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Spillover effect in supplier related product recall: the impact of supplier COO on product evaluations

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Spillover Effect in Supplier Related Product Recall: The Impact of Supplier COO on Product Evaluations

Abstract

Research has shown that supplier quality can lead to brand quality failures. However, what is not clear is whether a supplier's country of origin (COO) plays a role in the evaluations of manufacturer brands after a recall is initiated. In this paper, through the lens of resource advantage (R-A) theory, we empirically examine whether a supplier's COO hurts or helps the vehicle brand when a supplier is blamed during a vehicle recall event. R-A theory suggests that high brand quality can enhance competitive advantage for a firm. Through an experimental study, we find that high brand quality can override the spillover effect of COO after a product recall. However, the severity of a recall can nullify the impact of high brand quality.

Introduction

Product recalls are serious events that can spread quickly in the international marketplace (Borah and Tellis 2016). In the U.K., there were 575 product recalls across all product categories (e.g., food, medicine, automobile, and children toys) in 2016 (RPC 2017). In the U.S, there were 4,217 product recalls in 2015 (Statista 2016). Three decades ago, product recalls only affected a local area. Today, however, one single recall can cause great damage on a global scale (e.g. Marucheck et al. 2011). For instance, Toyota's 2015 airbag and General Motors' 2014 ignition switch recalls not only created huge litigation fees but also resulted in considerable sales loss, lower demand, lawsuits, and a harmed reputation (Lawrence 2017).

When experiencing a recall problem, consumers tend to attribute the problem to a cause (Kumar and Schmitz 2011). The perceived cause then impacts consumer evaluations of the product and its manufacturer (Story 2007). **Given that products are increasingly produced by a**

multinational supply chain, consumers consciously and unconsciously may incorporate country of origin (COO) in their product evaluation criteria (Bloemer, Brijs, and Kasper 2009; Raufeisen et al. 2019). Manufacturers may not be insulated from the damage even when only their supplier is blamed for a product recall, as consumers may use information on a supplier COO to infer attributes of the associated product (e.g., Berry et al. 2015).

However, previous research on whether a supplier's COO hurts or helps the evaluations of a manufacturer's products is rare (e.g., Huang and Radighieri 2018; Kabadayi and Lerman 2011). Previous work has mainly focused on the spillover of COO on brand performance in the extended brand context (Balabanis and Diamantopoulos 2004; Herz and Diamantopoulos 2013).

Evidence, though, shows that the COO spillover effect can also exist between a supplier and its associated manufacturer brand. For example, in the Japanese brand Takata's well publicized, widespread airbag recall, the National Highway Traffic Safety Administration (NHTSA) reported that 40 million cars from more than six manufacturers were affected by the airbag defect, which led to one of the biggest sales drops in history (Krisher 2020).

The association between a supplier and its associated manufacturer brand can be explained by resource advantage (R-A) theory. R-A theory states that relational resources include relationships with customers and suppliers (Hunt 2000). These relationships can be either domestic or international in nature. A relationship with suppliers can be a resource only when it leads to cost savings and profitability for a firm (e.g., Hunt and Davis 2008; Lee, Chen, and Lu 2009; Palmatier et al. 2006). In this study, we use R-A theory to explain whether supplier COO plays a role in associated product evaluations after a recall.

R-A theory not only emphasizes the relationship between a supplier and its manufacturer, but also stresses the importance of (1) market segments (e.g., consumer evaluation), (2)

heterogeneous organizational resources (e.g., supplier COO), (3) comparative advantage/disadvantage in resources (e.g., high brand quality), and (4) marketplace positions of competitive advantage/disadvantage (e.g., Hunt and Madhavaram 2012; Hunt and Morgan 1995). Comparative advantage exists when a firm's resource enables it to produce products or services with a superior value and/or at lower costs than its competitors (Barney 1991; Hunt and Morgan 1995). A comparative advantage (e.g., high quality brand, domestic COO) in resources can sometimes translate into a competitive advantage (Hunt and Morgan 1995). Therefore, it is important to investigate brand quality and COO effects on product evaluation. When a product recall occurs, consumers are likely to incorporate the organizational resource, the supplier's COO, to infer the cause of the associated product recall (Berry et al. 2015). In this case, the role of global supplier shifts from a source of competitive advantage (e.g., low cost, high profitability) to one of disadvantage (e.g., risks, damage to brand image) (Kim, Wagner, and Colicchia 2019).

This paper distinguishes itself from the existing literature by examining the spillover effect through the lens of R-A theory. Rather than studying information spillover on brand performance (Balabanis and Diamantopoulos 2004; Herz and Diamantopoulos 2013), we focus on the shifting of resource advantage and relational change in market allies under a recall.

The goal of this research is to empirically examine whether a supplier's COO has an impact on its associated manufacturer brand in the presence of a product recall. We seek to answer the following questions:

1. Does a supplier's COO hurt or help the associated product evaluation when its supplier is blamed for a recall?
2. Can other competitive advantage resources (e.g., high brand quality) nullify the spillover effect of supplier COO?

3. If high brand quality can nullify the spillover effect of COO, do the results hold when the recall is severe? In other words, will a non-fiduciary misallocation of resources (e.g., a severe recall caused by wrong supplier selection) lead to a position of competitive disadvantage?

To address these questions, we conducted a test with 43 participants to investigate the impact of supplier COO on purchase intentions after a product recall. We then conducted an experiment with 270 participants to test the three-way interaction of recall severity, brand quality, and supplier COO. **Consistent with the literature, we find that high brand quality can override the spillover effect of COO after a product recall.**

Literature Review

Product Recalls

Product recalls have become a major problem over the past six decades due to the increase in global corporations and the complexity and lack of control that comes with managing a global supply chain. The involvement of regulatory agencies in the United States such as the Food and Drug Administration (FDA) and the National Highway Traffic Safety Administration (NHTSA) has resulted in a very large number of product recalls (Gao et al. 2015). These incidents can bring negative publicity to the firm, which could have a devastating effect on shareholder wealth, brand equity, advertising effectiveness, and company sales performance (Cleeren, van Heerde, and Dekimpe 2013; Liu and Shankar 2015). For example, Gao et al. (2015) investigated the marketing-finance interface in the product recall domain. They found that a recall announcement can lead to shareholder wealth loss, especially when the recall involves a well-known brand with a severe problem. Notable examples include Volkswagen's stock dropping nearly 30% the second trading

day after the disclosure of its tailpipe emissions scandal involving 8.5 million diesel vehicles (Boston and Wilkes 2016).

