls. We hope this review takes an important step to take the literature forward.

In addition to facilitating future research, our stakeholder-stage framework can also help managers effectively manage recalls as it presents evidence on the issues and factors to focus on

during different stages of product recalls. Specifically, at the before-recall stage, managers should pay attention to employee training and supply chain monitoring to minimize product quality risks and the likelihood of product recalls. At the during-recall stage, managers should consider harm to consumers and monitor customer chatter on social media to make socially responsible recall decisions, i.e., preventive recall, speedy recall, and higher remedy. At the after-recall stage, managers can leverage advertising and promotion campaigns to mitigate the negative impact of product recalls. We hope that our review contributes to a better managerial understanding of product recalls and their management.

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**APPENDIX - Table A1. List of Disciplinary Categories and Journals Covered**

| <b>Discipline and Journal</b>                        | <b>N</b> | <b>Discipline and Journal</b>                          | <b>N</b> |
|------------------------------------------------------|----------|--------------------------------------------------------|----------|
| <b><i>Management</i></b>                             |          | <b><i>Marketing</i></b>                                |          |
| J. of Business Research                              | 10       | J. of Marketing                                        | 11       |
| J. of Business Ethics                                | 8        | J. of Marketing Research                               | 6        |
| Business Horizons                                    | 5        | J. of the Academy of Marketing Science                 | 5        |
| Strategic Management J.                              | 4        | Int. J. of Research in Marketing                       | 3        |
| Management and Organization Review                   | 4        | Marketing Science                                      | 3        |
| J. of Management Studies                             | 2        | Int. Marketing Review                                  | 2        |
| Information Systems Research                         | 2        | European J. of Marketing                               | 1        |
| Academy of Management Annals                         | 1        | J. of Advertising                                      | 1        |
| Academy of Management J.                             | 1        | J. of Int. Marketing                                   | 1        |
| J. Int. Business Studies                             | 1        | J. of Retailing and Consumer Services                  | 1        |
| Organization Science                                 | 1        | J. of Product and Brand Management                     | 1        |
| J. of Organizational Behavior                        | 1        | <i>Discipline total</i>                                | 35       |
| Long Range Planning                                  | 1        | <b><i>Economics, Finance, and Accounting</i></b>       |          |
| Technovation                                         | 1        | J. of Political Economy                                | 2        |
| Asia Pacific J. of Management                        | 1        | J. of Accounting Research                              | 1        |
| J. of Hospitality and Tourism Management             | 1        | Review of Economics and Statistics                     | 1        |
| J. of Int. Management                                | 1        | Review of Financial Studies                            | 1        |
| Management Decision                                  | 1        | J. of Law Economics & Organization                     | 1        |
| <i>Discipline total</i>                              | 46       | <i>Discipline total</i>                                | 6        |
| <b><i>Operations and Supply Chain Management</i></b> |          | <b><i>Ethics &amp; CSR</i></b>                         |          |
| Int. J. of Production Economics                      | 8        | CSR and Environmental Management                       | 2        |
| Int. J. of Production Research                       | 8        | J. of Medical Ethics                                   | 1        |
| Management Science                                   | 7        | <i>Discipline total</i>                                | 3        |
| J. of Operations Management                          | 5        | <b><i>Communication</i></b>                            |          |
| M&SOM                                                | 5        | Public Relations Review                                | 7        |
| Production and Operations Management                 | 4        | Communication Research                                 | 1        |
| European J. of Operational Research                  | 4        | Journalism & Mass Communication Quarterly              | 1        |
| J. of Supply Chain Management                        | 4        | <i>Discipline total</i>                                | 9        |
| Decision Sciences                                    | 2        | <b><i>Agricultural Economics &amp; Food Policy</i></b> |          |
| IJOPM                                                | 2        | Food Policy                                            | 7        |
| J. of Business Logistics                             | 2        | American J. of Agricultural Economics                  | 1        |
| Expert Systems with Applications                     | 1        | European Review of Agricultural Economics              | 1        |
| Annals of Operations Research                        | 1        | Food Quality and Preference                            | 1        |
| Omega-Int. J. of Management Science                  | 1        | J. of Food Engineering                                 | 1        |
| Supply Chain Management-An Int. J.                   | 1        | J. of Dairy Science                                    | 1        |
| Production Planning & Control                        | 1        | J. of the Science of Food and Agriculture              | 1        |
| <i>Discipline total</i>                              | 56       | <i>Discipline total</i>                                | 13       |
| <i>All journals total</i>                            |          |                                                        | 168      |

