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ABSTRACT

Purpose: To understand why firms expedite or delay product recall decisions involving international sourcing.

Design/Methodology/Approach: Combines U.S. toy recall data from the Consumer Products Safety Commission database for the period 1988-2011 with World Economic Forum data on institutional environments to predict the effect the host country conditions have on recall timing decisions.

Findings: Firms tend to expedite decisions to recall defective products sourced from countries where the informal institutional profile is perceived to be unfavorable for quality manufacture.

Research limitations and implications: The reported research is empirical in nature and uses pooled cross-country, single-industry data.

Practical implications: Managers should be careful not to allow their biases to affect their product recall timing decisions.

Originality/value: Whereas previous research has examined recall timing decisions, this study is the first to consider the institutional environment where products are sourced from as an explanatory variable.

Keywords: Product Recalls, Time to Recall, Institutional Unfavourability, Attribution.

Paper type: Empirical

1. Introduction

Product recalls, and especially those of globally sourced products, have become a cause of concern for many stakeholders, including firms, regulators, investors, and consumers (Cheah *et al.*, 2007; Luo, 2008; Lyles *et al.*, 2008; Bapuji and Beamish, 2008; Beamish and Bapuji, 2008; Bapuji, 2011). The U.S. Consumer Product Safety Commission (CPSC) estimates that, in the U.S. alone, an average of approximately 32,000 deaths and 35 million injuries occur each year due to defective or dangerous consumer products. It is also estimated that the deaths, injuries, and damage to property arising from such defective products cost the U.S. economy more than \$900 billion annually (CPSC, 2012). Firms recalling defective products incur huge direct costs related to restitution, reverse logistics and litigation (Hoffer *et al.*, 1988; Bromiley and Marcus, 1989; Dawar and Pillutla, 2000; Tang, 2008; Hora *et al.*, 2011). Firms also experience indirect costs, such as loss of future revenues, brand erosion, and deterioration of shareholder wealth (Jarrel and Peltzman, 1985; Davidson and Worrel, 1992; Smith *et al.*, 1996; Chen *et al.*, 2009). Therefore, in product harm crises situations, whether or not to recall a defective product represents a highly important decision facing firms.

Research on product recalls has focused largely on the consequences of recalls to firms (Beamish and Bapuji, 2008). Recently, however, researchers began to consider the time taken by firms to recall a defective product from the market (Roth *et al.*, 2008; Trottman and Mitchell, 2010; Hora *et al.*, 2011). Firms differ in the time taken to recall defective products. Johnson and Johnson's quick recall of the Tylenol brand from the market (Dawar, 1998) versus Firestone's belated recall of tires provide specific examples of this dichotomy. Delays in recalling products from the market have also constituted causes of concern for various regulatory bodies, and such

delays have become a matter of government scrutiny, as observed in the 2010 Toyota recall case (Trottman and Mitchell, 2010; Hora *et al.*, 2011).

This crucial decision concerning the timing of recalls imposes significant consequences on the firm's reputation and on its financial performance. Firms find themselves in time-sensitive decision-making situations, where they need to either initiate an immediate product recall or continue with business as usual, possibly having to recall the product at a later date. The key research question is: What factors prompt firms to expedite or delay recalling defective products from the market. Hora *et al.* (2011) have shown that organizational characteristics, such as design defects, proactive recall strategy, and position of the firm in the supply chain (i.e., distance from the customer), may serve to delay product recalls or in other words may increase the time to recall defective products from the market. Similarly Andrews *et al.* (2011) suggest that self-serving biases among crisis decision makers could be responsible for their responses during crisis situations. In extending the research of Hora *et al.* (2011) and building upon the suggestion by Andrews *et al.* (2011), we examine how recall timing also depends on the institutional environment of the host country from which products are sourced.

To build on arguments that predict time-to-recall decisions, we draw various insights from prior research on country of origin and attribution theory. In contrast with earlier research, the focus here is not on the *consequences of recalls* for firms but rather on the *management of recalls* in international sourcing. Our central arguments are that (1) firms try to avoid making decisions that signal their responsibility for crises, since doing so can lead to negative reactions from shareholders, and (2) the time taken to recall depends on the extent to which a given firm's management team is willing to accept responsibility for product recalls. We argue that firms may expedite recalls when they can pass on the responsibility for the crisis to the institutional

environment or to an external agent. In particular, firms may expedite recalls if they claim that responsibility lies with a foreign supplier.

We find support for our hypothesis in a sample of toy recalls coded from CPSC recall notices, combined with World Economic Forum (WEF) measures of institutional quality. The results indicate that firms expedite recalls of products sourced from countries with weaker institutional quality relating to product manufacture.

The remainder of this paper is organized as follows. First, we examine product recalls as organizational crisis events and discuss time to recall as an important component of crisis management. Second, using insights from extant research on attribution theory and country of origin we develop our hypothesis. Third, we introduce our methodology and describe the variables of interest to the study. Fourth, we present our results and interpret them. Finally, we discuss the implications of our study in terms of its contribution to product recalls literature, crisis management, and overall relevance to international business.

2. Product recalls and time to recall

Crisis scholars have classified product recalls, which represent the outcomes of health and safety incidents caused by defective products entering the market, as important organizational crises (Shrivastava *et al.*, 1988; Pearson and Claire, 1998). Product recalls undermine consumer confidence in a firm and its products (Dawar and Pillutla, 2000; Rupp, 2004), and have also been found to negatively affect investor perceptions (Jarrel and Peltzman, 1985; Davidson and Worrel, 1992). Extant literature asserts that firms can manage their stakeholder perceptions and thereby defend their reputations in a variety of ways, such as: appropriately timing recalls (Mowen *et al.*, 1981; Siomkos, 1989); strategically handling recall communications (Gibson, 1995; Siomkos,

1999; Coombs, 2007); and offering appropriate restitutions to customers (Davidson and Worrel, 1992).

Crisis management initiatives are efforts that managers undertake to avoid crises and to effectively manage the negative consequences of crises after they have occurred. Such initiatives therefore entail managerial responses aimed at recovery (Pearson and Claire, 1998). Although time to recall is one of the tools firms can use to manage stakeholder perceptions, research in this area has been limited to understanding a few of its consequences and antecedents. For example, Mowen *et al.* (1981) demonstrated that quicker recalls had a positive effect on consumer perceptions. Similarly, Teratanavat *et al.* (2005) showed that smaller firms are quicker at issuing recalls than are larger firms. More recently, Hora *et al.* (2011) examine the ways in which organizational characteristics influence the timing of recalls by firms.

In terms of defending the reputation of the firm, it is not clear whether issuing a recall early in the process or late in the process represents the better course of action (Smith *et al.*, 1996). On the one hand, a delayed recall can aggravate problems arising from a defective or dangerous product and can increase the number of customers affected in the future. Failing to act swiftly may also be viewed negatively by customers and other stakeholders and can also lead to fines by regulators. On the other hand, issuing a recall hastily may mean that action is taken before the facts are fully known, with a significant potential downside to shareholders. If the recall is issued without cause, then recall costs may be incurred unnecessarily. Further, a hasty recall may also imply that the problem was internal to firm operations and known to managers. Accordingly, a quicker recall is perceived to be an admission of firm error and, hence, increases the potential for litigation consequences (Smith *et al.*, 1996; Hora *et al.*, 2011). A manager's tendency to withhold unpleasant news (such as product recalls) stems from the agency problem

where managerial preferences are not aligned with those of shareholders and they withhold such information until it becomes inevitable (Kothari *et al.*, 2009).

