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List of Abbreviations

CARB ..... California Air Resources Board
CEO ..... Chief Executive Officer
CO ..... Carbon Monoxide
COPD ..... Chronic Obstructive Pulmonary Disease
CO_2 ..... Carbon Dioxide
DAX ..... Deutscher Aktienindex (German Stock Index)
EPA ..... Environmental Protection Agency
EU ..... European Union
FTP-75 ..... Federal Test Procedure 75
g/km ..... Grams per Kilometer
GmbH ..... Gesellschaft mit beschränkter Haftung (Limited Liability Company)
HC ..... Hydrocarbons
ICCT ..... International Council on Clean Transportation
i.e. ..... id est
KBA ..... Kraftfahrt-Bundesamt (Federal Motor Transport Authority)
km/h ..... Kilometers per Hour
LEV ..... Low Emission Vehicle (Standard)
NO_x ..... Nitrogen Oxides
LNT ..... Lean NO_x Trap
mg/km ..... Milligrams per Kilometer
NEDC ..... New European Driving Cycle
US ..... United States (of America)
USA ..... United States of America
PM ..... Particulate Matter
ppm ..... Parts per Million
SCCT ..... Situational Crisis Communication Theory
SCR ..... Selective Catalytic Reduction
SFTP ..... Supplemental Federal Test Procedure
SUV ..... Sports Utility Vehicle
TDI ..... Turbocharged Diesel Injection
THC ..... Total Hydrocarbons
VW ..... Volkswagen
VW AG ..... Volkswagen Aktiengesellschaft (Joint-Stock Company)

1. Introduction

"*The U.S. Environmental Protection Agency and the California Air Resources Board (EPA and CARB) revealed their findings that while testing diesel cars of the Volkswagen Group they have detected manipulations that violate American environmental standards.*
The Board of Management at Volkswagen AG takes these findings very seriously. I personally am deeply sorry that we have broken the trust of our customers and the public. We will cooperate fully with the responsible agencies, with transparency and urgency, to clearly, openly, and completely establish all of the facts of this case. Volkswagen has ordered an external investigation of this matter.
We do not and will not tolerate violations of any kind of our internal rules or of the law.
The trust of our customers and the public is and continues to be our most important asset. We at Volkswagen will do everything that must be done in order to re-establish the trust that so many people have placed in us, and we will do everything necessary in order to reverse the damage this has caused. This matter has first priority for me, personally, and for our entire Board of Management".

This statement was issued by Volkswagen AG's CEO Martin Winterkorn (2015a) on Sunday, September 20th, 2015 in response to an announcement made by the United States Environmental Protection Agency (EPA) on Friday, September 18th, 2015, in which the agency publicly declared that irregularities concerning nitrogen oxide emissions of Volkswagen diesel vehicles had occurred during emission tests (Plungis & Hull, 2015).

Dubbed, inter alia, "diesel dupe" (Hotten, 2015a), "diesel fraud" (Smith & Parloff, 2016), or "Dieselgate" (Gorzelany, 2015) by the media, and referred to as "diesel issue" by the company (Volkswagen AG, 2015a), this was the trigger for a major crisis, which not only threatened Volkswagen Group's existence but also spread across the whole automotive industry, ultimately questioning the further use and development of diesel engines for passenger cars in general (Schmitt, 2016).

The purpose of this thesis is to analyze the crisis situation and evaluate the success of Volkswagen's responses. The period under scrutiny ranges from the time the scandal was made public by the United States Environmental Protection Agency at the end of September 2015 to the point when a first agreement was reached with United States authorities, at the end of April 2016.

In order to explain and classify the company's reactions, Situational Crisis Communication Theory (SCCT) is applied. The company's share price, or rather fluctuations in it, are then used as an indicator for the effectiveness. The responses are assumed to have an influence on corporate reputation (Coombs & Holladay, 2002, p. 166 ; Coombs, 2006, p. 246), which in turn is reflected in financial performance (Iwu-Egwuonwu, 2011 ; Kleinnijenhuis, et al., 2015 ; Knight & Pretty, 2001 ; Sabate & Puente, 2003).

The Volkswagen emission scandal was chosen as the focus of analysis due to its impact, the importance of the affected company, the broad media coverage, and the high topicality. Altogether, it represents a typical, severe crisis situation that can adequately be described with the SCCT framework. Additionally, given the recentness of the events, there is still a lack of research on the topic.

This thesis is organized as follows. In section 2, the theoretical concepts, which form the basis for the subsequent analyses, together with some relevant definitions, are introduced. Section 3 deals with the case itself, namely the company, the market it operates in, the regulations it faces, as well as the events before and during the crisis. Section 4 contains information on the methodology and the conducted analyses, and presents the results. Section 5 comprises the discussion, and section 6 the concluding remarks.

2. Theoretical Framework

This section introduces the theoretical basics of the thesis. It starts with definitions for some key terms, and continues with brief explanations of institutionalism and attribution theory. These approaches are among the foundations of Situational Crisis Communication Theory, which is explained in more detail, as it serves as the starting point for analyzing the Volkswagen emission crisis.

2.1. Definitions

In this chapter, the basic terms linked to the theory of Situational Crisis Communication, namely crisis and crisis communication, stakeholder, reputation, and legitimacy, are introduced.

2.1.1. Crisis & Crisis Communication

There is not a single definition of what constitutes an organizational crisis. However, there are certain elements many definitions have in common. First of all, an organizational crisis is associated with severe consequences. Secondly, a crisis threatens the fundamental value of the organization involved. The third core element is time pressure with respect to the response. A fourth component is the unexpectedness of the events that trigger the crisis (Xu & Li, 2013, pp. 371-372).

Yet, it is worth noting that some authors, like Coombs in his Situational Crisis Communication Theory, do not consider unexpectedness an integral part of the definition.
"*A crisis is the perception of an unpredictable event that threatens important expectancies of stakeholders related to health, safety, environmental, and economic issues, and can seriously impact an organization's performance and generate negative outcomes*" (Coombs, 2015a, p. 3).

Unless indicated otherwise, the following explanations in this subchapter are referring to Coombs (2010, pp. 18-20 & 2015a, pp. 3-4 & 14).

Perception plays an important role when it comes to assessing whether there is a crisis situation or not. Some events may quite evidently constitute a crisis, for example natural disasters. However, there might also be situations, in which a company does not see itself in the middle of a crisis. Therefore, it is important to take stakeholders' perceptions into account. If they believe there is a crisis, they will act accordingly. Hence, there actually is a crisis situation, irrespective of the company's point of view.

While a crisis is unpredictable, it not necessarily is unexpected. One can assume that eventually, a crisis situation will occur. However, the exact place, date or time is often unknown. Depending on the type of crisis, there may be certain indicators prior to the crisis, that act as an early warning.

Stakeholders have certain expectations with regard to the organization's actions. Those expectations can be violated by crises. Consequently, the relationship between the company and its stakeholders is harmed.

A crisis has a serious impact, as the whole organization is actually or potentially affected. Frequently, this results in the company experiencing financial losses. However, the damage is neither limited to financial performance, nor to the organization involved. Harming stakeholders, be it in a physical, financial or psychological way, is considered the most important negative outcome. Further negative outcomes may be infrastructural damages or pollution. Additionally, one company's crisis may spill over to the entire industry due to the public's reaction.

This also separates an incident from a crisis. While the former is a minor, localized event, the latter is a serious disruption that requires the company's careful attention.

Furthermore, with the progress in communication technologies, crises have become more global, as news spreads easier and faster. Besides, even the remotest places are now easily covered.

Generally, nowadays, organizations have to deal with crises more often than ever before. Among other things, this can be ascribed to more sophisticated products, services, supply chains, and technologies (Massey, 2001, p. 157).

In order to deal with crisis events, affected organizations should engage in crisis communication. "*Crisis communication can be defined broadly as the collection, processing, and dissemination of information required to address a crisis situation*" (Coombs, 2010, p. 20). Ultimately, its aim is to "[…] *repair damaged images after a crisis or disaster*" (Seeger, 2006, p. 234).

2.1.2. Stakeholder

A number of definitions for the term stakeholder can be found in the literature. While some of them require a stakeholder to have a certain amount of power and influence on the organization, others are broader. Consequently, a stakeholder is considered any person, group or organization who is affect by, or affects an organization's actions (Bryson, 2004, p. 22 ; Freeman, 2010, p. 46).

Internet and social media have made it easier for stakeholders to express their discontent and connect with others. This can result in a minor incident becoming a serious crisis or aggravating an already existing crisis situation (Coombs, 2015a, p. 13).

In Situational Crisis Communication Theory, stakeholders and their perceptions are important for deciding on how to react to a crisis, and when the effectiveness of the response is evaluated. However, they are not seen as partners with whom the company may jointly work on a solution to the problem. Rather, they are seen as a threat that has to be dealt with, in order to protect the organization's reputation and interests (Xu & Li, 2013, pp. 373-374).

2.1.3. Reputation

Corporate reputation can be defined as "[…] *a stakeholder's overall evaluation of a company over time. This evaluation is based on the stakeholder's direct experiences with the company, any other form of communication and symbolism that provides information about the firm's actions and/or a comparison with the actions of other leading rivals*" (Gotsi & Wilson, 2001, p. 29).

All in all, it is how the company is perceived by the stakeholders. This perception goes in hand with certain expectations. Organizational reputation suffers, when expectations are not fulfilled (Coombs, 2015a, p. 4).

Therefore, reputation is a valuable intangible asset, linked to factors that contribute to the company's success, such as increasing sales, attracting talent, motivating employees, and generating positive news coverage, along with others (Coombs, 2009, p. 107 & 2015a, p. 12).

2.1.4. Legitimacy

"*Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions*" (Suchman, 1995, p. 574).

There are many overlaps with the concept of reputation, as both emphasize cultural influence factors on organizational structures, processes, and behavior. Additionally, both concepts consider stakeholders' perceptions of organizational compliance as crucial for success (Deephouse & Suchman, 2008, p. 60).

However, there are also differences. For having legitimacy, avoiding negative behavior is more important than a positive performance. So there is only a certain threshold to be reached.
Reputation, on the other hand, is more of a continuum, where each subject is compared to the others, and ranked from best to worst. Unlike legitimacy, this makes reputation rival, as one's position in the ranking can only be improved at the cost of others.
Since legitimacy is linked to authority and interactions with institutions, it is more political, while reputation rather emphasizes an economic aspect. Reputation built up by behavior in the past is used to assess present or predict future behavior. Therefore, reputation is also an input factor for a potential trade partner's expected utility function (Deephouse & Suchman, 2008, pp. 60-62).

2.2. Neo-Institutionalism & Organizational Legitimacy

This chapter briefly presents the basics of the institutionalism framework. Additionally, the idea of legitimacy, together with its significance for organizations, and the ways of dealing with it, are explained.

2.2.1. Basics

Legitimacy is an important concept in institutionalism (Deephouse & Suchman, 2008, p. 49). Institutionalism is among the most dominant theories for examining organizations. While its roots go back to the middle of the 19th century, the foundations of modern organizational institutionalism, also dubbed new or neo-institutionalism, go back to the late 1970s and 1980s. It had developed as an alternative for the rather rationalist and technocratic views of the 1960s, and highlights the importance of cultural influences on the organization (Greenwood, et al., 2008, pp. 2-3 & 29 ; Scott, 2014, p. vii).

Greenwood et al. (2008, pp. 4-5) see the term institution as a "[…] *more-or-less taken-for-granted repetitive social behavior that is underpinned by normative systems and cognitive understandings that give meaning to social exchange and thus enable self-reproducing social order*".
This covers a wide field, from the individual to the organizational, and societal level. Organizational institutionalism, however, is primarily focused on institutions and processes at the organizational level (Greenwood, et al., 2008, p. 5).

An organization's success does not only depend on an efficient coordination of activities and control over production resources. By complying with the institutional environment and acting socially responsible, organizations gain legitimacy, which is an essential resource for survival (Cowden & Sellnow, 2002, p. 195 ; Meyer & Rowan, 1977, pp. 351-352).
This process of homogenization, by which an organization aligns itself with the environment, is known as isomorphism (DiMaggio & Powell, 1983, p. 149).

However, adhering to the institutional rules and expectations may create conflicts and inconsistencies with technical activities and the need for being efficient.

Furthermore, the organization has to deal with different expectations from various sources. Consequently, individual expectations and rules may contradict each other (Greenwood, et al., 2008, p. 4).

Therefore, it can be necessary for an organization to display "*ceremonial conformity*" (Greenwood, et al., 2008, p. 4), whenever certain demands of the institutional context contradict production requirements. Ceremonial conformity separates symbolic practices from technical processes. This decoupling allows organizations to keep formal structures that comply with the rules and thereby increase legitimacy. At the same time, at the inside, behind the formal structure, a certain flexibility is maintained, which enables organizations to adapt to practical requirements (Greenwood, et al., 2008, p. 4 ; Meyer & Rowan, 1977, pp. 355-357).

From this it also follows that organizations have no big interest in being monitored or evaluated, since this may uncover practices that destroy legitimacy. Accordingly, inspections are also ceremonialized (Meyer & Rowan, 1977, p. 359).

2.2.2. Managing Legitimacy

Legitimation or de-legitimation respectively, "[…] *is the process by which the legitimacy of a subject changes over time*" (Deephouse & Suchman, 2008, p. 57). It can roughly be broken down into three parts, namely gaining, maintaining and rebuilding legitimacy (Massey, 2001, p. 156).

A company that has just been established, or wants to enter new markets, or has undergone substantial changes, has to gain legitimacy (Ashforth & Gibbs, 1990, p. 182).

Maintaining legitimacy seems to be easier than gaining or repairing it. An organization just has to stick to its compliant behavior or at least signal it, for example by issuing letters to shareholders, press releases, or by advertising. Additionally, it should engage in preventive measures such as the preparation of crisis management plans (Ashforth & Gibbs, 1990, p. 183 ; Suchman, 1995, pp. 593-594).

When a crisis occurs, the public may perceive the company as not meeting the normative expectations, which consequently challenges organizational legitimacy. This creates a need for defending or repairing it (Coombs & Holladay, 1996, p. 281).

Repairing legitimacy is similar to gaining it. However, there is an important difference, as reestablishing legitimacy is a reactive process. The organization's credibility, and therefore the effectiveness of its response, are undermined by the crisis (Suchman, 1995, p. 597).

A crisis also increases stakeholders' awareness, and the company involved is put under closer scrutiny. This "[…] *makes it difficult to decouple activities – especially those involving legitimation – and to engage in routine impression management* […]" (Ashforth & Gibbs, 1990, p. 183). Additionally, important stakeholders may try to loosen their connection to the organization and withdraw their support, in order not to be associated with the negative events.
Furthermore, due to the unpredictable nature of a crisis, an organization is commonly surprised and left with little time to respond. This results in a rather rigid response of denial or counterclaims, which may aggravate the damage (Ashforth & Gibbs, 1990, pp. 183-184).

Common strategies for regaining legitimacy usually involve building a wall between past events and current actions, together with separating the specific negative revelations from the public's perception of the whole company.
As mentioned before, denial will most likely result in further harm, unless the denial is justified. Therefore, the organization often questions its responsibility by blaming individuals inside or outside the company. However, this might suggest the company lacks control. For that reason, an alternative is to try to justify or excuse the events. Additionally, companies may also undergo some strategic restructuring by first admitting some of its structures or processes are problematic. Then, some kind of monitoring is implemented, in order to prevent future transgressions. Additionally, the company may disassociate itself from responsible executives or delegitimated locations and brands (Suchman, 1995, pp. 597-599).

2.3. Attribution Theory

Attributions can be defined as "*per-ceptions* [sic] *of causality, or the perceived reasons for a particular event's occurrence*" (Weiner, 1989, p. 280).

The basic assumption of attribution theories is that people try to find explanations for events by making attributions with respect to the causes of these events (Coombs, 1995, p. 448). This happens especially when such events are sudden and negative. Therefore, crises are typical examples for events that evoke attributions (Coombs, 2004, p. 267 & 2007a, p. 136).

Attribution theory helps to understand the connection between a certain crisis situation and the choice of a communication strategy because, depending on the crisis type, stakeholders' attributions concerning crisis responsibility may vary (Coombs & Holladay, 1996, p. 281 ; Xu & Li, 2013, p. 372).

Attributions can roughly be classified into 3 different causal dimensions, namely locus, stability, and control.
The locus of control can either be internal or external, from the actor's point of view. Stability refers to the frequency or duration of the cause. Some causes are stable over time, while others happen infrequently. Controllability refers to the extent, to which an actor is able to control the cause (Coombs, 1995, pp. 448-449 ; Coombs & Holladay, 1996, p. 281 ; Weiner, 2000, pp. 4-5).

Since locus of control and personal controllability are quite similar in terms of intentionality, these two dimensions can also be treated as one. An internal locus, together with a high degree of control lead to perceptions of willful actions. An external locus, combined with events beyond the actor's control, on the other hand, create perceptions of undeliberate action (Coombs & Holladay, 1996, p. 282 ; Coombs, 2004, p. 268).

People's attributions along the causal dimensions influence their emotions and behaviors towards the actor. However, those attributions can be influenced by the messages the actor sends. The response can affect stakeholders' perceptions with regard to the causal dimensions. Additionally, the explanation

can manipulate the feelings that are created by the attributions (Coombs & Holladay, 1996, p. 282 ; Coombs, 2010, p. 37).

