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Toward a Better Understanding and Management of Product Recall

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Abstract

Product recalls have become increasingly common across product categories and countries. Although recalls pose adverse consequences for businesses, regulatory agencies, and society, they also test these stakeholders' resilience in the face of adversity. Perhaps because scholars from multiple disciplines have studied recalls for nearly four decades now, a large number of terms, most of which stay undefined, has been used to describe recalls and several closely related yet distinct phenomena. We also lack a framework that can help synthesize our knowledge and guide us toward questions that are both interesting and relevant. Finally, there has been no attention to the fundamental question of what firm actions drive the effectiveness of recalls. My thesis seeks to address these two areas of improvement. Specifically, Essay 1 defines product recall, and delineates it from related phenomena. It also offers a framework of the various strategies firms can undertake in the aftermath of defective products, factors that drive choice of these strategies, and the performance implications of the chosen strategies. Essay 2 empirically examines how recall-announcing firms' marketing communications and marketing channels drive product recall effectiveness. The two essays thus seek to improve academics' and practitioners' understanding and management of product recall respectively.

Keywords: Product Recall, Marketing Communications, Channels, Topic Modeling.

Statement of Authorship

This is to certify that I am the principal author and have had a major role in the preparation and writing of the manuscript (per http://grad.uwo.ca/current_students/regulations/8.html).

Essay 1 (Product Recall: A Research Synthesis and New Directions)

Sometime toward the end of my first year in the Ph.D. program, I proposed to Professor Kersi D. Antia (chair of my thesis supervisory committee) that I would like to study the phenomenon of product recall for my thesis. Following his approval, and under his supervision, I started Essay 1 as a review of the marketing academic literature in product recall. With time, however, I included published and unpublished manuscripts from other disciplines (operations, accounting, finance, economics, communications, public relations, law, etc.) that have studied product recall. I also went a step ahead and reviewed reports from practitioners and government agencies, and white papers from consulting firms. Lastly, I interviewed personnel from nine regulatory agencies across six countries. I then wrote the manuscript that Kersi edited. We submitted the manuscript (*JM16.0500*) with Astvansh and Antia order-of-authorship on December 30, 2016, and received a "risky and major revision" decision on March 16, 2017. As part of our revision effort, we are pleased to have senior scholar, Gerard J. Tellis from University of Southern California, as the third author on the paper. We hope to submit the paper for second-round review in the winter of 2019. The new order of authorship – Astvansh, Antia, and Tellis – accurately reflects our respective contributions.

Essay 2 (Recalled but Not Remedied: The Role of Customer-Focused Recall Campaigns and Channel Quality in Product Recall Effectiveness)

Sometime in the second year of my Ph.D. program, building on my review of the multidisciplinary literature on product recall, I thought of *product recall effectiveness* – the extent to which the recalled products are remedied[1] – as an outcome that is both interesting to theory and relevant to practice. Upon Kersi's approval and under his guidance, I developed a conceptual framework, proposing various drivers of recall effectiveness. I then proceeded to identify vehicle recalls in the U.S. as a suitable empirical context to test the framework. We realized that the data required me to acquire skills in topic modeling – an unsupervised machine learning method – that could discover latent topics in the unstructured text underlying recall campaigns. We sought the expertise of Professor Xin (Shane) Wang and he kindly guided me on the theory and execution of topic modeling. I collected, cleaned the data and conducted the analysis and modeling. I also wrote the manuscript, which was later edited by Kersi and Shane in multiple iterations. We submitted the manuscript – Astvansh, Antia, and Wang – in February 2017, and received a reject-and-resubmit decision in May 2017. I have revised the manuscript and hope to submit it in spring/summer 2018. The order of authorship – Astvansh, Antia, and Wang – accurately reflects our respective contributions.

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[1] "[A] remedy is the corrective or compensation measure that companies provide for the defective products", such as repair, replacement, refund, and/or discount on a future purchase (Liu, Liu, and Luo 2016, p. 79).

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My experience during the Ph.D. program at the Ivey Business School at Western University (hereafter, Ivey) has been life-shaping. I am pleased to take this opportunity to thank the people who have helped me see this day.

First and foremost, I express my gratitude to the chair of my thesis supervisory committee, Professor Kersi D. Antia, for his unwavering support. Kersi and I have known each other from our University of Wisconsin-Madison days, and he was instrumental in helping me join the Ivey Ph.D. program. He has been absolutely patient with me, tirelessly helping me learn how (not) to write, speak, present, and even think. He has financially supported my data collection and conference travel expenses and helped me find grading work so that my family and I could have more resources to live with. I am immensely grateful to Kersi for being there for me throughout and I look forward to our continued association.

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Most importantly, I bow to my supportive and loving family, friends, relatives, and colleagues who have wished me luck. And indeed, good luck is what has brought me

here. I realize that I am at a massive advantage relative to the majority of the world. I thank the stars for being favorable to me all this while and promise to return to the world a part of what I have had the fortune to accumulate.

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Chapter 1: Introduction

1.1) Motivation

The global automobile industry is currently facing "the largest and most complex vehicle recalls in U.S. history" (National Highway Traffic Safety Administration 2018). Since 2008, nearly 34 million vehicles with defective Takata Corporation airbags have been recalled by 19 vehicle manufacturers in multiple countries. The roots of this catastrophe may be traced to the year 2000 when internal investigations at Takata found that its airbags were malfunctioning (Jones and Bommey 2018). The most recent updates on this fiasco suggest that several million additional vehicles are anticipated to be recalled over the next two years, taking the total number of recalled units to about 70 million (National Highway Traffic Safety Administration 2018). These vehicle recalls are by no means an isolated example. Product recall – a firm's removal of consumer products that have a safety-related defect and/or are noncompliant with applicable product standards – is a frequently occurring phenomenon. Figure 1 displays the number of recalls announced in the U.S. across different product categories from 2010 to 2015. Product recall is not just a U.S.-centric phenomenon. In 2015, Australia and New Zealand witnessed the largest number of food recalls in their history (Food Standards Australia New Zealand 2018). Each year since 2010, more than 2,000 recalls, mostly of toys and clothing items, have been issued across the 31 countries in the European Union (RAPEX Annual Report 2015). Canada doesn't fare much better either, with food recalls growing in frequency, size, and complexity (FoodInCanada.com 2009; Rosolen 2011).

Recalls are also consequential. The Takata episode, for example, has created opportunities and challenges alike for Takata (Tabuchi and Ivory 2015), its suppliers (Slodkowski 2014), competitors (Trudell and Rolander 2016), automaker customers (Yamazaki 2016), automakers' dealers (Zulovich 2016), used car retailers (Mittelman 2016), and rental car companies (Isidore 2016). As well, these recalls have led to new legislation (The Canadian Press 2015), regulatory changes (Automotive News 2015), landmark commitments from the auto industry to the regulator (Insurance Institute for Highway Safety News 2016), unprecedented reputational loss to Japanese firms

(Wharton School 2014), and spawned doubt as to the effectiveness of the Japanese keirestu system itself (Inagaki 2016). Recalls also influence society and the economy – for example, defective vehicles annually account for nearly 42,000 deaths in the U.S. (Kane 2012) and an accompanying loss to the economy of about $900 billion (Squire Patton Boggs 2015).

Yet, if managed well, recalls can also lead to significant advantage for the multiple relevant stakeholders. For example, Johnson & Johnson's response to Tylenol's product tampering crisis in 1982 made a hero of the firm (Rehak and International Herald Tribune 2002). Although Johnson & Johnson was not at fault, it still promptly withdrew 31 million Tylenol bottles with a retail value of $100 million (worth $300M today). Johnson & Johnson's proactive response is considered the epitome of firms' pro-social behavior, and is held up to this day as an exemplar of how firms should respond to such adverse circumstances. In another example of turning adversity into opportunity, the U.S. federal government and the automobile regulator (NHTSA) have used the recent spate of vehicle recalls to lead the world in drafting safety regulation laws for autonomous vehicles (Grigorian and Englund 2018).

Not surprisingly, product recalls have garnered academic attention for more than four decades across several disciplines including marketing, management, finance, economics, operations, law, public relations, and communications. Prior investigations have relied on both primary and secondary data, and made use of such diverse methodological perspectives as experiments (Germann, Grewal, Ross, and Srivastava 2014), interpretive studies (Elsbach 1994), case studies (Dardis and Zent 1982), survey research (Archer and Wesolowsky 1996), and analytical (Bala, Bhardwaj, and Chintagunta 2017), structural (Zhao, Zhao, and Helsen (2011), and econometric (Liu, Shankar, and Yun 2017) models. Notwithstanding the insights offered by this multi-disciplinary literature, at least two major concerns persist that hinder our understanding and management of product recalls.

First, surprisingly, we lack a formal definition of product recall. Existing scholarship seems to consider product recall as a firm's response to product-harm crisis. As I show in the next section, despite being well-received, this notion of product recall is

incorrect. As well, practitioner reports, news media articles, and regulators' handbooks[2] also do not help in this regard. Relatedly, the multi-disciplinary perspectives on product recall seem to have yielded a "Tower of Babel" where "…there are many different disciplinary voices, talking in different languages…" (Shrivastava 1993, p. 33) about the same topic. Such proliferation of different labels and terms for similar phenomena has prevented an integration of the scholarship (Lehmann 2004), limiting both theoretical and empirical progress (Pfeffer 1993; Suddaby 2010). Also, the absence of a consistent and unified language on product recall limits the ability of academics to provide a cogent set of insights to practitioners, regulators, and the general public (Rynes 2007).

Second and perhaps equally surprisingly, there has been no consideration by academics of whether recalls serve their fundamental purpose – that of ensuring that defective products are remedied in a timely manner. This lack of academic attention to product recall effectiveness – the extent to which recalled products are remedied – is surprising, given the repeated calls for research by multiple practitioners (Grocery Manufacturers Association and Deloitte Development 2014; Holloran 2015), government agencies (Consumer Product Safety Commission 2003; Government Accountability Office 2011), consumer safety advocacy groups (Cohen 2014; Kids in Danger 2016; McElhaney 2014; CPSCMonitor.com 2012), and the news media (Doering 2012; Layton 2012; Woodall 2016).

My thesis aims to address both these concerns. First, it offers a broad overview of this phenomenon to anyone who is new to the topic of product recall. Second, it provides empirical evidence on what firms and regulatory agencies can do to make recall efforts more effective. The next section offers a formal definition of product recall and distinguishes it from related phenomena. I follow this with an overview of each of my two essays and conclude with the contributions that my thesis seeks to make to the theory and practice of product recall.

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[2] I read the practitioner guides from multiple regulators across the U.S., Canada, Europe, and Australia and New Zealand and found only Health Canada and the U.S. Food and Drug Administration (FDA) to have defined product recall. However, their definitions are specific to their supervised product categories and regulatory terms, and therefore lack generalizability.

1.2) Defining Product Recall and Distinguishing it from Related Phenomena

> "...To define the limits of a field of inquiry may prove, in the long run, to be only a gesture, but for a start, delimitation, however tentative, is indispensable. The danger is not too great if we keep in mind that any boundaries we establish are an aid to understanding" (Inkeles 1964, p. 1).

Product Recall

Consistent with academic, regulatory, and practitioner notions, I define product recall as *a firm's removal of consumer products that have a safety-related defect and/or are noncompliant with applicable product standards*. Three dimensions of this definition warrant further attention. First, product recall is an action undertaken *by a firm*, and not by other stakeholders such as a regulatory agency. Second, recall applies to finished products that are sold to end-customers and thus it is a business-to-consumer (B2C) phenomenon. Third, a product can be recalled when it has a defect, is noncompliant with existing pre-specified standards, or both. Further, the defect has be safety-related (National Highway Traffic Safety Administration 2017). For example, technically speaking, if the defective air conditioner of a car does not compromise the passenger safety, its removal (i.e., repair) by the automaker will not be labeled recall. I next discuss phenomena that are related to yet distinct from product recall (see Table 1).

Stock Recovery

Stock recovery is defined as "[a] firm's removal or correction of a product that has not yet been distributed to the public" (Copeland, Jackson, and Morgan 2004, p. 104). This definition is consistent with that of the FDA: "[s]tock recovery means the correction or removal of a device that has not been marketed or that has not left the direct control of the manufacturer, i.e., the device is located on the premises owned, or under the control of, the manufacturer, and no portion of the lot, model, code, or other relevant unit involved in the corrective or removal action has been released for sale or use" (Food and Drug Administration 2018a). A "…product that is located on the premises owned by the producing establishment or under its control, and that has not been released for sale or use would be eligible for a stock recovery" (Food Safety and Inspection Service 2016). Similarly, Health Canada defines stock recovery as "the removal or correction of a

product that has not been distributed or that has not left the direct control of the party ordering the removal or correction" (Health Canada 2018). Some regulators refer to stock recovery as trade-level product recall (Ministry for Primary Industries 2015) and distribution-level product recall (Consumer Product Safety Commission 2018).

Stock recovery thus is *not* product recall, as the product is removed from the distribution channel (e.g., distributor, retailer) and not from the customer.

Product Withdrawal

If the focal product that has to be removed from possible consumption is not a consumer good, but a component or part sold by a supplier firm to a manufacturer, its removal is termed product withdrawal. Although both product withdrawal and product recall refer to a product's removal from potential consumption, the former occurs when the "…product is removed from the supply chain…" (Dingley 2013), whereas the latter refers to its removal from the distribution channel and/or consumers. Often, the defective and/or noncompliant components are a part of the consumer products that have been sold to the consumer. In such cases, the manufacturer, and not the supplier, is legally responsible for issuing the recall. Contrary to the routine references by the business press (Tabuchi 2016), the defective airbag-related recalls have been issued not by Takata, the supplier of the airbags, but by Takata's automaker customers. Specifically, Takata has issued a product withdrawal whereas the automakers have executed a recall on the basis of that withdrawal.

A second distinction between product withdrawal and product recall pertains to whether the consumer product is being removed due to product noncompliance and/or product safety defect, or some other reason. Health Canada defines product withdrawal as "[t]he removal from further sale or use or correction of a distributed product where there is no health and safety risk and no contravention of the legislation or regulations. *It is not considered to be a recall*" (italics added for emphasis) (Health Canada 2018). Per the FDA, a "[m]arket withdrawal occurs when a product has a minor violation that would not be subject to FDA legal action. The firm removes the product from the market or corrects the violation. For example, a product removed from the market due to tampering, without

evidence of manufacturing or distribution problems, would be a market withdrawal" (Food and Drug Administration 2016). Thus, whereas product recall relates to a firm's removal of products that have safety defects and/or are noncompliant to standards, product withdrawal refers to removal for all other reasons. Per the FDA definition, for example, Johnson & Johnson's removal of tampered Tylenol capsules in 1982 is a withdrawal and not a recall. However, most media reports (e.g., Moore 2012; Rehak and and International Herald Tribune 2002) and academic articles (Lei, Dawar, and Gurhan-Canli 2012; Liu, Liu, and Luo 2016) mistakenly refer to Johnson & Johnson's removal of Tylenol as a recall.

Product Seizure

An important assumption of product recall is that the focal firm removes the defective and/or noncompliant product without any judicial intervention. In some circumstances (e.g., if the firm has a history of violations, and/or has not fulfilled its recall obligations in the past), the regulator can seek an injunction – a judicial order that forces the firm to remove the product (Food and Drug Administration 2018b). Alternatively, the regulator can physically collect the product itself. Such a removal that occurs in lieu of product recall is called seizure (Jackson and Morgan 1988; Food and Drug Administration 2018c; Financial Times Lexicon 2016; United States Code Title 15 2018). In practice, products are often seized for reasons other than defect and noncompliance, such as counterfeiting, piracy, and tampering (Skuld 2015). For example, at the request of the FDA, the U.S. Marshals Service – a federal law enforcement agency – regularly seizes unapproved and misbranded drugs and dietary supplements (Food and Drug Administration 2018d).

Product-Harm Crisis, Product Crisis, and Brand Crisis

Although undefined, "product crisis" seems to have been used interchangeably and as a shortened version of product-harm crisis, by academics (Liu, Chen, Ganesan, and Hess 2012; Siomkos 1988; Van Heerde, Helsen, and Dekimpe 2007; Zhao, Zhao, and Helsen 2011; Cleeren, Dekimpe, and Helsen 2008; Lei, Dawar, and Gürhan-Canli 2012)

and practitioners (Bradley 2015). However, the absence of "harm" from "product crisis" seems to suggest an organizational crisis caused by product. Thus, a "product crisis can take many forms, from product recalls necessitated by real or claimed defects in the product design or manufacturing process to hoaxes and rumors concocted by criminals and miscreants" (Costello and Furfari 2013, p. 5). Scholars have also applied the concept of product-harm crisis at brand level. Dawar and Lei (2009, p. 513) define brand crises as "…instances of well-publicized claims that a key brand proposition is unsubstantiated and/or false"; for instance, artificial ingredients in Tropicana, and Gatorade's limited ability to rehydrate (Dawar and Lei 2009) relate to brand-level propositions and not to product-level defects.

Product-harm crisis, product crisis, and brand crisis thus share the dimension of significant negative publicity. However, they differ from product recalls in at least two ways. First, product-harm crisis and product crisis are conceptualized at product level, whereas brand crisis occurs at the more aggregate and more abstract brand level. Indeed, Financial Times defines brand crisis as a "…special form of a product-harm crisis where the negative event centers on one particular brand or a set of brands belonging to the same company" (Financial Times Lexicon 2016). Second, product-harm crisis occurs because the product is dangerous, whereas brand crisis arises because the claim regarding the focal brand attribute is found to be false and/or unsubstantiated. Thus, unlike a product-harm crisis, a brand crisis may not involve any harm to the consumers; instead, it involves damage to the brand (value) proposition.

The discussion thus far helps provide the bases whereby we might distinguish recalls from several other related phenomena. Specifically, I emphasize the distinction between (a) the occurrence of an adverse event (product-harm crisis, product crisis, and brand crisis) and the firm's response to it (product recall, withdrawal, recovery, and seizure), (b) whether the removed product is a consumer product (product recall, recovery, seizure) or a component of one (withdrawal), and (c) whether the removal is by the firm (product recall, withdrawal, and recovery) or the regulatory agency (product seizure). I next offer an overview of each of the two essays of my thesis.

1.3) Essay 1: Overview

The phenomenon of product recall has received, and continues to receive great attention from academics, practitioners, and third parties, such as regulatory agencies, and consumer safety and protection activists. Scholars from multiple disciplines have investigated this phenomenon for more than four decades now, using different theoretical lenses (e.g., organizational learning, corporate social responsibility, firm strategic response, and crisis management), and methodologies (such as analytical models, structural models, empirical models, case studies, and experiments). Perhaps as a consequence, this voluminous literature seems to have evolved into a Tower of Babel, with scholars from different disciplinary orientations speaking different languages. Surprisingly, there seems to be little attention to defining the product recall construct, or to identifying its conceptual domain and boundary conditions. What is also as yet forthcoming is a comprehensive and critical assessment of this literature, which can offer an organizing framework to help synthesize the accumulated knowledge and identify future research questions that are both interesting to theory and relevant to practice.

I strive to address each of these lacunae in Essay 1. Specifically, I synthesize findings from a review of the academic literature, practitioner reports, and regulators' handbooks with insights from interviews with 14 personnel responsible for overseeing recalls in nine regulatory agencies across six countries. My aims are to (a) propose a clear and comprehensive definition of product recall, (b) distinguish it from the multiple related yet distinct terms used variously by practitioners, academics, and regulators alike, (c) offer a parsimonious framework with which to organize the literature, and (d) identify theoretically and managerially relevant areas of future research. In doing so, I hope to provide much needed conceptual clarity to this important and promising area of inquiry.

1.4) Essay 2: Overview

On July 27, 2015, the U.S. regulator for automobile safety imposed a record $105 million fine on Fiat Chrysler Automobiles (FCA) for "…prolonged failures to fix recalled…" vehicles, and for putting "…millions of its customers, and the driving public, at risk" (Vlasic 2015). FCA's comeuppance with product recall effectiveness is by no means an isolated example. One in five vehicles in the U.S. has safety defects for which it has been recalled but is never repaired, up 27 per cent from just a year ago (Woodall

2016). Recall effectiveness remains stubbornly low for other product categories and countries as well. Product categories such as medical devices (Medical Device and Diagnostic Industry 2011) and children's products (Kids in Danger 2015) and regions such as Australia (Australian Competition and Consumer Commission 2010), Canada (Mertz 2015), the European Union (Ross 2009), and Japan (Organisation for Economic Cooperation and Development 2015) have faced the problem of ineffective recalls. Inadequate recall effectiveness can lead to heavy civil penalties for firms (Kell 2015), public backlash against the regulators (Shepardson 2016), heavy loss to the economy (Squire Patton Boggs 2015), and significant consumer harm (Kane 2015).

Drawing insights from interviews with personnel at recall advisory firms and with their clients, and from prior research, I examine how recall-announcing manufacturers' customer-focused recall campaigns and channel quality boost recall effectiveness. I further assess how a lack of fit with recall-specific exigencies augments or attenuates the two factors' effects on recall effectiveness. Integrating five datasets from four archival sources, I test my conceptual model on a unique database of nearly 300 vehicle recalls announced in 2013 and 2014 in the U.S. by 18 automakers. The findings indicate how marketing communications and marketing channels, and their fit with situational factors, affect firm performance. The results also suggest what specific actions managers can undertake to achieve high recall effectiveness.

1.5) Contributions

In a recent survey conducted by Deloitte, recall effectiveness was identified as the second most important step in recall management (Grocery Manufacturers Association and Deloitte Development 2014). Several countries are introducing legislative and regulatory changes (Ross 2009) and adopting standards "…to plan and execute timely and… effective product recalls" (International Organization for Standardization 2009). Practitioners (Holloran 2015), government agencies (Consumer Product Safety Commission 2003; Government Accountability Office 2011), consumer advocacy groups (Cohen 2014; CPSCMonitor.com 2012), and the news media (Doering 2012; Layton

2012) are actively seeking guidance on "identifying best practices for executing recalls and researching obstacles" to recall effectiveness (Plungis 2015).

The two essays of my thesis respectively seek to contribute to the theory and practice of product recall. Essay 1 offers a broad view of the four decades of multidisciplinary literature on product recall. Specifically, it proposes a definition of the product recall, disentangling the phenomenon from related events. I also offer a flow diagram that can aid managers', regulatory agencies', and consumers' efforts to correctly diagnose the specific phenomenon – product recall, product-harm crisis, product withdrawal, etc.) to the phenomenon under consideration. Next, I offer a framework that provides structure to the vast literature on this phenomenon. Using the framework, I identify future research questions that are relevant to practitioners and academics alike. My Essay 2 offers the very evidence and insights into product recall management that these stakeholders have been asking for. I identify the various mechanisms manufacturers and regulatory agencies have at their disposal to make recalls more effective.

Essay 1 is likely to be of significant value to scholars seeking a quick grasp of the product literature (e.g., doctoral students preparing for comprehensive examination or seeking a bibliography of scholarship on this phenomenon), whereas Essay 2 serves those who want to dive deeper into appropriate pre- and post-recall management.

1.6) Thesis Structure

This thesis is structured and formatted following the Integrated-Article specifications of Western University's School of Graduate and Postdoctoral Studies. Chapters 2 and 3 contain Essays 1 and 2, respectively. References and appendices are provided separately at the end of each essay. In Chapter 4, I reflect on the overall contributions of my thesis, and identify future research avenues.

Since chapter 2 (Essay 1) and chapter 3 (Essay 2) were earlier submitted to academic journals as co-authored papers, first-person plural pronouns ("we" and "our") are used in these chapters.

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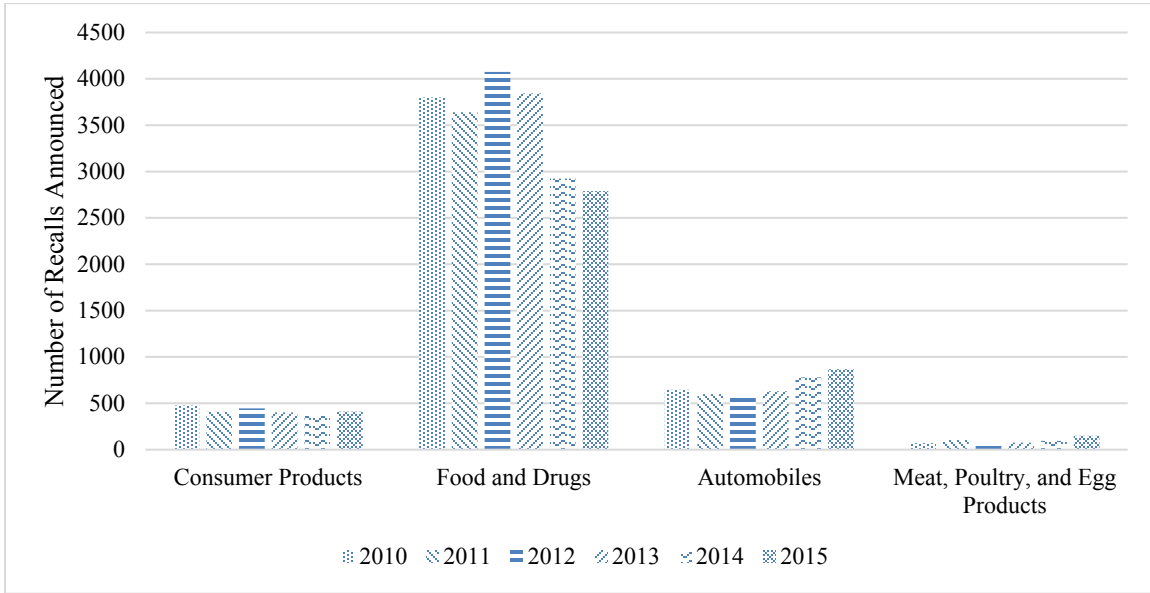Zhao, Yi, Ying Zhao, and Kristiaan Helsen (2011), "Consumer Learning in a Turbulent Market Environment: Modeling Consumer Choice Dynamics After a Product-harm Crisis," *Journal of Marketing Research*, 48 (2), 255-267.

