

**ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF ARTS AND
SOCIAL SCIENCES**

THE IMPACT OF PRODUCT RECALL MESSAGE ON FINANCIAL VALUE

Ph.D. THESIS

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Department of Management

Management Programme

FEBRUARY 2019

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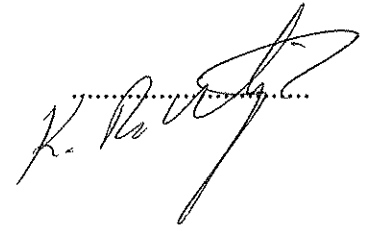
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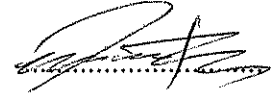
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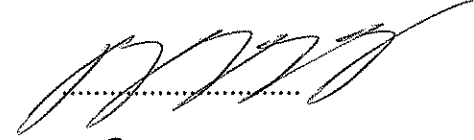
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To all inspiring and encouraging me in this journey.

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ABBREVIATIONS

AIC	: Akaike Information Criteria
AMA	: American Marketing Association
CPSC	: Consumer Products Safety Commission
CSR	: Corporate Social Responsibility
EPA	: Environmental Protection Agency
FDA	: Food and Drug Administration
ICM	: Institute for Crisis Management
R&D	: Research and Development
NHTSA	: National Highway Traffic Safety Administration
SCCT	: Situational Crisis Communication Theory
US	: United States

SYMBOLS

β	: Regression beta, systematic risk coefficient
ε	: Error term
P	: Stock price
R	: Stock return
$E(R)$	: Expected stock return
i	: Firm
t	: Time
k	: Number of days before event day
l	: Number of days after event day
R_m	: Average rate of return of the market
R_f	: Risk-free rate of return
α	: Intercept term
$\hat{\alpha}$	: OLS estimates of the intercept term
$\hat{\beta}$	: OLS estimates of systematic risk coefficient
$\hat{\sigma}$	: Maximum likelihood estimator of residual variance.
$\hat{\varepsilon}$	: Estimated residuals from the fitted model
$\log$	: Logaritma
K	: Number of estimated parameters
j	: Recall

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THE EFFECT OF PRODUCT RECALL MESSAGE ON FINANCIAL VALUE

SUMMARY

Product recalls increase worldwide in various industries depending on many factors. A product recall can be defined as a firm's request to stop the use of a product that is found to be faulty. Product recalls occur when companies or regulators consider products as dangerous due to any defect. In the United States of America (U.S.A), regulators for the automotive industry is the National Highway Traffic Safety Administration (NHTSA). It is responsible for determining quality requirements, ensuring the implementation of these standards and managing the product recall process (Rupp and Taylor, 2002). After NHTSA starts an investigation for an automobile, the manufacturer can either involve in the process voluntarily at any stage or wait until the investigation is complete. When the defect becomes certain, the product recall process starts.

Besides the automobile industry, companies in many other industries such as food, textile, medicine, furniture recall products. Increased numbers of recalls are results of higher consumer expectations in quality and safety, which lead companies to produce more functional, featured and complicated products. Furthermore, time and geography differences because global production could cause deficiencies and errors. Also, competition, time constraint, excessive production volume, etc. are other reasons for the increase in product recalls.

Product recalls generate direct and indirect costs. Costs emerged in the product recall process such as offering repair, change or refund options to affected customers (Jayaraman et al., 2003), cost of logistics, fixing production line or dissemination of recall process are direct costs. Direct costs can also turn into indirect costs related to the recall since they cause to loss of firm value and have a negative effect on brand equity in the longer run. Indirect costs also include a decrease in future profits (Ni et al., 2014), stock returns (Haibing et al., 2015; Jarrell and Peltzman, 2017) and potential investments.

Product recalls can damage firms in many ways. Hence, it is crucial to manage such crises. Current studies investigate consumer and investor behaviors in product recall context (Chen and Nguyen, 2013; Cleeren et al., 2008; Germann et al., 2014; Thirumalai and Sinha, 2011; Zhao et al., 2011). However, few studies are exploring the role of marketing strategies in product recall context to minimize the financial loss. Among them, Chen et al. (2009) look for the adjusting effect of passive vs. proactive recall strategies whereas another research focuses on advertising strategies in the product recall context (Gao et al., 2015). Studies in this field are still rare and emphasize the need for further investigation (Chen et al., 2009; Eilert et al., 2017; Haibing et al., 2015).

The main aim of crisis management is to prevent or minimize the negative influences of a crisis (Coombs, 2011). Although few studies explore how marketing strategies work for decreasing the financial loss in a product recall process (Chen et al., 2009; Eilert et al., 2017; Haibing et al., 2015), no study investigates the role of communication in this context. However, crisis communication is vital during a crisis

since it allows a company to get in touch with its stakeholders, explain the situation and express itself. This study seeks an answer to how product recall message content influences financial performance. By this way, this study would help to plan an optimum recall communication strategy.

Although significant product recalls occur in all product categories, one of the most well-known industries recalling products is the automobile industry. The high values of products, the high number of affected products in the recall and possible damage that the recall problems could create in this industry cause to the visibility of automobile recall news. Another reason for selecting this industry is the availability and accessibility of data. This study handles 250 recall news of publicly traded automobile manufacturers that Reuters US edition published for the nearly 3-year period.

Two main methods are applied. First, content analysis is adapted to determine and code the product recall message dimensions. Second, event study methodology which relies on the efficient market hypothesis is used to measure financial performance by calculating the difference between expected and realized stock returns. Five short event windows, which are the day before (-1,-1), the day before and the event day (-1,0), the day before and one day after the event (-1,1), the event day (0,0), and one day after the event (1,1) are calculated. The short period allows minimizing the contamination of possible confounding elements. After determining the variables, Automatic Linear Modelling was used to forecast and select the best predictor combination. Then the effects of the detected message dimensions on firm value were tested through regression analyses. These analyses enable to observe the effect of every single recall message dimension on firm value in the short-term.

The findings show that recall message dimensions affect firm value. Especially, a positive effect is observed when “the recall is made by the company,” “the recall is a voluntary one,” “the customers are or will be informed” information is available in the product recall announcements. Also longer news influence firm value positively in a product recall context. However, given information in the recall message, i.e. “the recall is mandated,” the “stock prices decrease after the recall,” “number of the recalled automobiles,” “past recalls due to same or similar reason” impact firm value negatively. These findings broaden previous product harm crisis management and communication literature by providing product recall communication strategies to lessen financial loss. Additionally, the study provides important implications for managers. The results show which information dimensions are of major importance for investors, and how and at what level they react to these dimensions.

ÜRÜN GERİ ÇAĞIRMA MESAJLARININ FİNANSAL DEĞER ÜZERİNE ETKİSİ

ÖZET

Dünya genelinde ürün geri çağırma vakalarında artış yaşanmaktadır. Bu artış bir çok nedene bağlı olmakla birlikte bir çok sektörde ürünlerin geri çağırıldığı görülmektedir. Ürün geri çağırma bir firmanın bir üründe kusur tespit edilmesi sonucunda ürününün kullanımının durdurulmasını talep etmesi olarak ifade edilir. Üretim basamaklarının herhangi birinde asgari kalite düzeyine ulaşamamış olması bu tür bir olaya sebebiyet verebilir. Kullanıcılara zarar verme ihtimali olan, tehlikeli maddeler içeren, standart ve düzenlemeleri ihlal eden ürünlerin tespit edilmesi durumunda ilgili ürün geri çağırılır (Chu ve diğ., 2005). Öncelikle ürüne ilişkin problemin fark edilmesi gerekir, bu kimi zaman kullanıcı, kimi zaman şirket, kimi zaman düzenleyici kurumlar tarafından tespit edilir. Sonrasında probleme ilişkin inceleme şirket, yetkili devlet kurumu veya her ikisi tarafından gerçekleştirilir. Amerika Birleşik Devletlerinde otomobil sektörü için düzenleyici kuruluş National Highway Traffic Safety Administration'dur. İlgili kuruluş asgari kalite gereklerinin belirlenmesi, bu standartların sağlanıp sağlanmadığının kontrolünün sağlanması ve ürün geri çağırma sürecinin yönetilmesi ile sorumludur (Rupp ve Taylor, 2002). Herhangi bir sorun nedeniyle düzenleyici kuruluş bir otomobil için inceleme başlattıktan sonra üretici şirket istediği aşamada gönüllü olarak sürece dahil olabilir veya yetkili kurumun araştırmasının sonuçlanmasını bekleyebilir. Soruna ilişkin incelemelerin tamamlanması sonucunda sorun kesinleşirse ürün geri çağırma süreci başlatılır.

Otomobil sektörünün yanısıra bir çok başka sektörde de ürünlerin geri çağırıldığı görülmektedir örneğin gıda, tekstil, ilaç, mobilya. Tüketicilerin kalite ve güvenlik beklentilerinin artması, bu beklentileri karşılamak üzere şirketlerin daha kullanışlı, daha güvenli, daha fazla özelliğe sahip ürünler üretme amacı gütmeleri, ürünlerin daha karmaşık hale gelmesine problemleri ürün ve buna bağlı olarak geri çağırma vakalarında artış yaşanmasına neden olmuştur. Küresel üretim üretimde senkronizasyonu önemli hale getirmiştir, zaman ve mekan farkları eksiklerin, hataların ortaya çıkmasına sebep olabilmekte. Ek olarak rekabet baskısı, zaman kısıtı, üretim hacminin fazlalığı gibi nedenler de ürün hasarına ve dolayısıyla geri çağırma sayılarında artışları beraberinde getirmektedir. Bir şirketin ürün geri çağırmasının bir şirkete dolaylı ve doğrudan oluşturduğu maliyetler vardır. Bir geri çağırma sürecinin tamamlanması sürecinin oluşturduğu tüm harcamalar doğrudan maliyetler olarak ifade edilebilir. İlgili ürünün mevcut kullanıcılarına tamir, değişim veya para iadesi olmak üzere bir çözüm sunulması (Jayaraman ve diğ., 2003), ürünlerin toplatılması ve yeniden dağıtılmasından dolayı lojistik maliyetlerinin oluşması, benzer hataların gelecekte ortaya çıkmaması için üretim hattının düzeltilmesi, geri çağırma süreci ile ilgili paydaşların bilgilendirilmesi gibi süreçler doğrudan oluşan maliyetlere örnek gösterilebilir. Doğrudan oluşan masraflar şirketin piyasa değerini düşüreceği için uzun vadede marka değerinde zarara sebep olabilmektedir, bu ürün geri çağırmaya bağlı dolaylı bir masraftır. Bu masraflara ayrıca ürün geri çağırımların gelecek satışları buna bağlı olarak gelecekteki karı olumsuz etkilemesi (Ni ve diğ., 2014), ilgili şirketin hisse

senedi getirilerinin düşmesi (Haibing ve diğ., 2015; Jarrell ve Peltzman, 2017), yatırımcı güveninin sarsılıp yatırım almasının zorlaşması (Chen ve diğ., 2009), markaya ilişkin algı ve inanışların değişmesi gibi örnekler verilebilir.

Ürün geri çağırma bir şirkete bir çok açıdan zarar verebileceği için bu tip bir krizin yönetilmesi oldukça önemlidir. Bir ürünün geri çağırılmasının ilgili şirketin firma değerini olumsuz etkilediği bilinmektedir bu nedenle böyle bir sürecin etkin yönetimi önem kazanmaktadır. Mevcut literatür ürün geri çağırma bağlamında farklı durumlarda ortaya çıkan tüketici ve yatırımcı davranışlarını incelemiştir (Chen ve Nguyen, 2013; Cleeren ve diğ., 2008; Germann ve diğ., 2014; Thirumalai ve Sinha, 2011; Zhao ve diğ., 2011) fakat ürün geri çağırma durumunda finansal hasarı azaltmaya yönelik pazarlama stratejilerinin rolünü araştıran az sayıda çalışma olduğu görülmektedir. Bu çalışmalardan biri ürün geri çağırma ve finansal değer ilişkisinde proaktife karşın pasif geri çağırma stratejisinin düzenleyici etkisini araştırırken (Chen ve diğ., 2009), bir diğer çalışma ise geri çağırma öncesi reklam harcamalarının hangi koşullarda azaltılması hangi koşullarda artırılması gerektiğini araştırmaktadır (Gao ve diğ., 2015). Ürün geri çağırmanın yarattığı finansal zararı azaltmada pazarlama stratejilerinin nasıl faydalı olabileceğini araştıran bu tür çalışmalara az rastlanmakta olup ilgili çalışmaların bu alanda daha fazla araştırma yapılmasına ihtiyaç duyulduğunu vurguladıkları görülmektedir (Chen ve diğ., 2009; Eilert ve diğ., 2017; Haibing ve diğ., 2015).

Kriz yönetiminin ana amacı bir krizin olumsuz etkisini önlemek veya azaltmaktır (Coombs, 2011). Chen ve diğ. (2009), Eilert ve diğ. (2017), Haibing ve diğ. (2015) ürün geri çağırmanın firma değeri üzerindeki negatif etkisini azaltacak pazarlama stratejilerini araştırmaktadır fakat hiçbir çalışma bu bağlamda iletişimin rolünü araştırmamıştır. Oysa kriz iletişimi kriz anında önemlidir çünkü şirketin paydaşları ile bağlantı kurmasını, durumu açıklamasını ve kendini anlatmasını sağlar. Kriz durumunda iletişimi ele alan araştırmaların vaka ve deneysel serim çalışmaları ağırlıklı olduğu görülmektedir (Coombs ve Holladay, 1996; 2002; Laufer ve Coombs, 2006; Coombs, 2007). Pazarlama-finance arayüzü ve ürün geri çağırma bağlamında iletişim konusunu irdeleyen herhangi bir çalışmaya rastlanmamıştır. Bu nedenlerden dolayı bu tezde ürün geri çağırma mesaj içeriği ve bu içeriğin finansal performans üzerindeki etkileri araştırılmaktadır.

Neredeyse her sektörde kayda değer ürün geri çağırılmakta olup, otomobil sektöründe yaşanan geri çağırımlar en çok duyulan ve bilinenlerin başında gelmektedir. Bir anda binlerce hatta milyonlarca araba geri çağırılabilen, geri çağırılan ürünlerin sayısının çok olması, arabaların değerinin fazla olması ve hasarın taşıdığı olası riskin büyüklüğü bu sektördeki geri çağırma görünürlüğünü arttırmaktadır. Bu çalışmada otomobil sektörünün uygulama alanı olarak seçilmesinin bir diğer nedeni bu sektörde bilginin var olması ve bu bilgiye ulaşılabilir olmasıdır. Haber kaynağı olarak Reuters'in Amerika yayını seçilmiş olup yaklaşık üç yıllık bir süreçte yayınlanmış olan 250 geri çağırma haberi kullanılmıştır. Hisse senedi getirileri ile çalışıldığı için çalışma halka açık otomobil şirketleri ile sınırlandırılmıştır.

Bu çalışmada iki ana yöntem kullanılmıştır birincisi içerik analizi ikincisi olay çalışması yöntemidir. İçerik analizi için öncelikle geri çağırma haberleri taranıp tespit edilmiştir. Bu haberlerde yer alan bilgilerden yola çıkarak içerik kodlama şeması hazırlanmıştır. Oluşturulan nihai kodlama şemasında 120 mesaj boyutuna ulaşılmıştır. İlgili kodlama şeması kullanılarak belirlenmiş olan 250 otomobil geri çağırma haberi için kodlamalar gerçekleştirilmiştir. Bu şekilde ürün geri çağırma haberlerinin mesaj içerikleri tespit edilmiştir.

Geri çağırma mesaj içeriğinin firma değerine etkisi araştırılmak istendiği için bir sonraki aşamada bağımlı değişken olan finansal performans değişkeni hesaplanmıştır. Bu aşamada çalışmanın ikinci ana yöntemi yani olay çalışması yöntemi uygulanmıştır. Bu yöntem piyasa etkin modeline dayanmakta olup piyasanın bir habere tepki verdiğini varsaymaktadır. Yöntem beklenen getiri ile gerçekleşen getirinin farkını hesaplamaktadır. Bunun için olayın 250 gün öncesinden başlayarak 21 gün öncesine kadar ki süre için bir beklenen getirir hesaplanır ve geri çağırma haberinin yayınlandığı gün ki getiri ile farkı alınır (MacKinlay, 1997). Hesaplanan bu değere kümülatif anormal getiri denir. Bu şekilde bir olayın firma değeri üzerindeki etkisi gözlemlenebilmektedir. Bu yöntem birden fazla olay penceresi ile çalışılmasına olanak sağlamaktadır. Bu tez için beş olay penceresi hesaplanmıştır, haber yayınlanmadan bir gün öncesi (-1,-1), haber yayınlanmadan bir gün öncesinden yayınlanma gününe (-1,0), haber yayınlanmadan bir gün öncesinden yayınlandıktan bir gün sonrasına (-1,1), haberin yayınlandığı gün (0,0) ve haber yayınlandıktan bir gün sonrası (1,1). Birden fazla olay penceresinin incelenmesi ilgili olayın farklı günlere nasıl etki ettiğinin görülmesini sağlar.

Bağımsız değişken olan mesaj içeriği ve bağımlı değişken olan finansal performans değişkenleri tanımlanıp hesaplandıktan sonra, kurulan ekonometrik modellerin test edilmesi aşamasına geçilmiştir. Bu aşamada önce veriler analize hazır hale getirilmiştir. Sonrasında çok fazla olan mesaj içeriği boyutlarından anlamlı etkiye sahip olanların belirlenmesine geçilmiştir. Bunun için otomatik doğrusal modellemeyen faydalanılmıştır. Bu modelleme bağımlı değişkenleri açıklayan en uygun bağımsız değişkenler kombinasyonunun tespit edilmesine olanak sağlamaktadır. Tespit edilen en iyi mesaj içeriği kombinasyonunun kümülatif anormal getiri üzerindeki etkileri regresyon analizi ile test edilmiştir. Bu işlem her bir bağımlı değişken için uygulanmıştır. Böylece geri çağırma haber içeriğinin farklı günlerde finansal performans üzerindeki etkileri tespit edilmiştir.

Analizler sonucunda geri çağırma mesajında yer alan hangi bilgilerin firma değerini hangi düzeyde ve ne yönde etkilediği tespit edilmiştir. Araştırma bulguları özellikle haber uzunluğunun üç ayrı olay penceresi için de firma değerini olumlu etkilediğini göstermektedir. Ayrıca “geri çağırma kurumun bizzat şirketin kendisinin olması”, “müşterilerinin bilgilendirilmiş veya bilgilendirilecek olması”, “gönüllü bir geri çağırma olması” ifadelerine yer verilmesinin firma değeri üzerinde olumlu etkiler yarattığı görülmektedir. Buna karşın “zorunlu bir geri çağırma olduğu”, “hisse senedi getirilerinde geri çağırma sonrasında düşüş yaşandığı”, “aynı şirketin geçmişte de aynı veya benzer bir sebepten ürün çağırdığı”, “geri çağırılan ürün sayısı” bilgilerinin ise olumsuz etkileri olduğu tespit edilmiştir.

Ürün geri çağırma mesaj içeriği çalışmaları çok kısıtlı olmakla birlikte geri çağırma mesaj içeriğinin finansal performans üzerindeki etkisine yönelik hiçbir çalışmaya rastlanmamıştır bu çalışma bu anlamda bir ilk olma niteliği taşımaktadır. Bu çalışma ayrıca mevcut yazını ürün-zarar krizinde bir şirketin finansal zararını korumasını sağlayacak ürün geri çağırma iletişim stratejisi sunarak genişletmeyi amaçlamaktadır. Bu anlamda hem ürün kriz yönetimi, hem iletişim, hem de pazarlama finans arayüzü literatürlerine katkı sağlamaktadır. Kısaca bu tez, disiplinler arası bir çalışma olup, daha önce araştırılmamış ürün geri çağırma mesaj içeriği-firma değeri ilişkisini irdelemektedir. Bu anlamda hem pazarlama hem de finans literatürüne katkı sağladığı öngörülmektedir.

Bununla birlikte bu tez ideal geri çağırma mesajının oluşturulması ve bu mesajın kriz anında bir stratejik araç olarak kullanılabilmesi bakımından yöneticiler için önemli sonuçlar ortaya koymaktadır. Ürün geri çağırma mesaj içeriğinin bir şirketin yaşayacağı finansal zararı nasıl etkilediğini anlamak, en uygun iletişim stratejisinin planlanabilmesini sağlayacaktır. Araştırma sonuçları kriz iletişimde yol göstereceği gibi yatırımcıların önem verdiği unsurların anlaşılması bakımından da önem arz etmektedir.

1. INTRODUCTION

A product recall is an institution's formal request to stop the use of a (potential) harmful product (Chu et al., 2005; Hora et al., 2011). It is known that product recalls are significantly increasing worldwide, and Figure 1.1 shows this yearly upward trend considering the main industries.

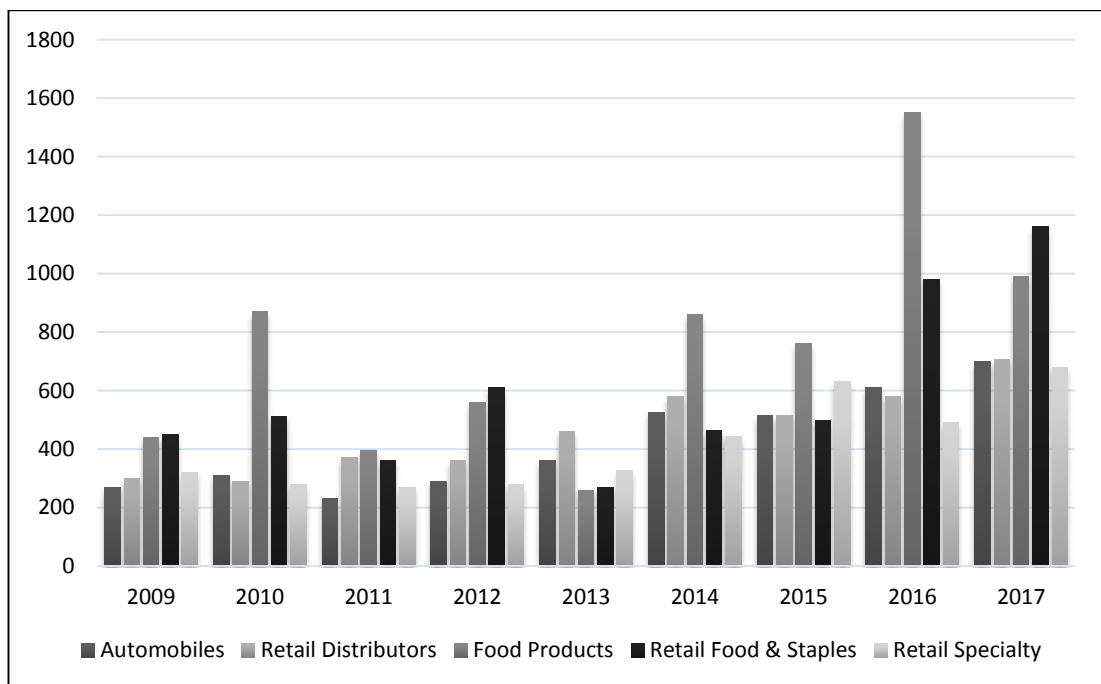


Figure 1.1 : Product recall industry trend by year (Url-1).

For example, thousands, even millions of cars are continually recalled in the automobile industry. Table 1.1 shows a section of recently published recall news examples. According to a Reuters news, US automobile recalls hit record in 2016 with 53.2 million recalled products. The Takata air-bag defect and the Volkswagen's emission cheating scandal are two of well-known recall reasons for automobiles.

Takata was a Japanese automobile airbag manufacturer and one of the biggest airbag suppliers worldwide. Car makers including BMW, Daimler, Fiat Chrysler, Ford, General Motors, Honda, Nissan, Toyota, etc. used Takata airbags in their cars. Approximate 10 million cars were affected because of the defective airbags. NHTSA

Table 1.1 : A section of published automobile recall news.

Recall News Publication Date	Recall News Publication Time	Brand	Recalled Product #
3.03.2017	12:50 PM	MERCEDES	1,000,000
27.02.2017	3:53 AM	NISSAN	33,275
23.02.2017	12:40 AM	MAZDA	460,000
17.02.2017	10:19 AM	VW	6,270
15.02.2017	1:32 AM	TOYOTA	2,800
3.02.2017	10:57 AM	BMW	230,117
31.01.2017	7:26 AM	HONDA	41,580
30.01.2017	12:34 PM	MERCEDES	3,236
27.01.2017	11:22 AM	PORSCHE	16,429
26.01.2017	8:45 AM	FORD	8,018
24.01.2017	12:48 AM	TOYOTA	73,000
16.01.2017	10:45 AM	FORD	45,000
13.01.2017	12:43 PM	TOYOTA	543,000
12.01.2017	8:57 AM	FORD	816,000
30.12.2016	10:35 AM	HONDA	52,710
29.12.2016	10:44 AM	HONDA	650,000
27.12.2016	7:53 AM	VW	4,481
26.12.2016	9:16 AM	TOYOTA	18,757
21.12.2016	9:11 AM	FORD	9,300
15.12.2016	10:27 AM	TOYOTA	66,830
2.12.2016	8:47 AM	FORD	650,000
29.11.2016	6:57 AM	BMW	33,026
22.11.2016	2:05 PM	TOYOTA	838,000
16.11.2016	10:45 AM	BMW	33,600
15.11.2016	9:53 AM	MAZDA	70,000
28.10.2016	1:16 PM	BMW	154,472
26.10.2016	11:02 AM	TOYOTA	2,712,000
26.10.2016	9:45 AM	FORD	408,180
21.10.2016	1:04 PM	TOYOTA	7,100
19.10.2016	8:28 AM	JEEP	182,308

became aware of the defective parts and pushed Takata to recall its airbags. The defective airbags cause at least ten deaths and over 100 injuries. Also, other car owners

are under potential risk because explosion of the inflator could lead to injuries and even deaths.