Product recalls can impact purchase intentions (e.g., Cleeren, van Heerde, and Dekimpe 2013). When a product recall occurs, consumers are likely to search for who is responsible for the product failure. It can lead to anger towards the company and the spreading of negative brand attitudes, thus decreasing purchase intentions, even if a third party (e.g., a supplier) is the culprit (Cleeren, Dekimpe, and Helsen 2008; Folkes 1988).

Product recalls can impact any member of a supply chain due to their association with the other members. Further, any member can be the cause of a product recall. In this paper, we focus on recalls stemming from supplier actions. The type of supplier blamed recall is called “supplier-related” (Hora, Bapuji, and Roth 2011). Conversely, a recall that cannot be directly attributed to the supplier is referred to as “supplier-unrelated.” Research has shown that many recalls are supplier-related, often as a result of compromising product quality due to the use of cheaper materials (Ganguly, Chatterjee, and Rao 2017). This phenomenon is especially prevalent when the parts are made in an undeveloped country. Therefore, there is evidence of a connection between a supplier’s COO and its associated product recall.

Spillover Effect of Country of Origin

Spillover refers to a change in beliefs regarding one entity due to the evaluation of another associated entity (Ahluwalia, Unnava, and Burnkrant 2001; Capello 2009). Firms can create spillover effects by using external cues like COO to convey product quality and brand awareness (Raufeisen et al. 2019). Consciously or unconsciously, consumers use external cues such as COO to evaluate product quality. Work has shown that this construct can influence perceived brand quality and brand equity (e.g., Mohd, Nasser, and Mohamad 2007; Thakor and Lavack 2003), and

transfer certain nation-related values to perceptions of products (Piron 2000). In other words, consumers can have a relative preference or aversion for products depending on where they are made (e.g., Balabanis and Diamantopoulos 2011). Thus, COO can serve as an informational cue for consumer product evaluation. Moreover, this information cue may be evaluated differently depending on customer involvement. It has been shown that COO has a greater impact on brand evaluation in a low involvement context (Gürhan-Canli and Maheswaran 2000; Han 1989; Maheswaran 1994).

Previous COO research has mainly focused on spillover of brand preferences (Balabanis and Diamantopoulos 2004; Herz and Diamantopoulos 2013; Koschate-Fischer, Diamantopoulos, and Oldenkotte 2012). However, the findings on customer preference for domestic products are mixed. Some work demonstrates that United States residents evaluate a product that originated in the domestic country more favorably only when the product is superior to competitors (e.g., Papadopoulos and Heslop 2014). However, Japanese respondents evaluate a product that originated in Japan more favorably regardless of the product's relative advantage (Gürhan-Canli and Maheswaran 2000). What is unclear is if these mixed results will occur in the presence of a foreign supplier.

R-A theory stresses the importance of comparative advantage/disadvantage in resources (Hunt and Morgan 1995). As mentioned previously, R-A theory states that a relationship with global suppliers can be a resource only when it leads to cost savings and profitability for a firm (e.g., Hunt and Davis 2008; Lee, Chen, and Lu 2009; Palmatier et al. 2006). When a product recall occurs, consumers are more likely to incorporate supplier's COO stimuli to infer the cause of an associated product recall (Berry et al. 2015). In this case the role of the global supplier shifts from competitive advantage (e.g., low cost, high profitability) to disadvantage (e.g., risks, damage to

brand image) (Kim, Wagner, and Colicchia 2019).

COO serves as a cue that triggers global evaluation of product quality and performance (Kabadayi and Lerman 2011). Work has shown that a negative COO effect can be offset by a high quality brand, showing that preference for a well-known brand is less likely to be impacted by COO (e.g., Kabadayi and Lerman 2011), thus overriding the COO effect. These findings also apply to the COO of the supplier, suggesting that brand trust and brand image impact the relationship between supplier COO and evaluations of products under recall. Accordingly, consumers may perceive recalls differently based on the manufacturer brand in addition to the COO of the supplier, particularly when the recall is supplier-related. For instance, the impact of a tire manufacturer's COO may differ between car brands of different perceived quality (e.g., BMW vs. Ford) when a customer evaluates a supplier-related recall.

Based on results from the existing COO research on spillover effects on brand preference, we expect that a supplier's COO can be utilized as a quality cue to trigger behavior change after a product recall. Given that foreign suppliers are viewed more negatively than domestic ones (Homburg et al. 2002), we posit that brands with a domestic supplier will fare better after a product recall than those with a foreign one.

Therefore:

H1: Purchase intentions after a supplier-related recall are lower (higher) when the COO of the supplier is foreign (domestic).

The Moderating Role of Brand Quality

Country of origin (COO) is used as an evaluation criteria of product quality by consumers (Bloemer, Brijs, and Kasper 2009; Raufeisen et al. 2019). Brand differentiation and brand loyalty also influence consumer's perceptions of brand quality (Chaudhuri and Holbrook 2001). High

brand quality can lead to a position of competitive advantage, which, in turn, can insulate brands in the wake of negative events (Hunt and Morgan 1997). Research has shown that consumers are more forgiving of high quality brands and believe that failure is an accident or rare; this is not the case for moderate quality brands however, which are less likely to receive forgiveness, especially after a severe recall (Gao 2010).

