Understanding and Mitigating the Negative Impacts of Product Recalls in the Global Supply Chain

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Contents

ABSTRACT

Product recalls can be detrimental to any company; the event can be costly and often causes a loss of company reputation, customer trust and loyalty, and sometimes a loss of customer lives. With the number of product recalls on the rise, the issue has become of utmost importance, and although government agencies are set in place to protect the customers, there is no such agency to act in the best interest of the company experiencing the recall (Sowinski, 2012). Therefore, understanding best practices for the prevention of, reaction to, and recovery from product recalls can be extremely beneficial to a business. Through extensive research, case studies, surveys, and company interviews, this paper defines best practices to protect businesses throughout product recalls. The paper first outlines the phases a company should progress through during a recall in a Product Recall Model. This paper also outlines recall best practices in a user-friendly Product Recall Strategy Development Checklist, complete with a scoring guide which enables company self-audits. The scoring guide categorizes the user into one of five stages in a corresponding Product Recall Performance Model. The model indicates to what degree the company is protecting itself against recalls and how prepared it would be if a recall were to occur. Recommendations are be given as to how to progress upward through the stages to achieve best practices, and therefore the highest protection from the consequences of a product recall.

INTRODUCTION

Background

A product recall is an event in which a company attempts to collect defective products that are moving downstream in the supply chain or have reached the final customer. Often times the product can be harmful to the end user, hence the speed and management of the recall are critical to its success. Product recalls can be voluntary, in the case that the company decides to recall a product independently, or it can be involuntary, in the case that a governmental agency mandates the recall.

The United States Food and Drug Administration (FDA) is one governmental agency that has the power to mandate a recall. The FDA is responsible for regulating the production and distribution of food, dietary supplements, human and veterinary drugs and vaccines, medical devices, products that emit radiation, cosmetics, and tobacco products (FDA, 2012). All companies selling products within these categories are regulated by the FDA and must adhere to their standards and regulations. These regulations are in place solely to protect consumers from dangers of product defects.

According to the FDA, there are three types of product recalls: Type I, Type II, and Type III. Type I recalls are for products that could cause serious health problems for consumers. Johnson & Johnson (J&J) experienced a Type I recall in 1982 when seven people died after taking its Extra Strength Tylenol. J&J stripped the shelves of all Extra Strength Tylenol, amounting to a total of 31 million bottles, and an investigation found that the deadly pills were laced with cyanide due to in-store tampering (Rehak, 2002). The seriousness of this recall classifies it as Type I.

Type II recalls are for products that could cause less severe, temporary health problems, or have the possibility of causing serious health complications. Clinical Specialties issued a voluntary recall in 2013 on its Avasin Unit Dose Syringes. The syringes were causing eye infections in consumers; five intra-ocular infections were reported to physicians. Because this product was not causing highly severe health problems, it can be categorized as a Type II recall (FDA, 2013).

Type III recalls are for products with the lowest health risk, and may include defective products that cause inconvenience or have labels that violate government regulations. McNeil Consumer Healthcare experienced a Type III recall in February of 2012 when customers were having difficulty using the measuring tool in Infants' Tylenol 1 oz. Grape. The syringe, which is supposed to pierce the protective bottle cover to measure the proper dosage of the medicine, would sometimes push the protective bottle cover into the bottle (Tylenol, 2012). Because this defective product was only inconvenient for the customer, and not threatening to anyone's health, it is categorized as a Type III recall.

Another United States agency responsible for protecting the public from dangerous product defects is the U.S. Consumer Product Safety Commission (CPSC). This agency is responsible for regulating consumer products that pose potential risk to the public due to fire, electrical, chemical, or mechanical threats, and threats to children (CPSC, 2012). Like the FDA, the CPSC also has the right to mandate a product recall for any company falling under these categories.

CPSC mandated a product recall for 2.1 million of Fisher-Price's Stork Craft cribs in 2009. The side-drop cribs were recalled due to defective hardware that could cause crib sides to detach unexpectedly, creating a gap between the crib wall and mattress. This gap could cause infants to fall out of the crib, or get stuck between the wall and mattress and consequently suffocate. 110 incidents were reported, four of which involved infant suffocation (Smith, Rooney, 2009).

Figure 1 illustrates a list of U.S. consumer protection agencies which protect the public against faulty products in a plethora of industries. These agencies make sure that a company acts in a way that will keep the public safe from harm, especially during a recall.

Similar regulatory agencies can be found around the world, as illustrated in Figure 2; in Mexico, the Cofepris regulates food and drugs. In China, the State Food and Drug Administration acts as the FDA equivalent. Europe requires various products to earn a 'CE' mark from the Notified Body which is placed on products to indicate that they conform with EU ('Conformite Europeenne' translated to 'European Conformity') health, safety, and environmental protection standards. Health Canada acts similarly to regulate products in Canada. Though these agencies help prevent some defective goods in the global supply chain, the various agency regulations are

not uniform, and therefore defects can still occur if outside regulations are not up to U.S. standards.

Consumer Protection Agency	**Responsibilities**
Federal Aviation Administration	Aircrafts
Consumer Product Safety Commission	Consumer Products
Bureau of Alcohol, Tobacco, and Firearms	Ammunition, alcohol, firearms, tobacco products
Amusement Rides	Jurisdiction based on State
National Highway Traffic Safety Administration	Automobiles, car seats, motorcycles, tires, trucks
U.S. Coast Guard	Boats
Food and Drug Administration	Cosmetics, drugs, electronic production radiation, food, medical devices, veterinary medicines
Environmental Protection Agency	Industrials/commercial products/Farm
Federal Trade Commission	Dissatisfaction with business practices
U.S. Nuclear Regulatory Commission	Radioactive materials
U.S. Commission Safety and Hazard Investigation Board	Chemical safety
Centers for Disease Control and Prevention	Vaccinations, poisoning due to food consumption
Department of Homeland Security	Terrorist attacks, natural disasters
U.S. Department of Transportation	Automobiles, car sears, motorcycles, tires, trucks

Figure 1 – U.S. Consumer Protection Agencies

Country	**Foreign FDA Equivalent**
Mexico	Cofepris
Canada	Health Canada
Korea	KFDA
China	State Food and Drug Administration
Europe	CE Mark (given by the Notified Body)

Figure 2 – Foreign FDA Equivalents

Problem Discussion

Product recalls can be detrimental to even the most esteemed companies; the event is usually costly to the business, harmful to the consumer, and damaging to the brand. According to Sowinski (2012), the number of recalls has been increasing in recent years; the FDA alone called for 3,400 recalls in 2010 – the highest number in five years. Recalls declared by the CPSC has also increased in recent years. In 2011 2,363 recalls were declared by the agency; this is a 14% increase from mandated recalls in 2010, and almost a 62% increase from recalls mandated in 2007 (Keenan, 2012).

The startling increase in product recalls is affected by many factors, one being that many governmental agencies, such as the FDA and CSPC, can now issue mandatory recalls; the FDA was given this right in 2011 as part of the Food Safety Modernization Act. The CSPC was given this right in 2010. Additionally, the FDA has broader oversight over companies due to new regulations in the same Food Safety Modernization Act of 2011, and also has the ability to closely monitor these companies, as other governmental agencies do, due to advances in recent technology (Sowinski, 2012). Finally, the growing trend of globalization makes it increasingly difficult for companies to maintain visibility throughout their extended supply chains, causing greater risk of product recalls (DiBenedetto, 2007a). From these huge increases in recent years, it is evident that the issue of product recalls is a growing problem and therefore it is crucial for companies to address this issue and find a way to defend themselves against its damaging effects.

Recalls can be especially harmful to the small to medium sized companies that are growing quickly; these companies generally are still developing their customer base and brand image, and

could therefore be greatly damaged by a recall if the situation is not handled appropriately. Additionally, these companies are typically focused on their forward supply chain, geographical expansion, and sales growth – they are *not* typically as focused on mitigating product risk, investing in Total Quality Management initiatives, developing contingency plans, maintaining a reverse supply chain, or preserving their brand name if product quality is sacrificed. Additionally, these companies usually do not have the money to spend on hiring a consultant or internal expert to advise best practices to defend against a potential product recall, leaving the company vulnerable to the resulting consequences.

Purpose of This Research

While recalls tend be detrimental to businesses, when handled correctly the event can actually offer the company an opportunity to strengthen their brand by making the customer feel safe and cared for (Field, 2006). This can be exemplified by the Saturn recall of 1993; the company was experiencing electrical wire problems that caused 34 engine fires in its vehicles. The company recalled 380,000 vehicles from the market, but decided to offer exceptional customer service during the recall. While waiting in line to have their vehicles fixed, employees were outside having a barbeque for the customers, giving out free movie tickets, filling gas tanks, and sometimes employees even picked up and dropped off the defective car for the customer. This exceptional customer service was remembered by Saturn's customers, and the company was actually able to use its recall for public relations, emphasizing how much they care about the safety and satisfaction of their customers (The Seattle Times, 1993).

Most companies, however, do not know how to best handle the event of a product recall, and therefore this opportunity to recover from an adverse event is missed. Additionally, little research has been done to summarize recall best practices or offer a self-auditing product recall tool. Also, no surveys were found that studied how effectively and efficiently companies handle recalls.

This project will attempt to fill a gap in the product recall literature by offering vulnerable companies a strategic framework to protect themselves against the dangerous consequences of a product recall. This will be done through the creation of a Product Recall Model; an overarching framework organizing and outlining the ideal phases a company should go through during a

product recall. It will also offer a user-friendly checklist, called the Product Recall Strategy Development Checklist, which enables companies to assess their readiness, responsiveness, recovery, and reflection capabilities regarding product recalls. The checklist will then place the business into a corresponding five stage Product Recall Performance Model, differentiating the companies accordingly (one being the least prepared for a product recall and five being the most prepared for a product recall). The model will also give insight on how the user can progress to higher stages of the model with a focus on prevention through quality management – as prevention is the best cure for product recall backlash. A self-auditing tool that allows companies to easily assess their own practices will allow them to make better decisions about mitigating threats against product recalls, and will therefore protect their customers and their business.

Upstream suppliers involved in business to business (B2B) transactions could also benefit from this research. When a recall occurs before reaching the end customer, often times it is not regulated by a government agency, and is usually kept hidden from the public. Instead, the supplier is quietly cut out of its customers' supply chain. These guidelines could assist in helping these upstream suppliers avoid and recover from a B2B product recall.

Research Question

This project will address the question of 'how can my business best understand and mitigate the negative impacts of product recalls'. It will do this by identifying the challenges of product recalls and defining best practices on how to avoid them, react to them, and recover from them. Though reverse logistics plays a large role in how companies manage the operational tasks of taking back their recalled goods, this paper will not go into depth on the efficiencies and best practices of this area.