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Table 1: Multidisciplinary Scholarship on Product Recall and Related Phenomena

Label	Article	Definition
Product-harm crisis	Dawar and Pillutla (2000)	"Product-harm crises are discrete, well-publicized occurrences wherein products are found to be defective or dangerous" (Dawar and Pillutla 2000, p. 215). Thus, a product-harm crisis is defined in terms of a highly publicized event that is triggered by a product that is found to be harmful to the customers (Siomkos 1989). I question the significance of discreteness of the event and whether the product being defective but not dangerous can be called a product-harm crisis. As I see, the only required dimensions are high publicity caused by a harmful or dangerous product.
Brand crisis	Dawar and Lei (2009)	Drawing on the "...well-publicized occurrences..." part of product-harm crisis' definition, Dawar and Lei (2009) define brand crises as "...instances of well-publicized claims that a key brand proposition is unsubstantiated and/or false" (Dawar and Lei 2009, p. 513). The commonality in the definitions of product-harm crisis and brand crisis is the high level of publicity. The differences, however, are at three levels. First, while product-harm crisis is defined in terms of an occurrence, brand crisis is presented as a claim by the focal brand. Second, as expected from the construct label, a brand crisis exists at the level of a brand (more exactly, at the level of a brand attribute that offers a key brand value proposition) and not that of a product. Dawar and Lei (2009, p. 513) suggest that the two crises exist along "...a continuum on which negative information occurs at the different levels of the brand association hierarchy." Third, while a product-harm crisis occurs because the product is defective or dangerous, a brand crisis arises because the claim regarding the focal brand attribute is found to be false.
Withdrawal	Jackson and Morgan (1998)	Jackson and colleagues distinguish recall from withdrawal. They define recall as a marketing action involving "...the withdrawal of goods manufactured legitimately and which turn out to be defective" (Jackson and Morgan 1998, p. 162). Thus, recall is a special type of withdrawal in which the firm is responsible for the defect. In their opinion, product tampering leads to withdrawal and not recall.
Recovery	Copeland, Jackson, and Morgan (2004)	A stock recovery is "...a firm's removal or correction of a product that has not yet been distributed to the public" (Copeland, Jackson, and Morgan 2004, p. 104). By extension, if the removal or withdrawal occurs after the product's retail sales, the appropriate label is recall.
Seizure	Jackson and Morgan (1998)	Seizures occurs "…when the goods in question carry counterfeit marks" (Jackson and Morgan 1998, p. 162).
Scandal	Roehm and Tybout (2005)	Although Roehm and Tybout (2005) do not define scandal, they operationalize it (in their laboratory experiments) as a brands/firms' actions that intentionally mislead customers. Organizational scandals are defined as firms' intentional morally or legally wrong behavior that cause public outrage. Importantly, product-harm crisis does not involve morally or legally wrong behavior, and hence, is distinct from scandal. However, product-harm crisis and scandal are similar as they involve high publicity and cause public outrage.

Figure 1: Recalls by Four U.S. Regulatory Agencies, 2010-2015

Note: Created by the author based on data collected from CPSC, FDA, NHTSA, and FSIS

Chapter 2

Product Recall: A Research Synthesis and New Directions

(Being Revised for Second-Round Review at the *Journal of Marketing*)

Abstract: Product recalls are pervasive and ever-increasing. Notwithstanding its significant implications and the attention this phenomenon has attracted, a formal definition of this critical act is as yet forthcoming. As a result, significant inconsistencies in terminology exist across the multidisciplinary literature base that underlies research on product recalls. We also lack a unifying framework that could help structure the four decades of multidisciplinary scholarship in this area. In the present study, we synthesize findings from a review of the academic literature, practitioner reports, and regulators' handbooks with insights from interviews with 14 personnel responsible for overseeing recalls in nine regulatory agencies across six countries. Our aims are to (a) propose a clear and comprehensive definition of product recall, (b) distinguish it from the multiple related yet distinct terms used variously by practitioners, academics, and regulators alike, (c) offer a parsimonious framework with which to organize the literature, and (d) identify theoretically- and managerially-relevant areas of future research. In doing so, we hope to provide much needed conceptual clarity to this important and promising area of inquiry.

Keywords: product recall, product-harm crisis, review, research agenda.

Introduction

On April 11, 2013, four Japanese automakers recalled 3.6 million vehicles worldwide because of defective airbags supplied by Takata Corporation (Kubota and Klayman 2013[3]). Over the next three years, what appeared to be a one-off incident unfolded into the largest auto recall in history (Tabuchi and Jensen 2014). By mid-2016, Takata's defective airbags had led to recalls issued by 14 different automakers in multiple countries for over 100 million vehicles manufactured between 2002 and 2015 (NHTSA 2016a; Consumer Reports 2016). Takata's defective airbags have hit the firm hard in several ways – a record civil penalty of $200 million (Mohn 2015), loss of key customers (Tabuchi and Ivory 2015), a drop in demand for other product lines (Hagiwara and Taniguchi 2015), and potential bankruptcy (Spector 2016).

These airbag-related auto recalls are by no means isolated examples. *Product recall* – a firm's removal of products that are non-compliant with applicable product standards and/or are defective – is a frequent phenomenon involving multiple products and categories. For example, in each of the years 2014 and 2015, automakers have recalled nearly 51 million vehicles in the U.S. – a recall volume nearly three times the annual sales volume (Woodall 2016). Similarly, food, drugs, and medical devices have been recalled 2,789 times in the U.S. in 2015 alone (Food and Drug Administration 2015). Recalls are also global in scope. In the last few years, food recalls in Australia and New Zealand (Food Standards Australia New Zealand 2016) and consumer product recalls in Europe (European Commission 2014) have reached record numbers.

The consequences of recalls often spill over to other value chain participants. For instance, Takata's suppliers now face greater scrutiny with respect to quality (Slodkowski 2014), its automaker customers have experienced significant financial losses (Yamazaki 2016), the stock performance of new-vehicle retailers has suffered (Mittelman 2016), and dealers (Beene 2016) and rental car companies (Isidore 2016) report significantly higher legal risk exposure. Recalls also influence society and the economy at large – defective vehicles account for the deaths of nearly 42,000 people annually in the U.S. alone (Kane

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[3] We were limited in the number of references used in text. All non-academic references are available in the Appendix A.

2012) and the loss to the U.S. economy is estimated at about $900 billion (Boggs 2015). Given that recalls are frequent, global, and consequential, firms and the regulators charged with ensuring public safety are looking for research-based guidance on understanding and managing recalls (Plungis 2015).

Not surprisingly, product recalls have garnered academic attention across a broad swathe of disciplines including marketing, strategy, economics, finance, law, accounting, operations, communication, and public policy. This multidisciplinary body of work has used both primary and secondary data, and relied on an eclectic set of methodological perspectives – case studies, experimentation, ethnography, survey research, discrete choice models, and structural and econometric models, to name but a few. The burgeoning scholarship has improved our understanding of a rich set of issues – the antecedents of product defects (Shah, Ball, and Netessine 2016; Steven, Dong, and Corsi 2014), the negative publicity in the aftermath of a defect and its consequences (Dawar and Pillutla 2000; Liu and Shankar 2015; Van Heerde, Helsen, and Dekimpe 2007), and firms' responses to such publicity (Borah and Tellis 2016; Chen, Ganesan, and Liu 2009).

Although providing an enriched understanding of this important and increasingly common phenomenon, extant scholarship suffers from three specific limitations. First, despite scholars from multiple disciplines examining product recall, we as yet lack a clear definition that adequately captures its domain[4]. Although some regulators have defined product recall, such definitions are product category-specific and limited in scope to their particular regulatory mandate. As we demonstrate later, the absence of a clear definition seems to have resulted in confusion among practitioners (Chobani 2013; Fatemi and Neumann 2015), news media (Moore 2012; Rehak 2002), regulators (Simone 2013), and academics (see Tables 1 and 2) alike. "Without well-developed construct definitions, it is impossible to develop a coherent theory…" (MacKenzie 2001, p. 324). A formal definition delineates the conditions under which a construct will or will not apply (Hunt 1991), shows the focal construct's semantic relationships to related constructs (Suddaby 2010), and thus enables the development of a coherent, robust, and generalizable theory

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[4] In their recent book, Flynn and Zhao (2016) do provide a definition of product recall. As we shall subsequently discuss, however, their definition does not encompass the entire scope of the phenomenon.

(Summers 2001). In contrast, an undefined or ill-defined construct severely limits the accumulation and synthesis of scientific knowledge (Churchill 1979; Suddaby 2010).

Second, in the absence of a valid and comprehensive definition, academic writings, practitioner discussions, and media reports use a plethora of related yet distinct terms synonymously with product recall (Simone 2013), resulting in a Tower of Babel. The distinctions are salient enough that if we do not pay enough attention, we hinder the integration of scholarship on the subject (Lehmann 2004), limiting both the theoretical and empirical progress of the field (Suddaby 2010). As well, the potential for unified language on product recall offers academics an opportunity to "lead with their strength" (Rynes 2007, p. 1048).

Third, although the phenomenon of product recall has been studied by different disciplines since the late 1970s, we have yet to take stock of our current knowledge. As a result, we lack a clear understanding of what we know, and conversely but equally importantly, what we do not know. Once we have such clarity, we can make informed decisions as to whether to exploit our existing knowledge (e.g., stock market reactions to product recall announcements), and/or deliberately cast a wider net to areas that have yet to receive attention (e.g., how does a focal firm's recall shape its supply network?).

The present study represents an attempt to address each of the three preceding limitations. We undertake a comprehensive review of the multidisciplinary academic literature, practitioner reports, and regulators' guides on product recall. Further, we conduct interviews[5] with 14 representatives in the Consumer Education and Compliance departments of nine regulatory agencies across six countries, including four leading U.S. regulatory agencies: the Consumer Product Safety Commission (CPSC), the Food and Drug Administration (FDA), the Food Safety and Inspection Service (FSIS), and the National Highway Traffic Safety Administration (NHTSA). Based on the literature review and the interviews, we present a formal definition of product recall that is consistent with regulators' and practitioners' notions of the phenomenon, and generalizable across product categories and contexts. Importantly, our definition clarifies

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[5] The status of our interviewees as government employees precluded our being able to record our conversations with them, or quoting them in the manuscript. We did, however, gain significant clarity from their insights, and relied on these to a non-trivial extent to improve our understanding of product recalls.

the scope of product recall. As we illustrate through examples and the flow chart in Figure 1, the resulting clarity on the construct domain helps not only academics but also practitioners, regulators, and news media objectively determine whether an event is a product recall. Such an objective determination reduces distraction and focuses stakeholders' attention on consumer safety, the very reason motivating the recall.

We identify multiple phenomena that are related to, yet distinct from, product recall –product-harm crisis, product withdrawal, seizure, and recovery – to name but a few. We provide a schema and identify the dimensions that help delineate product recall from each of these related yet distinct phenomena (Suddaby 2010; Yadav 2011). In doing so, "…we help academics and practitioners categorize phenomena and decide what to do [to manage them]" (MacInnis 2011). We thus attempt to demolish this Tower of Babel, and provide a firm foundation on which future research might build.

By summarizing, integrating, and delineating (MacInnis 2011) multidisciplinary insights from marketing, strategy, economics, finance, law, accounting, operations, communication, and public policy, our research offers a holistic yet parsimonious framework capturing the nearly four decades of research on product recall. We propose a research taxonomy comprising two dimensions: (a) whether the phenomenon under study is the *occurrence of*, or *response to*, a product defect and/or noncompliance, and (b) whether the consequences are examined for the focal entity (the crisis-struck firm/brand) or other entities (e.g., other firms/brands). Building on similar prior research efforts with respect to organizational crisis management (Grewal, Johnson, and Sarker 2007; Pearson and Clair 1998), we adopt a marketing capabilities-based viewpoint (Srivastava, Shervani, and Fahey 1998) to identify three promising areas for future research. Our review of scholarship on the product recall phenomenon is similar to recent scholarly work on digital marketing (Kannan and Li 2016), reference price (Mazumdar, Raj, and Sinha 2005), and bundling (Stremersch and Tellis 2002).

In the next section, we define the construct of product recall and identify its key dimensions. This is followed by an attempt to delineate product recall from product harm crisis, perhaps the phenomenon most commonly confused with a recall. We then integrate the rich, multidisciplinary literature base to provide a parsimonious taxonomy of recalls.

Specific areas of future investigation are also proposed, and the implications for academic research and managerial practice are discussed.

Defining Product Recall

To better understand what product recall involves, we started by examining the multidisciplinary literature base that has developed on the topic over the last four decades. Table 1 provides a snapshot of how marketing academics have examined product recall[6]. Perhaps the first thing to note from Table 1 is that *none* of the studies offers a formal definition of product recall. Even more troubling, several studies use multiple labels to refer to the same phenomenon. We also scoured practitioner articles, media reports, and handbooks of the following regulators: the five agencies in the U.S. (CPSC, EPA, FDA, FSIS, and NHTSA), Health Canada, European Commission's system for product safety, the Food Standards Agency UK, the New Zealand Food Safety Authority, and Food Standards Australia. In addition, we verified and supplemented our knowledge by interviewing representatives in regulatory agencies (see Table B1 in Web Appendix B) to inform our understanding of product recall.

The FDA defines product recall as "…a firm's removal or correction of a marketed product that the FDA considers to be in violation of the laws it administers and against which the agency would initiate legal action" (FDA 2016a). The CPSC considers recall a firm's decision to "…retrieve as many hazardous products from the distribution chain and from consumers as is possible…" (CPSC 2012). Health Canada defines a product recall as "[a] responsible party's removal from further sale or use, or correction, of a distributed product that presents a risk to the health of consumers or violates the Act or the Regulations" (Health Canada 2016). Per the Food Standards Agency UK, a recall occurs "…when customers are asked to return/destroy the product." Lastly, the New Zealand Food Safety Authority considers a recall's purpose the "…removal of unsafe food from the distribution chain" (Ministry for Primary Industries 2015).

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[6] A more comprehensive table listing articles in other disciplines is available from the first author upon request.

Practitioners and media outlets have also offered their notions of product recall. Squire Patton Boggs, a leading recall advisory firm, defines product recall as "…[a] company's removal or correction of a marketed product that is in violation of federal or state law, and against which a government agency could initiate legal action" (Boggs 2015). Advisen, a global recall insurance provider, states that "[c]ompanies are required to conduct product recalls when they have put a product into the stream of commerce that can or has already caused a safety related issue that was not anticipated when the product was originally designed or manufactured" (Advisen 2012). Per LexisNexis, a "[p]roduct recall targets requests for return of… consumer products usually due to safety or health concerns" (LexisNexis Academic 2016). Similarly, Factiva considers product recall to be "[t]he removal of products from sale that are of risk to health, defective or in violation of regulations" (Factiva 2016). Akin to these definitions, Financial Times states that "[i]f a company recalls one of its products, it asks customers to return it because there may be something wrong with it" (Financial Times Lexicon 2016).

The preceding broad overview of regulators', practitioners', and media outlets' notions of product recall yields three dimensions worth noting. First, recall is defined in terms of the focal firm's *removal* (FDA, Health Canada, New Zealand Food Safety Authority, Factiva, Squire Patton Boggs), *correction* (FDA, Health Canada, Squire Patton Boggs), or *retrieval* (CPSC) of the concerned product. Second, a recall occurs when the focal product violates the applicable law (FDA, Health Canada), poses a hazard to its consumers (CPSC, Health Canada, LexisNexis), or does both (Factiva). Third, recalls can and do involve multiple value chain participants – suppliers, distributors, retailers, and end-customers as well (Food Standards Agency UK, Financial Times Lexicon 2016, CPSC).

Because these considerations are specific to a product category (e.g., food products in case of New Zealand Food Product Safety), particular product standard (e.g., FDA's definition is restricted to laws that it administers), and subject to regulatory terminology (e.g., correction for FDA), none of the preceding definitions can be generalized across product categories and contexts. For example, a durable product such as a vehicle is unlikely to be destroyed, whereas a consumable product such as an adulterated food item cannot be corrected. Integrating all these conceptualizations, we

offer a comprehensive definition that can be applied across a wide range of product categories and regulators, and that is consistent with usage by multiple constituencies. We define product recall as *a firm's removal of products that are noncompliant with applicable product standards and/or are defective*.

Three aspects of this definition are worth noting. First, the phenomenon of product recall applies to consumer products – goods that are sold to, and used by, individuals rather than organizations as components or parts (that is, business-to-business products) (Financial Times Lexicon 2016; United States Code Title 15 2016a; CPSC 2012; Ministry for Primary Industries 2015). Also, the term "recall" applies only when the manufacturer.[7] of the focal product (and not a third-party, such as the regulator) removes the product from possible consumption. Further, a product can be recalled only if it is can be physically removed from potential consumption. A service provider can recover (referred to as service recovery) from a service failure but not recall the service per se. That is, to be eligible for a recall, the product has to be a tangible good and not a service (Schwarcz 2013).

Second, a product may be recalled because it does not comply with applicable product standards (United States Code Title 15 2016b). A product standard is a document that specifies the product requirements along the three dimensions of product quality – effectiveness, durability, and safety (Daughety and Reinganum 1995). Product standards can be voluntary (e.g., safety standards established and enforced by home appliances' trade association) or mandatory (e.g., toy safety standards, United States Code Title 15 2016c), and do vary by product category (e.g., automobiles, food, pharmaceutical drugs, and medical devices) and with respect to their focus (e.g., safety or emissions).

Third, a product may be recalled because it is defective (United States Code Title 15 2016b). Given the increasing complexity and the rapid compositional changes to products across categories, it is not uncommon for products to have manufacturing and/or

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[7] By manufacturer, we refer to the firm that has the legal liability for the product. In case of imported products, the importer assumes this responsibility.

design defects[8] that pose substantial safety[9] hazards to customers (Harris 2012) – often referred to as safety defects[10]. Manufacturing defects include the use of prohibited and inappropriate raw material, faulty production, and poor craftsmanship – for example, fragments of glass in instant coffee (Dawar and Pillutla 2000), tainted ice cream (Roehm and Tybout 2006), and salmonella poisoning of peanut butter (Van Heerde, Helsen, and Dekimpe 2007; Zhao, Zhao, and Helsen 2011). Conversely, design defects originate at the design stage of product development. They are often found in products that, by design, use such things as small detachable parts, strings, and awkward spaces that are potentially dangerous – for example, detachable button eyes and beads in toys (Beamish and Bapuji 2008). Design defects can also be caused by the absence of components that help meet the expected level of safety – for instance, inadequate shock absorption in athletic shoes (Ahluwalia, Burnkrant, and Unnava 2000; Ahluwalia, Unnava, and Burnkrant 2001). Importantly, the presence of a product defect and/or product noncompliance subjects firms to legal action by the regulators[11].

Delineating Product Recall

Academics, practitioners, regulators, and the business press have considered a multitude of phenomena – including but not limited to product-harm crisis, product withdrawal, recovery, and seizure – that are related to, yet distinct from, product recall. Table 2 lists eleven such phenomena, their definitions, and the seminal academic research articles dealing with each. As we will demonstrate, there are subtle yet critical

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[8] Product defects are also referred to as product failures, problems, faults, and errors (Simone 2013). Firms' involvement in product defects has been studied through the constructs of wrongdoing (Zavyalova, Pfarrer, Reger, and Shapiro 2012), transgression (Elsbach 1994), misconduct (Greve, Palmer, and Pozner 2010), and deviance (Jonsson, Greve, and Fujiwara-Greve 2009).

[9] Product safety is defined as the extent to which the use of the product involves risk of physical harm, which includes injury, illness, or death (Daughety and Reinganum 1995; United States Code Title 15 2016e). Thus, product safety does not include such types of consumer loss as psychological harm, social harm, and financial loss (Schwarcz 2013).

[10] Henceforth, we use the terms "defect" and "safety defect" interchangeably.

[11] Products may comply with standards and be safe, but still have a non-safety-related defect (NHTSA 2010; Ministry for Primary Industries 2015). For instance, although a car with a dysfunctional air-conditioner is compliant with applicable standards, it is still considered to have a defect, albeit not a safety-related defect. Importantly, a non-safety-related product defect does not subject the manufacturer to regulatory action.

distinctions between these phenomena and a product recall. These contrasts are meaningful for academics, practitioners and regulators alike.

Perhaps the most critical distinction is whether what is studied relates to the *occurrence* of an adverse event (product-harm crisis, product crisis, brand crisis, and service crisis) or the firm's *response* to it (product recall, withdrawal, recovery, and seizure). This nuance is often lost when scholars use the terms interchangeably, as is apparent from the repetition of the cited articles across the rows of Table 2. A likely reason for this confounding is that the majority of these eleven phenomena have not been formally defined. Instead, we must infer their definitions from the empirical contexts in which the studies are based.

Figure 1 displays a flow chart that helps distinguish product recall from these phenomena. The phenomena displayed above the broken line relate to the occurrence of an adverse event (product-harm crisis, product crisis, and brand crisis), whereas the different manifestations of the firm response to the adverse event are dealt with by terms below the broken line (product recall, withdrawal, recovery, and seizure).[12, 13]. Among these phenomena, the phenomenon of product-harm crisis has attracted perhaps the greatest attention from marketing academics, and is most commonly (yet, as we shall discuss subsequently, mistakenly) seen as being synonymous with product recall. We therefore focus on differentiating product-harm crisis from product recall.

Dawar and Pillutla (2000, p. 215) define product-harm crises as "…discrete, well-publicized occurrences wherein products are found to be defective or dangerous." The starting point thus is a tangible good that needs to be removed from potential consumption. If the focal good is a consumer product with a defect that has been well-publicized, the phenomenon is labeled product-harm crisis (see Figure 1). Indeed, Financial Times defines product-harm crisis as a "…highly publicized event caused by a

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[12] As illustrated in Tables 1 and 2, some empirical scholars have also used the term "product recall crisis" for product recall. Since the empirical contexts of all such articles relate to product recall, we consider product recall crisis a synonym of product recall.

[13] Given our focus on product recall, the flowchart does not consider two phenomena that scholars have considered to be similar to product recall but that we think are fundamentally different from it. Specifically, we do not include brand scandal (Roehm and Tybout 2006) because unlike product recall, a brand scandal arises from the focal firm's intentional, ethically and/or legally wrong behavior. We also do not consider service crisis (Gijsenberg, Van Heerde, and Verhoef 2015) because unlike products, services cannot be recalled.

product being found to be defective, contaminated or even harmful to consumers"
(Financial Times Lexicon 2016). As can be seen in Figure 1, scholars have also used the
terms "product crisis" and "brand crisis" to discuss the phenomenon of product-harm
crisis.

As shown in Figure 1, product-harm crisis and product recall have at the core the
occurrence of a product defect. The critical distinction between the two phenomena,
however, is that product-harm crisis is defined in terms of negative publicity following a
product defect, whereas product recall occurs when the firm decides to remove the focal
product. Thus, product-harm crisis is more likely to be a <u>circumstance</u> in which a firm
finds itself, whereas product recall is a potential <u>response</u> by the firm. As well, a product-
harm crisis can only occur in the aftermath of a product defect, whereas a product recall
can follow a product defect and/or an instance of product noncompliance with standards.
Thus, although both academics (Chen, Ganesan, and Liu 2009; Flynn and Zhao 2015)
and practitioners (Financial Times Lexicon 2016) have considered product recall a
response to product-harm crisis, a recall is actually a response to a product defect and/or
product noncompliance, and *not necessarily just to product-harm crisis*.

A firm may thus experience (a) a product-harm crisis but no product recall, (b) a
product recall but no product-harm crisis, and (c) a product-harm crisis followed by a
product recall. For example, for almost three years from 2010 to 2013, Chrysler kept
refusing NHTSA's request to recall what NHTSA alleged were defective Jeep vehicles
(Krisher 2013) – i.e., a product-harm crisis that did not yield a recall for about three
years. In stark contrast, in 2013, Tesla recalled about 1,300 Model S cars. Interestingly,
the regulator, the news media, and the customers learned about the underlying defect only
after Tesla had issued the recall (Jensen 2013) – i.e., the recall was not preceded by a
product-harm crisis. In 2014, General Motors' (GM) ignition switch defect led to
significant negative publicity before GM recalled the involved 30 million vehicles
worldwide (Basu 2014) – a case where a recall followed as a response to product-harm
crisis.