How the attribution of organizational responsibility is affected by the causal dimensions is somewhat predictable. An internal locus, together with a substantial degree of controllability, and a stable cause create the strongest ascriptions of responsibility. Summing this up, a crisis, which was triggered by intentional actions, that also were under the company's full control, together with a history of crises within this organization, constitutes the worst case scenario when it comes to attributions of responsibility. In contrast, external locus and controllability, together with an infrequent cause, suggesting the organization was not involved in past crises, lead to weak attributions of responsibility (Coombs & Holladay, 1996, p. 282 ; Coombs, 2004, p. 268).

Stronger attributions of responsibility go hand in hand with a negative assessment of the company involved, and produce negative feelings together with anger (Coombs, 2004, p. 267). That damages the organization's reputation and spoils future interactions with its stakeholders. This is where Situational Crisis Communication comes into play (Coombs & Holladay, 1996, p. 283).

2.4. Situational Crisis Communication Theory

Situational Crisis Communication Theory severs as the basis for the analysis conducted in this thesis. It is grounded in public relations and crisis communication, and builds on previous work done in these fields.
Together with the similar theory of image restoration, developed by Benoit (1995 & 1997), it is also the theoretical framework for most of the recent research performed in the area of crisis management and communication (Avery, et al., 2010).

2.4.1. Roots and Basic Assumptions

During the 1980s, research on crisis communication started to appear in the management literature (Coombs, 2007a, p. 136).

In his 1995 article "*Choosing the Right Words: The Development of Guidelines for the Selection of the "Appropriate" Crisis-Response Strategies*", Timothy Coombs identified a lack of research on the way organizations communicate to the public in the aftermath of a crisis situation.
This is an important topic, since crisis response communication influences the public's opinion about the crisis and its view on the organization. Depending on the type of crisis, different approaches may be required. Hence, Coombs developed guidelines for selecting proper crisis response strategies.
Attribution Theory is the basis for understanding this relationship between a certain crisis type and a matching crisis response (Coombs, 1995, p. 448).

Situational Crisis Communication Theory comprises 3 core elements, namely the crisis situation, the crisis response strategies, and a mechanism for aligning the former and the latter (Coombs, 2006, p. 243). This is illustrated in Figure 1.

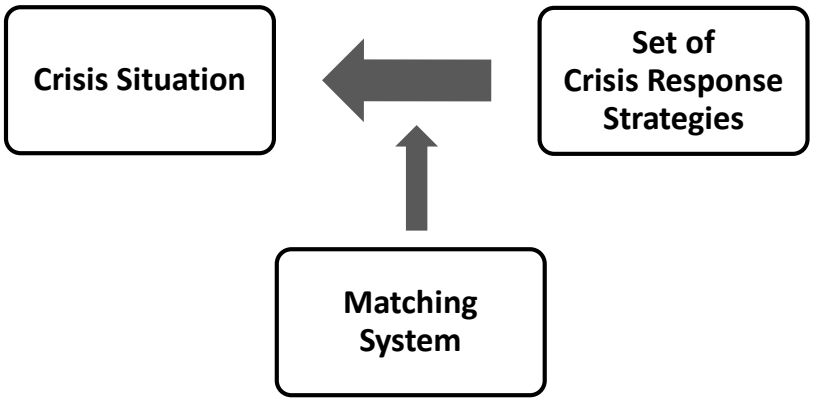

Figure 1: The 3 Core Elements of Situational Crisis Communication Theory

2.4.2. Crisis Types

To which extent an organization's reputation suffers, depends on the level of crisis responsibility and on further intensifying factors.

Crisis responsibility refers to the degree, to which the public beliefs the organization has caused the crisis. Crisis responsibility again comprises the 2 factors crisis type and the severity of the damage. Severity of damage is the scope of a crisis' impact, be it in a financial, physical, environmental or emotional way.

Building on previous crisis research, Coombs & Holladay (2002) identified several crisis types which differ with respect to their influence on the level of crisis responsibility. The different types of crises, together with their classification into 3 clusters are described in more detail on the following pages and in Table 1 on the next page.

Intensifying factors are the crisis history, i.e. whether the company had to deal with similar crisis cases in the past, and the relationship history, which means the quality of previous interactions between the organization and the stakeholders (Coombs, 2006, pp. 243-244).
Figure 2, based on Coombs & Holladay (2002, p. 181), and Coombs (2006, p. 245) summarizes the relationships of the concepts mentioned above.

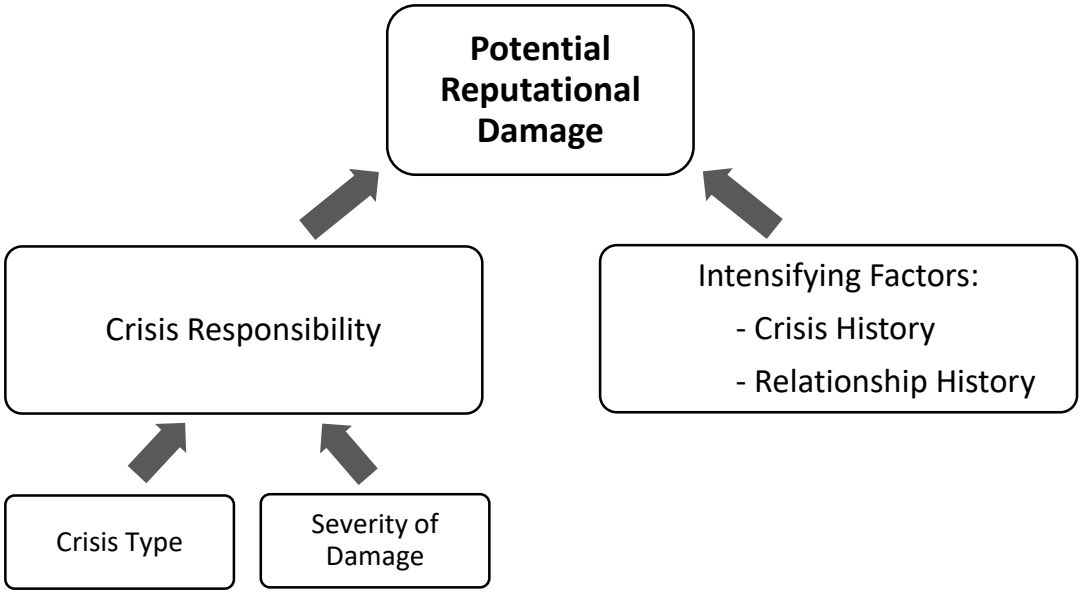

Figure 2: The Relationship between the Concepts

As already mentioned, a particular crisis can be classified into 3 different clusters, depending to which degree the organization is blamed for the events that triggered the crisis. The 3 clusters, developed by Coombs & Holladay (2002, p. 179) are the victim, the accidental, and the preventable cluster. These clusters contain several subtypes of crises, altogether 13.

Table 1 gives an overview of the 13 types of crises and their classification into the 3 clusters. Together with the subsequent descriptions, it is based on Coombs & Holladay (2002, pp. 170-171), and Coombs (2006, p. 244).

	Cluster Type	Crisis Type
Amount of Crisis Responsibility: *low*	**Victim Cluster**	Natural Disaster
		Rumor
		Workplace Violence
		Product Tampering/Malevolence
	Accidental Cluster	Challenge
		Technical Breakdown Accident
		Technical Breakdown Product Recall
		Megadamage
high	**Preventable Cluster**	Human Breakdown Accident
		Human Breakdown Product Recall
		Organizational Misdeed with no Injuries
		Organizational Misdeed Management Misconduct
		Organizational Misdeed with Injuries

Table 1: Crisis Clusters & Crisis Types

Within the victim cluster, all crises have in common that the organization had little or no influence on the cause and, together with the stakeholders, it is a victim of the crisis situation.

“Natural disasters” are force majeure events, like hurricanes and earthquakes, which affect an organization.

A “rumor” contains wrong and potentially harmful information about a company.

“Workplace violence” refers to a current or former colleague assaulting an organization’s employees on its premises.

“Product tampering” or “malevolence” is done by someone outside the company who manipulates the firm’s products.

The second type is the accidental cluster. The name refers to the fact that the company does not deliberately start the events which consequently lead to the crisis. Therefore, the attributed crisis responsibility is higher compared to the victim cluster but still at a moderate level.
A company is confronted with a “challenge” when certain stakeholders deem parts of the organization’s operations or product range inappropriate.
A “technical breakdown accident” is caused by technology or equipment malfunction.
If such a failure results in a product recall, the corresponding crisis type is termed “technical breakdown product recall”.
“Megadamage” comprises technical breakdown accidents with a substantial negative impact on the environment. This pollution is at the center of the public’s perception.

Crises in the preventable cluster are either caused by intentionally putting stakeholders at risk, by knowingly engaging in inappropriate or illegal activities or by human error which could have been avoided. Consequently, for crisis situations in this cluster, the perceived responsibility is the highest.
“Human breakdown accidents” are the result of human error. Although environmental damage may occur during such an industrial accident, the human error component is at the center of this crisis type.
As with technical breakdowns, human breakdown accidents may also consequently cause a product recall, which is the key element of the next crisis type, the “human breakdown product recall”.
“Organizational misdeeds with no injuries” refer to events, where the management actively deceives stakeholders but no physical harm is caused.
If the company breaks laws or violates regulations on purpose, it is called “organizational misdeed management misconduct”.
When an organization deliberately deceives and endangers stakeholders, and as a consequence, some of them are injured, this act is referred to as “organizational misdeed with injuries”.

According to Coombs (2002, p. 169), it is important for an organization to identify the correct crisis type in order to initially estimate the level of crisis responsibility its stakeholders are going to ascribe to the company. Afterwards, one should choose a corresponding crisis response strategy.
This is supported by the classification into clusters, as crises in the same cluster have certain similarities, also with respect to the amounts of crisis responsibility. Therefore, one general reaction plan can be applied, and if necessary adapted, to several crises within 1 cluster (Coombs, 2006, p. 243 & 2007b, p. 168).

2.4.3. Crisis Response Strategies

When an organization faces a crisis, it is very likely to become the center of extensive media coverage, as the crisis threatens the company's reputation and its financial performance.
Research has shown that there is a positive correlation between the emphasis, the media puts on a certain topic, and the importance the public ascribes to the issue. Furthermore, news coverage may not only reflect public's opinion but rather shape it. Ultimately, the news, rather than the actual negative event, propagate the crisis (Kleinnijenhuis, et al., 2015, p. 409 ; Samkin, et al., 2010, p. 28).

The aim of a crisis response strategy is to maximize reputational protection. Reputation can be described as the way an organization is perceived by the stakeholders (Coombs, 2006, p. 246). Further goals include preserving customers' purchasing intentions, and preventing negative word of mouth (Coombs & Holladay, 2002, p. 40).

In SCCT, the conceptual link between the reputational threat of a crisis and a crisis response strategy is the level of responsibility. Crisis responsibility is "[…] *the degree to which stakeholders blame the organization for the crisis event*" (Coombs, 1998, p. 180). In order to demonstrate responsibility, an organization must display accountability, and it has to explain its actions. The crisis response strategies are an organization's set of possible explanations. The responses vary with respect to the amount of responsibility, the company assumes. (Coombs, 2007b, p. 170).

The number and types of response strategies, as well as their classification, have experienced some changes and refinements over the years.
However, neither is it possible, nor necessary to develop a conclusive set of response strategies, as their amount also depends on the level of abstraction employed. Nonetheless, there are certain underlying similarities between the strategies by which they can be organized (Coombs, 1998, p. 179).

Initially, Coombs identified 5 strategies with altogether 15 substrategies. This original set of crisis response strategies was built on previous works in communication literature (Coombs, 1995, pp. 449-450).

In his 1998 article, Coombs suggested to structure a reduced number of 7 strategies along an accommodative-defensive continuum. Accommodative strategies involve accepting responsibility for the events and focus on image repair. Defensive strategies negate the problem or try to reject the responsibility (Coombs, 1998, pp. 180-181).

In 2006, Coombs rather categorized the crisis response strategies with respect to the amount of responsibility, an organization is willing to assume for the crisis situation. There are 3 categories, the “deny”, “diminish”, and “deal” response options. Within each category, there are several substrategies (Coombs, 2006, p. 248).

Later, Coombs added another layer, by splitting the crisis responses into primary and secondary strategies. Depending on the level of perceived accepted responsibility, primary crisis response strategies can again be split into 3 groups, namely “deny”, “diminish”, and “rebuild” strategies. Secondary crisis responses consist only of one type, so called “bolstering” crisis response strategies (Coombs, 2007b, p. 170).
On the accommodative-defensive continuum, deny strategies are the least accommodative, with rebuild strategies being the most accommodative, followed by diminish strategies (Coombs, 2009, p. 112).

In his 2015 article, Coombs stated that crisis response strategies are only one part of a more sophisticated toolset of crisis communication. Generally, there are 2 possible strategies for crisis communication. The first involves managing

information, which is collecting and spreading information on the crisis. The second strategy is about managing meaning. Crisis response strategies mostly belong to this category. It involves influencing the public's perception of the crisis and the company. Additionally, Coombs classified crisis reaction strategies on a broader level into 3 different categories. These are "instructing information", "adjusting information", and "reputation repair" (Coombs, 2015b, p. 142).

Instructing information is what stakeholder have to, and want to know, directly after a crisis situation occurs. It helps victims to protect themselves physically from additional negative consequences and prevents other stakeholders from becoming victims. Measures to achieve this goal could be evacuations or product warnings (Coombs, 2006, p. 246 & 2015b, p. 142).

Adjusting information refers to efforts such as expressions of sympathy, counseling or corrective action. These measures should support stakeholders in coping psychologically with the crisis, and reduce anger or anxiety (Coombs, 2015b, p. 142).

Under reputation repair, Coombs subsumes the company's actions that are aimed at reducing the negative impact of the crisis on the organization's reputation. Therefore, these activities are the crisis response strategies in a narrower sense, grouped into the 4 categories "denial", "reducing offensiveness", "bolstering", and "redress" (Coombs, 2015b, p. 142). These correspond to the previously established primary and secondary response strategies of "deny", "diminish", "bolstering", and "rebuild". Additionally, there are again the already established substrategies in each category (Coombs, 2007b, p. 170).

Table 2 gives an overview of the refinement of the set of crisis response strategies over time, together with their classifications. It is based on Coombs (1995, p. 450 & 1998, p. 181 & 2006, p. 248 & 2007b, p. 170 & 2015b, pp. 142-143).

Development over Time		Level of Aggregation *high*		*low*
	1995	Nonexistence Strategies	Denial Clarification Attack Intimidation	
		Distance Strategies	Excuse	Denial of Intention Denial of Volition
			Justification	Minimizing Injury Victim Deserving Misrepresentation of Crisis Event
		Ingratiation Strategies	Bolstering Transcendence Praising Others	
		Mortification Strategies	Remediation Repentance Rectification	
		Suffering Strategy		
	1998	Defensive ↓ Accommodative	Attack the Accuser Denial Excuse Justification Ingratiation Corrective Action Full Apology	
	2006	Deny Response Option	Attack the Accuser Denial Scapegoat	
		Diminish Response Option	Excuse Justification	
		Deal Response Option	Ingratiation Concern Compassion Regret Apology	
	2007	Primary Crisis Response Strategies	Deny Strategies	Attack the Accuser Denial Scapegoat
			Diminish Strategies	Excuse Justification
			Rebuild Strategies	Compensation Apology
		Secondary Crisis Response Strategies	Bolstering Strategies	Reminder Ingratiation Victimage
	2015	Instructing Information		
		Adjusting Information		
		Reputation Repair	Denial Reducing Offensiveness Bolstering Redress	

Table 2: Overview of Crisis Response Strategies

2.4.4. Matching Mechanism

The matching process is the mechanism, by which a proper crisis response strategy is chosen for a particular crisis situation. The choice heavily depends on the extent, to which the organization involved is perceived to be responsible for the crisis situation.

An organization is not directly responsible for any crisis type in the victim cluster. Therefore, Coombs suggests instructing information is a sufficient response. This concerns natural disasters, workplace violence, and product tampering/ malevolence. Only in case of rumors, when the company is confronted with false allegations, it is advised to rely on deny strategies, especially if the organization can prove there is no crisis (Coombs, 2006, p. 249).

Crisis types within the accidental cluster may happen as a consequence of ordinary organizational operations. Nonetheless, the public expects a company to be prepared for such events and properly cope with them. Therefore, accidents lead to higher levels of perceived crisis responsibility, compared to crises in the victim cluster. Since the threat is not too big, the people affected are still open for influences on attributions of crisis responsibility. Consequently, diminish responses are recommended (Coombs, 1995, p. 456 & 2006, p. 249).

Crisis types in the preventable cluster are the results of deliberate transgressions that put stakeholders at risk. As a consequence, attributions regarding crisis responsibility are strong, and the organization's reputation may be seriously damaged. Hence, the perpetrator would be well advised to use deal response strategies (Coombs, 1995, p. 457 & 2006, pp. 249-250).

Building on this, Coombs also developed crisis response strategy guidelines, which are explained in more detail below.

2.4.5. Crisis Response Guidance

"*The key to protecting the organizational reputation is to select the appropriate crisis response strategy(ies)* [sic]" (Coombs, 2009, p. 112). Therefore, SCCT offers some recommendations for deciding on an adequate response. The basic

assumption is, that the higher the reputational threat of a crisis, the more an organization should rely on accommodative strategies, which focus on victims and accepting responsibility. Rebuild, followed by diminish strategies have the highest degrees of accommodation. Still, this does not imply that rebuild strategies are always the preferred choice. On the one hand, research has shown that there is no additional reputational benefit for using a more accommodative strategy than necessary. This may even be detrimental, as it could lead stakeholders to become suspicious and believe the crisis situation is actually worse than they thought. On the other hand, there might be certain further constraints for the use of response strategies. Financial factors play an important role. Usually, the funds required increase, as responses become more accommodative. For example, an apology may encourage victims to go to court and demand payments.
However, if a company worries about such consequences, it may choose the next best strategy recommended (Coombs, 2007b, pp. 172-173 & 2009, pp. 112-113).