A more recent recall is the Volkswagen recall. The emission cheat scandal erupted in 2015 was determined by the Environmental Protection Agency (EPA). The affected cars equipped with a cheating device were programmed to underestimate the level of air emission values. Eventually, a total of 11 million Volkswagen cars were subject to the recalls worldwide.

The continuous increase in product recalls. Firms, regulators, investors, and consumers are getting aware of this situation (Berman, 1999), leading to consequences for firms (Hora et al., 2011). Therefore, recall(s) become a part of the business. All these events clearly show the importance and need of managing product harm crisis to protect the firm.

The increase of product recalls, and by extension, their financial results generate the motivation of this study. Despite the effect of product recalls on diverse metrics are analyzed in the marketing literature (Chen and Nguyen, 2013; Cleeren et al., 2008; Germann et al., 2014; Thirumalai and Sinha, 2011; Zhao et al., 2011), the role of marketing strategies in product recall situations are underexamined (Chen et al., 2009; Haibing et al., 2015). Whereas Chen et al. (2009) examine the moderating effect of proactive vs. passive recall strategy on the relationship between product recalls and abnormal stock returns, Gao et al. (2015) focus on the advertising strategy in a product recall-financial value context. However, this dissertation explores an optimum product recall message. It accomplishes previous literature by offering a product recall communication strategy to protect companies' financial value when they face a product-harm crisis.

The recall process begins when at least one party, the responsible federal agency, manufacturer, importer, distributor, retailer, and end-user detect a suspicious product (Chu et al., 2005). Regardless of who detect the problematic product, manufacturer has always adequate time until they make the formal recall announcement that enables companies to adjust their marketing strategies (Haibing et al., 2015) and minimize the negative effects of the product recall on financial value (Chen et al., 2009; Haibing et al., 2015). Nevertheless, before a company announces a recall, it can plan the recall process including the content of the announcement message. For these reasons, this

study focuses on the optimum announcement message relieving the negative effect of the recall on the financial value. Figure 1 illustrates the general research model. The independent variable is defined as the recall announcement message. The study deals with the impact of the recall announcement message on financial performance, the dependent variable of the study. As the financial performance indicator, abnormal stock returns will be used that is calculated by applying event study methodology that uses stock market data. An event study provides an understanding of how the market reacts to new information such as merger announcement, research and development (R&D) information, or a product recall. Hence, it enables to test the relationship between the recall announcement characteristics and financial performance.

1.1 Purpose of the Thesis

Product recall literature generally concentrated on the consequences of product recalls on consumer attitudes and behavior (Dawar and Pillutla, 2000; Cleeren et al., 2008; Dawar and Lei, 2009; Klein and Dawar, 2004), financial value (Chen et al., 2009; Cleeren et al., 2013; Jarrell and Peltzman, 2017; Van Heerde et al., 2007), organizational or consumer learning (Haunschild and Rhee, 2004; Kalaighnam et al., 2012; Zhao et al., 2011). Although the recall studies focus mainly on how a firm's recall event affects the brand equity, firm reputation, financial value, consumer behavior, etc., little is known about firm recall strategy. Except for the few studies of Chen et al. (2009), Eilert et al. (2017), Haibing et al. (2015), Hora et al. (2011) product recall strategies and the firm's response to these product recall strategies are under-investigated. These previous studies demonstrate how marketing strategy tools could be useful to help firms to minimize their financial loss due to a product-harm crisis. However, these studies are few and emphasizing the need for further research in this area (Chen et al., 2009; Eilert et al., 2017; Haibing et al., 2015). Prior research in product recall shows that various conditions cause different consumer and investor behavior. Despite it is known that communication could help in a crisis (Coombs, 2007; Coombs and Holladay, 1996; 2002; Laufer and Coombs, 2006), to best of my knowledge the recall message content's impact on financial value has not been investigated. Therefore, I investigate the product recall message content, because it is critical to understand how a recall message content could influence a firm's financial loss. Within the product recall message, this research is also testing the effects of

corporate social responsibility (CSR), firm reputation and past recall rate. The literature provides information that a product recall could damage the brand reputation, but no study has investigated how brands with different reputations should act in the communication context. Besides corporate social reputation is considered in some product recall studies (Cheah et al., 2007; Klein and Dawar, 2004) but real CSR scores in the recall communication aspect are not investigated until now.

1.2 Significance of the Thesis

In this dissertation, I focus on the impact of the recall message content on the firm's financial value and effectiveness (Figure 1.2). Recall message is the news which makes the recall information available for public. Recall message effectiveness reflects the extent to which investors respond to the recall by getting informed about diverse aspects of the recall (e.g., product/recall/remedy information/s, deny to comment about something, make promises for the future, etc.). So, recall message effectiveness refers in this study to the extent to which investors respond to the recall information considering the message content.

Brands are firms' valuable assets (Backhaus and Tikoo, 2004), which can get hurt by product recalls. A product recall can damage a brand's reputation, decrease future sales, create negative perception and beliefs about the brand, etc. For these reasons, protecting the brand equity gains much importance in a product recall situation. If product recall rates in the automobile industry (also valid for other sectors, such as a toy, food, pharmaceutical, textile, etc.) are considered, minimizing a brand's damage degree in a product recall context is of great importance. The degree of damage caused by a product recall can be changing linked to various factors. Previous studies show how different recall strategies under different conditions can shift the damage degree (Chen et al., 2009; Haibing et al., 2015), it is expected that a brand's recall message content should also influence the financial performance in a product recall context. Therefore, the main research question that this dissertation addresses is:

“How does a product recall message content influence the financial value of a firm?”

It is planned to use automobile recall messages. Automobile recalls are prepared in cooperation with the federal agency and the company, and the recall message is prepared attentively. Usually, the message is given publicly via media. Although the

negative effect of product recalls on financial value is demonstrated in previous research, it is still unknown how investors react to the details of a recall news message content reflected in the press.

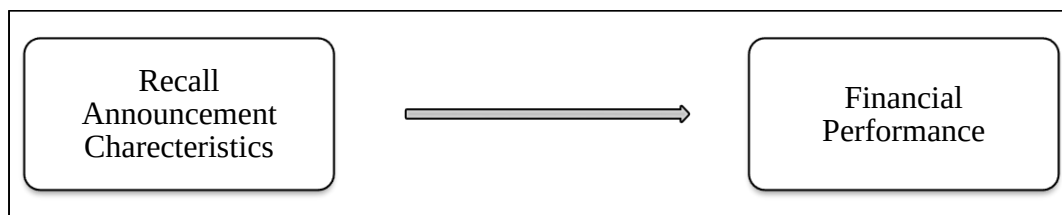


Figure 1.2 : General research model.

Previous recall studies (Chen et al., 2009; Haibing et al., 2015) and the automobile recall process show that the automobile industry is appropriate for this study.

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Product Recall

In the last decades, the amount of product harm crisis increased. A product harm crisis is defined as a discrete and publicized event because products are found to be defective and dangerous (Siomkos and Kurzbard, 1994; Dawar and Pillutla, 2000, Cleeren et al., 2017). Product harm crises arise in nearly all industries including automobile, electronics, furniture, textile, toy, etc. However, product harms in the automobile industry are may be the most visible ones. The high value of the products, the large number of affected products and the potential harm such products could cause contribute to the visibility of unsafe or even harmful automobiles.

Not all product recalls are related to a product-harm crisis; for instance, a syntax error in the instruction book or the label could also be a product recall reason. Besides, a defective product that has a potential harm result in a product recall. Tobin (1982, p.278) defines a product recall as “any attempt to remedy or correct products that are defective or hazardous or that do not comply with the agencies’ safety standards”. As a result of the increase of harmful products, product recalls also increase. Considerable major recall examples in the last decade are shown in Table 2.1.

2.1.1 Product recall process and trend

The absence of required quality in any step of the manufacturing and design process can affect all of the manufactured products in this product line (Chao et al., 2009). After a product failure is realized, it may cause to a product recall when the product (1) contains a defect that has a potential to harm consumers seriously, (2) involves dangerous material(s) which could create vigorous exposure to consumers, (3) has the potential to injure or lead to death and (4) violates standards and/or regulations (Chu et al., 2005). A defect can be detected by the end user, the company, or regulatory agencies. A government agency or the company could make the suspected products inquiry. In the case of a government agency investigation, the related company could

involve in the process voluntarily or wait until the investigation ends. After investigations related to the problem are made, and the problem becomes definite, the recall actualizes. Eventually, product recalls can be made voluntarily by the company or be made mandatorily demanded by regulatory agencies. Generally, the recall process is supervised by the regulatory agency.

Table 2.1 : Major product recall examples (Url-2).

<u>Year</u>	<u>Recall reason</u>	<u>Brand/Manufacturer</u>	<u>Affected product #</u>	<u>Estimated cost</u>
2016	Exploding Phones	Samsung recalled its Note 7 phones because overheated batteries explode.	2.5 million	\$5bn+
2015	Airbag Errors	19 manufacturers recalled worldwide cars due to defected Takata airbags causing one of the largest recalls in the automobile industry.	60 to 70 million	\$25bn+
2014	Ignition Flaws and Other Issues	GM recalled cars because of different issues including ignition switch flaws.	30 million	\$4bn+
2010	Hip Hiccups	DePuy Orthopaedics, a subsidiary of Johnson & Johnson recalled hip replacement devices. The devices caused to a high level of repeated surgeries.	90,000	\$3bn+
2009	Faulty Pedals	Toyota recalled its cars due to a pedal-related flaw.	9 million	\$3bn
2008	Peanut Contamination	Over 200 companies recall products because of salmonella fears. The responsible company was the Peanut Corporation of America and cause to one of the largest food recalls in the US.	4,000	\$1bn+

The NHTSA as the regulatory agency for automobiles is responsible for specifying the minimum quality requirements, detecting whether these requirements are fulfilled and supervising product recall processes (Rupp and Taylor, 2002). Besides the NHTSA

other agencies exist depending on the nature of the products. For example, the Consumer Products Safety Commission (CPSC) regulates consumer products market, whereas the Food and Drug Administration (FDA) ensures the safety of the drug, food, cosmetic, etc.

Regulatory agencies are consistently dealing with product recalls due to the increase in defective products. The increase in product recalls is attributed to several reasons. First, the expectation for product quality and safety by consumers rise, and intercompany competition hardens. Manufacturing of products with more features and functions leads to increased complexity of products. Complex products, globalization, cost issues bring along global production (Berman, 1999; Chen et al., 2009; Laufer and Jung, 2010). Despite the search of optimum production locations and a uniform quality understanding, problems could arise due to potential disconnections especially when the extended, more complex and more global supply chains are considered (Ni et al., 2014).

Furthermore, production amount of companies scale up. The increased quantity of production, limited production times and competitive pressure could also cause production errors (Gallozzi and Tucker, 2007; Beamish and Bapuji, 2008). On the other hand, closer monitoring for quality and safety by companies and government agencies are made to find out product defects to protect consumers (Berman, 1999; Chen et al., 2009; Laufer and Jung, 2010). It is expected that these trends will proceed in the future, which means that firms' risk of facing product recalls will also increase (Chen and Nguyen, 2013; Haibing et al., 2015) and that all efforts to prevent crises could be meaningless. This makes crisis and crisis management an ordinary part of the business (Kim, 2014).

2.1.2 Consequences of product recalls

A defective product, meaning a waste of time and financial loss for consumers, could even threaten the physical safety of individuals. This is the underlying reason for a product recall: protecting consumers, at least after a defect is detected. The results of a product recall are not limited to the effect on consumers, and they could also have serious consequences for companies. A product recall affects firms depending on the recall reason(s) and the risk they expose. In all circumstances, product recalls are costly events. Product harm crisis can have devastating negative outcomes on a brand,

its market share, and sales (Liu and Shankar, 2015) and has costs for companies, such as the costs of recalling, meeting the legal liability, repairing the damaged firm reputation, providing a remedy (Hora et al., 2011). All these costs related to the product recall could be distinguished by direct and indirect costs.

Direct costs of a recall are related to entire charges of the recall to the company. First of all, after a recall is announced, a company has to relief owners of the defective product. At this stage, companies are confronted with providing a remedy. Cost for remedy could occur in one of three forms; (1) repairing cost if a repair is possible, or (2) refunding cost if a repair is impossible, or the customer does not want to use the product anymore, or (3) replacement costs if the defective product is changed with a new complete product (Jayaraman et al., 2003). This retrieve requires transportation which means logistics costs for the company. In addition, a readjustment of the production line could be necessary to avoid same or similar problems in the future. On the other hand, communication costs will arise, because solving the problem related to the recall reason is only a part of the process. The company is liable to inform its stakeholders about the recall including information about the defect, the recall details such as the remedy type, remedy time, etc. Also, campaigns and activities to fix issues such as the damaged brand reputation, negative brand belief after the recall announcement should be a part of the product recall communication process (Souiden and Pons, 2009). Besides these costs, companies may have to pay to meet legal liabilities (Hora et al., 2011).

In a product recall situation, diverse *indirect costs* could appear for many reasons. For example, because of advertising, shipping, product repair, and replacement costs, etc. the market value of a firm would decrease after a product recall; therefore the brand equity of the brand will be damaged in the longer term (Chu et al., 2005). Product recalls also have an effect on the future sales and correspondingly future profits due to the negative perceptions and beliefs about the brand and the product and safety/health concerns (Ni et al., 2014). Financial damages of a product recall are not limited to these; also a firm's share price is negatively affected after a product recall announcement (Haibing et al., 2015; Jarrell and Peltzman, 2017). Additionally, product recalls could destroy investor confidence in the firm, which in turn leads to either a decline in the financial value of publicly traded firms or the unwillingness of investors to continue funding private firms (Chen et al., 2009).

In brief, a product recall could harm in various ways, and its effect could be observed either in the short and the long term. The whole product recall process triggers a crisis condition that the related company should handle.

2.2 Crisis

Crisis definitions vary. Many scholars have developed crisis definitions depending on their goals. Table 2.2 includes some examples of crisis definitions. Despite there is no commonly accepted definition of crisis, Coomb's (2010) crises definition is widely accepted in the literature.

In the early stages of crisis management literature, crisis definitions focus on the disruption characteristics of a crisis that has the potential to damage an organization on the physical and existential level (Pauchant and Mitross, 1992). Crises are also considered as "forewarning situations" which can harm future operations and revenue of an organization (Fink, 1986), and as turning points for an organization (Fink, 1986; Regester, 1989). Barton (2001, p.2) summarizes a crisis as "an incident that is unexpected, negative, and overwhelming". These unpleasant and undesirable happenings could occur in many diverse types.

The literature indicates various crisis type classifications. Hearit and Robertson (2010, p.543) lists crisis types of (1) allegations, (2) crisis in public perception, (3) natural disaster, (4) product or service crises, (5) terrorist attacks, (6) economic crises, (7) human resources crises, (8) industrial crises, (9) oil and chemical spills, (10) transportation disasters, (11) scandals and illegalities, (12) accidents, (13) product safety incidents, and (14) social irresponsibility. Despite Hearit and Robertson (2010) describe crises as listed before, Pauchant and Mitroff (1992) make a specific crisis classification as technical, economic, human, and social crises.

On the other hand, Fearn-Banks (2011) categorized crises into external economic attacks, mega-damage, external information attacks, breaks, and psychological and internal crises. Based on the Situational Crisis Communication Theory (SCCT) Coombs (2006) divides crises into victim crises (minimal responsibility), natural disasters, rumors, workplace violence, product tampering/malevolence, accident crises (low responsibility), challenges, technical-error accidents, technical-error product harm, preventable crises (strong responsibility), human-error accidents, human-error

product harm, and organizational misdeeds (according to organizational responsibility).

Table 2.2 : Crisis definitions.

Author(s)	Definition
Fearn-Banks (2011, p.1)	“a major occurrence with a potentially negative outcome affecting an organization, company, or industry, as well as public, products, services or good name. It interrupts normal business transactions and can sometimes threaten the existence of the organization.”
Segger et al. (1998, p.233)	“a specific, unexpected and non-routine organizationally based event or series of events which creates high levels of uncertainty and threat or perceived threat to an organization’s high priority goals.”
Coombs (1999, p.2)	“an event that is an unpredictable, major threat that can have a negative effect on the organization, industry, or stakeholders if handled improperly.”
Coombs and Holladay (2004)	“an event for which people seek causes and make attributions.”
Institute for Crisis Management (ICM) (2006)	the “any problem or disruption that triggers negative stakeholder reactions that could impact the organization’s business and financial strength.”
Coombs (2010, p.100)	“A crisis can be viewed as the perception of an event that threatens important expectancies of stakeholders and can impact the organization’s performance. Crises are largely perceptual. If stakeholders believe there is a crisis, the organization is in a crisis unless it can successfully persuade stakeholders it is not. A crisis violates expectations; an organization has done something stakeholders feel is inappropriate.”

Meanwhile, James and Wooten (2010) distinguish between sudden and smoldering crises. Sudden crises are defined as situations that unexpectedly occur, without any significant warning signs, such as natural disasters, sabotage, product tampering, and terror attacks. On the other hand, smoldering crises are situations that present before warning signs and are a cumulative result of small issues, such as corporate frauds,

lawsuits, misdeeds by personnel. These types of crises, which allow companies to intervene at a stage before the crisis occurs may be easier to handle.

Regardless of its type, crisis research shows that a crisis disrupts business, damage corporate reputation and financial livelihood (Coombs, 2007; Jaques, 2007; Williams and Olaniran, 2002). However, crises are also considered as possible “turning points” for firms due to their possible impacts on firm operations and livelihoods (Fink, 1986; Regester, 1989). According to the crisis management process, the crises can have positive or negative outcomes depending on how the crisis is managed (Coombs, 2010). At this point, crisis management and communication strategies will differ depending on the crisis type. Furthermore, Coombs (2010) considers crisis, crisis management, and crisis communication interrelated. Additionally, he defines this relationship as progressive and assumes that the crisis is followed by the crisis management process, which is followed by crisis communication.

2.2.1 Crisis management in context of marketing communication

Marketing communication provides companies to get into contact with its stakeholders which enables companies to express its marketing and business objectives. Companies compose messages by considering its environment and conditions. The overall aim of these messages is creating effective communication, for this by putting the audience into the center. Form and channel of the communication could vary depending on the aim of the communication. One of the marketing communication dimension is crisis management. Crisis management is vital for companies to overcome difficult situations.

Over time, crisis management has emerged as a strategic tool that helps to prepare for the crisis. Stocker (1997, p.189) defines crisis management as “... the preparation and application of strategies and tactics that can prevent or modify the impact of major events on the company or organization”. According to the American Marketing Association (AMA) crisis management is “An attempt by an organization to reduce, minimize, or control the impact of a calamitous event through various communication techniques”. Also, Coombs (2007) describes crisis management as “a process designed to prevent or lessen the damage a crisis can inflict on an organization and its stakeholders” and modifies his definition later as “... a set of factors designed to combat crises and to lessen the actual damages inflicted” (Coombs, 2010, p.20). In this

manner, crisis management can be considered as a predictive function which could help an organization to plan a strategy for a potential crisis event. In particular, crises happen unexpected, and these events affect a company's brand equity. It is known that all kinds of crises can harm a company, an institution. Thus, crisis management plays an important role to overcome such unpleasant happenings.

Coombs (2007; 2010; 2011) evaluates effective crisis management as a constant, everyday process and defines the crisis management process by proposing a three-step model (consisting of three interdependent stages) as shown in Figure 2.1. According to the Figure 2.1, crisis management consists of the crisis management plan(s) and post-crisis evaluations, and can be divided into three stages (1) pre-crisis, (2) crisis and (3) post-crisis.

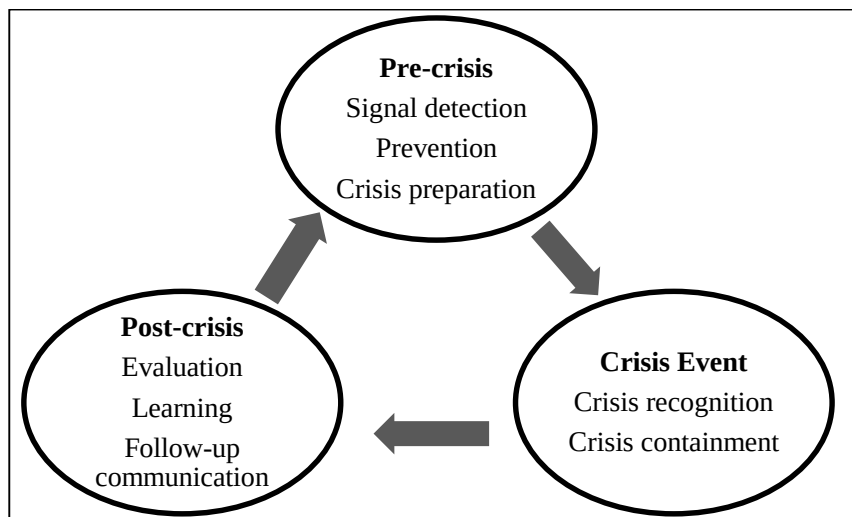


Figure 2.1 : The crisis management process (Coombs, 2007).

Crises often have signals. Detecting these signals could help to identify and even prevent a crisis (Alfonso and Smith, 2008). They could also enable to plan an action guideline including a crisis communication strategy (training spokesperson, develop a communication plan, etc.) and this stage is formulated as the pre-crisis stage. During the crisis, internal and external communication is decisive because the firm should accept that there is a crisis, gain information to make an appropriate decision(s), respond to interested parties. During a crisis response, four widely accepted rules are suggested (1) no silence, (2) quick response, (3) accuracy and (4) consistency (Coombs, 2010). The purpose of a response is to give information, adjust this information, and then contribute to reputation and trust restoration (Coombs, 2011).

Meanwhile, Fearn-Banks (2011) defines a five-stage process; (1) detection, (2) prevention/preparation, (3) containment, (4) recovery and (5) learning.

Due to technical uncertainties (Acquier et al., 2008; Beck, 2005; Callon et al., 2001), increase of stakeholders, interconnected communication and social systems, crises management process gets harder (Acquier et al., 2008; Boin and Lagadec, 2000). However, a right evaluation after a crisis could also lead to organizational learning, which would help to improve future crisis management including crisis communication if it can be integrated into the crisis communication plan. Besides, communication after the crisis allows giving information related to the recovery process and corrective actions which are significant for stakeholders. All these efforts could lead to restoring trust, reputation, beliefs, etc. (Coombs, 2011). A successfully-applied crisis strategy can help to minimize the damage caused by the crisis (Coombs, 1995; Herrero and Pratt, 1996; Chen et al., 2009), even turn it into an opportunity (Sellnow et al., 2011; Fearn-Banks, 2011). Therefore, it is pivotal how the crisis is managed.

2.2.2 Product recall announcement in crisis communication context

Preventing or mitigating the negative consequences of a crisis is the overall aim of crisis management (Coombs, 2011) and communication is one of the fundamental components of a crisis management process. Crisis communication process covers the dialogue of the organization with its stakeholders before, during, and after the crisis (Fearn-Banks, 2011). Crisis communication functions can be summarized as providing information to stakeholders, and protect and maintain the company, such as its image, reputation, financial performance, etc. (e.g., Coombs, 1995; Fearn-Banks, 2011). According to Coombs (2010, p.20), crisis communication is “...the collection, processing and dissemination of information required to address a crisis situation...”

In each of the crisis management step, shown in Figure 2.1, information about the crisis can be acquired and publicized. This process could be described as crisis communication. Pre-crisis communication consists of “collecting information about crisis risks, making decisions about how to manage potential crises and training people who will be involved in the crisis management process” (Coombs, 2010, p.20). Communication during a crisis includes collecting and processing information about the crisis. In a crisis situation, making an appropriate decision is vital. At this stage,

the way of action, and how to formulate (create) and publish (disseminate) the messages concerning the crisis event should be considered. Post-crisis communication is formulated by Coombs (2010, p.20) as “Dissecting the crisis management effort, communicating necessary changes to individuals, and providing follow-up crisis messages”. This means that post-crisis communication gives an opportunity for companies to express themselves.

Understanding the relationship between crisis management and crisis communication is beneficial for taking successful preventive actions in a crisis along with all three stages. Crisis actions include preparing a plan for the crisis, applying effective crises remedy strategies, and evaluating the effects of the crises and the actions taken against it, etc. After a product is recalled, a crisis occurs, the public seeks for information. Stakeholders such as owners of the affected products, investors, dealers require information about the defect, remedy details, action plan, etc. This makes crisis communication important.

Communication scholars also consider crisis management as a symbolic approach (Coombs, 1998). This approach, driven by Coombs (1998), is interested in “how communication can be used as a symbolic resource in attempts to protect the organization’s image”. The objective of the crisis management is managing or countering the negative effect(s) of a crisis. Assumptions of the symbolic approach are (1) crises threaten the image of an organization, and (2) communication type and content depends on the crisis event.

The crisis communication research focuses on protecting and strengthening the image (Benoit, 1997), and developing situational response strategies (Coombs and Holladay, 2002). Despite case studies demonstrate what to say and do in a specific crisis situation (Coombs, 2007), the symbolic approach is criticized due to concentrating on specific cases in the literature (Coombs, 2007; Hagan, 2007).

Suggested communication steps during a crisis are in crisis management literature is criticized since they can differ depending on the author. Stocker (1997) claims that crisis management is organization driven (centered), depending on this crisis management should start with a company, industry analysis. Consequently the decision should be given whether a crisis plan or preparation is needed. However according to the audience-centered approach stakeholders are of primary importance,

responsibility should be taken, and information sharing is crucial in the manner of monitoring new coverage and informing stakeholders (Wilcox et al., 2003).