It has been suggested that perceived brand quality is partially determined by its COO. (Mohd, Nasser, and Mohamad 2007), for instance, found that COO is significantly associated with brand distinctiveness, brand loyalty, and brand awareness. Further, Ahmed and d'Astous (2007) suggested that the salience of COO may vary across such brand dimensions as the level of brand image (e.g., weak versus strong) rather than COO information existing only as a single cue (Ahmed et al. 2002). This is particularly true within categories in which COO is indelibly linked to the quality of the brand, e.g., the automobile industry (Thakor and Lavack 2003). However, very little work has focused on the impact of supplier COO and brand quality together on consumer evaluations (D'Astous and Ahmed 1999).

Some research, though, has suggested that R-A theory is also applicable in supply chain management, such that the COO of a supplier has a similar impact as that of the manufacturer brand (e.g., Huang and Radighieri 2018; Morgan and Hunt 2002). When the recalled brand has a high quality, it can potentially override the COO effect, as consumers have strong beliefs regarding the quality of the brand, and thus are less likely to change their brand choice. Conversely, for a moderate quality brand, the disclosure of a foreign supplier-related recall could generate more negative outcomes than (versus a domestic supplier).

Based on the above logic, we suggest that a high quality brand as a resource of advantage can override the impact of supplier COO on purchase intention under recall. However, a moderate

quality brand will not receive the same benefit. Thus:

H2: The level of brand quality impacts the COO effect on purchase intentions such that (a) for a moderate quality brand, the disclosure of a foreign (vs. domestic) supplier-related recall results in lower purchase intentions, and (b) for a high quality brand, purchase intentions do not differ.

Methodology

A pretest and experiment were conducted to investigate our hypotheses. The pretest was to investigate the possible impact of supplier COO on purchase intentions after a product recall in a focus group and the effect of brand quality on this relationship. The main study follows with an experimental study with different recall scenarios to empirically test H1 and H2.

Pretest with Focus Group

Brand Selection

In order to test our hypotheses, we chose the automotive industry as our context. We selected two auto brands, one each for high and moderate brand quality. The transportation industry was chosen because the majority of vehicle manufacturers have a mixture of sub-brands at different price and quality levels in order to target different consumer segments (Dhar and Hoch 1997). We utilized a focus group of students to select the brands. Forty three participants were asked to rank different auto brands on eight items on a graphical rating scale (from 1-10), adapted from Gotlieb, Grewal, and Brown (1994), answering the question “how well do each of the following pairs of words describe your feelings about the auto’s quality? **Indicate the value that best fits your feelings.**” The eight items were: up-to-date equipment/outdated equipment, good appearance/bad appearance, very reliable/very unreliable, competent/incompetent, very responsive/very unresponsive to customer’ needs, very credible/not credible, easy to

contact/difficult to contact, safe/unsafe to use. Results led to the selection of Ford (M=4.3) as the moderate quality brand, and Honda as the high-quality brand (M=8.1).

Pre-test Procedures

In order to investigate how a supplier's COO impacts a brand after recall, an experimental design was employed. Forty three subjects participated in this pretest.

Step One: Baseline Measure

To begin, subjects were shown the following instructions: "Imagine you are at the dealership and you have the choice of the following two cars. Without considering your budget, please pick the car you are most likely to purchase." Then they were shown a drop-down menu with two selections: Ford and Honda. Subjects who chose Ford were placed into the moderate brand quality condition, with those who chose Honda being placed in the high brand condition.

Step Two: COO Manipulation Presentation

Then they were notified that there was a recall notice for their chosen brand, followed by a presentation of the notice in graphical format, which they were instructed to read. The recall notice provided various information about the supplier-related recall, including the names of the manufacturer and supplier, a description of the problem, and the COO of both the car brand and the supplier. Some subjects read a notice that indicated a Chinese supplier (foreign condition). Others saw an American supplier (domestic condition). This step served as the COO manipulation.

Step Three: COO Manipulation Checks

Subjects then answered manipulation check questions regarding the COO of the car and supplier brands. This served to ensure that subjects noticed the manipulation.

Step Four: Dependent Variable

Subjects were then shown the following instructions: “Imagine your dealership offers you a brand new car. Without considering budgeting, please pick the car you are most likely to purchase.” Again, they were shown a drop-down menu with two selections: Ford and Honda. They were free to keep their previous brand choice or switch to the other brand.

Pretest Results

Table 1 shows that 51% of participants changed their brand choice in the domestic supplier condition. For the foreign supplier condition, 49% of participants changed their brand choice. However, in the domestic supplier condition, 61% of previous Ford brand purchasers changed their choice, compared to only 50% of previous Honda brand purchasers ($F = 1.15, p < .05$). This significant difference also exists in the foreign supplier condition: 67% of previous Ford brand purchasers changed their choices, compared to only 38% of previous Honda brand purchasers ($F = 2.64, p < .05$). Therefore, after the disclosure of a foreign (vs. domestic) supplier-related recall, high quality brand customers are less likely to change their purchase intentions.

-----Insert Table 1 About Here-----

The pretest confirms the foundation of this research that some resource advantages (e.g., high brand quality) can lead to positions of advantage, thus overriding the COO effect. However, what is not clear is if these resource advantages are sustainable in a firm crisis such as a severe product recall. Prior research has shown that a non-fiduciary misallocation of resources can lead to positions of competitive disadvantage (Hunt and Davis 2012). Therefore, in our next study, we **undertake an** experimental design to empirically test the impact of supplier COO and brand quality on purchase intentions under both minor and severe product recall conditions.

Main Study

The marketing literature classifies recalls as minor or severe (e.g., Gao et al. 2015; Rupp 2004) based on the nature of the problem or defect. A severe defect can be a problem that causes a fire, crash, and/or death (e.g., problems with brakes, fuel systems, steering, and transmissions in the automobile industry). Recalls that are due to a severe defect are considered severe recalls. Further, recalls that affect a large volume of product units are also considered severe. Accordingly, auto recalls that fall outside these categories are considered minor recalls (e.g., Gao et al. 2015; Rupp 2004).

R-A Theory Linked to Recall Severity

Supplier selection is an important decision for a firm because a misallocation of supplier resources can lead to competitive disadvantage (Hunt and Davis 2012), e.g., Toyota's brake recall and General Motors' 2014 ignition switch recall. Recalls occur for many reasons, each with a specific level of severity: minor and severe.