Notes: 1. JIFQ – Journal impact factor quartile; 2. J. – Journal, Int. – International, CSR – Corporate Social Responsibility, M&SOM – Manufacturing & Service Operations Management, International Journal of Operations & Production Management.

**ONLINE APPENDIX - Table A2. List of Articles Included**

| <b>Authors</b>                                                                     | <b>Year</b> | <b>Title</b>                                                                                                                         | <b>Journal</b>                                 | <b>Area</b>        |
|------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------|
| Kong, Dongmin                                                                      | 2012        | Does corporate social responsibility matter in the food industry? Evidence from a nature experiment in China                         | Food Policy                                    | Agriculture & Food |
| Kong, Dongmin; Shi, Lu; Yang, Zhiqing                                              | 2019        | Product recalls, corporate social responsibility, and firm value: Evidence from the Chinese food industry                            | Food Policy                                    | Agriculture & Food |
| Li, Tongzhe; Bernard, John C; Johnston, Zachary A; Messer, Kent D; Kaiser, Harry M | 2017        | Consumer preferences before and after a food safety scare: An experimental analysis of the 2010 egg recall                           | Food Policy                                    | Agriculture & Food |
| Moghadam, Arian Khaleghi; Schmidt, Claudia; Grier, Kevin                           | 2013        | The impact of E. Coli O157: H7 recalls on live cattle futures prices: revisited                                                      | Food Policy                                    | Agriculture & Food |
| Pozo, Veronica F; Schroeder, Ted C                                                 | 2016        | Evaluating the costs of meat and poultry recalls to food firms using stock returns                                                   | Food Policy                                    | Agriculture & Food |
| Shang, Xia; Tonsor, Glynn T                                                        | 2017        | Food safety recall effects across meat products and regions                                                                          | Food Policy                                    | Agriculture & Food |
| Taylor, Mykel; Klaiber, H Allen; Kuchler, Fred                                     | 2016        | Changes in US consumer response to food safety recalls in the shadow of a BSE scare                                                  | Food Policy                                    | Agriculture & Food |
| Thomsen, Michael R; McKenzie, Andrew M                                             | 2001        | Market incentives for safe foods: an examination of shareholder losses from meat and poultry recalls                                 | American Journal of Agricultural Economics     | Agriculture & Food |
| Pouliot, Sebastien; Sumner, Daniel A.                                              | 2013        | Traceability, recalls, industry reputation and product safety                                                                        | European Review of Agricultural Economics      | Agriculture & Food |
| Barbarossa, C.; De Pelsmacker, P.; Moons, I.; Marcati, A.                          | 2016        | The influence of country-of-origin stereotypes on consumer responses to food safety scandals: The case of the horsemeat adulteration | Food Quality and Preference                    | Agriculture & Food |
| Velthuis, A. G. J.; Reij, M. W.; Baritakis, K.; Dang, M.; van Wagenberg, C. P. A.  | 2010        | Recall costs balanced against spoilage control in Dutch custard                                                                      | Journal of Dairy Science                       | Agriculture & Food |
| Gunawan, Ivan; Vanany, Iwan; Widodo, Erwin                                         | 2022        | Bulk food recall decisions: Postponement and preponement to sustain food business                                                    | Journal of Food Engineering                    | Agriculture & Food |
| Sohn, Mun-Gi; Oh, Sangsuk                                                          | 2014        | Global harmonization of food safety regulation from the perspective of Korea and a novel fast automatic product recall system        | Journal of The Science of Food And Agriculture | Agriculture & Food |
| Choi, Yoonhyeung; Lin, Ying-Hsuan                                                  | 2009        | Consumer response to crisis: Exploring the concept of involvement in Mattel product recalls                                          | Public Relations Review                        | Communication      |
| Gibson, DC                                                                         | 1995        | Public-relations considerations of consumer product recall                                                                           | Public Relations Review                        | Communication      |
| Laufer, Daniel; Jung, Jae Min                                                      | 2010        | Incorporating regulatory focus theory in product recall communications to increase compliance with a product recall                  | Public Relations Review                        | Communication      |