In summary, product recalls can result in many negative consequences for firms, especially in terms of their potential for reputational damage and erosion of shareholder wealth. Timing of a recall is therefore a tricky decision for firms. While issuing a hasty recall may signal admission of firm error, delaying a recall can aggravate problems arising from a dangerous product and can increase the number of customers affected.

2.1 Attribution and time to recall

According to attribution theory, managers tend to take credit for successes, but blame external factors for their failures (Shaver, 1975; Pearse II and DeNisi, 1983). Extant research has shown that self-serving attributions have been repeatedly documented in corporate annual reports and letters to shareholders (Staw *et al.*, 1983; Clapham and Schwenk, 1991). Wagner and Gooding (1997) found that, on the one hand, managers attribute positive outcomes of their own organizations to internal organizational strengths, while on the other hand, managers attribute negative outcomes of their own organizations to external environmental factors. Similarly, Salancik and Meindl (1984, p.351) have found that managements were three times more likely to acclaim their contributions to the firm's good fortune than they were to make any other causal statement. And they were three times more likely to fault the environment for setbacks than they were to take responsibility for them.

We, therefore, argue that managers will be more likely to blame recalls on environmental circumstances, likely doing so in an attempt to escape blame because of the increasingly litigious business environments faced by firms (especially those operating in the U.S.). Litigation can be very costly for firms, and it can lead to huge financial losses, even for financially viable

companies (Barney *et al.*, 1992). For example, in January 2008, RC2, a leading toy manufacturer, settled out of court, agreeing to pay \$30 million in compensation to customers who had purchased lead-tainted toys. Firms are highly motivated to avoid blame for safety issues and therefore try not to admit any legal liability through consumer product recall [notices] (Gibson, 1995, p.236). For instance, in Gioia's insider account of the climate at Ford during the infamous Pinto fires case, he recalls that "problem" was a word whose public use was forbidden by the legal office at the time, even in service bulletins, because it suggested corporate admission of culpability (Gioia, 1992, p. 381). Andrews *et al.* (2011) show that Toyota blamed user error, or blamed it on insufficient testing by suppliers and improper floor mats for their massive recalls in the years 2009 and 2010.

If the problem leading to the recall occurred within the firm's boundaries, then it becomes more difficult to find a scapegoat who could bear the blame for the managers; although Boeker (1992) found that powerful top managers often use their subordinates as scapegoats in order to avoid termination by the board of directors. Product recall situations are tricky because they evolve over a long time and involve many parties, making it difficult to find a scapegoat. However, foreign suppliers may be easy targets for managers to attribute blame in such situations. For example, in 2007, Mattel recalled nearly 20 million toys for loose magnets (a design flaw attributable to Mattel's internal operations) and excess lead paint on toys (a manufacturing flaw attributable to Mattel's foreign suppliers). Of the recalled toys, 90% were for loose magnets and 10 % were for excess lead paint. However, in explaining the recalls, Mattel's executives attempted to avoid taking responsibility for toy recalls by blaming the company's Chinese suppliers, publicly and repeatedly stating that "we wouldn't have faced this problem if our suppliers followed the rules" (Bapuji and Beamish, 2007). Although Mattel's internal

operations were responsible for 90% of the recalled toys, Mattel executives attempt to shift stakeholder attention to Chinese manufacturing problems, which were behind the recall of only 10% of the 20 million toys. This is a clear example of “scapegoating” a weaker partner (Bapuji and Beamish, 2007). Mattel was not alone in blaming the Chinese suppliers; several companies and stakeholders assigned blame to Chinese suppliers during the same period (Chen, 2007). These examples clearly show that firms attempt to make use of the unique conditions of foreign supplier context to their advantage in crisis situations. Our attempt here is to examine the extent to which perceptions of foreign country supplier context from which firms source products influence time to recall decisions.

3. Hypothesis development

Recall timing decisions are tricky because they signal the extent of responsibility that the firm is taking for the product harm crisis (Smith *et al.*, 1996; Hora *et al.*, 2011). Our central premise is that firms try to mitigate the direct and indirect costs of recalls by attributing blame to external agents, such as foreign suppliers. Using this central argument from the previous section, we develop our hypothesis to understand how the country profile of the host country from which firms source products may influence recall timing decisions.

3.1 Institutional profiles of source countries and time to recall

Firms are embedded in broader institutional environments, and the institutions within these environments influence them to conform to practices, policies, and structures that are consistent with institutional preferences (Meyer and Rowan, 1977). The concept of institutional environment and its effects on various phenomena are well known in international business literature in terms of the costs that multinational enterprises (MNEs) incur in doing business or conducting transactions abroad. Institutional profile of the host country has been used as an explanatory tool for understanding: the

international entry strategies of multinationals and expatriate strategies (Xu *et al.*, 2004); liability of foreignness and ownership strategies (Eden and Miller, 2004); international diversity-performance relationship (Chao and Kumar, 2010); and cross-border acquisition performance (Dikova *et al.*, 2010). We have extended the above research to reveal the effect of host country institutional profiles on products recalls in international sourcing. Understanding the influence of these institutions on international sourcing will therefore require detailed analysis of the environmental contexts from which firms source products and, in our study, how those contexts influence the particular issue of the quality of the products sourced.

Since the phenomenon examined here is that of product recalls, the issue in this study is that of quality management. Examining institutional profile dimensions for a specific issue (i.e., quality management, in our study) is in line with previous research that suggests that the elements of regulatory, normative, and cognitive dimensions, such as laws and regulations, cultural norms, and cognitive structures, are issue-specific (Rosenzweig and Singh, 1992; Walsh, 1995). Favorable institutional profiles are those that contribute in a positive manner to the adoption of quality management practices through regulations, laws, and rules supporting the practice; that have social norms that enforce the quality related practices; and that have common schemas or cognitive structures that help people to understand and interpret quality production practices (Kostova and Roth, 2002).

In the case of international sourcing, these institutions, we argue, may lead to cognitive biases against such countries when such environments do not support quality consciousness among manufacturers. Studies have suggested that country of origin operates as an extrinsic cue in the context of product quality evaluations (Johansson *et al.*, 1985; Darling and Arnold, 1988; Han and Terpstra, 1988; Thorelli *et al.*, 1989; Hastak and Hong, 1991; Wall *et al.*, 1991; Chao, 1993; Tse and

Gorn, 1993). The results of these studies show that consumers' perceptions of country of origin affect their evaluations of product quality. Specifically, country of manufacture has been found to have a stereotyping effect in the context of product evaluations (Maheswaran, 1994; Hadjimarcou and Hu, 1999). A country-stereotyping effect is any influence or bias resulting from country of origin (Samiee, 1994, p. 583). Samiee (1994) suggests that this stereotyping effect originates from the experience with a product from the country in question, personal experience in the country through study and travel, knowledge regarding the country, among other factors.

We extend this stereotyping argument to organizational crisis decision-making in recall crisis situations. Managers form country stereotypes or biases based on their perceptions of a given country's institutions. They tend to attach great weight to information that supports their stereotypes or biases and discount facts that call such biases to question (Andrews *et al.*, 2011). We argue that, with respect to quality production, such cognitive biases that managers have towards countries that have unfavorable environments would form the basis of external locus blame attribution in the event of a product-harm crisis situation. This argument is bolstered by Blount and Janick, (2001), who used attribution theory to explain that managers making unexpected changes to work schedules are perceived more positively when they are able to attribute the cause to the organizational environment (e.g., actors in another country). It might also be easier for managers to recognize error which lead to product defects if they have no direct role to play in production operations, such as in the case of international sourcing, leading them to do so earlier. Country stereotypes influence assumptions that such errors will likely occur in external host country environments, which lack norms for quality control, have low focus on quality manufacturing, where technology is not well developed and production processes are not sophisticated enough for quality production, and where consumers do

not have appropriate forums through which to complain to firms that let faulty products enter the market. Hence we would expect firms to recall products from such countries quickly. More formally:

Hypothesis: The more unfavorable the institutional profile of a supplying country with regard to manufacturing quality, the shorter will be the time to recall.