The extant literature has linked R-A theory to recall severity. As illustrated in Figure 1, R-A is a process theory of competitive firm behavior that stresses the importance of market segments and resources (Hunt and Morgan 1997). Market segments are groups of consumers who share tastes and brand preferences within the group but differ across groups. However, R-A theory proposes that inter-industry demands are substantially heterogeneous and dynamic, therefore, consumers' tastes and preferences change significantly through time (Hunt and Morgan 1997). When a severe product recall occurs, consumers will monitor the situation and potentially update their evaluations. They generally hold high expectations of high quality brands, since they pay higher prices for them even though they could be manufactured alongside moderate quality brands (Sullivan 1998). A severe recall can create a gap between perceived quality and expectations,

therefore potentially leading to customer dissatisfaction, thus destroying consumers' brand trust, shaking the knowledge and beliefs of brand quality, and lowering purchase intentions (Steenkamp, Batra, and Alden 2003).

-----Insert Figure 1 About Here-----

In a minor recall, the impact is smaller, because the manufacturers are more likely to work with their partners to take care of the issue generally in a transparent and timely fashion (e.g., Varma 2015). A minor recall also has minimal spillover because consumers are only slightly inconvenienced. In this situation, customers are less likely to change their brand quality perceptions. Therefore, there should be minimal difference in evaluations, regardless of the supplier COO.

In the case of a severe recall, outcomes may differ. Severe recalls result in larger inconveniences for consumers. When a severe supplier-related recall is announced, a manufacturer will generally cease sales of the affected product until either (a) the supplier fixes the problem, or (b) they find a new qualified supplier. Because manufacturers will remove affected products from the market after a severe recall, the impacts are very costly.

Severe recalls have been shown to spill over to the whole industry, such as Toyota's 2015 airbag recall. Therefore, the impact of COO is likely to be magnified. Ostensibly, during a severe recall, the resource advantage a company previously owned, such as high perceived brand quality, was misallocated, therefore leading to a position of competitive disadvantage (Hunt and Davis 2012). In this case, consumers are likely to act based on their knowledge of the safety of the product and the severity of the recall (e.g., Chen, Ganesan, and Liu 2009). Actions taken in this context include reduced purchase intentions, brand trust, and a harming of brand evaluations. However, when a recall involves a minor safety issue, consumers may not be as concerned about the product

or supplier COO and thus may not take any action nor change their purchase behavior (NADA 2014).

Some resources (e.g., high brand quality) can lead to positions of competitive advantage, thus overriding the COO effect. However, these resource benefits may not be sustainable in a firm crisis such as a severe product recall. This non-fiduciary event (e.g., wrong supplier selection) can erode the advantage. Therefore, we propose that the benefits of high brand quality do not override the COO effect in a severe recall situation. Accordingly,

H3: during a severe product recall, a high quality brand loses its resource advantage, thus negating the impact the COO effect on purchase intentions.

The conceptual map is illustrated in Figure 2.

-----Insert Figure 2 About Here-----

Sample and Measurement

To test the impact of the three-way interaction of recall severity, brand quality, and supplier COO on purchase intention, a 2 (brand quality: high, moderate) x 2 (recall severity: severe, minor) x 2 (supplier COO: foreign, domestic) between-subjects ANOVA was conducted. Two hundred seventy subjects from a Mid-South university in the United States participated in the study in exchange for course credit. The sample has a normal distribution, with ~50% male, 92% between the ages of 18-36, 43% had income under \$25,000, 75% were single, 55% were white, 32% were black, and 90% were car owners.

Procedures

Our procedures are the same as for the pretest, except for the addition of the recall severity factor. Our severe recall condition scenario refers to deaths from defective brakes, along with a large volume of cars involved in the recall. The minor recall condition scenario refers to faulty

sunroof controls along with a small volume of affected cars. Sample stimuli of our eight conditions are found in the Appendix.

Step One: Introduction

Subjects read the following: “Imagine that you are considering the purchase of a new or used automobile. As part of your research, you come across information relating to a product recall for one of the vehicle models that you are considering. Please read the recall notice on the following page. You will then be asked to answer a series of questions.”

Step Two: Manipulation

Subjects were then randomly assigned to one of eight conditions and were shown a vehicle recall report from the National Highway Traffic Safety Administration (NHTSA). After reading the report, we checked the severity of the recall and the realism of the scenarios. Subjects were asked to answer manipulation check items on a seven point scale, anchored with 1 = Strongly Disagree and 7 = Strongly Agree. The items were: “the scenario presented in the announcement is realistic,” “the mechanical issue that caused the recall is a significant one,” “the recall notice impacted a large number of vehicles,” “the mechanical issue that caused the product recall threatened the safety of vehicle owners and their passengers,” and “the scenario presented in the recall announcement is believable.”

Step Three: Measures

After reading the report, subjects then answered manipulation check questions regarding the COO of the car and supplier brands. This served to ensure that subjects noticed the manipulation. The results showed that 80.6% of participants passed the manipulation check, identifying the supplier as foreign.

Then, they were instructed to fill out a survey about their purchase intentions. Purchase intentions were measured by Fishbein's three item likelihood purchase scale assessing "If it were priced within your budget, what are the chances you would consider this vehicle for your next auto purchase?" The items were anchored by 1 = Not At All Likely and 7 = Very Likely, 1 = Poor and 7 = Excellent, and 1 = Weak and 7 = Strong (Fishbein and Ajzen 1975, 2011). Attitude towards the brand (Mitchell and Olson 1981) was measured with five items assessing "how would you describe your attitudes toward the automobile brand featured in the earlier press release?" The item endpoints were 1 = Bad and 7 = Good, 1 = Strong Avoid and 7 = Strong Prefer, 1 = Dislike and 7 = Like, 1 = Very Negative and 7 = Very Positive, and 1 = One of the Worst and 7 = One of the Best.