|                                                                           |      |                                                                                                                                                           |                                                              |                     |
|---------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------|
| Miller, Amy N.; Littlefield, Robert S.                                    | 2010 | Product recalls and organizational learning: ConAgra's responses to the peanut butter and pot pie crises                                                  | Public Relations Review                                      | Communication       |
| Olaniran, Bolanle A.; Scholl, Juliann C.; Williams, David E.; Boyer, Lori | 2012 | Johnson and Johnson phantom recall: A fall from grace or a revisit of the ghost of the past                                                               | Public Relations Review                                      | Communication       |
| Wang, X. Y.; Wang, Z. L.                                                  | 2014 | The effect of product-harm crisis situations on firms' spokesperson strategies: Evidence from China's emerging market economy                             | Public Relations Review                                      | Communication       |
| Zhu, Yunhao; Wei, Jiuchang; Wang, Feng; Liang, Liang                      | 2014 | Corporate statement serving as information subsidies in the product-harm crisis                                                                           | Public Relations Review                                      | Communication       |
| Tao, Weiting                                                              | 2018 | How consumers' pre-crisis associations and attitude certainty impact their responses to different crises                                                  | Communication Research                                       | Communication       |
| Wei, Ran; Lo, Ven-Hwei; Lu, Hung-Yi                                       | 2010 | The third-person effect of tainted food product recall news: examining the role of credibility, attention, and elaboration for college students in taiwan | Journalism & Mass Communication Quarterly                    | Communication       |
| Chang, Shao-Chi; Chang, Heng-Yu                                           | 2015 | Corporate motivations of product recall strategy: Exploring the role of corporate social responsibility in stakeholder engagement                         | Corporate Social Responsibility and Environmental Management | CSR & Ethics        |
| Oh, Hannah; Bae, John; Kim, Sang-Joon; Choi, Ryan                         | 2019 | Product recall as a way of responsible management of a firm: The roles of corporate social responsibility and board members' sense of ownership           | Corporate Social Responsibility and Environmental Management | CSR & Ethics        |
| Wasserman, J. A.; Dure, L. S.                                             | 2008 | The social psychology of amateur ethicists: blood product recall notification and the value of reflexivity                                                | Journal of Medical Ethics                                    | CSR & Ethics        |
| Hoffer, George E; Pruitt, Stephen W; Reilly, Robert J                     | 1988 | The impact of product recalls on the wealth of sellers: A reexamination                                                                                   | Journal of Political Economy                                 | Eco., Fin., and Acc |
| Jarrell, Gregg; Peltzman, Sam                                             | 1985 | The impact of product recalls on the wealth of sellers                                                                                                    | Journal of Political Economy                                 | Eco., Fin., and Acc |
| Lee, Lian Fen; Hutton, Amy P; Shu, Susan                                  | 2015 | The role of social media in the capital market: Evidence from consumer product recalls                                                                    | Journal of Accounting Research                               | Eco., Fin., and Acc |
| Hua, Xinyu                                                                | 2011 | Product Recall and Liability                                                                                                                              | Journal of Law Economics & Organization                      | Eco., Fin., and Acc |
| Freedman, Seth; Kearney, Melissa; Lederman, Mara                          | 2012 | Product recalls, imperfect information, and spillover effects: Lessons from the consumer response to the 2007 toy recalls                                 | Review of Economics and Statistics                           | Eco., Fin., and Acc |
| Kini, Omesh; Shenoy, Jaideep; Subramaniam, Venkat                         | 2016 | Impact of financial leverage on the incidence and severity of product failures: Evidence from product recalls                                             | The Review of Financial Studies                              | Eco., Fin., and Acc |
| Byun, Kyung-Ah Kay; Al-Shammari, Marwan                                   | 2021 | When narcissistic CEOs meet power: Effects of CEO narcissism and power on the likelihood of product recalls in consumer-packaged goods                    | Journal of Business Research                                 | Management          |