4. Methodology

4.1 Study setting, sample, and data

The U.S. toy industry represents an ideal context for this time-to-recall study because of the prevalence of international sourcing from global supply chains. The sample includes all firms that issued at least one voluntary product recall in cooperation with the CPSC between 1988 and mid-2011. During the period of study, about 350 firms issued toy recalls in cooperation with the CPSC. These firms include producers, distributors, and retailers, and the recalls covered approximately 105 million toy units, an average of about 0.15 million units per recall or 0.25 million units per firm. Some firms operated during the entire study period, while others entered or exited. Further we considered only recalls of products that were imported into the U.S. The CPSC recall notices contain the following information: 1) recall date, 2) name of the product, 3) the quantity recalled, 4) name of the recalling company, 5) whether the recalling company is a toy company, a retailer, or a distributor, 6) hazard description, 7) the number of incidents reported and injuries if any, 8) type of the hazard, and 9) manufacturing country (Hora *et al.*, 2011).

Our initial dataset compiled from the CPSC website contained 1050 recall notices for the years from 1988 to mid-2011. The recall notices prior to 1988 did not contain many of the details that were required to create the variables desired for this study. The number of recalls per year is shown in Figure 1. We had to exclude some of the notices for which the following data were

missing: 1) date of sale (required to calculate time to recall), 2) remedy data, 3) country of manufacture, and 4) details on the hazard. We also excluded notices that did not contain data on some of the control variables. The final sample contained 679 usable recall notices; there were 31 countries from which firms had sourced toys. The list of countries and the number of recalls from each country is shown in table 1.

-----Please insert Figure 1 and Table 1 about here-----

4.2 Operationalization of Variables

The list of variables used and their source is shown in Table 2.

(1) *Dependent Variable*: The dependent variable for the hypothesis is “time to recall,” which was operationalized as the number of days that elapse from the time a product was first sold to the date it was subsequently recalled. This definition, however, does not capture the actual recall processes in terms of when the product defect was first noticed. Data on when the product defect was first noticed by the firm was not available in the recall notices that are used in this study. In view of the unavailability of such data, we adopted the methodology followed by Hora *et al.* (2011) in order to calculate the time to recall, where information on the date of sale and date recalled is used from the CPSC’s recall notices. Typically, fewer days before the recall indicate that a firm has quickly identified the problem and has promptly taken action to remedy it. Conversely, a greater number of days before the recall indicate that a firm has failed to identify the problem quickly or has delayed the recall announcement. The average time to recall was 665 days. In order to eliminate the skewness of the number of days we used a natural log transformation of the number of days in our analysis.

(2) *Independent Variable*: In order to measure institutional unfavorability we identified five items from the *Global Competitiveness Report*, published by the World Economic Forum, that

relate to the institutional environment that directly and/or indirectly support quality consciousness and quality production among the manufacturers (Kostova and Roth, 2002). The items considered were: *How well do companies in your country treat customers?*; *To what extent are the latest technologies available in your country?*; *How would you assess the quality of local suppliers in your country?*; *In your country, how sophisticated are production processes?*; and *How would you assess the quality of scientific research institutions in your country?* Exploratory Factor Analysis confirmed a one factor solution for this measure. Cronbach's α was 0.957. In the exploratory analysis we used the principal components method for factor extraction, with a varimax rotation. This measure was then reverse-coded to arrive at the *institutional unfavorability measure*. Further, confirmatory factor analysis (CFA) was performed to verify how well the items represent the construct (Hair *et al.*, 2010). Table 3 lists the items in detail (along with the scale used) and details the results of CFA including factor loadings, average variance extracted (AVE), construct reliability as well as mean and standard deviations of all the five items.

Overall Fit- The overall model χ^2 is 460, $p < 0.001$. The comparative fit index (CFI) is 0.922 and Tucker Lewis Index (TLI) is 0.843.

Convergent Validity- As it can be observed in Table 3, the factor loading estimates of our measurement model for our construct are highly significant. The lowest loading obtained is 0.78. AVE estimated is 0.87. Construct reliability is 0.97 (exceeds 0.60), suggesting adequate reliability. Country wise institutional unfavorability scores have been indicated in Table 1.

(3) *Control Variables*: We included the following control variables. First was *recall ambiguity*, which may cause firms to delay decisions when crisis ambiguity is high (Mosakowski, 1997). Recall ambiguity was coded based on the information provided in recall notices and constitutes

the extent to which the cause of the defect that is inferred from the crisis information can be assigned to the product and to the firm recalling the product. This inference is made from the crisis hazard and problem information provided in the recall notices. The second control variable included was *recall severity*. Firms may tend to recall faster when severity is high in order to avoid negative publicity. Most researchers agree that severity of harm crisis can be determined by the extent of injuries and deaths caused by the recalled product (Vassillikopoulou *et al.*, 2009). An incident in a recall crisis involves a case of product failure, whereas an injury involves a case where that failure actually injured the consumer; death is a case where such failure resulted in a fatality. In order to test recall severity, a composite variable was created using the information on the number of incidents, injuries, and deaths that is provided in the recall notices. Weights were assigned for the number of incidents, injuries, and deaths in the composite variable using inputs from the Abbreviated Injury Scale (MacKenzie *et al.*, 1985). The third control variable included was *recall experience*, where we expect firms with more recall experience to delay recalls. In view of the negative shareholder experience with quicker recalls, as evidenced by equity erosion in response to proactive recalls (Chen *et al.*, 2009), firms may draw on their previous recall experience and decide to delay subsequent recalls. This argument may gain support from scholars who have argued that firms will tend to act defensively towards failures (Starbuck *et al.*, 2008), and in doing so, will necessarily avoid decisions such as quicker recalls and thereby avoid taking responsibility for the crisis. This variable was computed based on prior cumulative recalls issued by a firm. Although prior research has not theoretically suggested the rate at which prior experience discounts over time, discounting techniques used in prior research (Baum and Ingram, 1998; Haunschild and Sullivan, 2002; Haunschild and Rhee, 2004) have

been used to estimate recall experience. Both recall severity and recall experience were log transformed in order to reduce the skewness in the data.

We also controlled for the following variables (established by extant research) that may influence time to recall decisions: number of units recalled, average selling price, company size, supply chain position of the firm, design defects, and year of recall. Number of units recalled and average selling price of the recalled product were obtained from the CPSC recall notices. Number of units recalled and average selling price were log transformed in order to reduce skewness in the data. Company size was controlled for by dummy coding large firms (e.g., Mattel, Hasbro, Toys-R-Us). For the supply chain player variable (SC Player), which is a categorical variable, we followed the methodology adopted by Hora *et al.* (2011) to capture this measure. This categorical variable captures the proximity to the customer (i.e., the supply chain entity that actually recalls the product) and was coded as the primary player (categorical variable, indicating toy company, distributor, or retailer) and as the supply chain entity that announced the recall. Design defect recalls, which have been shown by extant research to be delayed, were coded as per the methodology followed by Hora *et al.* (2011). Defect was coded as a categorical variable, with design defect coded as 1 and manufacturing defect coded as 0. Besides the above variables, yearly dummy variables were added to control the effects of yearly variations in the dependent variable.