Results

COO effect. We first ran a validation test on the purchase intention scale. The result (Cronbach's $\alpha = 0.97$) indicated an internal consistency reliability. Then, an ANOVA on purchase intention was conducted. A Levene's test showed that the variances for purchase intention were not equal, $F(3, 266) = 1.78, p = 0.15$. The means and standard deviations are provided in Table 2. The analysis result yielded a main effect of COO ($F = 4.85, p < .05$). The detailed results are in Table 3. It revealed a significant difference in purchase intentions after a vehicle recall. Supplier parts manufactured in China (foreign) led to lower brand purchase intentions than those manufactured in the US (domestic) ($t = 4.8, p < .01, \text{Mean}_{\text{China}} = 3.41, \text{Mean}_{\text{US}} = 3.90$). These results support H1 that purchase intentions after a recall are lower when the supplier is foreign.

-----Insert Table 2 and Table 3 About Here-----

Moderation effect of brand quality. We predicted that the relationship between COO and

purchase intentions would be impacted by brand quality. Analysis revealed that the level of product quality indeed moderates the COO effect on purchase intention ($F = 6.2, p < .05$). The disclosure of a foreign supplier responsible for a moderate quality brand recall generates lower purchase intentions towards the brand than does the disclosure of a domestic supplier. Mean (Moderate brand_China) = 2.92, and Mean (Moderate brand_US) = 3.96. **The results are presented in Tables 2 and 3.** They also confirm that there is no significant change of consumers' purchase intentions between a foreign and domestic supplier for a high-quality brand, mean (High brand_China) = 3.9, and mean (High brand_US) = 3.83. Therefore, the moderating role of brand image of quality is validated, thus supporting H2(a) and H2(b).

Three-way Interaction effect of recall severity, brand quality, and COO. As we predicted, the three-way interaction was not significant ($F = .2, p > .05$). **The results support the notion that high brand quality may not necessarily lead to competitive disadvantage.** However, this possible advantage is not sustainable in a firm crisis such as a severe product recall. In spite of the fact that the severity level of recalls had a significant effect on purchase intention ($F = 12.37, p < .01$), the three-way interaction effect is not supported; therefore, H3 is supported. **The adjusted R Squared (0.097) is relatively low because we only include the main variables to test their effects on purchase intention, and we focused on comparing the mean difference of purchase intentions between different COOs and brand quality levels. Figure 3 provides the graphs of the effects of COO and brand quality on purchase intentions in minor and severe conditions.**

-----Insert Figure 3 About Here-----

Discussion

In this study, we used the R-A theory to assess the role of suppliers in the configuration of firm competitive and comparative advantages. First, we evaluated the relationship between

manufacturer brand quality and supplier COO. The results demonstrated a significant consumer purchase intention change based on supplier COO. Supplier COO has a much weaker spillover effect on a high quality brand (versus a moderate brand. High brand quality can help develop and sustain the manufacturer's comparative and competitive positional advantage. Thus, the supplier COO effect can be enhanced by brand quality when the supplier is blamed after a vehicle recall event.

Hunt and Morgan (1997) defines resources as the tangible and intangible entities available to the firm that enable it to produce effectively a market offering that has value for some marketing segments. Thus, resources are not just land, labor and capital. Rather, **resources can be categorized as informational (e.g., COO of key suppliers and brand quality) and relational (e.g., customer loyalty) (Hunt 2018; Hunt and Madhavaram 2012; Hunt and Morgan 1995; Morgan and Hunt 2002). The result of this study confirms previous studies which show that COO can serve as an informational source and interact with brand quality to influence consumer product evaluation.** validates the important role that brand quality plays in R-A theory. It suggests that consumers' strong brand loyalty can diminish the negative COO effect in the supply chain. In other words, consumers are less likely to switch from a high quality product when they find out a foreign supplier is involved in the product recall. However, for a moderate quality brand, this protection does not exist. Consumers have less trust towards a moderate brand (Veloutsou 2015), therefore, they are less likely to develop and sustain a committed relationship with the manufacturer. A moderate quality brand is less likely to have a competitive positional advantage than a high quality brand and is thus potentially vulnerable to the COO of a supplier when the supplier is blamed after a recall.

A high quality brand can help to create a committed relationship with suppliers and

consumers. Hunt and Davis (2012) indicate this relationship can constitute a comparative advantage in resources that can lead to positions of competitive advantage. The results of our main study confirm this. It demonstrates that the impact of COO on purchase intentions is impacted by brand quality. Customers favor a product whose parts are made domestically when the product is perceived as a moderate quality brand. A moderate quality brand usually does not enjoy the benefit of high commitment consumers. Therefore, consumers are more likely to rely on other cues (such as COO) to help with purchase decisions. Finally, though the results of the main study are consistent with the pretest and lend support to our contentions, the severity of a product recall indeed has a significant impact on consumer purchase intentions. However, there was still the question of whether a high quality brand can override the COO spillover effect in a severe recall, as we did not find support in our study.

Theoretical and Managerial Implications

We made several theoretical advancements in this study. First, we offered a specific empirical test of R-A theory on the concept of brand quality. Compared to high quality brands, moderate quality brands are less likely to attain positions of advantage, therefore, consumers are more likely to rely on other cues to help with evaluations. Moreover, this study extends R-A theory into the domain of supply chain management. We assessed the role of suppliers in the configuration of firm competitive and comparative advantages. It was found that supplier COO effect can be enhanced by the brand quality when the supplier is blamed after a vehicle recall event. This work also contributes to the literature on taking advantage of brand quality to mitigate the COO effect during product recall (Chen, Ganesan, and Liu 2009; Thakor and Lavack 2003).

This study also offers insights on supplier selection. It addresses the question of whether supplier COO impacts brands after a supplier related recall event. We find that consumers tend to

rely on COO information for moderate quality brands to help with product evaluation and decision making. It demonstrates that a high brand quality can override the COO effect on brand evaluation and selection. The finding should encourage high quality brands to be more aggressive with their supply chain options, such as seeking suppliers worldwide. The implications of this study shed light on the advantages of global marketing and provide support for high quality brands to expand their global business and build a global supply chain. However, a moderate brand should be more conservative, focusing on exploring the domestic market and targeting local suppliers.