This is also supported by research showing that when it comes to protecting or rebuilding reputation, compared to apologies, similar results can be achieved with other accommodative and victim centered crisis responses, such as compensation or expressing sympathy (Coombs & Holladay, 2008).

Table 3 gives an overview of most of the crisis response recommendations. It is based on Coombs (2007b, p. 173 & 2009, p. 112). The subsequent descriptions in this subchapter too, unless otherwise stated.

Level of Crisis Responsibility	Crisis Cluster	Intensifying Factors?	Recommended Strategies
Any	All Types	Either	Instructing information for all (potential) victims
			Adjusting information for all victims & expressions of sympathy
Minimal	Victim	No	Instructing & adjusting information responses are sufficient
		Yes	Add diminish strategies to instructing & adjusting information
Low	Accidental	No	Add diminish strategies to instructing & adjusting information
		Yes	Add rebuild strategies to instructing & adjusting information
High	Preventable	Either	Add rebuild strategies to instructing & adjusting information

Table 3: Crisis Response Strategy Guidelines

Mainly, the choice depends on the amount of attributed crisis responsibility, hence the crisis type or cluster. Additionally, intensifying factors may be present. The company could have been connected to similar crises in the past or it may have a negative relationship reputation with the stakeholders. In such cases, the organization will experience greater reputational damager. Hence, more reputation restoration efforts are required (Coombs, 2006, p. 244 & 2015b, p. 144).

In any crisis case, all victims, even potential ones, should receive instructing information. Additionally, all victims should receive adjusting information together with an expression of sympathy.
Instructing and adjusting information can be enough for crises with minimal levels of perceived responsibility, no history of similar crises and a good relationship history.

Diminish strategies are suitable for crises with minimal or low levels of responsibility attributions. In case of minimal levels, there may be a history of previous crises and/or a negative relationship history. For low levels, this should not be the case. Under such circumstances, rebuild crisis response strategies are better.

Rebuild crisis strategies are also the recommended option for crises in the preventable cluster, with strong attributions of crisis responsibility, regardless of the presence of any intensifying factors.
Furthermore, deny strategies are recommended for rumor and challenge crisis types.

Additionally, bolstering strategies can be used to supplement any response. Especially victimage is suggested for cases of rumor, workplace violence, product tampering, and natural disasters.

All in all, it is also important to be consistent. Mixing deny strategies with diminish or rebuild strategies will result in a loss of credibility.

Moreover, from an institutional point of view, companies would be well advised to use crisis response strategies that are capable of rebuilding legitimacy (Coombs & Holladay, 1996, p. 281).

3. The Case

This section deals with Volkswagen and the surroundings of the emission scandal. It starts with an overview of the company, its history, and structure. Consequently, the car market situation, Volkswagen faces, is presented. Afterwards, some general background information on the topic of emissions is given. This is complemented by a description of emission standards. Subsequently, some reasons for the fraud, and events prior to the discovery, are discussed. Finally, the emission crisis itself is treated, and information on the affected models is provided.

3.1. Volkswagen

The Volkswagen Group is Europe's largest car manufacturer, and with annual sales of around 10 million vehicles also among the world's leading carmakers, together with Toyota and General Motors. Headquartered in Wolfsburg, Germany's biggest company (Chen, 2015) has a global presence, with 121 production sites in 20 European countries, and 11 more across Africa, the Americas, and Asia. Its automobiles are sold in 153 countries. Apart from incorporating 12 separate brands with altogether 337 different models, Volkswagen also owns a financial services provider.
In 2015, the group employed roughly 610,000 people and achieved approximately 213 billion euros in annual sales revenue. Earnings after tax were -1.4 billion euros, a consequence of negative special items of 16.9 billion euros, mostly due to the diesel scandal (Bay, 2013 ; Volkswagen AG 2016a & 2016b, p. 193 & 2016c).

This section intends to provide further information on Volkswagen AG, starting with the company's history. Consequently, the group's structure with regard to brands and ownership is explained.

3.1.1. History

Unless otherwise stated, the following historical overview is based on Volkswagen AG (2016d & 2016e & 2016f & 2016g & 2016h & 2016i & 2016j & 2016k).

The roots of Volkswagen go back to the foundation of the “Gesellschaft zur Vorbereitung des Deutschen Volkswagens mbH” (Company for the Preparation of the German Volkswagen Ltd.) on May 28th, 1937.

Already 3 years before, Ferdinand Porsche had been asked by the “Reichsverband der Deutschen Automobilindustrie” (Reich Association of the German Automobile Industry) to design a “Volkswagen” (people’s car).
A Volkswagen, at that time being a classification rather than a brand name, was considered a small engine, fuel-economic, small-sized car, which was inexpensive to buy and maintain, as well as cheap to produce. In the early 20th century, the Ford Motor Company pioneered in the production of such cars with its Model-T, which turned out to be a tremendous success.

However, initially the German counterpart suffered from financing problems due to limits in currency and raw material supply, as well as doubts concerning the envisaged sales price of below 1,000 Reichsmark.

Finally, the “Deutsche Arbeitsfront” (German Labor Front) stepped in to finance the Nazi prestige project. The Gesellschaft zur Vorbereitung des Deutschen Volkswagens mbH was established in 1937, and had its name changed to “Volkswagenwerk GmbH” (Volkswagen Factory Ltd.) in 1938.

Also in 1938, the Volkswagenwerk GmbH began to build its first factory in Lower Saxony, at the newly founded “Stadt des KdF-Wagens bei Fallersleben” (City of the KdF Car at Fallersleben), since 1945 known as Wolfsburg (Stadt Wolfsburg, 2016).
In terms of size, production equipment and design, the plant was copying Ford Motor Company’s River Rouge site. However, due to a lack of material and labor, together with the beginning of the Second World War, the first cars were only finished in 1940.

During the Second World War, production was switched from passenger cars to military vehicles, and heavily relied on forced labor consisting of citizens form occupied countries, concentration camp inmates, and prisoners of war.

In 1945, the company was sued for collecting installment pays for its first car, the KdF-Wagen, from 1938 on, without ever delivering any of the vehicles ordered. A settlement was only reached in 1961, making it the longest civil law suit in the history of the Federal Republic of Germany.

After the Second World War, the British military government became the company's trustee. By the end of 1945, production had been resumed with the model formerly known as KdF-Wagen, now simply called Volkswagen, or informally Volkswagen Beetle. However, the production was suffering under a short supply of raw materials and workers. Moreover, prior to or during the war, Volkswagen had no chance to build up a distribution and service network. This issue was addressed in 1946 and 1947, respectively. Additionally, the British administration decided to enter foreign markets. In 1949, already more than 7,000 vehicles were exported into European countries. This equaled around 15 per cent of Volkswagen's total output.

In October 1949, the company was handed over to the State of Lower Saxony and the federal German government.
During the 1950s, the company continued to grow, also thanks to internationalization. The first foreign production was established in Brazil in 1953. In the home market, the Beetle gained a market share of around 40 per cent. The Transporter, introduced in 1950, had a market share of around 30 per cent among station wagons and delivery vehicles.
However, for many Germans, the Beetle was still unaffordable. Only in 1957, the number of newly registered cars exceeded the figure for motorcycles for the first time. Therefore, the company had to compensate the limited home market demand with export activities, mainly to developing economies, European countries, and the United States. In order to reach the required volumes, the Beetle production was restructured into an automated mass production system in 1954.

In 1960, Volkswagenwerk GmbH was partially privatized by transforming it into Volkswagenwerk AG. The West German parliament passed a law, stipulating that 40 per cent of the company's stock was to be split equally between the previous administrators, namely the federal government and the State of Lower Saxony. The majority of 60 per cent was to be sold as people's shares in order to avoid concentrated ownership.

During the early 1960s, the company's success continued and Volkswagen became one of the dominant manufacturers. However, competition was growing, especially in important European markets, where American companies started to offer larger vehicles. As a consequence, Volkswagen was looking for partners to strengthen its position. In 1964, a 75.3 per cent stake in the Daimler-Benz subsidiary Auto Union GmbH was acquired and the production of the Audi 72 was launched.

In 1966 and 1967, Volkswagen experienced its first recession after the Second World War. With competitors offering more technologically advanced vehicles, sales of the Beetle dropped. The small, air-cooled rear engine car could not compete with modern water-cooled engine, front-wheel drive vehicles, which also offered more space for passengers and luggage.
The negative impact of this development was partly offset by Volkswagen's successful South American subsidiary. Additionally, the Audi NSU Auto Union AG, a company established through the merger of NSU Motorenwerke AG and Auto Union GmbH, and finally renamed to Audi AG in 1985, started to cover the more demanding market segment.
Nonetheless, Volkswagen was under the pressure of cutting costs and developing a successor to the Beetle.

The oil crisis in the early and mid-1970s, along with the consequent global recession, threatened Volkswagen's existence. Eventually, the VW Passat sedan, based on the Audi 80, together with the Beetle's successor, the VW Golf, launched in 1973 and 1974, respectively, led the company on its path to recovery.

As part of a new construction concept, and as a measure to increase profitability, Volkswagen gradually introduced a modular design, which allowed for using the same, standardized parts in different types of vehicles.

In order to defend its market share in the United States, Volkswagen opened its first US production site in Westmoreland in 1978. There, the VW Rabbit, the US-version of the Golf, was produced.
The company also expanded stronger into the commercial vehicle sector by cooperating with Maschinenfabrik Augsburg-Nürnberg (M.A.N.) AG, and acquiring Chrysler Corporation's Brazilian and Argentinean subsidiaries.

The second oil shock of 1979 and 1980, as well as increased competition from Japanese manufacturers put the company under pressure again. Volkswagen reacted with flexible production techniques, and continued its international expansion.
In 1982, a licensing agreement for the Japanese market was reached with Nissan.
3 years later, in 1985, the company established a joint venture in China, which consequently made Volkswagen market leader in the People's Republic.
Additionally, in order to improve its market position in Spain, which was about to become part of the European Community, Volkswagen negotiated a cooperation agreement with the state owned carmaker SEAT. In 1986, SEAT was completely taken over by Volkswagen.

In 1985, the company changed its name from Volkswagenwerk AG to Volkswagen AG. In the same year, Volkswagen reached the position as market leader in Europe for the first time.
The collapse of communism in Eastern Europe offered further growth potentials. After the wall had fallen in 1989, Volkswagen started to invest heavily in production sites in the former German Democratic Republic.
Additionally, in 1991, Volkswagen bought the Czechoslovakian automobile manufacturer ŠKODA, making it the fourth independent brand within the group, alongside VW, Audi, and SEAT.

As a result of the recession in the early 1990s, Volkswagen shifted its focus from the internationalization and volume production strategy of previous years to product diversity, and increased productivity. Lean production, with a lower manufacturing depth, stronger logistical bonds with suppliers, flat hierarchies, and team work were promoted. Decision-making competences were given to operative departments, and continuous improvement methods were adopted.

Due to its platform strategy, efficient plant structures could be established, and development, as well as manufacturing depth, were reduced. Additionally, the vehicle development process was changed from sequential to simultaneous engineering, in order to shorten project times and be more responsive to market changes.

Furthermore, a global sourcing procurement policy was introduced, and instead of purchasing individual parts, whole modules and components were delivered and installed by external suppliers. Ultimately, this put Volkswagen's in-house suppliers under pressure.

These restructuring measures soon turned into a success. Between 1994 and 1996, productivity was increased by almost 30 per cent. Production costs decreased due to shorter production times. The core production time of a VW Polo, for example, was only 15 hours, instead of the 24 hours it took before.

The improved sales and earnings situation encouraged Volkswagen to expand its brand range. In 1998, the 3 luxury carmakers Bentley, Bugatti, and Lamborghini were acquired.

During the early and mid-2000s, Volkswagen continued its efforts to cut costs. Additionally, in 2007, the new CEO, Martin Winterkorn, announced a growth strategy. By 2018, Volkswagen was to become the car manufacturer with the highest sales, and the most innovative volume brand.

In 2012, Porsche was finally added to the Volkswagen group's brand portfolio after several years of rivalry between the chairmen Wolfgang Porsche and Ferdinand Piëch, and a failed takeover attempt by Porsche (Bowler, 2015).

In the first half of 2015, Volkswagen overtook Toyota as the world's largest automobile producer in terms of car sales for the first time (BBC, 2015).

3.1.2. Group Structure & Brands

This subchapter contains information from Volkswagen AG (2015b & 2016a & 2016b, p. 58 & 2016l).

The Volkswagen Group, with Volkswagen AG as the parent company, is split in 2 main divisions, namely the Automotive Division and the Financial Services Division. The latter covers offers such as dealer and customer financing, leasing, fleet management, and direct banking, as well as insurance services. The Automotive Division contains the Passenger Cars Business Area, as well as the Commercial Vehicles and Power Engineering Business Area. The former comprises motorcycles, as well as the whole range of passenger cars, from small cars to luxury vehicles. The latter includes vehicles such as pick-ups, buses and heavy trucks but also chemical reactors, turbochargers, compressors, and large-bore diesel engines for marine and industrial applications.

Altogether, there are 12 brands which operate as independent market entities. Those brands are SEAT, ŠKODA, Volkswagen Passenger Cars, Audi, Porsche, Lamborghini, Bentley, Bugatti, Ducati, MAN, Scania, and Volkswagen Commercial Vehicles. All brands, except VW Passenger Cars and Commercial Vehicles, are also legally independent, separate organizations.

Table 4, based on Volkswagen AG (2016a), summarizes the group structure, and Table 5, based on Volkswagen AG (2015b & 2016b, p. 23) shows some key figures for the most relevant passenger car brands, as of business year 2015, with sales figures for 2014 in brackets.

Volkswagen AG		
Automotive Division		**Financial Services Division**
Passenger Cars	**Commercial Vehicles & Power Engineering**	**Volkswagen Financial Services**
SEAT	MAN	
ŠKODA	Scania	
VW Passenger Cars	VW Commercial Vehicles	
Audi		
Porsche		
Lamborghini		
Bentley		
Bugatti		
Ducati		

Table 4: Volkswagen Group Structure

Brand	**Headquarters**	**Founded in**	**Acquired in**	**Number of Employees**	**Vehicle Sales** in thousand	**Sales Revenue** in million €
SEAT	Martorell, Spain	1950	1986	14,445	544 (501)	8,572 (7,699)
ŠKODA	Mladá Boleslav, Czech Republic	1895	1991	26,646	800 (796)	12,486 (11,758)
VW	Wolfsburg, Germany	1937	-	218,792	4,424 (4,583)	106,240 (99,764)
Audi	Ingolstadt, Germany	1909	1965	84,435	1,529 (1,444)	58,420 (53,787)
Porsche	Stuttgart-Zuffenhausen Germany	1931	2012	24,249	219 (187)	21,533 (17,205)

Table 5: Volkswagen Key Figures

3.1.3. Ownership Structure

Volkswagen AG issues ordinary and preference shares. Unlike common shares, preferential ones do not include voting rights for the owners. However, as a compensation, they usually generate a higher dividend.

For VW AG's business year 2015, the dividend proposal is 11 euro cents per ordinary share, and 17 euro cents per preference share. For 2014, the dividend payout was substantially higher, with 4.80 and 4.86 euros, respectively. The

preference shares are listed in the DAX, the “Deutscher Aktienindex” (German Stock Index).
By the end of 2015, the number of outstanding shares was split into 206,205,445 preferred shares, and 295,089,818 ordinary shares (Hank & Meck, 2015 ; Kokologiannis, 2015 ; Volkswagen AG 2016b, p. 103 & 2016c & 2016m).

Figure 3 shows the shareholder structure as a percentage of the subscribed capital for the end of the year 2015. Figure 4 represents the distribution of voting rights for the ordinary shares. Both figures are based on Volkswagen AG (2016b, p. 103 & 2016m).