Organizing the Knowledge

Given the overwhelming emphasis of prior research scholarship on product-harm crisis and product recall, we focus our attention on these two phenomena. Table 2 depicts the current multidisciplinary literature base on both topics. We build on our earlier distinction of whether the phenomenon under study is the *occurrence* of product-harm crisis or the focal entity's (the crisis-struck firm's or its competitors') *response* to the product-harm crisis. The second dimension we propose using to organize this knowledge base focuses on whether the consequences of the phenomenon are examined for the focal entity (the crisis-struck brand) or other entities (other brand attributes, other brands, etc.). Together, the two dimensions comprise a 2x2 matrix (see Figure 2) that (a) classifies the focus of prior research, (b) provides an example from the business world, and (c) identifies seminal research that has examined the issue.

We further map each cell of this matrix to a detailed conceptual framework representing all the studies we are aware of that have been undertaken in that space. Thus, Figure 3a corresponds to Cell a, Figure 3b to Cell b, and Figure 3c to Cell c. Each of the Figures 3a through 3c is designed to provide an understanding of the "forest and the trees" alike. That is, each figure reveals not only the big picture of the nomological network of the constructs examined, but also of how each study comprising this literature base has contributed – i.e., the specific associations and relationships studied. For example, as displayed in Figure 3a, Cleeren, Van Heerde, and Dekimpe (2008) examine how consumer loyalty moderates the effect of product-harm crisis on consumers' first post-crisis purchase decision. Similarly, in Figure 3c, Rhee and Haunschild (2006) assess how firm reputation and the availability of product substitutes moderate the adverse effect of a recall on the focal firm's market share.

Although both Cells a and b include studies that examine the occurrence of product-harm crisis, Cell a focuses on studies that investigate the consequences of the occurrence for the focal entity, whereas Cell b relates to the consequences for other entities. In contrast, Cell c relates to the phenomenon of the response by the crisis-struck firm and/or its competitors to a product harm crisis, and the consequences for the responding entity. Cell d, which relates to the focal entity's product-harm crisis response, and the consequences for *other* entities (e.g., response by crisis-struck firm and its

consequences for the firm's competitors), is not populated as there has so far been no study in this space.[14] We now offer an overview of research in each cell.

Occurrence of Product-harm Crisis and its Consequences

Academics have examined the effects of product-harm crisis on the focal entity (Cell a in Figure 2), and on other entities (Cell b in Figure 2). We discuss the findings with respect to each set of entities below.

Consequences for the focal entity: As indicated in Cell a in Figure 2, and detailed in Figure 3a, scholars have examined the effects of product-harm crisis on two focal entities: consumers of the focal product category, and on the crisis-struck brand. For example, a product-harm crisis often causes consumers to attribute blame to the crisis-struck brand. However, the extent of this blame varies by consumer characteristics – e.g., gender (Laufer and Gillespie 2004), attachment style (Whelan and Dawar 2016), and prior attitude toward the brand (Lei, Dawar, and Gürhan-Canli 2012), firm characteristics – for example, prior positive corporate social responsibility actions (Klein and Dawar 2004) and history of similar incidents (Lei, Dawar, and Gürhan-Canli 2012), and industry characteristics – such as industry frequency of similar incidents (Lei, Dawar, and Gürhan-Canli 2012).

As well, product-harm crisis negatively affects consumers' attitude toward the crisis-struck brand. The magnitude of attitude change, however, is moderated by consumer characteristics such as expectation of the brand (Dawar and Pillutla 2000) and commitment toward it (Ahluwalia, Burnkrant, and Unnava 2000; Germann, Grewal, Ross, and Srivastava 2014), firm characteristics such as the crisis-struck firm's performance history (Griffin, Babin, and Attaway 1991) and reputation (Siomkos and Kurzbard 1994), and publicity characteristics such as credibility of the reporting source and locus of responsibility in the report (Griffin, Babin, and Attaway 1991). Often,

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[14] Van Heerde, Helsen, and Dekimpe (2007) study changes in ad spending, and pricing by both the crisis-struck firm and its competitors, and the resulting consequences on both parties. However, they do not disentangle whether the consequences can be attributed to changes by the crisis-struck firm or its competitors.

consumers may temporarily expunge the crisis-struck brand from their purchase consideration set (Cleeren, Dekimpe, and Helsen 2008; Zhao, Zhao, and Helsen 2011). The timing of consumers' first post-crisis purchase of the focal brand is, in turn, moderated by their pre-crisis characteristics such as their loyalty and familiarity toward the brand, and their category purchases (Cleeren, Dekimpe, and Helsen 2008).

Some scholars have also examined the effects of the individual dimensions of product-harm crisis (i.e., product defect and negative publicity) on the crisis-struck brand. For example, the severity of product defect affects the crisis-struck brand's sales (Liu and Shankar 2015), and the extent of negative publicity impacts the brand's sales (Liu and Shankar 2015), market share (Cleeren, Van Heerde, and Dekimpe 2013), advertising effectiveness (Cleeren, Van Heerde, and Dekimpe 2013), and pricing effectiveness (Cleeren, Van Heerde, and Dekimpe 2013). In summary, product-harm crisis can adversely impact consumer-level and crisis-struck brand-level outcomes, and this impact is moderated by various consumer, crisis-struck firm, publicity, and industry characteristics.

Consequences for others (spillovers): Product-harm crises can have high, immediate, as well as longer-term adverse implications for such other entities as other attributes of the crisis-struck brand, other brands from the crisis-struck firm, brands from other firms, and the product category at large (cell b in Figure 2). For instance, in the immediate aftermath of the crisis engulfing Samsung Galaxy Note 7, Samsung Electronics blamed its supplier subsidiary, Samsung SDI, for faulty batteries. In what followed, Samsung Electronics not only dropped Samsung SDI as a supplier, but also switched to China's Amperex Technology Limited (Jung-a 2016). Similarly, the recent Volkswagen's emissions-related crisis has adversely affected not only Volkswagen but also its peer German automakers. For example, the stock price of BMW dropped sharply after a German newspaper claimed that some BMW diesel cars were emitting more poisonous gases than the scandal-struck Volkswagen cars (Clinch 2015).

As displayed in Figure 3b, scholars have examined multiple forms of this negative spillover, attending to its moderators and consequences. For example, Ahluwalia,

Unnava, and Burnkrant (2001) show that negative publicity of one brand attribute can spill over to associated but unmentioned attributes. This intra-brand, inter-attribute spillover is greater for the low commitment consumers than their high commitment counterparts (Ahluwalia, Unnava, and Burnkrant 2001). Lei, Dawar, and Lemmink (2008) show that negative publicity can spill over from one brand to other brands from the same firm. This intra-firm, inter-brand spillover is a function of the strength and the direction of association (between sub brands, from sub brand to parent brand, or vice versa) between the two brands. In the context of automobiles, Borah and Tellis (2016) find that negative user-generated content can spill over not only across brands from the same firm, but also across brands from different firms. Such inter-brand, category-level spillover is more likely when the focal firm or the product attribute is typical of the product category, or when the crisis-struck brand is similar to a competing brand on the scandalized product attribute (Roehm and Tybout 2006).

Similarly, scholars demonstrate that product-harm crises reduce competing brands' sales, ad effectiveness, and pricing effectiveness (Van Heerde, Helsen, and Dekimpe 2007), and sales of the product category at large (Cleeren, van Heerde, and Dekimpe 2013; Van Heerde, Helsen, and Dekimpe 2007).

Firm Response to Product-harm Crisis and its Consequences

As indicated in Cell c in Figure 2, and detailed in Figure 3c, this stream of research focuses on how the crisis-struck firm and its competitors strategically respond to a product-harm crisis, and how their response, in turn, impacts their performance[15]. We next discuss the response by each type of entity and the consequences of the response.

Response by focal entity: A crisis-struck firm's response to a product-harm crisis comprises the firm's communication and its potential recall of the defective products (see Figure 3c). The communication, in turn, includes whether the firm accepts responsibility

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[15] An emerging line of research studies what strategic actions firms can (publicly) undertake *after* the product-harm crisis but *before* the firms' response to the crisis. For example, Gao, Xie, Wang, and Wilbur (2015) demonstrate that under some conditions, increasing ad spending after the crisis but before the recall can arrest the negative effect on the focal firm's stock price.

(Dawar and Pillutla 2000; Siomkos 1988), and whether it apologizes (Dawar and Pillutla 2000; Siomkos 1988) for the defective product. Accordingly, firm communication can be arranged along a continuum that includes denial or unambiguous stonewalling (that is, neither accept responsibility nor apologize), ambiguous response (accept responsibility but not apologize), and unambiguous confirmation (accept responsibility and apologize) (Dawar and Pillutla 2000; Siomkos 1988). For instance, after the U.S. Environmental Protection Agency (EPA) accused Volkswagen of emissions-cheating software in its vehicles, the firm apologized with full-page ads in dozens of newspapers (D'Orazio 2015), and its CEO issued a video apology (Groden 2015). Crisis-struck firms can also respond by either counter-arguing the negative publicity or challenging the value of the negative publicity in discriminating among alternative brands in the focal product category (Ahluwalia, Burnkrant, and Unnava 2000). In 2013, for example, when athletic apparel-maker Lululemon was blamed for selling see-through yoga pants, its founder blamed the customers' bodies (Peppers 2013), then accused its Taiwanese supplier of the defect, only to be later rebuffed by the supplier (Bhasin 2013).

Scholars find that the crisis-struck firm's communication of its response impacts consumers' attitude toward the brand (Ahluwalia, Burnkrant, and Unnava 2000; Dawar and Pillutla 2000; Siomkos 1988). The level of attitude change, in turn, is moderated by consumers' expectation (Dawar and Pillutla 2000) and commitment (Ahluwalia, Burnkrant, and Unnava 2000) toward the crisis-struck brand.

Firms often respond to the product-harm crisis by issuing a recall of the defective products. Scholars in marketing, strategy, operations, and finance have focused on the consequences of product recall for the consumers and the crisis-struck firm. For example, Archer and Wesolowsky (1996) show that auto recalls do not significantly affect auto owners' loyalty toward manufacturer or dealer. On the other hand, product recalls are found to hurt the sales of the focal as well as other products (Thirumalai and Sinha 2011; Van Heerde, Helsen, and Dekimpe 2007). In addition, recalls impose indirect costs through the firm's loss of effectiveness of its own advertising and pricing efforts (Van Heerde, Helsen, and Dekimpe 2007). As well, the firm becomes more susceptible to adverse effects of competitors' marketing efforts (Van Heerde, Helsen, and Dekimpe

2007). Together, these indirect costs erode firm's market share (Rhee and Haunschild 2006; Van Heerde, Helsen, and Dekimpe 2007; Wynn and Hoffer 1976). The drop in market share is found to be higher for firms with greater reputation (Rhee and Haunschild 2006) and for products that have more substitutes (Rhee and Haunschild 2006).

Much event study-based research has been conducted to measure the stock market effects (abnormal stock returns, trading volume, and idiosyncratic risk) of product recall announcements by the firm and the regulator. Some scholars report firms' public announcement of a product recall causing a significantly large decline in their share price (Barber and Darrough 1997; Chu, Lin, and Prather 2005; Pruitt and Peterson 1986; Davidson and Worrell 1992; Hoffer, Pruitt, and Reilly 1987; Jarrell and Peltzman 1985). Others, however, find this decline to not be so punitive as to prevent firms from engaging in dubious behavior (Bromiley and Marcus 1989; Thirumalai and Sinha 2015). As well, firms' past corporate social responsibility actions can mitigate the loss in shareholder wealth (Cheah, Chan, and Chieng 2007).

Recalls are also found to affect the crisis-struck firm's learning. For example, automobile recall magnitude in time period *t-1* positively affects product reliability in period *t* (Kalaignanam, Kushwaha, and Eilert 2013), and negatively affects the level of consumer harm in period *t+1* (Bae and Benítez-Silva 2011; Kalaignanam, Kushwaha, and Eilert 2013). As well, recalls initiated by the firm are found to result in deeper learning than those that are initiated by the regulator (Haunschild and Rhee 2004).

More recently, scholars have considered the form of remedy, and the timing of the recall. Liu, Liu, and Luo (2016) demonstrate that compared to partial (repair or discount for future purchase) remedy, full remedy (refund or replacement) is less likely when the recall magnitude is high and the recalled product is expensive, but more likely when the defect is severe. Interestingly, full remedy is also found to be less likely when the CEO receives greater cash compensation or lesser equity incentive, and when the CEO has longer tenure in the position. With respect to recall timing, scholars have characterized the response strategy as proactive, responsible, or preventive if firms announce the recall

prior to any safety incident – injury, death, or severe property damage (Chen, Ganesan, and Liu 2009; Hora, Bapuji, and Roth 2011).

In contrast, the strategy is labeled passive and defensive (Chen, Ganesan, and Liu 2009) or reactive (Hora, Bapuji, and Roth 2011) if the recall is issued after any consumer harm is reported. Hora, Bapuji, and Roth (2011) further find that firms adopting a preventive strategy take longer to issue a recall. As well, they find that compared to products with manufacturing defects, those with design flaws take longer to be recalled. Perhaps surprisingly, relative to a passive and defensive response, a proactive and responsible response is found to have a more negative effect on the stock market (Chen, Ganesan, and Liu 2009), likely because stockholders relate a proactive response to a larger financial loss to the firm.

Response by competitors: An interesting aspect of product recalls pertains to how competitors of the recall-issuing firm might respond. The crisis-struck firm's competitors can issue an assurance of no defect in their products (e.g., a competing firm reassuring customers that it has never and will never mislead customers about the nutritional content of its products), thus attempting to arrest the potential spillover. Roehm and Tybout (2006) demonstrate that such an assurance by the competitors indeed weakens the spillover. For instance, subsequent to the Volkswagen emissions crisis, a German newspaper claimed that BMW may also have cheated on the emissions. Anticipating a potential spillover, BMW issued a press release stating that it did not "…manipulate or rig any emissions test" (Clinch 2015).

Competitors may also undertake a proactive response by optimizing their ad spending in anticipation of their peers' crises (Rubel, Naik, and Srinivasan 2011). They may also take a more aggressive stance by strategically increasing their ad spending (Van Heerde, Helsen, and Dekimpe 2007), promotion spending (Zhou, Dong, Cui, and Arreola 2016) and sales efforts (Bala, Bhardwaj, and Chintagunta 2015) in the aftermath of their peer's crisis. Such an aggressive response has been found to increase the competitor's ad effectiveness (Van Heerde, Helsen, and Dekimpe 2007), pricing effectiveness (Van

Heerde, Helsen, and Dekimpe 2007), and sales (Thirumalai and Sinha 2011; Van Heerde, Helsen, and Dekimpe 2007).

In the pharmaceutical industry, for instance, after pharma firm Janssen recalled its allergy drug Hismanal in 1999, its competitor McNeil increased selling efforts for the competing drug Zyrtec. In contrast, Janssen did not change sales efforts for its pain reliever drug Ultram when competitor Wyeth Ayerst recalled Duract, a competing drug for Ultram, in 1998 (Bala, Bhardwaj, and Chintagunta 2015). Similarly, amidst Toyota's massive recalls in 2009-2010, competitors in the same category as the recalled Toyota cars responded to Toyota's crisis by increasing their promotion spending in the short-run (Zhou, Dong, Cui, and Arreola 2016). Customers and investors may, however, perceive an aggressive response as "ambulance chasing" leading to unfavorable implications (Zhou, Dong, Ciu, and Arreola 2016). However, empirical evidence in this area is rather limited.

Future Research Directions

As evident from our discussion thus far, the multidisciplinary literature related to product recall is rich and growing. The opportunities for future research are thus varied and abundant; instead of providing specific propositions, we discuss three potential areas of recall-related inquiry that we believe will prove fruitful. Marketing and strategy scholars have theorized and empirically examined how firms' resources and capabilities can help them manage organizational crises (Grewal and Tansuhaj 2001; Pearson and Clair 1998). Consistent with this prior work, we adopt a capabilities-based perspective to identify specific marketing capabilities that inform *whether* and *when* the firm decides to undertake the recall (pre-recall announcement phase), how it *undertakes* the recall (recall announcement event), and how it *implements* the recall (post-recall announcement phase) (see Figure B1 in Web Appendix B). In doing so, we contribute to the nascent literature on how marketing personnel, actions, assets, and capabilities may help firms not only in steady-state conditions but also during times of adversity (Grewal, Johnson, and Sarker 2007; Grewal and Tansuhaj 2001). Our suggestions are informed by 17 interviews conducted by phone and email with more than 14 personnel employed by nine regulatory

agencies in different capacities across the U.S., Europe, the United Kingdom, Canada, Australia, and New Zealand (see Table B1 in Web Appendix B). We supplement these interview-generated insights with our reading of business press and practitioner reports and regulators' guides to suggest three specific future research directions.

Strategic Flexibility and Whether and When to Recall

Figure 3c indicates that the entire body of prior research on product recall assumes that the crisis-struck firm *has decided* to undertake a recall. By not examining (a) circumstances in which a firm decides *not* to issue a recall, and (b) why firms vary in the time they take to decide to undertake a recall after they become aware of a potential product defect, we seem to have focused on a restrictive sample, which has offered us incomplete knowledge. In our first future research direction, we attempt to open the black box covering the pre-recall announcement phase and propose that a firm's *strategic flexibility* – "…the organizational ability to manage economic and political risks by promptly responding in a proactive or reactive manner…" (Grewal and Tansuhaj 2001) – drives whether and when the firm decides to undertake a recall.

Manufacturers differ over whether and when they decide to undertake a recall. For instance, although General Motors (GM) became aware of the ignition switch defect as early as 2004 (NHTSA 2014a), it decided to issue a recall in 2014 only. In stark contrast, Tesla Corporation recalled its defective Model S cars within a week of being informed about the defect (Jensen 2013; NHTSA 2013). After becoming aware in August 2009 of a safety incident involving its defective floor mats, Toyota decided to issue a "customer safety advisory" rather than a recall (NHTSA 2009). In the wake of further similar incidents uncovered by the news media (Vartabedian and Bensinger 2009) and the regulator, Toyota decided to convert the advisory into a recall (NHTSA 2009) in late November 2009.

Before a manufacturer decides *how* to recall its defective products, it has to decide *whether* to undertake the recall – a strategic decision that can set the precedence for the manufacturer, and its value chain participants and competitors. The pre-recall announcement phase, which marks whether and when the firm decides to issue a recall,

involves two steps. In the first step, the manufacturer receives information about incidents that involve product malfunction, and the harm that they have caused and/or could potentially cause. Such information often comes in the form of product safety incident reports that are submitted to the manufacturer either directly or indirectly by employees, consumers, business customers (e.g., hospitals in the case of medical devices), regulators, and/or value chain participants (suppliers, distributors, and retailers). For example, in the above examples, Tesla Corporation learned about the defect through an employee, whereas GM and Toyota received evidence from their customers, dealers, NHTSA, and the news media.

The second step involves identifying patterns into these incident reports to conclude that these incidents are not one-off events but likely manifestation of a product defect (Gladwell 2015). Often, the reports are then sent to quality control staff so that they can reproduce the defect and identify a fix. With each incoming report that points to the same defect, the manufacturer determines whether the number of involved products and the level of safety risk posed by the defect are significant enough to warrant a recall. For instance, on January 20, 2014, General Motors' (GM) Marketing group was informed by a GM dealer of defective floor mats on a truck. A month later, GM was able to identify the vehicles that may have these defective mats. Finally, on June 11, 2016, GM decided to conduct a recall (NHTSA 2014b).

Depending upon product characteristics such as the type of defect (manufacturing vs. design) and technological complexity of the product, and firm characteristics (e.g., financial leverage and R&D intensity), the pre-recall announcement phase can require significant reallocation of and coordination among the firm's resources, and possible change in its routines, practices, and processes. Recent practitioner reports indicate that most firms do not have dedicated staff and information channel to receive and analyze incident reports before they are passed to the technical staff (Beerli 2014; Deloitte 2010). As well, firms often do not have the excess capacity in their technical staff so as to promptly attend to the passed on incident reports (Beerli 2014). Thus, whether and when a firm can decide to undertake a recall are influenced by its ability to reallocate and coordinate among its available resources, and reconfigure existing organizational

practices, routines, and process – that is, its strategic flexibility (Grewal and Tansuhaj 2001; Sanchez 1995).

Customer Orientation and Product Recall Announcement

Consistent with extant research (Chen, Ganesan, and Liu 2009; Van Heerde, Helsen, and Dekimpe 2007), regulators' guides (FDA 2007), and practitioner reports (Deloitte 2010), we consider a firm's product recall announcement as the critical incident that marks the onset of a recall (see Figure B1 in Web Appendix B). A recall announcement includes several elements that convey important characteristics of the recall such as defect description, risk to the consumers if the product is not fixed, and number of injuries and deaths so far due to the defect. As well, the announcement reflects important end-customer-focused strategic decisions made by the firm such as the remedy choice (repair, refund, replace, etc.); planned changes to the product design, manufacturing, and testing; date(s) when end-customers will be notified; and how they will be notified (radio spots, newspaper ads, video news release, and social media messages, point-of-purchase poster) (CPSC 2016a). The announcement also conveys firm choices related to its trade customers (distributors and retailers), such as when the defective part will be available, whom the trade customers can contact if they questions, and how they will be reimbursed.

Marketing scholars have only recently examined just two of these elements. Chen, Ganesan, and Liu (2009) theorize recall strategy (proactive and responsible, or passive and defensive) as the element that can moderate adverse impact of a recall on the firm's stock returns. Liu, Liu, and Luo (2016) identify the firm's choice of remedy (full or partial) as another element of substantive importance. Although product recall is a phenomenon that targets the safety of the firm's end-customers, its success hinges upon the cooperation and coordination between the firm and its trade customers (distributors and retailers). Product recall thus represents a threat to and simultaneously, an opportunity for the firm's *customer orientation* – "…the set of behaviors and beliefs that places a priority on customers' interests and continuously creates superior customer value" (Rindfleisch and Moorman 2003, p. 422). We posit that recalls serve as a context

that can express the firm's customer orientation in the face of adversity. Specifically, a recall announcement can highlight a firm's customer orientation. For example, a firm that decides to use a wide variety of media sources to inform customers of the product defect can be considered to be more oriented toward its end-customers. Similarly, a firm that provides details of what exactly distributors and retailers have to do as part of the recall can be considered to be high on trade customer orientation.

Customer-oriented recall announcements can be expected to weaken the negative consequences of product recall for the firm (see Figure 3c). For example, customer orientation can reduce the negative sentiment in the media reports and consumer-generated social media content. In some cases, the content may also include some positive mentions of the firm, appreciating its "super effort" in minimizing consumer harm, and reducing negative effects for its trade customers. As well, greater customer orientation can also yield higher cooperation with the regulator (CPSC 2016a). We thus propose that customer orientation can be a key firm capability that can be manifest in the firm's recall announcement, weakening the negative effects of recall for both the firm and its trade partners.

Innovation Effects of Product Recall

On September 15, 2016, Samsung Electronics recalled the newly launched version of its flagship smartphone Galaxy Note 7 (CPSC 2016b), which was expected to offer Samsung competitive advantage over Apple (Hern 2016). A month later, after reportedly failing to identify the defect (Samuelson 2016), Samsung declared that it would permanently stop production of the phone (Hern 2016). Although the recall has now been completed, it remains to be seen how it adversely affects Samsung's product innovation in the future. Given that the Note 7 was considered a radical innovation (Samuelson 2016), some conjecture that its recall will push Samsung more toward incremental innovation, and away from radical innovation, and that the push may spill over to the Galaxy brand, and Samsung's products in other product such as wearable devices (Martonik 2016).

A product recall amounts to the firm's acknowledgment that its product has a quality-related defect (Steven, Dong, and Corsi 2014). Thus, a product recall represents a firm failure. The firm may perceive the failure as a threat, becoming more rigid in the process (Staw, Sandelands, and Dutton 1981) and persisting with its past actions (Tripsas and Gavetti 2000). Alternatively, the firm may explore other alternatives, including those that are risky (Greve 2003). Specifically, when developing an innovative product, the firm makes make specific choices with respect to its various characteristics such as design, underlying technology, and use model. Thus, the firm chooses one of the many available trajectories (Maslach 2015). However, when the product fails, the failure offers feedback to the firm's subsequent innovation, either nudging the firm to choose a different trajectory (radical innovation) or making it more rigid through its continued use of the same trajectory (incremental innovation). The exact innovation trajectory that the firm adopts can be influenced by the product characteristics (e.g., whether the failed product was itself an incremental or a radical innovation), and firm characteristics (e.g., the firm's cumulative experience with respect to innovation and failure). The examination of the innovation-related effects of product recall represents a promising avenue for future research.

Discussion

The present study reviews the academic literature on product recall and related phenomena in marketing, strategy, economics, finance, law, accounting, operations, communication, and public policy. In addition, we review practitioner reports, and handbooks and guides of multiple regulatory agencies across six countries, supplementing our understanding by conducting interviews with representatives from nine of these agencies. On the basis of this extensive review, we define the construct of product recall, identify terms that scholars, practitioners, and regulators have used synonymously with product recall, and distinguish each of these terms from product recall. We then propose a framework organizing the multidisciplinary literature on product recall and the related phenomenon of product-harm crisis, and illustrate the value of this framework by identifying three areas of future inquiry. We propose how specific

marketing-relevant firm capabilities can lead to a better understanding of these recall-related areas. In what follows, we identify specific implications of our research for academic scholarship and management practice.