Based on the above, we offer recommendations with steps that should be followed during a product recall event. Such steps are accompanied via a flow chart as illustrated in Figure 4, covering aspects of stakeholders' participation and decision towards achieving the firm's competitive and comparative advantages. When a recall event occurs, firms should first acquire big data via tracking technology to help identify the source of the problem so as to help those affected.

An aggressive supplier selection strategy is recommended for high quality brands to help achieve comparative advantage, as high-quality brands can override the COO effect. Accordingly, a moderate brand should adopt a conservative supplier selection strategy. Finally, companies should consider a reactive public relations strategy and changing suppliers if the recall event is severe.”

-----Insert Figure 4 About Here-----

Limitations and Future Research

Across the pretest and the main study, we explored consumer brand purchase intentions and the impact of supplier COO, brand quality, and recall severity. However, we did not address other influences that may drive a consumer to change preferences in terms of COO. Furthermore,

it is unclear whether the enhanced COO effect as a result of high brand quality can be impacted by recall severity.

Another limitation is the use of a student sample. It is unclear if our results will generalize to the general population. However, it is well established that the use of student samples is both acceptable and valid (e.g., Benmoyal-Bouzaglo and Moschis 2010). We also examined a single industry in this paper, which could limit generalizability. In spite of this limitation, the recall literature contains a wealth of single industry studies, with many singularly focused on the auto industry (e.g., Gao et al. 2015).

There is ample opportunity for more contributions in this domain. Future studies could use secondary real-world recall data to examine our propositions. Other work should extend our research into other industries to test the generalizability of our results. Additionally, different types of recalls within the severe condition could be examined. It is possible that those resulting in physical harm could differ from those that simply impact a large number of units.

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Appendix A

High Quality Brand Scenario Example

OMB Control No.: 2127-0004

Part 573 Safety Recall Report

15V-417

Manufacturer Name : Honda Motor Co.
Manufacturer Address: Minato, Tokyo, Japan
U.S Submission Date : JUN 24,2015
NHTSA Recall No. : 15V-417
Manufacturer Recall No. : JQ7



Description of Defect :

Description of the Defect : Honda is recalling certain model year 2013-2014 Accord manufactured April 30, 2012, through March 28, 2013. The vehicles may contain certain lots A/C compressor clutch drive bolts that failed to receive the proper dielectric topcoat.

Number of potentially involved : 6,439
Estimated percentage with defect : 1%

Description of the Safety Risk :

Defect can either cause the A/C unit to blow warm air, or may fall off the vehicle during operation.

Supplier Identification :

Component Manufacturer Name : Time Part Co.



Location: Jersey City, NJ, United States

The information contained in this report was submitted pursuant to 49 CFR §573

Appendix B

Moderate Quality Brand Scenario Example

OMB Control No.: 2127-0004

Part 573 Safety Recall Report

15V-417

Manufacturer Name : Ford Motor Co.
Manufacturer Address: Dearborn, Michigan. U.S
Submission Date : JUN 24,2015
NHTSA Recall No. : 15V-417
Manufacturer Recall No. : JQ7



Description of Defect :

Description of the Defect : Ford is recalling certain model year 2013-2014 Fusion manufactured April 30, 2012, through March 28, 2013. The vehicles may contain brake fluid which does not protect against corrosion of the hydraulic electronic control unit (HECU). **The defective brakes were manufactured in Zhejiang, China.**

Number of potentially involved : 106,439

Estimated percentage with defect : 40%

Description of the Safety Risk :

Defect involves corrosion in critical brake system components that can reduce braking effectiveness and increase the risk of a crash.

Supplier Identification :

Component Manufacturer

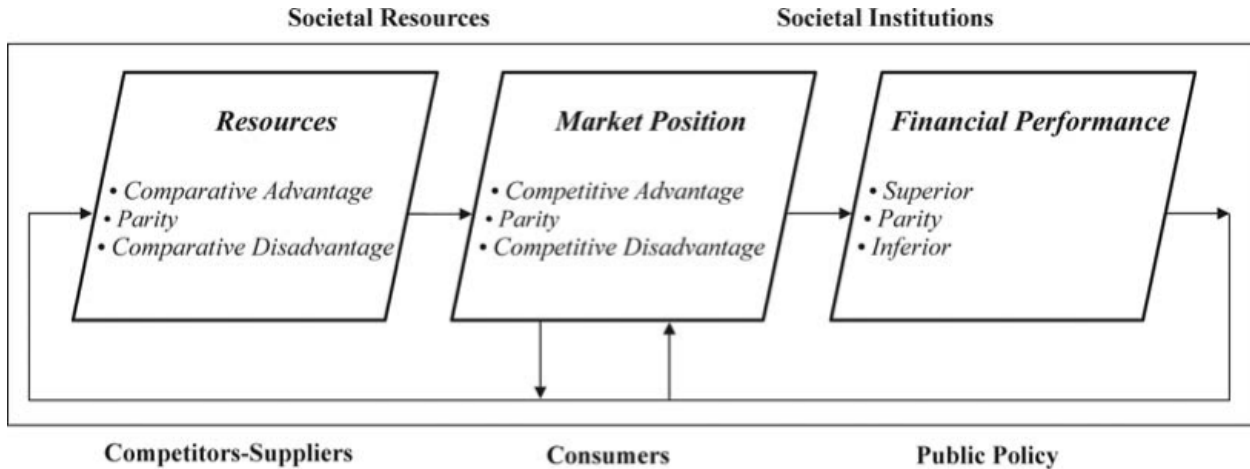
Name : Time Part Co.