-----Please insert Table 2 and Table 3 about here-----

4.3 Data analysis

In order to study the multivariate relationship with the independent and control variables, we analyzed the data using ordinary least squares (OLS) regression technique with the following specification.

$$\begin{aligned}
Time_i = & \beta_0 + \beta_1 Institutional\ Unfavorability_i + \beta_2 No\ of\ Units_i + \beta_3 Average\ Price_i + \beta_4 \\
& Company\ Size_i + \beta_5 Defect\ Type-Design_i + \beta_6 SC\ Player_i + \beta_7 Recall\ Ambiguity_i + \beta_8 \\
& Recall\ Severity_i + \beta_9 Recall\ Experience_i + \sum_{T=1}^T \beta_{10}\ Year + \varepsilon_i
\end{aligned}$$

Time_i is the natural log of the number of days to recall the defective product from the market. Institutional unfavorability_i is the extent to which the host country's environment from which product *i* is sourced is unfavorable for quality production. No of Units_i and Average Price_i are the natural logs of the number of units of the product recalled and the average price of the product *i* respectively. Company Size_i is a categorical variable for large firms vs. small firms that recalled the product *i*. Defect Type-Design_i is design defect vs. manufacturing defect for the product *i*. SC Player_i is the supply chain position of the firm recalling the product *i*. Recall Ambiguity_i is the extent of ambiguity in the recall notice of the product *i* that the cause of the recall can be assigned to the firm and the product. Recall Severity_i is the log of the severity of the hazard caused by the product *i*. Recall Experience_i is the log of the cumulative number of recalls by the firm of product *i*; and ε_i is the residual error.

Table 4 presents the descriptive statistics (mean, standard deviations, median, minimum and maximum values of the variables) and Table 5, correlations for the variables used in the analysis. Although there were some correlations among the independent variables, the correlations were low enough to indicate that these were distinct measures. The highest correlation (-0.63) is between Companies and Distributors, which is natural since a firm can only be of one type (please note that we omitted retailers to allow for comparison). The second highest correlation (0.58) is between recall ambiguity and design defects, suggesting that design defects are considered more ambiguous. The third highest correlation (0.52) is between recall experience and company size, which makes sense given larger firms are likely to have had more

recalls. The fourth highest correlation (0.44) is between recall severity and number of units, suggesting that large recalls tend to involve more severe hazards. The fifth highest correlation (-0.41) is between Distributor and defect type= “design”, which might be expected given that distributors are not involved in the design process, but may be held responsible for distributing products manufactured abroad. Year dummies were included in the first model in order to control for yearly variations.

We ran two regression models where the base model included the control variables, and the second model contained all the variables, including the independent variable. Model 1 (Table 6) has an r-square of 0.218, whereas Model 2 has an r-square of 0.238, suggesting that the addition of the independent variable explain more of the variance in the dependent variable than control variables do on their own. While the overall r-square is relatively small, we note that archival data such as ours does not benefit/suffer from single source bias (e.g., common method bias in surveys) that tends to artificially inflate the variance explained (Chang *et al.*, 2010). Moreover, it suggests that other unknown predictors have yet to be discovered.

-----Please insert Table 4 and Table 5 about here-----

(1) *Results*: Table 6 provides the results from the regression analysis. Model 1 included only the control variables. Most of the control variables were found to be significant, and in the expected directions.

Number of units is significant and positive, suggesting that for a one percent increase in the number of units recalled firms take (0.14%¹) longer to issue recalls. Average price is significant and positive, meaning that for a one percent increase in the average price of the recalled product firms take (0.09%¹) longer to issue recalls. Company size is significant and

¹ Percentages are calculated using the formula: $(1.01^{\text{B1}} - 1) * 100$ as per Cornell Statistical Consulting Unit (2012).

negative, such that large firms (vs. small firms) take (26%²) less time to issue recalls. Defect type was positive and significant, suggesting that firms take (43%²) more time recall design defects than manufacturing defects. Distributor and Company dummies were significant and positive, such that these firms had a time to recall that was 26%² and 30%² longer. Finally, recall severity was significant and negatively associated, meaning that a one percent increase in severity results in 0.09%¹ less time to recall. Recall ambiguity and recall experience were not significant.

Model 2 included the independent variable ‘institutional unfavorability’. We posited that the higher the institutional unfavorability of the host country environment, the sooner the recalls would occur. We had a significant result ($p < 0.001$) with a negative coefficient, thereby supporting our hypothesis that firms tend to recall defective products sooner when these products have been manufactured in countries with unfavorable institutional environments. The estimated coefficient of the ‘institutional unfavorability’ variable is $\beta_1 = -0.34$, we would say that an increase of one unit in the ‘institutional unfavorability’ would result in $(e^{\beta_1} - 1) * 100$ percentage change in ‘time to recall’, approximately $((2.72^{-0.34} - 1) * 100) = -28.8\%$ change in the TimeToRecall (Cornell Statistical Consulting Unit, 2012). In other words, ‘time to recall’ will be 28.8% shorter for each unit of increase in ‘institutional unfavorability’; a substantive effect size (about six months) given that the average ‘time to recall’ is nearly two years (665 days).

-----Please insert Table 6 about here-----

(2) *Robustness checks*: In order to adopt OLS regression, we confirmed that our data did not violate the assumptions related to normality, homoscedasticity, and multicollinearity (Hora *et al.*, 2011). We conducted the following robustness tests. To confirm that the error terms in the models are normally distributed, we ran the Kolmogorov-Smirnov test. We could not reject the

² Percentages are calculated using the formula: $(e^{\beta_1} - 1) * 100$ as per Cornell Statistical Consulting Unit (2012).

null hypothesis that there is no difference between cumulative distribution of the error terms against the theoretical normal distribution ($p < 0.90$). This confirms normality of data. Our data did not violate this assumption when the dependent variable was log transformed. Without transforming the dependent variable the data violated this assumption. The presence of heteroscedasticity in residual errors violates a critical assumption of OLS regression (homoscedasticity). Thus, we ran the Breusch-Pagan test to confirm that the variance of residual error was constant for all values of an independent variable. We could not reject the null hypothesis of no heteroscedasticity ($p\text{-value} = 0.68$). Variance inflation factors (VIFs) of all the independent and control variables were well within the acceptable limit of less than 10 (Neter *et al.*, 1996). The maximum value of VIF was found to be 2.04. Hence, our data does not appear to be affected by multicollinearity³.

We ran additional robustness tests as follows. Since approximately 75 % of the recalls were sourced from China, we controlled for Chinese recalls by introducing a dummy for all recalls from China and ran the regression. The results showed institutional unfavorability ($\beta = -0.21$) was significant ($p < 0.10$). We, next, excluded the recalls in year 2007 (which is ‘dubbed as the year of recalls’) and found that our results in both our models were similar. Further, we conducted analysis per other specifications such as number of recalls. We ran regressions on countries with more than 2 recalls (16 countries), more than 5 recalls (9 countries), and more than 10 recalls (6 countries) and found that our results were similar.

³ Serial correlation, which may happen when the errors terms are correlated across time, is a problem in time series regressions (Wooldridge, 2012). Our analysis used cross-sectional data and thus serial correlation does not affect our analysis. However, we ran the Durbin-Watson test, which produced a value of 1.73, suggesting that serial correlation may not be a concern in our study. Most statistical packages require us to define the time variable before running the tests for serial correlation. Since our data set is not a time series, we have used SPSS to calculate the Durbin-Watson statistic. SPSS provides this statistic for all regressions.