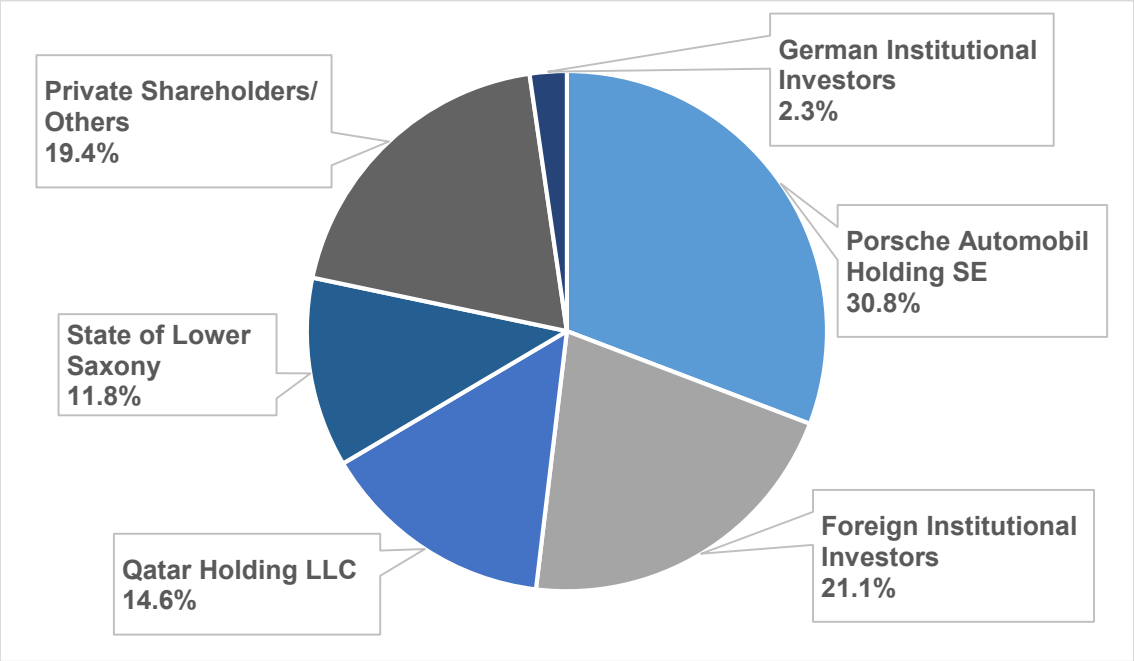

Figure 3: Shareholder Structure of Subscribed Capital

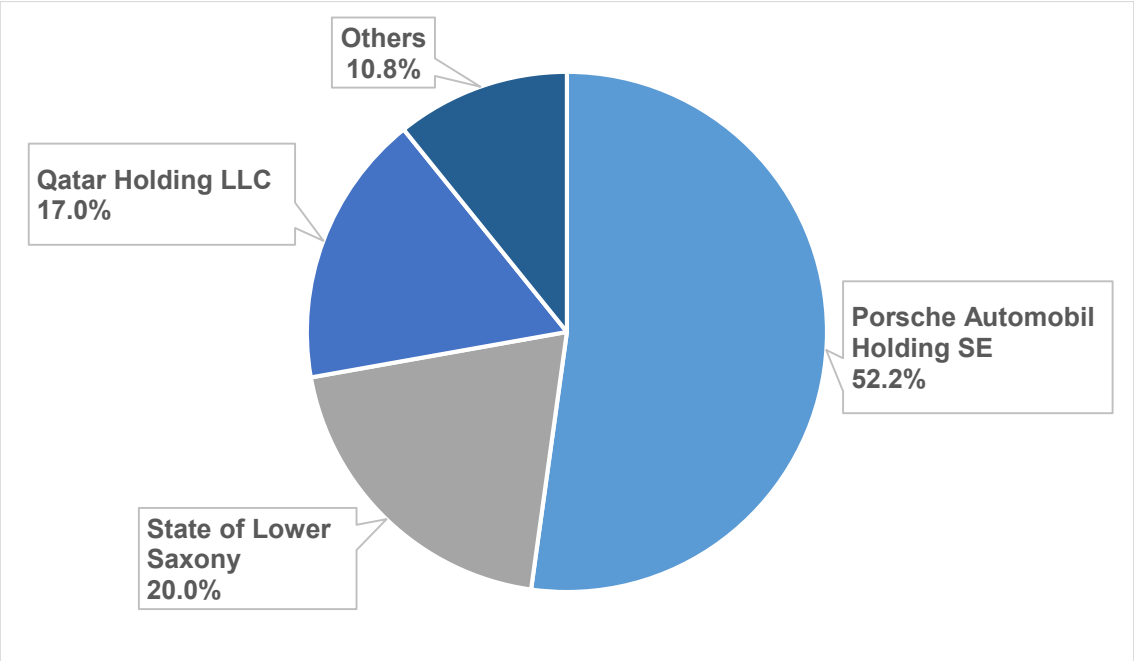

Figure 4: Distribution of Voting Rights for Ordinary Shares

As can be seen, there is a considerable ownership concentration, especially concerning the common stocks. Porsche Automobil Holding SE is the most significant shareholder. This holding company is owned by the Porsche and Piëch families (Hank & Meck, 2015). Another important owner is the State of Lower Saxony. Its 20 per cent stake guarantees a blocking minority (Bohne, 2013). The third major shareholder is Qatar Holding, a wholly-owned subsidiary of Qatar Investment Authority, the sovereign wealth fund of the State of Qatar. After initially acquiring a stake in Porsche in 2009, it later expanded its ownership to the Volkswagen Group (Critchlow & Ficenec, 2015 ; Qatar Investment Authority, 2016).

3.2. Car Market

This section gives a brief overview of the pre-crisis situation for Volkswagen in the European Union and the United States, with respect to market size, market share, and fuel technology.

For the Volkswagen Group, China is the most important market. It accounts for approximately 40 per cent of passenger car deliveries. Europe ranks second, with

almost 35 per cent. Around 6 per cent of sales can be attributed to the United States (Volkswagen AG, 2016b, p. 97).

3.2.1. EU

In 2014, there were approximately 12.5 million new registrations for passenger cars in the European Union. Germany was the largest market with a 24 per cent share (International Council on Clean Transportation, 2015a, pp. 14-15).

The VW core brand, being the most-registered of all manufacturers' brands, accounted for 12 per cent of the European Union's market.
Among the 10 best-selling passenger car models, 4 were from the Volkswagen Group. The VW Golf was the most popular model, with a market share of 4 per cent. The VW Polo ranked fourth, followed by the ŠKODA Octavia, and the Audi A3 on ranks 8 and 9, respectively (International Council on Clean Transportation, 2015a, pp. 14 & 20-21).
Generally, in Western Europe, every fourth new car is from a VW AG brand (Volkswagen AG, 2015c, p. 4).

In 2014, 6.6 million out of the 12.5 million, hence 53 per cent, of the newly registered passenger cars in the EU were powered by diesel engines. Compared to the other major car markets such as the USA and China, this is an extraordinarily high number (International Council on Clean Transportation, 2015a, p. 6).

3.2.2. USA

The USA are the world's second biggest car market, right after China (International Council on Clean Transportation, 2016 ; Plungis & Hull, 2015).

In the United States, VW has a market share of around 2 per cent, while the whole Volkswagen Group reaches a share of 3.5 per cent (Schröder & Schimansky, 2016 ; The Economist, 2015a).

In 2014, Volkswagen Group's top-selling car model was the VW Jetta. By gaining a market share of below 1 per cent, it only ranked 26th in the list of best-selling

models. With rank 54, the Passat was VW's second most successful model (Cain, 2015).

In the USA, gasoline-powered vehicles dominate the market. With a share of 3 per cent, even alternative fuel cars, such as hybrid, natural gas, or battery electric vehicles, are more common than diesel-powered cars.
Of the 16.4 million passenger cars sold in 2014, only 138,000, equaling 0.84 per cent, had diesel engines. VW managed to seize half of that market (The Economist, 2015b ; Yang, et al., 2015, pp. 3-4).

3.3. Emissions

Emissions is a collective name for undesired particles and gases that are transferred into the air.
Main sources are energy, manufacturing, and construction industries, as well as traffic and agriculture (Umweltbundesamt, 2016a).
Among the most important pollutants emitted by internal combustion engines are carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NO_x), unburned hydrocarbons (HC), and further particulate matter (PM).

Diesel, as well as gasoline fuels, contain hydrocarbons. In an optimal engine, the oxygen of the air would react with all the hydrogen atoms of the hydrocarbons to form water. In the same way, all the carbon and the oxygen would convert to carbon dioxide. However, this optimum is not reached in reality. Consequently, not all the fuel is burnt, and the nitrogen in the air is also involved in the chemical process. Therefore, the problematic substances mentioned before are also created and emitted (Sharaf, 2013, p. 947).

For triggering the Volkswagen diesel scandal, NO_x played the most prominent role. Later, CO_2 emissions became a smaller issue too. Therefore, a more detailed description of these 2 substances' relevance follows. Then, Volkswagen's approach for reducing NO_x emissions is presented.

3.3.1. NO_x

The following information on nitrogen oxides is based on Clean Air Technology Center (1999), Environmental Protection Agency (2016a), Li, et al. (2016), Madrigano, et al. (2013), Manufacturers of Emission Controls Association (2007, pp. 4-5), Oldenkamp, et al. (2016), Sharaf (2013, p. 948), Umweltbundesamt (2016b), and World Health Organization (2006, pp. 9-10).

In an internal combustion engine, due to high temperature and pressure, nitrogen and oxygen atoms form different types of nitrogen oxides, summarized under the collective term NO_x.

Nitrogen oxide emissions are especially responsible for a certain type of particulate matter, namely $PM_{2.5.}$ It is comprised of particles with a diameter of less than 2.5 micrometers, which is comparable to the size of bacteria.
This type of pollution is particularly dangerous, as, when inhaled, the small particles can get deep down into the lungs, reach the alveoli, and consequently enter the bloodstream. Therefore, particulate matter is connected to a wide range of respiratory and cardiovascular diseases, such as bronchitis, lung cancer, chronic obstructive pulmonary disease (COPD), and myocardial infarction.
Additionally, NO_x also contribute to the formation of tropospheric ozone and can cause acid rain.

The problems are aggravated by the fact that $PM_{2.5}$ can stay in the atmosphere for several weeks, during which the particulates can travel distances of up to 1,000 kilometers.

3.3.2. CO_2

The information on carbon dioxide, provided in this subchapter, is based on Herring (2013), International Energy Agency (2015, pp. 5-7), Kennedy (2016), Schmalensee, et al. (1998, p. 15), Sharaf (2013, p. 948), and Wittich (2015).

The CO_2 emission level of a vehicle with an internal combustion engine is directly related to its fuel consumption. 1 liter diesel fuel is transformed into approximately 2.65 kilograms carbon dioxide.

Under normal conditions, carbon dioxide is not a direct threat to human health. However, among other gases such as methane and nitrous oxide for example, it is a greenhouse gas. These gases contribute to global warming by absorbing warmth from the atmosphere, and radiating it back to the surface of the earth.

Due to its rate of increase, CO_2 has more influence on global warming than all the other greenhouse gases combined. Every day, more than 70 million tons of CO_2 are released into the atmosphere. Over the last 200 years, the amount of CO_2 in the atmosphere has increased by more than 40 per cent to around 400 parts per million (ppm). The highest share of these human caused carbon dioxide emissions can be attributed to the burning of fossil fuels. Road transportation, in particular, is responsible for around 17 per cent of the CO_2 emissions.

3.3.3. VW's Solution

This section briefly explains the challenges in emission reduction, together with 2 of the systems Volkswagen has in use. It is based on Gates, et al. (2016), Gomaa, et al. (2010), Handelsblatt (2016b), Manufacturers of Emission Controls Association (2007, pp. 2-3 & 23-34), Sharaf (2013, pp. 956-957), Vieweg (2015), and Zentner, et al. (2014, pp. 1230-1232).

Diesel engines are popular due to their higher efficiency, durability, and better fuel economy. However, the lean combustion in this type of engine prevents the use of three-way catalysts, which are common in gasoline engines to reduce NO_x emissions.

For diesel engines, there is a trade-off between CO_2 and NO_x emissions because the nitrogen oxides created during combustion require exhaust-gas after-treatment procedures, which in turn increase the amount of carbon dioxide emitted. Therefore, the challenge is to achieve minimal CO_2 emissions, without exceeding the regulatory NO_x thresholds.

For reducing nitrogen oxide emissions of diesel engines, depending on the type of engine, Volkswagen, among other manufacturers, basically has 2 different technologies in place. The particles are either trapped or they are treated with

urea. The former system is called “lean NO_x trap” (LNT), the latter one “selective catalytic reduction” (SCR).

The catalyst in the LNT-system has to regenerate from time to time, as the ability to bind further NO_x molecules decreases with the number of already absorbed ones. During the regeneration process, fuel is injected. However, this has a negative effect on the fuel consumption, and therefore on the CO_2 emissions of the car. The advantage of this method is the fact that no extra additives are needed during the process. LNTs can achieve a NO_x reduction of around 80 per cent.

The SCR-system works with urea, commonly known under its brand name AdBlue, as a reducing agent. It is injected into the exhaust stream and splits nitrogen oxides into water and nitrogen. There is no extra fuel needed in the process but disadvantages include added weight and costs, as well as the urea having to be replenished periodically, which might be seen as an inconvenience for customers. SCR can reduce NO_x emissions by up to 90 per cent.

3.4. Emission Standards & Tests

Due to the harmful effects of the previously mentioned substances on human health, air quality, and global warming, governments around the world are keen on regulating their emission (Sharaf, 2013, p. 947).
Therefore, in most places enforceable emission limits with respect to CO_2, CO, NO_x, PM, and total hydrocarbons (THC) are present. The compliance to these standards is usually tested during the vehicle type approval process via standardized test cycles on chassis dynamometers, where the exhaust emissions are measured.

However, to ensure that the results from various vehicles are comparable, the conditions of the test in the emissions laboratory differ from the real-world conditions on the road, which leads to deviations between measured and actual emissions (Franco, et al., 2014, p. 4).

The aim of this section is to give an overview of the standards and tests for diesel passenger cars in the EU and the USA.

3.4.1. EU

The European Union has regulated emission standards via several directives. The limits have been tightened continuously in several stages, from Euro 1 to Euro 6 (Geringer & Tober, 2010).

Table 6 shows a simplified version of the European Union's emission standards for passenger cars with diesel engines. It is based on Delphi (2015, p. 4&10), and Geringer & Tober (2010).

		Standard					
		Euro 1	**Euro 2**	**Euro 3**	**Euro 4**	**Euro 5**	**Euro 6**
Type Approval		July 1992	January 1996	January 2000	January 2005	September 2009	September 2014
First Registration		January 1993	January 1997	January 2001	January 2006	January 2010	September 2015
Pollutant in mg/km	**CO**	2,720	1,000	640	500	500	500
	HC + NO_x	970	700	560	300	230	170
	NO_x	-	-	500	250	180	80
	PM	140	80	50	25	5	5

Table 6: EU Emission Standards

As can be seen, especially the thresholds for nitrogen oxides and particulate matter have been lowered considerably over the last decade.

The Euro-standard does not regulate CO_2 emissions. Initially, in 1995, the EU planned to set a target limit of 120 g/km for passenger cars to be reached until 2005. However, when in 1998, car manufacturers offered to voluntarily decrease

average CO_2 emissions of their vehicles to 140 g/km until the year 2008, the EU refrained from further actions. In 2007, average carbon dioxide emissions were still at 160 g/km. Consequently, in 2009, the EU passed a regulation that limited the average fleet consumption to 130 g/km. For 2020, a threshold of 95 g/km is envisaged. For each gram above the limit, a fine has to be paid by the respective car manufacturer (Geringer & Tober, 2010 ; Umweltbundesamt, 2016c).

Compliance with the emission standards is assessed via the New European Driving Cycle (NEDC) since 1997. It is a standardized process, during which the car is mounted on a chassis dynamometer where the drive wheels turn rollers with a variable resistance. Exhaust emissions are then measured while mimicking driving statuses through a series of accelerations, decelerations, and constant speed driving. The test takes 20 minutes to complete and represents a distance of 11 kilometers. The top speed is 120 km/h, the average speed almost 34 km/h. The majority of the test is composed of 4 repetitions of urban drive cycles, with gentle accelerations, short periods of constant speed, and breaks to stationary. Afterwards, an acceleration to the maximum speed of 120 km/h is emulated (Delphi, 2015, p. 12 ; Gulde & Bloch, 2016 ; Transport and Environment, 2013, pp. 18-20).

The NEDC is criticized for not properly reflecting modern driving conditions. During the urban drive cycles for example, the maximum speed reached is 50 km/h, for which the car may take 26 seconds. Additionally, altogether the vehicle is stationary for 4 minutes during the whole test. Therefore, automatic engine start-stop systems substantially lower measured emissions. Furthermore, such accessories as air-conditioning, heated seats, navigation, and multimedia systems may be turned off, and the alternator may be disconnected, so that the battery discharges during the test procedure (Transport and Environment, 2013, pp. 5, 8, 20 & 22).

The testing is performed by certified organizations and overseen by type approval authorities. However, the testing organization is chosen and paid by the respective carmaker (McAleer, et al., 2015).

3.4.2. USA

Emission standards in the United States are established by the US Environmental Protection Agency on a federal basis. Its regulation authority is based on the Clean Air Act. In the State of California, there is another entity, the California Air Resources Board (CARB), which is part of the California EPA, and allowed to issue separate emission standards. Generally, those are more stringent than the federal ones. Only California is allowed to develop own emission regulations. However, other states may choose to adopt either the EPA or the CARB limits (Ecopoint, 2016a).

Due to different testing cycles, US and EU standards are not directly comparable. However, concerning NO_x emissions, the USA are by far stricter. Additionally, with respect to the current emission limits, there is no difference between diesel and gasoline engines (Umweltbundesamt, 2016d).

The EPA Tier 2 emission standard was phased in between 2004 and 2009. In comparison to the previous Tier 1 standard, emission limits were stricter and the separation in different vehicle weight classes was abandoned. Instead, there are several “bins”, from Bin 11 to 1, with Bin 1 equaling zero emissions. Bins 11 to 9 are only temporary, during the phase-in, as they contain the highest limits. Carmakers may choose any of the bins for certifying a new model, as long as a certain average for the whole light-duty vehicle fleet, especially with respect to NO_x, is not exceeded (Ecopoint, 2016b).

Table 7 contains an extract of the EPA Tier 2 emission standard. It is based on Blumberg & Posada (2015, p. 8), and Ecopoint (2016b).

		Bin					
		2	**3**	**4**	**5**	**6**	**7**
Pollutant in mg/km	**CO**	1,305	1,305	1,305	2,610	2,610	2,610
	NO_x	12	19	25	44	62	93
	PM	6	6	6	6	6	12

Table 7: EPA Tier 2 Emission Standard

The Californian equivalent to the EPA Tier 2 standard is CARB's Low Emission Vehicle Standard II (LEV II). It was phased in between 2004 and 2010. Until model year 2003, the first version, LEV, which has similar emission thresholds as the Tier 2 Bin 5 standard, was applicable (Ecopoint, 2016c).