Theoretical Implications

Definition and delineation of product recall: We propose a formal definition (Hunt 1991; Teas and Palan 1997) of product recall that transcends the terminology specific to multiple regulatory bodies, product standards, and categories. In addition, we clearly identify the scope of product recall, clarifying what it is and isn't, thereby enabling its valid measurement (Wacker 2003) and a synthesis of knowledge regarding this critical phenomenon (Churchill 1979; Suddaby 2010). Our focus on the substantive importance of formal construct definitions highlights "the problem with labels" (Moorman 2016) – when scholars incorrectly perceive that formal conceptual definitions are largely common sense. We hope our work encourages marketing scholars to take a step back, and formally define their constructs before they proceed to discuss them, thereby allowing marketing to win both "the war of influence" and "the war of labels" (Moorman 2016).

The absence of a formal definition of product recall has allowed scholars with different disciplinary orientations to use, but often not define, different terms to refer to product recall. In order to resolve this conceptual inconsistency and ambiguity (Golder, Mitra, and Moorman 2012), we first identify nearly a dozen labels that scholars, practitioners, and regulators use in association with product recall. We then rely on our formal definition of product recall to carefully distinguish the latter from each of these terms (see Figure 1), supplementing our arguments with examples from practice. Our effort is expected to offer much needed clarity to scholars of product recall, and to improve the conceptual contributions of their research.

Conceptual framework of the literature: Although the multidisciplinary academic literature on product recall is rich, and offers valuable insights, it remains complex and fragmented. We attempt to address this limitation by synthesizing the literature through a unified and parsimonious framework that classifies the scholarship on this phenomenon.

Demonstrating the value of our proposed framework, we next identify three areas of future research on product recall. Each of these three areas is both practice-relevant and theoretically rigorous. We adopt a capabilities-based view of the firm, and propose how specific firm capabilities can play a key role in different aspects of product recall. The structure and the future research agenda help us take stock of what we know and what we do not.

Envisioning a more impactful role of marketing: Top marketing academics continue to call for research that emphasizes a more impactful and comprehensive role of marketing within firms (Hanssens and Pauwels 2016; Moorman and Rust 1999). With a few notable exceptions (Grewal, Johnson, and Sarker 2007; Grewal and Tansuhaj 2001), however, the focus has been exclusively on the role of marketing in steady-state conditions. Our research seeks to extend these "boundaries of marketing" (Kumar, Keller, and Lemon 2016) in two ways. First, taking a more holistic view of marketing (Moorman and Day 2016), our research calls for an examination of the role of marketing-relevant firm capabilities, marketing personnel (such as the presence of a Chief Marketing Officer), assets (e.g., brands), and actions (e.g., hiring analytics staff that can promptly mine incoming safety incident reports) in helping firms manage their product recall processes. Second, since product recall represents a salient adverse event for the firm, we emphasize the role of marketing in guiding firms not only in steady state conditions but also during times of adversity.

Our study is different from other conceptual articles as we focus on a phenomenon, rather than a theoretical perspective. Leading marketing academics have often called for "…a more intellectually driven… approach to the pursuit of marketing phenomena" (MacInnis 2005). More recently, while debating whether scholars should begin with a theory or a phenomenon, Tellis (2016, p.3) opines that "[p]henomena may be the bedrock of theory", emphasizing that "…it may be better to start with the phenomenon rather than the theory." Importantly, our phenomenon of interest – product recall – transcends methodological orientations, with contributions from consumer behavior researchers, modelers, and strategy scholars. Our study thus "…observes the bigger picture that emerges from diverse approaches" (MacInnis 2005).

Senior marketing scholars have long expressed concern for the lack of "homegrown theory" in marketing (MacInnis 2005, 2011; Rust 2006). While creating new theories is definitely one way by which marketing academics can contribute, another possible pathway in "the evolution of marketing as a discipline" (Kumar 2015) is by showing the way forward to scholars of *multidisciplinary* research that is marked with conceptual confusion and fragmentation. Our research represents an example of the latter contribution. For instance, our future research direction of how firms acquire information about product defects is relevant and interesting to operations scholars. Similarly, the characteristics of firms' recall announcements can be of value to communication and strategy scholars alike. We thus present one case of "…the maturation of marketing thought and a growing self-confidence in the discipline's ability to create important new knowledge on its own" (Rust 2006, p. 1).

Managerial Implications

Our study also posesseveral relevant implications for practicing managers and regulators alike. In what follows, we consider three particular questions and the implications that would arise from addressing them.

How does a firm make a recall determination? Better informed customers, geographically widespread supply chains, more complex products, and stricter government oversight mean that product defects increasingly represent a business reality rather than an exception (Advisen 2012). Consequently, persistent questions that firms face are how and when they will become aware about these defects, and whether they will have to subsequently issue a recall. In a survey of manufacturers, retailers, and service providers in food and consumer packaged goods industries, 42 percent respondents agreed that deciding whether and when to issue a recall is the most important step in recall management (Deloitte 2010). Consistent with this managerial feedback, our research emphasizes the substantive importance of this pre-recall announcement phase (see Figure B1 in Web Appendix B). We suggest that in addition to traditional standard metrics such as the number of incident reports per week (Deloitte 2010), managers might conduct predictive analytics on incident reports, including text mining of the incident

description contained in these reports, to determine the likelihood that the incidents will yield a recall. We thus enrich managerial understanding of the information contained in these reports, suggesting that appropriate analytics can reveal more relevant insights about potential product recalls.

Is the manufacturer on the hook for a recall? Practitioner articles, media reports, and social media messages are replete with examples in which a firm's removal of a tampered over-the-counter drug has been labeled a recall (Moore 2012; Rehak 2002), whereas another firm's removal of contaminated food has been called a withdrawal (Chobani 2013; Fatemi and Neumann 2015). Our research offers a parsimonious yet comprehensive definition of product recall that helps managers decide whether their product removal falls within the ambit of a recall. In addition, we offer a flowchart that unambiguously determines whether a firm's product removal is a recall, a withdrawal, a recovery, or one of a myriad other related yet distinct terms.

These distinctions are not solely of academic interest. For example, when Chobani removed its yogurt from retailers and distributors after suspecting a contamination, it incorrectly called its removal a withdrawal (Chobani 2013). After being accused of undertaking a covert recall albeit by using a different term, the firm promptly re-labeled its removal a recall. Unfortunately, however, the firm continued to be questioned on its integrity even two years after the incident (Fatemi and Neumann 2015). In another well-known example, Johnson & Johnson's removal of Tylenol capsules in 1982 after they were found to be tampered was labeled a recall by news media (Knight 1982). Perhaps as a consequence, the victims took the firm to court holding it liable for the defective product (Szymczak 1991). After about a decade of costly litigation and stress to the victims, Johnson & Johnson was not held liable for foreseeing product tampering (Szymczak 1991). Our research clearly indicates that Chobani's removal was a recall and not a withdrawal, whereas Johnson & Johnson's removal of the tampered Tylenol was a withdrawal and not a recall. The resulting clarity can help prevent unnecessary negative publicity, and facilitate a more informed and constructive discussion on consumer safety among practitioners, business press, regulators, and consumers.

What are the relevant recall-related decisions? Managers have consistently pointed to the lack of rigorous research-based guidance regarding the multiple decisions they must make as part of a recall announcement (Deloitte 2010). These include, but are not limited to, whether firms should have a fairly standardized message protocol for all the recalls they may undertake, or craft a notification specific to each recall; what should the chosen means of communication be when recall notifications need to be issued (e.g., telephone hotline, social media)? Relative to existing research (Chen, Ganesan, and Liu 2009; Liu, Liu, and Luo 2016), we identify a significantly larger set of decisions managers must make as part of a recall announcement. More importantly, we suggest how these decisions can have implications for the firm with respect to consumers, trade partners, and regulator. We propose, for instance, that a firm that chooses to inform the impacted customers through multiple media sources (e.g., newspapers ads, radio spots) can expect reduced negative media publicity, and improved consumer response. Similarly, prompt and elaborate sharing of information between the firm and its trade partners can yield greater coordination. If the firm chooses to undertake a fast-track[16] recall, it can earn greater cooperation from the regulator, and also reduce its product liability risk (CPSC 2016a).

Conclusion

Product recalls only continue to grow in importance, and are widely considered a true litmus test of the firm. Our expansive review of the trade press, insights gleaned from the publications of and interviews with responsible personnel at multiple regulatory bodies, and the multi-disciplinary academic literature base that has developed over the last three decades yields significant gaps that remain in our understanding of product recall. It is our hope that our effort helps provide a deeper and more complete understanding of product recall than is as yet available to interested scholars, and serves to stimulate further research in this area.

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[16] As the name suggests, a fast-track recall is one in which the firm notifies all the parties and remedies the product within 20 days of recall announcement.

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Table 1: Marketing Scholarship on Product Recall

Study	Product recall defined?	Labels used	Empirical context	Finding
Borah and Tellis (2016)	No.	Recall crisis, product recall.	Auto recalls in the U.S. in 2009 and 2010.	Negative user-generated content following auto recalls can spill over to other brands by the crisis-struck firm with the same segment, and competing brands by other firms across segments. The negative spillover affects competitor firms' sales and stock returns.
Chen, Ganesan, and Liu (2009)	No.	Product-harm crisis, product recall.	Consumer product recalls in the U.S. from 1996 to 2007.	Firms that issue a recall prior to any consumer harm (e.g., injury and death) incur a greater loss in stock returns compared to firms that announce the recall after some level of consumer harm.
Cleeren, Dekimpe, and Helsen (2008)	No.	Product-harm crisis, product crisis, brand crisis, product recall.	Kraft's peanut butter brands' recall in Australia in 1996.	Consumers' pre-crisis characteristics and the crisis-stuck brand's post-crisis advertising can influence the timing of consumers' first post-crisis purchase decision.
Cleeren, Van Heerde, and Dekimpe (2013)	No.	Product-harm crisis, product crisis, product recall.	Consumer goods recall in the United Kingdom and the Netherlands between 2000 and 2007.	Crisis-struck brands' post-crisis advertising and pricing adjustments impact brands' market share and consumers' category purchases. The effects are moderated by the negative publicity and whether the brands acknowledge blame.
Dawar and Pillutla (2000)	No.	Product-harm crisis, product recall.	Experiments involving soft drink and laptop computer categories.	Product-harm crisis negatively affects consumer attitude. The loss can be mitigated by how the brand responds to the crisis. The effects are moderated by consumers' prior expectation about the brand.
Gao, Xie, Wang, and Wilbur (2015)	No.	Product-harm crisis, recall crisis, product recall.	Auto recalls in the U.S. from 2005 to 2012.	Firms' pre-recall advertising spending can weaken the negative effect of recall on stock returns. Product newness and defect severity moderate this weakening effect.
Germann, Grewal, Ross, and	No.		Experiments involving smartphone	

Srivastava (2014)		Product recall.	category. Auto recalls in the U.S. from 2001 to 2009.	Consumer commitment and defect severity moderate the effect of recalls on consumer attitude and stock prices.
Hsu and Lawrence (2016)	No.	Recall crisis, product recall.	Auto, food, and consumer product recalls in the U.S. from 2010 to 2012.	Volume, valence, and growth rate of user-generated content following a recall exacerbates effect on stock returns. Brand equity moderates this effect.
Kalaignan am, Kushwaha, and Eilert (2013)	No.	Recall crisis, product recall.	Auto recalls in the U.S. from 1995 to 2011.	Auto recalls impact future product reliability, future number of accidents, and future recall frequency.
Liu and Shankar (2015)	No.	Recall crisis, product-harm crisis, product recall.	Auto recalls in the U.S. from 1997 to 2002.	Post-recall sales are affected by negative publicity, defect severity, prior product reliability, and advertising spending.
Liu, Liu, and Luo (2016)	No.	Product-harm crisis, product recall.	Consumer product recalls in the U.S. from 1996 to 2007.	Firms remedy choice (full vs. partial) is driven by recall magnitude, price of recalled product, defect severity, and CEO's tenure and equity incentive.
Van Heerde, Helsen, and Dekimpe (2007)	No.	Product-harm crisis, product crisis, product recall.	Kraft peanut butter brands' recall in Australia in 1996.	Product-harm crisis impacts focal firm's baseline sales and effectiveness of its advertising and pricing efforts. Also, while the firm's marketing efforts become less effective on its other, unaffected brands, its brands become more sensitive to competing brands' marketing efforts.
Zhao, Zhao, and Helsen (2011)	No.	Product-harm crisis, product crisis, recall crisis, product recall.	Kraft peanut butter brands' recall in Australia in 1996.	Product-harm crisis creates consumer uncertainty about product quality. They subsequently learn about quality through use experience, and then decide upon their first post-crisis purchase.
Zhou, Dong, Cui, and Arreola (2016)	No.	Product recall crisis, product recall.	Auto recalls issued in the U.S. by Toyota in 2009 and 2010.	Subsequent to a focal firm's recalls, its competitors can increase their promotional spending, which then positively affects their sales.

Table 2: Multi-Disciplinary Scholarship on Product Recall and its Related Constructs

Label	Articles	Definition
Product-harm crisis	Cleeren, Dekimpe, and Helsen (2008); Cleeren, van Heerde, and Dekimpe (2013); Dawar and Pillutla (2000); Klein and Dawar (2004); Gao, Xie, Wang, and Wilbur (2015); Lei, Dawar, and Gurhan-Canli (2012); Lei, Dawar, and Lemmink (2008); Liu, Liu, and Luo (2016); Liu and Shankar (2015); Liu, Chen, and Ganesan (2011); Rubel, Naik, and Srinivasan (2011); Siomkos (1988); Siomkos and Kurzbard (1994); Van Heerde, Helsen, and Dekimpe (2007); Whelan and Dawar (2016); Zhao, Zhao, and Helsen (2011)	"Product-harm crises are discrete, well-publicized occurrences wherein products are found to be defective or dangerous" (Dawar and Pillutla 2000, p. 215).
Product crisis	Cleeren, Dekimpe, and Helsen (2008); Cleeren, van Heerde, and Dekimpe (2013); Einwiller, Fedorikhin, Johnson, and Kamins (2006); Koh, Qiang, and Wang (2013); Lei, Dawar, and Gurhan-Canli (2012); Liu, Chen, and Ganesan (2011); Van Heerde, Helsen, and Dekimpe (2007); Zhao, Zhao, and Helsen (2011)	Not defined; although seems to be a shortened form of "product-harm crisis."
Brand crisis	Cleeren, Dekimpe, and Helsen (2008); Dawar and Lei (2009); Dutta and Pullig (2011); Gao, Zhang, Zhang, and Knight (2015)	Brand crises are "...instances of well-publicized claims that a key brand proposition is unsubstantiated and/or false" (Dawar and Lei 2009, p. 513).
Recall crisis	Borah and Tellis (2016); Gao, Xie, Wang, and Wilbur (2015); Hsu and Lawrence (2016); Jackson and Morgan (1988); Kalaignanam, Kushwaha, and Eilert (2013); Liu and Shankar (2015); Zhao, Zhao, and Helsen (2011); Zhou, Dong, Cui, and Arreola (2016)	"A product recall crisis is a negative event, regularly accompanied by negative publicity and press" (Hsu and Lawrence 2016, p. 62).
Service crisis	Gijsenberg, Van Heerde, and Verhoef (2015)	Not defined; although refers to extreme service failures.
Brand scandal	Roehm and Tybout (2006, 2009)	Brand scandals are defined as brands' intentional, morally and/or legally wrong behavior that causes public outrage (Roehm and Tybout 2006).
Stock recovery	Copeland, Jackson, and Morgan (2004)	A stock recovery is "...a firm's removal or correction of a product that has not yet been distributed to the public" (Copeland, Jackson, and Morgan 2004, p. 104).
Product recovery	Guide, Jayaraman, and Linton (2003); Sridhar and Srinivasan (2012)	Not defined; although label used to suggest a manufacturer's reuse of a used product

		returned by consumers (that is, remanufacturing) or the rectification of a service failure.
Goods withdrawal	Jackson and Morgan (1988)	Not defined; although used interchangeably with recall.
Product withdrawal	Boulding, Morgan, and Staelin (1997); Figueiredo and Kyle (2006); Iyer and Soberman (2016)	Not defined; although refers to a firm's withdrawal of its newly introduced product from the market.
Goods seizure	Jackson and Morgan (1988)	Not defined; although suggests a regulator's physical collection of the defective or counterfeit good.
Product recall	Cleeren, Dekimpe, and Helsen (2008); Chen, Ganesan, and Liu (2009); Cleeren, Van Heerde, and Dekimpe (2013); Dawar and Pillutla (2000); Germann, Grewal, Ross, and Srivastava (2014); Haunschild and Rhee (2004); Hsu and Lawrence (2016); Kalaignanam, Kushwaha, and Eilert (2013); Liu, Liu, and Luo (2016); Liu and Shankar (2015); Rhee and Haunschild (2006); Rhee and Valdez (2009); Rubel, Naik, and Srinivasan (2011); Thirumalai and Sinha (2011); Van Heerde, Helsen, and Dekimpe (2007); Zavyalova, Pfarrer, Reger, and Shapiro (2012); Zhao, Zhao, and Helsen (2011); Zhou, Dong, Cui, and Arreola (2016)	Not defined, but reflects a firm's response to a product-harm crisis.
	This study	We define product recall as *a firm's removal of products that are non-compliant with applicable product standards and/or are defective.*

Figure 1: Product Recall and Related Constructs

Start: a product that needs to be removed from the market

Consumer (B2C) product?   N   B2B

Y

Defect?   N   Noncompliance?   N   Stop

Y   Y

Stop   N   Defect well-publicized?   Y

Product-harm crisis

Product crisis, brand crisis

Removal by firm?   Y

N

Stop   N   Removal by regulator?

Y

Product seizure

Product recall

Product in consumer's possession?

Product withdrawal   Due to low demand, retrenchment, etc.

Y   N

Consumer-level recall   Stock recovery, or trade/distribution-level recall

Figure 2: Organizing the Knowledge

Phenomenon of interest

	Occurrence of product-harm crisis	Response to product-harm crisis
Focal entity	Cell a Figure 3a e.g., defects in Jeep vehicles in 2010 and the resulting negative publicity of Chrysler. Ahluwalia, Burnkrant, and Unnava (2000); Dawar and Pillutla (2000); Liu and Shankar (2015)	Cell c Figure 3c e.g., Toyota's recalls in 2009-2010, and subsequent changes to Toyota's and its competitors' ad spending. Borah and Tellis (2016); Cleeren, Van Heerde, and Dekimpe (2013); Van Heerde, Helsen, and Dekimpe (2007)
Other entities	Cell b Figure 3b e.g., decline in BMW's stock price following Volkswagen's emissions-related noncompliance in 2015. Roehm and Tybout (2006); Lei, Dawar, and Lemmink (2008)	No published research on this as yet.

Consequences for

Figure 3a: Product-Harm Crisis and its Consequences for the Focal Entity

Consumer characteristics

Gender
Laufer and Gillespie 2004

Attachment style
Whelan and Dawar 2016

Prior attitude
Lei, Dawar, and Gürhan-Canli 2012

Expectation
Dawar and Pillutla 2000

Commitment
Ahluwalia, Burnkrant, and Unnava 2000; Germann, Grewal, Ross, and Srivastava (2014)

Loyalty
Cleeren, Dekimpe, and Helsen 2008

Familiarity
Cleeren, Dekimpe, and Helsen 2008

Category purchases
Cleeren, Dekimpe, and Helsen 2008

Firm characteristics

Corporate social responsibility
Klein and Dawar 2004

Performance history
Griffin, Babin, and Attaway 1991 Lei, Dawar, and Gürhan-Canli 2012

Reputation
Siomkos and Kurzbard 1994

Product-harm crisis

Product (safety) defect

Negative publicity

Consumer outcomes

Blame attribution
Whelan and Dawar 2016

Attitude toward focal brand
Ahluwalia, Burnkrant, and Unnava 2000; Dawar and Pillutla 2000; Klein and Dawar 2004; Liu and Shankar 2015; Griffin, Babin, and Attaway 1991; Siomkos 1988; Siomkos 1989; Siomkos and Kurzbard 1994

Timing of first post-crisis purchase
Cleeren, Dekimpe, and Helsen 2008; Zhao, Zhao, and Helsen 2011

Brand outcomes

Sales
Liu and Shankar 2015

Market share
Ad effectiveness
Pricing effectiveness
Cleeren, Van Heerde, and Dekimpe 2013

Publicity characteristics

Credibility
Griffin, Babin, and Attaway 1991
Locus of responsibility
Griffin, Babin, and Attaway 1991

Industry characteristics

Industry frequency (of similar incidents)
Lei, Dawar, and Gürhan-Canli 2012

Figure 3b: Consequences of Product-Harm Crisis for Other Entities

Consumer characteristics

Brand characteristics

Consumer commitment to focal brand
Ahluwalia, Unnava, and Burnkrant 2001

Association between focal and other brands
Lei, Dawar, and Lemmink 2008

Consumer attitude toward

Other attributes of the crisis-struck brand
Ahluwalia, Unnava, and Burnkrant 2001

Other brands from the crisis-struck firm
Borah and Tellis 2016; Lei, Dawar, and Lemmink 2008

