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A Cross-disciplinary review of product recall research: A stakeholder-stage framework

Huashan Li [a], Hari Bapuji [a], Srinivas Talluri [b,*], Prakash J. Singh [a]

[a] Department of Management and Marketing, University of Melbourne, Level 10, 198 Berkeley Street, VIC 3010, Australia
[b] Broad College of Business, Michigan State University, 632 Bogue Street, Room N351, East Lansing, MI 48824, United States

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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.

1. 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). In 2007, the toy giant Mattel recalled about 20 million toys that had excess lead 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

* Corresponding author.
E-mail addresses: huashan.li@unimelb.edu.au (H. Li), hari.bapuji@unimelb.edu.au (H. Bapuji), talluri@broad.msu.edu (S. Talluri), pjsingh@unimelb.edu.au (P.J. Singh).

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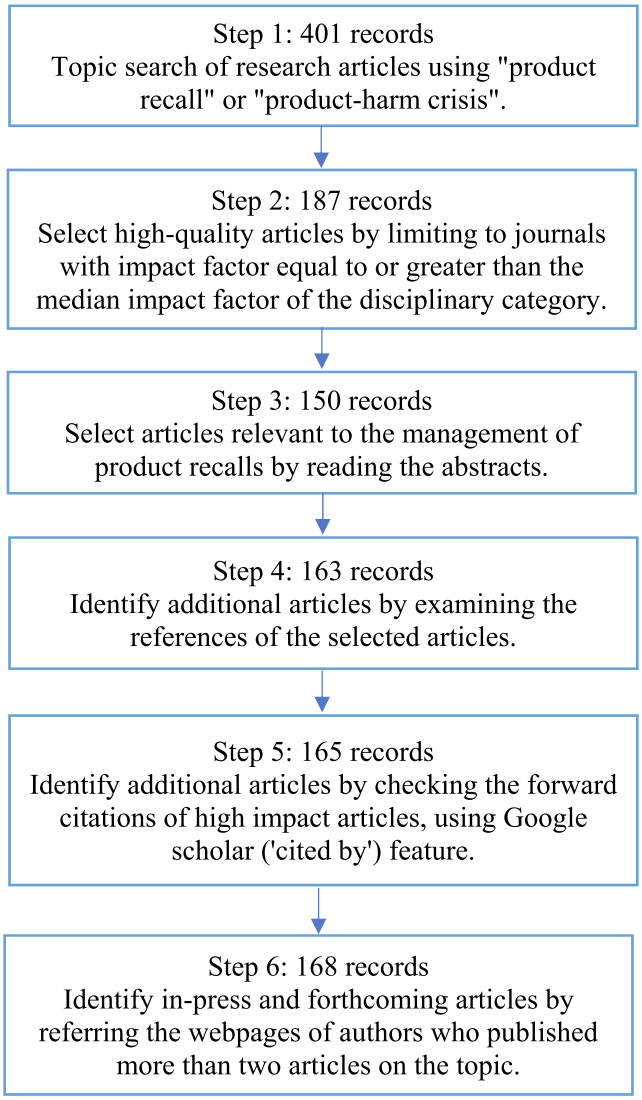

Fig. 1. Search procedure.

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.

2. Review methodology and framework

2.1. 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 Fig. 1, and explained below.

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 factor 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 *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 A. The full list of the 168 articles is included in the Online Appendix.

2.2. 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

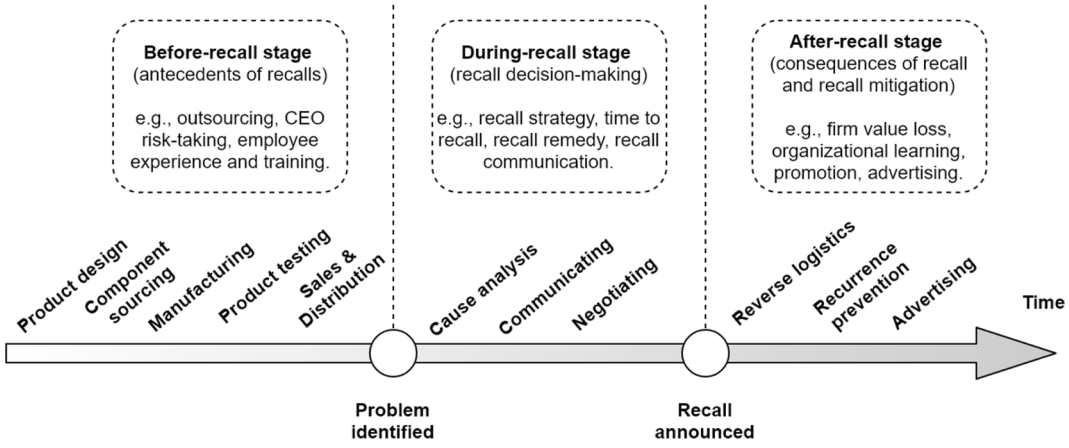

Fig. 2. Different stages of a product recall and relevant phenomena.