As an additional robustness measure, we split our sample in two halves (by number of years). The number of recalls originating from each country in the first half of the data (i.e. 12 years from year 1988 to 1997) was used as an indicator of institutional unfavorability of the host country. These measures of institutional unfavorability were then used to test its impact on time to recall on the second half of our data (i.e. 12 years from 1998 to 2011). The results obtained were qualitatively similar (institutional unfavorability significant at $p < 0.10$). The number of recalls in this 12 year period tested was 461 and the number of countries was 12.

5. Discussion

Product recalls represent an important area of study for international business researchers and practitioners because the manner in which firms handle recalls has serious implications for international business. Our study illustrates one of the reasons why firms differ in the time taken to recall defective products from the market. Our central argument is that mitigating the direct and indirect costs of a recall are key motivations for firms in a recall crisis. We argued that firms delay recalls depending on the extent of responsibility they are willing to assign to themselves. In justifying early recalls, firms attribute blame to the foreign suppliers from which the recalled products have been sourced. The extent of attribution is influenced by the stereotypes or biases that stem from the host country's institutional profiles. The more unfavorable the host country's institutional environment is for quality production, the faster the recall will be, since firms can more easily justify such recalls by passing blame to the foreign supplier. Our robustness checks also corroborate the above, in that when we used a measure of institutional unfavorability constructed from our own data (by splitting the earlier data from the later data), the findings were consistent. Volume of previous instances of recalls was negatively associated with time to recall.

Thus, two very different, but related measures of institutional unfavorability both pointed to the same result.

Consistent with our hypothesis, we found that firms recall defective products faster when the host country from which the product is sourced has an unfavorable institutional environment for producing quality products. This finding suggests that managers may exploit biases against such countries in order to assign blame for defective products, and hence, they will not delay product recalls. In such situations, managers may need to adopt an ethical position, and therefore we do not advocate the strategic use of scapegoating in managing such crisis situations, yet the positive effect of hastening recalls stands out as something to explore. If recalls happen faster from convenient attributions, then are customers not better off than if the firm delays the recall to avoid carrying blame? This highlights an ethical dilemma that business ethics scholars may pursue.

Relatedly, previous research has suggested that time to recall signals the extent of responsibility the firm is willing to take for recall crisis, firms may perceive recalling products as an account-generating response (Coombs, 2007 ; Dowling, 2002), where quick recalls may be undertaken as a way to build a socially responsible profile of ensuring consumer safety. By contrast, delayed recalls could represent a way of not admitting responsibility for hazards, since signalling responsibility (by launching an early recall) could potentially lead to liability costs in the future, especially in litigious countries like the U.S. In such settings, a firm may delay a product recall in an attempt to avoid admitting guilt especially when the products are sourced from countries that are perceived to be good at quality production. In a recent example⁴, GM's CEO admitted that the problem was internally driven (i.e., she triggered an internal investigation), and offered restitution to customers that were affected. Had the problem been

⁴ <http://bigstory.ap.org/article/gm-1q-profit-dragged-down-recalls>

with a component made in a third country, our study results suggest the CEO might have issued the recall earlier.

6.1. Contributions to theory and practice

Our study contributes to current research in multiple ways. First, we contribute to the literature on product recalls in answering the research question: *Why do firms differ in their time to recall?* The existing research examining the factors that affect the recall decision is limited. Recall decisions involve timing of the recall, which is typically a managerial decision that must be made under pressure and with ambiguous information. We integrate insights from the research on attribution theory and country of origin effects in order to shed light on how host country institutional profiles influence the timing of product recalls.

Second, our study contributes to the product recalls literature by examining the issues surrounding recalls. Current research on product recalls has largely focused on the consequences of recalls on firm performance, but it has not examined the issues surrounding recalls. Given the recent increase in (and attention to) product recalls, it is important to better understand the phenomenon. Several issues, such as why recalls occur, whether firms differ in their recalls, and how firms act in recall situations, represent important concerns for managers, consumers, and regulators. By focusing our research on the specific issue of time to recall, we have made an important step towards better understanding the phenomenon of recalls and how they affect and are dealt with by firms. This new information will help in further strengthening extant understanding of recall timing by extending the work of Hora *et al.* (2011) and others concerning the phenomenon within the area of crisis management.

Third, this article contributes to an overall understanding of how external factors facilitate (or hinder) recall crisis decisions such as time to recall (Rhee and Valdez, 2009). While

most of the current research has attempted to examine the consequences of such decisions, this article instead attempts to address the factors and underlying mechanisms that influence such decisions. Consequences for firms are known to vary based on the handling of the response—future research might uncover ways to avoid these crises altogether.

Fourth, the dataset used in this study represents an improvement over previous research on recalls. In the past, researchers who examined issues related to recalls have largely used newspaper sources and have focused on automotive recalls. By focusing on a particular consumer product (i.e., toys) and utilizing CPSC recall notices, this study not only enlarges the context of recalls research, but also provides a definitively more complete and larger sample size than that of most of the previous research.

Fifth, in addition to its main contribution of understanding the recall phenomenon, this article also holds some significance for regulators, who can use these insights to help them better fulfil their mandates to ensure consumer safety. For example, regulators should be wary of firm's blame attributions, especially when they involve suppliers in countries with unfavorable institutional conditions related to product quality.

6.2. Study limitations and future research

Although this study makes several valid contributions in the areas of product recalls specifically and crisis management in general, we must also present some of its limitations. First, the study was specifically focused on consumer products and on the toy industry. Recall management decisions may be influenced by the type of product under consideration. For example, contaminated food may be recalled faster than tables with missing screws because food is consumed in a short period after purchase and hence swiftness is needed to avoid harm to consumers. Similarly defective automobiles may be recalled faster than a defective toy. This

study may, therefore, in the future, have to be replicated across other industries such as food, automotive, consumer durables, etc., where characteristics of the products may be important factors in influencing recall timing decisions, and where the safety standards of these industries differ. Further, firms may respond differently to crisis situations based on their strategic orientations. Classification of firms using the strategic types typology of Miles and Snow (2003) can be used by future research to predict recall decisions.

Second, the reputation of the firms has not been considered in this study. Highly reputed firms attract more media attention and may, therefore, recall faster. Such firms may prefer quick decisions because instances of defects in their products would tend to attract more media attention than for firms with lesser reputations (Deephouse, 2000; Walker, 2010), and therefore delaying recalls may cost their reputation dear. Future research may therefore consider the moderating effect of firm reputation in recall decision making by managers.

We also assumed that unfavorable institutional profiles of the host countries (in terms of production quality) lead to managers' cognitive biases towards these countries. While this assumption has been established in literature, directly capturing such biases in recall decision making would strengthen our findings. Further it is not clear whether managers make biased attributions in such crisis situations unknowingly, or whether they make it knowing that their stakeholders are likely to make biased attributions and therefore accept their claims of blame. Capturing responses of managers taking such recall decisions and examining their biases will help in developing a further understanding of the link between blame attribution and recall timing. Using survey or case methodology in order to capture managerial responses by future research can help build upon our findings.

We measured recall speed as the number of days for which a product remains in the market before it is recalled. A better measure would be the number of days a firm took to recall a product after that firm learned about the product hazard, however, such information is not made public by CPSC and is, therefore, not possible obtain at this time. Knowing the exact time when the firm learned about the product hazard would help clearly pinpoint the intentions of managers behind recall timing decisions, in other words, it would reveal whether the managers really delayed the recall or whether they noticed the hazard late. Understanding this would also help to infer whether the recall decision was influenced by managerial biases or whether there was a systemic problem in the value chain of the firm.