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|------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------|
| Byun, Kyung-Ah Kay; Duhan, Dale F; Dass, Mayukh                              | 2020 | The preservation of loyalty halo effects: An investigation of the post-product-recall behavior of loyal customers                                                         | Journal of Business Research | Management |
| Gao, H. Z.; Knight, J. G.; Zhang, H. X.; Mather, D.                          | 2013 | Guilt by association: Heuristic risks for foreign brands during a product-harm crisis in China                                                                            | Journal of Business Research | Management |
| Kashmiri, Saim; Brower, Jacob                                                | 2016 | Oops! I did it again: Effect of corporate governance and top management team characteristics on the likelihood of product-harm crises                                     | Journal of Business Research | Management |
| Liu, Dong; Varki, Sajeev                                                     | 2021 | The spillover effect of product recalls on competitors' market value: The role of corporate product reliability                                                           | Journal of Business Research | Management |
| Muralidharan, Etayankara; Hora, Manpreet; Bapuji, Hari                       | 2022 | Hazard severity and time to recall: Evidence from the toy industry                                                                                                        | Journal of Business Research | Management |
| Topaloglu, Omer; Gokalp, Omer N                                              | 2018 | How brand concept affects consumer response to product recalls: A longitudinal study in the US auto industry                                                              | Journal of Business Research | Management |
| Tse, Ying Kei; Zhang, Minhao; Tan, Kim Hua; Pawar, Kulwant; Fernandes, Kiran | 2019 | Managing quality risk in supply chain to drive firm's performance: The roles of control mechanisms                                                                        | Journal of Business Research | Management |
| Yuan, Denghua; Lin, Zhibin; Filieri, Raffaele; Liu, Ran; Zheng, Mengqin      | 2020 | Managing the product-harm crisis in the digital era: The role of consumer online brand community engagement                                                               | Journal of Business Research | Management |
| Zou, Peng; Li, Guofeng                                                       | 2016 | How emerging market investors' value competitors' customer equity: Brand crisis spillover in China                                                                        | Journal of Business Research | Management |
| Carvalho, Sergio W; Muralidharan, Etayankara; Bapuji, Hari                   | 2015 | Corporate Social 'Irresponsibility': Are Consumers' Biases in Attribution of Blame Helping Companies in Product-Harm Crises Involving Hybrid Products?                    | Journal of Business Ethics   | Management |
| Cheah, Eng Tuck; Chan, Wen Li; Chieng, Corinne Lin Lin                       | 2007 | The corporate social responsibility of pharmaceutical product recalls: An empirical examination of US and UK markets                                                      | Journal of Business Ethics   | Management |
| Coleman, Les                                                                 | 2011 | Losses from failure of stakeholder sensitive processes: financial consequences for large US companies from breakdowns in product, environmental, and accounting standards | Journal of Business Ethics   | Management |
| Kim, Sora                                                                    | 2014 | What's worse in times of product-harm crisis? Negative corporate ability or negative csr reputation?                                                                      | Journal of Business Ethics   | Management |
| Lin, Chieh-Peng; Chen, Shwu-Chuan; Chiu, Chou-Kang; Lee, Wan-Yu              | 2011 | Understanding purchase intention during product-harm crises: Moderating effects of perceived corporate ability and corporate social responsibility                        | Journal of Business Ethics   | Management |
| Noack, D.; Miller, D. R.; Smith, D.                                          | 2019 | Let me make it up to you: Understanding the mitigative ability of corporate social responsibility following product recalls                                               | Journal of Business Ethics   | Management |
| Noggle, R; Palmer, DE                                                        | 2005 | Radials, rollovers and responsibility: An examination of the Ford-Firestone case                                                                                          | Journal of Business Ethics   | Management |