While government agencies, like the FDA, require procedures that best protect the consumers, no guidelines have been set for how to best protect the company conducting the recall. It is obvious that consumers must be protected, but companies must also be interested in how to best protect themselves against the potential backlash that a recall can bring. Therefore, this paper will focus on helping companies survive a product recall, while abiding with governmental agency requirements. The paper will also attempt to assist suppliers when dealing with product recalls from original equipment manufacturers upstream in the supply chain.

LITERATURE REVIEW

John Lamb provides insight on product recalls in his article *'Many happy recalls and returns'* published in Logistics Manager Magazine in 2009. Lamb notes that product recalls are continuing to increase due to the greater amount of responsibility being put onto businesses for products after they are sold. Tighter safety and health regulations are also contributing to this spike in recalls. Lara Sowinski's findings agree with Lamb's as she notes the startling increase in product recalls over the past few years, mostly due to new government regulations and increasing government authority over recalls. Sowinski also mentions the harsher penalties companies are now facing for breaking these regulations, therefore increasing the damage a recall can cause (Sowinski, 2011).

These harsher regulations and penalties stem from The FDA Food Safety Modernization Act passed on January 4th, 2011. The act gives the FDA the authority to access internal records of questioned companies and mandate a recall (Layton, 2010). The new requirements also focus on prevention rather than punishment, putting responsibility of contamination prevention in the hands of the suppliers and manufacturers instead of federal officials. The bill also requires companies to continuously test their prevention strategies to ensure effectiveness. Additionally, importers are now required to verify that their overseas products meet U.S. safety standards (Layton, 2010). Those who break this bill are subject to civil and/or criminal penalties. Figure 3 displays the maximum criminal penalties for individuals and companies who violate the terms of the Food Safety Modernization Act; as stated, an individual can face up to one year in prison and $250,000 in fines for a first offense if the misdemeanor results in death. A second offense can lead to no more than three years in prison. An organization can face up to $500,000 in fines if the misdemeanor results in death (Johnson, 2011).

Statute	**Description of Statutory Provision**	**Maximum Criminal Penalty for Individuals (as adjusted by 18 U.S.C. §§ 3559 and 3571)**	**Maximum Criminal Penalty for Organizations (as adjusted by 18 U.S.C. §§ 3559 and 3571)**
Federal Food, Drug, and Cosmetic Act (FFDCA) § 303(a)(1) (21 U.S.C. § 333(a)(1))	Violation of FFDCA prohibited acts provisions, FFDCA § 301	Imprisonment for one year and/or either $100,000 if the misdemeanor does not result in death, or $250,000 if the misdemeanor results in death	$200,000 if the offense does not result in death, $500,000 if the offense results in death
FFDCA § 303(a)(2) (21 U.S.C. § 333(a)(2))	Violation of FFDCA prohibited acts provisions after a prior conviction under FFDCA § 303 or a violation committed with the intent to defraud or mislead	Imprisonment for not more than three years or a fine of not more than $250,000, or both	A fine of not more than $500,000

Figure 3 – Criminal Penalties for Violations of FFDCA § 303(a)
Source: Prepared by CRS.
Retrieved: Johnson, 2011

Alan Field (2006) has found that as the number of recalls rise, as has been the trend in recent years, it becomes increasingly difficult to collect the defective and sometimes dangerous products from consumers. On average, only 30% - 40% of all products identified as recalls get collected from the consumers, keeping 60%-70% of the defective items in the hands of the customers. Part of this is due to lack of effective communication, as it is difficult to inform all customers about the recall. Another factor that sometimes contributes to a lack of returned defective product is that the item is sometimes intentionally kept by the consumer in the hopes of it becoming a valuable collectable or novelty item. This can be seen in a recall conducted by McDonald's in 2010. The company found that it's 'Shrek Forever After' drinking glasses being sold for $2 contained dangerous levels of cadmium, and therefore recalled the 7.5 million sold. As an incentive, McDonald's even offered a premium, giving a $3 refund for each glass returned

(Gregory, 2010). Despite this premium, many McDonald's customers were reluctant to return the drinking glasses and chose to keep them as collectible items instead. In February of 2013, almost three years after the recall, there were 121 active listings for the Shrek drinking glasses on EBay, 106 of which were categorized as 'collectables' and many of which were being sold for around $15 – five times greater than the amount that was offered by McDonald's refund.

The problem of collecting defective products heightens the risk of product recalls, as it can increase the number of customers who are negatively impacted by the purchase, therefore increasing the negative impact for the company. In addition, upstream sellers might not have sufficient visibility into downstream distribution, and hence lose sight of where their products go.

Lamb (2009) cites a study conducted at Cranfield University which illustrates just how detrimental a product recall can be to a company. The study found that on average, a recall in Europe decreases company shareholder value by 14%. Lamb attributed the decrease in shareholder value to the perceived lack of control over the design of the products being made, and the supply chain in general. Additionally, a Harris Poll survey found that only 13% of customers would be very likely to shop with a company that forces them to drive to complete a recall return, a strategy very popular in recent recalls (Hoffman, 2006). Finally, DiBenedetto (2007b) found that returning an item due to a recall can cost a company 2-3 times more than it cost to get the product to the consumer in the first place. These statistics give evidence to the devastating effects of poorly handled recalls and highlights the need for companies to learn how to avoid recalls and handle them more appropriately when they do occur. It is therefore evident that protecting itself against the effects of product recalls should be a top priority for current businesses.

Strategies and Frameworks

Several recall frameworks have been developed advising companies on how to best handle a product recall. One of the first strategic frameworks was developed by Smith et al. (1996) who illustrated a user's guide for managing product recalls. This framework covered the key business functions of policy and planning, product development, communications, and logistics and information systems for the three phases of a recall (before, during and after).

Due to the rising number of recalls of imported products, Riswadkar and Jewell (2007) presented strategies for managing risks from imported products. Key elements of their strategy focus on supplier selection, due diligence and the clear communication of product specification and quality assurance. A legal viewpoint on the planning for and implementing a product recall is discussed by Wix and Mone (2007), particularly when dealing with a CPSC mandated recall. Roth et al. (2008) identified strategic insights into food supply chain recalls. They developed a conceptual framework called the "Six Ts" of supply chain quality management: traceability, transparency, testability, time, trust, and training.

A 3R framework (Exhibit 5) of readiness, responsiveness and recovery is illustrated by Tang (2008) who outlined the production/logistics, product development, and communication that companies must have in order to conduct a successful recall. He also mentioned the use of RFID for track and trace, and privacy issues around RFID. Sowinski (2011) emphasized the need to *avoid*, *streamline*, and *optimize*. This suggests that companies must identify opportunities to avoid recalls, streamline processes to ensure efficiency when a recall does occur, and optimize by recycling any part of the recalled product that is still useable. This strategy gives companies some insight on how to handle recalls, but the strategy is still somewhat vague.

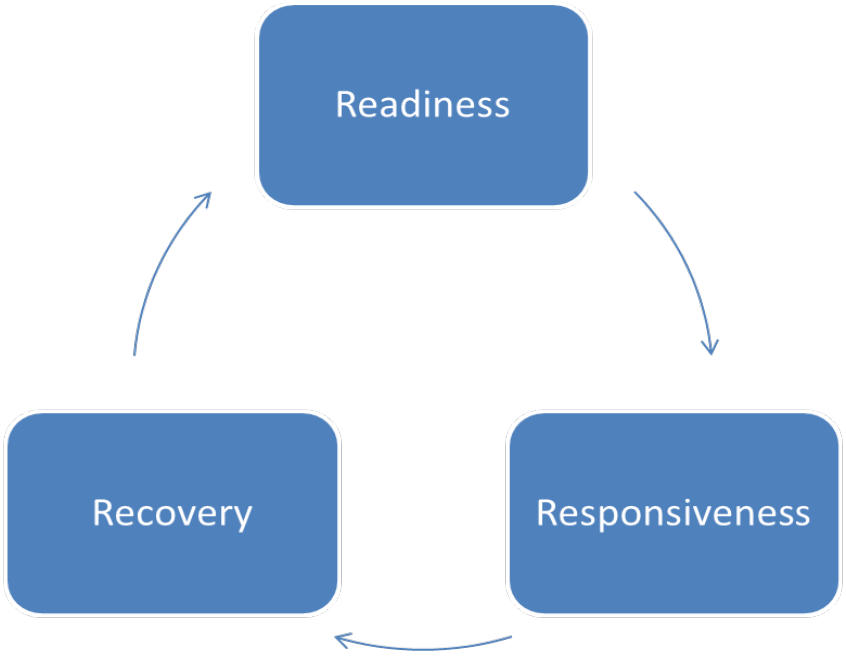

Figure 4 – Tang's 3R Framework (2008)

PRODUCT RECALL MODEL

Though the frameworks and strategies offered in previous works are a great start in filling the gap in the product recall literature, they are missing three key ideas. First, reflection is not mentioned in any model. This is a problem because companies need to frequently reflect on their product recall processes and performance to ensure these procedures are still relevant and efficient. Reflection will assist companies with continuous improvement of their recall procedures.

Additionally, the models offered in literature do not address reintroduction. After a recall, companies are forced to reintroduce either safe versions of the recalled product or their brand back into the market, and this can be very difficult to do if customer trust and loyalty was lost in the recall. Reintroduction difficulties are illustrated in the Ford Explorer and Firestone Tire recall of 2001. The Ford Explorer was designed as a top-heavy car, making it slightly unstable. The cars were also equipped with Firestone Tires that had tread separation problems, meaning the treads would come apart causing tire blow-outs. This dangerous combination caused 200 deaths, and in response, 13 million vehicles and 20.5 million tires were recalled. Ford decided to completely redesign the Explorer, and came out with a new version in 2002. Unfortunately, Ford had lost customer trust in the product, and the vehicle completely failed in sales (Huffman, 2013). This case supports the importance of addressing reintroduction strategies in recall frameworks.

Finally, frameworks offered in literature lack any idea of benefits that can be realized when a recall is handled successfully. This aspect is critical because it is important to acknowledge that not all recalls are disastrous, and in fact there have been successful recalls in the past. Emphasizing that benefits, such as minimized expense, retained customers, and a retained reputation can be obtained should act as a motivator for companies to handle recalls in an appropriate fashion.

Because of the shortcomings found in the literature models, a new model, The Product Recall Model, is suggested in Figure 4. This model is based off of Tang's 3R framework of readiness, responsiveness and recovery. Unlike Tang's framework, however, the Product Recall Model incorporates reintroduction to the recall process, emphasizes reflection at the end of each stage, and includes possible recall benefits that can be obtained. Different 'best practices' tips will

prepare a company for different stages of this model, and all stages must be strong in order for a company to mitigate against and react strategically to a potentially damaging product recall.