Brands from other firms
Borah and Tellis 2016; Roehm and Tybout 2006

Category
Roehm and Tybout 2006

Product-harm crisis

Product (safety) defect

Negative publicity

Competing brands

Sales
Borah and Tellis 2016; Van Heerde, Helsen, and Dekimpe 2007

Stock returns
Borah and Tellis

Ad effectiveness

Pricing effectiveness
Van Heerde, Helsen, and Dekimpe 2007

Category

Sales
Cleeren, Van Heerde, and Dekimpe 2013 Van Heerde, Helsen, and Dekimpe 2007
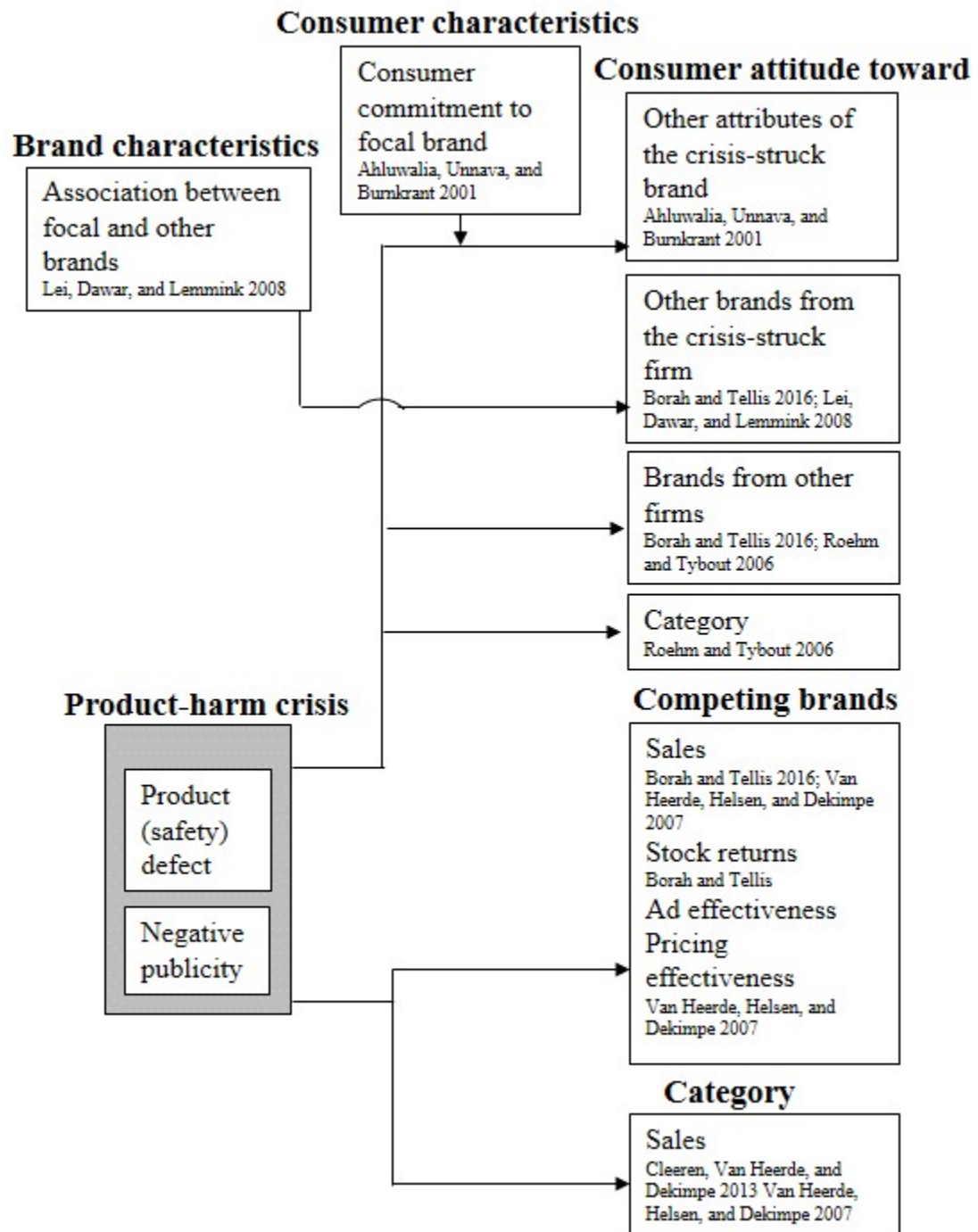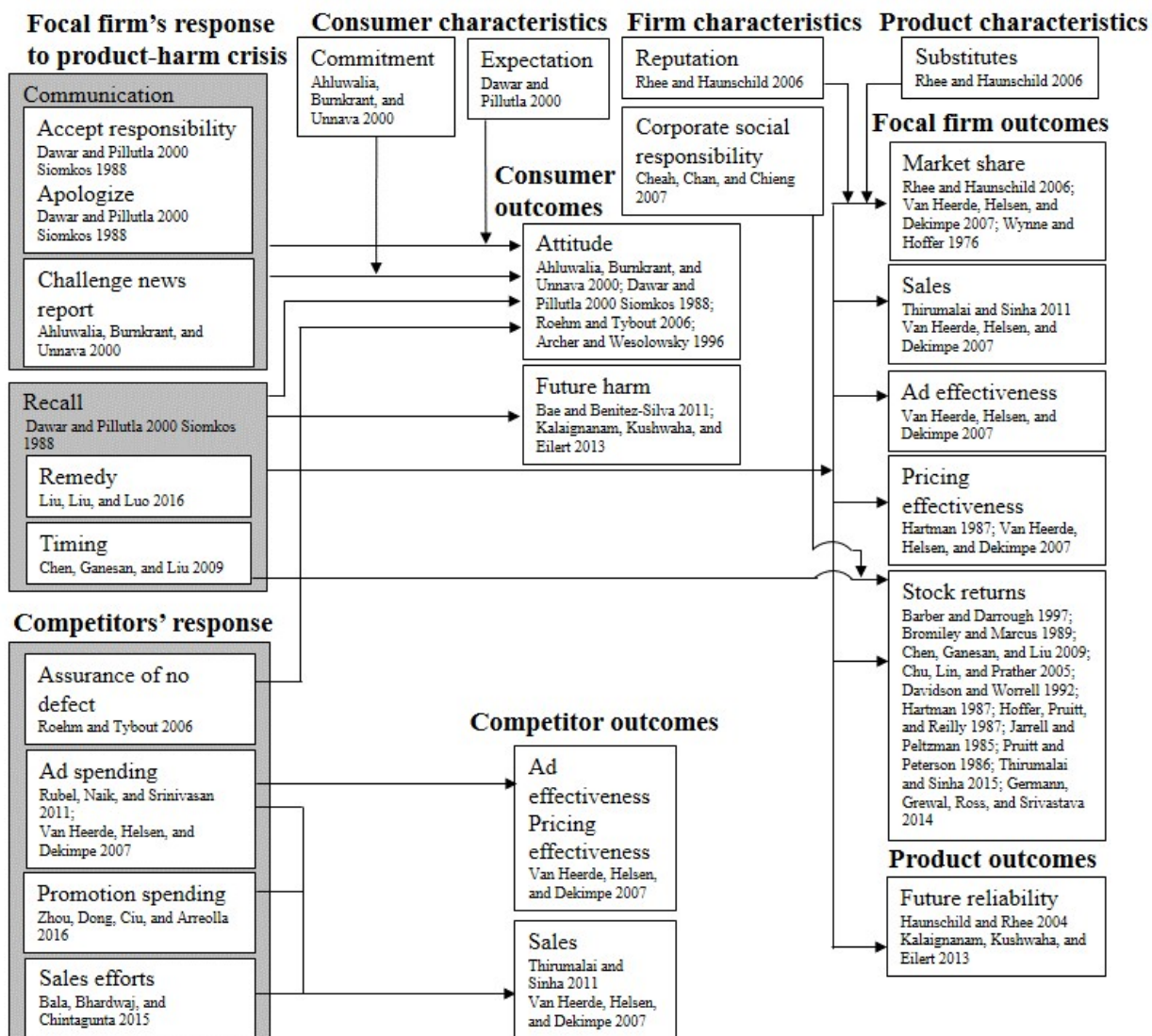
Figure 3c: Consequences of Firm Response to Product-Harm Crisis

Appendix A

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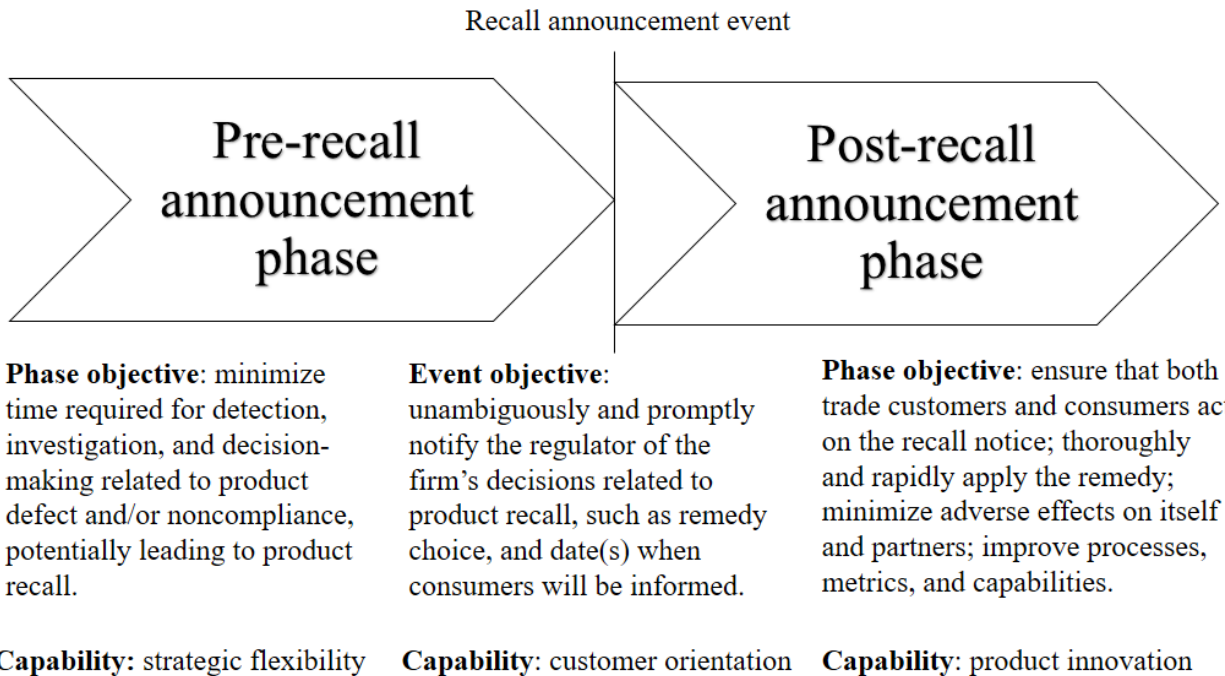Woodall, Bernie (2016), "Carfax says nearly 1 in 5 U.S. vehicles have open safety recalls," (accessed on December 6, 2016), [available at http://www.reuters.com/article/us-autos-safety-recalls-idUSKCN0VJ2HO].

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Web Appendix B
Table B1: List of Interviews with Regulators

Regulatory agency	Date(s)	Modality	Division
National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation	Oct. 4, 2016, and Nov. 15, 2016	Email	Office of Defects Investigation
NHTSA	Sep. 30,2016, and Oct. 4, 2016	Email	Public Affairs, Office of Defects Investigation
NHTSA	Dec. 7, 2015, and Jul. 15, 2016	Email	Recall Management Division
Consumer Product Safety Commission (CPSC)	Oct. 11, 2016, and Oct. 12, 2016	Phone and email	Office of Communications
CPSC	Oct. 11, 2016	Email	Division of Resources Management, Office of Compliance and Field Operations
CPSC	Oct. 12, 2016, and Nov. 14, 2016	Phone and email	Defect Investigations Division, Office of Compliance and Field Operations
CPSC	Nov. 14, 2016, and Nov. 16, 2016	Email	Regulatory Enforcement
Food and Drug Administration (FDA), U.S. Department of Health and Human Services	Sep. 30, 2016	Phone and email	Recall Branch
FDA	Oct. 31, 2016	Phone and email	Premarket Programs Branch, Division of Industry and Consumer Education , Office of Communication and Education, Center for Devices and Radiological Health
Food Safety and Inspection Service (FSIS), U.S. Department of Agriculture	Dec. 1, 2016	Email	Food Safety and Inspection Service
Food Safety Authority Australia and New Zealand	Dec. 1, 2016	Email	Ministry for Primary Industries
European Commission	Dec. 1, 2016	Email	Contact Center, European Commission
Health Canada	Dec. 1, 2016	Email	Call center
Food Standards Agency UK	Dec. 1, 2016	Email	Email center

Figure B1

Product Recall Process

Recall announcement event

Pre-recall announcement phase

Post-recall announcement phase

Phase objective: minimize time required for detection, investigation, and decision-making related to product defect and/or noncompliance, potentially leading to product recall.

Event objective: unambiguously and promptly notify the regulator of the firm's decisions related to product recall, such as remedy choice, and date(s) when consumers will be informed.

Phase objective: ensure that both trade customers and consumers act on the recall notice; thoroughly and rapidly apply the remedy; minimize adverse effects on itself and partners; improve processes, metrics, and capabilities.

Capability: strategic flexibility

Capability: customer orientation

Capability: product innovation

Chapter 3

Recalled but Not Remedied: The Role of Customer-Focused Recall Campaigns and Channel Quality in Product Recall Effectiveness

(Being Revised for Resubmission to the *Journal of Marketing*)

Abstract: Product recalls are pervasive and ever-increasing. Despite their significant implications and the attention they have consequently attracted, the fundamental issue of the extent to which the recalled products are remedied – what we refer to as *product recall effectiveness* – remains unexplored. In the absence of evidence-based guidance, firms continue to face penalties for low recall effectiveness, regulators keep fending off challenges to their relevance, and the general public remains exposed to potentially dangerous products. We examine how recall-announcing manufacturers' customer-focused recall campaigns, as inferred from a topic modeling analysis of their customer notifications, enhance recall effectiveness. The key role played by manufacturers' channel quality in impacting recall effectiveness is also studied. We further assess how the (mis)match between these two drivers and recall-specific situational factors helps or hinders recall effectiveness. We test our hypotheses using a unique database comprising 273 recalls announced in 2013 and 2014 in the U.S. by 18 automakers. In doing so, we emphasize the role of firm-generated content (B2C) and channel partners' quality (B2B) in boosting recall effectiveness.

Key words: product recall effectiveness, customer focus, marketing channel quality.

Introduction

On July 26, 2015, the U.S. regulator for automobile safety imposed a record $105 million fine on Fiat Chrysler Automobiles (FCA) for "…prolonged failures to fix recalled…" vehicles, and for putting "…millions of its customers, and the driving public, at risk" (Vlasic 2015). The crisis underlying FCA's low product recall[17] effectiveness, defined as *the extent to which the recalled products are remedied*[18], is by no means an isolated example. One in five vehicles in the U.S. has an open recall – a safety defect which has yet to be repaired despite a recall being announced – up 27 per cent from just a year ago (Woodall 2016). Low recall effectiveness is a widely prevalent problem, impacting multiple product categories (Kids in Danger 2015) and countries (Mertz 2015).

Effective recalls rely on the recall-announcing firm persuading customers to avail of the remedy, and having in place the means (typically provided by the firm's channel partners) to actually conduct the remedy once customers have acted. If either step is performed inadequately, recall effectiveness suffers. Low recall effectiveness in turn can expose the firm to massive legal liabilities, such as the $5.2 billion class action lawsuit filed against FCA just three days after the regulator-imposed fine became public (CBC News 2015).

Given the diversity and magnitude of the consequences of low recall effectiveness, there is great interest in ensuring recall effectiveness. Practitioners, regulators, and consumer safety advocates are actively seeking guidance on "…identifying best practices for executing recalls and researching obstacles…" to recall effectiveness (Plungis 2015). Despite these calls, scholarly attention to recall effectiveness is limited at best. Our review of more than four decades of multidisciplinary work yielded just two studies assessing recall effectiveness. Rupp and Taylor (2002) report customers being more likely to respond to recalls that involve a severe safety

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[17] Product recall refers to a firm's remedy of products that are defective and/or noncompliant with applicable product standards.

[18] Liu, Liu, and Luo (2016, p. 79) define remedy as "…the corrective or compensation measure that companies provide for the defective products", such as repair (the focus of the current inquiry), replacement, refund, and/or discount on a future purchase.

hazard or high publicity. Most recently, Eilert (2013) finds the response rate to a product recall to be higher for brands with greater perceived quality and higher customer loyalty. Despite their valuable insights, neither study speaks to how recall-announcing firms can persuade customers to avail of the offered remedy and how their channel partners can impact recall effectiveness. In the absence of such guidance, firms continue to drain shareholder wealth (Ernst & Young 2011), regulators must fend off challenges to their relevance (Shah, Brody, and Olson 2015), consumer advocacy groups persist in their quest for greater "consumer safety and confidence" (Deloitte 2010, p. 1), and the general public remains exposed to potentially dangerous products (Kids in Danger 2016).

The present study attempts to address each of these gaps in our understanding of recall effectiveness. First, we propose product recall effectiveness as a critical outcome of interest to multiple stakeholders – product manufacturers and their channel partners, regulatory agencies, and consumer safety advocacy groups alike. By positioning recall effectiveness as both a firm performance- and consumer welfare-related outcome, we attempt to provide practitioners with the knowledge, tools, and capabilities to effectively manage the confluence of private and public interests through their actions.

Second, building on prior research on customer-focused campaigns (Ascarza, Ebbes, Netzer, and Danielson 2017; Kumar, Venkatesan, and Reinartz 2008), we underscore the importance of content to the objective of eliciting a favorable response from end-customers – in the present context, availing of the firm-offered remedy for the defective products. We apply state-of-the-art topic modeling techniques (Tirunillai and Tellis 2014; Wang, Bendle, Mai, and Cotte 2015) to mine the unstructured text in manufacturers' customer-targeted recall notifications (i.e., product recall campaigns) and uncover how customer-focused each campaign is – that is, *the extent to which it provides information that end-customers can use to avail of the recall remedy*. Our work thus extends the emerging scholarship on text mining and machine learning methods from their traditional emphasis on user-generated content (UGC) to that of firm-generated content (FGC) (Bao and Datta 2014; Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016).

Third, in emphasizing the role of marketing channels in what has thus far been examined as an end-customer-focused phenomenon, we emphasize the importance of

distribution channels in helping firms recover from crisis (Grewal, Johnson, and Sarker 2007; Pearson and Clair 1998). Specifically, we study how channel quality – that is, *the end-customers' evaluations of a channel's overall excellence or superiority based on their interactions with the channel* (Anderson, Fornell, and Lehmann 1994; Brady and Cronin 2001) – impacts recall effectiveness. We thus contribute to the channels scholarship that has thus far focused on steady-state channel conditions (Palmatier, Stern, and El-Ansary 2015). Our research emphasizes the complementarity of *ex ante* (pre-recall announcement) business-to-business channel quality and *ex post* (post-recall announcement) business-to-customer recall campaign strategy in helping firms emerge from crises.

We expect the customer-focused recall campaign and channel quality to positively affect recall effectiveness. Using prior research in product recall, we identify recall-specific situational factors that may likely moderate these positive associations. Our results suggest that the while some situational factors serve as boundary conditions for the positive influence of customer-focused campaign, others strengthen the impact of channel quality.

We integrate data from the U.S. regulator for automotive safety, Ward's Automotive, J. D. Power and Associates, and Factiva to construct a unique database that comprises information on 273 car recalls announced in 2013 and 2014 in the U.S. by 18 automakers that together account for 99 per cent of car sales. Our use of the latent Dirichlet allocation (LDA) method of topic modeling (Tirunillai and Tellis 2014; Wang *et al*. 2015) helps uncover the specific content that might persuade customers to act on the recall campaign.

In the sections that follow, we provide some institutional background with respect to product recall, discuss our proposed conceptual model, and our hypotheses linking firms' customer-focused campaign and channel quality to product recall effectiveness. This is followed by a description of our research context, data collection and analysis approach, and results. We conclude with the theoretical and managerial implications of our study, and avenues for further research.

Conceptual Background and Hypotheses

A firm becoming aware of product defects that can potentially harm end-customers is required to notify the concerned regulator (Consumer Product Safety Commission 2012; National Highway Traffic Safety Administration 2016). The firm must also inform the impacted customers, and be "…creative in developing ways to… motivate [them] to respond" (Consumer Product Safety Commission 2012 p. 18). The firm achieves this objective by undertaking a recall campaign. The campaign seeks to provide information that end-customers can use to avail of remedy. The recall campaign is, however, a necessary though insufficient driver of recall effectiveness. Once customers are motivated to avail of the remedy – what we refer to as responding favorably to the campaign – the firm's channel partners must stand by to provide the remedy (Ni, Flynn, and Jacobs 2014). Together, the firm's recall campaign and its channel partners' following through on the remedy represent the critical drivers of recall effectiveness.

Practitioners attribute low recall effectiveness to customers' indifference to their recall campaigns (Autotrader 2015). Such indifference is thought to be a result of an inadequate customer focus (Deloitte 2010; Kelly and O'Donohue 2015) and missteps that increase customer inconvenience (Berry, Seiders, and Grewal 2002; Lorell and Forrest 2011). To achieve its objective of persuading customers to avail of its offered remedy, the recall-announcing firm must understand what information customers need to avail of the remedy, and provide such information via its recall campaign (Australian Competition and Consumer Commission 2010) – that is, undertake a customer-focused recall campaign.

The other likely catalyst of recall effectiveness is the channel members' provisioning of the remedy. As the intermediary between end-customers and manufacturers, channel members are expected to "…serve as a liaison… for recall-related services…" (Berman 1999, p. 71), thereby serving to add value for end-customers and to help reduce costs for the manufacturers (Palmatier, Stern, and El-Ansary 2015). Prior academic research suggests that high quality distributors and retailers help manufacturers

reduce the adverse effects of product recall (Berman 1999; Ni, Flynn, and Jacobs 2014).[19]. We thus expect channel quality to be the second driver of recall effectiveness.

Consistent with the contingency view of firm action-performance link, we propose that the impact of these two key drivers is contingent on recall-specific situational factors. We synthesize insights from prior research (Gao, Xie, Wang, and Wilbur 2015; Liu, Liu, and Luo 2016; Liu and Shankar 2015; Rhee and Haunschild 2006) and from interviews with personnel from management consulting firms (e.g., KPMG, Stericycle Expert Solutions) and their recall-issuing clients (e.g., General Motors Company) to identify specific situational factors that create a (mis)match with the firm's customer-focused campaign and channel quality.

Specifically, we predict that high levels of recall severity and media coverage make customers' perceptions regarding the manufacturer's "misdeeds" (inferred from its offering and sale of defective products) more salient than its words (Moorman, Deshpandé, and Zaltman 1993; Yadav, Prabhu, and Chandy 2007). The resulting word-deed mismatch is expected to reduce the persuasiveness of the manufacturer's customer-focused campaign. We thus hypothesize the mismatch to weaken the positive effect of the manufacturer's customer-focused campaign on recall effectiveness.

In contrast, the wider the scope of the recall (i.e., its involvement of multiple product lines), the greater the match between the manufacturer's channel quality and the increased demands of the wide ranging recall. The match allows the channel members to better serve the heterogeneous set of impacted customers, and is thus expected to strengthen the positive effect of the manufacturer's channel quality on recall effectiveness. Figure 1 presents our conceptual model.

Hypotheses

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[19] In the automotive context, for example, dealers not only perform necessary repairs to the recalled vehicles, but also inform customers bringing in their vehicles for unrelated issues, of any outstanding recall campaigns.

Effect of customer-focused recall campaign: An effective recall requires the recall-announcing firm to understand what would persuade its customers to notice, comprehend, evaluate, and act favorably on the recall campaign (Consumer Product Safety Commission 2003). Demonstrating such a comprehensive understanding of customer motivation and behavior in the recall campaign amounts, by definition, to a customer-focused recall campaign. A customer-focused campaign can improve the likelihood of customer response in two ways. First, by proactively providing information regarding the steps customers must take to avail of the remedy for the defective product, a customer-focused campaign decreases their perceived costs of availing of the remedy. Second, by highlighting the availability of the firm, its channel partners, and the regulator to serve the customers, a customer-focused campaign increases the customers' perceived benefits of responding to the campaign (Chakravarty, Kumar, and Grewal 2014). Together, the decreased costs and the increased benefits improve customers' perceived value (Deshpandé, Farley, and Webster 1993; Consumer Product Safety Commission 2003), thereby increasing the likelihood of their responding favorably.

> H_1: The recall-announcing firm's customer-focused recall campaign positively affects product recall effectiveness.

Mismatch between customer-focused recall campaign and situational factors: A customer-focused campaign places priority on customers' interests. In stark contrast, the defective products that have compromised customer safety paint a picture of a firm whose deeds (i.e., the products it offers) seem to significantly diverge from its professed focus on customers' interests. This perceived mismatch between the firm's words and deeds are likely to make the campaign appear less credible (Simons 2002) and less sincere (Moorman, Deshpandé, and Zaltman 1993), reducing customers' likelihood of being persuaded by the campaign. Drawing insights from our interviews and prior research (Eilert 2013; Rupp and Taylor 2002), we propose that this word-deed mismatch can become salient through at least two specific situational factors.

First, as the recall severity increases (e.g., if the defect is likely to result in death rather than injuries), so does the customer perceived risk – the consumer's perceptions of

the uncertainty and adverse consequences of using the product (Dowling and Staelin 1994). Consistent with Rupp and Taylor (2002), we expect that on average, recall severity influences customers to promptly act on the manufacturer's campaign. One may extend this expectation and assume that the increased risk also strengthens the effect of customer-focused campaign on recall effectiveness. Prior research, however, suggests that as the customer perceived risk increases, customer responsiveness to firms' influence efforts diminishes (Bechwati and Siegal 2005; Petersen and Kumar 2015). The increased risk nudges the customers to focus disproportionately more on the manufacturer's deeds (i.e., the product defect and the resulting customer risk) and less on its words (i.e., content of the campaign). The resulting word-deed mismatch reduces the customers' propensity to be influenced by the customer-focused campaign.

> H2a: Recall severity weakens the positive effect of the recall-announcing firm's customer-focused recall campaign on product recall effectiveness.

Second, customers often rely on information intermediaries (e.g., the media) to make sense of firm actions (Pollock and Rindova 2003; Rindova, Pollock, and Hayward 2006). In line with Rupp and Taylor (2002), we expect that on average, media coverage facilitates product recall effectiveness. In the aftermath of a wrongdoing, however, a firm often becomes the target of negative publicity that focuses on not only its present but also its past wrongdoings (Desai 2011; Zavyalova, Pfarrer, Reger, and Shapiro 2012). The resulting salience of firm misconduct makes its customers less likely to approve its current behavior and more likely to withdraw from transactions with the firm (Jonsson, Greve, and Fujiwara-Greve 2009). A product recall often results in high negative publicity that disproportionately focuses on the firm's defective products (Liu and Shankar 2015). Such high levels of negative information about the firm are expected to make customers less likely to attend to, and believe in, the manufacturer's customer-focused campaign. The likely result is a decrease in likelihood of their response to the campaign.

> H2b: Recall media coverage weakens the positive effect of the recall-announcing firm's customer-focused recall campaign on product recall effectiveness.

Effect of channel quality: An effective and efficient network of channel members serves to positively influence customers' decisions not only to purchase the manufacturer's products (Yu, Niehm, and Russell 2011), but also equally crucially, as to whether and when to avail of the recall remedy. For those customers whose experience with the channel members is limited solely to the sales process (i.e., they have not availed of the channel members' post-sales services), a high level of satisfaction with the channel members' sales process is likely to predispose them to a greater level of confidence in the channel members' ability to offer the remedy. Customers who have had prior positive interactions with the channel's post-sales service will perceive a lower cost of availing of the remedy (Petersen and Kumar 2015) and be more motivated to undertake it (Selnes 1998). Greater confidence in the channel's ability and the lower cost of interacting with the channel are likely to incentivize the customers to comply with the recall, thereby boosting recall effectiveness.

An additional characteristic of high quality channel members is their proficiency at handling product returns, and managing customers who have had a less than satisfactory experience with the manufacturer's products (Bechwati and Seigal 2005; Petersen and Kumar 2009, 2015). This characteristic becomes more prominent in the context of defective and unsafe products when customers are more likely to experience heightened anxiety and frustration elicited by the recall and the inconvenience caused as a result (Berry, Seiders, and Grewal 2002). On being informed by the firm's campaign, customers are likely to contact channel members, inquiring about the remedy process. The channel members' response to customers' concerns can determine how promptly customers follow up the firm's call with their availing of the remedy (Richins 1983). Thus, channels that are adept at handling customers during the product return process (Petersen and Kumar 2009) will help enhance recall effectiveness.