When a product defect is realized, the product will be recalled. In the case of a product recall, the company is responsible for communicating about the event. In such a situation a suitable crisis communication should be applied. Primarily the company has to determine its product recall message and announce the recalled product and the details a product recall contains. A product recall announcement could help a company to lessen the negative effects of a crisis (Coombs, 2007). Previous crisis communication literature demonstrates that messages have an impact on individuals (Claeys and Cauberghe, 2014; Claeys et al., 2013). If the negative effects of a product recall in the short and longer term and the power of messages are considered crisis communication as crisis management tool could be vital for companies. For this reason, understanding the message content of product recall announcements is important.

2.3 Marketing-Finance Interface

Traditionally marketing and finance are two diverse disciplines. These two fields have different approaches to doing business and managerial perspectives. Financial managers focus on investment and financing decisions as well as controlling resources while marketing managers are interested in identification of needs and how to fulfill these needs. However, these approaches should be assessed as interdependent (Zinkhan and Verbrugge, 2000) and complementary, i.e. marketing managers should take the financial effects of their decisions into consideration.

The marketing-finance interface approach is a new research field that explores the relationship between firm-level marketing spending and financial performance (Kim and Richarme, 2010). Although there is strong link between marketing and finance fields, there is not much knowledge about it. Hence, some research has been done to investigate this interface (Dougherty, 1992; De Ruyter and Wetzels, 2000; Zinkhan and Verbrugge, 2000; Jenkins and Meer, 2005). The interface literature has shifted from the relation of marketing activities and financial performance metrics to customer-level strategies for this link boosting profit and value (Kumar and Petersen, 2005).

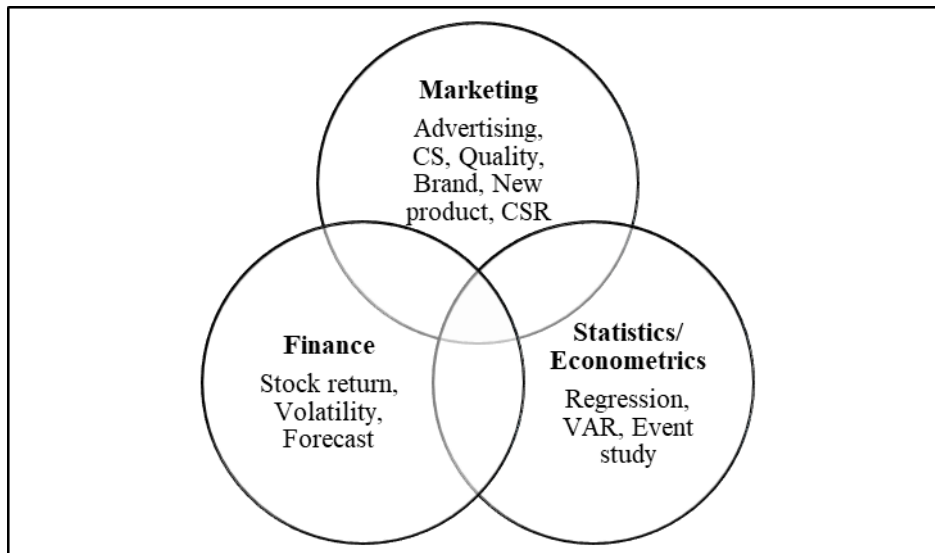


Figure 2.2 : Components of the marketing-finance interface (Kim and Richarme, 2010, s.9).

As depicted in Figure 2.2, Kim and Richarme (2010) define the marketing-finance interface as “consisting of three components, marketing variables, finance related factor, and methods. In other words, the marketing-finance interface seeks to find the relationship between marketing variables and finance variables using a variety of advanced statistical methods”. Table 2.3 demonstrates studies in this area. In brief, the effect of marketing inputs on financial outputs is subject to the marketing-finance interface. The definition assumes that financial value is obtained via marketing actions in line with some marketing concepts such as brand equity, product lifetime, customer equity (Kim and Richarme, 2010).

Harrison (1978) states that differences between marketing and financial information have evolved in the seventies. De Ruyter and Wetzels (2000) list barriers to effective collaboration of marketing and finance functions. Finance people are interested in shareholder value maximization, therefore focus more on shareholders and other creditors. However, marketing managers have also interest in other stakeholders.

Moreover, how to report brand valuation, giving how much importance to discounted cash flows and non-financial information, and amount of current assets, especially inventory level are the other conflicting areas. Nevertheless, these two disciplines have strong interdependency, and this relation can be strengthened by more mutual resource dependence, more fair-perceived procedures, and less interfunctional distance and competition between them (De Ruyter and Wetzels, 2000). In general, consisting of two interdependent fields, the marketing-finance interface enables companies to reach

their corporate goals. Effective collaboration between two disciplines is important for shareholder wealth maximization, which contributes to the sustainable business.

Table 2.3 : Selected marketing-finance studies.

Study	Marketing actions	Method	Financial measure
Srivastava et al. (1998)	External market-based assets	Theoretical	Shareholder value
Kaufman and Gordon (2000)	Marketing channel structure	Analytical	Earnings per share, operating return on asset
Chaney et al. (1991)	New product announcements	Event study	Stock returns
Hozier and Schatzberg (2000)	Termination of ad agency	Event study	Stock returns
Geyskens et al. (2002)	Distribution channels	Event study	Stock returns
Graham and Frankenberger (2000)	Advertising, R&D, tangible assets	Econometric modeling	Earnings, market value
Pauwels et al. (2004)	Price promotions	Vector autoregressive model	Stock returns
Kumar and Petersen (2005)	Customer-level marketing tactics	Analytical	Shareholder value, customer equity, and overall profitability,
Madden et al. (2006)	Brand valuation	Fama-French three-factor model	Stock returns
McAlister et al. (2007)	Advertising and R&D expenditures	Capital Asset Pricing Model	Systematic market risk
Hoffmann et al. (2011)	Investor relation management quality	Survey	Shareholder value
Osinga et al. (2011)	Advertising and Promotions	Kalman Filtering, four-factor model, stochastic volatility model	Returns, idiosyncratic and systematic risk
Feng et al. (2015)	Current marketing department power and marketing capabilities	Carhart four-factor model, Panel data analysis	Short-term return on assets (ROA) and total shareholder returns

2.3.1 Product recall and financial value of the firm

The financial effect of product recalls can be various. Firms can be affected negatively by decreasing sales and profits due to negative belief and concerns about the brand (Ni et al., 2014); damaging investor confidence and therefore decline in investors' interests for private and share price of publicly-traded companies (Chen et al., 2009, Haibing et al., 2015; Jarrell Peltzman, 2017).

Jarrell and Peltzman (1985) find automobile recalls to be associated with significant negative abnormal stock returns and they argue that shareholder losses would encourage managers to refrain from selling significantly defective products. Hoffer et al. (1987) reach similar results for the same industry. Some studies document significant positive reactions for automobile companies when their competitors announce recall of a product (Dowdell et al., 1992; Govindaraj et al., 2004). Govindaraj and Jaggi (2004) also find that the response of investors to product recalls is initially much higher since they evaluate all potential costs before the costs realize. However, financial markets adjust their overreaction with the realization of costs.

Davidson and Worrell (1992) investigate the information in 133 non-automotive recalls derived from Wall Street Journal Index for the period from 1968 to 1987. They find significant negative abnormal returns. They also suggest that recall announcement for replacing or repairing have a less negative effect on abnormal returns than an announcement for a product taken off, and mandatory recall generates significant results. Similarly, Chu et al. (2005) explore 269 non-automotive product recall announcements published in Wall Street Journals during 20 years. They find that the stock market reacts negatively to announcements before, during and after the event. They also find evidence of different recall responses in different industries.

Another stream of research focuses on the impact of recall characteristics on shareholder value (Ni et al., 2014, Gao et al., 2015). Ni et al. (2014) examine some features of consumer product recall announcements and their impacts on top U.S. retailers. They use event study and report negative effect on retailers' firm values. These negative impacts deepen in the recalls with private labels comparing to national ones, refund option rather than exchange or repair and a higher level of hazard. Furthermore, Gao et al. (2015) concentrate on pre-recall advertising expenditure besides recall characteristics in automobile recalls. Spending more money before a

recall of product with a recent launching date or little hazard lessens financial damage while it widens the loss of old products with many hazards.

2.3.2 Marketing strategies in product recall

Marketing-finance interface enables to investigate the impact of diverse marketing actions on financial value. Different methods could help be applied on this subject, one of the appropriate methods is the event study methodology which allows observing the share price change related to the marketing action taken such as news related to channel expansion (Homburg et al., 2014), product evaluation (Tellis and Johnson, 2007). Table 2.4 shows a sample of studies applying the event study methodology.

According to the research aim, the event study allows determining the estimation of expected returns and length of event windows (detailed explanation is given in the methodology section). This methodology is also used to test the effect of diverse marketing strategies on firm value in the product recall context (Pennings et al., 2002; Cleeren et al., 2013; Liu and Shankar, 2015; Liu et al., 2016; Eilert et al., 2017). Table 2.5 includes studies related to marketing strategies in product recall context.

All studies in Table 2.5;

- based on the efficient market hypothesis,
- focus on investors in some cases also firms are taken into consideration as in the papers of Thirumalai and Sinha and Eilert et al., and
- define the dependent variable as firm value, which is proxied by abnormal and cumulative abnormal returns, some of the papers formulate additional dependent variables such as Thirumalai and Sinha – the number of recalls, Eilert et al. – time to recall.

Although some studies are examining the implications of marketing strategies in a product recall situation, research in this area is still rare.

2.4. General Research Model

The increase in product recalls and the damage they cause makes product recall management for managers and policy makers very important. It is crucial to apply an appropriate crisis management strategy which may help the company to decrease the

negative effect of a recall. Especially when the recall growth rate and their economic extent is taken into consideration (Chu et al., 2005), managing product recalls effectively become a top topic (Chen et al., 2009). Companies are interested in how they can deal with this unpleasant situation. Understanding consumer and investor reactions to product recalls would facilitate to handle this complex situation. The importance of this topic leads to diverse empirical researches investigating the product recall-consumer behavior relationship (Souiden and Pons, 2009) but the product harm crisis communication and marketing strategies are still under-examined areas of the crisis management context (Laufer and Jung, 2010).

Initially, crisis communication research focused on case studies. Later the literature was expanded by experimental research that covers the effects of different crisis response strategies, perception of crisis responses, etc. (Arpan and Roskos-Ewoldsen, 2005; Coombs and Holladay, 2008; Dean, 2004; Huang et al., 2005; Schultz et al., 2011) but the impact of crisis (in this study limited to product recalls) communication content on financial value is not investigated to best of my knowledge. Besides the product recall literature lacks at the point how to communicate in a product crisis management context by considering the marketing-finance interface. This study aims to contribute to the literature by examining this gap. Also, the literature emphasizes the actuality and importance of the question of how investors react to diverse marketing movements; this proves the significance of this study (Srinivisan and Hanssens, 2009).

After a crisis occurs the public seeks for information and media coverage provides this information to the public. The message content (frame) influences the public's perception, beliefs, etc. related to the organization. Therefore, analyzing and understanding the media message content gain much importance (An & Gower, 2009; Coombs, 2006).

After a defect is detected, first the NHTSA or the company could start the initial testing related to the suspected product. If a violation is established the second stage continues with engineering tests. The completion of the processes takes on average nearly one and a half year (Rupp and Taylor, 2002). The company could announce the recall at any phase of the recall process. In all cases, the company has adequate time to plan its recall and determine the appropriate product recall strategy.

Table 2.4 : A sample of studies applying event study in the marketing literature.

Info source	Author	News theme	Impact of the news on financial value	Estimation of expected returns	Length of the event window
Company	Elberse (2007)	Casting	+	Constant-mean-return model, Market model	Short term (-7,0)
Company	Wiles et al. (2012)	Brand acquisition Brand disposal	+ +	Market model	Short term (0,1)
Company	Homburg et al. (2014)	Channel expansion	+	Market model	Short term (-1, 0)
Company	Borah & Tellis (2014)	Make a new product Buy new product Ally (to design/market)	+ - +	Fama-French-Carhart	Short term (-1, 1)
Agency	Tellis & Johnson (2007)	Product evaluation	+	Market-adjusted model	Short term (-5, 5)
Competitor	Gielens et al. (2008)	Competitor entry	-	Market model	Short term (0,1)
Regulatory	Sorescu et al. (2007)	Merger and acquisition	° for acquirers + for target firms	BHARs	Long term 1-2 year
Company	Chen et al. (2009)	Product recall	-	Market model	(0,0)
Company	Gao et al. (2015)	Product recall	-	Market model	(-1,1)
Company	Eilert et al. (2017)	Product recall	-	Fama-French four-factor model	(-2,2)

Table 2.5 : Effect of marketing strategies in product recall context.

Authors	Event Window	Topic - Issue	Findings
Chen et al. (2009)	[0,0]	The effects of proactive vs. passive recall strategies on financial value	Proactive strategies can harm more than passive alternatives. Investors may read a proactive strategy message as a signal of financial loss for the company. Financial markets may evaluate the moves of the company managing proactive recall process as the efforts to minimize the financial damage of a crisis.
Thirumalai and Sinha (2011)	[-10, +1]	Empirical testing whether the financial effects of recalls of medical equipment make medical companies remove dangerous equipment from the market as proposed in the literature Also the impact of firm characteristics are taken into consideration	Financial market is not significantly sensitive as expected at the aggregate level. However, firm characteristics such as product scope, sales, expected growth, and the capital structure of a company influence financial outcomes. R&D-oriented, diverse product portfolio-holder companies are likely to have higher recalls while past recalls might be followed by less subsequent recalls.
Gao et al. (2015)	[0,+1]	The impact of pre-recall advertising spending as proactive strategy to limit the stock market loss.	Increasing pre-recall advertising spending for a new product with a minor hazard (an older product with a major hazard) diminishes (magnifies) financial loss. Furthermore, reducing pre-recall advertising spending is financially depressing for newly introduced products.
Hsu and Lawrence (2016)	[-1,+1]	The negative effects of social media on firm value during a product recall Moderating effect of brand equity, participating in online platforms on the relation of online word-of-mouth (WOM) and recall.	Most WOM variables amplify the negative effect of recall on companies' abnormal returns. The higher the brand equity of a company is the lower negative effect social media has. No effect of online participation on the negative impact of social media during the recall.

Table 2.5 (continued) : Effect of marketing strategies in product recall context.

Eilert et al. (2017)	During After	The impact of problem severity on time to recall by moderating effect of brand characteristics Financial market response to time to recall	Problem severity leads to rising in time to recall, The effect is lower for reliable and experienced (severe recall) companies while it is higher for the companies that have brand diversification. Stock markets consider the product recall timing by reacting negatively to delays.
Liu et al. (2017)	[-2,+2], One year after	Long-term impacts of recall volume on the financial value Moderating effect of crisis management strategies on this relation	There is a negative effect of recall volume on financial value and recall remedy efforts moderate this effect. Besides, financial value is positively affected by brand advertising and voluntary recall, and negatively by promotional advertising.

In this dissertation, I investigate specifically the message content of the product recall news (message in this paper) and whether the message content has an impact on firm value. It is critical to understand how a recall message could influence a firm's financial loss which could guide a recall communication strategy. I focus on the impact of recall message content on the firm's financial value and effectiveness. Recall message is the news which makes the recall information available for public. Recall message effectiveness refers in this study to the extent to which investors respond to the recall information considering the message content.

Additionally the effect of reputation, CSR and past recall rate is tested. The literature provides information that a product recall could damage the brand reputation, but no study has investigated the impact of reputation in the communication context. Also, corporate social reputation is considered in few studies in the product recall context, and these studies are mainly case or experimental design studies (Cheah et al., 2007; Klein and Dawar, 2004), but real CSR scores in the recall communication aspect are not investigated until now. Besides past recall rate is an important variable which enables an overview of the companies' recall history.

$$\text{Financial Performance} = \beta_0 + \beta_1 * \text{Message} + \beta_2 * \text{Reputation} + \beta_3 * \text{CSR} + \beta_4 * \text{Past Recall} + \beta_5 * \text{Control} + \varepsilon \quad (2.1)$$

For coding the recall message the content analysis is applied, where the event study methodology is used to calculate the financial performance measure.

3. METHODOLOGY

This chapter will illustrate the empirical context, data collection and used sources, after that the selected research methods will be evaluated and discussed. To answer the research questions and to fulfill the discovered gap(s) in the literature two different research methods are adopted, (1) the content analysis, and (2) the event study methodology.

3.1 Empirical Context and Sampling

The empirical setting for this study is the US automotive industry. This industry provides a great context because of comprehensive data availability and therefore has been subject of diverse recall studies (Eilert et al., 2017; Haibing et al., 2015; Haunschild and Rhee, 2004; Jarrell and Peltzman, 2017; Kalaighanam et al., 2012; Rhee and Haunschild, 2006).

The dataset is limited to automobile recall news published in Reuters US edition and concentrates only on recall news that is subject to recall of one brand (see for examples A1 in the appendix) because recall news including recalls for more than one brand will not allow a precise evaluation of the financial constructs.

I collected data on all recall news published in Reuters between March 2017 (beginning date of this study) and June 2014 until I reach up 250 recall news in the automotive industry. The final dataset includes 250 automobile recall news comparable to other studies, e.g., 153 observations, Chen et al. 2009; 170 observations, Liu et al. 2016.

Table 3.1 provides an overview of the brands and their number of recall news included in the sample. The data shows that more recall news belongs to US originated firms (40,8%) followed by Asia originated firms (37,6%) and Europe originated firms (21,6%) as exhibited in Figure 3.1.

Table 3.1 : Number of recall news included in the sample.

Firm	Brand	Number of recall news
US originated		
Fiat Chrysler	Chrysler, Dodge, Eagle, Fiat, Plymouth, Jeep	37
Ford	Ford, Lincoln, Mercury, Jaguar, Land Rover, Volvo	33
General Motors	Buick, Chevrolet, Cadillac, GMC, Hummer, Oldsmobile, Saab, Saturn, Pontiac	31
Tesla	Tesla	1
Asia originated		
Honda	Honda, Acura	27
Mitsubishi	Mitsubishi	1
Nissan	Nissan, Infiniti	19
Mazda	Mazda	12
Toyota	Toyota, Lexus	35
Europe originated		
BMW	BMW	14
Daimler	Mercedes	5
Renault	Renault	1
VW	Audi, Bentley, Porsche, VW	34
Total		250

Two different research methods, content analysis and event study methodologies (qualitative and quantitative research methods) were applied to complement each other and to obtain more valuable information (Collis and Hussey, 2003; Reinard, 2001, etc.). So, a better understanding of “crisis communication” content is gathered, and the effect of the crisis communication content on financial performance is obtained.

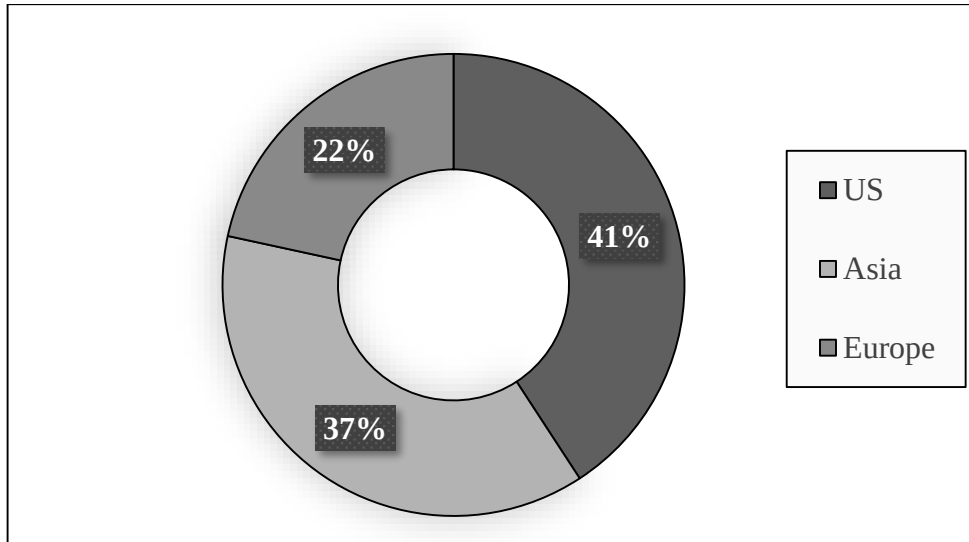


Figure 3.1 : Origin of recalled automobiles.

3.2 Data Sources and Measures

In this study, I use secondary data. Recall news content is the information presented in the Reuters articles according to the related recall event (recall news examples are given in Appendix B). After I determined published recall newspaper articles, a content analysis (detailed list of the analyzed content dimensions is illustrated in Appendix C) is conducted to measure the recall news content (MESSAGE).

The dependent variable of the study is financial performance, which is proxied by short-term cumulative abnormal returns, shortly CAR (FINANCIAL PERFORMANCE). To derive abnormal returns (ARs), the event study methodology is applied, and CARs are calculated for specified event windows. This method relies on Fama's (1970) efficient market hypothesis and suggests that the price of a stock reflects publicly available information instantly, which allows testing the information effect and also enables to determine the effect of factors that influence the stock price (Eilert et al., 2017; Kartik, 2013). AR is calculated as the difference between the actual stock return and the expected return. To predict the expected return the market model is used following the literature (MacKinlay, 1997).

The data for corporate reputation (REPUTATION) is obtained from the Fortune magazine's 'America's most admired companies' survey. This is proxied by the attributes, ability to attract and retain talented people, quality of management, to the community and the environment, innovativeness, quality of products or services, wise use of corporate assets, financial soundness, long term investment value, and

effectiveness in doing business globally. Raters evaluate companies on each attribute on a zero (poor) to ten (excellent) scale, and an overall score is calculated by taking an average (Url-3).

To measure corporate social responsibility (CSR), I use the data from Thomson Reuters ASSET4. Thomson Reuters ASSET4 evaluates firms' CSR scores on the social, environmental and corporate governance dimensions ('pillars').

Past recall rate refers to how many cars automobile companies recall in the United States from 1985 to 2014 (PAST RECALL RATE), used data is detailed shown in Figure 3.2. This data is obtained from Statista (Url-4). Statista offers continually updated statistics and industry reports for business and academia.

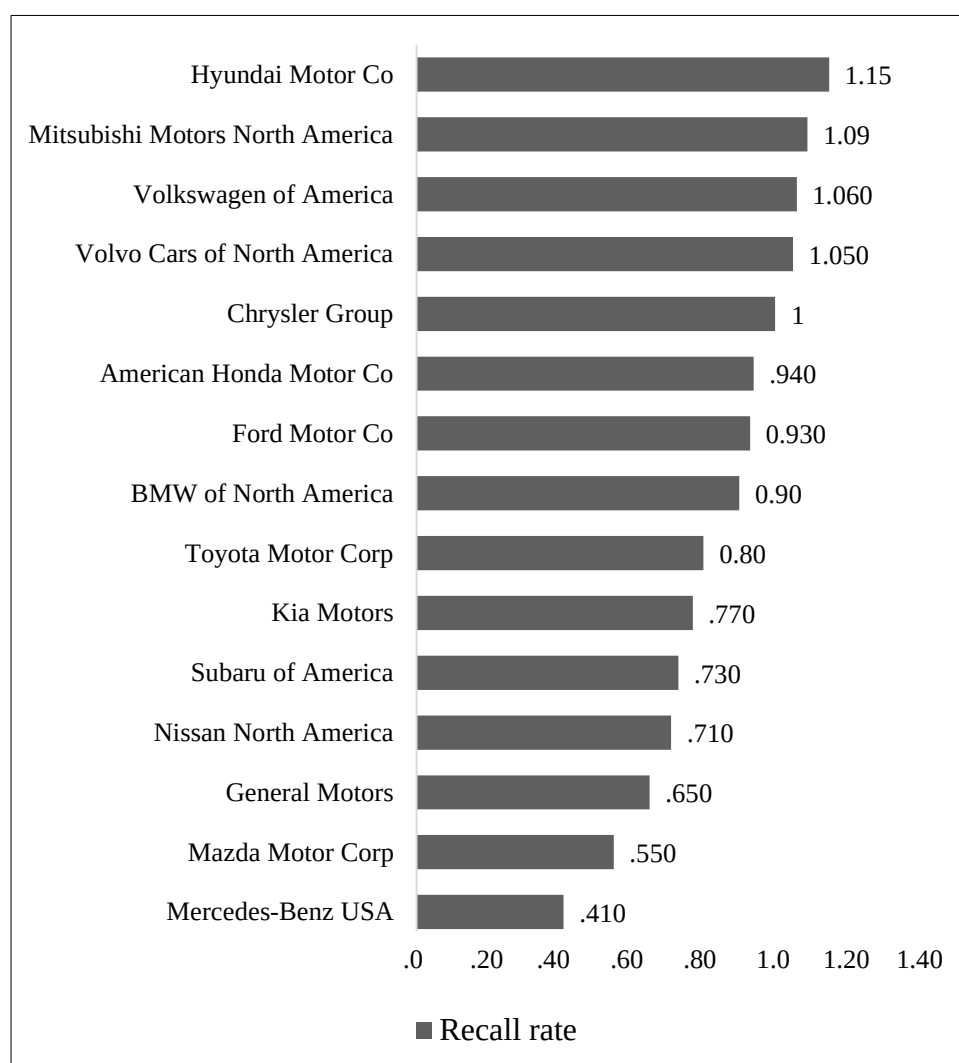


Figure 3.2 : Car manufacturers' recall rate in the United States from 1985 to March 2014 (Url-4).

The data for the control variables were conducted from the Thomson Reuters database and Yahoo Finance. In Table 3.2 data sources and variables are given for an overview. Firm characteristics data including firm size, firm debt, price to book value, return on assets, and sales are obtained from Thomson Reuters database. These variables based on annual data are used as the control variables of this study. Additionally, trading date info is considered as a dummy variable to control whether there is a significant difference when publishing date of the news and trading date is the same or not.

Table 3.2 : Control variables.