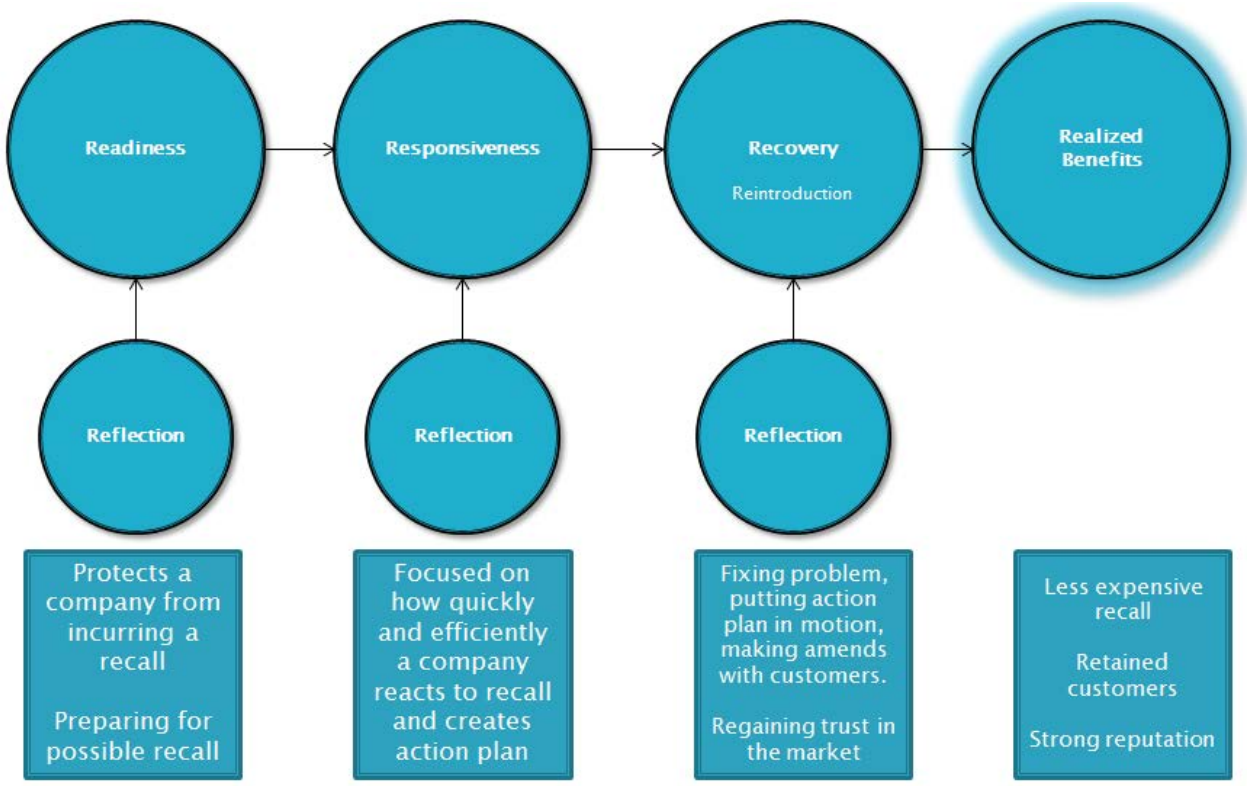

Figure 5 – Product Recall Model

Readiness

As illustrated in Figure 5, the first phase of the Product Recall Model is Readiness. This phase focuses on protecting a company from incurring a recall in the first place, and preparing for if a recall if it was to occur in the future. This phase is extremely important because the best way to ensure a company protects itself against the negative impacts of a product recall is to prevent a recall from happening at all.

According to DiBenedetto (2007b), being prepared is the best way to decrease costs during a recall. In order to be prepared, the 'Readiness' stage of the framework must be strong. To strengthen this stage, DiBenedetto stresses the importance of setting up reverse logistics systems for regular returns so that the system will be somewhat prepared for a large amount of recalled returns if needed. Additionally, recall procedures or a recall manual should be set in place before

a recall occurs so that all employees are utilizing the same plan, and ready to handle the situation as outlined (DiBenedetto, 2007b).

Lamb (2009) reports that installing a product tracking system is key to recall readiness; being able to identify the specific products that must be recalled can save a company a significant amount of money. Sowinski (2011) and DiBenedetto (2007b) agree that raising product visibility through tracking technology can help a company easily identify products by lot, date, or SKU. This will prepare a company for identifying which products will truly need to be recalled and disposed of, and which products can stay on the shelves, allowing for better accuracy in the returns process. This strategy can minimize waste and brand damage while maintaining customer loyalty and sales (Sowinski, 2011).

Storing current customer contact information is another practice that strengthens a company's state of readiness; knowing who to contact can greatly strengthen the responsiveness stage once a recall occurs (Field, 2006). Additionally, setting up pre-assigned teams to handle returns and recalls if the event does occur can also help prepare a company to mitigate to backlash that recalls can cause. Studying market leaders, creating contingency plans, and taking out insurance for recall protection are other practices that can help a company prepare for such an event (Lamb, 2009).

Smith, (et al., 1996) encouraged senior managers to instill a sense of importance when dealing with recall readiness; if senior managers do not take recall readiness seriously, the company will never be fully prepared if a recall occurs. This can be done by ensuring that employees understand the link between product recalls and consumer safety and satisfaction. Senior managers should also eliminate the 'kill the messenger' mentality because if employees are afraid to point out a mistake, a defective product will not be spotted as quickly. To prevent this 'kill the messenger' culture, Netscape Communications Corporation actually offered prizes to employees who found defects in its product software. Incentives like these will decrease the time it takes to identify and fix defected products, and therefore minimize negative backlash of a recall (Smith et. al., 1996).

Corporations should also assign recall responsibility to one senior executive who should have a team of employees ready to act as a response team if a recall occurs. Ideally this team should be

made up of cross-departmental employees, ensuring someone from marketing and logistics are included, who would deal with the recall on a daily basis (Smith et. al., 1996). This multi-talented team should have the ability to produce a well-rounded recall plan.

Recalls must also be considered in new-product development; new products should be safe, traceable, made of the correct materials, design focused, and frequently and thoroughly tested. Products that allow for replacement parts are also beneficial during a recall because it allows for easier and less expensive fixes if only one piece of the product is defective, and also this practice allows for more recyclable parts if the entire product must be redesigned (Smith et. al., 1996).

Additionally, Smith et. al., (1996) promoted the practice of mock recalls. These practice runs will help a company test its product traceability as well as its distribution and information systems. Mock recalls can help companies fill in the gaps of its recall processes, and therefore decrease the negative impact that a real recall could have.

Responsiveness

When a recall does occur, a company moves into the responsiveness phase. The success of this phase is based on how quickly and efficiently it reacts to the recall and creates an action plan. 'Responsiveness' can be strengthened in a company by implementing many different practices. A response team should immediately determine the seriousness and type of recall before any action is taken (Smith et. al., 1996). These determinations play a large role in how the recall should be handled. After this step is taken, DiBenedetto (2007b) advised that companies quickly create a reverse logistics plan and have answered questions prepared before communicating the recall to the public, as it will ensure a clear and accurate depiction of the situation. Conducting a root-cause analysis is the next step; understanding where the error occurred in the process will allow the company to eliminate the problem (Smith et. al., 1996).

After these steps have been taken, DiBenedetto (2007b) and Lamb (2009) advised that communication with all stakeholders must be nearly immediate. Details on the recall, instructions on how to return a recalled product, and company response to the recall are critical (Field, 2006). The company should also communicate their eagerness to make amends to their customers through appropriate corrections (Smith et. al., 1996). Finally, companies must ensure that communication is consistent, especially if there are different people and/or companies

communicating with various stakeholders. If the recall is not effectively communicated, people will be frustrated, uninformed, and unsafe (DiBenedetto, 2007b). Effective communication, on the other hand, can decrease the anger, confusion, and exaggerated rumors of a recall, therefore preventing the brand from becoming overly tarnished (Lamb, 2009).

The company must offer itself to the public in any way it can, for example through call centers, websites, and emails (DiBenedetto, 2007b). One way to spread the word is by utilizing current stored contact information to notify customers (Field, 2006). Lamb (2004) also mentioned the benefits of using the web to effectively communicate the truth to customers after a recall occurs – this method is fast, cheap, and easy for a company to use. Other web based communication tools which can be utilized are Twitter and Facebook. These social media sites have the ability to reach millions of people at virtually no cost.

However, with the number of recalls on the rise, it is becoming increasingly difficult to effectively reach consumers. Doering (2012) calls this trend 'recall fatigue'; the heightened bombardment of recall information increases the chance that consumers could ignore or miss an important recall notification. For this reason, it has become extremely important for companies with a serious recall to ensure that its message is reaching all consumers who have or may have purchased the product and its urgency is taken seriously.

Sowinski (2011) advised to avoid the popular 'shelve cleansing' strategy. This involves collecting all distributed product from each distribution location to ensure that no bad product gets into the hands of the consumer. Sowinski noted that not only is this 'cleansing of shelves' wasteful by recalling some products that were not defective, but it also creates customer concern; if a product is completely removed from the shelves, customers tend to start doubting the product and company brand, which therefore threatens customer loyalty. Instead, companies should use their product tracking system to identify which items are defective and recall only those items.

Sowinski (2011) and Field (2006) agreed that tracking should also be used to anticipate where, when, and how many products will arrive back at the warehouse. This will enable the company to plan for enough staff and space to handle the products (Field, 2006). Additionally, the tracking system should be used to identify which recalled goods have been received, processed, and disposed of. Immediately utilizing product visibility can decrease recall time, provide visibility

into the amount of labor needed to handle the incoming goods, and reduce the hours that employees must work handling the recalled goods, all strengthening the responsiveness phase of the recall (Sowinski, 2011).

Finally, the company should incentivize customers to return the recalled product in some way. This will not only collect more defective products, but will also keep customers loyal to the company. Mattel did this during its recall in 2007; the company provided its customers with vouchers for new or alternative products when dangerous, lead-painted toy cars were returned (DiBenedetto, 2007b). Newgistics, a company that specializes in reverse logistics, recommends giving Smart Labels to customers, who then stick the label on their good before mailing it back to the warehouse. This makes it easy for customers to return defective products, and enables the company to easily trace their recalled goods (Field, 2006).

Recovery

As the response stage nears its conclusion, the company enters the recovery phase. This phase includes setting the plan in motion to fix the problem and make amends with customers. The 'Recovery' stage can be strengthened by informing customers of the progress of the recall and how the company plans to rebuild brand trust and reputation. Throughout this stage, the company must focus on long-term marketing implications and opportunities that can emerge from the recall; ideally, the chosen recall strategy should be used to positively market the firm in the future (Smith et. al., 1996).

Companies should alter existing process plans and/or product designs to verify that the root cause of the recall has been eliminated, and report this progress to its stakeholders (Smith et. al., 1996). This will help improve the company's reputation as it admits its mistakes and illustrates its efforts to change. Once the flaw has been fixed, a resolution plan should be created and followed. This plan should outline goals for the recall (such as a 90% return rate of defective goods), determine the adjustment offer (such as product replacement), and how to market the recall in order to retrieve the product from the customer (Smith et. al., 1996). Returning the product should be made as easy as possible for the consumer in order to maximize the number of returns, hence the reverse logistics process should be looked at for improvements.