Relatedly, a high quality channel has greater ability to handle product exchanges, repairs and maintenance (Berman 1999; Parasuraman, Zeithaml, and Berry 1985). Channels often thrive on the service component of their offering, attempting to differentiate themselves on value-added services such as preventive or corrective maintenance (Palmatier, Stern, and El-Ansary 2015). In the context of product recall, remedy of the product is a key function performed by the firm's channel partners

(Berman 1999). In sum, a high quality channel improves recall effectiveness by offering a high quality customer experience even when in the throes of a recall-caused crisis.

> H$_3$: The recall-announcing firm's channel quality positively affects product recall effectiveness.

Match between channel quality and situational factors: A firm depends upon its channel partners to understand the varied needs of its end-customers and to serve those needs with the most appropriate product from the manufacturer (Palmatier, Stern, and El-Ansary 2015). Thus, a channel's contribution to the firm's performance depends upon how well the channel's ability to address customer heterogeneity is matched with the product line (Kabadayi, Eyuboglu, and Thomas 2007). For example, when a high quality channel supports a narrower set of product lines, the resulting mismatch does not help realize the full potential of the channel. On the other hand, a low quality channel matched with an extensive product portfolio is likely to fall short of customer expectations, hurting the manufacturer's customer-related performance outcomes. In contrast to these two suboptimal configurations, a match achieved by bringing together a high quality channel and a wide and deep product portfolio has a multiplier effect on the manufacturer's channel quality-performance link. Consistent with prior research in marketing channels (Kabadayi, Eyuboglu, and Thomas 2007; Kumar, Heide, and Wathne 2011; Palmatier, Stern, and El-Ansary 2015; Sande and Haugland 2015), we reason that a manufacturer's customer-facing performance outcomes are significantly greater when its channel quality *match* the situational factors.

A recall with a wide scope offers a greater match with a high quality channel (Venkatraman 1989). On average, when multiple and diverse products are recalled (that is, the recall is of wide scope), we expect the recall effectiveness to be low. Interestingly, however, wide scope allows a high quality channel to leverage its expertise in managing the wide product portfolio, effectively and efficiently serving customers during recall remedy. We thus expect this match between channel quality and the context (i.e., wide recall scope) to improve manufacturer's performance toward downstream customers (i.e., recall effectiveness).

H4: Recall scope strengthens the positive effect of the recall-announcing firm's

channel   quality on product recall effectiveness.

Research Method

Context

We conduct our research in the context of passenger car recalls announced in the U.S. Our choice of context is driven by three factors. First, we hypothesize that a key driver of recall effectiveness is the customer focus as revealed by the content of the recall campaigns, and require a setting where the textual content of recall campaigns is available (National Highway Traffic Safety Administration 2011). Second, we require a context where the marketing channel is key to the sales (Pauwels, Silva-Risso, Srinivasan, and Hanssens 2004; Weitz 1981) and service (Zeithaml, Berry, and Parasuraman 1996; Mittal, Kamakura, and Govind 2004) processes, and by extension, to the recall process (Wowak and Boone 2015). Lastly, our objective of assessing product recall effectiveness calls for a setting where information regarding this crucial outcome is archived and available (National Highway Traffic Safety Administration 2016).

Consistent with prior research (Gao, Xie, Wang, and Wilbur 2015; Kalaignanam, Kushwaha, and Eilert 2013; Liu and Shankar 2015), we chose the passenger car (light motor vehicles) category because our interest is more in the vehicles owned by individual customers. Our observation window comprises recalls announced in the years 2013 and 2014 so as to balance recency of sample with the passage of enough time to collect recall effectiveness data in the aftermath of the recall announcement.

Institutional Details

An auto recall is announced when the automaker notifies the U.S. National Highway Traffic Safety Administration (NHTSA, the auto safety regulator) about a safety defect in its vehicles. The automaker undertakes a recall campaign targeted toward the impacted customers. The campaign seeks to inform customers about the defect and its consequences, and to reassure them regarding the automaker's and its dealers' objective of ensuring repair of the defective vehicles. In addition, the campaign shares the recall-related arrangements the customers may avail of to contact the automaker and/or its

dealers, the customers' responsibilities (particularly if the vehicle is leased), the role of the dealers in providing satisfactory vehicle repair and customer service, and the automaker's regulatory compliance through the campaign. The automaker is also required to submit to NHTSA the number of vehicles repaired in the period following the recall announcement (effectiveness data). Were NHTSA to determine that the automaker has fallen short on any of the preceding critical tasks, the latter is liable for civil penalties similar to what Fiat Chrysler Automobiles faced (Vlasic 2015).

Data Collection

We integrated data from four different archival sources – Ward's Automotive, NHTSA, J. D. Power & Associates, and Factiva – to create a unique database. Table 1 provides the specific variables and their data sources. First, we consulted Ward's Automotive Yearbook for the years 2012 and 2013 to identify the 18 automakers that account for 99 per cent of passenger car sales in the U.S., and their annual passenger vehicle sales in those years. We next noted the unique recall identification number for all passenger car recalls announced by each of these 18 automakers in the years 2013 and 2014, and for which recall campaigns and effectiveness data were available from the NHTSA's Website. This effort yielded a sample of 273 recalls. Table 2 provides the distribution of the recalls in our sample by automaker and by year. Our sample size compares favorably with previous studies of product recall (Davidson and Worrell 1992; Gao, Xie, Wang, and Wilbur 2015; Jarrell and Peltzman 1986). We next developed a Web scraping software program in JAVA to download for each of the 273 recalls the recall campaign PDF file and corresponding recall effectiveness data from the NHTSA's Website. Each recall-announcing automaker submits to the NHTSA a copy of the campaign content it seeks to use. Barring a few cosmetic changes, the content remains the same irrespective of the medium used to inform the customers (e.g., letters sent through first-class mail, notices posted on the automaker's Web site, and text, social media, and email messages redirecting customers to the Web site). As well, the use of such alternative means of informing customers has become acceptable only after enactment of the Moving Ahead for Progress in the 21st Century Act (MAP-21) in 2016.

For each recall, we used Factiva to determine the number of unique media articles published in the U.S. within a week of the focal recall campaign. To this information, we added data from J. D. Power and Associates regarding each of the 18 automakers' scores on the Sales Satisfaction Index (SSI), Customer Service Index (CSI), Initial Quality Study (IQS), and Vehicle Dependability Study (VDS). We merged these data with information regarding each of the recalls that we had obtained from NHTSA. The combined dataset comprises rich information regarding the number of vehicles recalled, the number of makes, models, and model-years impacted, and the date of announcing each recall campaign.

Unit of Analysis and Measures

Our unit of analysis is the individual recall announced by an automaker. Table 3 provides the descriptive statistics and correlation matrix for the variables in our study. We next briefly describe each measure.

Product recall effectiveness: We define product recall effectiveness as the extent to which the recalled products are remedied. Consistent with prior work by academics (Eilert 2013; Hooker, Teratanavat, and Salin 2005; Rupp and Taylor 2002), regulators across the world (Australian Competition and Consumer Commission 2010; Consumer Product Safety Commission 2003; National Highway Traffic Safety Administrator 2016), government agencies (U.S. Government Accountability Office 2011), and practitioners (Steinkamp 2015; Stout Risius Ross 2015), we measured recall effectiveness as the proportion of recalled vehicles repaired in the six quarters since recall announcement.

Customer-focused recall campaign (CustFocus): A product recall campaign is customer-focused to the extent it provides information that end-customers can use to avail of the recall remedy. Our interviews with recall advisory firms and their automaker clients helped us improve our domain knowledge of auto recalls and the ensuing recall campaigns. Each author randomly chose ten recalls from our sample, and read textual content of the recall campaign to gain a better sense of the content characteristics likely to be of theoretical and managerial relevance. Consistent with practitioners' (Deloitte

2010; Holloran 2016) and regulators' (Consumer Product Safety Commission 2003; U.S. Government Accountability Office 2011) suggestions, we found significant variation on customer focus in the recall campaigns not only across the automakers (i.e., *inter*-firm), but also across the multiple recalls within each automaker (i.e., *intra*-firm).

To compute the level of customer focus in each recall campaign, we relied on state-of-the-art topic modeling techniques to discover the latent semantics. A topic (also known as theme or idea) refers to highly probable words in a text (Blei and Lafferty 2009). Statistically, a topic is a distribution of words over a vocabulary (Blei 2012). Topic modeling thus refers to a suite of "...statistical methods that analyze the words of the original texts to discover the [latent] themes that run through them, [and]… how those themes are connected to each other…" (Blei 2012, p.77). Topic modeling has distinct advantages over the more traditional content analysis and text analysis methods (Gross and Sheth 1989; Healey and Kassarjian 1983). It "...does not require classification of content into pre-conceived topics that may not be relevant" (Liu, Singh, and Srinivasan 2016, p. 365) and instead "…enables the extraction of a parsimonious set of an optimum number of latent [topics]…" (Tirunillai and Tellis 2015, p. 465). Relatedly, topic modeling "…allows for [statistical] computation of the importance of the extracted [topics] by the intensity of the conversations on each [topic]" (*ibid*.). Specifically, we used the robust and most commonly used latent Dirichlet allocation (LDA) method of topic modeling (Tirunillai and Tellis 2014; Wang *et al*. 2015).

For each recall campaign, we undertook topic modeling using both unigrams (one word) and bigrams (two-word phrases). Comparing the results from the two models, we found that the bigram solution produced a more intuitive interpretation (for instance, "customer service" makes more sense than "customer" and "service" separately), and therefore chose the bigram topic modeling approach. Consistent with prior research that uses topic modeling (Tirunillai and Tellis 2014; Wang, Bendle, Mai, and Cotte 2015), we varied the number of topics from 4 to 10. Following marketing scholars' prior use of topic modeling (Büschken and Allenby 2016; Netzer, Lemaire, and Herzenstein 2016; Tirunillai and Tellis 2014), we relied on perplexity score (a measure of model fit) and

interpretation of topics as the two criteria to determine the following five topics – *customer service assurance, customer service access modalities, customer role and responsibility, role of dealer in customer service,* and *regulatory compliance.* Topic 1 (*customer service assurance*) included bigrams such as "representatives available" and "without charge", whereas topic 2 (*customer service access modalities*) was reflected in phrases such as "customer assistance" and "contact dealer". Table 4 lists the top five terms and representative phrases for each of the five topics mentioned in the recall campaigns.

The first four topics demonstrate the extent to which the campaign provides information that end-customers can use to avail of the recall remedy. Conceptually, thus, these four topics are expected to collectively serve as a measure of customer focus of a recall campaign. We created a formative index of customer-focused campaign (*CustFocus*) from the first four topics. We found that the extent of customer focus in campaigns varied not only across the 18 automakers but also across recalls within an automaker.

Channel quality (ChQual) is defined in terms of the end-customers' evaluations of a channel's overall excellence or superiority based on their interactions with the channel. Prior research on product quality has measured it in terms of customer perceptions of their interactions with the product (Anderson, Fornell, and Lehmann 1994; Brady and Cronin 2001). Following this prior work, we obtained a measure of channel quality using a formative index of J. D. Power & Associates' Sales Satisfaction Index (SSI) and Customer Service Index (CSI). The former measures "…the ability of dealerships to manage the sales process, from product presentation and price negotiation to the finance and insurance process and final delivery" (J. D. Power & Associates 2016a), whereas the latter "…examines customer satisfaction with maintenance and repair service" (J. D. Power & Associates 2016b) provided by dealers.

Recall scope (Scope) captures the breadth and depth of the products impacted by the recall (Thirumalai and Sinha 2011). We thus measure recall scope as a four-item reflective scale comprising the number of makes, models, and model-years involved in

the recall (Gao, Xie, Wang, and Wilbur 2015; Rhee and Haunschild 2006). A confirmatory factor analysis of this scale provides evidence regarding its validity and reliability ($\chi^2(2) = 4.60$, $p = .10$; RMSEA = .07; SRMR = .03; CFI = .98; TLI = .93); all four items' loadings significant at $p < .001$.

Recall severity (Severity) is the level of consumer harm that the product defect underlying a product recall may cause. Recall that the automaker's notifications to the regulator and the campaigns targeted to the impacted customers mention the defect and its consequences. We developed a Python application that searched these notifications and campaigns for the following words: death, crash, fire, and injury. Consistent with prior research (Gao, Xie, Wang, and Wilbur 2015; Liu, Liu, and Luo 2016; Liu and Shankar 2015; Rupp and Taylor 2002), we considered defect severity to be the highest (value 3) if the defect could lead to death of passengers in the vehicle. If the defect could not lead to death, but could result in crash and/or fire, we ascribed to it the severity level of 2. If the defect could not result in death, crash, and fire, but could cause an injury, its severity level was set to 1. Lastly, if the defect could not cause death, crash, fire, or injury, it had the lowest severity level of 0.

Recall media coverage (Media) refers to the extent of attention by the news media to the product recall. In line with prior research (Liu and Shankar 2015; Rupp and Taylor 2002), we searched Factiva for unique media articles that were published in the U.S. within a week of the announcement of the focal recall, referring to the recall-announcing automaker, and having "recall" as a key word. We then manually read each article to ensure that it indeed referred to the focal recall. We operationalized media coverage as the natural logarithm of the number of articles that met the preceding criteria. Using Linguistic Inquiry and Word Count (LIWC) software program, we computed the sentiment of each article, and found 96% of the articles are predominantly negative. As a result, we use the count of articles, rather than their aggregate sentiment, to operationalize recall media coverage.

Control variables: Based on prior research, we included several additional control variables. Prior research suggests that the manufacturers' unit sales (*Sales*) (Haunschild

and Rhee 2004; Kalaignanam, Kushwaha, and Eilert 2013; Liu, Liu, and Luo 2016; Liu and Shankar 2015) can influence customers' decisions of returning the recalled vehicles and the dealers' ability to repair them. We used Ward's Automotive Yearbook to obtain the sales volume of the focal automaker in the year prior to the year of the focal recall's announcement; for example, for a recall announced in 2013, we use the sales volume in the year 2012 (Liu, Liu, and Luo 2016; Liu and Shankar 2015).

Product quality (*PdtQual*) has also been found to impact product recall performance (Kalaignanam, Kushwaha, and Eilert 2013; Liu and Shankar 2015). Consistent with prior research, we controlled for product quality, using a formative index of J. D. Power & Associates Initial Quality Study (IQS) and Vehicle Dependability Study (VDS) scores (Kalaignanam, Kushwaha, and Eilert 2013; Rhee and Haunschild 2006). As well, automakers' prior experience (*Exp*) with managing recalls can aid their recall management (Liu, Liu, and Luo 2016). Similar to Liu, Liu, and Luo (2016), we measured automakers' recall experience in terms of the number of recalls in 2012 and 2013 that the automaker had experienced before the focal recall. For each recall, we also controlled for the initial period (*InitPeriod*), which refers to the number of days in the calendar quarter in which the recall is announced; for instance, if the recall is announced on March 1, the initial period is 31 days. Lastly, we also controlled for the year of recall (*Year*) (2013 or 2014).

Model Specification

Given a recaller *i* and its recall *j*, we specify the model as follows:

$$RecallEffectiveness_{ij} = \beta_1 CustFocus_{ij} + \beta_2 CustFocus_{ij} * Severity_{ij} + \beta_3 CustFocus_{ij} *$$
$$Media_{ij} + \beta_4 ChQual_i + \beta_5 ChQual_i * Scope_{ij} + \beta_6 Severity_{ij} +$$
$$\beta_7 Media_{ij} + \beta_8 Scope_{ij} + \sum_9^{13} \beta_i Controls_{ij} + \varepsilon_{ij} \qquad (1)$$

Accounting for endogeneity of customer-focused recall campaign: The level of customer focus in automakers' recall campaign (*CustFocus*) is endogenous in that it represents a strategic choice undertaken with a specific goal in mind – that of evincing favorable

customer response – rather than a random assignment (Wooldridge 2009). Ignoring the endogeneity of customer-focused campaign can lead to biased and misleading results (Angrist and Pischke 2008). We accounted for this endogeneity by using the control function approach (Germann, Ebbes, and Grewal 2015; Petrin and Train 2010).

We relied on the insight that firms are prone to isomorphic pressures (DiMaggio and Powell 1983), such that their behavior is likely to be similar to and drawing from relevant other firms in their operating environment. Critically, there is no reason to expect that these peers' past behavior will directly influence the outcome realized by the focal firm. This approach to instrument creation has been used in prior marketing studies (Kumar, Sunder, and Leone 2014). Accordingly, as instruments for the focal customer-focused campaign, we used the average level of customer focus across all prior recall campaigns issued by all peers (luxury or value) in the last 30 days for passenger car recalls in 2012 and 2013 (*IVCustFocus*).

To ensure that our instrumental variable meets the requirements of relevance and orthogonality, we first tested whether the proposed endogenous variable (i.e., customer-focused campaign) could be treated as exogenous. We used the difference of two Sargan-Hansen statistics (C statistic), where the test statistic is distributed as a chi-square with degrees of freedom equal to 1 for the number of endogenous regressors. The test rejected the null hypothesis of exogeneity at $p < .01$. The *F*-statistic for the first-stage equations was 19.76, much above the rule-of-thumb of 9.08 (Staiger and Stock 1997). As well, we relied on the Sargan C test to test the exogeneity of our instrument. We could not reject this null hypothesis ($p = .26$). These tests provided evidence in support of the validity of the instrument.

Following Petrin and Train (2010), for our endogenous variable of customer-focused campaign, we next conducted an auxiliary estimation with customer-focused campaign (*CustFocus*) as the dependent variable, and the instrument (*IVCustFocus*) and other explanatory variables and covariates from equation (1) above included as regressors.

We retained the predicted residuals (*ResCustFocus*) from the auxiliary estimation for inclusion as an endogeneity-controlling variable, as follows:

$$RecallEffectiveness_{ij} = \beta_1 CustFocus_{ij} + \beta_2 CustFocus_{ij} * Severity_{ij} + \beta_3 CustFocus_{ij} *$$
$$Media_{ij} + \beta_4 ChQual_i + \beta_5 ChQual_i * Scope_{ij} + \beta_6 Severity_{ij} +$$
$$\beta_7 Media_{ij} + \beta_8 Scope_{ij} + \sum_9^{13} \beta_i Controls_{ij} + \beta_{14} ResCustFocus_{ij} +$$
$$\varepsilon_{ij} \hspace{10em} (2)$$

Channel quality (*ChQual*) is <u>not</u> endogenous to the specific recall. Investments in channel quality are made much in advance of any specific recall. We thus reason that it is not endogenous to the effectiveness of a specific recall. Given that our dependent variable (*RecallEffectiveness*) is a limited dependent-variable (with lower and upper limits of 0 and 1 respectively), we estimated a Tobit model, identifying appropriate lower and upper limits and clustering the observations on the recall-announcing automakers.

Results

Table 5 displays the results of our empirical model. Examining the results suggests broad support for our hypotheses. Hypothesis H_1 predicted a positive association between the recall-announcing firm's customer-focused campaign and product recall effectiveness. The results support this hypothesis; that is, the greater the customer-focus in the recall campaign, the higher the product recall effectiveness ($b_1 = 1.09$, $p < .05$). This main effect of customer-focused campaign on recall effectiveness is, however, significantly weakened in the presence of the two hypothesized situational factors – recall severity and media coverage. We thus find support for hypotheses H_{2a} and H_{2b} where we expected the effect of customer-focused campaign on recall effectiveness to weaken in the presence of high recall severity ($b_2 = -.40$, $p < .05$) and high media coverage ($b_3 = -.19$, $p < .05$). As well, consistent with Rupp and Taylor (2002), we find higher levels of recall severity and media coverage to be associated with greater recall effectiveness ($b_6 = .29$, $p < .01$; $b_7 = .13$, $p < .05$ respectively).

H_3 hypothesized the recall-announcing firm's channel quality to positively influence recall effectiveness. The results support this hypothesis ($b_4 = .05$, $p < .05$). We further expected, in hypothesis H_4, that the positive impact of channel quality on recall effectiveness is strengthened in the presence of a recall with wider scope. We find

evidence supporting this hypothesis ($b_5 = .49$, $p < .05$). Also, higher recall scope is found to significantly reduce recall effectiveness ($b_8 = -1.45$, $p < .05$).

With respect to control variables, both unit sales and product quality positively impact recall effectiveness ($b_9 = .08$, $p < .05$; $b_{10} = -.04$, $p < .05$). Neither automakers' prior recall experience (b_{11}) nor the recall year (b_{12}) impact recall effectiveness. However, the number of days in the quarter in which the recall is announced is found to significantly influence recall effectiveness ($b_{13} = -.03$, $p < .05$). Lastly, the results from our first-stage auxiliary regression of customer-focused campaign on its instrument and the covariates has a significant effect, thus attesting to the endogeneity of customer-focused campaign ($b_{14} = -1.51$, $p < .05$).

Robustness Checks

We undertook a series of checks so as to assess the robustness of our findings, specifying an alternate measure of our dependent variable, alternate estimators, and possible additional pairwise interactions among the explanatory variables that we did not hypothesize.

Robustness to alternate measure of recall effectiveness. Our original measure of recall effectiveness comprised the proportion of recalled vehicles repaired in the six quarters since recall announcement. We also specified our regression model operationalizing recall effectiveness as the proportion of recalled vehicles repaired in the quarter in which the recall is announced and the next complete quarter. Our substantive findings remain invariant to this alternate operationalization of the dependent variable.

Robustness of topic modeling results. To validate the results we obtained from the topic modeling effort, we conducted additional checks on the recovered topics using a web-based survey. We recruited 102 individuals via Amazon's MTurk (all U.S. based; rated $\geq 95\%$) to evaluate the relationships among our five topics and the five key terms assigned to each topic. 95 people completed the survey, yielding a response rate of just over 93 per cent. We used a balanced, fractional factorial design to generate the {topic, key terms}-pairs shown to each respondent. Each participant was shown one randomly selected topic along with three key terms randomly generated from the list of all twenty-five terms. For example, a rater was equally likely to see regulatory compliance paired

with federal law, as with any of the other four topics. The participant next rated each of the three key terms on a six-point scale rating from 0 to 5, where 0 represents no correspondence between the term and the topic and 5 means full correspondence. The participant repeated this task once for another key term. Average ratings greater than or equal to 3 were considered assigned to that topic (convergence group); conversely, average ratings less than 3 were considered not contained in that topic (discrimination group). The average rating of 3.8 (sd = .21) for the convergence group versus 1.2 (sd = .13) for the discrimination group suggests that respondents conducting the sorting and term-to-topic mapping task viewed the correspondence in a manner quite consistent with our topic model results.

Robustness to alternate estimators. We specified three additional models, using alternate estimation techniques – a linear regression of the logit transformation of proportion of recalled vehicle remedied, a linear regression of the natural log of the number of recalled vehicles, and a negative binomial regression of the number of recalled vehicles repaired (count variable). The latter two models controlled for the magnitude of the recall (i.e., the number of vehicles recalled by the manufacturer). Across all three estimators, our substantive findings remain unchanged.

Robustness to additional unhypothesized interactions. Although no additional pairwise interactions were hypothesized, we nevertheless included multiple such additional interactions. Specifically, we assessed the possibility of significant interactions involving customer-focused campaign and channel quality (*CustFocus * ChQual*), customer-focused campaign and recall scope (*CustFocus * Scope*), channel quality and recall media coverage (*ChQual * Media*), channel quality and recall severity (*ChQual * Severity*), recall scope and recall media coverage (*Scope * Media*), and recall scope and recall severity (*Scope * Severity*). In no case did we find the specified interaction statistically significant, and all originally hypothesized effects remain robust to these alternate specifications.

Post-hoc Interaction Probing

So as to better understand how the match customer-focused campaign and

channel quality and situational factors might impact recall effectiveness, we conducted an analysis of simple slopes for the significant interactions (Aiken and West 1991; Dawson 2014). Table 6 displays the results corresponding to the significant two-way interactions. An examination of Figure 2, Panel A suggests that the positive effect of customer-focused campaign on recall effectiveness is significant only in case of low recall severity (simple slope = 1.09, *p* < .05). When a customer-focused campaign occurs in the presence of a high recall severity, manufacturers' deeds become more salient than their words, thereby annulling the positive influence of customer-focused campaign on recall effectiveness (simple slope = -.10, n.s.). A similar weakening of the positive impact of customer-focused campaign on recall effectiveness can be discerned in Figure 2, Panel B. Specifically, for recalls accompanied by high media coverage, the word-deed mismatch becomes pronounced, taking away the positive effect of customer-focused campaign on recall effectiveness (simple slope = .24, n.s). When recall media coverage is low (i.e., 1 SD below the mean) the positive impact of customer-focused campaign on recall effectiveness remains significant (simple slope = 1.09, *p* < .05).

Finally, examining Figure 2 Panel C, we find that the positive main effect of an automaker's channel quality on its recall effectiveness is significant for both recalls with low scope (simple slope = .05, p < .00) and recalls with high scope (simple slope = .18, p < .00). However, the size of this effect becomes much greater in the presence of a high scope (t-value increases from 3.75 to 5.98).