CO_2 emissions are regulated in 2 separate standards, the first being the Corporate Average Fuel Economy Standard developed by the National Highway Traffic Safety Administration, and the other one being EPA's Greenhouse Gas Emission Standard. Compared to the EU CO_2 emission regulation, the US standard is more lenient.
Based on CO_2 emissions-footprint curves, for each vehicle a different emission target, with respect to its footprint value, is set. The footprint value corresponds to the size of the car. The larger the footprint, the higher the permitted carbon dioxide emissions. Consequently, depending on the type of vehicles produced, each manufacturer has their own fleet-wide standard (Ecopoint, 2016d ; Environmental Protection Agency, 2016b).

In the USA, emission tests are more thorough. All the tests combined take a longer time period to be completed. The cycles account for city and highway driving, as well as aggressive driving, and electrical consumers, such as air conditioning (Hotten, 2015b).

There is the basic Federal Test Procedure (FTP-75), which takes 20 minutes to complete. The average speed is roughly 34 km/h, the top speed around 91 km/h. It is composed of 3 segments, namely the cold start, stabilized, and hot start phase. They include several accelerations to around 50 km/h and decelerations

to stationary. The maximum speed of 91 km/h is reached in the cold and hot start phases. The FTP-75 has to be complemented with 2 Supplemental Federal Test Procedures (SFTP). The US06 SFTP aims at simulating high speed, aggressive driving behavior. This cycle takes 10 minutes to complete. An average speed of 88 km/h is reached, with the maximum speed being 130 km/h. The SC03 SFTP is a 10-minute test at an average speed of 35 km/h designed to mimic engine load and emissions while the air conditioning is running (Ecopoint, 2016e & 2016f & 2016g ; Global Fuel Economy Initiative, 2016).

The testing is done by the manufacturers themselves, with the results being reported to the EPA. In cases of suspicion, the EPA conducts its own tests. This happens for roughly 10 to 15 per cent of new models (Environmental Protection Agency, 2016c ; Hotten, 2015b ; McAleer, et al., 2015).

3.5. Events Leading to the Crisis

The regulatory environment in the EU had steered European carmakers towards focusing on the development, refinement, and promotion of the diesel engine. Apart from diesel fuel enjoying a tax advantage, its energy content is higher, which results in a lower per-kilometer fuel consumption, compared to gasoline. Not only customers profit from this, it also makes it easier for manufacturers to comply with the CO_2 fleet emission targets (Doll, 2012 ; Fisher, 2015 ; The Economist, 2016).

Volkswagen was striving to overtake Toyota and become the world's biggest carmaker. In order to achieve that, the company had to improve its position in the US market. Apart from increasing the production of Sports Utility Vehicles (SUVs), which are highly popular in the USA, in 2005, Volkswagen decided to use its traditional strength in the area of diesel cars to push sales (The Economist, 2015b ; Volkswagen AG, 2016b, p. 51).

Between 2006 and 2007, Volkswagen AG engaged in a cooperation with its rival Daimler AG, back then known as DaimlerChrysler AG, which also wanted to sell more diesel passenger cars in the USA. Volkswagen licensed from Daimler its BlueTEC brand. BlueTEC technology used a combination of SCR, together with

further NO_x-reducing systems, to comply with the stringent US emission standards. However, Volkswagen soon ended this collaboration, also because the company did not want to launch cars with the Mercedes-Benz BlueTEC label on them. Instead, the own TDI (Turbocharged Diesel Injection) label was to be used together with a less expensive system for exhaust gas treatment (Boston & Geiger, 2015 ; Green Car Congress, 2006 ; The Economist, 2016).

A new powertrain, featuring common-rail injection, with the advantage of more cost-efficient production, was already in development. Its introduction was accompanied by a big marketing campaign on the US market, during which the new vehicles' low emission levels were emphasized (Hotten, 2015a ; The Economist, 2015b ; Volkswagen AG, 2016b, p. 51).

In 2008, the VW Jetta TDI, with its advertised "Clean Diesel" technology, was the first non-hybrid, diesel-powered car to receive the "Green Car of the Year" award. It is a prize awarded at the Los Angeles Auto Show by the Green Car Journal for especially eco-friendly cars. One year later, the Audi A3 won (Groom, 2008 ; Smith & Parloff, 2016 ; Voelcker, 2009).

While other carmakers were unsuccessful, and instead tried to improve their gasoline engines or invested in alternative concepts, such as electric engines or hybrid drives to decrease pollutant emissions, the Volkswagen Group seemingly was the only manufacturer that managed to produce a small, affordable, efficient, low-emission diesel engine. However, as was revealed later, this was not possible without cheating (The Economist, 2016).

The uncovering of the emission fraud had its beginnings in 2013, initially with an investigation by the International Council on Clean Transportation (ICCT), in cooperation with researchers from the West Virginia University Center for Alternative Fuels, Engines and Emissions. Back then, the ICCT was wondering, why European cars released comparatively high levels of nitrogen oxides, while the same models sold in the United States did not seem to have problems meeting the stricter US emission standards. Consequently, they tested 3 different cars under real-world conditions. Among the vehicles under scrutiny, a VW Jetta and Passat, being compact and mid-size sedans respectively, as well as a BMW

X5 SUV, the Volkswagen models showed very high emission levels. Both were equipped with a 2.0-liter, 4-cylinder, turbocharged engine of the EA189 series. The Jetta, relying on LNT technology, scored particularly bad, with NO_x emissions almost reaching 40 times the standard. The emissions of the Passat with its SCR system were up to 20 times higher than expected. The BMW X5 showed no abnormal deviations (Blinda, 2015 ; Gates, et al., 2016 ; Jaffe, 2015 ; Kretchmer, 2015 ; Thompson, et al., 2014, pp. 9-10).

The findings were then handed over to the EPA and the CARB in May 2014. Volkswagen was also provided with a copy of the report. The company claimed a bug in the engine control system was responsible for the results, and promised to issue a software update in order to fix the problem. In December 2014, Volkswagen recalled almost 500,000 vehicles in the USA to perform the update. However, when CARB tested some of the updated vehicles in 2015, emissions were still too high. At the same time, US authorities were to decide on the approval of Volkswagen's 2016 models. It was made clear that the new models would not receive a permission until the issue was fixed (Blinda, 2015 ; Kretchmer, 2015).

3.6. Events During the Crisis

On September 18th, 2015, the Volkswagen emission fraud was publically revealed by the EPA and the CARB through a "Notice of Violation" of the Clean Air Act, which was sent to Volkswagen AG (California Air Resources Board, 2016 ; Environmental Protection Agency, 2015a & 2016d ; International Council on Clean Transportation, 2015b ; Tuttle, 2015).

Consequently, on September 20th, 2015, Volkswagen Group's CEO, Martin Winterkorn, had to admit irregularities concerning the company's diesel engines (Handelsblatt, 2016a).

It turned out that a substantial number of Volkswagen's cars were equipped with a so called defeat device. This software can detect a testing cycle, for example by registering that the wheels of the car are spinning but the steering wheel is not moving. Additionally, the fact that the testing procedure is standardized, in order

to make the results of different cars comparable, helps the software to recognize a pattern. Consequently, the car is switched into a low emission mode. On the road, however, it is deactivated again. This results in better torque and acceleration, and lower fuel consumption (Biermann & Polke-Majewski, 2015 ; Gates, et al., 2016 ; Jaffe, 2015).

While it is quite common for car manufacturers to align the engine control system to the emission test procedures, the use of a defeat device is prohibited, both, in the USA as well as in the EU. However, in its regulation, the EU has a few exemptions. Especially one exception leaves room for interpretation. Carmakers are allowed to use defeat devices in cases where it is necessary to protect the engine from damages or to guarantee safe operation of the car (European Parliament, 2007, p. 6 ; Stegmaier, et al., 2016a).

What ultimately triggered the VW debacle was not just the fact that nitrogen oxide levels were substantially above the limits. This may have resulted in a fine and some negative news. The extraordinary fact was the considerable deviation between the emission levels during lab tests and road tests, which ultimately suggested the use of a defeat device (Jaffe, 2015).

During the first days of the revelation, Volkswagen AG's share price plunged. The company lost almost 40 per cent of its value. Figure 5 shows this development for Volkswagen AG's preference stock traded at XETRA, the trading venue of the German Stock Exchange (Deutsche Börse, 2016a). It covers 2 weeks, from Monday, September 14th to Friday, September 25th, 2015. The allegations were revealed on Friday, September 18th, with Monday, September 21st being the first trading day after the weekend. Closing prices are denoted in euros and obtained from Deutsche Börse (2016b).

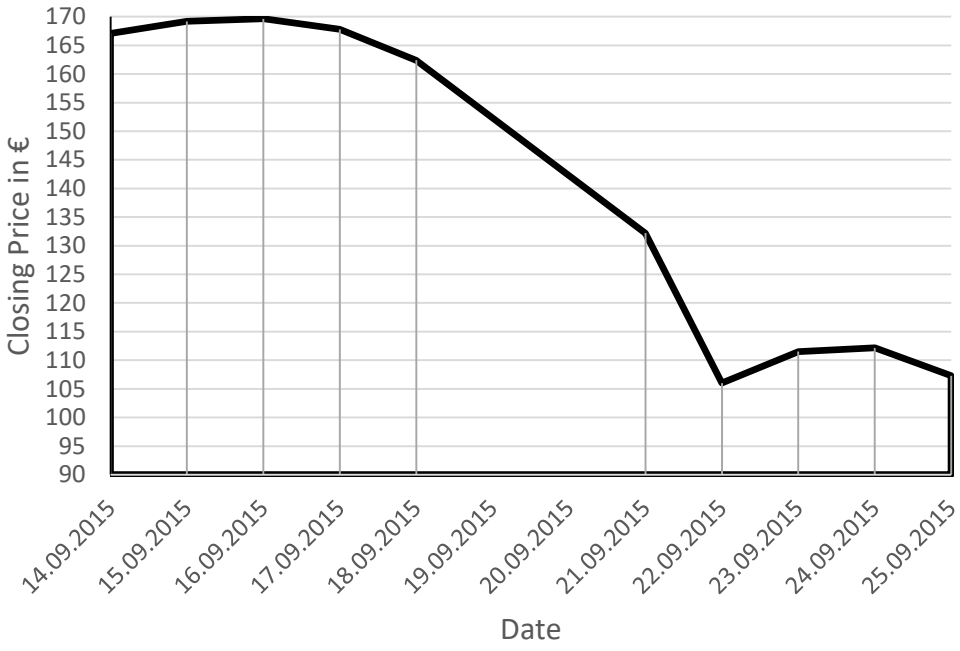

Figure 5: VW AG Share Price Reaction to EPA's Announcement

On September 23rd, 2015, having been Volkswagen Group's CEO since 2007, Martin Winterkorn resigned. He assumed full responsibility for the events but denied any personal wrong doings (Winterkorn, 2015b ; Zeit Online, 2015a).

2 days later, Matthias Müller, former CEO of Porsche, took over the helm by being appointed the new CEO of the whole group. He had been an employee of Volkswagen Group for almost 40 years. During his career, he has worked for several of the Volkswagen brands, and has also been a member of the board of management of VW AG, since March 2015.
Several other senior executives were also replaced. Volkswagen Group of America's CEO Michael Horn kept his position (Volkswagen AG, 2015d ; Zeit Online, 2015b).

Additionally, VW AG announced a restructuring plan, under which the USA, Mexico, and Canada markets were to be combined into one North America region (Volkswagen AG, 2015e).

At the end of September 2015, Volkswagen AG's supervisory board initiated an internal investigation of the events by law and audit firms. A final report is expected by the end of 2016 (Volkswagen AG, 2016n).

As a consequence of the revelations, various European and Asian countries started investigations into Volkswagen, as well as other manufacturers (Hotten, 2015a), and customers in the United States filed class actions against VW (Zeit Online, 2015a). Under the pressure of the US government, Volkswagen announced a recall for, and halted sales of the affected models in the United States (Spiegel Online, 2015a ; Zeit Online, 2015c). Additionally, for each recalled vehicle, the company could be fined $37,500 based on the Clean Air Act (Vlasic & Kessler, 2015).

In the EU, the recall of affected cars was ordered by the "Kraftfahrt-Bundesamt" (Federal Motor Transport Authority, KBA), after the KBA had approved Volkswagen's plan and timetable for resolving the issue in mid-October (Volkswagen AG, 2015f).

In late October 2015, Volkswagen reported its first quarterly loss in over 15 years due to initially setting aside 6.7 billion Euros for fixing the problem (Hotten, 2015a ; Oldenkamp, et al., 2016, pp. 121-122).

On November 2nd, 2015, EPA made further allegations. The agency announced that "Auxiliary Emission Control Devices", which the company had not disclosed during the type approval process, were also found in Audi's 3.0 liter V6 diesel engines. Apart from Audi, this mainly concerned luxury sports utility vehicles and sedans from the VW and Porsche brands (Boston, 2015 ; Environmental Protection Agency, 2015b ; Ruddick, 2015).

1 day later, VW announced that during its internal investigation on the diesel fraud, it also suspected irregularities concerning the determination of CO_2 levels for type approvals. During the certification process, carbon dioxide emission levels, and consequently fuel consumption, may have been set too low. 800,000 vehicles within the Volkswagen Group, approximately half of which being model year 2016 cars, were estimated to be affected. This equaled an economic risk of around 2 billion euros (Volkswagen AG, 2015a & 2015g).

On November 13th, Volkswagen reassured its customers that the company was in dialogue with the fiscal authorities of the affected countries. The correctly determined, thus higher, CO_2 emission levels would result in additional tax claims, which Volkswagen promised would directly be charged to the company (Volkswagen AG, 2015g).

However, in December, Volkswagen released a statement in which it made clear that the initial suspicion was not confirmed. Only 9 models, reflecting an annual production of roughly 36,000 vehicles, showed slightly higher figures with an increased consumption of not more than 0.2 liters per 100 kilometers.
Therefore, no modifications or recalls were necessary (Volkswagen AG, 2015h).

Concerning the NO_x issue, in late November 2015, Volkswagen proposed a solution for Europe. Vehicles with the 1.2- and 2.0-liter engine will receive a software update. The 1.6-liter version will also get an update. Additionally, a “flow rectifier” has to be installed. This device is a mesh that is installed in front of the air mass sensor with the purpose of eliminating air swirls. Thus, the accuracy of the measurement is improved, which in turn supports an optimal combustion process with reduced emissions.
The implementation of these measures should ensure that the respective cars comply with the applicable emission standards. According to Volkswagen, these changes have no effect on fuel economy, performance, and carbon dioxide or noise emissions (Volkswagen AG, 2015i & 2016o).

At the beginning of 2016, the United States sued Volkswagen AG for its violations of the Clean Air Act. In addition, EPA and CARB rejected a recall plan proposed by Volkswagen (Environmental Protection Agency, 2016e ; Zeit Online, 2016a).

In March 2016, Volkswagen Group of America CEO Michael Horn, who had led VW AG’s American branch through the crisis so far, resigned (Zeit Online, 2016b).

On April 21st, it was announced that Volkswagen had reached a basic agreement to settle the issue in the United States. The company agreed to either fix or buy back all the affected models sold to US customers. Although this was not the end of the crisis, and Volkswagen still faced criminal investigations and law suits, it

was considered a major milestone (Ewing, 2016a ; Mehrotra, et al., 2016 ; Sage & Shepardson, 2016 ; Schröder, 2016).

1 day later, Volkswagen reported its first annual loss since 1993. After an operating result of 12.7 billion euros in 2014, the company posted a loss of 4.1 billion euros for 2015. This is the result of provisions for the emission scandal amounting to 16.2 billion euros (Volkswagen AG, 2016b, p. 193 & 2016p).

Eventually, it turned out that the decision to employ special software to pass emission tests dated back to 2005/2006 (Domes & Gerhardt, 2016 ; Ewing, 2016b). Volkswagen claimed that under the time and budget constraints during the development of a new engine, employees in the powertrain development division decided to modify the engine software in order to meet the emission requirements (Volkswagen AG, 2016b, p. 51).
This may also be attributed to Volkswagen's organizational culture, in which there was little tolerance for failure (Milne, 2015 ; Smith & Parloff, 2016).
To which extent VW's top management had knowledge or was involved is still under investigation (Oberhuber, 2016).

The diesel scandal had a significant impact on the whole Volkswagen Group and its brands' reputation (boerse.ARD.de, 2016 ; finanzen.net, 2016 ; O'Boyle & Adkins, 2015 ; The Economist, 2015b). Additionally, the damage was not limited to the perpetrator. The crisis affected suppliers (ORF, 2016), as well as other car manufacturers (Breitinger, 2015 ; Wittich, 2016).

3.7. Affected Models

Due to Volkswagen Group's platform strategy, basically the same technology is used across different vehicle classes and brands. Therefore, a wide range of models, hence a significant number of cars, is involved in the fraud (Stegmaier, et al., 2016b).

At the center of the diesel scandal is an engine type referred to as EA189, where EA stands for "Entwicklungsauftrag" (development order). This new generation, common rail TDI engine was announced in summer 2007, as the world's cleanest

diesel. The first models equipped with it received type approval in 2008.
There are several versions of the EA189, with displacement ranging from 1.2 liters to 1.6 and 2.0 liters. The 1.2-liter model has 3 cylinders, the 2 larger ones are 4-cylinder engines (Biermann & Polke-Majewski, 2015 ; Breitinger, 2016 ; Domes & Gerhardt, 2016 ; Dowideit & Schnell, 2015).