According to Sowinski (2011), optimizing the products being returned from the recall can also help in this stage. Optimizing means maximizing the value of the recalled product in any way it can such as donations, or recycling parts. This can help the company's reputation by minimizing the wastefulness of a recall. The recall should also be closely monitored and audited to track return rates (Smith, et al., 1996).

Another piece of this phase is reintroduction. This is when a new product or the revamped recalled product is introduced back to the market. The reintroduction stage focuses on regaining trust in the marketplace and recovering from lost sales. Reintroduction can be strengthened by communicating a new product safety plan to the public, outlining how the company will prevent a recall from occurring again (Smith, et al. 1996). Advertising and promotions should also aim to rebuild the brand name. This will increase customer trust as the company puts product back on the shelf, therefore increasing the likelihood of sales. Success stories from the recall, such as exceptional customer service, should be told. This will highlight the company's dedication to its customers. The company should also monitor customer satisfaction regarding the replacement or reintroduced product. Through monitoring, the company can alter its reintroduction strategy if necessary. Finally, the firm must keep an eye on its competition, who could have gained market share during the recall (Smith et. al., 1996). Staying knowledgeable about where the competition stands will give the company an edge when re-entering the marketplace.

Johnson & Johnson (J&J) successfully reintroduced its previously recalled Extra Strength Tylenol by utilizing many of these strategies. First, J&J advertised its new triple-seal tamper resistant packaging, illustrating to consumers how the product packaging will be safer. Through newspapers and a toll-free number, $2.50 coupons were also offered to consumers to incentivize them to purchase the new product. Finally, over 2,250 representatives traveled around the country giving presentations to the medical community in order to restore confidence in the product (Susi, 2002). By the end of the recall, J&J had fully recovered its 40% market share in the pain-relief industry. These decisive actions reestablished stakeholder trust in Extra Strength Tylenol, and therefore allowed Johnson & Johnson to successfully reintroduce the product.

Reflection

Finally, the company must learn from its mistakes by reflecting after each stage. This can be done by documenting and reviewing all recall notification procedures and recognizing if more opportunities to point out a mistake should be implemented (Smith et. al., 1996). A company should then identify possible improvements in recall logistics, information systems, and recall manuals, and alter these things if necessary to minimize recall damage in the future (Smith et. al., 1996). This is also the phase where a company should evaluate whether to continue purchasing from its current suppliers if they had any part in the recall.

SURVEY

Empirical research was conducted through surveying 17 companies about how they have, or would have, handled a product recall (see Appendix A for the complete surveys). The survey questioned companies about their readiness, responsiveness, and recovery regarding product recalls. The survey did not seek answers about benefits of well-handles product recalls.

Because there were only 17 survey respondents, it was impractical to conduct a full statistical analysis on the data. But this research is an exploratory study and the purpose of the survey was simply to look at what companies are currently doing to protect themselves from recalls, and what they believe are product recall best practices.

Survey Results

The first significant finding resulting from the empirical survey was that 15 of the 17 respondents, or 88%, indicated that they had experienced at least one recall in the past (Figure 6). This is in alignment with the data suggesting that the number of recalls has been increasing, and supports the idea that recalls are almost an inevitable part of business. This finding illustrates the need for companies to be prepared to handle a product recall, as it will most likely occur in their company in the future, therefore validating the purpose of this research.

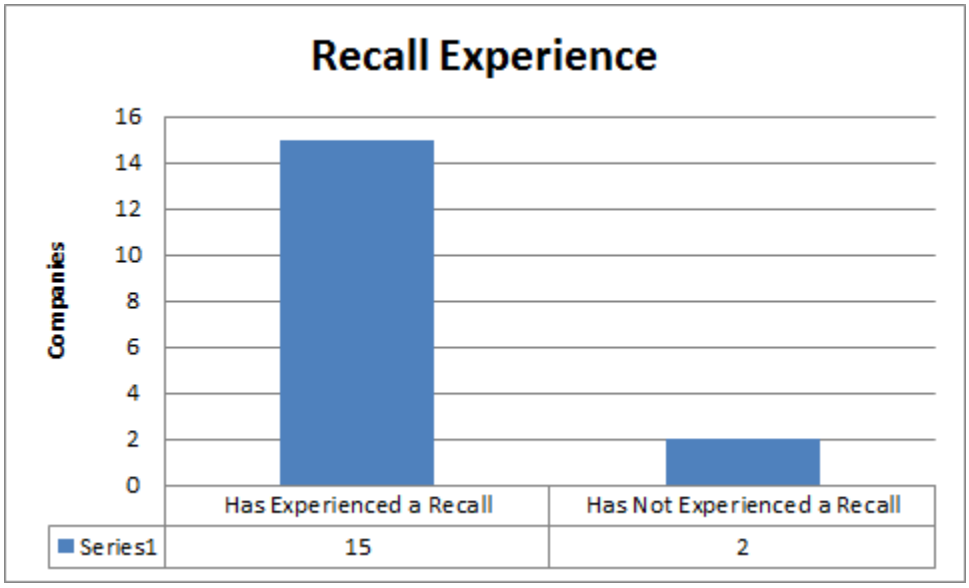

Figure 6 – Recall Experience

Another survey finding, as illustrated in Figure 7, was that 94% of respondents documented each procedure as it happened during the recall. Of these respondents, 81% used this documentation to reflect on and improve the procedures they had set in place. This emphasizes the usefulness of the reflection phase and illustrates that it is currently used as a best practice in company recalls, therefore supporting the argument that it should be included in the Product Recall Model.

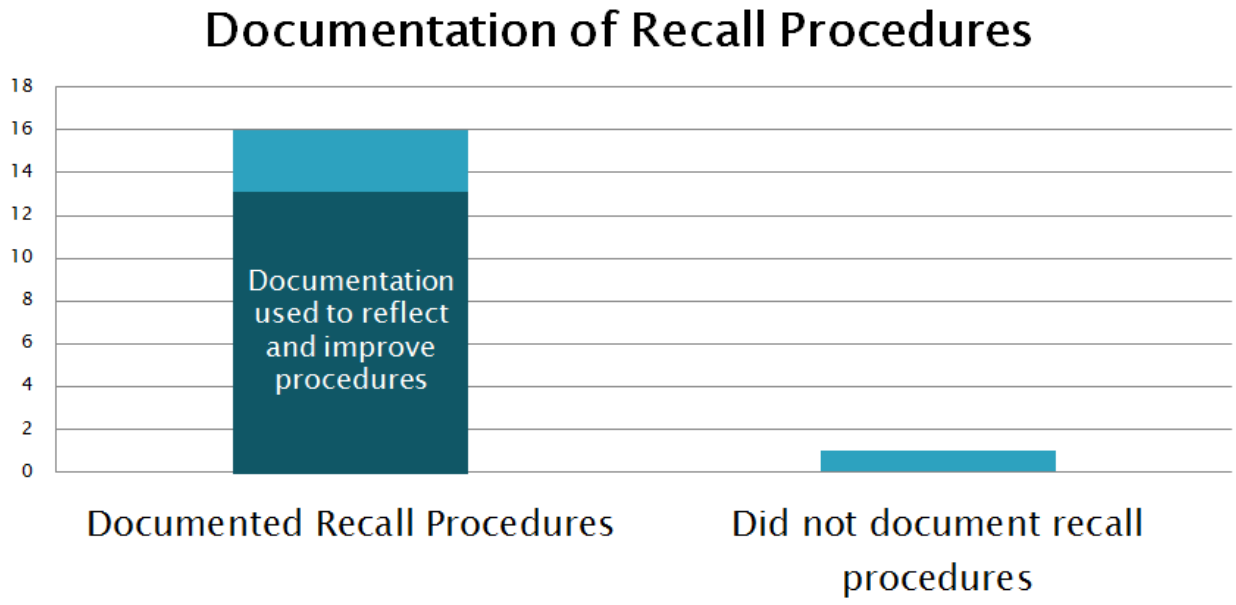

Figure 7 – Documentation of Recall Procedures

It was also found that 88% of the respondents had a response team determine the seriousness, type, and scale of the recall. Of these respondents, 100% claimed that it directly affected the way the recall was handled (Figure 8). This finding indicates that having a response team determine the seriousness, type, and scale of the recall is critical in the way the recall is handled. Therefore, this item is included on the best practices list.

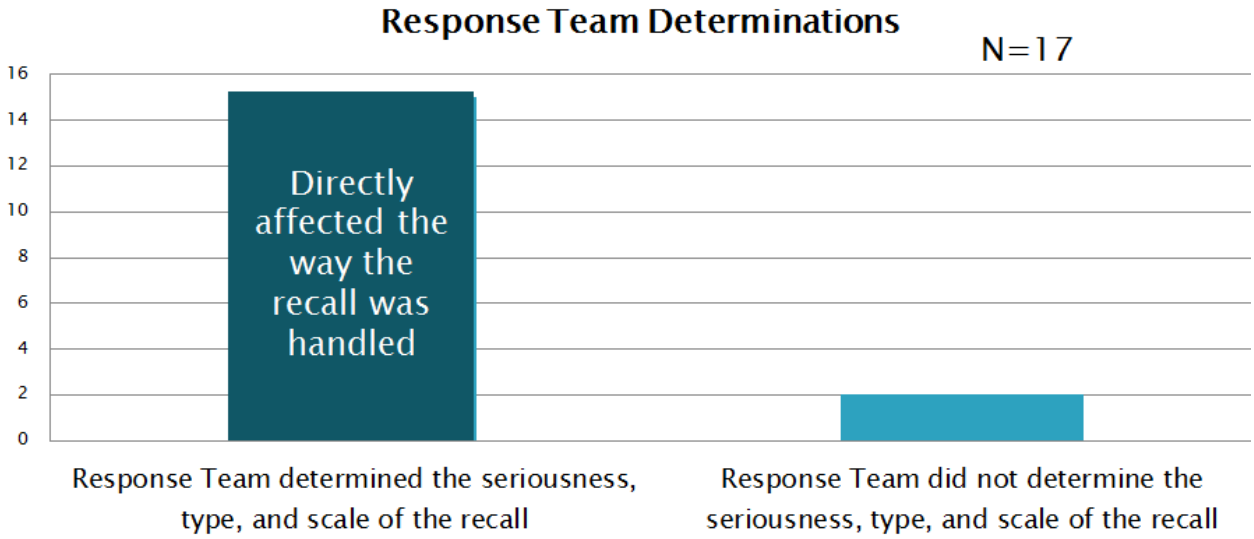

Figure 8 – Response Team Determinations

Most companies' response teams were made up of at least 2 departments, as it provides the team with a well-rounded and diverse knowledge base. The most common departments participating in the response team were the quality assurance/quality control department, and also the customer service department for companies dealing directly with the public.