Discussion

The present study builds on prior research to examine the role of two marketing drivers – customer-focused recall campaign and channel quality – in enhancing product recall effectiveness. Drawing insights from prior research on product recall and from our interviews with personnel at recall advisory firms and with their client organizations, we identify specific situational factors that, when (mis)matched with the specific driver, attenuate or augment the particular driver's effect on recall effectiveness. In what follows, we discuss the implications of our study for scholars and practitioners alike.

Implications for Scholarship

Recall Effectiveness – A substantive marketing phenomenon relevant to multiple stakeholders: We extend four decades of prior multidisciplinary research on product recall by answering a relatively ignored question – to what extent are the recalled products remedied? Our study thus pays heed to the recent calls by marketing thought leaders for conducting problem-driven, phenomenon-based, impactful research that addresses the scholarship-practice gap (MacInnis 2005; Tellis 2017; Varadarajan 2017). Importantly, we position product recall effectiveness as an outcome of importance not only for recall-announcing firms and their customers, but also for regulatory agencies, customers, and customer advocacy groups. In "…examining the ability of firms to deliver a value proposition that meets the needs of a portfolio of commercial and societal stakeholders…" (Bharadwaj 2015, p. 100), we broaden the scope of marketing strategy theory (Moorman 2016; Sheth and Sisodia 2005).

Marketing drivers, and their (mis)match with situational factors: Effective recalls are accomplished when the recall-announcing firm undertakes a customer-focused campaign that persuades the impacted customers to avail of the recall remedy and provides a high quality channel that can provide the remedy. We demonstrate how a business-to-customer (B2C) driver (i.e., customer-focused campaign) and a business-to-business (B2B) driver (i.e. channel quality) help firms realize superior performance – in the present context, effective product recall. In addition, we showcase how the (mis)match between the two drivers and situational factors either attenuates or augments the driver's effect on firm performance. Our study emphasizes the role of marketing drivers in bringing about greater value when deployed in ways consistent with ground realities (Moorman and Slotegraaf 1999).

In contrast to extant scholarship relying on retrospective managerial and customer surveys (Deshpandé, Farley, and Webster 1993) and interviews (Blocker, Flint, Myers, and Slater 2011) to measure customer focus in firm behavior, we are able to infer customer focus from text-mined firm-generated content[20] (Kumar *et al*. 2016). Our work

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[20] Firm-generated content (FGC) refers to firm-initiated communication targeted toward its customers and intended to evince a specific desired behavior from customers (Goh, Heng, and Lin 2013; Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016).

thus contributes to the emerging scholarship that seeks to apply text mining and machine learning methods that have largely been used in the context of user-generated content (UGC) to firm-generated content (Bao and Datta 2014; Kumar *et al*. 2016).

The role of marketing in firms: Prominent marketing academics continue to call for research that emphasizes a more impactful and comprehensive role of marketing within firms (Hanssens and Pauwels 2016; Moorman and Rust 1999). With a few notable exceptions (Grewal, Johnson, and Sarker 2007; Grewal and Tansuhaj 2001), however, the focus has been exclusively on the role of marketing in business-as-usual, steady-state conditions. By investigating the importance of marketing in helping firms achieve effective product recalls, we seek to enable the deployment of marketing drivers at the end-customer and channel levels, and help realize a critical outcome that impacts the firm and its multiple stakeholders. Marketers may thus demonstrate their impact with respect to driving the boardroom's primary agenda during times of crisis (Kumar and Shah 2009).

Implications for Practice

Achieving effective recalls involves high, and immediate-term costs of remedying the recalled products. The benefits – such as reducing the likelihood of product liability lawsuits and being perceived as a responsible firm – are less certain and more longer-term. As a result, product manufacturers' objective is likely to optimize rather than maximize recall effectiveness. The regulatory agencies' purpose, however, is to ensure consumer safety and they are thus more likely to benefit from the findings of this study. Nonetheless, we discuss the implications of our findings for recall-announcing firms and recall-supervising regulators, in that order.

Implications for recall-announcing firms: In a recent Deloitte (2010) survey of managers, the recall-announcing firm's recall campaign was ranked among the top two factors influencing recall effectiveness. Surveyed managers expressed frustration at the "…lack of clarity on the exact information that needs to be provided…" in the campaign (Deloitte 2010, p. 21). Similarly, although practitioners have acknowledged the role of marketing channels in product recall (Green 2014; Stout Risius Ross 2015), they have

lacked rigorous research-based evidence regarding the extent to which manufacturer's distribution channel may help achieve effective recalls. Our study offers empirical evidence on both accounts. Specifically, we find that increasing customer focus in the recall campaign by 1 per cent increases recall effectiveness by 1.09 per cent. On the other hand, improving channel quality by 1 per cent boosts recall effectiveness by 2 per cent. Such improvements to recall effectiveness are likely to showcase firms' commitment toward customer safety, enabling them to improve their relationships with the regulatory agencies, customer safety advocacy groups, and the media.

Implications for recall-supervising regulators: The U.S. Congress-passed Consumer Product Safety Improvement Act of 2008 includes a section that requires recall campaigns "…to include certain additional information…" so as to improve recall effectiveness (Ross 2014). More recently, the Safety Recall Improvement Act 2015 requires U.S. regulators to identify factors that help improve recall effectiveness (SafetyResearch.net 2014). Not surprisingly, regulators have been looking for guidance on how manufacturers' recall campaigns (Australian Competition and Consumer Commission 2010) and their channel quality (U.S. Government Accountability Office 2011) might influence effectiveness.

By providing insights with respect to these two very aspects, our study helps recall-supervising regulators guide the recall-announcing manufacturers in terms of the content of their recall campaigns and their channel quality. Thus, instead of adopting only an outcome-focused approach (i.e., monitor firms on their recall effectiveness), regulators can perhaps enact a more constructive perspective by helping manufacturers devise a customer-focus recall campaign and offer high quality channels. We thus seek to promote a proactive and collaborative engagement between regulators and those regulated that promotes their mutual goals of customer safety and business prosperity (Jones, Shillady, Owtram, and Greenspan 2016; Organisation for Economic Cooperation and Development 2013).

Our findings help manufacturers avoid stiff financial penalties for slow and/or ineffective remedy (Vlasic 2015) and suggest that a recall may be leveraged as a customer touchpoint to demonstrate dedication toward customer service and safety (Stout

Risius Ross 2015). We also help regulators ward off the criticism of not being able to improve the recall process (U.S. Government Accountability Office 2011).

Limitations and Future Research Directions

Like any research effort, the present study is subject to some limitations. First, although our use of archival longitudinal data provides rich information on how firms' customer-focused recall campaign and channel quality impact product recall effectiveness, we must rely on imperfect proxies for the theoretical constructs in this study. The upshot of our reliance on archival sources of information, however, is that we get to observe the actual behavior of firms and their customers. Future studies of recall effectiveness would benefit from integrating archival and more direct (perhaps survey-based) operational measures of the constructs. Second, we have examined the content of recall-announcing firms' recall campaigns targeted to the impacted customers. Firms may also use other modes, such as social media, to inform customers. A potentially fruitful direction for research lies in assessing such other modalities.

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Table 1: Key Constructs and their Measures

Construct	Definition	Measure	Data source
Product Recall Effectiveness	The extent to which the recalled products are remedied.	Proportion of recalled vehicles repaired in the six quarters since announcement.	NHTSA Website
Customer-Focused Recall Campaign	The extent to which a recall campaign provides information that end-customers can use to avail of the recall remedy.	Formative index of the weightings of the following four topics in recall campaigns: customer service assurance, customer service access modalities, customer role and responsibility, and role of dealer in customer service.	NHTSA Website
Channel Quality	The end-customers' evaluations of a channel's overall excellence or superiority based on their interactions with the channel.	Formative index of standardized scores from J. D. Power and Associates' Sales Satisfaction Index (SSI) and Customer Service Index (CSI). Average of the prior six years.	J.D. Power and Associates Website
Recall Severity	The level of consumer harm that the product defect underlying a product recall may cause.	4, if the defect can lead to death; 3 if fire or crash but not death; 2 if injury but not death, fire, and injury; 0 if none.	NHTSA Website
Media Coverage	The extent of attention given by the news media to an event.	Natural log of the number of unique recall-specific media articles published in the U.S. within a week of recall announcement.	Factiva
Recall Scope	The extent of firm- and product-level impact of a recall.	Reflective index of standardized number of manufacturers, makes, models, and model-years involved in the recall.	NHTSA recalls dataset

Table 2: Distribution of Recalls in the Sample by Automaker and by Year

Automaker	Number of car recalls announced in 2013	Number of car recalls announced in 2014
BMW	5	7
Daimler	4	2
Fiat Chrysler Automobiles	3	18
Ford	5	30
General Motors	6	71
Honda	3	15
Hyundai	3	10
Jaguar Land Rover	3	4
Kia	1	4
Mazda	1	7
Mitsubishi	1	8
Nissan	1	10
Porsche	1	0
Subaru	0	4
Suzuki	2	6
Toyota	5	21
Volkswagen	2	9
Volvo	1	0

Table 3: Descriptive Statistics and Correlation MAatrix

		Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
1.	Recall Effectiveness	.55	.25	-							
2.	Customer-Focused Recall Campaign	.83	.25	-.01	-						
3.	Channel Quality	.30	1.65	.15*	-.04	-					
4.	Recall Scope	0	.05	-.24*	.03	.17*	-				
5.	Recall Severity	1.26	.82	.05	.10	.17*	.02	-			
6.	Recall Media Coverage[+]	1.67	1.45	.06	.09	.38*	.36*	.13*	-		
7.	Unit Sales[+]	13.88	1.36	.19*	.07	.15	.25*	.09	.50*	-	
8.	Product Quality	.56	1.58	.16*	.08	.30*	.05	.12*	.18*	.63*	-
9.	Experience	20.29	20.06	.13*	.08	.38*	.19*	.16*	.53*	.46*	.25*

Note: * $p < .05$; [+] ln-transformed; $n = 273$

Table 4: The Five Topics and their Top Five Bigrams

Bigrams (Two-Word Phrases)	Representative Phrase
Topic 1: *Customer Service Assurance*	
Customer service	"We are committed to provide customer service…"
Happy assist	"We are happy to assist you…"
Concerns please	"If you have any concerns, please…"
Representatives happy	"…representatives are happy to serve you…"
Representatives available	"…representatives are available…"
Topic 2: *Customer Service Access Modalities*	
Customer assistance	"If customers need further assistance…"
Assistance center	"…contact the appropriate Assistance Center…"
Contact dealer	"You should contact your dealer [to arrange a service appointment]…"
Questions call	"…if you have concerns or questions, call…"
Please contact	"…if the concerned dealer cannot resolve, please contact…"
Topic 3: Customer Role and Responsibility	
Requires lessor	"…regulation requires that any vehicle lessor…
Lessor receiving	"…lessor receiving this recall notice...
Must forward	"… [lessor] must forward the recall notice [to the lessee]…
Forward copy	"…forward a copy [of the notice]…
Lessee ten	"…forward a copy of this notice to the lessee within ten days."
Topic 4: Role of Dealer in Customer Service	
Authorized dealer	"…contact your authorized dealer…"
Schedule appointment	"…schedule an appointment with your dealer…"
Repair performed	"…repair will be performed by the dealer…"
Without charge	"…dealer will remedy this condition without charge…"
Reasonable time	"…dealer will repair in reasonable time…"
Topic 5: Regulatory Compliance	
Notice sent	"This notice is sent…"
Sent accordance	"…sent to you in accordance…"
Accordance requirements	"…in accordance with the requirements…"
Requirements act	"…requirements of the Safety Act…"
Administrator safety	"…Administrator, National Highway Traffic Safety Administration…"

Table 5: Regression Estimates ($n = 273$)

DV: Product Recall Effectiveness					
Construct	**Variable Name**	**Hypothesis**	**Coefficient**	**Coefficient Estimate**	***t*-value**
Customer-Focused Recall Campaign	*CustFocus*	H_1	b_1	1.09	2.26**
	*CustFocus * Severity*	H_{2a}	b_2	-.40	-2.15**
	*CustFocus * Media*	H_{2b}	b_3	-.19	-2.51**
Channel Quality	*ChQual*	H_3	b_4	.05	6.26**
	ChQual Scope*	H_4	b_5	.49	3.33**
Recall Severity	*Severity*		b_6	.29	2.12**
Recall Media Coverage	*Media*		b_7	.13	1.95**
Recall Scope	*Scope*		b_8	-1.45	-5.16**
Control Variables					
Unit Sales	*Sales*		b_9	.08	3.83**
Product Quality	*PdtQual*		b_{10}	-.04	-3.16*
Experience	*Exp*		b_{11}	-.00	-.20
	Year		b_{12}	.01	-.36
	InitDays		b_{13}	-.03	-3.43**
	ResCustFocus		b_{14}	-1.10	-2.25**

Note: ** $p < .05$; $F(15,258) = 107.04$; $p = .0000$; all two-tailed tests

Table 6: Simple Slopes of Significant Interactions

	Estimated Impact on Product Recall Effectiveness (Simple Slope)	t-value	*p*-value
Impact of customer-focused recall campaign on product recall effectiveness			
Recall Severity (Low)	1.09	2.26**	.03
Recall Severity (High)	-.10	-.80	.43
Recall Media Coverage (Low)	1.09	2.26**	.03
Recall Media Coverage (High)	.24	1.27	.20
Impact of channel quality on product recall effectiveness			
Recall Scope (Low)	.05	3.75**	.00
Recall Scope (High)	.18	5.98**	.00

Note: ** p < .05

Figure 1: Conceptual Model
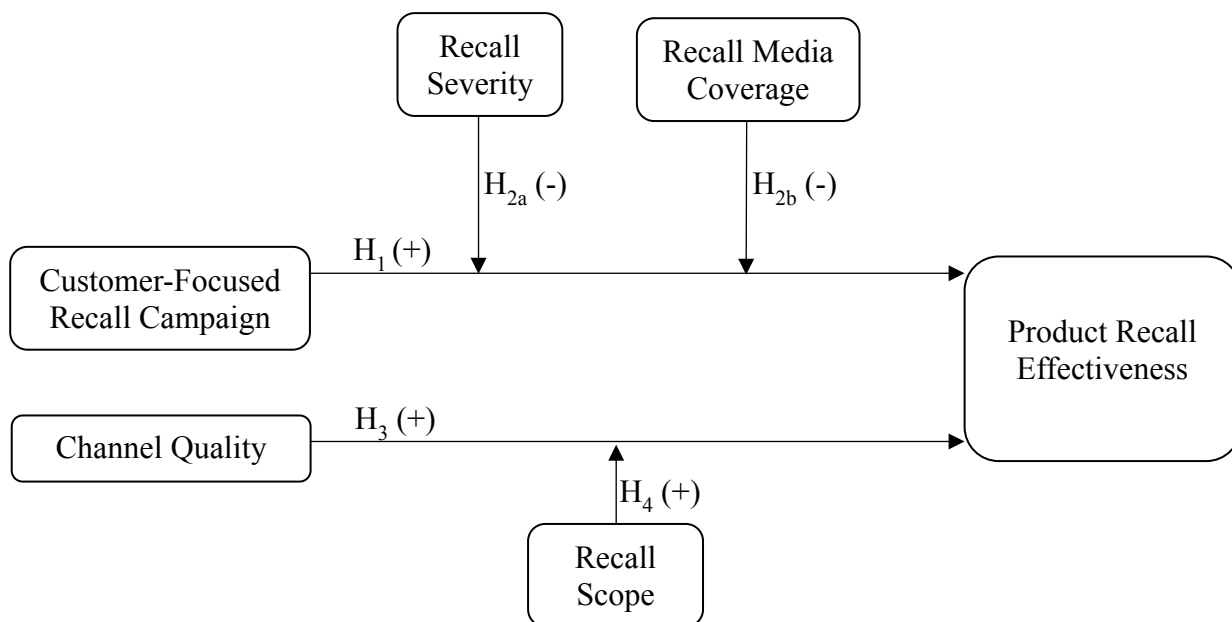
Figure 2

Panel A: Product Recall Effectiveness as a Function of Customer-Focused Recall Campaign and Recall Severity
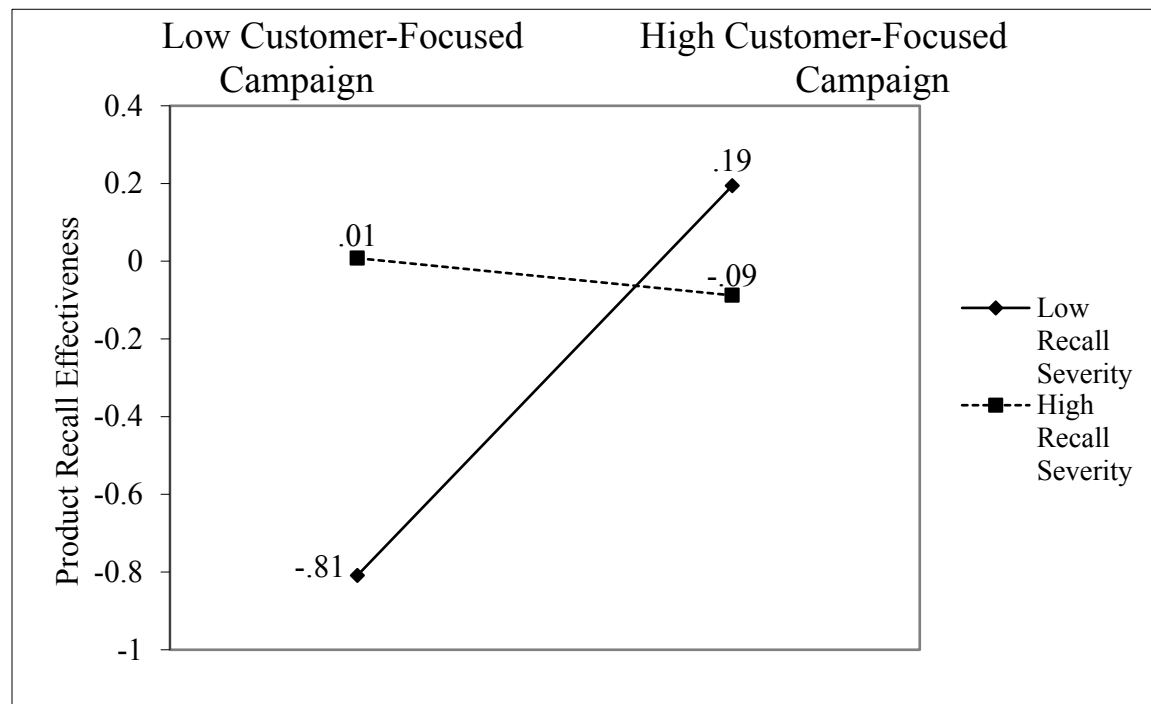
Panel B: Product Recall Effectiveness as a Function of Customer-Focused Recall Campaign and Recall Media Coverage
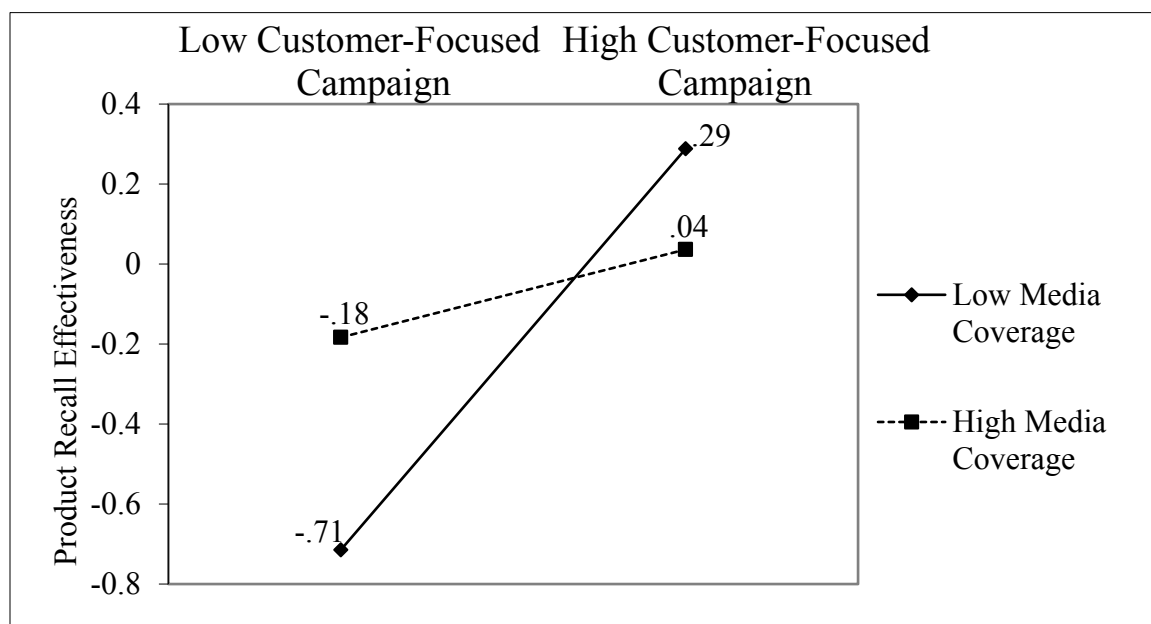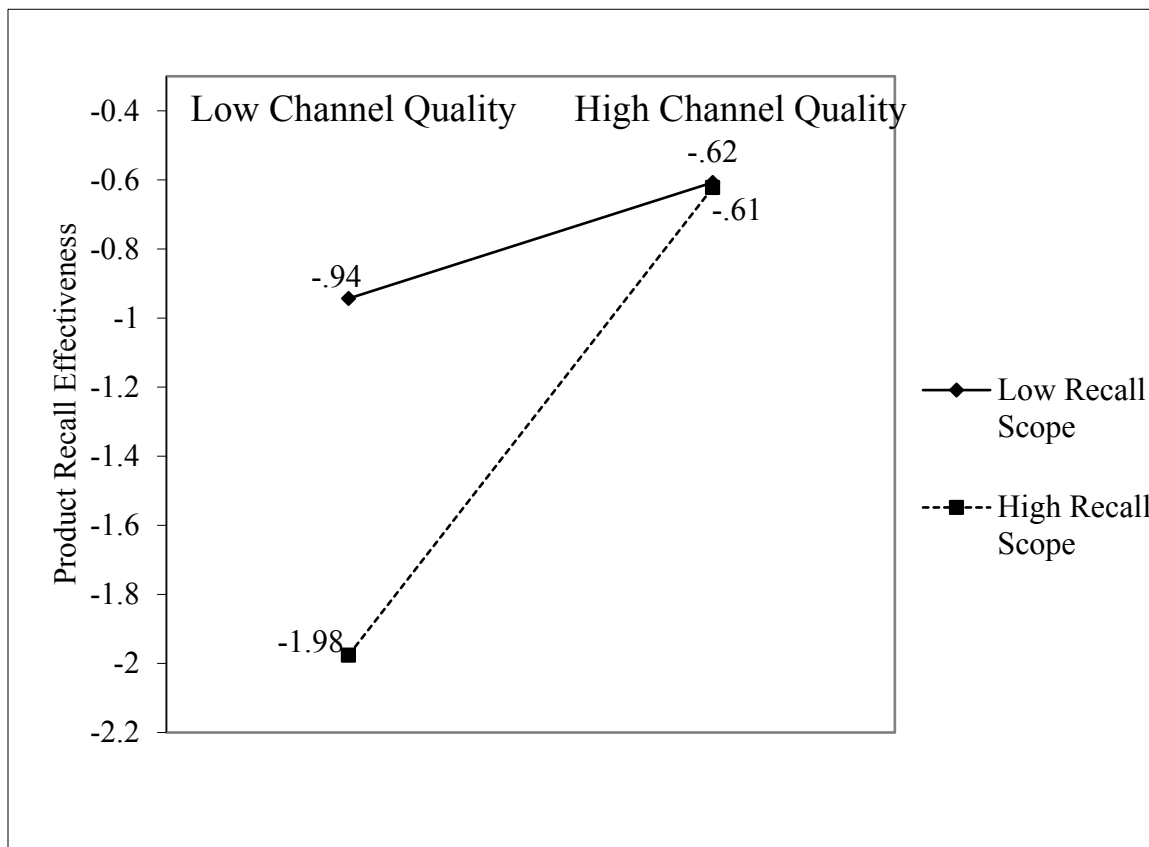
Figure 2

Panel C: Product Recall Effectiveness as a Function of Channel Quality and Recall Scope

Chapter 4

Conclusion

4.1) Discussion

Essay 1 of my thesis seeks to offer an improved understanding of product recall; essay 2 to provide insights regarding its management. Specifically, Essay 1 synthesizes about 200 published and unpublished treatments of product recall across nine disciplines (marketing, management, operations, finance, economics, communications, public relations, law, and accounting). In this essay, I provide a definition of product recall and specify its boundary conditions. In doing so, I am able to identify how the phenomenon of product recall is similar to, yet distinct from, related phenomena such as product withdrawal, product seizure, and product-harm crisis (see Figure 1 of Chapter 2).