Variable	Definition/Operationalization	Source
Fsize	Market capitalization of the firm	Thomson Reuters Datastream
Fdeb	Total amount of the firm's debt	Thomson Reuters Datastream
Fp2b	Price to book value per share of the firm	Thomson Reuters Datastream
Froa	Return on asset of the firm	Thomson Reuters Datastream
Fsale	Net sales of the firm	Thomson Reuters Datastream
TraDate	Whether the trading day is the same as the news publishing day or not	YahooFinance

3.3 Content Analysis

3.3.1 Content analysis methodology

Content analysis is a flexible research method, which allows to identify the content dimensions of texts in printed or visual style. Shapiro and Markoff (1997) define content analysis as “any methodological measurement applied to text or other symbolic materials for social science purposes”. According to Neuendorf and Kumar (2002), this method is the systematic, objective and qualitative analysis of a message, which helps to investigate the details of content. In brief, content analysis is a systematic, replicable, objective technique that enables to categorize long texts into specific dimensions by applying specific rules (Krippendorff, 1980; Weber, 1990). The

main assumption of this method is that it helps to understand cognitive schemas (Duriau et al., 2007; Gephart, 2018) which express the compatibility of the method for this study because it is aimed to decode and describe the “crisis communication phenomenon” at the first step of the investigation.

This method is objective and systematic, due to its replicability and transparency of the procedure in assigning the information in the texts into categories which allows minimizing personal biases. Additionally, the systematic application of rules in the analyzing stage provides consistency. Therefore, if the same sampling procedures are followed and coding schemes are used, the coding results should be replicable (Carley, 1997). Another major point is that the method is analytically flexible; it allows to explore the content of the text in some text statistics, and discover the deeper meaning embedded in the underlying content (Erdener and Dunn, 1990; Woodrum, 1984). Also, it is possible to combine the method with quantitative analyze techniques, that enables to expand the qualitative structure of the method (Erdener and Dunn, 1990).

A correct coding procedure is possible if instructions are given clear, the unit of analysis is definite, and categories cover the whole content and are not overlapping. Inter-coder reliability (consistent coding between coders) ensure the reliability of the coding results (Bryman, 2008). Additionally, if problems are found during the study process, it is possible to correct the coding scheme (Tallerico, 1991; Woodrum, 1984).

In this study, content analysis is defined as a research method for the objective assessment of the content of text data through the systematic classification process of coding and identifying themes or patterns.

3.3.2 Content analysis procedure

As mentioned before, the content analysis method is used in various contexts in the literature and has proven its usefulness and adequacy in the understanding of the information content. Therefore, the overall objective of content analysis in this study is to investigate, determine and conduct the information content employed in product recall news. For a comprehensive overview, a detailed assessment was necessary. Therefore it was aimed to capture all crisis communication details by adopting content analyses in this study. In this part, it is aimed to clarify how a product recall news is. A comprehensive content analysis was conducted in this study, which includes

defining sample and unit of analysis, preparing the codebook, coding the news (collecting the data), testing reliability, analyzing, revealing findings and results.

3.3.2.1 Sample and unit of analysis

To survey recall news comprehensively using content analysis, I used a two-stage strategy. First, I searched for all automobile recall news. To do that I scanned all business news in the Reuters U.S. edition, not to dismiss any recall news. By limiting the study to one Newspaper, it is aimed to control between-newspaper (news sources) variation. The newspaper article was selected as the most appropriate sampling frame because of its content characteristics, accessibility, and visibility to investors. Besides, automobile recall news is prepared by a regulatory (for the automobile industry generally NHTSA) and the firm, and announced by media channels (generally first online, later in the newspaper as printed). All recalls in the automotive industry are taken into consideration between the dates June 2014 and March 2017 until 250 published recall news was obtained. According to previous content analysis studies, 250 is adequate (Chen et al., 2009; Liu et al., 2016). The detailed list of the number and proportion of recall news included in the sample brand by brand is illustrated detailed in Table 3.1.

The unit of analysis was one automobile recall newspaper article that was examined by applying coding instruments which consisted of 120 dimensions. The dimensions coded for the variables are explained in the next section, and the detailed list is given in Appendix C.

3.3.2.2 Codebook

A correct coding process depends on an inclusive and nonoverlapping coding scheme, well defined coding categories, complete and clear coding instructions which are explained in this section.

Coding scheme development

Putting content in a systematic and replicable way into fewer content categories is basing on fixed specific rules of coding (Krippendorff, 1980; Weber, 1990). The method which should be applied in the coding process (such as in other processes) depends on the aim of the study. According to the aim of this study two people independently reviewed the recall newspaper articles and determine a set of features

which formed the checklist for the content analysis in this study. Then the researcher compared their checklists and reconciled the differences. Finally, the reconciled final checklist was independently applied to decode, describe, and classify the content of product recall news.

The next step is to check the reliability scores. If the values are not accepted, researchers repeat the previous steps. After reliability establishment, the coding is applied on a large scale, and then a periodic quality control check can be made. (Haney et al., 1998).

Coding categories

The coding instrument consists of 36 dimensions and their sub-dimensions. A dimension set consisting of total 120 dimensions is defined. The defined coding categories are explained below.

Brand information

Brand information refers to the brand of the recalled product in the published news article. The brand dimension covers x1a to x1u, lower dimensions and are respectively; Mercedes, Volkswagen, BMW, Mitsubishi, Ford, Mazda, Nissan, Honda, Toyota, General Motors, Porsche, Renault, Chrysler, Chevrolet, Audi, Tesla, Volvo, and Bentley.

Additional source information

In some of the recall news additional source (x2) is given for further or detailed information. In such cases generally, a link is given which directs to the company website. 1 (one) is coded if the additional source is available and 0 (zero) if not.

Publication number information

Refers to how often the recall article is published (x3). In some cases, the recall news is published more than one, certain recall news redouble, in other cases corrections are made, or additional information is given.

Brand origin information

This refers to the brand origin of the recalled product if given 1 if not given 0 is coded (x4). In the case of the brand origin was mentioned, the related origin was coded in the sub-dimensions as Japanese (x4a), German (x4b), US (x4c), France (x4d), Korean (x4e), China (x4f), Italian (x4g).

Country of manufacturing information

Refers to whether the country of manufacturing information is in the recall article available (1) or not (0).

Manufacturing, sales, and model period information

Manufacturing period information (x6) refers to the time interval of manufacturing of the recalled products. When this information was available (in that case coded 1, otherwise 0 for x6a) the manufacturing period length (x6a) of the recalled product was calculated on a monthly basis. Additionally, it was calculated how long ago the manufacturing period (x6b) was (considering the beginning date of the manufacturing period).

The same transact was made for sales period availability (x7), sales period length (x7a), and sales period when (x7b) dimensions.

Model period availability (x8) was coded in the same way as for the manufacturing and sales periods. However, differently from the formers, the dimension of model period length (x8a) and model period when (x8b) were calculated and coded on an annual basis.

Solution information

It refers to the information availability of a solution (x9) in the recall message (1) or not (0).

Source of the problem

In some recall messages, the responsible for the recall reason is mentioned. The responsible dimensions are divided into two sources of the problem mentioned as a supplier (1) or not (0) (x10a), and source of the problem mentioned as the company (1) or not (0) (x10b).

Recall type information

In some recall messages recall type information is available (1) whereas in other cases not (0) (x11). If recall type information type is mentioned the recall types are categorized as; safety recall (x11a), voluntary recall (x11b), preventive recall (x11c), mandatory recall (x11d), and types not covered in the mentioned categories are defined as other recalls (x11e).

Source of the message information

In some recall messages recall information source is available (1) whereas in other cases not (0) (x12). In some recall messages, the source is mentioned clearly in some intimated. In the case the source of the message is given the information is detailed as whether the recall source is a regulatory or not (x12a), company or not (x12b), company spokesman/women or not (x12c), ministry or not (x12d), another newspaper or not (x12e), and the information not covered in the mentioned dimensions are gathered as other or not (x12f).

Recall channel information

In some recall messages recall channel information is available (1) whereas in other cases not (0) (x13). In the case the recall channel information is given the information is detailed as whether the recall channel is an e-mail or not (x13a), a website or not (13b), a media briefing or not (13c), a filling or not (x13d), a newspaper or not (x13e), a letter or not (x13f), an interview or not (x13g), and television or not (x13h).

Recall news date information

Refers to whether the recall date is mentioned in the message (1) or not (0).

Model information

In some recall news, the model information related to the recalled products is given available (1) whereas in other cases not (0) (x15). In some messages, the model information is clear given (1) or not (0) (x15a), and in other messages, the model information is unclear given (1) or not (0) (x15b). Generally when the recalled model information is clear given, or the number direct mentioned the number of many models is recalled could be determined as a dimension (x15c).

Recalled product number information

In most of the recall news the number of affected cars (x16) are given (1), in few cases not (0), and in the case of product number availability, the number is also coded as another dimension (x16a).

Recall region information

In some recall messages recall region information is available (1) whereas in other cases not (0) (x17). In the case the recall region information is given the information

is detailed as whether the region covers the United States (x17a), is globally (x17b), covers North America (x17c), South America (x17d), Europe (x17e), Far East (x17f), China (x17g), Russia (x17h), Middle East and Africa (x17i), India (x17j), and Australia (x17k).

Recall rate information

Refers to the information how much products of the total sold products are recalled (recalled product number/sold total product number) (x18).

Complaint information

Refers to if any customer complaint information in the recall article is available (1) or not (0). In the case of complaint information availability, the number of complaints (x19a) is also coded as an additional dimension.

Recall institution information

In some recall, messages recall institution information (x20) is available (1) whereas in other cases not (0). In the case, the recall institution information is given the information is detailed as whether the recall institution is a regulatory (x20a), and the company (x20b).

Recall action information

Refers to whether the recall message contains the information of a proactive or reactive action (1) or not (0) (x21). After the evaluation of the information availability, this dimension is detailed whether the recall is proactive (x21a), and whether the recall is reactive (x21b).

Accident, injury, and death information

In some recall messages accident (including fire) information (x22) is available (1) whereas in other cases not (0). This dimension is detailed in three sub-dimensions as, accident info available, accident available (1) other (0) (x22a), accident info available, accident not available (1) other (0) (x22b), if specified number of accident(s) including fire is coded clearly (x22c).

The same transact was made for injury information availability (x23), detailed in injury info available, injury available (x23a), injury info available, injury not available (x23b), number of injury (x23c), and death information (x24) detailed in death info

available, death available (x24a), death info available, death not available (x24b), number of death (x24c).

Recall reason information

Refers to if the recall reason in the recall message is available (1) or not (0) (x25).

Level of hazard information

Refers to the level of the hazard of the affected products (x26)

Customer information

Refers to the information availability of whether the car owners of the affected recall are/will be informed (1) or not (0) (x27).

Recall date information

Refers to the information of the planned recall date related to the affected cars (x28), 1 is coded if the information is available and 0 if not. In some cases the planned recall date is stated clearly or roughly, which allowed to code an additional dimension the duration of the period from message to the planned recall date (x28a), this dimension was calculated on a monthly basis.

Recall repetition information

Refers to the information whether the brand and/or model was recalled before (1) or not (0).

Refrain information

It is observed that in some cases the company, company spokesman/woman, etc. refrain from commenting on any dimension of a recall (e.g., accident info, recall reason...). This content dimension refers to whether a refrain situation is in the recall article given (1) or not (0).

Remedy information

In recall articles remedy information (x31) is available (1), or not (0). If remedy information was defined in the message remedy as repair (x31a) is coded as stated (1) or not (0), whether remedy date information (x31b) is available (1) or not (0), and when information was available the duration of period from message to the planned remedy date is calculated on a monthly basis (x31c).

Instruction information

Refers to whether an instruction for owners of the affected cars are given when they face a (the) problem (1) or not (0) (x32).

Current sale information

It refers to the information related to the current sale status (x33), available (1) or not (0). In the case of detailed information related to current sales the dimension is detailed whether the sales of the affected cars still sold (1) or not (0) (x33a), or the sales of the affected cars stopped to sell (1) or not (0) (x33b).

Free of charge information

It refers to whether a free of charge for reparation, change, etc. towards the affected cars are mentioned (1) or not (0).

Cost information

In some recall messages, the recall costs for the company are mentioned (1), in others not (0). In the case of clear information, the cost amount is coded as another dimension (x35a).

Recall due to airbag problem information

It refers to whether the recall information due to an airbag problem is available (1) or not (0) (x36). During the research period of this study, it is observed that many cars are recalled related to Takata (an airbag company which was a supplier of many car companies and cause to several deaths, injuries, and accidents due to its problematical airbags) airbag defect(s). Therefore, this dimension is detailed through another dimension which was coded as the airbag problem was related to Takata (1) or not (0) (x36a).

Other event information

In some recall news besides to the recall event related to the certain brand, also other information is available (1) in others not (0) (x37). The other information dimension is detailed when information about another automobile firm (s) is available (1) or not (0) (x37a), and Takata information is available (1) or not (0) (x37b). If the information type could not be coded under the dimensions x37a or x37b, it was coded as

information about something else available, which refers to the information content which was not repeated (1) not available (0) (x37c).

Joint venture information

Refers to whether a joint venture made the recall is mentioned (1) or not (0).

Emission cheat information

The research period covers the time of Volkswagen's emission cheat, due to the many repeated emission cheat articles during the emission cheat scandal this information is also coded as, whether the recall is due to an emission cheat information is available (1) or not (0) (x39).

Stock price information

Refers to if any information about the stock price is available (1) or not (0). This information takes place as stock price or rate decrease in recall news after the recall.

3.3.2.3 Coding

According to the prepared checklist, data coding was manually conducted by two coders, by an independent coder and me. The codes were looked over and discussed in detail to avoid any dilemma. Intercoder reliability, as calculated using Krippendorff's Alpha (2011) formula, the reliability score was falling within the accepted range of 0.8–1.0 (detailed explanation is given in the "Empirical Findings" section).

Table 3.3 : Steps of a text coding (Weber, 1990, s.21-24).

1.	Definition of the recording units (e.g., Word, phrase, sentence, paragraph)
2.	Definition of the coding categories
3.	Test of coding on a sample of text
4.	Assessment of the accuracy and reliability of the sampling coding
5.	Revision of the coding rules
6.	Return to Step 3 until sufficient reliability is achieved
7.	Coding of all the test
8.	Assess the achieved reliability or accuracy

Weber (1990) suggests certain steps for the coding process of content analysis for creating, testing, and implementing a coding scheme without any bias. The steps

showed in Table 3.3 are widely adopted in the literature, it was also used in this study as guide by adopting the content analysis.

The data coding process was done by two coders, by an independent coder and me. Explanations according to the coding process was given to the independent coder and discussed among the coders.

3.4 Event Study Methodology

The event study methodology investigates the financial effect of an event based on stock prices. The methodology is based on a semi-strong efficient market where publicly available information immediately update the security prices after it is announced. This method is beneficiary since the immediate change in the stock price will show the effect of an event under the market rationality assumption (MacKinlay, 1997). The instantaneous change assumption in stock prices makes the methodology especially interesting because it allows to isolate the effect of other factors and to measure the effect of the related action or event. However, data of other financial performance metrics (e.g. ROI, ROE) is available at a low frequency (e.g. monthly, annually).

Studies investigating the impact of an event on firm value have emerged in Finance researches first. Dolley (1933), known to be the first to use event study, explore the effect of stock splits on the price. More sophisticated research was conducted later; however, this methodology as its use in today's first introduced by Ball and Brown (1968), and Fama et al. (1969). Ball and Brown (1968) examined the earning announcements regarding information content, whereas Fama et al. (1969) (FFJR) used event study to determine how stock splits are reflected in the prices after controlling the effect of dividend increases. The basic methodology of Ball and Brown (1968) and FFJR has been modified by some studies. Among them, Brown and Warner (1980, 1985) and Boehmer et al. (1991) added important modifications. Brown and Warner (1980, 1985) present how to conduct an event study. They introduce use of longer data sets (monthly) and two separate windows: estimation and event windows (Binder, 1998). They include three different models; (1) mean-adjusted returns, (2) market-adjusted returns and (3) risk-adjusted returns. However, event study format has been the same with FFJR (Kothari and Warner, 2007).

The event-study approach has been adopted to a vast number of idiosyncratic and macro events. The approach has been used in different fields of accounting and finance; mergers and acquisitions, earnings announcements, issues of new debt or equity, and announcements of macroeconomic indicators (Campbell et al., 1997).

This method enables to examine the widespread effects on firm value and provides evidence related to the immediate response of stock prices to information (Fama, 1998). Hence, Fama (1991) considers event studies as the test of market efficiency and the source of our knowledge in corporate finance. Fama (1970) defines efficient markets as the markets where all available information is always reflected in security prices. Therefore, prices should change in response to newly arrived information.

Nevertheless, the event study methodology has been widely adopted in other fields of social sciences such as management (Koh and Venkatraman, 1991; Diestre and Rajagopalan, 2014; Yang et al., 2015; McWilliams and Siegel 1997), law (Davidson et al., 1994), accounting (Geiger et al., 2008), economics (Greenstone et al., 2006; Lee and Mas, 2012), and operations systems (Subramani and Walden, 2001; Yang et al., 2012) and marketing. Most papers that use the approach examine the event impact on equity prices (Campbell et al., 1997).

Papers using event study in the marketing literature are mainly focusing on corporate firm announcements, and these papers generally investigate the expected positive reactions of the investor to positive marketing actions. On the other hand, studies on marketing actions or events (such as product recalls) which are likely to have a negative effect on financial value are considerably less. In this article, an overview of event study papers in the marketing literature is given, and then the product recall studies applying event study methodology are examined. All studies are concerned with the product recall context and investigate the impact of diverse marketing strategies on financial value when firms are confronted with a recall. Therefore, an analysis of these papers shows how the topic is handled in previous researches and prepares ground for future studies.

3.4.1 Use of event studies in marketing research

The event study methodology is used in the marketing literature to investigate the effects of diverse marketing events on firm value and help in predicting the impact of marketing actions on financial value. Sorescu et al. (2017) claim that our knowledge

about the effect of marketing on firm value comes from event studies and their statement shows the suitability and importance of the methodology for the marketing literature.

A sample of event studies in marketing literature is shown in Table 1. We see that the source of the event announcements could be the company, an agency, a competitor, a regulatory and the ministry. For instance, product recalls are announced by the company, ministry and/or regulatory, e.g., Toyota recall because of Takata airbags is announced by the company and regulatory. A firm can announce its entry in a new market, which will affect existing firms in the market, e.g., Walmart's entry in the UK. Depending on the research aim, different lengths of event windows and measurement types of AR are applied in the marketing literature. Mostly short-term event windows are used because the short-term AR allows isolating the effect of other variables that could occur in the longer run. However, long-term studies also appear in the literature (e.g., Sorescu et al., 2007). Furthermore, some studies combine both periods. Liu et al. (2017) investigate the effect of crisis management strategies on the financial value in short- and long-term since these strategies can change in both terms due to recall volume.

Event study research in marketing includes (but not limited) firm announcement topics such as brand acquisitions (Wiles et al., 2012), corporate brand name changes (Kalaighnam and Bahadir, 2013), innovation and/or new product (Sood and Tellis, 2009; Raassens et al., 2012), marketing alliances (Swaminathan and Moorman, 2009), channel expansion (Homburg et al., 2014), etc. Findings of these studies show that investors generally react positive to this kind of firm announcements. Nevertheless, studies are showing that announcements like the entry of a competitor to the market, product recall noticed by the company, competitor and/or regulatory have a negative impact on financial value.

3.4.2 Abnormal return calculation

Event study aims to determine event-related stock returns. The method uses ARs to measure the stock market reactions to the event. ARs are different from returns of normal days (so-called normal return). AR is a deviation from the normal returns in periods surrounding the event and computed as the difference between actual returns and expected returns as follows:

$$AR_{it} = \frac{P_{it} - E(P_{it})}{P_{it-1}} = R_{it} - E(R_{it}) \quad (3.1)$$

In the formula, P_{it} and P_{it-1} denote the stock price of firm i at time t and $t-1$, respectively, whereas $E(R_{it})$ expresses the expected stock returns of firm i at period $(t-1, t)$ derived in the absence of the event.

Event studies can be short- or long-term depending on the measurement period of ARs. In short-term event studies, daily stock data is used while long-term studies explore ARs in longer windows.

Short-term event studies are based on the assumption of market efficiency according to which researchers would find evidence on the impact of the event in any immediate changes. An event study involves two basic periods: estimation window and event window. The regular stock returns are estimated over estimation periods whereas event window covers beginning and ending dates to measure expected returns. In event studies, not only event days but also days surrounding the event are considered. Event or measurement window includes at least one day before the event to capture the leakage and one day after the event to account the diffusion of information among investors. Figure 1 depicts the windows in an event study as follows.

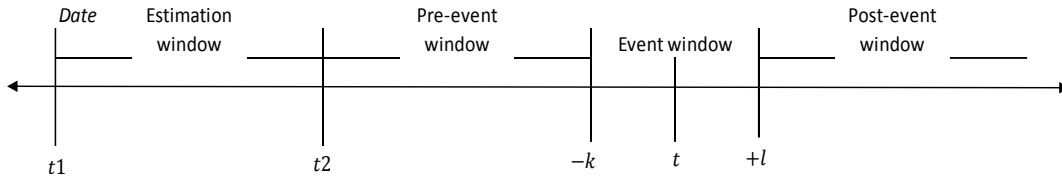


Figure 3.3 : Event study timeline.

When an event window is longer than one day, CARs are calculated as sum of daily ARs. The general formula for CAR that shows a total change of firm value upon arrival of new information (Sorescu et al., 2017) is below:

$$CAR_i = \sum_{t=-k}^{t+l} AR_{it} \quad (3.2)$$

where AR_{it} denotes abnormal return of stock i on day t , whereas k and l represent the number of days before and after event day, respectively. For example, $CAR(-1,-1)$ denotes abnormal returns for one day, the day before the event announcement, whereas $CAR(-1,1)$ shows cumulative abnormal returns for the period from one day before to one day after the announcement date.

The earlier methods to calculate short-term ARs are based on the work of Brown and Warner (1985) which use market model and market adjusted model to measure the expected returns.

$$\text{Market model} \quad E(R_{it}) = R_{mt} \quad (3.3)$$

where $E(R_{it})$ is the estimate of the expected stock return of firm i and R_{mt} is the average rate of return of market at time t .

The market-adjusted model proposes that the current return on the market predicts the stock returns in the best way. Hence, the only information to measure ARs during the event period is available in the event period necessary (Peterson, 1989).

$$\text{Market-adjusted model} \quad E(R_{it}) = R_{ft} + \beta_i(R_{mt} - R_{ft}) \quad (3.4)$$

where R_{ft} is the risk-free rate of return and β_i is the risk factor estimation obtained from a regression over measurement windows.

Suggested by FFJR, market index model is basic asset pricing method used in event study methodology. It assumes linear relations between the returns of the stocks and the market. In the model, the rate of return on stock i over day t is described as below:

$$\text{Market index model} \quad R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (3.5)$$

where R_{it} is the rate of return on stock i over day t , R_{mt} is the rate of return on a market portfolio (a stock market index, such as New York Stock Exchange Market Portfolio) over day t , α is the intercept term, β is the systematic risk of stock i , and ε_{it} is the error term, $\varepsilon_{it} = 0$.

Abnormal return for i th stock, therefore is calculated as:

$$\text{Abnormal return} \quad AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (3.6)$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are ordinary least squares (OLS) parameter estimates derived by regressing the actual (realized) rate of return on stock i on an estimation period whereas R_{it} is the return of the stock i being adjusted for the risk factor of that stock. AR_{it} is abnormal return that is the significant difference between expected return and actual return. The model is also known as OLS market model (i.e., Brown and Warner, 1985).

In this study, the event is defined as the product recall. Event day is the day on which the product recall news is published in Reuters US edition.

Following prior studies, several periods are applied (Chen et al., 2009; Jarrell and Peltzman, 2017). Figure 3.4 shows the timeline of this study.

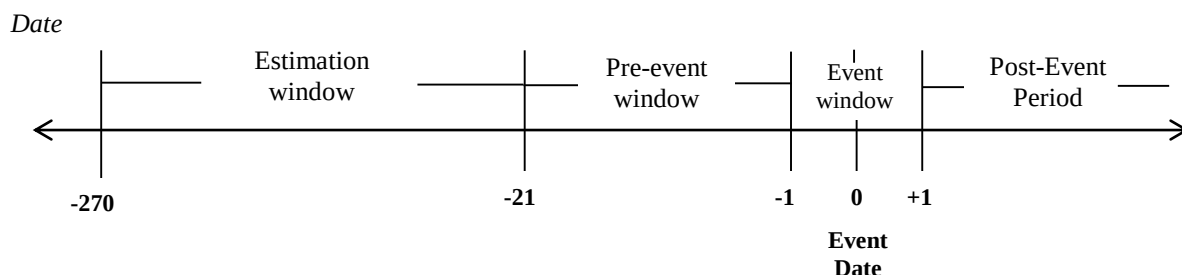


Figure 3.4 : Event study timeline of the study.

As the performance measure, five periods are defined and calculated according to this.

The periods are:

y1 for the CAR(-1,-1) period – one day before the recall news publish date,

y2 for the CAR(-1,0) period – one day before until the recall news release date,

y3 for CAR(-1,1) period – one day before until one day after the recall news release day,

y4 for CAR(0,0) period – the recall news publish date, and

y5 for CAR(1,1) period – one day after the recall news publish date.

3.5 Modeling Stage

As I have explained in the earlier sections, the stock price change of a company can be expressed by the AR. In this study, the stock price of a company during an event period is considered. Therefore CAR is used as the dependent variable because it allows representing the quantitative valuation of a company over a certain event period. So, to study the relationship between the valuation change of the firms and the factors described in earlier sections calculated CAR values are used.