Additionally, many different supply chain management strategies were set in place in these companies to prevent defects from occurring in products. The most popular included lean manufacturing, poka-yokes, ISO-9001, Total Quality Management methodologies, quality assurance checkpoints, and six sigma strategies.

INTERVIEWS

Three interviews were conducted to further investigate how current companies handle product recalls. Companies were questioned about the processes, challenges, and strategies of past recalls. For confidentiality reasons, the companies will be addressed by their industry name.

Juvenile Products

In 2004 there were seven reports of infant strangulations due to baby monitor cords. Two of these deaths involved a product of this juvenile products company. In response to this trend, the company decided to conduct a voluntary recall. This recall did not involve collecting the defective product from the customers, but instead involved distributing free safe installation guides, cord warning labels, and cord wall mounting security clips to customers who bought the product. These goods were made accessible to the public through ordering from a toll free number or by completing an online registration form. This recall was announced through the company's 8K report, online website, and social media sites (Facebook and Twitter). The total recall took five months to complete.

The company had a recall response team made up of employees from many different departments. This is extremely important to recall success because it dispersed responsibility onto different departments, gave the team diverse ideas, and ensured that all aspects of the recall were covered. The company believes that having a response team made up of employees from one department is inefficient, prolongs the process, and increases the probability that the team could overlook part of the recall process; therefore there should always be more than one department involved.

The company currently has many procedures in place to ensure product safety. Strict audits are conducted in manufacturing and distribution facilities periodically. Quality assurance checkpoints are also set in place during the manufacturing process to prevent defects from occurring. Additionally, there are warehouse inspections and Total Quality Management methodologies are followed.

The company also monitors their supply chain partners very closely. They do this through ensuring the companies follow a standard set of operating procedures, and by performing audits on supply chain partners twice a year. With the number of suppliers this company does business with, there are audits going on almost every month. These audits ensure the integrity of their products is being upheld.

The company tracks its products by serial number and lot codes throughout the supply chain. This tracking is especially important for technology based products of high value. This tracking

can determine which products are defective and which are not, determining what portion of total products need to be collected from stores and customers. This has the potential to save the company excess expenses.

Grocery Retail

The grocery retail company experiences product recalls on a regular basis involving perishable and non-perishable items. This industry is fairly unique in that recalls usually affect the entire industry instead of just one brand. This is because the defect is usually found in the manufacturing plant of large brands, or in major sourcing areas of the world, causing it to affect most supermarkets in the industry. Even a defect in a private label brand can affect competitors as the manufacturing plants and recipes are often used by other brands.

The company has a plan in place to manage recalls in the future, and has a predetermined team, led by their food safety and legal departments, to manage recalls. To communicate a recall with its customers it utilizes social media and its loyalty card data, and the internet is therefore critical when declaring a recall. Facebook and Twitter are often utilized, but they have found that the loyalty cards are the most effective; the data on the cards indicate which customers have recently purchased a recalled product, enabling them to contact the customer by phone, email, or letter. This was done a few years ago in response to a large dog food recall, and customers were extremely grateful for the warning that helped protect their dogs.

Their computer systems are also effective in keeping recalled products from leaving the store; when a recall is announced, all scanning systems are notified. After that, anytime the recalled item is scanned, the scanner gets a notification saying that the product is not for sale. This keeps dangerous goods out of the hands of the consumers as quickly, effectively, and inexpensively as possible.

While the company has full supply chain tracing of its products, they do this with minimal technology; “the old fashioned way.” The company tracks products through purchase orders, truckers’ driver’s licenses, and documentation about which picker is responsible for picking the product/pallet in the warehouse and where it is being sent. The company is not alone in utilizing this more manual technique for tracking products, as they state that Radio Frequency Identification (RFID) tags have not yet been fully adopted by supermarkets yet. Product tracking

is extremely important for this company during a recall. It is not necessarily used to identify which specific products are defective, but it is always used in figuring out the cause of the recall, and where the defect is being created. This is because the company must notify the FDA of exactly where the defect originated, making it critical to the success of the recall. Quality assurance checks along the supply chain help to track and document this.

The Grocery Retail Company also monitors their supply chain partners very closely through ongoing inspections in stores and distribution centers. Products are always thoroughly inspected at point of receipt because this is where the company takes financial responsibility for the product, incentivizing them to send something back at this point if there is a defect. For goods that are delivered directly to the store, the company employs district sanitarians to conduct daily inspections in the stores.

The company conducts mock recalls four times per year as required by the FDA. These mock recalls are conducted to prove traceability of its products, which must be confirmed within 24 hours (although they usually get it done in two hours). These recalls do require some extra expense, as labor must be utilized to prove the traceability, but the procedure is extremely helpful in ensuring that their tracing systems are efficient if a real recall were to occur.

One of three strategies are used when word of a defective product reaches the company: hold, hold and destroy, or hold and return the items. Hold involves taking the product off the shelves, but storing it until further instruction, as the product has not been confirmed as defective. Hold and destroy involves taking the product off the shelves and destroying the item because it cannot be sold or used in any way. Hold and return involves taking the product off the shelves and returning it to the manufacturer. This can sometimes happen if a store receives a shipment of product with packaging targeting customers from another supermarket. In this case, the product is not bad, so should not be destroyed, but must be relocated.

Clothing Retail

This company specializes in the retailing of women's clothing. A recall in this industry is not necessarily dangerous to consumers, but may involve "color crocking," in which the color of one garment rubs off onto another, creating a defective product.

The company monitors its supply chain partners very closely. This is especially important for clothing retailers because many manufacturers are oversees, and therefore it is important to monitor and regulate working conditions. The company uses a third party to audit these manufacturers to ensure quality working conditions and effective production procedures.

This company and industry is unique in its product recall procedures as it rarely has to communicate with the public about a recall, as the recalls pose no threat to the customers. The company indicated that the customer is usually the one to bring a product defect to the company's attention. For these reasons, this company probably does not have as many quality assurance procedures as other industries may have, and does not need to be as concerned with its communication procedures when a recall occurs.

Optimizing the value of the recalled product is very important to this company. The company will either fix the product using recoloring techniques or by re-sewing the product and selling it at full price, or by selling it directly to a discount retailer. By maximizing the value of the defective product, the company saves as much money as possible.

EMPIRICAL FINDINGS

From the empirical studies some best practices were identified. First, this research supported the idea that a recall team should be made up of at least two departments; this will ensure the team has different perspectives and is covering all areas. These teams should include someone from the quality assurance/quality control department. Additionally, companies should become an expert on the industry's legal and regulatory requirements. This will enable them to have enough time and resources to not only comply with these requirements that protect their customers, but also construct a strategy to protect their business. Knowing where financial responsibility for materials begins is also crucial; this will help determine where quality checkpoints are set in place, as quality should be checked before the company takes full financial responsibility. This way, if there is a defect in the product, the suppliers will be financially responsible for it. Additionally, utilizing intranet systems was indicated as a very popular and efficient way to communicate internally. Finally, some type of supply chain strategy, or a combination of a few, should be implemented into day-to-day manufacturing. These can include lean manufacturing,

poka-yokes, ISO-9001, Total Quality Management methodologies, quality assurance checkpoints, and six sigma strategies. These findings were added to the list of best practices.

PRODUCT RECALL STRATEGY DEVELOPMENT CHECKLIST

The Product Recall Strategy Development Checklist featured in Appendix C summarizes the key actions a company should perform regarding the product recall process. The checklist is based on the literature, surveys, case studies, and interviews conducted in this study. Organized into the Product Recall Model phases illustrated in Figure 5, the checklist is broken up into readiness, responsiveness, and recovery sections. This self-auditing tool enables companies to be as strategically prepared as possible for a product recall and constantly reflect on its processes and performance.

Readiness Checklist

For recall readiness, the company must first ensure upper management support for recall preparedness; senior managers must instill an organization-wide recognition of the importance and seriousness of good product recall strategies. This can be done by ensuring that employees understand the effect that well-run recalls have on corporate success, as well as the effect that poorly run recalls have on corporate failure. This support is important because without it, it is unlikely that any recall-ready procedures will ever be successfully put in place. Finding ways to eliminate a "kill the messenger" culture will also be extremely beneficial to a recall-ready environment; companies want their employees to catch a defect before the product reaches the customer, and by eliminating this type of culture, it is more likely that employees will feel comfortable pointing these things out. Providing incentives to identify product defects or flaws in the process is one way to create an ideal recall-ready corporate culture.

Documentation and transparency are also important in recall readiness. All procedures and practices of the company should be documented so that if a defect occurs, the company will be able to identify if it was because of the set procedures, or if something went astray in the process. A formal contingency plan addressing what to do if a recall occurs should also be documented; this will cut down on response time to the recall, as employees will have some type of plan to start with. Metrics measuring product specifications, quality standards, reverse logistics, and handling processes should also be recorded and constantly tested. Finally, to be able to

differentiate potential defective products, and ensure accurate product location, individual products should be traceable and trackable, which will increase overall supply chain transparency.

Recall responsibility and product safety responsibility should be assigned before a recall occurs. A product safety committee should be created from cross-functional departments to ensure product safety is being met. Putting safety responsibility in the hands of employees will ensure products are being produced as accurately as possible. This team should also have the ability to order a recall if they discover that the product is no longer safe for the consumer. Recall responsibility should be assigned in advance to one leader in charge of a multi-disciplinary team whose duty it is to handle the recall once it occurs. This team should be made up of employees from at least two different departments. One department participating in the recall should be quality assurance. Additionally, a high ranking employee should lead the team in order to give it credibility.

Monitoring supply chain partners is another important part of recall readiness. Companies must ensure that their upstream suppliers and/or downstream customers have their own adequate product safety programs to prevent product recalls. Companies should also protect themselves against the damages of recalls by creating agreements with supply chain partners to share the cost of a recall if the partners were partially responsible for the defective product; no company wants full financial responsibility for a defect that it was not responsible for. Finally, a centralized data system that allows product and process visibility to major players in the supply chain can also be beneficial in understanding where and how a product was being damaged. Access to this database by regulatory agencies should also be considered.

Companies should also prepare consistent recall-ready processes to prepare themselves for a potential recall. First, mock recalls should be conducted periodically in order to identify improvements in the recall system. These mock recalls no not necessarily need to be on the same scale as a real recall, but it is important to ensure that recall procedures, traceability, reverse logistics, and storage availability are up to date and effective. A closed-loop logistics system should also constantly be in place to handle regular returns. If a recall were to occur, this system would be very beneficial in helping handle the influx of defective product.

Areas of risk along the supply chain should periodically be identified and analyzed. Additionally, quality assurance checkpoints should be present in different parts of the supply chain to enable a company to detect a defect quickly. These checkpoints should be placed directly before the company takes financial responsibility for the product, enabling it to send back a defective product without financial responsibility. Product traceability should also be checked routinely. Finally, a list of stakeholders who should immediately be contacted if a recall occurs should be maintained and periodically updated; this will decrease reaction time if a recall occurs.