Essay 1 also offers a taxonomy of the strategies firms may rely on once they detect a defective product, the determinants of such strategies, and their implications for different stakeholders such as customers, firms, and investors (see Figures 2, 3a, 3b, and 3c of Chapter 2). The taxonomy allows me to classify the literature and its research findings. For example, consumer behavior scholars have considered two dimensions of recalls – product defect and negative publicity – and their implications for consumers and brands (see Figure 3a of Chapter 2). The taxonomy facilitates identification of areas that have been less attended to, and that warrant future research attention. Figure 2 of Chapter 2, for instance, demonstrates that there has been no study to assess how the recall-announcing entity's actions impact other entities such as competing brands or the focal firm's suppliers.

In contrast to Essay 1, Essay 2 is empirical. I hypothesize and empirically test the factors that drive product recall effectiveness – the extent to which the recalled products are remedied. I show that recall effectiveness is positively impacted by customer-focused recall campaigns and channel quality, and that the impact of these factors is contingent on three boundary conditions: recall severity, recall media coverage, and recall scope. The essay also contributes methodologically. While user-generated content reflects consumer behavior, firm-generated content captures firms' strategic and tactical responses to consumer behavior. To the best of my knowledge, this essay is the first to apply machine

learning methods to firm-generated content[21] (Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016). My work thus contributes to the emerging scholarship that applies to firm-generated content (FGC) text mining and machine learning methods that have largely been used with user-generated content (UGC) (Bao and Datta 2014; Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016; Swain and Cao 2014). Consumers are increasingly generating data that firms can use in their study of consumer behavior and in their formulation of strategies in response. The successful execution of such strategies and tactics, however, lies in firm-generated content – as the text in firms' press releases and social media posts, images in firms' advertising and product packaging, voice in customer-firm interactions in the call center operations, and a combination of all these forms of data (text, voice, images, and videos) in earnings calls. Although scholars of consumer behavior have long attended to user-generated content, their counterparts in marketing strategy have only recently started mining firm-generated content to discover firm strategies and tactics, and to assess the performance implications thereof (Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016). By investigating the importance of marketing in helping firms achieve effective product recalls, I highlight how marketing can help guide firms not only in steady state conditions but also during times of adversity.

4.2) Practical Implications

Essay 1

A lack of understanding of the difference between product recall and related phenomena seems to have confused academics, firms, and news media, leading to adverse repercussions. For example, on August 31, 2013, Chobani initiated a withdrawal due to "…quality concerns surrounding certain products, which were experiencing swelling or bloating…" (Chobani 2013). After investigating the cause and attributing the defect to a mold, the firm, on September 5, 2013, "…moved from a voluntary withdrawal to a voluntary recall…" (Chobani 2013; Food and Drug Administration 2013). The firm's "move" led to questioning whether it was originally trying to quietly withdraw the

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[21] Firm-generated content (FGC) refers to firm-initiated communication targeted toward its customers and intended to evince a specific desired behavior from the customers (Goh, Heng, and Lin 2013; Kumar, Bezawada, Rishika, Janakiraman, and Kannan 2016).

product instead of recalling it (Fatemi and Neumann 2015). Per my Essay 1, since the consumer harm (swelling or bloating) was caused by a product defect, Chobani should have called its initial action a recall and not a withdrawal. A correct understanding of the terminology would have helped Chobani ward off negative press coverage (Marler 2013; CBS News 2013) and social media engagement (Gabbatt 2013) and avert harmful litigation (Merman 2013).

The confusion related to nomenclature has impacted the news media as well. For example, per the FDA definition and my Essay 1, Johnson & Johnson's removal of tampered Tylenol capsules in 1982 is a withdrawal and not a recall. However, most media reports (Moore 2012; Rehak and and International Herald Tribune 2002) and academic articles (Lei, Dawar, and Gürhan-Canli 2012; Liu, Liu, and Luo 2016) incorrectly consider Johnson & Johnson's removal of Tylenol a recall. Such incorrect labeling of phenomena can have severe implications. While a firm is legally liable to recall its defective products, its removal of products that have been used in a crime isn't technically the firm's responsibility (Moore 2012). Johnson & Johnson, however, showed business acumen and empathy in withdrawing all Tylenol capsules from the market (Rehak and and International Herald Tribune 2002). By offering a flow diagram that explains what term to use when, Essay 1 attempts to help these stakeholders choose the right term for the phenomenon under consideration.

Essay 1's focus on the substantive importance of formal construct definitions highlights "the problem with labels" (Moorman 2016) when scholars incorrectly perceive that formal conceptual definitions are largely common sense. I hope my work encourages marketing scholars to formally define their constructs before they proceed to discuss them, thereby allowing marketing to win both "the war of influence" and "the war of labels" alike (Moorman 2016). Such "Towers of Babel" are commonly found in multidisciplinary academic literatures that have grown over decades, but await consolidation (Lehmann 2004; Chandy and Prabhu 2010). I thus hope my effort motivates scholars from other disciplines to ensure that when they use new labels, they present their arguments on why existing labels could not have been used to explain their phenomenon of interest.

Essay 1's conceptual framework can serve as a springboard for future research that approaches the topic of product recall in new and interesting ways. For instance, focusing on the pre-recall announcement phase, one could study how firms sift through unstructured customer complaints to decide whether, when, and how to announce a recall. A "during recall" study could investigate whether brands, in the midst of a recall, change the content they share on their social media pages, and how such a change affects followers' engagement. Lastly, casting an organizational learning perspective on the "post recall" phase, scholars can study the conditions that facilitate or hinder firm learning from recalls.

Essay 2

Essay 2 asks and answers the fundamental question of how effective recalls are. An effective recall is a call to action – for customers to promptly return the recalled product, and for intermediaries to effectively and efficiently remedy the product. Although recall-announcing firms are required to undertake recall campaigns to notify the impacted customers about the recall, we have so far lacked a theoretical exposition and an empirical examination of how and under what conditions these recall campaigns serve as effective calls to action. Practitioners (Grocery Manufacturers Association and Deloitte Development 2014; Holloran 2015), government agencies Consumer Product Safety Commission 2003; Government Accountability Office 2011), and consumer safety advocacy groups (Cohen 2014) have taken the lead in proposing how specific aspects of recall campaigns can persuade or dissuade customers from promptly returning the recalled products. For example, practitioners conjecture that campaigns may not necessarily make it "…convenient [for the customers] to get the repairs" (Holloran 2015). A focus group discussion of vehicle owners revealed that customers "…preferred [recall campaigns] with certain elements and may be more likely to comply if the letters included the VIN [vehicle identification] number and clarified the severity of the defect" (Government Accountability Office 2011). Customer safety reformers hope that "…using particularly urgent language in the mailed notice letters will motivate more…" customers (Cohen 2014). Although these conjectures and anecdotes help the conversation, what is

needed is a rigorous empirical examination of whether and when recall campaigns influence customers.

Consistent with the above evidence, in 2008, the U.S. Congress passed the Consumer Product Safety Improvement Act that, among others, includes a section that requires "…recall notices to include certain additional information…" so as to make recalls more effective (Ross 2009). More recently, the Safety Recall Improvement Act 2015 required U.S. regulators to identify factors that help improve recall effectiveness (SafetyResearch.net 2014). Not surprisingly, regulators have been looking for guidance on how the recall campaign content (Australian Competition and Consumer Commission 2010) and channel members (Government Accountability Office 2011) influence effectiveness. Importantly, both the recall campaign and channel management are very much within the control of the firm, the former reflecting a *post-recall* initiative, the latter a *pre-recall* imperative.

By providing empirical support on these two very aspects, Essay 2 helps manufacturers avoid stiff financial penalties for slow and/or ineffective repairs (Vlasic 2015), and to potentially use the recall as a customer touchpoint to demonstrate their commitment toward customer service and safety (Stout Risius Ross 2015). The findings also help regulators ward off criticism for not being able to improve the recall process (Government Accountability Office 2011). As well, regulators can use the evidence to guide recall-announcing manufacturers in terms of the content of their recall campaigns and their channel management efforts. The results from my thesis provide much-needed guidance to academics and practitioners to better understand and manage this highly consequential phenomenon.

4.3) Limitations and Future Research Directions

My thesis can be used and extended by research specific to product recall, as well as by the broader academic research in marketing. I suggest a few promising future directions below.

Organizational Crisis-Informed Research

Each of the two essays of my thesis can be extended in multiple ways. Essay 1 has a phenomenological, rather than a theoretical, orientation. It reviews the product recall literature to suggest strategies that firms can undertake to manage recalls more effectively and efficiently. Given that recall has been conceptualized as an organizational crisis, a useful next step could be to review the literature in crisis management, and apply the findings from this literature to suggest new recall management strategies. An organizational crisis-perspective to recalls can also inform and identify new directions for future research, some of which I now briefly discuss.

Organizational crisis is defined as a low probability, high-impact event that threatens the viability of the organization, and is characterized by ambiguity of cause, effect, and means of resolution as well as by a belief that decisions must be made swiftly (Pearson and Clair 1998). Taking a more focused approach, Grewal, Johnson, and Sarker (2007) define marketing crises as events that alter patterns of demand and stress a firm's ability to interface with its marketing-related constituents, namely, customers and suppliers. A product defect and the associated negative publicity often shape the future demands for not only the product but also the underlying components and services, thus impacting the recall-announcing firm and its upstream partners. Further, firms' response to crisis can be studied from three perspectives: (a) the type of crisis (endogenous vs. exogenous), (b) the audiences or stakeholders to whom the response is targeted (employees, investors, regulators, customers, business partners, and news media), and (b) whether the response is from the crisis-struck firm or its partners and competitors in the industry (Grewal, Johnson, and Sarker 2007). For example, although, a recall-announcing firm may choose when and how to respond to the news media, it may have less leeway in responding to its investors, customers and suppliers. The firm will likely have little flexibility in its response to the regulatory watchdogs. Further, under some conditions (such as when the field's legitimacy is threatened), not only the recall-announcing firm, but also its partners and competitors may choose to respond. Finally, the firm may respond not only at the intra-firm level (change in organizational processes, systems, and routines) but also at the firm-environment interface (such as change in suppliers). In sum, organizational crisis is a rich theoretical lens that can inform future research in the area of product recalls.

Essay 2 is also subject to some limitations. I study two specific drivers of recall effectiveness – marketing communications and marketing channels – and thus, omit multiple potential determinants, such as the presence of a CMO, influence of the marketing department, quality of supplier relationships, and characteristics of the recalled brand. Also, I look at one specific type of marketing communications – that is, recall campaigns – that firms use to contact customers. Firms, however, often reach out to customers directly through emails, text messages, and phone calls, and indirectly through social media posts. Such communication channels become particularly relevant in the context of vehicles where dealers serve as manufacturers' touchpoint with the customers. Possible extensions of Essay 2 can include these different channels of marketing communications, and other determinants of recall effectiveness. Also, I rely on secondary data and thus my constructs likely suffer from measurement error. Future inquiry can supplement my measures with their primary counterparts (e.g., survey data).

Directions for Future Research in Marketing

Beyond product recall-specific research, I propose three areas of future inquiry. First, review and conceptual papers are not only difficult to write but also fraught with high publication risk. My own experience in writing Essay 1 suggests that despite these challenges, writing review papers is an enriching and rewarding exercise. By its very nature, a review requires one to immerse oneself in the phenomenon through multiple readings of both published and unpublished manuscripts across several disciplines. The importance of field interviews cannot be underestimated either. These interviews provide access to practitioners, allowing development of longer-term, mutually gratifying academic-practitioner relationships. The knowledge thus acquired can be further sharpened by reading practitioner publications, media reports, and regulatory handbooks, and staying abreast of how the phenomenon is unfolding in the real world. Importantly, when these steps are repeated multiple times over the entire course of one's thesis, the accumulated knowledge ripens over time. One is able to question one's prior understanding and identify one's assumptions, thus revealing new ways of thinking, and new questions of relevance and importance (Palmatier, Houston, and Hulland 2017). At the end, one can potentially become a subject-matter expert. This expertise can be applied

by commenting on the phenomenon as it manifests in the real world and attending practitioner conferences on the topic. One can also showcase leadership by organizing special sessions in academic conferences.

Second, with a few notable exceptions (Grewal, Johnson, and Sarker 2007; Grewal and Tansuhaj 2001), the focus of academic research in marketing has been exclusively on its role in steady-state conditions. My thesis seeks to extend the "boundaries of marketing" (Kumar, Keller, and Lemon 2016) by examining how marketing can help firms manage product recalls. Although my thesis focusses on only marketing communications and marketing channels as drivers of product recall management, future research can take a broader perspective by studying how other marketing capabilities and assets can help firms manage product recall. For example, taking a dynamic view of firm capabilities, one can examine how firms' product development capability (Krasnikov and Jayachandran 2008) and pricing capability (Vorhies and Morgan 2005) evolve in the aftermath of product failures. Similarly, one can assess whether firm reputation and product reputation act as assets or liabilities in firms' recovery from product recall. Lastly, a relevant future investigation could ask whether firms that have a more influential marketing department (e.g., employ a chief marketing officer) achieve more effective recalls.

Product recalls are rich in context, international in scope, interesting to academics across multiple disciplines, and relevant to practitioners, public policy makers, and to society at large. This multi-stakeholder view of the phenomenon cautions against a singular focus on *the firm* and places marketing at the center of *the society* (Bharadwaj 2015, emphasis added). Multiple academics have argued that marketing is losing its influence within the firm (Bartels 1977; Homburg, Vomberg, Enke, and Grimm 2015). A broader, multi-stakeholder view of marketing suggests that marketing can have a stronger influence not just within firms but also in society (Bloom and Gundlach 2001). Although marketing academics have contributed to policy evaluation (Moorman, Ferraro, and Huber 2012), entrepreneurship (Anderson, Chandy, and Zia 2018), and subsistence marketplaces (Viswanathan, Rosa, and Ruth 2010), such efforts have been few and far

between. I hope my thesis helps raise marketing's aspirations in terms of contributing to a better world (Sheth and Sisodia 2007).

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Sheth, Jagdish N., and Rajendra S. Sisodia (2007), "Raising Marketing's Aspirations," *Journal of Public Policy & Marketing*, 26 (1), 141-143.

Curriculum Vitae

Vivek Astvansh ►

RESEARCH INTERESTS

How does marketing help firms recover from adversity? That is the central question I seek to answer through my conceptual and empirical research.

Substantive (Phenomena): product recall, data breaches, customer complaints, bankruptcy, and crowd funding.

Theoretical: information economics, failure and learning, strategic disclosure, and interfirm marketing relationships.

Methodological: linguistics, text mining, machine learning, sequence analysis, econometrics.

Empirical context: medical devices, consumer finance, consumer durables, vehicles, and food.

EDUCATION

2014-present   Ph.D. in Business Administration (anticipated completion November, 2018), Ivey Business School, Western University, London, Ontario, Canada

2012-2014   M.S. in Business
Wisconsin School of Business, University of Wisconsin-Madison, USA

2009-2011   MBA
Indian Institute of Management Lucknow, NOIDA, India

1996-2000   Bachelor of Technology in Compvuter Engineering
Aligarh Muslim University, Aligarh, India

ACADEMIC POSITIONS

2018-present   Assistant Professor of Marketing,
Kelley School of Business, Indiana University Bloomington

2018-present   Adjunct Research Professor,
Ivey International Centre for Health Innovation,
Ivey Business School, Western University

| 2018 | Visiting Research Scholar |
| | Fuqua School of Business, Duke University, Durham, NC |

INDUSTRY POSITIONS

2011-2012	Senior Manager, ESQ Management Solutions, India
2010-2011	Manager, Sapient Corporation, India
2007-2010	Member of Consulting Staff, Cadence Design Systems, India
2006-2007	Executive, Barclays Capital Global Services, Singapore
2003-2006	Senior Member of Technical Staff, Cadence Design Systems, India
2000-2003	Senior Software Engineer, Hughes Software Systems, India

DISSERTATION

Title: *Toward a Better Understanding and Management of Product Recall*
Committee: Kersi D. Antia (chair), Xin (Shane) Wang, Kenneth H. Wathne, and Sudha Mani

MANUSCRIPTS UNDER REVIEW

Mani, Sudha, Vivek Astvansh, and Kersi D. Antia, "Buyer-Supplier Interactions and Buyers' Emergence from Bankruptcy," under second-round review at *Journal of Marketing Research.*

Astvansh, Vivek, Kersi D. Antia, and Gerard J. Tellis, "Product Recall: Research Synthesis and New Directions," in preparation for second round submission to *Journal of Marketing* (first of the two essays of my dissertation).

Astvansh, Vivek, Kersi D. Antia, and Xin (Shane) Wang, "The Role of Customer-Focused Recall Campaigns and Channel Quality on Product Recall Effectiveness," being revised for resubmission to *Journal of Marketing* (second of the two essays of my dissertation).

Manary, Matthew P., Christine Moorman, Vivek Astvansh, "Learning that Pays: Stealth Strategies for Alliance-to-Acquisition," being revised for resubmission to *Marketing Science*.

AWARDS AND HONORS

| 2018 | Fellow, Marketing Strategy Consortium, University of Missouri. |

2018	Ivey International Center for Health Innovation research grant; Cdn 15,000; January 2018.
2017	Vice Admiral D A (Alan) Collins Research Grant; Cdn 1,500; fall 2017.
2017	Al Mikalachki PhD Research Grant; Cdn 1,500; fall 2017.
2017	Dr. Alvin J. Silk Graduate Scholarship; Cdn 9,600; fall 2017.
2017	Ivey International Center for Health Innovation research grant; Cdn 2,000; April 2017.
2016	Awardee, Al Mikalachki PhD Research Grant; Cdn 1,500; fall 2016.
2016	Fellow of: ISMS Doctoral Symposium and ISBM PhD Student Camp.
2016	Best Poster Award, "Rising from the Ashes: Buyer-Supplier Conflict Evolution and Its Effects Bankruptcy Outcomes," with Sudha Mani and Kersi D. Antia. Empirical and Theoretical (ET) (Canadian Marketing Strategy) Symposium, Lake Louise, Alberta, Canada. May 19, 2016.
2016	Mathematics of Information Technology and Complex Systems (MITACS) Accelerate research award; Cdn $39,000.
2015	Nominee, Trudeau Foundation Scholarship.
2014-2015	MITACS Accelerate research award; Cdn $30,000.
2014-2018	Plan for Excellence Doctoral Fellowship from the Ivey Business School, Western University; Cdn $38,286 per academic year.
2014	Wisconsin School of Business Marketing Department Scholarship, University of Wisconsin-Madison; U.S. $6,000 for the period from May 2013 to Aug 2013, and U.S. $3,000 for the period from May 2014 to Aug 2014.

CONFERENCE PARTICIPATION (*denotes presenter)

Astvansh, Vivek*, Abhishek Borah, and Christine Moorman, "Customer Complaints and Firm Response Strategies," poster at the *Lazaridis Marketing Symposium*, Waterloo, ON, Canada, May 4, 2018.

Astvansh, Vivek*, Kersi D. Antia, and Gerard J. Tellis (2018), "Product Recall: Research Synthesis and New Directions," presentation in a self-organized special session titled "Product Recall Strategies: Toward A Theoretical Base and Empirical Evidence" at the American Marketing Association's (AMA's) *2018 Winter Marketing Academic Conference*, New Orleans, LA, February 18, 2017.

Astvansh, Vivek*, and Kersi D. Antia, and Xin (Shane) Wang (2017), "The Role of Customer- Focused Recall Campaign and Channel Quality in Product Recall Effectiveness," presentation at the *NYU-Temple Conference on Digital, Mobile, and Social Media Analytics*, New York, NY, December 9, 2017.

Astvansh, Vivek, Sudha Mani*, and Kersi D. Antia (2016), "Buyer-Supplier Interactions During Bankruptcy," presentation at the Australia and New Zealand Marketing Academy Conference (ANZMAC), Melbourne, VIC, Australia, December 5, 2017.

Astvansh, Vivek*, and Kersi D. Antia, and Xin (Shane) Wang (2017), "The Role of Customer- Focused Recall Campaign and Channel Quality in Product Recall Effectiveness," presentation at the *39th ISMS Marketing Science Conference*, Los Angeles, CA, June 9, 2017.

Astvansh, Vivek, and Kersi D. Antia*, and Xin (Shane) Wang (2017), "The Role of Customer- Focused Recall Campaign and Channel Quality in Product Recall Effectiveness," presentation at the *Empirical and Theoretical (ET) (Canadian Marketing Strategy) Symposium*, Montreal, Québec, Canada, May 26, 2017.

Astvansh, Vivek*, and Kersi D. Antia, and Xin (Shane) Wang (2017), "The Role of Customer- Focused Recall Campaign and Channel Quality in Product Recall Effectiveness," invited presentation in a special session titled "From Footsteps to Footprints: The Growing Value of Business-to-Business (B2B) Relationships in Firm Performance" at the *European Marketing Academy (EMAC) Conference*, Groningen, Netherlands, May 24, 2017.

Astvansh, Vivek*, Kersi D. Antia, and Xin (Shane) Wang (2017), "Recalled but Not Remedied: The Role of Customer Orientation and Channel Capabilities on Product Recall Efficacy," poster at the *2017 Lazaridis Marketing Symposium*, Waterloo, Ontario, Canada, April 7, 2017.

Astvansh, Vivek*, Kersi D. Antia, and Xin (Shane) Wang (2017), "Recalled but Not Remedied: The Role of Customer Orientation and Channel Capabilities on Product Recall Efficacy," presentation in a self-organized special session titled "Firms' Marketing Capabilities and their Recovery from Crises" at the American Marketing Association's (AMA's) *2017 Winter Marketing Academic Conference*, Orlando, FL, February 18, 2017.

Astvansh, Vivek*, Sudha Mani, and Kersi D. Antia (2016), "Rising from the Ashes: Buyer-Supplier Evolution Conflict and Its Effects on Bankruptcy Recovery," poster at the *Empirical and Theoretical (ET) (Canadian Marketing Strategy) Symposium*, Lake Louise, AB, May 19, 2016.

Astvansh, Vivek*, and Kersi D. Antia (2016), "Communicating How Much, With Whom, and When: A Triadic Perspective on Product Recall Efficacy," presentation in a

self-organized special session at the *ISBM Academic Conference 2016*, Atlanta, GA, August 4, 2016.

Astvansh, Vivek*, Sudha Mani, and Kersi D. Antia (2016), "Buyer-Supplier Interactions and Buyers' Emergence from Bankruptcy," presentation in a self-organized special session titled "Making Sense of the Problem of Plenty: Understanding the Individual and Joint Effects of Multiple Marketing Levers over Time" at the *ISBM Academic Conference 2016*, Atlanta, GA, August 3, 2016.

Astvansh, Vivek*, Kersi D. Antia, and Xin (Shane) Wang (2016), "Communicating How Much, With Whom, and When: A Triadic Perspective on Product Recall Efficacy," presentation at the *ISMS 2016 Marketing Science Conference*, Shanghai, China, June 16, 2016.

Astvansh, Vivek*, Sudha Mani, and Kersi D. Antia (2016), "Rising from the Ashes: Firms' Supplier Relationships and their Recovery from Bankruptcy," presentation in a self-organized special session titled "Firms' Marketing Capabilities and their Recovery from Crises" at the American Marketing Association's (AMA's) *2016 Winter Marketing Academic Conference*, Las Vegas, NV, February 26, 2016.

Astvansh, Vivek*, Sudha Mani, and Kersi D. Antia (2015), "Rising from the Ashes: Effects of Firms Supplier Relationships on their Recovery from Bankruptcy," presentation at *Interdisciplinary Graduate Student Conference,* London, ON, May 22, 2015.

TEACHING

Teaching Interests

Marketing Analytics   Social Media Marketing

Digital marketing   Marketing Metrics

Teaching Experience and Certification

Instructor, King's University College, Western University, winter 2016. Course: Introductory Marketing (undergraduate-level, third-year mandatory course; 41 students). Instructor rating: 5.4 out of 7.

Instructor, Wisconsin School of Business, University of Wisconsin-Madison, summer 2014. Course: Marketing Research (undergraduate-level, elective; 10 students). Instructor rating = 3.92 on a scale of 5.

Instructor, Indus World School of Business, fall 2011. Course: Services Marketing and Sales Management (second-year MBA, elective; 40 students). Instructor rating = not available.

Graduate Certificate in Research, Teaching, and Learning ▶
Center for Integrating Research, Teaching, and Learning, U Wisconsin-Madison ▶
<u>Research Internship Title</u>: *Effect of Blended Muddiest Point on Students' Learning*
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Teaching Cases

Antia, Kersi D., and Vivek Astvansh (2016), "Medtronic Plc: Combating the Grey Market," Ivey Publishing, Product Number 9B16A003.

Wang, Baoheng, Kersi D. Antia, and Vivek Astvansh (2017), "Zheng Shan Tea Company: Growing the Home Market," Ivey Publishing, Product Number 9B16A013.

INVITED RESEARCH PRESENTATIONS

Bocconi University, November 2017
University of Arkansas, October 2017
University of Guelph, October 2017
Singapore Management University, September 2017
Indian School of Business, Hyderabad, September 2017
Indian Institute of Management, Ahmedabad, September 2017
Georgia Institute of Technology, September 2017
Wilfrid Laurier University, September 2017
Iowa State University, September 2017
Indiana University, September 2017
University of Missouri-Columbia, August 2017
San Diego State University, August 2017
University of Warwick, July 2017