First of all outliers for the defined five dependent variables were tested and examined (results are shown in Figure 3.5). As shown in Figure 3.5 no common extreme outlier

was found for the dependent variables (y1, y2, y3, y4 and y5), therefore the whole data was used in the analyzes.

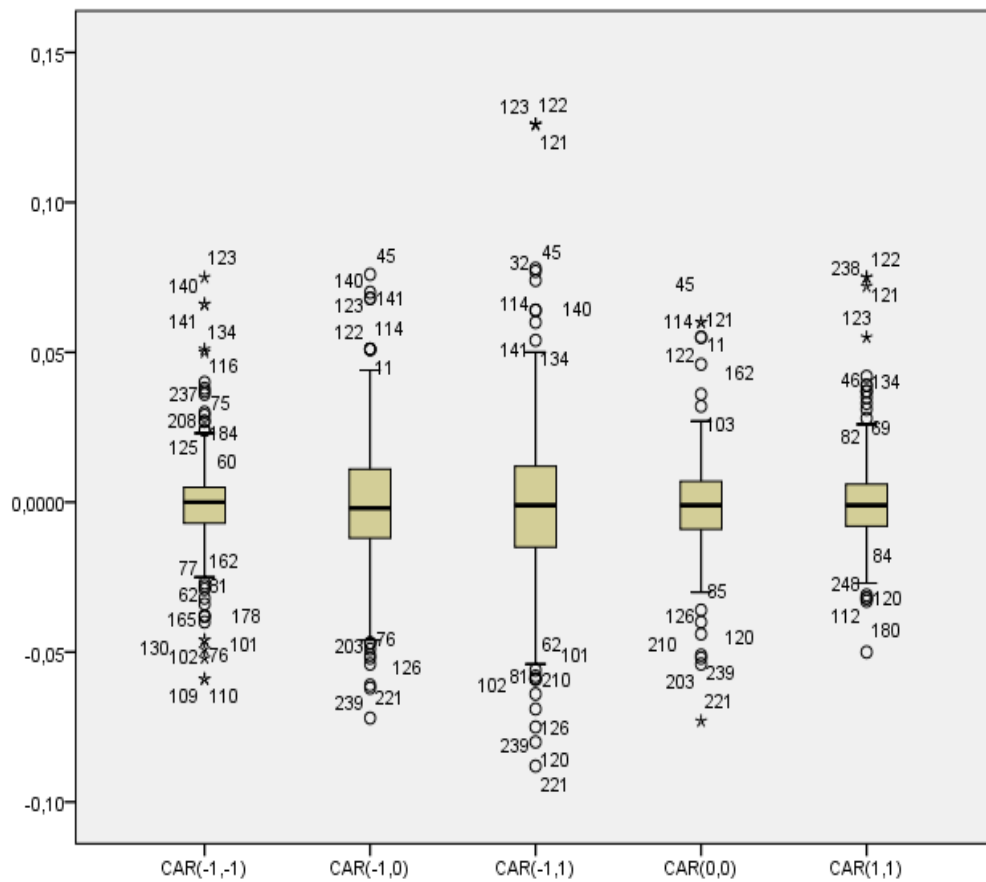


Figure 3.5 : Outlier test results for y1, y2, y3, y4, and y5.

The content analysis enabled to specify the product recall announcement dimensions. Following the implementation of this method, 120 message dimensions were determined. In order to detect which recall message dimensions influence the firm value, Automatic Linear Modelling (ALM) was used. ALM is a suitable method for linear models and predicts the dependent variable in the best way. At this stage, ALM enabled to use the large recall message dimension group and find the best combination for predicting firm value (Yang, 2013).

ALM forecasted and modeled the dependent variable and its predictors based on a linear relationship. 120 predictors from x2 to x44 given in A1 were included in the analysis. Brand information (x1a to x1r) was not included in the analysis to eliminate the brand effect. The model selection method used was “Best Subsets”, which picks the best predictor combination for all possible predictors, based on the Akaike Information Criterion (AIC). AIC considers the predictor number based on the

likelihood function. It can be defined as follow where least squares estimation has normally distributed errors.

$$AIC = n * \log(\hat{\sigma}^2) + 2K \quad (3.7)$$

where $\hat{\sigma}^2 = \frac{\sum(\hat{\epsilon}_i)^2}{n}$ and the $\hat{\epsilon}_i$ are the estimated residuals from the fitted model and K is the number of estimated parameters. The smaller the AIC value of a model is the better the model is. ALM data preparation steps include (1) date and timing handling, (2) adjustment of measurement level, (3) outlier and missing value handling, and (4) supervised merging. In the automatic data preparation process outliers are trimed (x15c, x16a, x19a, x22c,...), missing values are replaced (x41, x42, x43a, x43b,...), and categories are merged to maximize the association with the target (x7a) in my data set.

After particular predictors were determined regression analysis was applied. Regression analysis is a method, which allows testing obtained massive data and uses statistical methods to formulate the relationship(s) between the dependent and independent variable(s) as a model function. In this study, the dependent variable is financial performance which is assessed by CAR, and the independent variables are the recall message content, reputation, and corporate social responsibility scores.

Assuming that there is a stock price reaction (valuation change) to the recall message context and to the determined moderator variables regression analyses are used with the collected data. Regression analysis helps to formulate the relationship function(s) between the dependent and the independent variables and is adequate for analyzing massive observed data (Sykes, 1993).

The relationship between the dependent and independent variables, the model function is assumed as linear. Based on the linear assumption and the defined expected relationships the model function is formulated as below.

Modeling the effect of the recall message: According to these variables (defined above), the following model was used to predict the financial value of a firm after a recall message given the set of variables listed above in Table 3. To estimate this model, I used a dataset of all 250 product recall news by publicly traded firms that were published between June 2014 and March 2017.

$$CAR_i = \beta_0 + \sum_{j=1}^{40} \beta_j * MESSAGE_{ij} + \beta_{41} * REPUTATION_i + \beta_{42} * CSR_i + \sum_{j=43}^{48} \beta_j * CONTROL_{ij} + \varepsilon_i \quad (3.8)$$

where i and j denote the firm and recall, respectively.

4. EMPIRICAL FINDINGS

4.1 Product Recall Message Characteristics

4.1.1 Reliability testing and analysis

Due to the nature of the coding process in content analysis, it is supposed that disagreements could occur between raters. The content analysis literature suggests comparing the judgment of two coders for interrater reliability (Krippendorff, 1980). Diverse statistic methods allow evaluating the consistency level between the raters' coding, which is defined as the data's reliability. Cohen's kappa is an index valued between 0 (agreement is no better than chance) and 1 (perfect consensus between raters) and designated as one of the more robust and relatively conservative measures of inter-rater reliability (Neuendorf, 2002). Whereas Krippendorff's alpha is another widely applied method to test intercoder reliability. This method enables to ignore missing data, could be used for various sample sizes, categories and number of raters, most important for this study it is suitable for testing reliability for any measurement level (Krippendorff, 2011). For these reasons, Krippendorff's alpha was applied in this research. According to the Krippendorff's alpha reliability test for the one hundred and twenty dimensions in this study the scores are ranging from a high of 1.0 for many obvious variables such as "x1: brand information", "x36a: Whether the recall is due to a Takata airbag problem (1) or not (0)", "x38: Whether the recall is made by a joint venture (1) or not (0)" to a low of 0.727 for "x20b: Whether the recall institution of the message is the company (1) or not (0)". The total interrater agreement of the content analysis was 0.958, showing a high degree of interrater reliability. Additionally, to check the results of Krippendorff's alpha also Cohen's Kappa is tested, same or too close results were found.

In case of disagreements between coders, the related dimensions in the certain automobile recall newspaper articles are examined again and discussed and resolved (Scandura and Williams, 2000).

4.1.2 Findings and conclusion of the content analysis

Category schema and frequencies

The content analysis contains 36 main and 84 subdimensions. The first dimension includes the brand information and its subdimensions (a detailed list is given in Appendix C). The second dimension is the additional source. 14.8% of the published recall news include additional source, some link to another website (company website or another newspaper website) for further information related to the automobile recall. The third dimension represents how many times the recall news was published related to the same product recall. Mostly one-time publications were observed (88.8%), two-time publications occur fifteen times (6%), followed by three-time (2.8%), four and five-time publications related to the same recall were rare (1.6% and 0.8%, respectively).

Brand origin information is included in 29.6% of the recall news. Recalled automobiles brand origins were mentioned as Japanese, German, US, France, and Italian car maker, automobile maker, etc. and occur respectively 25, 31, 16, 1 and 2 times, as shown in Table 4.1. Most of the recall news include the information that German (12.4) car makers recall automobiles, which is followed by the information of that Japanese (10%) car makers make recall. Additionally, in 17 (6.8) recall news country of manufacturing information was given.

Table 4.1 : Schema of brand origin categories.

Main category	Subcategory	Number	Frequency (%)
Brand origin information		74	29.6
	Japanese	25	10
	German	31	12.4
	US	16	6.4
	France	1	0.4
	Italian	2	0.8

Automobile recalls may contain information related to the manufacturing periods, sales periods and model periods of the recalled products. Table 4.2 demonstrates the data related to these three period types of information. It is seen that the more information related to the models of the recalled automobiles is given (more than half

of the sample), which is followed by the manufacturing period information and lastly sales period information. Table 4.2 also shows that the manufacturing, sales and model periods of the affected automobiles spans to a long time up to 144, 109 and 216 months, respectively.

Table 4.2 : Information related to the manufacturing, sales, and model period information of the recalled automobiles.

Main category	Subcategory	Min	Max	Number	Frequency(%)
Manufacturing period information				66	26.4
	Manufacturing period length info	1	144	63	25.2
	Manufacturing period when info	1	198	64	25.6
Sales period information				17	6.8
	Sales period length info	9	109	16	6.4
	Sales period when info	12	194	16	6.4
Model period information				137	54.8
	Model period length info	1	216	137	54.8
	Model period when info	1	19	137	54.8

Some automobile recall news (42 of 250, 16.8%) give information related to the solution of the problem that could caused the recall. Solution information statements in recall news include some sentences such as “the problem is fixed”, “an update is made”.

An automobile recall could be due to a mistake of a company, a supplier or both. As seen in Figure 4.1, it is observed that recall news predominately states that the recall caused by the supplier(s) whereas the company is highlighted as the responsible of the recall rarely.

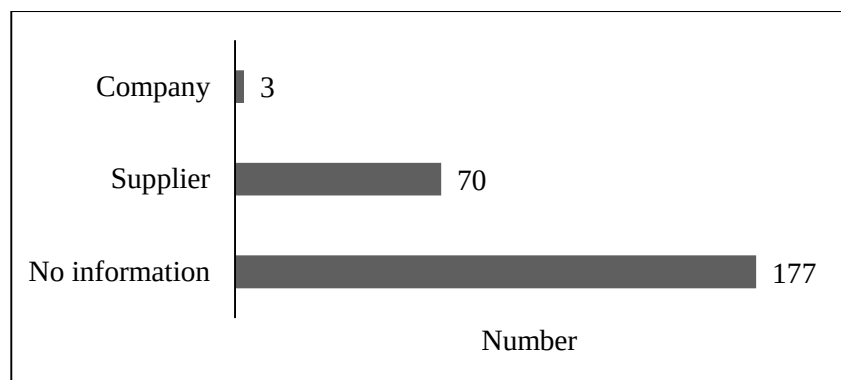


Figure 4.1 : Information on recall responsibility.

Various recall types exist. Particularly, the recall type depends on the crisis stage and the problem size. In Table 4.3, it is seen that 16.8% of the recall news include recall type information. It could be inferred that mostly voluntary recall type is mentioned which is followed by safety recalls. On the other hand, companies are reluctant to say that the autos are recalled due to some safety issues or that the recall is a mandatory recall.

Table 4.3 : Schema of recall type categories.

Main category	Subcategory	Number	Frequency (%)
Recall type information		42	16.8
	Safety recall	15	6.0
	Voluntary recall	20	8.0
	Preventive recall	5	2.0
	Mandatory	1	0.4
	Other	2	0.8

Table 4.4 presents the source of the recall news. It could be the fact that the recall news has one or more sources. In some recall news, it could be inferred that information is given by the company. Additionally, information is given by a company spokesperson or in some cases, it is seen that the regulatory and the company make a statement together. In most of the news (82.4%) company is the source of the information

contained in the recall news, which is followed by the regulatory (39.2%) and company spokesperson (26.4%).

Table 4.4 : Schema of recall news source categories.

Main category	Subcategory	Number	Frequency (%)
Recall news source information		247	98.8
	Regulatory	98	39.2
	Company	206	82.4
	Company spokesperson	66	26.4
	Ministry	15	6.0
	Other newspaper	13	5.2
	Other	14	5.6

Not all recall news gives information about the way the automobiles are or would be recalled. Fifty-eight news (23.2%) discloses the recall channel information as presented in Table 4.5. An automobile recall could be announced by using different channels. The recall news for this study shows that the website is mostly preferred way to announce the recall by 9.6% (24 out of 58), followed by filling and e-mail by 6.8% and 4.4%, respectively as seen in Table 4.5. On the contrary, announcements via newspaper, letter, briefing, interview and TV form small part.

Table 4.5 : Schema of recall channel categories.

Main category	Subcategory	Number	Frequency (%)
Recall channel information		58	23.2
	e-mail	11	4.4
	Website	24	9.6
	Briefing	2	0.8
	Filling	17	6.8
	Newspaper	6	2.4
	Letter	4	1.6
	Interview	1	0.4
	TV	1	0.4

The recall date is often stated in recall news (221 of 250, 88.4%). Also, model information of the related recalled automobiles is generally mentioned in the news (222 of 250, 88%) as seen in Table 4.6. 197 recall news (78.8%) gives model information clearly while 25 recall news (10%) releases model information that the information is unclear (i.e. expressing as “some new models”, “some of the x series’ models”). The recalled model number vary between one model (58 in 250, 39.6%) and fourty-four models (1 of 250, 0.4%). Most recall news indicates one recalled model information (58 of 250), followed by two models (44 of 250), three models (42 of 250), information of fourteen and more recalled models are rarer (14, 16, 19, 26, 44 models occurred only one time).

Table 4.6 : Model information of the recalled automobiles.

Main category	Subcategory	Min	Max	Mean	Number	Frequency(%)
Recalled model information					222	88.8
	Model information clear				197	78.8
	Model information unclear				25	10.0
	Model number information	1	44	3.19	209	83.6

Nearly in all automobile recall news, recalled product number information is given (96.4%). The recall volume information vary from 341 automobiles to 2,000,0000. Also in many recall news, the information of countries that are affected by the related recall is given. As seen in Table 4.7, affected country information is in 86.4% of the news available.

Only eight recall news include the recalled/sold percentage (3.2%), in one news it was %50 and in seven recall news %100. Complaint information in recall news was also rare (11 of 250, 11%), and only four of this news include complaint number information (1, 15, 314, 1271 complaints). All of the recall news include the recall

institution information, in 218 cases the recall institution was stated as only the company, in fifteen cases only a regulatory, and in twenty-two recall news, there was the information available that the company and regulatory made the recall together. Only in three recall news, it was mentioned that whether the recall is proactive or reactive.

Nearly all recall news give information related to the recall reason (240 of 250, 96%) and forty-one (16.4%) of the recall news are saying that car owners of the affected cars will be informed. Thirty-four (13.6%) recall news give information about the recall date, twenty-nine (5.6%) of them specify the recall date, the planned earliest recall date is one month after the recall news is published and the latest eleven months later. Ninety-eight news informs the public that the brand was recalled before due to the same or similar reason. In twelve (4.8%) news the company or a company person refrain from giving information about the recall.

Table 4.7 : Affected country information.

Main category	Subcategory	Number	Frequency (%)
Recall country information		216	86.4
	Globally	60	24%
	US	167	66.8
	North America	167	66.8
	South America	62	26.4
	Far east	77	30.8
	China	74	29.6
	Russia	70	28.0
	Middle East and Africa	64	25.6
	India	71	28.4
	Australia	60	24.0

Although the company is responsible for making a remedy after a recall, only 38.8% of the published recall news includes information about the remedy. Information about what kind of remedy would be offered is presented in ninety-one news (36.4%), and only fifteen news (6%) informs consumers about the exact remedy date. Furthermore, twelve news (4.8%) gives instructions what to do when faced with the recall problem.

On the other side, news with current sale information of the recalled products is 5.6% of the total sample. Among those, there is no information related to the sales of the affected cars still sold and thirteen (13 of 250, 5.2%) news highlights that sales of the affected cars have stopped.

9.6% of the automobile recall news inform car owners about free of charge service for recall repair. Only eleven (4.4%) news stress the cost of the recalls and among those nine (3.6%) news give exact amount which varies between 1,000\$ and 2,500,000,000\$. Most of the news does not shed light on the cost information of the recall.

Table 4.8 : Accident, injury and death information.

Main category	Subcategory	Min	Max	Number	Frequency(%)
Accident information				111	44.4
	Accident available information			39	15.6
	Accident no available information			72	28.8
	Accident number information	1	121	35	14.0
Injury information				125	50.0
	Injury available information			36	14.4
	Injury no available information			89	35.6
	Injury number information	1	150	36	14.4
Death information				47	18.8
	Death available information			22	8.8
	Death no available information			26	10.4
	Death number information	1	36	22	8.8

Another information to consider the news is the reason for the recall. Nearly 35% (87 of 250) addresses airbag problem as the reason of the recall, and 24.4% (61 of 250) announces that recall is due to the problems and precautions related to Takata airbags. In sixty-eight news (27.2%) information except the recall is available (other information). In forty-seven (18.8%) of these news includes information about other companies, thirty-four (14.0%) recalls give more detailed information about Takata and twenty-one (3.6%) presents additionally other information. Only the six news (2.4%) post that the recall is due to emission cheat scandal. Besides, nine news (3.6%) underline that a joint venture company recalls and seven news (2.8%) give information about stock prices after the recall of the related company. The news shows read duration of one to six minutes in the sample. Table 4.9 shows the detailed frequency of read duration information.

Table 4.9 : News read duration.

Read duration	Frequency	Percent (%)
1	116	46.4
2	93	37.2
3	37	14.8
4	3	1.2
6	1	0.4

Figure 4.2 provides an overview of how many times the product recall message dimensions appear in the handled recall news.

Overview of product recall news

Figure 4.2 shows the distribution of recall message dimensions included in the investigated 250 product recall news. Recall institution information was in all recall news available. After that, source information of the recall message (247) was the most stated information in product recall news, followed by product number information (241), recall reason information (240), information of the models affected by the recall (222). On the other hand, information whether the recall is proactive or reactive (3), emission cheat information (6), and stock price information (7) was the least mentioned recall message dimensions in the automobile recall news.

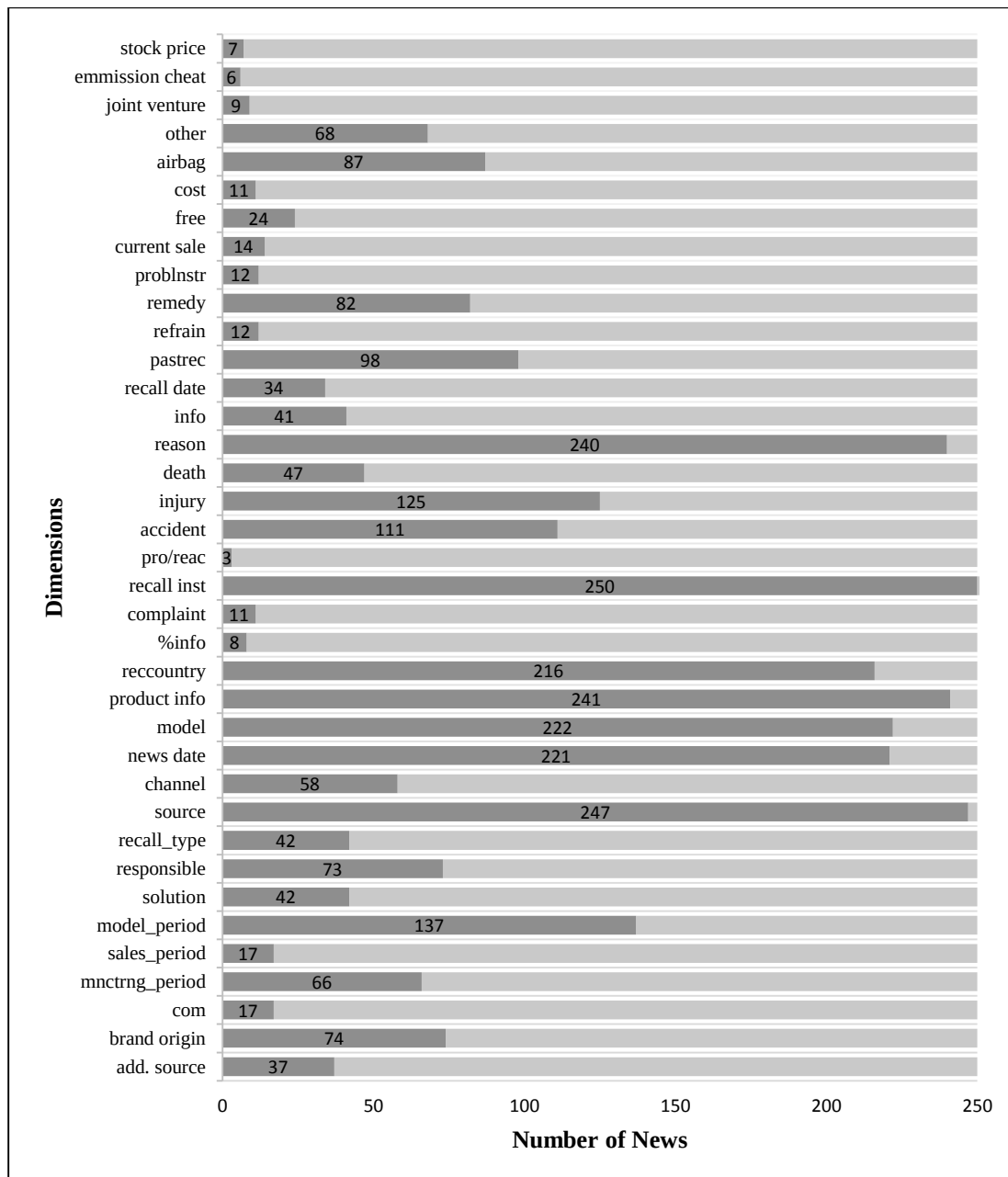


Figure 4.2 : The frequency of the news dimensions.

Amount of information

The amount of information contained in the automobile recall news published between June 2014 and March 2017 was examined. According to Figure 4.2, a total of 3010 cues were used in the 250 recall news. Thus, each recall news contained an average of 12.04 cues. Table 4.10 shows a number of information dimensions for each recall news. Across the investigated recall news Nissan's recall published on the 27th of February 2017 and Chrysler's on 18th of June 2015 include minimum information dimensions (six), whereas Ford's, GM's, and Nissan's recall news published

respectively on 16th of January 2017, 5th of December 2014, and 4th of November 2014 maximum information dimensions (nineteen).

Table 4.10 : Dimension number in recall news.

Number of informational dimensions of each recall news	Frequency	Percent (%)
6	2	1
7	10	4
8	16	6
9	24	10
10	22	9
11	35	14
12	36	14
13	31	12
14	25	10
15	19	8
16	13	5
17	8	3
18	6	2
19	3	1

4.2 Effect of Product Recall Message Content on Shareholder Returns

4.2.1 Automatic Linear Modelling

Table 4.11 presents ALM results for the first dependent variable y_1 , which is abnormal return for one day before the publish date of recall date.

One of the important result that ALM suggests is that information about the ratio of recalled product oversold product has a negative impact (-0.040, $p < 0.01$) on CAR (-1,-1). The results show that investors perceive recall message containing a number of recalls regarding the ratio as a signal of a systematic matter rather than a random issue.

The remedy is another important dimension. The absence of remedy information in the message has a positive and highly significant impact (0.007, $p < 0.01$) on CAR (-1,-1), meaning that investors' reaction becomes more positive when the message does not include remedy information.

Recall news that shares the recalled product numbers have a negative impact (-0.000, $p < 0.1$) on CAR (-1,-1), meaning that investors react negatively to the number of recalled products in a recall message.

Table 4.11 : ALM results for y1 CAR (-1,-1).

Dependent variable	y1 = CAR (-1,-1) one day before the recall news publish date
%info*% = 0 (x18*x18a_transformed)	0,006
%info*% = 1 (x18*x18a_transformed)	-0,044***
Remedy info = 0 (x31)	0,007***
Customer info = 0 (x27)	-0,008***
News length = 0 (x45_transformed)	-0,045***
Complaint info*complaint# (x19*x19a_transformed)	-0,101**
Product#info*Product# (x16*x16a_transformed)	-0,000*
Publication number = 0 (x3_transformed)	-0,021*
CSR score (x42_transformed)	0,000*
ROA (x43d_transformed)	0,095
Responsible: company = 0 (x10b)	-0,014
Adjusted R square = 0,168	
n = 250	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

A significant negative effect is detected if there is no information in the message that assures customers are informed (-0.008, $p < 0.01$). This finding suggests that investors react more negatively when the recall message does not involve customer briefing.

Length of the recall news, represented by the number of words in the message has a positive effect (-0.045, $p < 0.01$) on CAR (-1,-1), suggesting that the investors' reactions become more negative when the recall message expands to contain more information.

Availability of customer complaint information in the recall message has a negatively significant impact (-0.101, $p > 0.05$) on CAR (-1,-1). Recall messages involving the number of recalled products has also negative but not strong effect (0.000, $p < 0.10$) on CAR (-1,-1). This evidence suggests that investors are more concerned when the recall news covers numbers showing the magnitude of recall and customer bothers.

No information saying that the company is the source of the problem has a negative but insignificant impact (-0.014, $p > 0.1$) on CAR (-1,-1).