New product development should also be considered when preparing for a recall. Products should be designed for manufacturability, disassembly and repair, and sustainability/value recovery. Manufacturability includes ensuring that safety and traceability are designed into the product. Disassembly and repair requires products to be designed in a way that allows for the insertion of replacement parts. The ability to safely and quickly disassemble a product can decrease the cost of a recall because if only one piece of a product is defective it can be easily replaced. This can be seen in many automobile recalls where a customer must only bring the car into a dealership to swap out a single part instead of replacing the entire car. Finally, products should be designed for sustainability so that the product can be reused in some way if returned due to a recall.

Finally, a company should reflect on its recall readiness by identifying any new tracking technology that could be incorporated into its products. It should also reflect on the culture of the company and upper management support, analyzing if improvements in this area should be made. Lastly, a company should reflect on the assignment of recall responsibility, ensuring that it is still appropriate.

Responsiveness Checklist

To effectively respond to a product recall a company must first identify the defect, and then halt production and distribution to prevent more defective products from being sold to the customer. The recall response team should then determine the seriousness, type, and scale of recall which will dictate how the company should proceed. A root cause analysis should then be performed either by the company or by a recall specialist.

Communication is the next area to address in the responsiveness phase. Senior managers must quickly communicate awareness of the problem as well as the company's response to internal product stakeholders. Next the recall should be publically announced, explained, and apologized for as rapidly as possible. Additionally, senior management's eagerness to make amends should be genuinely communicated. The web and social media sites like Facebook and Twitter can be a very fast, effective, and inexpensive tools in communicating these ideas and minimizing rumors or exaggeration about the recall. Opening separate phone lines to answer customer questions and concerns can be effective in managing both customers concerned about the recall (calling the specialized phone line) and also unaffected customers (calling the regular phone line); this way, each customer can easily reach a service representative who is equipped to handle their inquiry.

The next step in the responsiveness phase is to prepare for the collection of the recalled product. Warehouses need to allocate space for the defective incoming product and transportation must be secured to pick up larger shipments. Use of a 3PL should be considered if warehouses and transportation are unable to handle the increased capacity. Finally, companies should only collect defective products, and avoid cleansing shelves of all products if possible. If only one lot of product is defective, for example, the company should not cleanse the shelves of defective *and* non-defective products; it instead should identify which products are defective and collect only those items. Cleansing shelves increases panic and distrust among consumers.

Corrective action should then be taken during the responsiveness phase. This is conducted by developing a recall plan that is specific to the current recall and building commitment to it throughout the organization. Building the recall plan should involve taking generic company plans and procedures and customizing them to fit the current recall at hand.

Finally, the company should reflect on how well it performed in the responsiveness phase. Recall procedures and communication strategies should be reviewed to identify areas for improvements. Additionally, the company should analyze how long it took to identify the defect, and review ways to reduce this time. Finally, a cost benefit analysis of hiring an outside expert to handle this phase of the recall should be conducted.

Recovery Checklist

The last phase of the checklist is recovery. A company must first resolve the defect by identifying the glitches in the process that led to the defect, design a resolution plan, and then fix the flaws. Next the company must verify that the root cause has been eliminated through testing.

Communication is the next step in this process. Progress of the recall and the steps being taken to fix the problem must be reported to stakeholders; this will maintain stakeholder trust and loyalty. Additionally, the company must reassure the stakeholders that the new process being put in place is safe. This will increase consumer confidence in the product and company.

The company must then focus on the return of the product. An adjustment offer for the recalled product should be created, as well as a marketing plan to retrieve the defective product if appropriate. The company should ensure easy returns processing and consider offering outbound replacement shipping. Anything that will make it easier for consumers to return the product will increase customer retention and keep the defective products off the market.

The next step is tracking and documentation. This includes setting goals for recall success. These goals should be set before the recall data is collected and analyzed to prevent bias in determining recall success. Some examples of recall goals are a 90% return rate or a 5 month recall period. It is important to track the returns of the product to determine if the company is successfully incentivizing its customers to return the defective product. It will also indicate to what extent the dangerous or defective product is still in the hands of the consumers. Also included in tracking and documentation is setting up a recall-management information system. This will help the company manage and analyze the recall data. Auditing the recall is also important, as it is crucial that the recall procedures are being handled appropriately and as planned.

Optimization is the next step during the recovery and reintroduction phase. This step is focused on creating value from the recalled product in any way possible. Some examples are reusing parts of the product, selling the product at a discount, donating the product, or scrapping the parts for maximized value. The company should also keep long-term marketing implications in mind (the donation or recycling of the recalled products, for example, could be used as a marketing tool later on). Finally, the company should assess and identify opportunities to redesign the

product, process, materials, and anything else that goes into the creation of company products to create the highest probability for optimization in the future.

The company should then focus on reintroduction by creating a reintroduction plan that reasserts brand identity. It is important to stay consistent with what the brand stood for before the recall to increase consumer confidence. Customer satisfaction with the new product should also be monitored. Additionally, the company should monitor the competition that may have been thriving during the recall, as it is important to be aware of who and what the company is competing against. Communicating the new product safety plan to all stakeholders is also important; people want to know what the company is doing differently in order to avoid another recall. This communication will boost consumer confidence in the brand and product. The company should also tell success stories of the recall, as this can be used as an effective marketing tool in increasing brand reputation and consumer confidence as well. Finally, the company should continue to rebuild its brand through advertising and promotions that highlight improved safety of the product. This will keep the brand on the minds of the consumers and diminish any brand tarnishing that occurred during the recall.

Finally, the company must reflect on its performance in this phase of the recall. The company should identify possible improvements in its reverse logistics system and recovery procedures. It should also reflect on the appropriateness of its recall goals, the success of those goals, and identify why the company did or did not meet the goals. Finally, the recall response team should be recognized for completing the recall and the results should be shared internally to promote organizational learning.

PRODUCT RECALL PERFORMANCE MODEL

The scoring guide featured in Figure 9 enables a company to score itself in all three stages of the Product Recall Strategy Development Checklist. For every item marked ‘complete,’ the user is awarded one point. For every item marked ‘Partial,’ the user is awarded 0.5 points. For every item marked ‘None’ or ‘N/A’ the user is awarded zero points. To calculate the score, the user places the earned points in one section over the total number of items in the section, excluding any items that were marked ‘N/A’. The resulting percentage places the user into the Product Recall Performance Model featured in Figure 10.

Item Status	Points Earned
Complete	1
Partial	.5
None	0
N/A	0

Figure 9 – Scoring Guide

The Product Recall Performance Model (Figure 10) is a maturity model indicating to what degree the company is ready to handle the consequences of a product recall in each phase of the recall process. A score of 0-20% places the company in Stage 1: Poorly Protected. A score of 21-40% places the company in Stage 2: Somewhat Protected. A score of 41-60% places the company in Stage 3: Moderately Protected. A score of 61-80% places the company in Stage 4: Strongly Protected. A score of 81-100% places the company in Stage 5: Fully Protected. This scoring system enables a company to assess its level of protection in each phase of the model: readiness, responsiveness, and recovery.

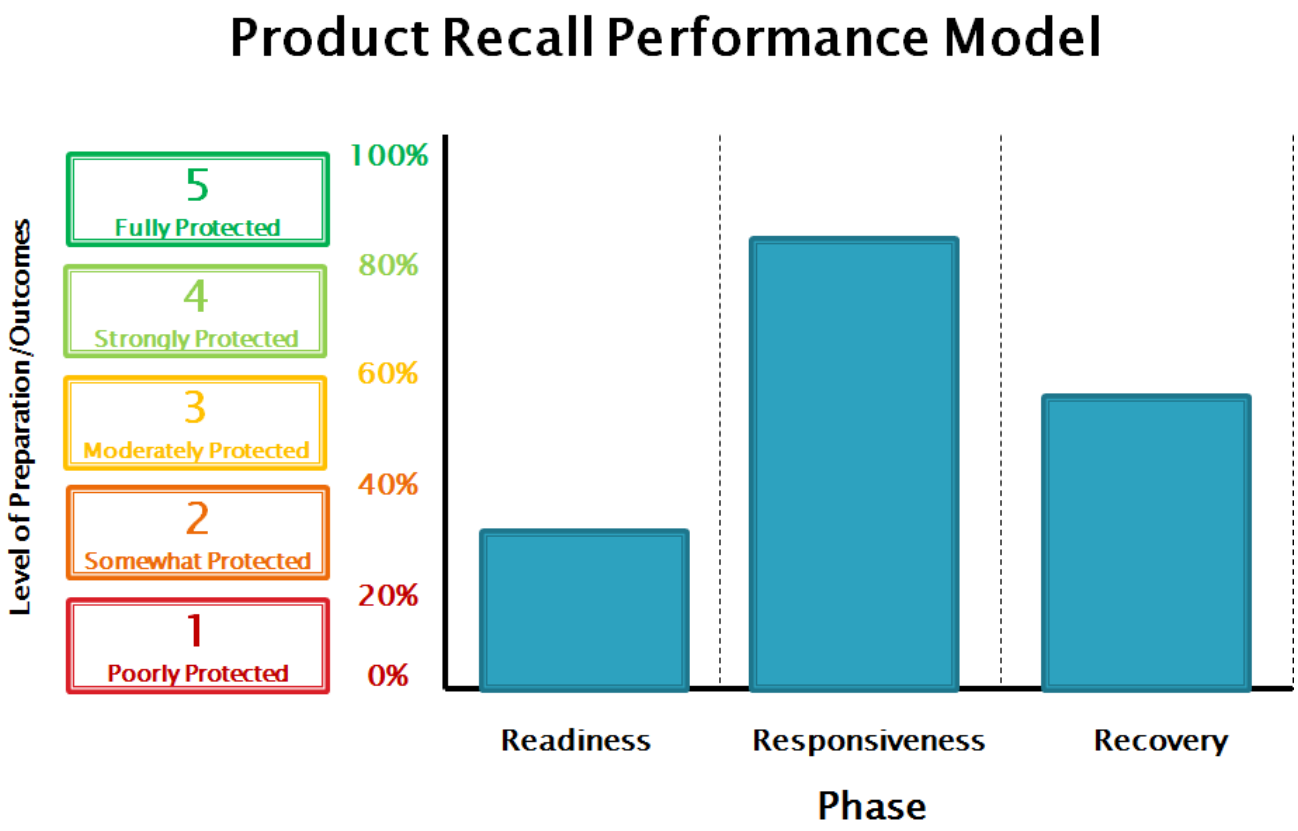

Figure 10 – Product Recall Performance Model

Stage 1: Poorly Protected

At this stage, recalls pose a high risk for the organization. High costs, low customer retention, brand tarnishing, and product waste are all very likely to occur during the recall.