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|------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------|
| Zhang, Shafu; Jiang, Like; Magnan, Michel; Su, Lixin Nancy | 2019 | Dealing with ethical dilemmas: A look at financial reporting by firms facing product harm crises                                              | Journal of Business Ethics         | Management |
| Avnet, Tamar; Laufer, Daniel                               | 2015 | Exploring the effectiveness of creating regulatory fit in crisis communications: Can it change perceptions of media coverage during a crisis? | Business Horizons                  | Management |
| Berman, B.; Swani, K.                                      | 2010 | Managing product safety of imported Chinese goods                                                                                             | Business Horizons                  | Management |
| Cleeren, Kathleen                                          | 2015 | Using advertising and price to mitigate losses in a product-harm crisis                                                                       | Business Horizons                  | Management |
| Laufer, Daniel; Coombs, W Timothy                          | 2006 | How should a company respond to a product harm crisis? The role of corporate reputation and consumer-based cues                               | Business Horizons                  | Management |
| Sumukadas, Narendar                                        | 2021 | Are you ready for your next product recall crisis? Lessons from operations and supply chain management                                        | Business Horizons                  | Management |
| Beamish, Paul W; Bapuji, Hari                              | 2008 | Toy recalls and China: Emotion vs. evidence                                                                                                   | Management and Organization Review | Management |
| Luo, Yadong                                                | 2008 | A strategic analysis of product recalls: The role of moral degradation and organizational control                                             | Management and Organization Review | Management |
| Lyles, Marjorie A; Flynn, Barbara B; Frohlich, Mark T      | 2008 | All supply chains don't flow through: Understanding supply chain issues in product recalls                                                    | Management and Organization Review | Management |
| Meyer, Marshall W                                          | 2008 | Editor's introduction—No free lunch: Dilemmas of product quality in China                                                                     | Management and Organization Review | Management |
| Bromiley, P; Marcus, A                                     | 1989 | The deterrent to dubious corporate-behavior - profitability, probability and safety recalls                                                   | Strategic Management Journal       | Management |
| Davidson, Wallace N; Worrell, Dan L                        | 1992 | Research notes and communications: The effect of product recall announcements on shareholder wealth                                           | Strategic Management Journal       | Management |
| Raithel, Sascha; Hock, Stefan J                            | 2020 | The crisis-response match: An empirical investigation                                                                                         | Strategic Management Journal       | Management |
| Wowak, Adam J.; Mannor, Michael J.; Wowak, Kaitlin D.      | 2015 | Throwing caution to the wind: The effect of CEO stock option pay on the incidence of product safety problems                                  | Strategic Management Journal       | Management |
| Gao, Yang; Duan, Wenjing; Rui, Huaxia                      | 2021 | Does Social Media Accelerate Product Recalls? Evidence from the Pharmaceutical Industry                                                       | Information Systems Research       | Management |
| He, Shu; Rui, Huaxia; Whinston, Andrew B                   | 2018 | Social media strategies in product-harm crises                                                                                                | Information Systems Research       | Management |
| Liu, Alfred Zhu; Liu, Angela Xia; Wang, Rui; Xu, Sean Xin  | 2019 | Too Much of a Good Thing? The Boomerang Effect of Firms' Investments on Corporate Social Responsibility during Product Recalls                | Journal of Management Studies      | Management |
| Rhee, Mooweon                                              | 2009 | Does reputation contribute to reducing organizational errors? A learning approach                                                             | Journal of Management Studies      | Management |
| Hersel, Matt C; Helmuth, Catherine A; Zorn, Michelle L;    | 2019 | The corrective actions organizations pursue following misconduct: A review and research agenda                                                | Academy of Management Annals       | Management |