Location: Wenzhou, Zhejiang, China

The information contained in this report was submitted pursuant to 49 CFR 5573

Figure 1

A Schematic of the Resource-Advantage Theory of Competition



Notes: Competition is the disequilibrating, ongoing process that consists of the constant struggle among firms for a comparative advantage in resources that will yield a marketplace position of competitive advantage and, thereby, superior financial performance. Firms learn through competition as a result of feedback from relative financial performance “signaling” relative market position, which, in turn signals relative resources

Source: Adapted from Hunt and Morgan (1997)

Figure 2

Conceptual Model

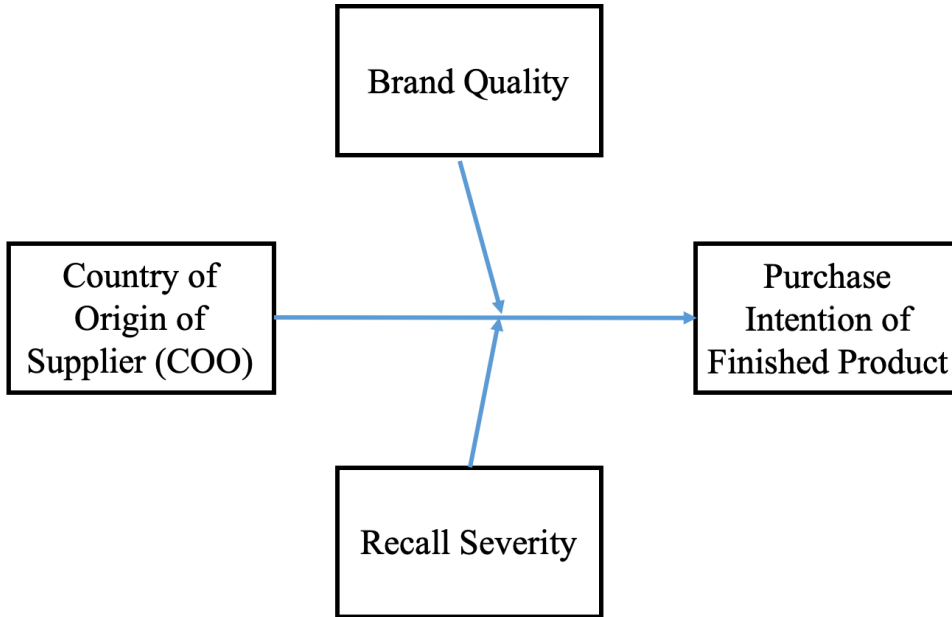
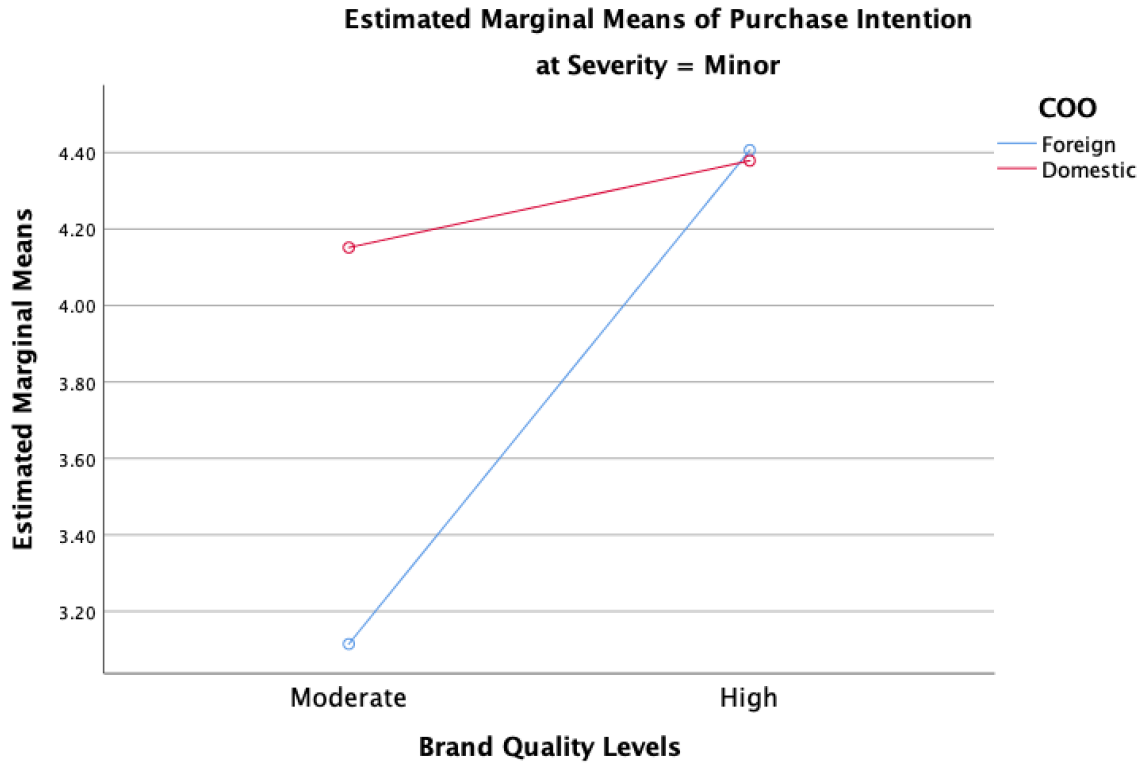