Readiness: It is likely that companies in this stage are lacking any upper management support, documentation and transparency, recall responsibility assignments, monitoring of supply chain partners, and consistent processes to protect against recalls. Companies in this stage should first focus on creating formal recall procedure documentation; this will give companies a standard expectation of how a recall should be run. Companies should also focus on upper management support because if support is not present, any movement toward recall readiness will not change.

Responsiveness: It is likely that companies in this stage are lacking any ability to identify the defect, communicate effectively both internally and externally, prepare for the collection of the product, or correct the problem. Companies should focus on halting production and distribution

and perform a root cause analysis immediately; this will keep defective products out of the hands of the consumer and indicate what went wrong with the creation of the product. Additionally, communication should be improved by deciding on a unified message and mode of communication.

Recovery: It is likely that companies in this stage are lacking any ability to resolve the defect, communicate effectively to stakeholders, collect the defective product, document the success of the recall, optimize the defective product, or reintroduce itself successfully back into the market. Companies in this stage should immediately work to resolve the defect in order to minimize the cost of halting production. Clear updates to stakeholders should also be given through an effective mode of communication. The company should also begin tracking the success of its recall so far.

Stage 2: Somewhat Protected

At this stage, the company is somewhat protected from the consequences of a product recall but is still lacking protection in many areas. The company is therefore still very vulnerable to the consequences of a recall.

Readiness: Companies in this stage may have documentation of recall procedures, and assigned recall responsibility, but are probably lacking upper management support, monitoring of supply chain partners, consistent recall conscious processes, and recall conscious product development strategies. Companies should focus on building consistent recall conscious processes into its daily routines, such as periodically identifying areas of risk along the supply chain, and making routine on-site visits to manufacturing centers; this will minimize the chance of a recall occurring. Product tracing should also be implemented in these companies to increase product visibility throughout the supply chain.

Responsiveness: Companies in this stage have little ability to accurately identify the product defect, allowing lots of damaged products to reach the market. Additionally, these companies fail to effectively communicate to others in the organization, or to stakeholders outside the organization about the recall. Warehouses are only slightly prepared to receive the influx of product returns, and it is difficult for the company to create a corrective action plan to fix the problem. Companies should focus on immediately identifying the defect and halting production.

A corrective plan should also be immediately created. Collection of the product should also be more efficiently managed; ensure there is a plan in place to collect and store all returned product. To improve communication, companies should encourage upper management involvement in communication throughout the company, and an effective mode of transportation should be utilized when communicating with the public (perhaps the web, or by phone). Companies should also always reflect on their performance during this stage and learn from successes and failures.

Recovery: Companies in this stage have little ability to resolve the problem causing the recall, recall progress is poorly reported to stakeholders, if at all, and they are not making it easy for customers to return the product. Additionally, goals are not set for recall success, and the recall is poorly being monitored. The returned product is not being optimized and reintroduction into the market is not well planned. To improve, companies should focus on finding more efficient ways to resolve the problem. Specific goals should also be set to determine the success of the recall, and the recall should be closely monitored during this phase. Companies should also always reflect on their performance during this stage and learn from successes and failures.

Stage 3: Moderately Protected

At this stage, the company is moderately protected from the consequences of a product recall. Effects can still be damaging to the company, but there are efforts being made and some procedures in place to minimize the backlash of a product recall.

Readiness: Documentation of recall procedures is adequate at this stage, and there is a good chance that there are many recall-conscious processes that are consistently practiced. Additionally, there is probably some degree of upper management support for a recall-protected company atmosphere. However, monitoring of supply chain partners may be weak, and there may not be recall-conscious strategies being implemented into new product development. Additionally, there may not be adequate product tracking in the supply chain. Companies should focus on these lacking areas by ensuring that supply chain partners have their own adequate product safety program in place which contains product inspection points. Additionally, the companies should also push for stronger upper management support.

Responsiveness: Companies in this stage have stopped production and performed root cause analysis to find the problem, and warehouses may have been prepared to collect the recalled products. Communication is happening, but it may be a bit inefficient, and a corrective action plan may have been made. To improve, companies should focus on creating effective communication by urging upper management to take a larger role. A corrective action plan should be created and followed carefully. Companies should also always reflect on their performance during this stage and learn from successes and failures.

Recovery: Companies in this stage have perhaps resolved the defect and made goals for the recall, but the returned product is not being optimized and communication could be improved. Additionally, a reintroduction plan has probably not been set. To improve to higher stages, these companies should look to utilize the returned product in any way it can (reusing, donations, etc) to maximize value. Progress should also be communicated effectively to stakeholders, assuring them that this mistake will not happen again. A focus should also be on effectively re-entering the market with a unified brand image. Companies should also always reflect on their performance during this stage and learn from successes and failures.

Stage 4: Strongly Protected

At this stage, companies are strongly protected against the damaging consequences of product recalls. Much effort is being put into protecting the company against the effects of a recall, and the company takes the idea of a recall very seriously. Still, the company is able to improve in some areas.

Readiness: There is strong upper management support for being recall ready and there is detailed documentation about what to do when a recall occurs. Additionally, recall responsibility is assigned to a multidisciplinary team. Supply chain partners are closely monitored by this company and the company has almost completed all of the recall ready consistent processes in the checklist. The company also keeps recalls in mind when developing new products. Companies in this area should focus on reflection of their processes to make them even better and keep them current. They should also work on completing all of the consistent processes listed for recall readiness.

Responsiveness: Companies in this stage effectively and efficiently identified the defect and found the root cause. Communication is effective and is reaching the correct stakeholders. Return of the product was well thought through and warehouses are prepared for the influx of product. A corrective action plan was also created and followed with commitment. Companies at this stage should focus on perfecting their communication technique and ensure a unified message and brand identity is being communicated. Companies should also always reflect on their performance during this stage and learn from successes and failures.

Recovery: Companies in this stage can easily resolve the defect, effectively communicate progress to stakeholders, and incentivize the customers to return the defective product. Specific, time-oriented goals are set to define recall success, and the recall is well monitored throughout this phase. Some waste optimization may be utilized, and some reintroduction plan may have been created. Companies should focus on maximizing the value of the returned products to decrease waste, and form a strong reintroduction strategy. Companies should also always reflect on their performance during this stage and learn from successes and failures.

Stage 5: Fully Protected

At this stage, the company is as protected as possible from the damaging effect of a product recall. With this level of protection, the product recall should retain the maximum amount of stakeholders, be as inexpensive as possible, keep brand identity and reputation intact, and allow for an easy reentry into the market. Any damages it experiences after a recall have been minimized as much as possible.

Readiness: Companies at this stage have full upper management support for defending against recall consequences, and has likely formed a recall educated corporate culture. There is detailed documentation for what to do when a recall occurs, and products are traced throughout the supply chain, ensuring product visibility. Recall responsibility is assigned to a multi-disciplinary team, and the company monitors its supply chain partners closely. These companies also have many consistent processes in place to be ready for a recall, such as periodically testing product traceability and performing mock recalls. Recalls are also considered when developing new products, and the companies always reflect on their performance after this stage. To stay on top, the company should continue to monitor changes in the market, new technologies that can be

utilized, and changes in consumer preferences or demographics. These changes may alter the way they communicate with their customers and track their products.

Responsiveness: Companies at this stage have effectively and efficiently identified the defect. Their communication is timely, unified, clear, and reaching the correct stakeholders. Collection of the product is well planned, as is taking corrective action. To stay competitive, companies should continue to reflect on their performance in this stage, and stay alert to any changes in the market.

Recovery: Companies in this stage are fully capable of resolving the problem causing the recall, communicating progress to appropriate stakeholders, incentivizing customers to return the recalled product, setting goals and monitoring the recall, optimizing the returned product, and forming a reintroduction strategy. These companies also reflect on their successes and failures of this stage to improve their performance during the next recall. To stay competitive, these companies should continue to reflect on their performance and procedures, and stay alert to any changes in the market.

LIMITATIONS

One limitation to this study is the small number of companies surveyed and interviewed. A larger survey and interview pool may have offered the study more accurate and/or meaningful results. More survey data may have also allowed for a statistical analysis, possibly generating more significant results.

In addition to the small number of companies surveyed in general, there was also only 2 companies surveyed who had not experienced a recall, while the other 15 companies had experienced a recall. This made it difficult to compare and contrast the answers of these two different segments. If comparable, more significant findings may have been found

Another limitation to the study is the generalizations made across industries. Different industries vary in procedures and needs; focusing on one specific industry could have provided more specific best practices. Additionally, some best practices listed in the Product Recall Strategy Development Checklist may not be relevant to all industries.

FUTURE RESEARCH

Future research should focus on collecting best practices for specific industries, as these will offer more specific best practices for companies to follow. Additionally, more surveys should be conducted studying how companies currently handle recalls, and the resulting successes and failures. A key to this research is collecting a sample size large enough to divide by industry and recall experience, and also to conduct statistical analyses.

Researching the benefits of a well-managed recall is another area that should be studied as little research on this topic was found while conducting this study. This research could outline exactly what companies could gain by managing a recall efficiently.

CONCLUSION

Product recalls are more prevalent now than ever before, and have therefore become an inevitable part of business. Companies face harsh consequences after a poorly managed recall, and for this reason it is of utmost importance that companies understand how to best manage these recalls. The Product Recall Model offers a framework for companies to follow, which organizes and outlines the phases companies go through during a recall. In line with this framework, the Product Recall Strategy Development Checklist offers companies a user-friendly self-auditing tool, encouraging best practices in handling a recall. The corresponding scoring guide places the checklist user into one of five stages of the Product Recall Performance Model, indicating to what degree the company is prepared for a recall. This Performance Model also offers descriptions of the company's current situation and recommendations for how to progress to higher levels of the model. Utilizing the frameworks and tools offered in this paper, companies can best protect themselves against the damaging consequences of product recalls, keeping their customers and business as safe as possible.

APPENDICES

Appendix A – Product Recall Survey

Product Recall Survey

Survey for companies **who have experienced a product recall**

What industry do you operate in?:

1. Please give some background information about the recall and the recalled product.

Readiness

2. Did your company have a plan of action in place to manage a recall?

1 2 3 4 5 6 7
(No Plan) (Some Plan Aspects) (A Plan was In Place)

2b. Did you update your product recall plan as market conditions changed?

Yes No

3. Did you have a predetermined team to respond to the product recall?

Yes No

4. To what degree was the response team made up of employees from different departments?

1 2 3 4 5 6 7
(All from the same dept) (Dominated by 1-2 depts.) (all from different dept)

4a. Which department led the recall effort?:

5. How well did your company trace its products before the recall occurred?

1 2 3 4 5 6 7
(Did not trace products) (Some Tracing) (Full supply chain tracing)

5b. If some tracing to full tracing can you elaborate on where the tracing occurred?