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|--------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|
| Shropshire, Christine; Ridge, Jason W                                                      |      |                                                                                                                                                                   |                                               |            |
| Zavyalova, Anastasiya; Pfarrer, Michael D; Reger, Rhonda K; Shapiro, Debra L               | 2012 | Managing the message: The effects of firm actions and industry spillovers on media coverage following wrongdoing                                                  | Academy of Management Journal                 | Management |
| Sun, Zhihui; Wu, Dejun; Zhang, Min                                                         | 2019 | Better late than never? Corporate social responsibility engagement after product-harm crises                                                                      | Asia Pacific Journal of Management            | Management |
| Seo, Soobin; Jang, SooCheong                                                               | 2021 | A negative or positive signal? The impact of food recalls on negative word-of-mouth (N-WOM)                                                                       | Journal of Hospitality and Tourism Management | Management |
| Bapuji, Hari; Beamish, Paul W                                                              | 2019 | Impacting practice through IB scholarship: Toy recalls and the product safety crisis                                                                              | Journal of International Business Studies     | Management |
| Laufer, D.; Garrett, T. C.; Ning, B.                                                       | 2018 | The moderating role of power distance on the reaction of consumers to the ceo as a spokesperson during a product harm crisis: Insights from china and south korea | Journal of International Management           | Management |
| Munyon, Timothy P; Jenkins, Matthew T; Crook, T Russell; Edwards, Jonathan; Harvey, N Paul | 2019 | Consequential cognition: Exploring how attribution theory sheds new light on the firm-level consequences of product recalls                                       | Journal of Organizational Behavior            | Management |
| Siomkos, George; Shrivastava, Paul                                                         | 1993 | Responding to product liability crises                                                                                                                            | Long Range Planning                           | Management |
| Rayfield, Blake; Unsal, Omer                                                               | 2019 | Product recalls, lobbying, and firm value                                                                                                                         | Management Decision                           | Management |
| Rhee, Mooweon; Haunschild, Pamela R                                                        | 2006 | The liability of good reputation: A study of product recalls in the US automobile industry                                                                        | Organization Science                          | Management |
| Kumar, Sameer; Budin, Erin M                                                               | 2006 | Prevention and management of product recalls in the processed food industry: a case study based on an exporter's perspective                                      | Technovation                                  | Management |
| Bendig, David; Willmann, Daniel; Strese, Steffen; Brettel, Malte                           | 2018 | Share Repurchases and Myopia: Implications on the Stock and Consumer Markets                                                                                      | Journal of Marketing                          | Marketing  |
| Chen, Yubo; Ganesan Shankar,; Liu, Yong                                                    | 2009 | Does a firm's product-recall strategy affect its financial value? An examination of strategic alternatives during product-harm crises                             | Journal of Marketing                          | Marketing  |
| Cleeren, Kathleen; Van Heerde, Harald J; Dekimpe, Marnik G                                 | 2013 | Rising from the ashes: How brands and categories can overcome product-harm crises                                                                                 | Journal of Marketing                          | Marketing  |
| Eilert, Meike; Jayachandran, Satish; Kalaignanam, Kartik; Swartz, Tracey A                 | 2017 | Does it pay to recall your product early? An empirical investigation in the automobile industry                                                                   | Journal of Marketing                          | Marketing  |
| Gao, H. B.; Xie, J. H.; Wang, Q.; Wilbur, K. C.                                            | 2015 | Should ad spending increase or decrease before a recall announcement? The marketingfinance interface in product-harm crisis management                            | Journal of Marketing                          | Marketing  |