Finally, even though our data spans two decades, we cannot use an unbalanced panel approach mainly due to data limitations. We do not have a good measure of institutional unfavorability going back to 1988. The Global Competitiveness Index for the detailed items considered for our study only goes back to 2006, therefore, there would be no yearly variation in our key variable of interest. We view this as limitation of our study that could be addressed by future research.

6. Conclusion

In this article, we have shown that firms tend to recall defective products faster when the institutional environment of the host country from which they source their products is perceived to be unfavorable to the production of quality products. Managers tend to recall such products faster probably as a result of the bias that they may have towards countries where these suppliers are located. This article addresses the relatively new research area of *recall management*. Over and above an understanding why recalls occur, gaining an understanding of why and how firms

behave differently in recall situations stands as an important area of inquiry, since these behaviors have significant implications for key stakeholders involved in international business.

References

- Andrews, A.P., Simon, J., Tian, F. and Zhao, J. (2011), "The Toyota crisis: an economic, operational and strategic analysis of the massive recall", *Management Research Review*, Vol. 34 No.10, pp. 1064-1077.
- Bapuji, H. (2011), *Not just China: The rise of recalls in the age of global business*, Palgrave Macmillan, NY.
- Bapuji, H. and Beamish, P. W. (2007), "Toy recalls: Is China really the problem", *Canada-Asia Commentary*, Vol. 45, pp.1-9.
- Bapuji, H. and Beamish, P. (2008), "Product recalls: Avoid hazardous design flaws", *Harvard Business Review*, Vol. 86 No.3, pp. 23-26.
- Barney, J.B., Edwards, F.L. and Ringleb, A.H. (1992), "Organizational responses to legal liability: Employee exposure to hazardous materials, vertical integration, and small firm production", *Academy of Management Journal*, Vol. 35 No.2, pp. 328-349.
- Baum, J.A.C. and Ingram, P. (1998), "Survival-enhancing learning in the Manhattan hotel industry, 1898-1980", *Management Science*, Vol.44 No.7, pp. 996-1016.
- Beamish .P. and Bapuji, H. (2008), "Toy recalls and China: Emotion vs. evidence", *Management and Organization Review*, Vol.4 No.2, pp.197-209.
- Blount, S. and Janicik, G. A. (2001), "When plans change: Examining how people evaluate timing changes in work organizations", *Academy of Management Review*, Vol.26 No.4, pp. 566-585.
- Boeker, W. (1992), "Power and managerial dismissal: Scapegoating at the top", *Administrative Science Quarterly*, Vol.37 No.3, pp. 400-421.
- Bromiley, P. and Marcus, A. (1989), "The deterrent to dubious corporate behavior: Profitability, probability and safety recalls", *Strategic Management Journal*, Vol. 10 No.3, pp. 233-250.
- Chang, S. J., van Witteloostuijn, A. and Eden, L. (2010), "From the editors: common method variance in international business research", *Journal of International Business Studies*, Vol. 41 No.2, pp. 178-184.
- Chao, P. (1993), "Partitioning country of origin effects: Consumer evaluations of a hybrid product", *Journal of International Business Studies*, Vol.24 No.2, pp.291-306.

- Chao, M, C-H. and Kumar, V. (2010), "The impact of institutional distance on the international diversity-performance relationship", *Journal of World Business*, Vol.45, pp. 93-103.
- Cheah, E. T., Chan, W. L. and Chieng, C. (2007), "The corporate social responsibility of pharmaceutical product recalls: An empirical examination of U.S. and U.K. markets", *Journal of Business Ethics*, Vol.76 No.4, pp.427-449.
- Chen S-F. (2007), "Don't bash China - U.S. toy makers are at fault", *Globe and Mail*, Toronto. Sep 3.
- Chen, Y., Ganesan, S. and Liu, Y. (2009), "Does a firm's product-recall strategy affect its financial value? An examination of strategic alternatives during product-harm crises", *Journal of Marketing*, Vol.73 No.6, pp.214-226.
- Cornell Statistical Consulting Unit (2012), "Interpreting Coefficients in Regression with Log-Transformed Variables." Cornell University; [cited April 2014]
<http://www.cscu.cornell.edu/news/statnews/stnews83.pdf>
- CPSC. (2012). Consumer Product Safety Commission. Accessed May 2012.
<http://www.cpsc.gov/cpscpub/prerel/category/toy.html>.
- Clapham, S.E. and Schwenk, C.R. (1991), "Self-serving attributions, management cognition, and company performance", *Strategic Management Journal*, Vol.12 No.3, pp. 219-229.
- Coombs, W.T. (2007), "Protecting organization reputations during a crisis: The development and application of situational crisis communication theory", *Corporate Reputation Review*, Vol.10 No.3, pp. 163-176.
- Darling, J. R. and Arnold, D. R. (1988), "Foreign consumers' perspective of the products and marketing practices of the United States versus selected European countries", *Journal of Business Research*, Vol.17 No.3, pp. 237-248.
- Davidson, W. N. and Worrell, D. L. (1992), "Research notes and communications: The effect of product recall announcements on shareholder wealth", *Strategic Management Journal*, Vol.13 No.6, pp. 467-473.
- Dawar, N. (1998), "Product harm crisis and signaling ability of brands", *International Studies of Management and Organization*, Vol.28 No.3, pp.109-119.
- Dawar, N. and Pillutla, M. M. (2000), "Impact of product-harm crises on brand equity: The moderating role of consumer expectations", *Journal of Marketing Research*, Vol.37 No.2, pp.215-227.
- Deephouse, D.L. (2000), "Media Reputation as a Strategic Resource: An Integration of Mass Communication and Resource-Based Theories", *Journal of Management*, Vol. 26 No.6, pp.

1091–1112.

- Dikova, D., Sahib, P.R. and Van Witteloostuijn, A. (2010), “Cross-border acquisition abandonment and completion: The effect of institutional differences and organizational learning in international business service industry, 1981-2001”, *Journal of International Business Studies*, Vol.41, pp. 223-245.
- Dowling, G. (2002), *Creating Corporate Reputations: Identity, Image, and Performance*, Oxford University Press, New York.
- Eden, L. and Miller, S.R. (2004), “Distance matters: Liability of foreignness, institutional distance and ownership strategy”, *Advances in International Management*, Vol.16, pp. 187-221.
- Gibson, D. (1995), “Public relations considerations of consumer product recall”, *Public Relations Review*, Vol.21 No.3, pp.225-240.
- Gioia, D.A. (1992) “Pinto fires and personal ethics: A script analysis of missed opportunities”, *Journal of Business Ethics*, Vol.11 No.5/6, pp.379-389.
- Hadjimarcou, J. and Hu, M.Y. (1999), “Global product stereotypes and heuristic processing: The impact of ambient task complexity”, *Psychology and Marketing*, Vol.16 No.7, pp. 583–611.
- Hair, J.F., Black, W., Babin, B.J. and Anderson, R.E. (2010), *Multivariate Data Analysis*, Prentice Hall, NJ.
- Han, C.M. and Terpstra, V. (1988), “Country-of-origin effects for uni-national and bi-national products”, *Journal of International Business Studies*, Vol.18 No.3, pp. 235–255.
- Hastak, M. and Hong, S. T. (1991), “Country of origin effects on product quality judgments: An information integration perspective”, *Psychology and Marketing*, Vol.8 No.4, pp.129–143.
- Haunschild, P. R. and Rhee, M. (2004), “The role of volition in organizational learning: The case of automotive product recalls”, *Management Science*, Vol.50 No.11, pp.1545–1560.
- Haunschild, P. R. and Sullivan, B. (2002), “Learning from complexity: Effects of prior accidents and incidents on airlines' learning”, *Administrative Science Quarterly*, Vol.47 No.4, pp. 609-643.
- Hoffer, G., Pruitt S. and Reilly, R. (1988), “The impact of product recalls on the wealth of sellers: A re-examination”, *Journal of Political Economy*, Vol. 96 No.3, 663-670.
- Hora, M., Bapuji, H. and Roth, A. (2011). “Safety hazard and time to recall: The role of recall strategy, product defect type, and supply chain player in the U.S. toy industry”, *Journal of Operations Management*, Vol.29 No.7, pp.766-777.