Worldwide, roughly 11 million diesel cars of the whole Volkswagen Group, including the brands Audi, SEAT, ŠKODA, and VW, equipped with the EA189 engine, mainly the 4-cylinder versions, are affected. 8.5 million of those cars were sold in Europe, and almost 500,000 in the United States (Gnirke, et al., 2016). In the USA, Audi and VW brand cars with a production period from 2009 to 2015, certified to the EPA Tier 2 Bin 5 and CARB CA LEV II standards, are affected. In Europe, Volkswagen Group models between 2009 and 2014, certified to the Euro 5 standard, are involved (Dowideit & Schnell, 2015 ; Green Car Congress, 2015 ; Zeit Online, 2015c).

In Europe, Volkswagen claims, the successor, EA288, which is sold since 2012, is not affected, as it is able to comply with the Euro 5 emission standard without cheating. In the United States, however, the defeat device was also used with this engine generation due to the lower thresholds (Domes & Gerhardt, 2016 ; Spiegel Online, 2015b ; Volkswagen AG, 2015j).

Apart from the 3- and 4-cylinder engines, in the United States, over 100,000 cars of the Audi, Porsche, and VW brands, built between 2009 and 2016, and equipped with the 3.0-liter, 6-cylinder diesel engine are also affected (Environmental Protection Agency, 2015b ; Volkswagen AG, 2016b, p. 52).

Table 8, based on Environmental Protection Agency (2016d), Frankfurter Allgemeine Zeitung (2016), Lippl (2016), and ÖAMTC (2016) gives an overview of the affected models, equipped either with versions of the EA189 and/or the 3.0 V6. The table comprises a combination of models sold in the USA and the EU. Not all Audi and VW models are available in the USA (Audi of America, 2016 ; Volkswagen of America Inc., 2016), and the SEAT and ŠKODA brands are not present at all in this market (SEAT S.A., 2016, p. 108 ; ŠKODA AUTO a.s., 2016,

p. 22). Affected US models are marked with an asterisk (*).

Audi	Porsche	SEAT	ŠKODA	VW
A1	Cayenne*	Ibiza	Fabia	Polo
A3*		Leon	Rapid	Beetle*
A4		Toledo	Roomster	Golf*
A5		Exeo	Octavia	Jetta*
A6*		Altea	Superb	Eos
A7*		Alhambra	Yeti	Scirocco
A8*				Passat*
Q3				Touran
Q5*				Sharan
Q7*				Tiguan
TT				Touareg*
				Amarok
				Caddy
				Transporter

Table 8: Affected Car Models

As can be seen, a wide range of models, reaching from the VW Polo in the supermini segment up to the luxury-SUV Porsche Cayenne, are involved in the fraud.

4. Analysis

This section covers the analytical part. The aim of the thesis is to identify Volkswagen's crisis responses between September 2015 and April 2016, and evaluate the success by taking a look at the share price development. Therefore, the research questions to be answered are as follows:

Which SCCT response strategies did Volkswagen use?

Did the responses have a positive effect on the share price?

To answer the research questions, a two-step approach is chosen. At first, a content analysis is conducted to identify Volkswagen's crisis responses, and to classify them within the SCCT framework. Consequently, the share price on trading days connected to such responses is compared to trading days without SCCT reactions.

Before presenting the results, the following subchapter introduces the methodology.

4.1. Methodology

It is common for research building on Situational Crisis Communication Theory to rely on experiments with hypothetic crisis situations in order to analyze the effects of crisis communication efforts. However, there is a lack of analyses focusing on real world examples, and also taking further factors, such as share price development and news coverage into account (Kleinnijenhuis, et al., 2015, p. 409).

As one goal of the thesis is to incorporate these factors into the analysis, this section gives an overview of the applied methods and the data set. First, general information on the content analysis approach is given, together with specific information on the content analysis conducted as part of this thesis. Afterwards, the set of crisis response strategies used in the content analysis process is explained. Finally, it is set out, how the subsequent analyses were performed.

4.1.1. Content Analysis

Unless otherwise stated, the general information on content analysis provided in this subchapter is based on Hsieh & Shannon (2005), Krippendorff (2004, pp. 3-8, 15-21, 125-126, 211-220 & 313), and Mayring (2010).

Content analysis is a scientific tool for gaining insights into a particular phenomenon by systematically reading a text. More precisely, it is "[…] *a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use*" (Krippendorff, 2004, p. 18). Hence, being a research technique, content analysis follows certain procedures which are reliable and replicable. Moreover, the produced results should be valid.

This research method has a centuries-old tradition. Its modern roots go back to the early 20th century, were it was mostly used for quantitatively analyzing newspaper articles, for example by conducting word frequency analyses. Later, a qualitative approach, which focuses more on interpretative text analyses, hence the content and contextual meaning, was developed. This qualitative content analysis can be described as "[…] *a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns*" (Hsieh & Shannon, 2005, p. 1278).

However, it should be noted that the common differentiation between quantitative and qualitative content analysis is, to a certain extent, pointless. "*Ultimately, all reading of texts is qualitative, even when certain characteris-tics* [sic] *of a text are later converted into numbers*" (Krippendorff, 2004, p. 16).

For a meaningful content analysis, the quality of coding is crucial. Coding is the process of transcribing, categorizing or interpreting the content of a certain unit of analysis, in most cases a text, into a system, while taking into account specific reader-independent rules, in order to compare and analyze the findings.

With respect to the way of coding, qualitative content analysis approaches can further be split into 3 categories, namely conventional, summative, and directed analysis.

With the conventional approach, also referred to as inductive approach, coding categories are based on, and formulated out of the text data. This is suitable for investigating a phenomenon that has not appropriately been dealt with in existing theories or scientific literature.
Summative content analysis combines the counting and comparison of certain keywords with a subsequent interpretation of their context, and exploration of their usage.
Under the directed approach, also known as deductive approach, the codes are derived from a certain theory and then applied to the text. Ultimately, the aim is to validate or extend a theoretical framework.

The whole process of content analysis can be broken down into several steps. At the beginning, a research question has to be formulated, in order to direct the research. Then, a sample for performing the analysis has to be selected. Afterwards, the categories to be applied have to be developed. This is followed by establishing coding schemes, explaining the coding process, and training the people who perform the coding. Subsequently, after a pretest, the actual coding is done. Later, the results are checked. Finally, the results are analyzed to find an answer to the research question.
This is the general model for conducting a content analysis. However, depending on the actual approach, there may be certain variations.

As mentioned at the beginning of this subchapter, as with other research methods, a content analysis should fulfill certain quality criteria. 2 important criteria are reliability and validity.
Validity refers to the extent, to which the results produced by a certain procedure correspond to the real world events that were intended to measure. In other words, "*A measuring instrument is considered valid if it measures what its user claims it measures*" (Krippendorff, 2004, p. 313).
Concerning reliability, "[…] *a research procedure is reliable when it responds to the same phenomena in the same way regardless of the circumstances of its implementation*" (Krippendorff, 2004, p. 211).

Reliability can further be split into several types, with one being stability, also known as intra-coder reliability. This means, irrespective of how often the same

material is coded by the same person, the results should be rather congruent. The higher the degree of consistency, the better. This can be assessed via test-retest procedures, where, after some time has passed, the text is coded again by the same person.
Another type of reliability is reproducibility, also referred to as inter-coder reliability. It describes the degree of correspondence of the results between two coders. It can be assessed via test-test procedures, where 2 or more coders, using the same coding instructions, work separately on the same text.

Several approaches for measuring reliability, with a varying degree of sophistication, have been suggested in the literature. One of the simplest formulas, for example, is:

$$C.R. = \frac{2M}{N_1 + N_2} \quad (1)$$

Where $C.R.$ stands for the coder reliability of 2 coders, M represents the number of articles that were coded in the same way by the 2 persons, and N_1 and N_2 are the number of articles coded by each person. However, it should be noted that this easy approach does not account for random agreement between the coders (Holsti, 1969, p. 140).

In this thesis, the codes for the content analysis were derived from the set of crisis responses suggested by Situational Crisis Communication Theory, which are explained in detail in the next section. Hence, a directed approach to content analysis was used.

As the categories, together with their descriptions, were already established by SCCT, and the coding was performed by only 1 person, coding instructions were not explicitly formulated. For the same reason, no pretest was done either (Krippendorff, 2004, pp. 350-352).

For answering the first research question, and as a starting point for finding an answer to the second one, VW AG's crisis responses were identified via a content analysis on Volkswagen press releases. The company has created an extra "Information on Diesel- and CO_2-Issue" section for all crisis related releases on its media services homepage (www.volkswagen-media-services.com). Between

September 18th, 2015, the day VW's transgressions were made public, and April 21st, 2016, when a basic agreement with US authorities was reached, 52 articles, containing statements and personnel announcements, were released. Of those articles, 15 were identified to be relevant, i.e. they contained information on responses in terms of SCCT.

In addition, the digital versions of 2 newspapers were chosen, namely the US "The Wall Street Journal" (www.wsj.com), and the German "Handelsblatt" (www.handelsblatt.com). They are both daily business newspapers with a high circulation, and official stock exchange journals (Bundeszentrale für politische Bildung, 2016 ; Dow Jones, 2016 ; IQ Media Marketing, 2016 ; Stynes, 2014). Therefore, all relevant news releases should be covered, and available to the investors in a timely manner.

The articles in the 2 newspapers were used to establish a proper timeline of Volkswagen's responses, as for the subsequent analyses, the responses have to be linked to the correct trading days. Therefore, the 2 sources' websites were searched for articles containing the term "Volkswagen". The results were then filtered for articles that appeared the day before, the same day, and the day after VW had released news. Afterwards, articles containing the respective information were identified. The time of their publication was then used to assign them to a trading day.

Concerning the results, the issue of validity was addressed to a certain extent by relying on already elaborated, well tested categories, namely the different crisis response options provided by SCCT.
In order to check the reliability of the results of the content analysis, the articles were coded for a second time, after 5 days had passed. No deviations with respect to the identified crisis responses occurred. This corresponds to $C.R.$ = 1 in formula (1), if it is adapted for the measurement of intra-coder reliability. This high degree of correspondence may be attributable to the various response options being quite distinct due to their continuous refinement over the years (Coombs, 1998). Furthermore, the coding was performed by only 1 person, namely the author, who therefore was quite familiar with the topic and the categories.

4.1.2. Crisis Response Strategies Coding Scheme

For the coding process of the content analysis, Coombs' crisis response strategy set of 2007 was used. Altogether, it consists of 10 substrategies classified into 4 categories. Table 9 summarizes the strategies. It is based on Coombs (2007b, p. 170). The ensuing descriptions too, as well as on Coombs (2006, pp. 247-249).

Primary Crisis Response Strategies	DENY	Attack the Accuser
		Denial
		Scapegoat
	DIMINISH	Excuse
		Justification
	REBUILD	Compensation
		Apology
Secondary Crisis Response Strategies	BOLSTERING	Reminder
		Ingratiation
		Victimage

Table 9: 2007 Crisis Response Strategies

Deny crisis response strategies focus on disassociating the organization from the negative events.

By "attacking the accuser", the company retaliates and directly confronts those who make claims. The "denial" strategy involves assuring that there is no crisis situation. The company may also produce evidence to support the assertion. In case someone outside the organization is blamed for the disaster, the firm uses a "scapegoat" strategy.

Diminish response measures build on attribution theory. The company does admit a crisis occurred but tries to influence the attributions the public makes about responsibility.

An "excuse" strategy includes activities to play down the company's role in triggering the crisis. Either it is argued the company had no bad intentions, and it did not want to harm anyone or circumstances beyond the organization's control

are blamed. With “justification”, the perpetrator tries to convince the stakeholders, the crisis is not as severe and the damage not as great, as they might think.

Rebuild response options reflect the neo-institutional roots of SCCT. An organization’s environment expects it to comply with societal rules and norms and provides legitimacy. A crisis violates these expectations and threatens organizational legitimacy. Therefore, the respective company wants to rebuild this legitimacy by trying to influence the public’s view on the organization’s efforts to deal with the events and by trying to offset the negative consequences of the crisis.
A “compensation” strategy includes offering money or gifts to the victims of the crisis. An “apology” asks the stakeholders for pardon and demonstrates that the company takes full responsibility for the situation.

Bolstering crisis response strategies serve as secondary or supplementary measures. They are more focused on the organization, rather than the stakeholders.
“Reminder” strategies emphasize the company’s previous achievements and good work of the past. “Ingratiation” involves praising the stakeholders for their actions during the crisis situation, or their subsequent response. “Victimage” refers to the organization’s efforts to remind everyone that the company also suffers under the crisis.

4.1.3. Subsequent Analyses

Concerning the impact of the crisis responses, under the assumption of efficient markets, the respective event should have an immediate effect on the share price, as the current stock price represents the present value of the future cash flows, which are influenced by information on the company and its assets. Therefore, if new information with the potential of affecting future returns is revealed, markets, thus also security prices, will respond (Agrawal & Wagner, 1995, p. 57 ; Fama, et al., 1969 ; MacKinlay, 1997, p. 13).

Appendix A gives an overview of the daily closing prices, together with the respective daily returns, in the time window spanning from the first to the last

identified crisis response between September 2015 and January 2016. The returns, which were used for the subsequent analyses, were calculated on the basis of closing prices using the formula:

$$R_t = \frac{CP_t}{CP_{t-1}} - 1 \quad (2)$$

Where R_t stands for the daily return, CP_t denotes the closing price of the respective trading day, and CP_{t-1} is the closing price on the trading day before CP_t. The closing share prices, denoted in euros, were obtained from Deutsche Börse (2016b), and represent Volkswagen AG's preference stock "Volkswagen AG Vz., ISIN DE0007664039, WKN 766403" traded at XETRA.
Share prices of the preferred stock were used for the analysis due to the larger proportion of free float, in comparison with the common stock (Volkswagen AG, 2016b, p. 103 & 2016m). The quotes were taken from the German Stock Exchange's trading venue XETRA, as it is the reference market for German shares, covering over 90 per cent of all trading activities at German stock exchanges, and more than 60 per cent of all DAX-listed stocks traded in Europe (Deutsche Börse, 2016a & 2016c).

As a consequence of the results of the content analysis, the identified responses were analyzed in a bundle. For this purpose, all the trading days coinciding with at least a single type of crisis response in terms of SCCT were considered 1 group. All the other trading days between September 21st, 2015, the day of the first response, and January 11th, 2016, the day of the last response in the observed time window, formed the other group. Altogether, 77 trading days were involved. 12 of which were in the "response" group, the other 65 days were not linked to any SCCT responses.

In order to answer the second research question, using IBM SPSS Statistics 24, the "response" group and the "no response" group were compared with respect to daily returns. As, especially in the "response" group, the returns were not normally distributed, a Mann-Whitney U test (Mann & Whitney, 1947) was conducted. The corresponding null hypothesis assumes an identical distribution of returns in the 2 separate groups, which suggests there is no response-induced effect on the share price.

The histograms for the initial check on normal distribution, concerning the “no response” and the “response” groups are included in Appendix B.1 and B.2, respectively.

4.2. Results

Figure 6 depicts the timeline of the SCCT responses identified by the content analysis, and therefore also provides the answer to the first research question. More details on the articles and the results can be found in Appendix C.

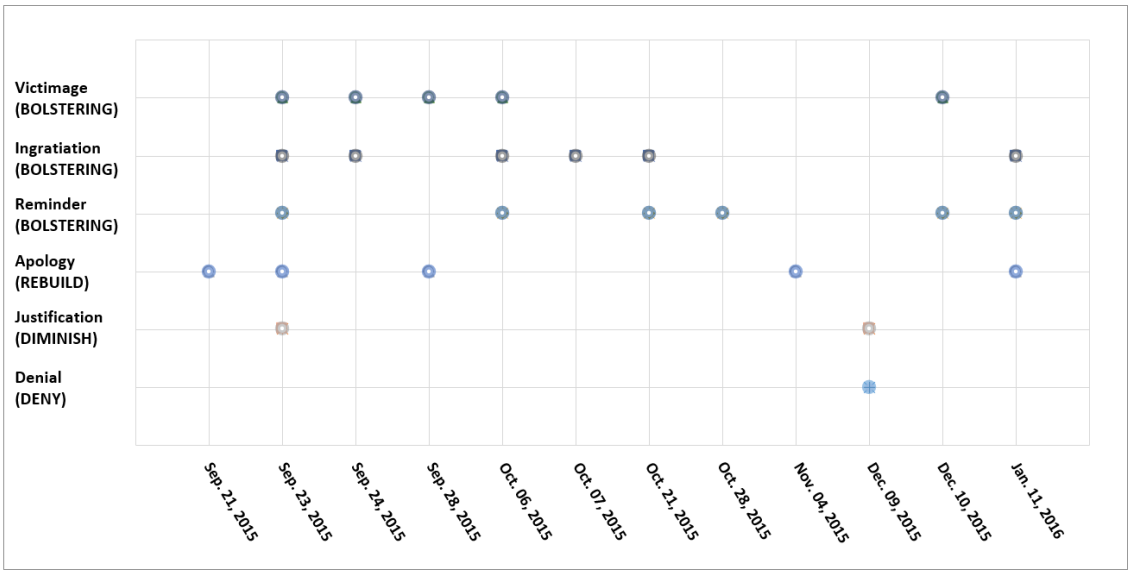

Figure 6: Timeline of VW's Responses

As can be seen, often there was more than 1 response type associated with a certain date, either because a press release contained several responses or because there was more than 1 article associated with a certain day.

Concerning the types of responses, all 3 primary response strategies, namely deny, diminish, and rebuild were used over the period examined. From the set of deny strategies, denial was employed. Justification, as a substrategy of the diminish strategy, was used as well. Apology, as a part of the rebuild strategies, was chosen too.