On the other side, among firm characteristics CSR has a positive impact on abnormal returns (0.000) in 10% significance level, meaning that companies engaged in higher environmental, social and governance awareness are less likely to be damaged in the recall process. Results also show that ROA, another firm characteristics showing how the companies use their asset profitable, has no significant impact on abnormal returns.

Table 4.12 : ALM results for y2 CAR (-1,0).

Dependent variable	y2 = CAR (-1,0) from one day before to the recall news publish date
News length = 0 (x45_transformed)	-0,025**
News length = 1 (x45_transformed)	-0,015
News length = 2 (x45_transformed)	-0,020*
Remedy info = 0 (x31)	0,010***
Product#info*Product# (x16*x16a_transformed)	-0,000***
CSR score (x42_transformed)	0,001***
Customer info= 0 (x27)	-0,012***
(x28*x28a_transformed)	-0,008**
ROA (x43d_transformed)	0,127
Recall area: North America= 0 (x17c)	0,005
Adjusted R square = 0,120	
n = 250	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

ALM results for y2, which is the cumulative abnormal return for the period starting from one day before the recall news publish date to recall news publish date. The cumulative abnormal return for his period is denoted by CAR (-1,0). Table 4.12 shows the ALM estimates.

The length of the recall news has a positive effect (-0.025, $p < 0.05$) on y2. This finding shows that explaining the recall process in fewer words worsens the financial loss.

Not offering a remedy in the recall message has a negative and significant effect (0.010, $p < 0.01$) on y_2 . This evidence is a strong reactions sign of the investors who care post-recall process.

Some recall messages give detail with information on how many products are recalled. According to ALM results, sharing this information in the recall news has a significantly negative effect (0.001, $p < 0.01$) on y_2 meaning that stock market participants are worried if they see such information in the message.

Investors take detailed information into account in recall news. Recall messages with no phrases that customers are informed or will be informed have negative effect on y_2 (-0.002, $p < 0.01$).

Recall news expressing that autos not from North America will be recalled has a positive but insignificant effect (0.005, $p > 0.1$).

ROA as firm characteristics has no significant impact on y_2 in 10% significance level (0.127, $p > 0.1$).

Table 4.13 : ALM results for y_3 CAR (-1,1).

Dependent variable	$y_3 = \text{CAR} (-1,1)$ from one day before to one day after of the recall news publish date	
Emission cheat info = 0 (x39_transformed)	-	0,040***
Recall type: mandatory = 0 (x11d)		0,096***
Product#info*Product# (x16*x16a_transformed)	-	0,000***
News length = 0 (x45_transformed)	-	0,031**
Firm debt= 0 (x43b_transformed)	-	0,000**
Model info = 0 (x15)		0,011*
Solution info = 0 (x9)		0,008*
Recall institution company = 0 (x20b)	-	0,016*
ROA (x43d_transformed)		0,161
Adjusted R square = 0,134		
n = 250		

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

ALM results are shown in Table 4.13 for the dependent variable y_3 or CAR (-1,1), which is cumulative abnormal return for the period from one day before to one day after of the recall news publish date.

One of the significant result that ALM reveals is that information about emission cheat in the recall news (Emission cheat info, x_{39}) has a negatively significant impact (-0.040, $p < 0.01$) on CAR (-1,1). This result indicates that recall message including emission cheat information might increase the negative effect of the product recall message.

The absence of information in the message saying that the recall is mandatory (Recall type: mandatory, x_{11d}) has a positive and highly significant impact (0.096, $p < 0.01$). A product recall message showing that the recall is mandatory has negative effect on CAR (-1,1).

Giving recalled product numbers has a negative and significant impact (-0.000, $p < 0.01$) on CAR (-1,-1), indicating that stock market reacts negatively to the number of recalled products in a recall message.

Shortening the length of the recall message (News length, x_{45}) has a significantly negative effect on CAR (-0.031, $p < 0.05$), meaning that the shorter the recall news, the more financial loss the company is likely to have.

Another significant result shows that it matters who makes the recall. When a recall does not involve any information that the recall institution is the company (Recall institution company, x_{20b}), this also has a negative effect (-0.016, $p > 0.05$) on CAR (-1,1).

On the other side, a positive effect is observed if the model information of the recalled products (Model info, x_{15}) is not given in the recall message (0.011, $p > 0.1$). Recall news which defines the model information of the related recalled products has a negative impact on CAR (-1,1). Some recall messages contain information related to the recall problems solution. Some of this news mention that the problem is solved or yet not solved; in some cases, there is no information about the solution. Absence of solution information (Solution info, x_9) in the recall news influences CAR (-1,1) positively (0.008, $p < 0.10$). Given solution info in the recall, the message has a negative effect on financial value. News including information about model and solutions lead to more positive investor reactions.

Besides recall message content, firm characteristics influence firms' financial value. A firm's corporate debt level (Firm debt, x43b) has a negative and significant influence (-0.000, $p < 0.05$) on CAR (-1,1). Another variable, a firms' average returns on their assets (ROA, x43d) has positive but not significant coefficient (0.161, $p > 0.10$).

Table 4.14 : ALM results for y4 CAR (0,0).

Dependent variable	y4 = CAR (0,0) the recall news publish date
Recall type: mandatory = 0 (x11d)	0,050***
Stock price info = 0 (x40_transformed)	0,014**
Product # info = 0 (x16)	0,011**
Past recall info = 0 (x29)	-0,004**
Recall type: other = 0 (x11e)	-0,020*
(x23*x23c_transformed)	-0,003*
Adjusted R square = 0,090	
n = 250	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

The ALM results for the for the dependent variable, y4 which is the abnormal return surrounding the publish date of the recall news are shown in Table 4.14.

An important finding is that recall news saying that recall is not mandatory has a positive impact (0.050, $p < 0.01$) on CAR (0,0). In other words, recalls that are mandated by related bodies have negative effect on abnormal returns for news publish date.

Some recall news gives information about decrease in the stock price of the recalling companies. According to the results, the absence of stock price information of the company in the recall news has a negative and significant impact (0.014, $p < 0.05$) on y4.

Recall messages not explaining the recalled product numbers has also positive effect (0.011, $p < 0.05$) on CAR (0,0). This positive coefficient suggests that investors give negative reactions to the recall messages giving an exact number of recalled products.

On the other hand, some variables have negative effect on abnormal returns for the publish date of the recall news. Among those, past recall information has positive

impact. The recall message not mentioning the past recalls has negative effect (-0.004, $p < 0.05$) on CAR (0,0).

Another negative effect is observed for the message that does not cover any information about other types of recall rather than safety, preventive, voluntary and mandatory. Such messages have a significant and negative impact (-0.020, $p < 0.10$) on y_4 .

Recalls news may cover death or injury information. Results show that a recall message containing the number of injuries observed for the current recall is followed by negative and slightly significant investor reactions (-0.003, $p < 0.10$).

Table 4.15 : ALM results for y_5 CAR (1,1).

Dependent variable	$y_5 = \text{CAR (1,1)}$ one day after the recall news publish date
Emission cheat info= 0 (x39_transformed)	-0,022***
Source: ministry= 0 (x12d)	0,015***
News length= 0 (x45_transformed)	-0,049***
Recall institution company= 0 (x20b)	-0,014***
Recall type: voluntary = 0 (x11b)	-0,010***
Recall type: other = 0 (11e)	0,030***
Product#info*Product# (x16*x16a_transformed)	-0,000**
x24*x24c (transformed)	0,003**
Other info= 0 (x37)	-0,005**
Current sale info= 0 (x33)	-0,009**
x7*x7a (transformed)	-0,002**
Brand origin: italian= 0 (x4g)	-0,021**
Solution info= 0 (x9)	0,005**
Past recall rate (x46_transformed)	-0,009
Adjusted R square = 0,210	
n = 250	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

The last ALM results are shown in Table 4.15. Results reveal significant results for y_5 , which is abnormal return for one day after the recall news publish date.

According to Table 4.15, most variables affect after CAR after the publish date of a product recall. ALM results reveal that the absence of emission cheat information in the recall news has negative impact (-0.022 , $p < 0.01$) on y_5 or CAR (1,1).

The impact of the recall information source varies depending on who releases the news. Recall news stressing ministry as the source of the recall information has a positive and significant effect (0.015 , $p < 0.01$) on CAR (1,1).

Using fewer words in a recall message has a significantly negative effect (-0.049 , $p < 0.01$) on CAR (1,1), meaning that the shorter the recall news, the faster the shareholder wealth shrinks.

Stock market participants take into account whether the company, regulatory or others recall. Recall news not mentioning the company as the recall institution causes to negative impact (-0.014 , $p < 0.01$) on CAR (1,1). Stock markets give significant reactions negatively in such case.

Recall type is another issue in a recall message investors react. Table 4.15 shows that information on recall type has significant results. Voluntary recall information has negative effect (-0.010 , $p < 0.01$) on while information about other recall types has significantly positive impact (0.030 , $p < 0.01$) on CAR (1,1). This evidence proposes that investors are depressed when the recall has no information of voluntariness while they give positive reactions if they do not read a message with words of other types.

Recall institutions may prefer to reveal some recalled products. Giving product number information has a negative and significant impact (-0.000 , $p < 0.05$) on y_5 , meaning that financial market perceives negatively to read a number of recalled products in a recall message.

Death or injuries related to a product makes people uncomfortable about that product. According to the ALM results, death numbers in recall message have a negative impact (0.003 , $p < 0.05$) on CAR (1,1).

Recall news may have some information that has no relation with the current recall. Information about other events in the message has a negative coefficient (-0.005 , $p < 0.05$), showing that investors give negative reaction to the unrelated information.

Whether information about that recalled product is currently sold available is another issue to investigate the investors' reaction to the recall news. Current sales information of the recalled product has a significantly negative effect (-0.009 , $p < 0.05$) on abnormal return.

The brand origin is taken as another dimension in the analysis. ALM results for y5 show that not mentioning the Italian brand has negative effect (-0.021 , $p < 0.05$) on CAR (1,1). In other words, the recall messages highlighting brand origin as Italian have a positive impact on abnormal returns.

In an auto recall, beside of explaining recalls, post-recall periods are those both consumers and investors care much. Whereas consumers are interested in how to fix the problem in their car, shareholders of the company much focus on operating profits that may be an important determinant of a company's market performance. Recall news having solution information is followed by subsequent positive market reaction (0.005 , $p < 0.05$).

As a recall characteristics, past recall rate represents companies' previous rate of recalls. According to ALM results, this rate has negative but insignificant impact (-0.009 , $p > 0.1$) on y5.

4.2.2 Regression Analysis

Following the ALM results a regression analysis is adopted for the y1 or CAR (-1,-1) period one day before publish date of the recall news. Table 4.16 shows the regression results.

Information on the ratio of recalled product on the sold product has significantly negative effect (-0.009 , $p < 0.01$) on y1.

An important result shows that a recall message has significant negative effect (-0.029 , $p < 0.01$) on y1 if it contains information related to remedy. This suggests that investors do not welcome remedy information.

Word counts in the message as a measure of news length have a positive effect (0.108 , $p < 0.10$) on y1 showing that the longer the recall message is, the stock market reacts more positively since it perceives as a good signal.

Table 4.16 : OLS results for y1 CAR (-1,-1).

Dependent variable	y1 = CAR (-1,-1)
	one day before the recall news publish date
%info*% (x18*x18a)	0,850***
%info (x18)	-0,900***
Remedy info (x31)	-0,209***
Customer information(x27)	0,236***
News length (x45)	0,108*
Complaint info*complaint# (x19*x19a)	-0,222***
Complaint info (x19)	-0,024
Product#info*Product# (x16*x16a)	-0,009
Product#info (x16)	0,097
Publication number (x3)	0,088
CSR score (x42)	0,077
ROA (x43d)	0,082
Responsible: company (x10b)	0,084
R square = 0,207	
Adjusted R square = 0,163	
n = 248	

***, **, * significant at p = 0.01, p = 0.05, and p = 0.10, respectively.

Information of complaints in the recall message has a negative but not significant impact on y1. However, abnormal return significantly weakens, and investors' reactions become stronger (-0.222, $p < 0.01$) and when the message reveals a number of complaints.

On the other side, OLS regression suggests that recall message containing recalled product information, publication number and exposing the company as a source of the problem does not have significant impacts (0.097, 0.088 and 0.084, respectively). CSR and ROA also have no significant impact on y1.

Table 4.17 shows the results derived from regression of the CAR(-1,0), namely cumulative abnormal return for the period one day before the recall release date to the publish date of the recall.

Length of recall message has a positive but not significant effect (0.084, $p > 0.1$) on y2.

Table 4.17 : OLS results for y2 CAR (-1,0).

Dependent variable	y2 = CAR (-1,0)
	from one day before to the recall news publish date
News length (x45)	0,084
Remedy info (x31)	-0,136**
Product#info*Product# (x16*x16a)	-0,006
Product#info (x16)	-0,022
CSR score (x42)	0,093
Customer info (x27)	0,293***
Recall date info*recall date (x28*x28a)	0,018
Recall date info (x28)	-0,218**
ROA (x43d)	0102
Recall area: North America (x17c)	-0,124*
R square = 0,109	
Adjusted R square = 0,072	
n = 248	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

The remedy is an important part post-recall process. OLS regression results reveal a negative and significant coefficient (-0.136, $p < 0.05$). According to this finding, financial markets become pessimistic over the company's stocks.

Investors consider whether the recall is satisfactory regarding informing customers. The coefficient of the variable measuring whether the recall message claims that customers are informed is significantly positive (0.293, $p < 0.01$). It means that investors react more positively to the recall messages saying customers are/will be aware of the recall.

Another significant effect is observed when the recall message contains recall date information. The impact of recall when the message includes the exact date of the recall are significantly negative (-0.218, $p < 0.10$). However, the duration of the period from message to the planned recall date (month) shows no significant impact according to results.

Recalls can be worldwide. Regression result shows a negative effect if recall news says that autos in North America are subject to the recall (-0.124, $p < 0.10$). Decreasing

CARs might suggest that investors of US financial markets are concerned about auto recalls from North America.

CSR and ROA are the only firm characteristics ALM offers. However, either has insignificant impact on y2.

Table 4.18 : OLS results for y3 CAR (-1,1).

Dependent variable	y3 = CAR (-1,1) from one day before to one day after of the recall news publish date
Emission cheat info (x39)	0.210***
Recall type: mandatory (x11d)	- 0.227***
Product#info*Product# (x16*x16a)	- 0.047
Product#info (x16)	- 0.011
News length (x45)	0.126*
Firm debt (x43b)	- 0.112*
Model info (x15)	- 0.124*
Solution info (x9)	- 0.104*
Recall institution company (x20b)	0.122*
ROA (x43d)	0.074
Adjusted R square = 0.078	
n = 247	

***, **, * significant at p = 0.01, p = 0.05, and p = 0.10, respectively.

According to the ALM results a regression analysis is adopted for the CAR (-1,1) period, the period from one day before to one day after the recall news publish date. Table 4.18 shows the results of this regression. According to the results, the impact of emission cheat information (Emission cheat info, x39) has a positive and highly significant impact on CAR (-1,1), y3 (0.210, p<0.01).

It is observed that information about the recall type affects financial value. If the recall news involves the information that the recall is a mandated one (Recall type: mandatory, x11d) this has a significantly negative impact (-0.227, p<0.05) on CAR (-1,1), showing that investors do not welcome mandatory recall information and give a more negative reaction.

Length of the recall news (News length, x45), which is measured by the word counts in the message has a positive effect (0.126, $p < 0.1$) on CAR (-1,1). The finding suggests that investors react more positively when the recall message is longer and has more information in other words. This evidence shows that companies giving more effort to explain the recall might manage to decrease the negative effect of the recall.

Investors also care about who is recalling. A recall containing information about whether the recall is decided and made by the company (Recall institution company, x20b) has a positive and significant effect (0.122, $p < 0.10$).

In contrast, if recall news present information about which models are affected by the recall (Model info, x15) has a negative impact (-0.124, $p < 0.10$) on CAR (-1,1). Also, informing about the solution of the problem (Solution info, x9) that caused the recall has a negative impact (-0.104, $p < 0.10$) on CAR (-1,1). This result might suggest that giving model information and solution in recall news has negative effect on the market reaction.

Availability of recalled product number information (Product#info, x16) and offer recalled product number in counts (Product#info*Product#, x16*x16a) have negative coefficients (-0.011, $p > 0.1$; -0.047, $p > 0.1$, respectively). However, the coefficients are small and not statistically significant.

When the effect of firm characteristics on financial value is analyzed, it is confirmed that firm debt (x43b) influences CAR (-1,1) negatively (-0.112, $p < 0.10$), meaning that recalling companies with higher (smaller) debt are likely to get the more (less) financial loss whereas the coefficient of asset profitability measured by return on assets (ROA) is positive but small and not statistically significant by explaining financial value (0.074, $p > 0.1$).

Table 4.19 presents the results for the regressing dependent variable y4 or CAR (0,0), namely the abnormal return for the recall news publish date over variables derived from ALM for y4.

According to Table 4.19, information about the recall type affect financial value. The recall news involving the information that the recall is mandated has a significantly negative impact (-0.194, $p < 0.01$) on CAR (0,0). This finding shows that investors are worried about mandatory recall information and give a more negative reaction.

Table 4.19 : OLS regression results for y4 CAR (0,0).

Dependent variable	y4 = CAR (0,0) the recall news publish date
Recall type: mandatory (x11d)	- 0,194***
Stock price info (x40)	-0,135**
Product # info (x16)	-0,123**
Past recall info (x29)	-0,042*
Recall type: other (x11e)	0,108*
Injury info*Injury# (x23*x23c)	-0,013
Injury info (x23)	-0,042
R square = 0,104	
Adjusted R square = 0,078	
n = 250	

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

Stock price information expresses the statement of a decrease in the stock price of a company. Such statements have negative and significant influence (-0.135, $p < 0.05$) on abnormal returns.

Similar negative effect is observed if the model information of the recalled automobiles is not given in the recall message (-0.123, $p > 0.05$). Recall message describing the model information of the related recalled products have a negative impact on CAR (0,0).

The coefficient of past recall information is negative (-0.042, $p < 0.10$). This negative estimate shows that reminding the past recalls in current recall news has negative effect on CAR (0,0). In other words, stock markets react negatively when the recall is repeated to the same or similar reason.

Final significant OLS variable for y4 is the recall type. As shown in Table 4.19, information about recall type that is different from mandatory, voluntary, safety and preventive recalls has a negative and significant effect (0,108, $p < 0.10$) in 10% significance level on CAR (0,0).

Whether an injury is available and a number of the injuries in the recall message have both negative impacts on CAR (0,0). However, these impacts are not statistically significant.

Table 4.20 : OLS regression results for y5 CAR (1,1).

Dependent variable	y5 = CAR (1,1) one day after the recall news publish date
Emission cheat info (x39)	0,196***
Source: ministry (x12d)	-0,178***
News length (x45)	0,139**
Recall institution company (x20b)	0,183***
Recall type: voluntary (x11b)	0,191***
Recall type: other (11e)	-0,186***
Product#info*Product# (x16*x16a)	-0,078
Product#info (x16)	-0,026
Death info*death# (x24*x24c)	0,088
Death info (x24)	-0,011
Other info (x37)	0,111
Current sale info (x33)	0,132**
Sales period info*sales period length (x7*x7a)	0,108
Sales period info (x7)	-0,217**
Brand origin: italian (x4g)	0,155***
Solution info (x9)	-0,139**
Past recall rate (x46)	-,089
R square = 0,235	
Adjusted R square = 0,178	
n = 246	

***, **, * significant at p = 0.01, p = 0.05, and p = 0.10, respectively.

The regression results for dependent variable y5, which is abnormal return for one day after the recall news publish date are shown in Table 4.20. The results indicate significant findings.

Emission cheat information in recall news has positive information (0.196, $p < 0.01$) on CAR (1,1), indicating that recall message that includes emission cheat information might increase the negative impact of the product recall message.

The information source can vary between recall news of similar or different brands. If the message explicitly underlines or imply that information source of the message is a ministry, investors give more negative impact (-0.178, $p < 0.01$) to that news.

Length of the recall news, measured by the word counts in the message, has a positive effect (0.139, $p < 0.01$) on CAR (1,1), suggesting that the market participants react more positively when the recall message is long. This evidence indicates that companies that care of explaining the recall process are likely to diminish the negative effect of the recall.

Auto recalls can be made by different bodies, e.g., companies, ministry, regulatory, etc. Recall news saying that the company is recalling cause to more positive market reaction (0.183, $p < 0.01$).

The absence of information in the news saying that the recall is voluntary has a positive and highly significant impact (0.191, $p < 0.01$). A product recall message showing that the recall is voluntary has a positive impact on CAR (1,1). On the contrary, recall news with information of other recall type information has negative influence (-0.186, $p < 0.01$) on abnormal returns.

Recall news containing information related to recalled product number and an exact number of the recalled product has negative coefficients (-0.078, $p > 0.1$; -0.026, $p > 0.1$, respectively). It shows that the effect of the information is escalated by giving the numbers of the recalled product. However, both effects are not statistically significant.

The coefficient of current sales information of the recalled product is negative (0.132, $p < 0.05$) on CAR (1,1). This finding means that investors react negatively to whether information is showing that recalled product is currently sold.

Death information has negative (-0.011), information of unrelated events has positive (0.111) coefficients; however both have no significant impact ($p > 0.1$) on CAR (1,1).

Sales period information in recall news has negative and significant impact (-0.217, $p < 0.05$) on CAR (1,1). However, information on the length of the sales period has no significant impact.

Although many different automobile makers recall, the country of origin for some brands are the same. OLS results show that news underlining brand origin of the recalled product as Italian has a more positive impact (0.155, $p < 0.01$) on CAR (1,1).

As an important part of post-recall periods, consumers and investors are expected to care of a solution. Findings for y_5 reveal that investors react more positively to recall news having solution information (-0.139, $p < 0.05$).

Table 4.21 : Overview of the regression results for y1, y2, y3, y4, and y5.

	y1	y2	y3	y4	y5
Brand origin: Italian (x4g)					✓ (+)
Sales period info (x7)					✓ (-)
Solution info (x9)			✓ (-)		✓ (-)
Recall type: voluntary (x11b)					✓ (+)
Recall type: mandatory = 0 (x11d)			✓ (-)	✓ (-)	
Recall type: other (11e)				✓ (+)	✓ (-)
Source: ministry (x12d)					✓ (-)
Model info (x15)			✓ (-)		
Product # info (x16)				✓ (-)	
Recall area: North America (x17c)		✓ (-)			
%info*% (x18*x18a)	✓ (+)				
%info (x18)	✓ (-)				
Complaint info*complaint# (x19*x19a)	✓ (-)				
Recall institution company (x20b)			✓ (+)		✓ (+)
Customer info (x27)	✓ (+)	✓ (+)			
Recall date info (x28)		✓ (-)			
Past recall info (x29)				✓ (-)	
Remedy info (x31)	✓ (-)	✓ (-)			
Current sale info (x33)					✓ (+)
Emission cheat info (x39)			✓ (+)		✓ (+)
Stock price info (x40)				✓ (-)	
Firm debt (x43b)			✓ (-)		
News length (x45)	✓ (+)		✓ (+)		✓ (+)

***, **, * significant at $p = 0.01$, $p = 0.05$, and $p = 0.10$, respectively.

Past recall rate representing the previous rate of recalls for a company has no significant impact (-0.089, $p > 0.1$) on CAR (1,1). The regression results for y1, y2, y3, y4, y5 are summarized in Table 9.

5. CONCLUSION

5.1 Discussion

The purpose of this dissertation is to investigate the role of product recall announcements to protect firm value in a product-harm crisis. Specifically, the study sought out to answer the key questions: Does the announcement matter when firms recall their products from the market? What kind of information does help firms to minimize their financial loss and vice versa? I find evidence that firm value could be influenced by the product recall announcement. That is the message which informs the public about the product recall.

The findings show that some information cues cause to more positive effect. These are the information about current sales of the affected automobiles, whether customers of the affected cars are or will be informed, the recall is made voluntarily, the recall is initiated by the company. Surprisingly, positive effects are observed when product recall announcements including information of Italian brand and emission cheat. Italian brands are famous with their aesthetics rather than durability, performance or reliability. Hence, it could be assumed that investors accept technical defects of Italian cars more easily than their German, Japan or American competitors. Volkswagen stock price dropped dramatically after admitting emission cheat scandal. Later, the company made some recalls related to the scandal at different times. This sharp negative effect of the scandal on the company's stock returns cause a rebound effect. Hence, the positive effect observed in emission cheat-related recalls could be a misleading result.

On the other hand, information of sales period, solution, mandatory recall, model, product number, complaint, recall date, past recall, remedy, stock price, recall area as North America has negative impact on firm value if these are mentioned in product recall announcements.

Depending on the recall trend during the decade and its negative influence, recall management gets more crucial. Therefore, the findings of the study provide interesting insights into managing product recalls.

5.2 Theoretical Implications

This dissertation contributes to different areas of marketing literature. Researchers have paid considerable attention to the issue of information content in diverse marketing fields. However, little research has been conducted to identify information contained in product recall news.

Due to the increase of recalls, the financial impact of this recalls should not be dismissed. Given that product recalls increase and the public is informed about these recalls through news, understanding features of recall news and their impact/power has become important in managing product harm crises. Knowing the information content of automobile recalls could be pivotal to diminish the expected negative financial effect. To best of my knowledge, no research has concentrated on product recall news content and minimizing the negative effects of product recalls. This content analysis serves to understand the recall message, and forms an important ground for the next step of the research, where the impact of news content on financial value is investigated. Therefore this dissertation provides primarily important contributions to the product harm crisis, communication, marketing-finance interface literature.