6. How closely did your company monitor the product safety of its supply chain partners?

1	2	3	4	5	6	7
(No monitoring)			(periodic audits)		(monitored extremely close)	

7. Did your company stage mock recalls before the recall occurred?

   Yes No

   7b. If yes, how often?

8. Did your company have a closed-loop logistics system in place before the recall?

   Yes No

9. Did your company have product inspection points along the supply chain?

   Yes No

10. What techniques did you use to ensure safety within your own internal supply chain? (TQM system in place, lean manufacturing, poka-yokes, etc.)

Responsiveness

11. How long did it take your company to find the root cause of the defect?

12. Did you hire outside specialists to analyze the root cause of the defect?

    Yes No

13. Did a response team determine the seriousness, type, and scale of the recall?

    Yes No

    13b. If yes, did this affect the way the recall was handled?

    Yes No

14. Please list stakeholders in the order that they were notified during the recall (upper management, employees, supply chain partners, public, regulatory agencies, etc.)

15. In what ways was the recall announced to the public?

16. Approximately how long did it take from the time of finding the defect to announcing it to the public?

    16b. Do you believe that this timing had an impact on the success of the recall?

    Yes No

17. How important was the use of the internet when declaring the recall?

1	2	3	4	5	6	7
(Not important)			(somewhat important)			(crucial)

18. How did your company prepare for the influx of returned product?

19. Did your company document all recall procedures?

    Yes No

    19b. If yes, did this documentation help the company determine what could have been better executed?

    Yes No

20. Did your company hire an outside expert to help handle the recall? (If yes, refer to 20b. if no, refer to 20c.)

    Yes No

    20b. If yes, do you believe it was worth hiring an expert?

    Yes No

    20c. If no, do you believe it would have been worth hiring an expert?

    Yes No

Recovery

21. How long did it take your company to fix the flaws responsible for the product defect?

22. Did your company set recall goals (such as percentage of return rates, stock price expectations, etc.?)

Yes No

22b. If yes, please list these goals

23. Did your company track the number/percentage of recalled product that was returned?

Yes No

23b. If yes, what percentage of product was returned, and was the company satisfied with this percentage?

24. Did your company offer incentives for customers to return the recalled product?

Yes No

24b. If yes, what were these incentives?

24c. If no, do you believe this negatively affected the number of returned products?

Yes No

25. Was the recalled product recycled or reused in any way?

Yes No

If you have any additional comments or insights on product recalls we would be interested in hearing about them.

Thank you for completing the survey.

Survey for companies **who have not experienced a product recall**

What industry do you operate in?:

Readiness

1. Does your company have a plan of action in place to manage a recall?

1 2 3 4 5 6 7
(No Plan) (Some Plan Aspects) (A Plan was In Place)

1b. Do you update your product recall plan as market conditions change?

Yes No

2. Do you have a predetermined team to respond to a product recall?

Yes No

3. To what degree would the response team be made up of employees from different departments if a recall were to occur?

1 2 3 4 5 6 7
(All from the same dept) (Dominated by 1-2 depts.) (all from different dept)

3a. Which department will lead the recall effort?:

4. How well does your company trace its products?

1 2 3 4 5 6 7
(Does not trace products) (Some Tracing) (Full supply chain tracing)

4b. If some tracing to full tracing can you elaborate on where the tracing occurs?

5. How closely does your company monitor the product safety of its supply chain partners?

1 2 3 4 5 6 7
(No monitoring) (periodic audits) (monitored extremely close)

6. Does your company stage mock recalls?

Yes No

6a. If yes, how often?

7. Does your company have a closed-loop logistics system in place?

Yes No

8. Does your company have product inspection points along the supply chain?

   Yes No

9. What techniques does your company use to ensure safety within your own internal supply chain? (TQM system in place, lean manufacturing, poka-yokes, etc.)

Responsiveness

10. Would your company consider hiring an outside expert to help handle a recall?

    Yes No

11. Would a response team determine the seriousness, type, and scale of the recall before taking further action?

    Yes No

12. Please list stakeholders in the order that they would be notified in the case of a recall (upper management, employees, supply chain partners, public, regulatory agencies, etc.)

13. In what ways would the recall be announced to the public?

14. How important would the use of the internet be when declaring the recall?

1 2 3 4 5 6 7
(Not important) (somewhat important) (crucial)

15. How would your company prepare for the influx of returned product?

16. Would your company document all recall procedures?

    Yes No

    16b. If yes, would this documentation be used to determine what could have been better executed?

    Yes No

Recovery

17. Would your company set recall goals (such as percentage of return rates, stock price expectations, etc.?)

    Yes No

    17b. If yes, please list some goals the company may have

18. Would your company track the number/percentage of recalled product that was returned?

    Yes No

19. Would your company offer incentives for customers to return the recalled product?

    Yes No

    19b. If yes, what types of incentives would be offered?

20. Would your company look into recycling or reusing the recalled product in any way?

    Yes No

If you have any additional comments or insights on product recalls we would be interested in hearing about them.

Thank you for completing the survey.

Appendix B – Product Recall Strategy Development Checklist

Product Recall Strategy Development Checklist		Complete	Partial	None	N/A
1. Readiness					
Upper Management Support					
1.	Senior managers instill organization-wide recognition of the seriousness and need for recall readiness				
2.	Upper management commitment and support in making product safety a top priority				
3.	Senior managers ensure that employees understand the effect that well-run recalls have on corporate success, and the effect that poorly run recalls have on corporate failure.				
4.	Find ways to eliminate a "kill the messenger" culture through incentives, or other means, to promote pointing out mistakes				
Documentation and Transparency					
5.	Ensure there is documentation of all standard procedures and practices				
6.	Develop a formal, written recall manual that describes a contingency plan in anticipation of possible recall				
7.	Code/trace products in order to increase visibility of recalled products				
8.	Ensure there are metrics that constantly measure reverse logistics policies, safety goals, and handling processes				
9.	Ensure there are clear product specifications and quality standards				
Recall Responsibility					
10.	Create a specialized product safety committee created from cross-functional departments that has the power to order a recall if necessary				
11.	Assign recall responsibility in advance to a coordinator, or multi-disciplinary team that will be responsible for any future recall. Ensure the quality assurance department is part of this team.				
Monitoring Supply Chain Partners					

12.	Ensure that manufacturers and/or distributors have their own adequate product safety and liability prevention program				
13.	Create agreements with suppliers that defend against total costs of recall/losses if suppliers were partially responsible				
14.	Consider investing in a centralized data system to offer retailers and manufacturers visibility of the process (can help the supply chain understand how and why a product is being damaged)				
Consistent Processes					
15.	Conduct companywide product safety training and awareness				
16.	Stage mock recalls to evaluate process efficiencies				
17.	Have a closed-loop logistics system in place to handle regular returns that can also handle recalls				
18.	Take out insurance in case of a recall				
19.	Study market leaders and past recall campaigns				
20.	Identify areas of risk along the supply chain				
21.	Consider the costs and benefits of an outsourced returns service				
22.	Ensure there are inspection points along the supply chain				
23.	Make routine on-site visits to manufacturing centers				
24.	Test product traceability				
25.	Ensure there are toll-free customer service lines open that are operated by people who understand how to react and who know to whom they should report if they hear that a product is defective				
26.	Identify and document recall stakeholders who should be immediately notified if a recall occurs				
27.	Become an expert on the industry's legal and regulatory requirements				
28.	Be conscious of where financial responsibility begins in the supply chain and ensure quality checks are done before product becomes the company's financial responsibility				

29.	Build organizational credibility with key recall stakeholders so that if a recall does happen, these stakeholders will trust the company				
New Product Development					
30.	Incorporate safety into the design of the product (materials matter)				
31.	Ensure traceability in the product				
32.	Design the product in a way that allows for replacement parts				
Reflection					
33.	Identify any new tracking technology that could be incorporated				
34.	Reflect on upper management support and changing company culture and identify if improvements could be made				
35.	Ensure all documentation is up to date				
36.	Check if employee/s responsible for a recall is/are still appropriate				
2. Responsiveness					
Defect Identification					
1.	Suspend production and distribution				
2.	Notify appropriate regulation agency				
3.	Consider the pros and cons of hiring a product liability specialist to provide services on defect and hazard analysis				
4.	Perform root cause analysis				
5.	Have response team determine the seriousness, type, and scale of recall				
Communication					
6.	Senior managers quickly communicate awareness of the problem internally and generate company responses to stakeholders				
7.	Select media outlets and decide on a unified message				
8.	Publicly announce and acknowledge the recall to internal and external stakeholders and apologize quickly				
9.	Senior managers quickly communicate their eagerness to make amends with appropriate corrections				
10.	Use the web to communicate directly with customers and cut rumors/exaggeration if appropriate				

11.	Utilize social media to communicate				
12.	Open separate phone lines for effected customers to ask questions				
Prepare for Collection of Product					
13.	Prepare warehouses and transportation for product returns				
14.	Consider hiring a 3PL to collect and store recalled products				
15.	Do not cleanse all shelves of all products if possible (this is why tracking is so important)				
Corrective action					
16.	Develop a recall plan and build commitment to it				
Reflection					
17.	Document the recall notification procedures that took place and identify communication improvements				
18	Analyze how quickly it took to identify the defect and work to decrease this time				
19.	Consider if hiring an outside expert would have been beneficial to the organization				
3. Recovery					
Resolve Defect					
1.	Identify glitches in the process that led to product defect				
2.	Design resolution plan to fix the flaw				
3.	Follow the resolution plan to fix design flaws responsible for defect				
4.	Verify root cause has been eliminated				
Communication					
5.	Report progress to stakeholders				
6.	Reassure customers and other stakeholders that the problem will not happen again				
Return of Product					
7.	Determine adjustment offer for a returned recalled product, including product replacement				
8.	Use marketing to retrieve product from the customer if appropriate				
9.	Ensure easy returns processing (sending return envelopes, outbound replacement shipping, free returns, easy access to return information, etc.)				

Tracking and Documentation					
10.	Set goals for recall success (ex. 90% return rate)				
11.	Track return rates				
12.	Set up recall-management information systems and logistics				
13.	Audit and document recall procedures that were performed				
Optimization					
14.	Use the recalled product in any way you can (reuse, donation, maximize value)				
15.	Focus on long-term marketing implications/ opportunities that can emerge from the recall				
16.	Identify opportunities to redesign product and/or processes or identify more appropriate materials for the product				
Reintroduction					
17.	Create reintroduction plan that reasserts brand identity				
18.	Monitor customer satisfaction with replacement/reintroduced product				
19.	Be conscious of competition who could have taken market share during the recall				
20.	Communicate the new way the company will prevent this defect from occurring to stakeholders				
21.	Tell success stories of the recall if possible				
22.	Rebuild the brand through advertising and promotions				
Reflection					
23.	Reflect on the success of recall goals and identify the causes of successes or failures				
24.	Congratulate recall response team and thank participants				

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