- Jarrell, G. and Peltzman, S. (1985), "The impact of product recalls on the wealth of sellers", *Journal of Political Economy*, Vol. 93 No.3, pp.512-536.
- Johansson, J. K., Douglas, S. P., and Nonaka, I. (1985), "Assessing the impact of country of origin on product evaluations: A new methodological perspective", *Journal of Marketing Research*, Vol.22, pp.388-396.
- Kostova, T. and Roth, K. (2002), "Adoption of an organizational practice by subsidiaries of multinational corporations: Institutional and relational effects", *Academy of Management Journal*, Vol.45 No.1, pp. 215-233.
- Kothari, S.P., Shu, S. and Wysocki, P.D. (2009), "Do Managers Withhold Bad News?", *Journal of Accounting Research*, Vol.47 No.1, pp.241-276.
- Luo, Y. (2008), "A strategic analysis of product recalls: The role of moral degradation and organizational control", *Management and Organization Review*, Vol.4 No.2, pp.183-196.
- Lyles, M.A., Flynn, B.B. and Frohlich, M.T. (2008), "All supply chains don't flow through: Understanding supply chain issues in product recalls", *Management and Organization Review*, Vol.4 No.2, pp.167-182.
- MacKenzie, E.H., Shapiro, S. and Eastham, J.N. (1985), "These lives will not be lost in vain: Organizational learning from disaster in U.S. coal mining", *Medical Care*, Vol.23 No.6, pp. 823-835.
- Maheswaran, D. (1994), "Country of origin as a stereotype: Effects of consumer expertise and attribute strength on product evaluations", *Journal of Consumer Research*, Vol.21 No.2, pp.354-365.
- Meyer, J., and B. Rowan. (1977), "Institutionalized organizations: Formal structure as myth and ceremony", *American Journal of Sociology*, Vol.83 No.2, pp.340-363.
- Miles, R. E., and Snow, C. C. (2003), *Organizational strategy, structure, and process* [A. D. Meyer, collaborator; H. J. Coleman Jr., contributor], Stanford Business Classics, Stanford, CA.
- Mosakowski, E. (1997), "Strategy making under causal ambiguity: Conceptual issues and empirical evidence", *Organization Science*, Vol. 8 No.4. pp.414-442.
- Mowen, J., Jolly, D. and Nickell, G.S. (1981), "Factors influencing consumer responses to product recalls: a regression analysis approach", *Advances in Consumer Research*, Vol.8 No.1, pp. 405-407.
- Neter, J., Kutner, M.H., Nachtsheim, C.J. and Wasserman, W. (1996), *Applied linear statistical models*, Irwin, Chicago.

- Pearse II, J.A. and DeNisi, A.S. (1983), "Attribution theory and strategic decision making: An application to coalition formation", *Academy of Management Review*, Vol. 26 No.1, pp. 119-128.
- Pearson, C.M. and Claire, J.A. (1998), "Reframing crisis management", *Academy of Management Review*, Vol.23 No.1, pp.59-76.
- Rhee, M. and Valdez, M.E. (2009), "Contextual factors surrounding reputational damage with potential implications for reputation repair", *Academy of Management Review*, Vol.34 No.1, pp.146-168.
- Rosenzweig, P. and Singh, H. (1991), "Organizational environments and the multinational enterprise", *Academy of Management Review*, Vol. 16 No.2, pp.340-361.
- Roth, A.V., Tsay, A.A., Pullman, M.E. and Gray, J.V. (2008), "Unraveling the food supply chain: strategic insights from China and the 2007 recalls", *Journal of Supply Chain Management*, Vol.44 No.1, pp. 22–39.
- Rupp, N. G. (2004), "The attributes of a costly recall: Evidence from the automotive industry", *Review of Industrial Organization*, Vol.25 No.1, pp.21–44.
- Salancik, G.R. and Meindl, J.R. (1984), "Corporate attributions as strategic illusions of management control", *Administrative Science Quarterly*, Vol.29 No.2, pp.238-254.
- Samiee, S. (1994), "Customer evaluation of products in a global market", *Journal of International Business Studies*, Vol.25 No.3, pp. 579–603.
- Shaver, K.G. (1975), *An introduction to attribution process*, Winthrop, Cambridge, MA.
- Shrivastava, P., Mitroff, I.I., Miller, D. and Miglani, A. (1988), "Understanding industrial crisis", *Journal of Management Studies*, Vol.25 No.4, pp. 285-303.
- Siomkos, G.J. (1989), "Managing product-harm crises", *Organization and Environment*, Vol.3 No.41, pp. 41-60.
- Siomkos, G.J. (1999), "On achieving exoneration after a product safety industrial crisis", *The Journal of Business and Industrial Marketing*, Vol.14 No.1, pp.17-29.
- Smith, C. N., Thomas, R. J. and Quelch, J. A. (1996), "A strategic approach to managing product recalls", *Harvard Business Review*, Vol.74 No.5, pp.102-113.
- Starbuck, W.H., Barnett, M.L. and Baumard, P. (2008), "Payoffs and pitfalls of strategic learning", *Journal of Economic Behavior & Organization*, Vol.66 No.1, pp. 7-21.
- Staw, B.M., McKechnie, P.I. and Puffer, S.M. (1983), "The justification of organizational performance", *Administrative Science Quarterly*, Vol.28 No.4, pp.582-600.

- Tang, C.S. (2008), "Making product safe –process and challenges", *International Commerce Review*, Vol. 8 No.1, pp.48-55.
- Teratanavat, R., Salin, V. and Hooker, N.H. (2005), "Recall event timing: Measures of managerial performance in US meat and poultry plants", *Agribusiness*, Vol.21 No.3, pp. 351-373.
- Thorelli, H. B., Lim, J. S. and Ye, J. (1989), "Relative importance of country of origin, warranty, and retail store image on product evaluation", *International Marketing Review*, Vol.6 No.1, pp.35–46.
- Trottman, M. and Mitchell, J. (2010), "Toyota recall delay comes under scrutiny", *Wall Street Journal*, January.
- Tse, D. K. and Gorn, G. G. (1993), "An experiment on country-of-origin effects in the era of global brands", *Journal of International Marketing*, Vol.1 No.1, pp. 57–77.
- Vassilikopoulou, A., Lepetsos, A., Siomkos, G. and Chatzipanagiotou, K. (2009), "The importance of factors influencing product-harm crisis management across different crisis extent levels: A conjoint analysis", *Journal of Targeting, Measurement and Analysis for Marketing*, Vol.17 No.1, pp. 65-74.
- Wagner, J.A. and Gooding, R.Z. (1997), "Equivocal information and attribution: An investigation of patterns of managerial sensemaking", *Strategic Management Journal*, Vol.18 No.4, pp. 275-286.
- Walker, K. (2010). "A systematic review of the corporate reputation literature: Definition, measurement, and theory", *Corporate Reputation Review*, Vol. 12 No. 4, pp. 357-387.
- Wall, M., Liefeld, J. and Heslop, L. A. (1991), "Impact of country-of-origin cues on consumer judgments in multi-cue situations: A covariance analysis", *Journal of the Academy of Marketing Science*, Vol.19 No.2, pp.105–113.
- Walsh, J. (1995), "Managerial and organizational cognition: Notes from a trip down memory lane", *Organization Science*, Vol.6 No.3, pp.280-321.
- Wooldridge, J. (2012), *Introductory econometrics: A modern approach*, Cengage Learning.
- Xu, D., Pan, Y. and Beamish, P.W. (2004), "The effect of regulative and normative distances on MNE ownership and expatriate strategies", *Management International Review*, Vol.44, pp. 285-307.