First of all, this study contributes to the product harm crisis literature by examining the product recall announcement content and its impact on financial value. Previous literature demonstrate the impact of product recalls on firm value depending on share prices (Chen et al., 2009), and the influence of marketing strategies on firm value in a product recall situation (Cleeren et al., 2013; Eilert et al., 2017; Liu and Shankar, 2015; van Heerde et al., 2007), and organizational learning after a product-harm crisis (Cleeren et al., 2008; Gao et al., 2015; Rubel et al., 2011). By investigating the product recall announcements, a deeper understanding of product recall communication is generated. The power of product recall crisis communication on firm value is a dimension that has not yet been examined in the literature. The results of this study disclose those specific information aspects could be decisive.

Past communication research presents evidence for crisis situations, such as the role of apology (Coombs and Holladay, 2008), defensive, supportive, evasive crisis responses (Liu et al., 2011), communication rules in product recall situations; be candid, be consumer-centered, be consistent, be contrite, be compassionate, be careful, be cooperative, be correct, be concise, CEO involvement, be credible, be quick, extends to improve recall (Gibson, 1995) but information related to product recall message dimensions and their effects on financial value is absent. This research shows that information related to Italian brand origin, voluntary recall type, recall institution company, whether customers are or will be informed, current sale, and unexpectedly emission cheat has a positive impact on financial value. Whereas, information about sales period, solution, mandatory recall, information source ministry, model, product number, recall are North America, complaint, recall date, past recall, remedy, stock price impact financial value negatively. Additionally, other recall type information influences firm value positive and negative for different event periods and recall percentage information availability impacts firm value negative whereas percentage information availability multiplied with percentage has a positive impact.

According to Haunschild and Rhee (2004), the effect of mandated recalls on organizational learning is smaller than in the voluntary recall case. The results of this study are showing that when the recall is mandatory, there is a negative influence on financial performance. This result can be related with, that mandatory recalls are perceived as more hazardous (Haibing et al., 2015) or vice versa voluntary recall information leads to a more positive impact, this could be perceived as the sincerity of the company (Gibson, 1995). This finding related to recall type expands prior study results (Haunschild and Rhee, 2004) by showing that the effect of recall type is not limited on organizational learning. Nevertheless, other recall types show different impacts for different event windows. Other recall types variable indicates several recall types which could be the reason for this confusion.

Due to negative perception of high recall rates, there is a negative effect if product number information is given which is also consistent with the problem size effect (Lefevre et al., 1996; Zbrodoff, 1995), how big the problem (automobile recalls can reach millions of cars in one time) more negative impact would be occur. In some product recall news, the sales period information is available, that also has a negative impact. The sales period of the affected cars span to a period from 9 to 109 months;

this long period indicates the multitude of the affected automobiles. For these reasons it was accepted that a longer period would have a worse impact. Due to similar reasons also for past recall information was a negative impact expected. A past recall related to the same or similar problem as in the actual case could lead to an uneasiness for products, accordingly for the company in the future.

Bad news has a negative impact on stock prices (Chambers and Penman, 1984) it is also in the literature approved that product recalls lead to a decrease in stock prices (Chen and Nguyen, 2013; Haibing et al., 2015; Jarell and Peltzman, 2017, etc.) therefore previous literature can lead to the conclusion that emphasizing a bad situation could increase the negative effect. The results of this study show that a negative impact is obtained if the stock price decrease information is given in the recall news article.

The findings are showing that solution info has a negative impact, this can be explained that investors are not convinced with the solution information indicated in the recall news announcement because given solution information in product recall news is limited with repair or updates.

There is a negative effect if the ministry announces the recall; this can be related to that investors are expecting an announcement directly from the company. The findings of this study also reveal that company as recall institution has a positive impact.

Recall news length -providing more and detailed information- is a positive factor. Even though Gibson (1995) claims that brief explanation is better, this research shows that longer recall news including more details affect financial performance more positively.

In brief, generally, the first communication step is the product recall announcement where the public encounters the information of the product recall. Therefore understanding the content of the product recall announcement messages and its influences gain importance. This is the overall aim of this dissertation. In this way, this dissertation contributes to the communication literature.

Additionally, this dissertation offers empirical evidence on the financial performance consequences of product recall communication. In crisis situations, companies are responsible for informing the public. They apply communication strategies depending on their aims, conditions, nature of the crisis, etc. to justify themselves (Gurău and Serban, 2005). Past crisis communication research focuses on case studies (Ulmer and Sellnow, 2000) and experimental studies (Coombs and Holladay, 1996; Schultz and

Göriz, 2011). Studies based on real data is limited (Chen et al., 2009; Haibing et al., 2015). The literature is extended by investigating the product recall message context and the impact of these context on financial value. A product recall inherently hurts a company in diverse aspects, but appropriate crisis management could help. Despite the anatomy of the product recall announcement is investigated (Gurău and Serban, 2005) no study examined the impact of the product recall announcement on firm value as a crisis management tool. This study also strengthens the marketing-finance link by investigating how a company could minimize its financial loss by applying an appropriate marketing strategy.

5.3 Managerial Implications

When a company faces a product-harm crisis and has to announce a product recall, what kind of a product recall message should the company prepare for sharing it with the public? Should be the recall announcement short or long? Which message dimensions are more important, less important or ineffective? Managers have to define a crisis communication plan in such a situation, and the product recall announcement is one of the first processes of this plan. Communication research has argued that communication could help in crisis situations. Therefore the content of a product recall announcement could influence individuals as well as investors emotions, opinions, behavioral intention, etc. From here, which recall message dimensions how affect stock prices before, during, and after the recall?

The dissertation extends our product recall management knowledge. Despite prior research for example papers of Jarrell and Peltzman (1985), Davidson and Worrell (1992), Klein and Dawar (2004), Rhee and Haunschild (2006) focuses on the results of a product recall this dissertation presents exciting outcomes related to minimizing the financial loss in a product-harm crisis. The findings of this study show that a product recall announcement is a strategic tool that a company could apply to minimize the negative influence of a product recall on firm value. The product recall process consists of specific stages and takes, therefore, a certain time until the process ends. That allows companies sufficient time to prepare its recall message before the announcement is made. For these reasons, the findings of this dissertation have important implications for managers which could help to guide in product recall as

well as in other crisis contexts. Although the study focuses on one industry, the results could also create a basis for other industries.

It is known that investors reaction after a product recall announcement is negative. The key implication for managers of this study is that investors react to the recall message content. The findings show that negative reaction after a product recall announcement could be minimized with composing an appropriate product recall announcement. Performed analyses provide an understanding of which communication dimensions influence firm value in what way.

Moreover, managers need to recognize that longer product recall announcements have a more positive impact. This means that investors are looking for more details related to the product recall. By providing longer recall news, the impact of each message dimensions which is introduced in this study should be taken into consideration.

Besides, the findings of this dissertation also provide an understanding of what kind of actions in a product recall would help. Departing from the analysis results it could be inferred that waiting until a recall is mandated, the recall is announced by the ministry are more destroying. Making voluntary recalls and being the recall institution would help companies for minimizing their financial loss. According to the research results, solution and remedy information have a negative impact. Recall problems are generally fixed, repaired, and the remedy is offered as repairing. Managers should also revise their remedy strategies because it seems that this kind of remedy is not convincing enough and does not clear the air.

5.4 Limitations and Further Research

Although this dissertation enables exciting outcomes, the study has some limitations. These limitations could be addressed in further research. First, because of the high recall rates and visibility of the recall news the automobile industry is chosen as the study context. Existing product recall research also shows that in general, single industry is applied (e.g., Rhee and Haunschild 2006; Van Heerde et al., 2007; Hora et al., 2011; Thirumalai and Sinha, 2011; Thomsen and McKenzie, 2001; Eilert et al., 2017). Nonetheless considering one industry provides to avoid heterogeneity which could occur depending on industry-specific features, which would hinder clear empirical evaluations. Therefore this studies within-industry context is consistent with

previous product recall literature. However, further investigations for different industries such as electronic, toy, textile would increase the generalizability of the findings. Additionally, this would also allow observing the differences related to the investor reactions, influence of recall message dimensions, the impact of the control variables, etc. among industries in a product recall situation.

Moreover, this study used US data. Rules and regulations related to product recalls are more specific and clear in developed countries and data from developed countries are more organized and easier to obtain. Depending on the culture, law, regulations differences between countries could occur. Therefore product recall investigations for various countries is open to research. Gain research from emerging and underdeveloped countries would enable us to understand how consumers, investors and all other stakeholders react towards product recalls in various countries.

Besides, secondary data was used for the research, that increases the external validity but blocks the possibility to detect the underlying reasons and evidence related to the process of the happening. On the other hand, previous literature conducts product recall studies also by applying experimental designs and case studies. Additionally, after a product recall, excessive information and data occur on the internet such as online newspaper articles, company release via social media, consumer reviews. Because of these facts, future product recall research could consider integrating diverse research methods and multiple data sources (Cleeren et al., 2017; Hamilton, 2016). That would help for a deeper understanding and more accurate findings regarding (1) understanding the product recall process and its consequences as a whole, (2) increase the validity issue, (3) explore the role and power of diverse information sources.

This manuscript investigates the effect of the product recall announcement on abnormal stock returns for the short term. Future studies may also address different market models and investigate the effect of the announcement for the longer term. Also, other communication efforts of companies could be taken into consideration. Investigating multiple communication efforts such as further explanations of the company related to the recall, the information offered on the official company website or social media accounts, advertising content following the product recall would

enable to offer an integrated crisis communication strategy for organizations to take actions as well as in the short run and the long run.

Another point is that this study is limited to one crisis type: product recall. Despite product recalls occur in many industries and a high number of products are affected. Future research could extend crisis and crisis communication literature by investigating the effect of communication strategy on financial value for other crisis types such as bankruptcy, organizational misdeeds, workplace violence. This would ensure to observe the reaction of stakeholders toward crisis communication content among crisis types.

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APPENDICES

APPENDIX A: Automobile Recall News List

APPENDIX B: Examples of Automobile Recall News Published in Reuters

APPENDIX C: Content Coding Scheme

APPENDIX A

Table A.1 : List of Reuters news for automobile recall.

News date	News hour	Brand	Headline of the news
03.03.2017	12:50 pm	MERCEDES	RPT-UPDATE 2-Daimler to recall one million Mercedes globally after 51 fires
03.03.2017	10:58 am	VW	VW's Audi recalls 681,000 cars in China over coolant-pump risks
03.03.2017	9:38 am	MERCEDES	BRIEF-Mercedes is recalling about 354,000 cars and SUVs in U..S. because a starter part can overheat and cause a fire- AP
02.03.2017	8:46 am	MAZDA	Russia's standards agency says Mazda recalls 12,301
27.02.2017	3:53 am	NISSAN	Russian announces recall of 33,275 Nissan Qashqai cars
23.02.2017	12:40 am	MAZDA	Mazda to recall 460,000 cars globally for diesel engine defects
21.02.2017	5:34 am	HONDA	Russia announces recall of 135,491 Honda and Acura cars
17.02.2017	10:19	VW	BRIEF-Volkswagen says recalls 6,270 natural gas models n Germany
15.02.2017	01:32	TOYOTA	Toyota to recall all 2,800 Mirai fuel cell cars on the road
14.02.2017	03:02	TOYOTA	BRIEF-Toyota China venture to recall 286,578 vehicles on risk of bonnet unlatching-quality watchdog
14.02.2017	02:59	GM	BRIEF-GM China venture to recall 161,281 vehicles for gear shift issue-quality watchdog
03.02.2017	10:57 am	BMW	BMW to recall 230,117 vehicles that may have Takata air bags
31.01.2017	7:26 am	HONDA	BRIEF-Honda Cars India to recall 41,580 vehicles to replace Takata passenger front airbag inflators
30.01.2017	12:34	MERCEDES	Mercedes-Benz recalls 3,236 cars in Russia: standards agency
27.01.2017	11:22 am	VW	Porsche recalls 16,429 cars for problems with fastening screws
26.01.2017	8:45 am	FORD	BRIEF-Ford issues one safety recall in North America
24.01.2017	12:48 am	TOYOTA	BRIEF-Toyota certain Tundra vehicles
16.01.2017	10:45 am	FORD	Ford South Africa recalls Kugas after cars burst into flames
13.01.2017	12:43	TOYOTA	BRIEF-Toyota Motor North America says expanding recall involving Takata front passenger air bag inflators
12.01.2017	8:57 am	FORD	BRIEF-Ford expands safety recall for vehicles containing certain takata airbag inflators in North America

30.12.2016	10:35 am	HONDA	BRIEF-Honda Canada says voluntarily recalled 52,710 Odyssey Minivans from 2011-2016 model years
29.12.2016	10:44 am	HONDA	Honda to recall about 650,000 Odyssey minivans in U.S.
27.12.2016	7:53 am	VW	Volkswagen recalls 4,481 cars in Russia: standards watchdog
26.12.2016	9:16 am	TOYOTA	Toyota recalls 18,757 Lexus cars in Russia-standards agency
21.12.2016	9:11 am	FORD	BRIEF-Ford issues safety recall for certain 2017 Ford Super duty vehicles
19.12.2016	2:34 pm	TOYOTA	BRIEF-Toyota Motor North America recalls four model year 2016 Avalon and eight model year 2017 Camry vehicles in US
15.12.2016	10:27	TOYOTA	Toyota recalls 66,830 imported Lexus cars in China
02.12.2016	08:47	FORD	Ford recalls 680,000 vehicles including Fusion, MKZ
29.11.2016	6:57 am	BMW	BMW to fix child restraint systems in 33,000 cars sold in Russia
22.11.2016	2:05 pm	TOYOTA	Toyota recalls 838,000 Sienna minivans to fix sliding door issue
16.11.2016	10:45 am	BMW	BRIEF-BMW recalls 33,600 cars to replace airbag sensors
15.11.2016	9:53 am	MAZDA	Mazda recalls 70,000 cars in the U.S.
28.10.2016	1:16 pm	BMW	BMW recalling 154,472 vehicles in U.S., Canada over fuel pumps
26.10.2016	11:02 am	TOYOTA	Toyota to recall 5.8 million cars in Japan, China, Europe over Takata airbags
26.10.2016	9:45 am	FORD	BRIEF-Ford issues three safety recalls in North America
21.10.2016	1:04 pm	TOYOTA	BRIEF-Toyota Motor North America says to recall certain Model year 2016 highlander vehicles in U.S.
19.10.2016	8:28 am	FIAT CHRYSLER	BRIEF-NHTSA says FCA US recalling about 182,308 vehicles for airbags
18.10.2016	9:11 pm	FIAT CHRYSLER	Fiat Chrysler recalls vehicles in the U.S., Canada and Mexico
12.10.2016	8:50 am	BMW	BMW recalls 33,026 cars in Russia: watchdog
12.10.2016	7:16 am	RENAULT	France's Renault to recall some of its top-selling Kwid cars in India
12.10.2016	4:09 am	TOYOTA	Toyota recalls 340,000 Priuses globally to fix parking brake issue
11.10.2016	8:50 am	FORD	BRIEF-Ford issues two safety compliance recalls in North America
07.10.2016	5:26 pm	VW	VW, Audi recall 334,000 vehicles in N. America due to fuel leaks

05.10.2016	8:38 am	TOYOTA	Toyota recalls 219,811 Toyota and Lexus cars in Russia: agency
21.09.2016	8:48 AM	MITSUBISHI	Russian watchdog says Mitsubishi recalling 47,800 L200 cars
16.09.2016	10:46 AM	FIAT CHRYSLER	Fiat Chrysler recalling 1.9 million cars for new air bag defect
09.09.2016	3:48 PM	GM	GM recalls 4.3 million vehicles over air bag-related defect
09.09.2016	9:50 AM	NISSAN	Nissan recalling 134,000 cars in fire risk, mainly in U.S., Canada
09.09.2016	2:33 AM	BMW	BMW recalls 110,000 cars in Japan over Takata air bags
08.09.2016	2:25 AM	HONDA	Honda recalls 668,000 more cars in Japan over Takata air bags
07.09.2016	9:19 AM	GM	Russian watchdog says informed about recall of 3,257 Chevrolet cars
07.09.2016	6:36 AM	NISSAN	Nissan recalls new minivan over idling stop problem
26.08.2016	8:52 AM	MAZDA	Mazda recalling 190,000 CX-7 vehicles in U.S.
24.08.2016	12.01 PM	FORD	Ford to recall 91,000 cars worldwide to fix fuel-pump issue
24.08.2016	7:50 AM	VW	Audi recalls A8 models in South Korea due to stalling problem
15.08.2016	4:07 AM	HONDA	Russia's standards agency informed about recall of 55,590 Honda cars
04.08.2016	9:36 AM	FORD	Ford to recall some vehicles to replace side-door latches
22.07.2016	6:41 PM	FIAT CHRYSLER	Fiat Chrysler recalling 410,000 vehicles
21.07.2016	7:46 AM	GM	GM recalling nearly 290,000 U.S. cars for air bag defect
21.07.2016	4:30 PM	GM	GM says it may recall 4.3 million vehicles over Takata air bags
14.07.2016	9:34 AM	HONDA	Honda Motor to recall 190,578 cars in India to replace Takata airbag inflators
06.07.2016	1:30 PM	VW	Volkswagen recalls 5,900 gas-powered Touran models worldwide
29.06.2016	7:48 PM	TOYOTA	Toyota recalls 3.37 million cars over air bags, emission control
28.06.2016	7:36 PM	TOYOTA	Toyota recalling 1.43 million hybrids worldwide for air bag issue
16.06.2016	12:19 PM	NISSAN	Nissan's Infiniti recalls 60,000 Q50 sedans over steering issue
09.06.2016	3:26 AM	HONDA	Honda recalls more vehicles in Japan over Takata air bags
02.06.2016	5:39 AM	VW	Porsche recalls around 14,500 Cayenne cars in Russia-regulator

01.06.2016	10:29 AM	FORD	Ford expands recall of vehicles with defective Takata airbags
01.06.2016	5:21 AM	TOYOTA	Toyota recalls 490,000 vehicles in Japan, other regions over airbags
27.05.2016	4:45 PM	BMW	BMW recalls 120,000 cars over Takata air bags: Bild
25.05.2016	9:56 AM	FORD	Ford recalls about 271,000 F-150 pickup trucks
23.05.2016	5:56 PM	TOYOTA	Toyota recalls 1.6 million U.S. vehicles for Takata air bags
23.05.2016	7:22 AM	FORD	Ford to recall 48,700 EcoSport SUVs in India
18.05.2016	3:10 PM	FIAT CHRYSLER	Fiat Chrysler recalls half million Jeep Wrangler SUVs
08.05.2016	10:17 PM	HONDA	Honda to recall 20 million more Takata airbags: Nikkei
29.04.2016	2:58 PM	NISSAN	Nissan to recall 3.53 million vehicles: air bags may not deploy
22.04.2016	7:46 PM	FIAT CHRYSLER	Fiat Chrysler recalls 1.1 million cars, SUVs for rollaway issue
22.04.2016	8:25 AM	FORD	Ford Motor to recall 42,3000 cars in India to fix airbag deployment-related issue
15.04.2016	10:13 AM	GM	GM recalls 1.04 million pickup trucks worldwide to repair seat belts
14.04.2016	11:03 AM	BMW	BMW recalls 7 Series models due to air bag issue
11.04.2016	2:12 PM	TESLA	Tesla to recall 2,700 Model X SUVs over seat issue
11.04.2016	1:25 PM	HONDA	Honda recalls older Accords with incorrect air bag modules
01.04.2016	2:15 PM	VW	VW recalls 91,000 Passat sedans in U.S. to fix cable insulation
31.03.2016	10:17 AM	FORD	Ford issues three recalls, including one that led to two fires
29.03.2016	5:59 AM	FIAT CHRYSLER	Chrysler to recall 60,000 SUVs in China over ABS braking issue: watchdog
28.03.2016	1:26 PM	VW	Volkswagen recalls 5,600 U.S. electric vehicles for stalling issue
24.03.2016	12:29 PM	VW/PORSCHE	Volkswagen, Porsche recall about 800,000 SUVs to check pedals
23.03.2016	4:46 AM	FIAT CHRYSLER	Fiat Chrysler to recall 219 cars in Russia: standards agency
09.03.2016	9:37 AM	GM	GM recalls 1,750 midsize pickup trucks, sedans on air bag concerns
07.03.2016	6:20 PM	TOYOTA	Toyota recalls 33,264 more vehicles over airbags in Canada: government
02.03.2016	3:49 AM	FIAT CHRYSLER	Fiat Chrysler to recall voluntarily 2,496 cars in Russia

02.03.2016	2:05 PM	TOYOTA	Toyota ads 331,200 vehicles to Takata air bag recalls
19.02.2016	1:56 am	MAZDA	Mazda recalls more vehicles in Japan, overseas over Takata airbags
17.02.2016	10:46 pm	TOYOTA	Toyota recalling 2.9 million vehicles globally over seatbelt issue
16.02.2016	9:40 am	GM	GM says recalling Saab, Saturn brand vehicles with Takata parts
10.02.2016	12:48 pm	VW	VW recalls 680,000 brand cars in U.S. Over airbag problems
10.02.2016	12:35 pm	BMW	BMW to recall 840,000 vehicles in U.S. With Takata air bags
10.02.2016	11:06 am	VW	Audi to recall 170,000 cars in U.s. On airbag worries: source
09.02.2016	4:07 pm	GM	GM recalling 473,000 SUVs, pickups in North America for brake pedal problems
05.02.2016	12:35 am	HONDA	Honda to recall more cars in Japan due to Takata airbag issue
04.02.2016	4:30 am	HONDA	Honda adds 2.2 million vehicles to Takata air bag recall
03.02.2016	9:56 pm	HONDA	Honda says to recall around 341,000 Accord sedans in U.S. Over restraint system
29.01.2016	3:11 pm	NISSAN	Nissan recalling 930,000 cars for hood latch problem
27.01.2016	9:35 am	VW	VW recalls 67,000 Caddy vans
18.01.2016	6:04 am	VW	Volkswagen to recall 614 Skoda Superb III cars sold in Russia
08.01.2016	3:23 pm	MAZDA	Mazda recalls 374,000 vehicles for Takata airbag defects
24.12.2015	2:15 pm	FIAT CHRYSLER	Fiat Chrysler recalling 570,000 SUVs for fire risks
15.12.2015	2:02 am	FIAT CHRYSLER	Russia's agency says 6,635 Jeep Grand Cherokee cars recalled
4.11.2015	1:19 pm	VW	Volkswagen to recall some gas-powered vehicles in U.S., Canada
3.11.2015	10:59 pm	VW	Volkswagen to recall certain vehicles in US, Canada
2.11.2015	5:02 am	GM	General Motors recalls 9,354 Opel Meriva-B cars in Russia
30.10.2015	8:48 am	FIAT CHRYSLER	Fiat Chrysler recalls about 900,000 SUVs to fix airbags, brakes
29.10.2015	4:39 am	VW	Volkswagen India likely to recall 100,000 cars: CNBC-TV18
27.10.2015	10:09am	FIAT	Fiat recalls 65,760 trucks and 75,364 SUVs in United States
27.10.2015	6:46 am	VW	VW's Bentley recalls 27,640 cars for battery cable problems

22.10.2015	10.08am	VW	Volkswagen to recall Brazil pickups in emissions cheating scandal
21.10.2015	2:06 am	TOYOTA	Toyota to recall 6.5 million cars to fix power window switch
16.10.2015	9:58pm	GM	GM discovers new ignition switch issue, recalling 3,300 vehicles:AP
16.10.2015	3:36 am	FORD	Ford China venture to recall 220,000 SUVs over risk of fuel leak
15.10.2015	6:57 am	VW	Germany says has ordered VW to recall cars at start of 2016
9.10.2015	5:57 am	VW	Volkswagen Australia to recall all vehicles with emissions cheating devices
8.10.2015	7:51 pm	VW	Volkswagen Australia to recall all vehicles with emissions cheating devices
8.10.2015	10:53 am	VW	Volkswagen to recall 389 Polo cars in India to fix handbrake issue
8.10.2015	10:14 am	GM	GM to recall 31,685 SUVs in North America
2.10.2015	10:44 am	NISSAN	Nissan to recall 218,019 Versa vehicles in U.S. For suspension issue
2.10.2015	8:22 am	VW	Volkswagen to recall cars with cheating device: Italian government
17.09.2015	2:20pm	TOYOTA	Toyota recalls 423,5000 SUVs in U.S. for windshield wipers issue
14.09.2015	6:58 am	VW	VW China unit to recall 78,000 cars over air bag defect: regulator
10.09.2015	9:46 am	FIAT CHRYSLER	Fiat Chrysler to recall 1.06 million trucks over steering glitch
04.09.2015	5:47 pm	FIAT CHRYSLER	Fiat Chrysler U.S. To recall 7,810 SUVs to prevent hacking
04.09.2015	12:49 pm	NISSAN	Nissan to recall about 300,000 vehicles in U.S. to fix console panel
14.08.2015	10:48 am	VW	Volkswagen recalls 461,300 cars in U.S., Canada to fix air bags
03.08.2015	9:04 am	FIAT CHRYSLER	Fiat Chrysler recalls 332,000 Dodge Chargers due to air bag issue
24.07.2015	6:28 pm	FIAT CHRYSLER	Fiat Chrysler U.S. To recall vehicles to prevent hacking
15.07.2015	1:21 am	TOYOTA	Toyota recalls 625,000 hybrid cars globally for software glitch
13.07.2015	2:28 am	GM	GM to recall 155,000 vehicles in India to fix wiring trouble
10.07.2015	5:33pm	GM	GM recalls 780,000 SUVs for possible lift gate issue
09.07.2015	5:56 am	HONDA	Honda expands recall to replace Takata-made air bags
08.07.2015	5:28 pm	GM	GM recalls Hummer models after fires burn three people