Figure 3

Graphs of Effect of COO and Brand Quality Levels on Purchase Intention

Minor Recall Condition



Severe Recall Condition

Estimated Marginal Means of Purchase Intention at Severity = Severe

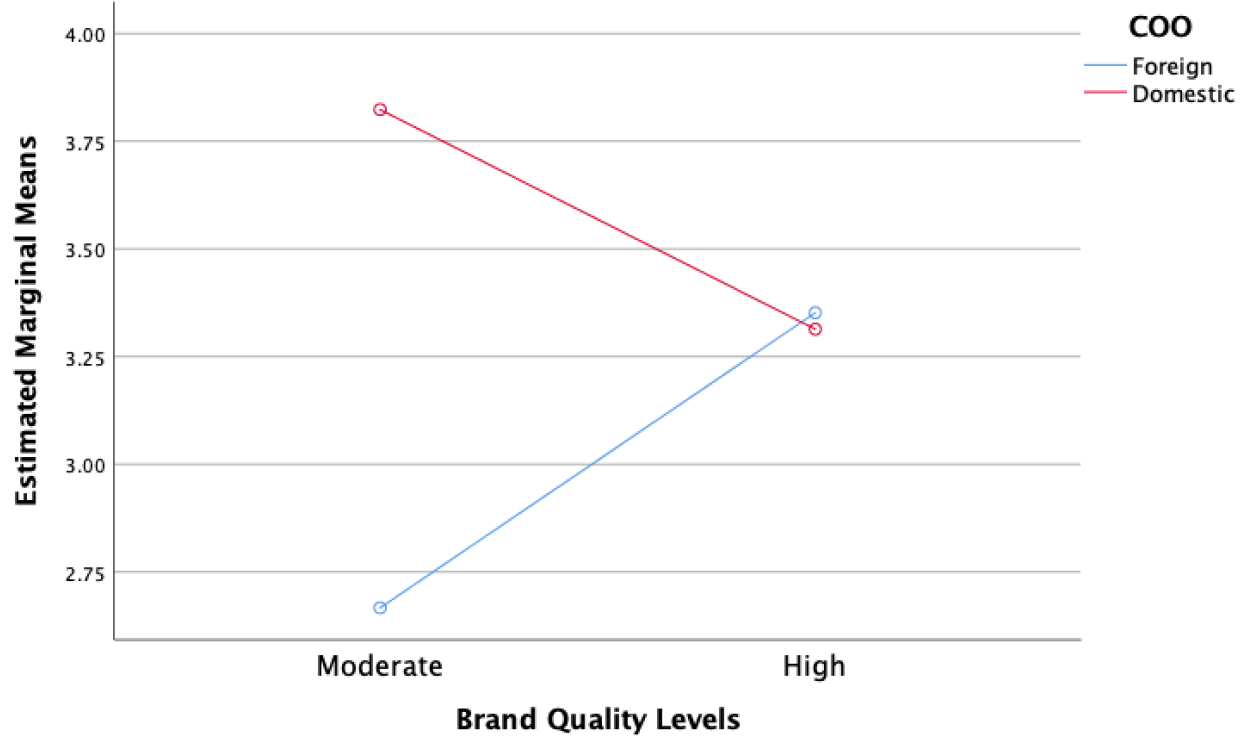


Figure 4

Recommendations for Firms and Stakeholders during Recall Event

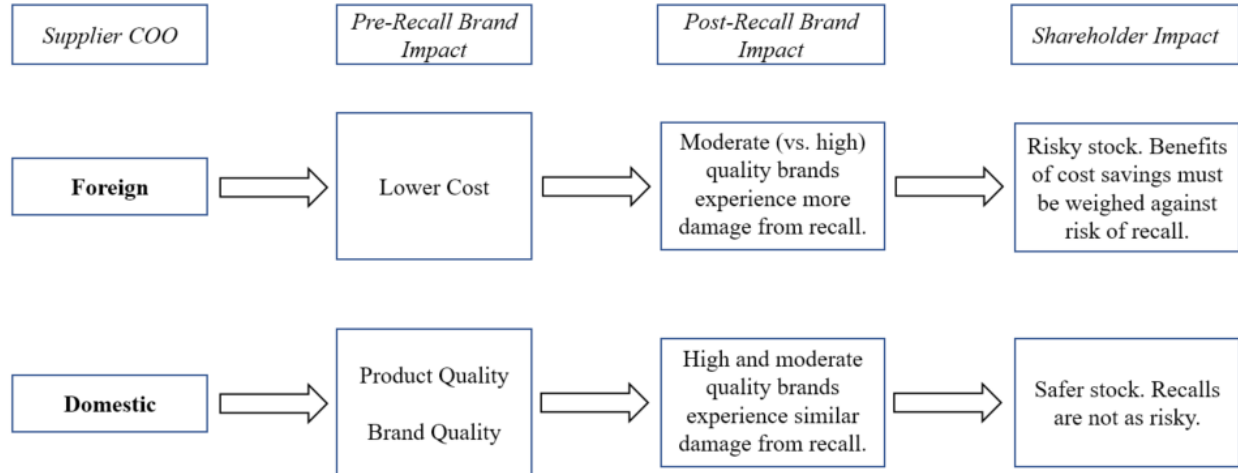


Table 1
Purchase Intention Change After Recall

COO	No. of Participants Changed	No. of Participants Unchanged	Total	% Participants Changed
Brand				
China	23	22	45	49%
Ford Fusion	14	7	21	67%
Honda Accord	9	15	24	38%
US	20	16	36	51%
Ford Fusion	11	7	18	61%
Honda Accord	9	9	18	50%
Grand Total	43	38	81	

Table 2**Mean of Dependent Variables**

D V	COO	Brand	Severity	N	Mean	Std. Error		
Purchase Intentions	China	Moderate	/		2.92	0.21		
		High	/		3.9	0.22		
		/	Severe		2.98	0.2		
		/	Minor		3.83	0.23		
		Total			147	3.41	0.15	
		Moderate	/			3.96	0.22	
	America	America	High	/		3.83	0.25	
			/	Severe		3.54	0.22	
			/	Minor		4.26	0.25	
			Total			123	3.9	0.16

Table 3

Main and Interaction Effects on Purchase Intentions

Dependent Variable: Purchase Intention

Source	df	Mean Square	F	p
Corrected Model	8	14.812	4.627	0
Intercept	1	212.587	66.4	0
ETHMEAN	1	19.456	6.077	0.014
SEV_CODE	1	39.606	12.371	0.001
COO_CODE	1	15.357	4.797	0.029
BRAND_CODE	1	11.527	3.6	0.059
SEV_CODE * COO_CODE	1	0.279	0.087	0.768
SEV_CODE * BRAND_CODE	1	6.285	1.963	0.162
COO_CODE * BRAND_CODE	1	19.935	6.226	0.013
SEV_CODE * COO_CODE * BRAND_CODE	1	0.001	0.2	0.989
Total	270			

a R Squared = .124 (Adjusted R Squared = .097)