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|--------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------|
| Kalaiganam, Kartik; Kushwaha, Tarun; Eilert, Meike                                   | 2013 | The impact of product recalls on future product reliability and future accidents: Evidence from the automobile industry | Journal of Marketing                           | Marketing |
| Lei, Jing; Dawar, Niraj; Lemmink, Jos                                                | 2008 | Negative spillover in brand portfolios: exploring the antecedents of asymmetric effects                                 | Journal of Marketing                           | Marketing |
| Liu, Angela Xia; Liu, Yong; Luo, Ting                                                | 2016 | What drives a firm's choice of product recall remedy? The impact of remedy cost, product hazard, and the CEO            | Journal of Marketing                           | Marketing |
| Liu, Yan; Shankar, Venkatesh; Yun, Wonjoo                                            | 2017 | Crisis management strategies and the long-term effects of product recalls on firm value                                 | Journal of Marketing                           | Marketing |
| Pagiavlas, Sotires; Kalaiganam, Kartik; Gill, Manpreet; Bliese, Paul D               | 2021 | Regulating Product Recall Compliance in the Digital Age: Evidence from the "Safe Cars Save Lives" Campaign              | Journal of Marketing                           | Marketing |
| Puzakova, Marina; Kwak, Hyokjin; Rocereto, Joseph F.                                 | 2013 | When humanizing brands goes wrong: The detrimental effect of brand anthropomorphization amid product wrongdoings        | Journal of Marketing                           | Marketing |
| Borah, Abhishek; Tellis, Gerard J.                                                   | 2016 | Halo (spillover) effects in social media: Do product recalls of one brand hurt or help rival brands?                    | Journal of Marketing Research                  | Marketing |
| Dawar, Niraj; Pillutla, Madan M.                                                     | 2000 | Impact of product-harm crises on brand equity: The moderating role of consumer expectations                             | Journal of Marketing Research                  | Marketing |
| Lei, Jing; Dawar, Niraj; Gürhan-Canli, Zeynep                                        | 2012 | Base-rate information in consumer attributions of product-harm crises                                                   | Journal of Marketing Research                  | Marketing |
| Roehm, Michelle L; Tybout, Alice M                                                   | 2006 | When will a brand scandal spill over, and how should competitors respond?                                               | Journal of Marketing Research                  | Marketing |
| Trendel, Olivier; Mazodier, Marc; Vohs, Kathleen D                                   | 2018 | Making Warnings About Misleading Advertising and Product Recalls More Effective: An Implicit Attitude Perspective       | Journal of Marketing Research                  | Marketing |
| Zhao, Yi; Zhao, Ying; Helsen, Kristiaan                                              | 2011 | Consumer learning in a turbulent market environment: Modeling consumer choice dynamics after a product-harm crisis      | Journal of Marketing Research                  | Marketing |
| Cleeren, Kathleen; Dekimpe, Marnik G; Helsen, Kristiaan                              | 2008 | Weathering product-harm crises                                                                                          | Journal of the Academy of Marketing Science    | Marketing |
| Cleeren, Kathleen; Dekimpe, Marnik G; van Heerde, Harald J                           | 2017 | Marketing research on product-harm crises: a review, managerial implications, and an agenda for future research         | Journal of the Academy of Marketing Science    | Marketing |
| Kashmiri, Saim; Nicol, Cameron Duncan; Arora, Sandeep                                | 2017 | Me, myself, and I: influence of CEO narcissism on firms' innovation strategy and the likelihood of product-harm crises  | Journal of the Academy of Marketing Science    | Marketing |
| Mafael, Alexander; Raithel, Sascha; Hock, Stefan J                                   | 2021 | Managing customer satisfaction after a product recall: the joint role of remedy, brand equity, and severity             | Journal of the Academy of Marketing Science    | Marketing |
| Zhou, Chen; Sridhar, Shrihari; Becerril-Arreola, Rafael; Cui, Tony Haitao; Dong, Yan | 2019 | Promotions as competitive reactions to recalls and their consequences                                                   | Journal of the Academy of Marketing Science    | Marketing |
| Hsu, Liwu; Lawrence, Benjamin                                                        | 2016 | The role of social media and brand equity during a product recall crisis: A shareholder value perspective               | International Journal of Research in Marketing | Marketing |

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|-------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------|
| Klein, Jill; Dawar, Niraj                                         | 2004 | Corporate social responsibility and consumers' attributions and brand evaluations in a product-harm crisis                             | International Journal of Research in Marketing | Marketing |
| Pennings, Joost ME; Wansink, Brian; Meulenbergh, Matthew TG       | 2002 | A note on modeling consumer reactions to a crisis: The case of the mad cow disease                                                     | International Journal of Research in Marketing | Marketing |
| Bala, Ram; Bhardwaj, Pradeep; Chintagunta, Pradeep K              | 2017 | Pharmaceutical product recalls: Category effects and competitor response                                                               | Marketing Science                              | Marketing |
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Note: Eco., Fin., and Acc. – Economics, Finance, and Accounting; OSCM – Operations and Supply Chain Management.