Table -1 Countries, number of recalls, time to recall, and institutional unfavorability

No.		No.of Recalls	Time to Recall (No of days)	Institutional Unfavorability
1	Argentina	1	844	5.42
2	Bangladesh	1	196	5.84
3	Canada	1	833	3.66
4	China	522	626	5.02
5	Costa Rica	1	618	4.70
6	England	1	550	3.82
7	France	1	522	3.60
8	Germany	9	1594	3.30
9	Greece	1	1864	5.00
10	Hong Kong	29	843	3.92
11	India	7	326	4.46
12	Indonesia	4	249	4.86
13	Israel	2	2635	3.88
14	Italy	3	726	4.76
15	Japan	6	463	3.28
16	Korea	12	703	3.84
17	Malaysia	1	1085	4.16
18	Mexico	13	1070	5.14
19	Nepal	1	1073	6.06
20	Peru	1	1483	5.48
21	Phillipines	1	361	5.00
22	Poland	1	1461	5.02
23	Singapore	2	597	3.64
24	South Africa	1	782	4.50
25	Spain	2	844	4.48
26	Sweden	2	1544	3.30
27	Taiwan	35	698	3.72
28	Thailand	14	355	4.72
29	Trinidad	1	753	5.26
30	Vietnam	2	689	5.46
31	Yugoslavia	1	689	4.40
		Total Recalls	679	

Table 2		Variable Dictionary	
No	Variable	Source	Methodology
1	Time to Recall	CPSC Recall Notices	Computed by researchers
2	Number of Units	CPSC Recall Notices	Extracted from Recall Notices
3	Average Price	CPSC Recall Notices	Extracted from Recall Notices
4	Company Size	Company Websites	Coded by Researchers
5	Defect Type-Design	CPSC Recall Notices	Coded as per Hora <i>et al.</i> 2011
6	SC Player-Distributor	Company Websites	Coded as per Hora <i>et al.</i> 2011
7	SC Player-Company	Company Websites	Coded as per Hora <i>et al.</i> 2011
8	Recall Severity	CPSC Recall Notices	Coded as per AIS scale MacKenzie <i>et al.</i> 1985
9	Recall Experience	CPSC Recall Notices	Coded as per Haunschild and Rhee,2004
10	Recall Ambiguity	CPSC Recall Notices	Coded by researchers
11	Institutional Unfavorability	Global Competitiveness Report	Created by researchers

Table 3: Standardized Factor Loadings, Average Variance Extracted, and Reliability

No	Item	Mean (SD)	Factor Loading	AVE	Construct Reliability
				0.870	0.970
1	How well do companies in your country treat customers? [<i>1 = generally treat their customers badly; 7 = are highly responsive to customers and customer retention</i>]	4.80 (0.435)	0.957		
2	To what extent are the latest technologies available in your country? [<i>1 = not available; 7 = widely available</i>]	4.51 (0.647)	0.969		
3	How would you assess the quality of local suppliers in your country? [<i>1 = very poor; 7 = very good</i>]	4.88 (0.392)	0.973		
4	In your country, how sophisticated are production processes? [<i>1 = not at all—labor-intensive methods or previous generations of process technology prevail; 7 = highly—the world's best and most efficient process technology prevails</i>]	3.97 (0.663)	0.970		
5	How would you assess the quality of scientific research institutions in your country? [<i>1 = very poor; 7 = the best in their field internationally</i>]	4.49 (0.375)	0.780		

Table 4 Descriptive Statistics- Mean, Mode, SD, Min, and Max Values

No	Variable	Mean	Median	SD	Min Value	Max Value
1	Time to Recall	6.10	6.12	0.92	3.40	8.64
2	Number of Units	9.65	9.62	2.22	3.71	16.00
3	Average Price	2.34	2.40	1.17	0.00	5.99
4	Company Size	0.16	0.00	0.37	0.00	1.00
5	Defect Type-Design	0.68	1.00	0.47	0.00	1.00
6	SC Player-Distributor	0.51	1.00	0.50	0.00	1.00
7	SC Player-Company	0.27	0.00	0.45	0.00	1.00
8	Recall Severity	0.81	0.00	1.40	0.00	7.38
9	Recall Experience	0.43	0.00	0.66	0.00	2.89
10	Recall Ambiguity	2.33	3.00	1.01	1.00	5.00
11	Institutional Unfavorability	4.81	5.02	0.48	3.28	6.06

Table 5 Descriptive Statistics – Correlations

No	Variable	1	2	3	4	5	6	7	8	9	10	11
1	Time to Recall (log)	1										
2	Number of Units	0.26**	1									
3	Average Price	-0.02	-0.02	1								
4	Company Size	-0.06	0.27**	0.13**	1							
5	Defect Type-Design	0.22**	0.14**	-0.14**	-0.01	1						
6	SC Player-Distributor	0.05	-0.11**	-0.22**	-0.41**	-0.03	1					
7	SC Player-Company	0.08*	0.20**	0.32**	0.28**	0.00	-0.63**	1				
8	Recall Severity	0.03	0.44**	0.38**	0.24**	0.10**	-0.13**	0.28**	1			
9	Recall Experience	0.05	0.26**	0.08*	0.52**	0.07	-0.34**	0.33**	0.25**	1		
10	Recall Ambiguity	0.10**	0.12**	-0.06	0.06	0.58**	-0.03	0.04	0.17**	0.10**	1	
11	Institutional Unfavorability	-0.16**	0.11*	-0.01	-0.04	-0.09*	0.12**	-0.03	0.14**	0.10**	-0.05	1

** Correlation is significant at the 0.01 level (2 tailed)

* Correlation is significant at the 0.05 level (2 tailed)

Table-6 OLS Regression for Time to Recall (log)

Variables	Model-1	Model-2
N	679	679
Constant	4.21*** (0.23)	5.87*** (0.46)
No of Units ^a	0.14*** (0.02)	0.14*** (0.02)
Average Price ^a	0.09** (0.03)	0.08* (0.03)
Company Size	-0.31** (0.11)	-0.33** (0.11)
Defect Type-Design ^b	0.36*** (0.09)	0.34*** (0.09)
SC Player- Distributor ^c	0.23* (0.09)	0.25** (0.09)
SC Player-Company ^c	0.26* (0.10)	0.24* (0.10)
Recall Ambiguity	-0.06 (0.04)	-0.05 (0.04)
Recall Severity ^a	-0.09** (0.03)	-0.09** (0.04)
Recall Experience ^a	0.08 (0.06)	0.10 [!] (0.06)
Institutional Unfavorability		-0.34*** (0.09)
R ²	0.218	0.238

Note: Standard Errors in paranthesis

Dependent Variable= Time to Recall

N = Number of observations

^aThese variables are transformed using natural log transformations

^bBase category- Manufacturing defect

^cBase category- Retailer

[!]p <0.10, *p <0.05, **p<0.01, ***p<0.001

Figure 1- Annual number of recalls