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 Fig. 2 for various issues over time).

3. 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.

3.1. 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.

3.1.1. 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 on 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

Table 1
Summary of research findings

Stakeholders	Before recall (antecedents)	During recall (recall decisions)	After recall (consequences)
Internal stakeholders			
Managers	Product recalls increase due to: • Excessive pursuit of value creation, e.g., R&D, efficiency (Shah et al., 2016; Thirumalai & Sinha, 2011). • Risk-taking due to (i) CEO narcissism (Kashmiri & Brower, 2016), (ii) a high stock option pay (Wowak et al., 2015). • High financial distress in the firm that affects managers' decisions (Kini et al., 2016).	Recall decisions are influenced by: • CEO and TMT traits, e.g., CEO narcissism (Byun & Al-Shammari, 2021), CEO tenure (Mayo et al., 2021), CEO compensation (Liu et al., 2016), and female board representation (Wowak et al., 2021a). • Managerial perception, e.g., the source and consequences of recalls (Ball et al., 2018a), perceived resource condition of the firm (Ketchen et al., 2014), and perceived harm to consumers (Eilert et al., 2017; Liu et al., 2016).	Managers can mitigate recall consequences by: • Responsible recall decisions, e.g., proactive recall, swift recall, a full refund remedy (Eilert et al., 2017; Liu et al., 2017). • Marketing initiatives, e.g., promotion and advertising (Cleeren et al., 2008; Liu et al., 2017). • CSR activities, i.e., donations (Sun et al., 2019). • Effective communication, i.e., explain the cause of the defect and ways to fix it (Zavyalova et al., 2012).
Employees	Product recalls decrease due to: • Employee experience (Haunschild & Rhee, 2004). • Employee training & communication (Kumar & Schmitz, 2011). • Low level of employee unionization (Kini et al, 2021)		• Recalls motivate employees to learn from recalls and improve product quality (Haunschild & Rhee, 2004; Kalaignanam et al., 2013; Rhee & Haunschild, 2006). • The learning effect is stronger for voluntary recalls (Haunschild & Rhee, 2004), recalls caused by internal and supplier factors (Hall & Johnson-Hall, 2017), and firms with a wider product scope (Kalaignanam et al., 2013).
Shareholders	Product recalls decrease due to: • High managerial and family ownership (Kashmiri & Brower, 2016).		The impact of recalls on shareholder value affected by: • 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 & Sinha, 2011). • Firm characteristics (e.g., supply chain position) that signals the ability of the recalling firm (Ni et al., 2016). • The institutional context that affects investor behaviors (Cheah et al., 2007; Zhao et al., 2013).
External stakeholders			
Customers		Harm to consumers prompts: • A higher remedy to reduce negative consumer reaction (Liu et al., 2016). • Delay in recall for the fear of negative consequences (Eilert et al., 2017). Communication with customers is more effective when: • Using imaginary information (Trendel et al., 2018). • Achieving regulatory fit (Avnet & Laufer, 2015).	Product recalls lead to: • Consumer uncertainty about product quality (Zhao et al., 2011). • Losses of sales and market share (Cleeren et al., 2013; Liu & Shankar, 2015). • Spillover effects on other brands of the same firm (Lei et al., 2008). Customers' reaction to recalls is contingent on: • Customers' ex-ante evaluation of the recalling brand (Klein & Dawar, 2004). • Customers' loyalty and commitment to the recalling brand (Byun et al., 2020). • Customers' ex-post blame attribution (Munyon et al., 2019).
Suppliers	Product recalls can be reduced by: • Reducing outsourcing and offshoring (Steven, et al., 2014) from emerging markets (Steven & Britto, 2016). • High density and low centrality supply network (Kalaignanam et al., 2017).	Upstream and downstream complexity increases the uncertainty of recall processes (Wowak et al., 2021). Firms spend longer time to recall when the defect is caused by suppliers (Ni & Huang, 2018). This can be mitigated by: • Geographical proximity and industrial relatedness between the firm and suppliers (Lawson et al., 2019).	Consequences of recalls are affected by: • Traceability developed with suppliers, who are held accountable after recalls (Dai et al., 2015a; Piramuthu et al., 2013). • A proper sourcing and production distribution design (He et al., 2020).