In addition, all 3 substrategies in the response set of bolstering, the secondary response strategy, were applied. Those are reminder, ingratiation, and victimage.

Bolstering strategies were deployed practically over the whole time horizon, in various supervisory or management board statements, and progress reports.
Explicit apologies were mainly made right after major negative events, more precisely by the CEO and the supervisory board after the NO_x emission fraud had been revealed in September, and by the new CEO after the CO_2 discrepancies had been discovered in November 2015. When Mr. Müller visited the USA in January 2016, he did also apologize for the wrongdoings.
Justification strategies were identified in September and December. In the former case, the company tried to limit the damage by claiming that only EA189 engines were affected. In the latter case, VW AG issued clarifications on the CO_2 issue.
Denial was used only once, also in the context of the carbon dioxide matter.

An initial comparison of the response dates with the share price development is shown in Table 10.

DENY	DIMINISH	REBUILD	BOLSTERING	R_t
		Sep. 21, 2015		-18.60%
	Sep. 23, 2015	Sep. 23, 2015	Sep. 23, 2015	5.19%
			Sep. 24, 2015	0.58%
		Sep. 28, 2015	Sep. 28, 2015	-7.46%
			Oct. 06, 2015	3.82%
			Oct. 07, 2015	7.12%
			Oct. 21, 2015	1.72%
			Oct. 28, 2015	3.99%
		Nov. 04, 2015		-9.50%
Dec. 09, 2015	Dec. 09, 2015			6.21%
			Dec. 10, 2015	1.14%
		Jan. 11, 2016	Jan. 11, 2016	1.69%

Table 10: Returns on Days with SCCT Responses

As can be seen, on 3 out of the 12 days connected to a SCCT response the share price experienced a decrease. For the other 9 days, the returns were positive.

The subsequent analysis of the returns on the 12 trading days within the “response” group, and the 65 days within the “no response” group, by applying the U test, yielded the results depicted in Figure 7, Table 11, and Table 12.

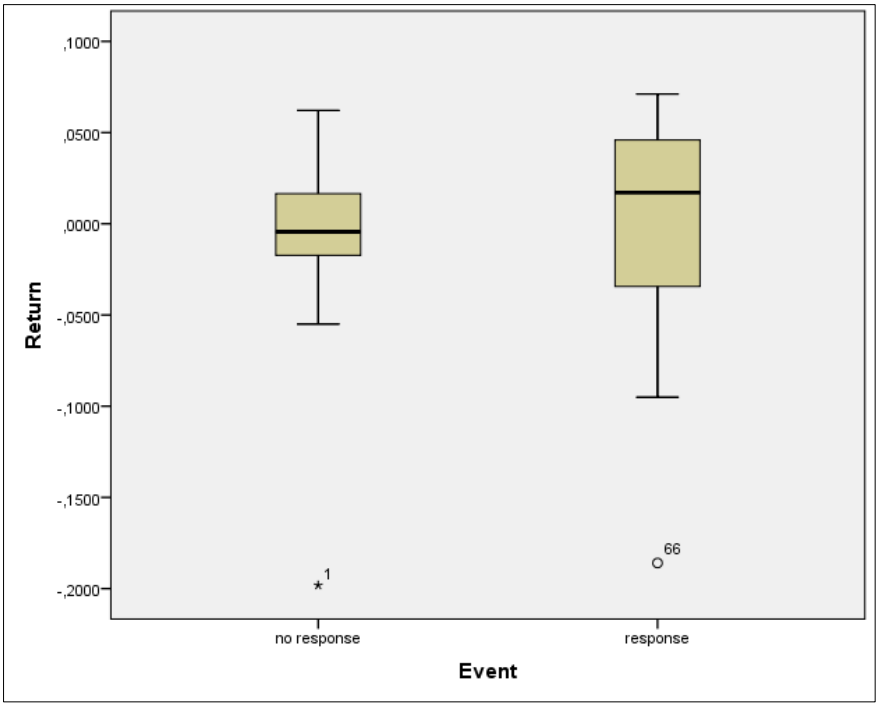

Figure 7: Boxplots of Returns per Group

As can be inferred from the boxplots, the median return in the “no response” group is marginally below, and in the “response” group slightly above 0. Both groups have a substantially negative outlier.

Ranks				
	Event	N	Mean Rank	Sum of Ranks
Return	no response	65	37.37	2429.00
	response	12	47.83	574.00
	Total	77		

Table 11: U Test Output - Ranks

Test Statistics[a]	
	Return
Mann-Whitney U	284.000
Wilcoxon W	2429.000
Z	-1.489
Asymp. Sig. (2-tailed)	.137
a. Grouping Variable: Event	

Table 12: U Test Output - Test Statistics

As shown in Table 11, the mean rank of 47.83 compared to 37.37 is higher in the “response” than in the “no response” group.

However, Table 12 demonstrates the corresponding one-tailed p-value of .0685 is above the significance level of .05, and therefore not significant. Consequently, the null hypothesis is failed to be rejected.

The returns in the “response” group are typically higher but the results do not support the assumption that the responses had a significantly positive effect on the share price.

5. Discussion

In this section, Volkswagen's reactions, the results of the content analysis and the subsequent test, as well as some limitations are discussed.

5.1. Findings

Within the SCCT framework, the Volkswagen diesel crisis can be classified into the preventable cluster. The company was neither a victim of events beyond its control, nor did the manipulation happen by accident.
As for the crisis type, it may be seen as an "organizational misdeed management misconduct" crisis. Alternatively, although no one was harmed or injured directly, taking the indirect, negative long-term effects of the extra emissions into account (Oldenkamp, et al., 2016), it may also be considered an "organizational misdeed with injuries" type of crisis.

Additionally, the severity of damage was considerable. Millions of vehicles, and consequently millions of people around the globe were affected. There was a substantial financial impact on the company itself but also on other firms in the industry. The environment and people's health were adversely affected, and stakeholders felt betrayed (Appel, 2015 ; Gnirke, et al., 2016 ; Henning & Varnholt, 2015 ; Oldenkamp, et al., 2016 ; Zeit Online, 2015d).

These 2 factors, the preventable cluster crisis type, together with the substantial severity of damage, are assumed to lead to a large degree of attributed crisis responsibility, which again results in a high potential reputational damage.
The absence of negative intensifying factors, namely crisis history and relationship history, may mitigate that to a certain extent. Although Volkswagen had several scandals in the past, they were not similar to the emission crisis and its cause (Handelsblatt, 2007). Additionally, Volkswagen traditionally had a good reputation and good relations with stakeholders (Peitsmeier, 2015 ; Tatje, 2016).

For crisis types within the preventable cluster, which come with a substantial amount of crisis responsibility attributions, Coombs (2007b, p. 173 & 2009, p.

112) suggests to use the highly accommodative rebuild strategies, accompanied by bolstering strategies, together with instructing and adjusting information, irrespective of the presence or absence of intensifying factors.

The results of the content analysis show that all in all, Volkswagen's reactions were in line with these SCCT guidelines. The company almost exclusively used rebuild and bolstering strategies, accompanied by instructing and adjusting information. Once, Volkswagen relied on denial, together with justification. Although a mixture of deny with diminish or rebuild strategies is not recommended, this response concerned a corrective statement on the CO_2 issue. Therefore, in this case the denial might be seen as justified and credible.

Nonetheless, the subsequent Mann-Whitney test indicated that the daily returns on trading days with SCCT responses do not significantly surpass the returns of days without such reactions. Therefore, within the observed time frame, the crisis responses had no significant positive effect on the share price.

As was shown in Table 10, on 75 per cent of the days linked to SCCT responses, there was an increase in the share price. The other quarter experienced a decrease. In all these negative cases, apology responses were involved. Twice, they were the only response, and once the apology was combined with the bolstering substrategy victimage. This seems surprising, as according to SCCT, apologies are highly accommodative, and should therefore be more successful. However, the dates of the 2 apologies, September 21st and November 4th, 2015 were also the trading days directly following the revelations concerning the NO_x and CO_2 issues, respectively. Therefore, it could be that any potential positive effects were offset by the effects of negative news on the crisis, especially in the case of September 21st, 2015.

In order to control for such strong negative effects during the initial phase of this substantial crisis situation, the U test was repeated with the same data set, with only the first week being excluded. However, with a one-tailed p-value of .0555 the result was not significant either. The corresponding SPSS outputs are shown in Appendix D.

5.2. Limitations

The extent and complexity of the examined case together with the scope of this thesis result in certain limitations. First of all, Volkswagen still has not completely overcome the crisis. Therefore, a final judgement on the company's overall success is not possible yet. However, as the crisis stretches over a longer time period, the examination was anyhow limited to a certain time window.

Furthermore, only Volkswagen's press released were searched. On the one hand, this, together with checking for Wall Street Journal and Handelsblatt articles should ensure that no company responses were overlooked, and that they were all covered by the news reports. On the other hand, these 3 sources only represent a small fraction of the total media coverage on the topic. As social media has become an important factor in corporate communication (Coombs & Holladay, 2014), Volkswagen's communication efforts on such platforms could, for instance, also have been included.

Another factor is that the research design did not take longer lasting effects into account. One or more responses at a certain date were only attributed to 1 day, either the exact same day or the next trading day. However, it may well be the case that events on days included in the "response" group continued to have an effect on days within the "no response" group, and vice versa.
However, as the investigated time period was characterized by a high concentration of good and bad news, considering all the potential effects together with their duration would have been problematic. Therefore, certain restrictions had to be imposed.

This also concerns the choice of the time window. The content analysis was performed on news between September 2015 and April 2016. The following analysis of responses and returns covered a period from September 2015 to January 2016, representing 77 trading days altogether, with 12 response days. Including more trading days with possibly more responses, hence increasing the number of observations in the "response" and "no response" group, could be useful.

With a larger data set, one could also continue to try to examine potential differences between certain types of response strategies and the effects of certain combinations of strategies. Due to the small data set, such an analysis was not conducted in this thesis. Therefore, it could be possible that such an isolation yields different results.

Besides, positive returns were used as a measure for success. However, the share price might not be an accurate gauge for reputation or SCCT responses, as the theory was partly derived from the results of experimental studies (Kleinnijenhuis, et al., 2015, p. 409).
Additionally, some of the news containing SCCT responses may have been deemed irrelevant by investors (Boudoukh, et al., 2013).

Apart from that, the choice of Situational Crisis Communication Theory as the main theory to examine Volkswagen's reactions was somewhat arbitrary, as there are also other contributions in the scientific literature, which could have been used, and might have identified different responses, or response days, and hence generated different results. In addition, the recommendations and guidelines laid out by SCCT (Kim & Sung, 2014), together with its assumptions about responsibility attributions (Schwarz, 2008) have also been subject to criticism.

Finally, for a comparison, better interpretation, and potential generalization of the findings, it would also be necessary to perform the same kinds of analyses on other companies, which experienced similar crisis situations.

6. Summary & Conclusion

The topic of this thesis was the crisis situation triggered by the revelation of Volkswagen Group's fraud concerning the emissions of diesel-powered cars. The focus was on a time period ranging from EPA's public disclosure of the transgressions in September 2015, to April 2016, when a first agreement with US authorities was reached. Volkswagens responses to the crisis during that time window were the center of analysis. In order to classify the company's reactions, Situational Crisis Communication Theory was used. Additionally, for assessing the effectiveness of the crisis responses, it was tested whether the responses had a positive effect on the company's share price.

These analyses were accompanied by background information on the theoretical framework, Volkswagen itself, the market and regulatory conditions the company faces, as well as the crisis situation and its triggers.

For the purpose of answering the first research question, namely which response strategies were used by Volkswagen, a content analysis was conducted on press releases. It turned out that over the investigation period, the company employed all types of strategies, with an emphasis on various bolstering strategies.

To answer the second research question, whether the identified reactions had a positive impact on the share price, 12 trading days, which were connected to responses, were examined. The results showed that in 9 out of those 12 days, the closing share price was above the price of the day before, and that the mean rank of the returns in the "response" group was higher than in the other group. However, with a p-value of .0685, the result is not statistically significant. Consequently, there is no sufficient reason to assume that the reactions in terms of Situational Crisis Communication Theory positively influence the price development.

Additionally, when observing the media, it seems despite Volkswagen's reactions being rather congruent to the SCCT approach, frequently the company is not perceived to be handling the crisis as a whole particularly well (Doll & Kamann, 2015 ; Hakim, 2016 ; Thomas, 2015). Therefore, instead of only monitoring

certain points in time, and short-term share price fluctuations, future research might take a long-term perspective, as soon as the crisis is completely overcome, to assess the events as a whole.

At the beginning of the year 2017, the company's share price still has not reached the pre-crisis level, as Volkswagen has not completely recovered yet. Some settlements were agreed upon (Shepardson, 2016) but plenty of law suits and compensation payments are still pending (Matussek, 2016).

Meanwhile, Volkswagen has communicated a new strategical agenda, with a focus on electromobility, connectivity, and digitalization (Volkswagen AG, 2016q & 2016r). VW AG's recent financial results and sales figures have been quite solid too (Volkswagen AG, 2016s & 2016t), and the company is optimistic about the future.

"*The diesel issue gave us a thorough shakeup, and we still need time to fully overcome it. But we have solid foundations on which to build as we now move forward to shape the future of the Volkswagen Group. Here, the recent crisis acts as a catalyst: Doors have opened at Volkswagen. There is far greater readiness for change*" (Müller, 2016).

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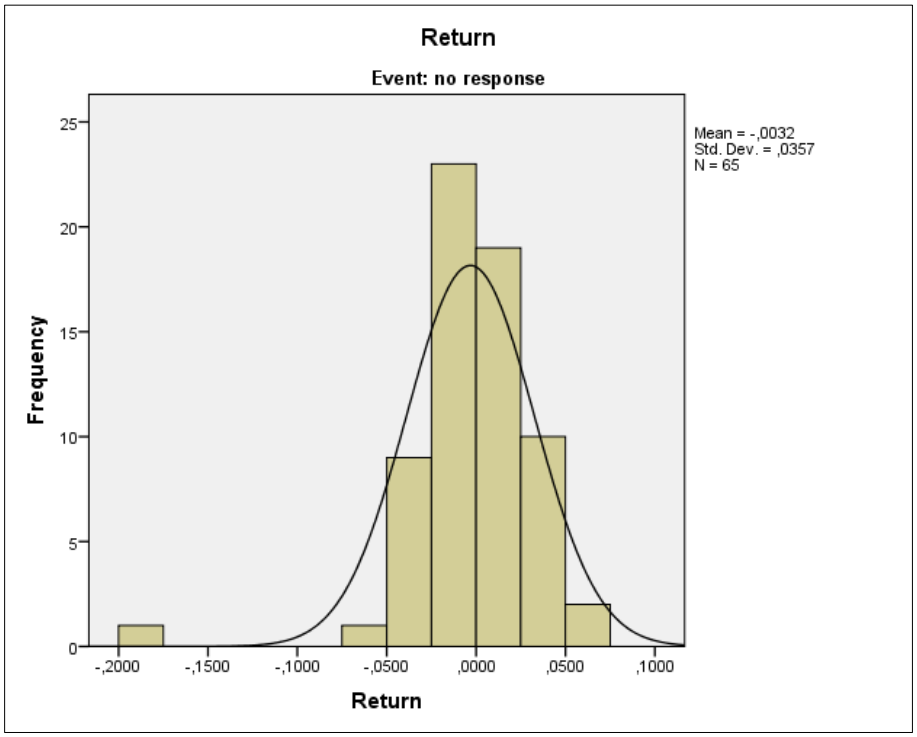
8. Appendix