29.06.2015	8:58am	FIAT CHRYSLER	FCA US recalls SUVs over suspension component
28.06.2015	3:06pm	FIAT CHRYSLER	FCA US recalls SUVs over suspension component
04.06.2015	1:45 am	MAZDA	Mazda recalls 75,000 cars in Japan after Takata expands U.S. recall
28.05.2015	2:41 pm	HONDA	Honda expands air bag recall after Takata complies with U.S. order
28.05.2015	1:13 pm	BMW	BMW recalling vehicles with Takata air bags: U.S. regulators
22.05.2015	12:25pm	VW	Porsche recalls 918 Spyder on cooling system risk
15.05.2015	8:14 am	TOYOTA	Expansion of Toyota air bag recall includes 637,000 U.S. vehicles
15.05.2015	6:17 am	HONDA	Honda Motor to recall 11,381 cars in India to replace air bags
14.05.2015	10:33 am	HONDA	Honda adds to Takata air bag recalls; global tally now around 36 million
13.05.2015	2:52 am	HONDA	Honda says preparing fresh Takata-related recalls
12.05.2015	5:33 pm	GM	GM recalling more than half million Malibu sedans, pickup trucks
01.05.2015	10:14 am	FORD	Ford expands door latch recall to 156,000 more vehicles
29.04.2015	9:31 am	FORD	Ford recalls over 591,000 vehicles for steering, other problems
24.04.2015	3:51 pm	FORD	Ford recalling Fiesta, Fusion, Lincoln MKZ on door latch issue
18.04.2015	3:46pm	BMW	BMW recalls 91,800 Mini Coopers to fix air-bag sensor
16.04.2015	10:29 pm	NISSAN	Nissan says to expand U.S. regional recall for Takata air bags
08.04.2015	8:37 am	BMW	BMW recalls 53,000 X3s in China on risk of short circuit
25.03.2015	3:01pm	FORD	Ford recalls over 220,000 vehicles in North America for three issues
12.03.2015	11:19 pm	GM	GM recalls about 64,000 Chevrolet Volt hybrids: Automotive News
11.03.2015	8:39 pm	TOYOTA	Toyota to recall 112,5000 U.S. vehicles on possible safety issues
07.03.2015	5:09 am	FIAT CHRYSLER	Fiat Chrysler recalls 703,000 vehicles in U.S. to fix ignition switches
06.03.2015	4:06 pm	NISSAN	Nissan expands North America hood latch recall to 878,000 Altima sedans
27.02.2015	4:54 pm	FIAT CHRYSLER	Fiat Chrysler says recalling 467,500 SUVs worldwide
22.02.2015	10:54 pm	MERCEDES	Mercedes recalls 147,000 cars in U.S. for engine fire risk

14.02.2015	7:52 pm	GM	GM recalling 81,000-plus vehicles over steering problem
03.02.2015	4:14 am	FIAT CHRYSLER	Chrysler to recall more than 228,000 Jeep Cherokees:NYT
28.01.2015	4:36 pm	NISSAN	Nissan recalls 768,000 crossovers and SUVs for separate problems
24.01.2015	1:34pm	VW	Volkswagen to recall 80,000 Audis; 35,000 in China
02.01.2015	2:15 am	GM	General Motors issues three new recalls, cites ignition systems
01.01.2015	8:51 pm	GM	General Motors issues three new recalls, cites ignition systems
29.12.2014	7:02pm	FIAT CHRYSLER	Former Chrysler unit recalls 66,819 older pickups for clutch issue
23.12.2014	12:01 am	BMW	BMW expands Takata air bag recall to nationwide U.S.
20.12.2014	1:23 am	FIAT CHRYSLER	Former Chrysler Group expands Takata driver-side air bag recall globally
19.12.2014	4:43 pm	FIAT CHRYSLER	Former Chrysler Group recalling pickups for possible loose fastener
18.12.2014	5:01 pm	FORD	Ford expands Takata driver-side air bag recall in U.S.
18.12.2014	8:10pm	MAZDA	Mazda recalls 2,800 cars in Mexico to check Takata air bags
18.12.2014	4:14 am	NISSAN	Nissan recalls autos in Mexico to check Takata air bags
16.12.2014	3:38 pm	HONDA	Honda to recall more than 500,000 cars in China due to Takata air bags
16.12.2014	3:43pm	FORD	Ford India to recall 20,752 EcoSport cars to inspect corrosion concerns
12.12.2014	5:19 pm	FIAT CHRYSLER	Chrysler expands Takata passenger-side air bag recall in U.S.
12.12.2014	10:15am	MAZDA	Mazda to recall 52,000 cars in Japan over Takata air bags
11.12.2014	7:25 am	NISSAN	Nissan to recall around 152,000 cars worldwide over Takata air bags
09.12.2014	4:12 pm	NISSAN	Nissan recalls about 470,000 SUVs, cars for possible fuel leaks
09.12.2014	2:39 am	HONDA	Honda to expand investigative air bag recall globally
05.12.2014	6:49 pm	GM	GM'S recall of mid-sized pickups affects 2,432 vehicles in U.S., Canada
05.12.2014	1:44pm	HONDA	Honda to recall 135,000 cars in Japan as Takata air bag fallout spreads
04.12.2014	11:37 pm	MAZDA	Mazda expands recall for U.S. cars with Takata passenger air bags
04.12.2014	4:10pm	FORD	Ford recalls about 20,000 cargo vans due to loose plastic panel

04.12.2014	7:16 am	TOYOTA	Toyota expands Takata air bag recall in Japan, China
04.12.2014	3:37 am	FORD	Ford expands U.S. recall of Takata air bags
01.12.2014	11:11pm	GM	GM recalls 316,000 vehicles because of malfunctioning headlights
27.11.2014	7:28 am	TOYOTA	Toyota to recall more cars for dangerous Takata air bags
21.11.2014	5:06 pm	TOYOTA	Toyota Lexus to recall some 2006-2011 models due to fuel leak
18.11.2014	4:15pm	FORD	Ford recalls 65,000 Fusion models on ignition key issues
13.11.2014	7:36 am	HONDA	Honda discloses fifth Takata air bag-linked fatality, widens recall
12.11.2014	7:28 am	TOYOTA	Toyota to recall 362,000 Camry, other models globally
11.11.2014	6:54 pm	MERCEDES	Mercedes recalls 10,500 C-Class cars in U.S. for steering defect
10.11.2014	4:27 pm	NISSAN	Nissan expands U.S. recall for faulty Takata air bags to 52,738 vehicles
07.11.2014	2:05 am	HONDA	Facing U.S. safety probe, Honda expands air bag recall
07.11.2014	1:34 am	HONDA	Honda upgrades recall of cars with faulty Takata air bags
04.11.2014	8:39 pm	TOYOTA	Toyota recalls 5,850 cars, mostly in U.S., for possible steering issue
04.11.2014	5:21 pm	FORD	Ford calls back more than 202,000 vehicles in five North American recalls
04.11.2014	4:33 pm	NISSAN	Nissan recalls Infiniti hybrid sedans for software, transmission issues
30.10.2014	2:31 pm	FIAT CHRYSLER	Chrysler recalls 33,443 light trucks in U.s. for tire pressure issues
29.10.2014	3:14 pm	FIAT CHRYSLER	Chrysler recalling over 300,000 Ram trucks for fire hazard
29.10.2014	4:00pm	FORD	Ford recalls 204,448 Ford and Lincoln crossovers for fire hazard
29.10.2014	9:28 am	VW	Volkswagen's China JV recalls cars over air bag issue
23.10.2014	12:42 pm	NISSAN	Nissan recalling 260,000 vehicles globally with Takata air bags
20.10.2014	5:42 pm	TOYOTA	Toyota recalls 247,000 vehicles in U.S. over Takata air bags
17.10.2014	6:16 pm	VW	VW recalls 1.1 million cars in North America, China over suspension issue
17.10.2014	11:38 am	VW	Volkswagen to recall over 580,000 cars in China: government
16.10.2014	2:56 pm	FIAT CHRYSLER	Chrysler recalls more than 900,000 vehicles globally in two actions

15.10.2014	8:38 am	TOYOTA	Toyota recalls 1.67 million Toyota, Lexus cars
15.10.2014	6:32 am	TOYOTA	Toyota China JV recalls 93,700 sedans due to leaking brake fluid
14.10.2014	3:52pm	FIAT CHRYSLER	Chrysler recalls 184,215 SUVs for possible air bag issue
13.10.2014	5:06 pm	HONDA	Honda recalls 43,000 2014-2015 Acuras in U.S. to fix front belts
10.10.2014	4:50 pm	NISSAN	Nissan recalls 238,000 2013 Altima sedans on hood latch issue
07.10.2014	3:07pm	FIAT CHRYSLER	Chrysler recalls cargo vans due to inadvertent airbag deployments
06.10.2014	4:10pm	FIAT CHRYSLER	Chrysler recalls 21,470 commercial vans
03.10.2014	3:46 pm	GM	GM recalls more than half a million cars, SUVs
03.10.2014	12:00am	GM	GM recalls 117,651 vehicles for potential electrical short issue
29.09.2014	8:01pm	TOYOTA	Toyota to recall 690,000 Tacoma vehicles in U.S. to fix suspension
26.09.2014	5:41 pm	FORD	Ford to recall about 850,000 cars to fix airbag deployment glitch
25.09.2014	9:01pm	FIAT CHRYSLER	Chrysler recalls 350,000 vehicles on ignition switch issues
22.09.2014	3:03pm	FIAT CHRYSLER	Chrysler recalls 230,760 SUVs globally for fuel pump issue
21.09.2014	7:05pm	GM	General Motors recalls cars over parking brake fire risk
18.09.2014	8:03 pm	TOYOTA	Toyota recalling 20,000 late-model vehicles on potential fuel leak
18.09.2014	5:28 pm	GM	GM recalling natural gas-powered vans due to possible leak
12.09.2014	5:25pm	FORD	Ford recalls older model Escapes and Mercury Mariner hybrids
11.09.2014	8:18 pm	TOYOTA	Toyota recalling 130,000 Tundras for air-bag issue
05.09.2014	5:43 pm	FORD	Ford recalls 191,770 Focus sedans in China on fuel leak risk
04.09.2014	08:53 am	NISSAN	Nissan to recall 55,000 vehicles over gasoline engine starter motor glitch
21.08.2014	6:05pm	FORD	Ford tells dealers to stop selling some C-Max, Focus models
21.08.2014	5:08pm	HONDA	Honda to modify Fit to boost test score, calls back 12,000 cars
15.08.2014	10:47 pm	FORD	Ford recalls 160,000 Focus, Escape models for wiring problem
09.08.2014	6:16 pm	VW	VW recalls 189,000 SUVs in North America for potential stalling

08.08.2014	9:43pm	GM	GM recalls another 269,000 cars for variety of defects
08.08.2014	6:32 pm	FORD	Ford recalls about 3,000 vehicles in North America
30.07.2014	11:42 pm	FIAT CHRYSLER	Chrysler recalls Fiat 500L on knee air bag issue
25.07.2014	4:31 pm	MAZDA	Mazda recalls U.S. cars with faulty Takata air bags
23.07.2014	8:40pm	GM	GM recalls 717,950 vehicles in U.S., not for ignition switches
23.07.2014	1:02am	FIAT CHRYSLER	Chrysler recalls older Jeep SUVs for ignition switch issues
18.07.2014	4:28 pm	MITSUBISHI	Mitsubishi recalls Lancer sedans with Takata air bags
16.07.2014	2:52 pm	BMW	BMW to recall 1.6 million cars on concerns over Takata air bags
11.07.2014	4:12 pm	FIAT CHRYSLER	Chrysler to recall 900,000 SUVs to fix mirror wiring
08.07.2014	6:00pm	FORD	Ford recalling 100,610 vehicles in North America in six actions
07.07.2014	5:31am	MAZDA	Mazda recalls over 42,000 cars in China due to Takata air bag issue
04.07.2014	10:25 am	HONDA	Honda says to expand U.S. regional air bag recall to include California
04.07.2014	5:32 am	GM	GM to recall 27,051 Spark cars in Korea due to transmission defect
01.07.2014	1:44 am	FIAT CHRYSLER	Chrysler expands ignition switch recall by 696,000 vehicles
30.06.2014	10:33pm	GM	GM adds 8.23 million cars to ignition-switch recall
28.06.2014	3:02am	GM	GM recalls thousands of new pickups, SUVs in U.S. and Canada

APPENDIX B

 **REUTERS**

BusinessMarketsWorldPoliticsTVMore

BUSINESS NEWSDECEMBER 27, 2016 / 3:53 PM / 2 YEARS AGO

Volkswagen recalls 4,481 cars in Russia: standards watchdog

1 MIN READ



Volkswagen cars are seen at Volkswagen car factory in Palmela, Portugal, December 9, 2016.
REUTERS/Rafael Marchante

MOSCOW (Reuters) - Russian standards agency Rosstandart said on Tuesday it had been informed about a voluntary recall by Volkswagen of 4,481 Caddy, Golf and Jetta cars which had a possible fault.

The recall affected cars sold between 2013 and 2016, the agency said in a statement.

Reporting by Anton Dzersev; Writing by Peter Hobson; Editing by
Our Standards: [The Thomson Reuters Trust Principles](#).

Figure B.1 : Volkswagen recall news (Url-5).


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BUSINESS NEWS

MAY 25, 2016 / 4:39 PM / 2 YEARS AGO

Ford recalls about 271,000 F-150 pickup trucks

1 MIN READ






A Ford logo is pictured at a store of the automaker, in Mexico City, Mexico, April 5, 2016.
 REUTERS/Edgard Garrido

(Reuters) - Ford Motor Co (F.N) said it was recalling about 271,000 F-150 pickup trucks in North America to replace their brake master cylinders.

The company said on Wednesday it was aware of nine possible accidents with no injuries and one alleged injury not associated with an accident. (ford.to/25lDEx4)

Ford said it was possible that the leak of brake fluid from the cylinder could increase the risk of a crash.

The company said on Wednesday the recall involved vehicles of model years 2013 and 2014.

Figure B.2 : Ford recall news (Url-6).


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JAPAN
OCTOBER 12, 2018 / 8:52 AM / 2 YEARS AGO

Toyota recalls 340,000 Priuses globally to fix parking brake issue

1 MIN READ





A woman is reflected on a screen showing Toyota Motor Corp's Prius hybrid car at the company's showroom in Tokyo, Japan June 14, 2016. REUTERS/Toru Hanai/FILE PHOTO

TOKYO (Reuters) - Toyota Motor Corp (7203.T) said on Wednesday it was recalling around 340,000 of its latest Prius gasoline hybrid model in Japan and overseas to fix a parking brake issue.

The recall covers models produced between August 2015 and October 2016, and affects around 210,000 vehicles in Japan and 94,000 in North America, Toyota said, adding that the balance would be recalled in Europe, Australia and other regions.

No accidents have been reported in Japan in connection with the issue, a Toyota spokeswoman said, while declining to comment on whether any accidents had occurred overseas.

(This version of the story corrects paragraph 2 to say 94,000 vehicles, not 92,000, will be recalled in North America; also corrects start of production period to August 2015, from October 2015)

Reporting by Naomi Tajiri; Editing by Subhanshu Sahu

Our Standards: [The Thomson Reuters Trust Principles](#)

Figure B.3 : Toyota recall news (Url-7).

Fiat Chrysler to recall 1.06 million trucks over steering glitch

2 MIN READ



A new Fiat Chrysler Automobiles sign is pictured after being unveiled at Chrysler Group World Headquarters in Auburn Hills, Michigan May 4, 2014.

REUTERS/Roberta Cook

(Reuters) - FCA US LLC, a unit of Fiat Chrysler Automobiles NV, is recalling about 1.06 million of its Ram trucks in the United States to fix a steering wheel defect that may cause an air-bag to deploy inadvertently.

The company said an internal investigation discovered that these trucks may have steering-wheel wiring harnesses that wear because of contact with a spring.

Such wear may cause a short-circuit that may result in the inadvertent deployment of the driver-side air-bag. (bit.ly/1M6JAYd)

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The company said it was aware of two injuries due to wiring harnesses wear, but no accidents.

FCA US also said an additional 154,493 heavy-duty trucks were being recalled as they were supplied with steering components that may have welds with insufficient fusion. This may cause separation and lead to diminished steering response.

The company said it was aware of a single minor accident in the United States related to the condition of bracket welds, but was unaware of any injuries.

As well, about 155,000 vehicles are being recalled to make their side-curtain air-bags compliant with a federal regulation to reduce the risk of rear occupant ejection during a rollover.

The company is also recalling 323,153 trucks in Canada, Mexico and outside the North American Free Trade Agreement (NAFTA) region to fix wiring harnesses and bracket welds.

(This story has been corrected to add 'million' in headline)

Reporting by Ankur Ajmera in Bangalore; Editing by Don Scherzer and Sreenidhi Chakrabarty
Our Standards: [The Thomson Reuters Trust Principles](#)

Figure B.4 : Fiat Chrysler recall news (Url-8).

MARKET NEWS FEBRUARY 22, 2015 / 10:50 PM / 4 YEARS AGO

Mercedes recalls 147,000 cars in U.S. for engine fire risk

1 MIN READ



DETROIT, Feb 22 (Reuters) - Daimler AG's Mercedes-Benz is recalling more than 147,000 mid-size sedans and station wagons from 2013-2015 to check for risk of engine fires, the U.S. safety regulator said Saturday.

The cars have a rubber seal in the engine compartment that can fall onto the exhaust system, increasing the risk of an under-hood fire, according to the National Highway Traffic Safety Administration.

Among the cars being recalled are versions of the CLS-class sedan and the E-class sedan and wagon.

Mercedes said U.S. dealers will begin notifying owners and repairing the cars in mid-March.

Last week, the automaker recalled another 149,000 CLS-class and E-class cars in Europe and China for a similar problem. (Reporting by Paul Lienert in Detroit; Editing by Eric Walsh)

Our Standards: [The Thomson Reuters Trust Principles.](#)

Figure B.5 : Mercedes recall news (Url-9).

APPENDIX C

Table C.1 : Coding scheme for the content analysis.

Variable	Definition	Coding
x1		brand
x1a	mercedes	brand mercedes (1) or not (0)
x1b	vw	brand vw (1) or not (0)
x1c	bmw	brand bmw (1) or not (0)
x1d	mitsubishi	brand mitsubishi (1) or not (0)
x1e	ford	brand ford (1) or not (0)
x1f	mazda	brand mazda (1) or not (0)
x1g	nissan	brand nissan (1) or not (0)
x1h	honda	brand honda (1) or not (0)
x1j	toyota	brand toyota (1) or not (0)
x1j	gm	brand GM (1) or not (0)
x1k	porsche	brand porsche (1) or not (0)
x1l	renault	brand renault (1) or not (0)
x1m	chrysler	brand fiat chrysler (1) or not (0)
x1n	chevrolet	brand chevrolet (1) or not (0)
x1o	audi	brand audi (1) or not (0)
x1p	tesla	brand tesla (1) or not (0)

x1q	volvo	brand volvo (1) or not (0)
x1r	bentley	brand bentley (1) or not (0)
x2	additional source	additional source available (1) not available (0)
x3	publication number	publication number
x4	Brand origin	Brand origin info available (1) not available (0)
x4a	Brand origin=Japanese	If brand origin is Japanese (1) or not (0)
x4b	Brand origin=German	If brand origin is German (1) or not (0)
x4c	Brand origin=American	If brand origin is US (1) or not (0)
x4d	Brand origin=French	If brand origin is French (1) or not (0)
x4e	Brand origin=Korean	If brand origin is Korean (1) or not (0)
x4f	Brand origin=Chinese	If brand origin is Chinese (1) or not (0)
x4g	Italian	If brand origin is Italian (1) or not (0)
x5	CoM	Whether the country of manufacturing information is available (1) or not (0)
x6	mnctrng_period_available	manufacturing period information of the related recalled product available (1) or not (0)
x6a	mnctrng_period_length	manufacturing period length of the related recalled product (month)
x6b	mnctrng_period_when	how long ago is the manufacturing period of the related recalled product(s) (month for beginning date)
x7	sales_period_available	sales period information of the related recalled product available (1) or not (0)
x7a	sales_period_length	sales period length of the related recalled product (month)

x7b	sales_period_when	how long ago is the sales period of the related recalled product (month)
x8	model_period_available	model period information of the related recalled product available (1) or not (0)
x8a	model_period_length	model period length of the related recalled product (month)
x8b	model_period_when	how long ago is the model period of the related recalled product (month)
x9	solution	Whether the solution info is available (1) or not available (0)
x10a	responsible=supplier	Source of the problem supplier (1) or not (0)
x10b	responsible=company	Source of the problem company (1) or not (0)
x11	recall type	recall type information available (1) not available (0)
x11a	safety recall	recall type information safety (1) or not (0)
x11b	volntry recall	recall type information voluntary (1) or not (0)
x11c	prvntve recall	recall type information preventive (1) or not (0)
x11d	mandatory	recall type information mandatory (1) or not (0)
x11e	other	recall type information other (1) or not (0)
x12	source info	Whether the information source of the message is available (1) or not (0)
x12a	source=regulatory	Whether the information source of the message is a regulatory institution (1) or not (0)
x12b	source=company	Whether the information source of the message is the company (1) or not (0)
x12c	source=company spokesman	Whether the information source of the message is a spokesman for the company (1) or not (0)
x12d	source=ministry	Whether the information source of the message is ministry (1) or not (0)

X12e	source=other newspaper	Whether the information source of the message is another newspaper (1) or not (0)
x12f	other	Whether the information source of the message other (1) or not (0)
x13	channel info	recall channel information available (1) not available (0)
x13a	channel=e-mail	If recall channel is e-mail (1) or not (0)
x13b	channel=website	If recall channel is website (1) or not (0)
x13c	channel=briefing	If recall channel is media briefing (1) or not (0)
x13d	channel=filling	If recall channel is filling (1) or not (0)
x13e	channel=newspaper	If recall channel is newspaper (1) or not (0)
x13f	channel=letter	If recall channel is letter (1) or not (0)
x13g	interview	If recall channel is interview (1) or not (0)
x13h	tv	If recall channel is tv (1) or not (0)
x14	new_date	Whether the recall news date is given (1) or not (0)
x15	model info	Whether the model information is given (1) or not (0)
x15a	model info clear	Model information is clear given (1)
x15b	model info unclear	unclear given
x15c	model#	How many models are affected
x16	product#info	Recalled product number available (1) or not (0)
x16a	product#	How many products are recalled (no information=0)

x17	RecCoun	Whether the product recalled country/ies information is available (1) or not (0)
x17a	us	Whether the recall affects cars in the US (1) or not (0)
x17b	globally	Whether the recall is globally (1) or not (0)
x17c	North America	Whether the recall affects cars in North America (1) or not (0)
x17d	South America	Whether the recall affects cars in South America (1) or not (0)
x17e	Europe	Whether the recall affects cars in South America (1) or not (0)
x17f	Far East	Whether the recall affects cars in Far East (1) or not (0)
x17g	China	Whether the recall affects cars in China (1) or not (0)
x17h	Russia	Whether the recall affects cars in Russia (1) or not (0)
x17i	Middle East and Africa	Whether the recall affects cars in the Middle East and Africa (1) or not (0)
x17j	India	Whether the recall affects cars in India (1) or not (0)
x17k	Australia	Whether the recall affects cars in Australia (1) or not (0)
x18	%	Recalled products/Sold total products
x19	complaint	Whether customer complaints are available (1) or not (0)
x19a	complain#	Number of customer complaints
x20	recall inst	Whether the recall institution information is available (1) or not (0)
x20a	inst=regulatory	Whether the recall institution of the message is a regulatory institution (1) or not (0)
x20b	inst=company	Whether the recall institution of the message is the company (1) or not (0)

x21	pro/reac	Whether the recall type (proactive or reactive) is available (1) not (0)
x21a	pro	proactive (1)
x21b	re	reactive (1)
x22	accident info	accident information not available (0) available (1) (including fire)
x22a	accident+	accident info available, accident available (1) other (0)
x22b	accident-	accident info available, accident not available (1) other (0)
x22c	accident#	number of the accident (including fire)
x23	injury info	Whether injury (information) is available (1) or not (0)
x23a	injury+	injury info available, injury available (1) other (0)
x23b	injury-	injury info available, injury not available (1) other (0)
x23c	injury#	number of injuries
x24	death info	Whether death (information) is available (1) or not (0)
x24a	death+	death info available, death available (1) other (0)
x24b	death-	death info available, death not available (1) other (0)
x24c	death#	Number of death
x25	reason	Whether the recall reason is available (1) or not (0)
x26	hazlev	Level of hazard
x27	info	Whether customers are/will be informed (1) or not (0)
x28	recall date	If the recall date information is given (1) or not (0)

x28a	planned recall date	Duration of the period from message to the planned recall date (month)
x29	pastrec	Whether the brand/model was recalled before (1) or not (0)
x30	refrain	Refrain from commenting on the recall (in any way) (1) refrain info not available (0)
x31	remedyinfo	Whether remedy information is available (1) or not (0)
x31a	remedytype	Whether the remedy date information is available (1) or not (0)
x31b	remedy date info	Whether the remedy date information is available (1) or not (0)
x31c	remedy when	Duration of the period from message to the planned remedy date (month)
x32	probInstr	Whether instructions are given when faced with a problem (1) or not (0)
x33	current sale	Whether current sale information of the recalled product is available (1) or not (0)
x33a	still sold	Whether the sales of the affected cars still sold (1)
x33b	sales stopped	Whether the sales of the affected cars stopped to sell (1)
x34	free	Whether free of charge is mentioned (1) or not (0)
x35	cost info	Whether cost info is available (1) not available (0)
x35a	cost#	Cost amount
x36	airbag	Whether the recall is due to an airbag problem (1) or not (0)
x36a	takata	Whether the recall is due to a Takata airbag problem (1) or not (0)
x37	other info	Whether info about other events available (1) or not (0)
x37a	other company info	info about other automobile firm/s available (1) or not (0)

x37b	takata info	info about Takata available (1) or not (0)
x37c	other	info about something else available (1) or not (0)
x38	joint venture	Whether the recall is made by a joint venture (1) or not (0)
x39	emission cheat	Whether the recall is due to an emission cheat (1) or not (0)
x40	stock price	Whether stock price info is available (1) or not (0)

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