(*continued on next page*)

Table 1 (*continued*)

Stakeholders	Before recall (antecedents)	During recall (recall decisions)	After recall (consequences)
	• Reward and risk-sharing contracts (Chao et al., 2009). • Adopting information technology to increase traceability (Kumar, 2014). • Supplier development (Tse et al., 2019).	• The adoption of information technologies (Crumbly & Carter, 2015).	
Competitors	Product recalls increase due to product competition (relaxation of quality standards) (Ball et al., 2018b).	Firms are more likely to initiate a recall following competitors' product recall announcements (Mukherjee et al., 2021).	• Recalls cast doubt on the whole product category and induce a negative spillover effect (Borah & Tellis, 2016; Zou & Li, 2016). • 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).
Media		Social media contents, e.g., negative user comments on social media, can help firms to make recall decisions (Zavala & Ramirez-Marquez, 2019; Gao et al., 2021).	• Recalls increase negative media coverage (Zavyalova et al., 2012). • Firms' social media usage reduces the negative consequences of recalls (Lee et al., 2015).
Regulators	Product recalls can be predicted by negative regulatory inspection reports (Ball et al., 2017).	Regulator-initiated digital marketing campaign improves consumer compliance to recalls (Pagiavlas et al., 2021).	

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).

3.1.2. *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).

3.1.3. *After-recall*

Research shows that recalls give rise to financial distress for the recalling firm and change managers' behaviors. Recalling defective products creates 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 generate 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). Specifically, 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 willingness 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 about 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 willingness 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.

3.2. 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.

3.2.1. 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).

3.2.2. 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 problems that cause 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; Kalaignanam 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; Kalaignanam 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.

3.3. Shareholders and recalls

As owners of the firm and bearers of firm risk, shareholders are considered 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.

3.3.1. 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).

3.3.2. 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 non-severe recalls into their return expectations in some industries. Confirming this view, non-severe recalls are not associated with negative abnormal returns in the automobile industry (Gokhale et al., 2014; Hoffer et al., 1988). 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 serve as signals of 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.

3.4. Consumers and recalls

Consumers are a firm's core stakeholders (Ogden & Watson, 1999). Not only are they the 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.

3.4.1. 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).

3.4.2. 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.

3.5. 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.

3.5.1. 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).

3.5.2. 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).

3.5.3. 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 using 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.

3.6. 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.

3.6.1. 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.

3.6.2. 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 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).

3.6.3. 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 in the industry.

3.7. 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.

3.7.1. 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).

3.7.2. 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.

3.8. 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.

3.8.1. 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).

3.8.2. 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.

3.9. 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 harm consumers as they recall fewer products than necessary

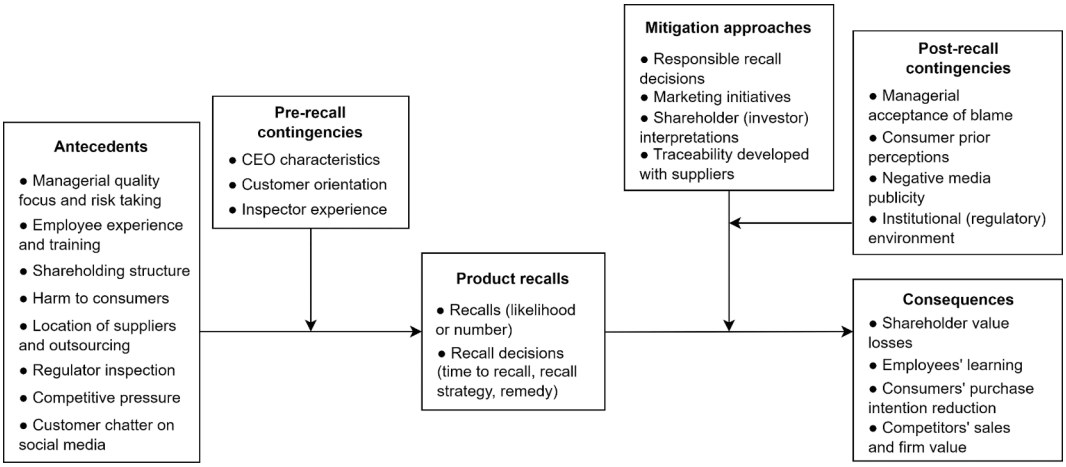

Fig. 3. Mapping of research findings.

(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 hazards 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.

3.10. Mapping research findings

Based on the research findings summarized above, we map current studies about product recalls in Fig. 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.

4. 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.

4.1. 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.

4.2. 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?

4.3. 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?

4.4. 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

Table 2
Summary of future research directions

Stakeholders	Before-recall(Factors leading to product recalls)	During-recall(Effective decisions and implementation)	After-recall(Recall consequences and mitigation)
Managers	• What cultural, social, and political factors affect managers' actions that lead to product recalls?	• 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	• How would product recalls affect CEO/TMT turnover? • What actions can managers take to turn product recalls into opportunities for learning and innovation?
Employees	• What types and characteristics of organizational culture lead to quality failures and thus, product recalls? • How are quality failures normalized, leading to product recalls?	• How do employees affect product recall decisions? • What types of organizational culture enable effective recall decisions and implementation?	• What effect does a product recall has on employees' commitment to the organization and employee turnover?
Shareholders	• What types of shareholders emphasize product safety, leading to fewer recalls?	• What shareholder characteristics affect recall decisions?	• What can shareholders do to mitigate the negative consequences of recalls?
Customers	• Does customer involvement in new product development reduce product recalls?	• What communication and recall processes affect the return rate of recalled products?	• What can the firm do to re-engage with the firm?
Suppliers	• What supply network characteristics influence product recalls?	• What role do suppliers and supplier-relations play in recall decisions?	• Do recall consequences spillover to suppliers (as they do to competitors), and what factors would affect such spillover?
Competitors	• How do competitor strategies (e.g., low-cost vs. differentiation) affect recalls?	• How do competitors respond to the focal firms' product recalls? And what competitor characteristics account for the variability in their responses?	• What factors cause the spillover effect of product recalls to competitors? • How do industry characteristics (e.g., industry concentration) affect competitors' response to product recalls?
Media	• Does social media chatter pressure firms to recall more products?	• How does social media sentiment affect managers' product recall decisions?	• How does social media sentiment affect the relationship between product recalls and firm value loss?
Regulators	• What features of the institutional environment reduce product recalls? • What actions can regulators take to reduce massive recalls?	• How can regulators work with companies to increase recall effectiveness? • How are the recall decisions of multinational enterprises (MNEs) affected by country and regulatory characteristics?	• Does the regulatory environment influence the negative consequences of product recalls? • What can regulators do to increase learning from recalls (e.g., research and dissemination) and prevent their recurrence (e.g., revising standards)?
Industry Associations	• How do characteristics of an industry association (e.g., number, leadership, role in standard-setting) affect recalls?	• How can industry associations work with companies and regulators to enhance recall effectiveness?	• How can industry associations facilitate learning from recalls, and improve standards to improve product safety?

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.

4.5. 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 the role of suppliers 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?

4.6. 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?

4.7. 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?

4.8. 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.

4.9. 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 can 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.

5. 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 of our review, 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.

CRediT authorship contribution statement

Huashan Li: Formal analysis, Writing – original draft. **Hari Bapuji:** Conceptualization, Writing – review & editing. **Srinivas Talluri:** Supervision, Resources, Writing – review & editing. **Prakash J. Singh:** Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

Appendix A

See Table A1.

Table A1
List of disciplinary categories and journals covered

Discipline and Journal	N	Discipline and Journal	N
Management		***Marketing***	
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	**Discipline total**	**35**
Long Range Planning	1	***Economics, Finance, and Accounting***	
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
Discipline total	**46**	**Discipline total**	**6**
Operations and Supply Chain Management		***Ethics & CSR***	
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	**Discipline total**	**3**
J. of Operations Management	5	***Communication***	
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	**Discipline total**	**9**
Decision Sciences	2	***Agricultural Economics & Food Policy***	
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
Discipline total	**56**	**Discipline total**	**13**
All journals total			168

Notes: J. – Journal, Int. – International, CSR – Corporate Social Responsibility, M&SOM – Manufacturing & Service Operations Management, IJOPM – International Journal of Operations & Production Management.

Appendix B. Supplementary material

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.tre.2022.102732.

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