Appendix A – Daily Closing Prices & Returns

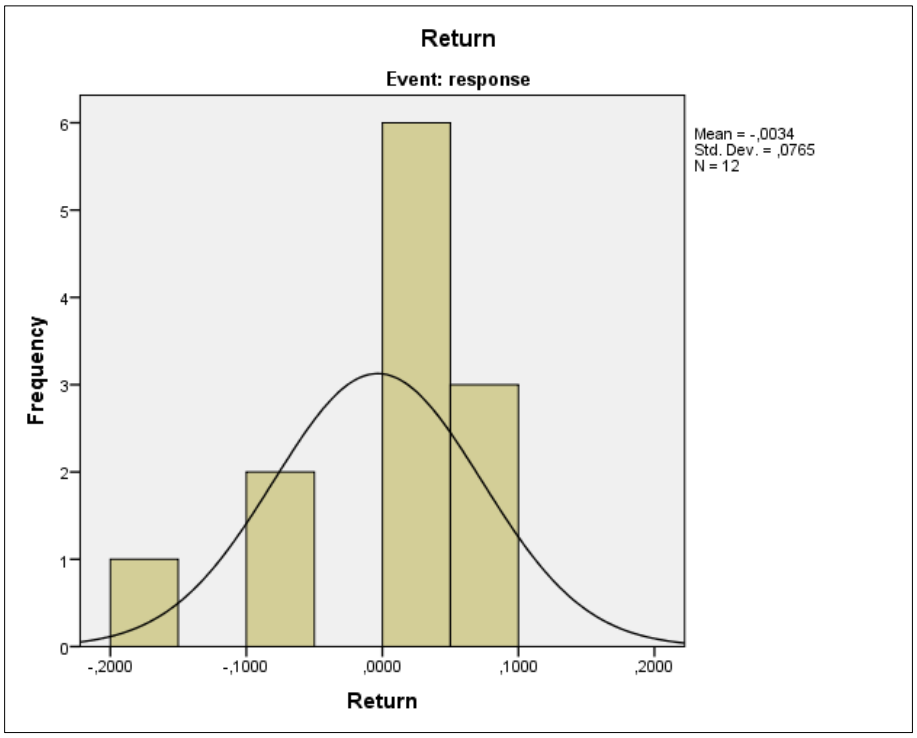
Date	CP	R	Date	CP	R
21.09.2015	132,2	-18,60%	13.11.2015	96,35	1,01%
22.09.2015	106	-19,82%	16.11.2015	97,46	1,15%
23.09.2015	111,5	5,19%	17.11.2015	98,64	1,21%
24.09.2015	112,15	0,58%	18.11.2015	101,4	2,80%
25.09.2015	107,3	-4,32%	19.11.2015	105,85	4,39%
28.09.2015	99,3	-7,46%	20.11.2015	108,45	2,46%
29.09.2015	95,2	-4,13%	23.11.2015	109,9	1,34%
30.09.2015	97,75	2,68%	24.11.2015	115,9	5,46%
01.10.2015	96,5	-1,28%	25.11.2015	120,35	3,84%
02.10.2015	92,36	-4,29%	26.11.2015	124,6	3,53%
05.10.2015	93,52	1,26%	27.11.2015	123,85	-0,60%
06.10.2015	97,09	3,82%	30.11.2015	131,55	6,22%
07.10.2015	104	7,12%	01.12.2015	130,15	-1,06%
08.10.2015	103,5	-0,48%	02.12.2015	126,95	-2,46%
09.10.2015	106,6	3,00%	03.12.2015	125,65	-1,02%
12.10.2015	108,55	1,83%	04.12.2015	126,9	0,99%
13.10.2015	106,3	-2,07%	07.12.2015	127,1	0,16%
14.10.2015	106,6	0,28%	08.12.2015	124,05	-2,40%
15.10.2015	102,8	-3,56%	09.12.2015	131,75	6,21%
16.10.2015	100,6	-2,14%	10.12.2015	133,25	1,14%
19.10.2015	99,19	-1,40%	11.12.2015	128,55	-3,53%
20.10.2015	98,7	-0,49%	14.12.2015	123,25	-4,12%
21.10.2015	100,4	1,72%	15.12.2015	125,4	1,74%
22.10.2015	103,8	3,39%	16.12.2015	125,5	0,08%
23.10.2015	107,7	3,76%	17.12.2015	130,85	4,26%
26.10.2015	107	-0,65%	18.12.2015	130	-0,65%
27.10.2015	105,15	-1,73%	21.12.2015	130,45	0,35%
28.10.2015	109,35	3,99%	22.12.2015	132,1	1,26%
29.10.2015	108,4	-0,87%	23.12.2015	135,05	2,23%
30.10.2015	109,3	0,83%	28.12.2015	133,15	-1,41%
02.11.2015	112,7	3,11%	29.12.2015	135,35	1,65%
03.11.2015	111	-1,51%	30.12.2015	133,75	-1,18%
04.11.2015	100,45	-9,50%	04.01.2016	126,4	-5,50%
05.11.2015	97,5	-2,94%	05.01.2016	121,4	-3,96%
06.11.2015	97,18	-0,33%	06.01.2016	118,9	-2,06%
09.11.2015	96	-1,21%	07.01.2016	115	-3,28%
10.11.2015	95,58	-0,44%	08.01.2016	115,1	0,09%
11.11.2015	96,17	0,62%	11.01.2016	117,05	1,69%
12.11.2015	95,39	-0,81%			

Appendix B – Test for Normal Distribution of Returns

Appendix B.1



Appendix B.2



Appendix C – Content Analysis

Appendix C.1

#	Article ID	Date	Time	Effects on Date	Topic/Incident	Contains Information on
1	VW_001_150920	20.09.2015		21.09.2015	Winterkorn reaction	
2	VW_002_150922	22.09.2015		23.09.2015	VW info	
3	VW_003_150922	22.09.2015		23.09.2015	Winterkorn reaction	
4	VW_004_150923	23.09.2015		24.09.2015	Winterkorn resigns	
5	VW_005_150923	23.09.2015		24.09.2015	Board statement	
6	VW_006_150925	25.09.2015		28.09.2015	Müller new CEO	
7	VW_007_150925	25.09.2015		28.09.2015	Müller new CEO	
8	VW_008_151006	06.10.2015		06.10.2015	Works meeting	
9	VW_009_151007	07.10.2015		07.10.2015	Pötsch new chairman SB	
10	VW_010_151021	21.10.2015		21.10.2015	LS Prime Minister visit	
11	VW_011_151028	28.10.2015		28.10.2015	Group realignment	
12	VW_012_151103	03.11.2015		04.11.2015	CO2 issue	
13	VW_013_151209	09.12.2015		09.12.2015	CO2 issue solved	
14	VW_014_151210	10.12.2015		10.12.2015	Interim report	
15	VW_015_160110	10.01.2016		11.01.2016	Future of VW US operations	
16	HB_001_150920	20.09.2015	13:34	21.09.2015	Winterkorn reaction	VW_001_150920
17	HB_002_150922	22.09.2015	17:41	23.09.2015	VW info	VW_002_150922
18	HB_003_150923	23.09.2015	06:50	23.09.2015	VW info, Winterkorn reaction	VW_002_150922, VW_003_150922
19	HB_004_150923	23.09.2015	17:32	24.09.2015	Winterkorn resigns, board statement	VW_004_150923, VW_005_150923
20	HB_005_150925	25.09.2015	18:39	28.09.2015	Müller new CEO	VW_006_150925
21	HB_006_150925	25.09.2015	23:25	28.09.2015	Müller new CEO	VW_006_150925, VW_007_150925
22	HB_007_151006	06.10.2015	11:35	06.10.2015	Works meeting	VW_008_151006
23	HB_008_151007	07.10.2015	10:50	07.10.2015	Pötsch new Chairman SB	VW_009_151007
24	HB_009_151007	07.10.2015	15:14	07.10.2015	Pötsch new Chairman SB	VW_009_151007
25	HB_010_151021	21.10.2015	13:51	21.10.2015	LS Prime Minister visit	VW_010_151021
26	HB_011_151028	28.10.2015	09:01	28.10.2015	Group realignment	VW_011_151028
27	HB_012_151103	03.11.2015	19:10	04.11.2015	CO2 issue	VW_012_151103
28	HB_013_151209	09.12.2015	12:51	09.12.2015	CO2 issue solved	VW_013_151209
29	HB_014_151210	10.12.2015	11:50	10.12.2015	Interim report	VW_014_151210
30	HB_015_160111	11.01.2016	06:46	11.01.2016	Future of VW US operations	VW_015_160110
31	WJ_001_150921	21.09.2015	06:57	21.09.2015	Winterkorn reaction	VW_001_150920
32	WJ_002_150921	21.09.2015	07:02	21.09.2015	Winterkorn reaction	VW_001_150920
33	WJ_003_150923	23.09.2015	03:35	23.09.2015	Winterkorn reaction	VW_003_150922
34	WJ_004_150923	23.09.2015	21:09	24.09.2015	Winterkorn resigns	VW_004_150923
35	WJ_005_150925	25.09.2015	20:10	28.09.2015	Müller new CEO	VW_006_150925, VW_007_150925
36	WJ_006_151006	06.10.2015	14:03	06.10.2015	Works meeting	VW_008_151006
37	WJ_007_151007	07.10.2015	11:52	07.10.2015	Pötsch new chairman SB	VW_009_151007
38	WJ_008_151021	21.10.2015	12:14	21.10.2015	LS Prime Minister visit	VW_010_151021
39	WJ_009_151028	28.10.2015	13:38	28.10.2015	Group realignment	VW_011_151028
40	WJ_010_151104	04.11.2015	03:23	04.11.2015	CO2 issue	VW_012_151103
41	WJ_011_151209	09.12.2015	20:07	09.12.2015	CO2 issue solved	VW_013_151209
42	WJ_012_151210	10.12.2015	10:51	10.12.2015	Interim report	VW_014_151210
43	WJ_013_160111	10.01.2016	21:55	11.01.2016	Future of VW US operations	VW_015_160110

Appendix C.2

Article ID	Response *A*	Response *B*	Sub-Response *a*	Sub-Response *b*	Sub-Response *c*	Instructing Info	Adjusting Info
VW_001_150920	Rebuild		Apology			no	yes
VW_002_150922	Diminish	Bolstering	Justification	Victimage		yes	yes
VW_003_150922	Rebuild	Bolstering	Apology	Reminder	Ingratiation	no	yes
VW_004_150923	Bolstering		Victimage			no	no
VW_005_150923	Bolstering		Ingratiation	Victimage		no	yes
VW_006_150925						no	yes
VW_007_150925	Rebuild	Bolstering	Apology	Victimage		no	yes
VW_008_151006	Bolstering		Reminder	Ingratiation	Victimage	no	yes
VW_009_151007	Bolstering		Ingratiation			no	yes
VW_010_151021	Bolstering		Ingratiation	Reminder		no	yes
VW_011_151028	Bolstering		Reminder			no	yes
VW_012_151103	Rebuild		Apology			yes	yes
VW_013_151209	Diminish	Deny	Justification	Denial		yes	yes
VW_014_151210	Bolstering		Victimage	Reminder		no	yes
VW_015_160110	Rebuild	Bolstering	Apology	Reminder	Ingratiation	no	yes

Appendix C.3

	21.09. 2015	23.09. 2015	24.09. 2015	28.09. 2015	06.10. 2015	07.10. 2015	21.10. 2015	28.10. 2015	04.11. 2015	09.12. 2015	10.12. 2015	11.01. 2016
DENY										Denial		
DIMINISH		Justification								Justification		
REBUILD	Apology	Apology		Apology					Apology			Apology
BOLSTERING		Reminder			Reminder		Reminder	Reminder			Reminder	Reminder
		Ingratiation	Ingratiation		Ingratiation	Ingratiation	Ingratiation					Ingratiation
		Victimage	Victimage	Victimage	Victimage						Victimage	

Appendix C.4

Article ID	Accessed	Link
VW_001_150920	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Statement-of-Prof-Dr-Martin-Winterkorn-CEO-of-Volkswagen-AG/view/2709406/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_002_150922	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Volkswagen-AG-has-issued-the-following-information/view/2715181/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_003_150922	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Text-video-statement-of-the-CEO-of-Volkswagen-AG/view/2718956/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_004_150923	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Statement-by-Prof-Dr-Winterkorn/view/2721302/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_005_150923	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Statement-from-the-Executive-Committee-of-Volkswagen-AGs-Supervisory-Board/view/2721544/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_006_150925	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Matthias-Mller-appointed-CEO-of-the-Volkswagen-Group/view/2726856/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_007_150925	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Statement-by-the-Supervisory-Board-of-Volkswagen-AG/view/2726870/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_008_151006	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Matthias-Mller-We-will-overcome-this-crisis/view/2778966/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_009_151007	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Statement-from-the-Supervisory-Board-of-Volkswagen-AG/view/2786301/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_010_151021	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Prime-Minister-Stephan-Weil-visits-Volkswagens-main-plant-in-Wolfsburg/view/2822973/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_011_151028	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Matthias-Mller-unveils-next-steps-for-the-Volkswagen-Group/view/2838969/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_012_151103	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Clarification-moving-forward-internal-investigations-at-Volkswagen-identify-irregularities-in-CO2-levels/view/2857367/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_013_151209	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/CO2-issue-largely-concluded/view/2966215/18108d8d101b6284fe7b29bcf415eda5?p_p_auth=uXcR0oJi
VW_014_151210	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Volkswagen-making-good-progress-with-its-investigation-technical-solutions-and-Group-realignment/view/2973818/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
VW_015_160110	19.12.2016	https://www.volkswagen-media-services.com/en/detailpage/-/detail/Matthias-Mller-The-USA-is-and-remains-a-core-market-for-the-Volkswagen-Group/view/3061225/5ea8784c3b654f0aef71f2c5bf76826f?p_p_auth=NwY4PNKb
HB_001_150920	20.12.2016	http://www.handelsblatt.com/unternehmen/industrie/milliardenstrafe-in-usa-droht-volkswagen-gibt-massive-abgas-manipulation-zu/12344114.html
HB_002_150922	20.12.2016	http://www.handelsblatt.com/finanzen/maerkte/marktberichte/boerse-frankfurt-dax-verliert-fast-400-punkte-vw-bricht-erneut-ein/12351562.html
HB_003_150923	20.12.2016	http://www.handelsblatt.com/my/unternehmen/industrie/martin-winterkorn-kaempft-vw-versinkt-im-chaos/12355498.html
HB_004_150923	20.12.2016	http://www.handelsblatt.com/unternehmen/industrie/ruecktritt-des-vw-chefs-das-sagen-martin-winterkorn-und-die-vw-aufseher/12359958.html
HB_005_150925	21.12.2016	http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-matthias-mueller-ist-neuer-vw-chef-a-1054858.html
HB_006_150925	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/vw-skandal-das-hoffnungsvolle-ende-einer-schlimmen-woche/12372568.html
HB_007_151006	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/betriebsversammlung-bei-vw-es-wird-nicht-ohne-schmerzen-gehen/12413038.html
HB_008_151007	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/konzernumbau-bei-vw-gericht-bestellt-poetsch-in-den-aufsichtsrat/12417988.html
HB_009_151007	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/poetsch-zum-vw-chefaufseher-gewaehlt-ich-werde-meinen-beitrag-leisten/12420092.html
HB_010_151021	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/warum-erst-jetzt-vw-stoppt-verkauf-von-neuwagen-mit-schummelmotor/12479228.html
HB_011_151028	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/volkswagen-und-dieselgate-vw-buesst-fuer-seine-fehler/12507272.html
HB_012_151103	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/unregelmaessigkeiten-bei-co2-werten-vw-gesteht-neues-milliarden-problem/12538280.html
HB_013_151209	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/volkswagen-vw-erklaert-das-ende-eines-skandals-und-kuert-einen-neuen-personalvorstand/12699380.html
HB_014_151210	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/vw-fuehrung-zum-dieselgate-volkswagen-wird-daran-nicht-zerbrechen/12704654.html
HB_015_160111	21.12.2016	http://www.handelsblatt.com/unternehmen/industrie/vw-chef-in-detroit-der-amerikanische-mueller/12813582.html
WJ_001_150921	21.12.2016	http://blogs.wsj.com/moneybeat/2015/09/21/volkswagen-halts-u-s-sales-of-popular-diesel-cars-energy-journal/
WJ_002_150921	21.12.2016	http://www.wsj.com/articles/volkswagen-shares-driven-lower-1442826436
WJ_003_150923	21.12.2016	http://www.wsj.com/articles/volkswagen-scandal-pressures-ceo-1442967027
WJ_004_150923	21.12.2016	http://www.wsj.com/articles/volkswagen-ceo-winterkorn-resigns-1443007423
WJ_005_150925	21.12.2016	http://www.wsj.com/articles/volkswagen-names-matthias-mueller-ceo-1443200183
WJ_006_151006	21.12.2016	http://www.wsj.com/articles/volkswagen-to-launch-massive-vehicle-recall-in-january-1444213610
WJ_007_151007	21.12.2016	http://www.wsj.com/articles/volkswagen-poised-to-name-potsch-chairman-1444214103
WJ_008_151021	21.12.2016	http://www.wsj.com/articles/german-authorities-investigating-missing-vw-emissions-scandal-file-1445427635
WJ_009_151028	21.12.2016	http://www.wsj.com/articles/volkswagen-posts-loss-as-emissions-scandal-bites-1446021802
WJ_010_151104	21.12.2016	http://www.wsj.com/articles/volkswagens-shares-take-tumble-after-epas-fresh-allegations-1446559388
WJ_011_151209	21.12.2016	http://www.wsj.com/articles/volkswagen-says-carbon-deviations-much-smaller-than-suspected-1449662033
WJ_012_151210	21.12.2016	http://www.wsj.com/articles/vw-shares-up-ahead-of-emissions-findings-1449740759
WJ_013_160111	21.12.2016	http://www.wsj.com/articles/volkswagen-ceo-says-epa-meeting-outcome-unclear-1452480916

Appendix D – U Test Output with 1st Week Excluded

Appendix D.1

Ranks				
	Event	N	Mean Rank	Sum of Ranks
Return	no response	63	35.02	2206.00
	response	9	46.89	422.00
	Total	72		

Appendix D.2

Test Statistics[a]	
	Return
Mann-Whitney U	190.000
Wilcoxon W	2206.000
Z	-1.592
Asymp. Sig. (2-tailed)	.111
a. Grouping Variable: Event	

Appendix E – Abstracts English & German

Appendix E.1

The purpose of this thesis is to analyze the Volkswagen diesel scandal which came to light in 2015. The focus is on the crisis situation and Volkswagen's reactions to it. The period under examination ranges from the time the scandal was made public by the United States Environmental Protection Agency at the end of September 2015 to the point when a first agreement was reached with US authorities, at the end of April 2016.

In order to explain and classify the company's responses, Situational Crisis Communication Theory is applied. By conducting a content analysis of VW press releases, the aim is to find out which types of crisis responses were used. Additionally, the effectiveness of the responses is assessed by comparing them to the share price development of the company. The share price is assumed to rise on days containing at least one type of crisis response.

The results of the test show indeed that the returns for the group of days with responses are typically higher than those for the group of days that do not contain such responses. However, with a p-value of .0685, the result is not statistically significant. Consequently, there is no sufficient reason to assume that the reactions in terms of Situational Crisis Communication Theory positively influence the price development.

Appendix E.2

Das Ziel dieser Arbeit ist es, den Volkswagen Dieselskandal, welcher 2015 aufgedeckt wurde, zu analysieren. Der Fokus liegt auf der Krisensituation und Volkswagens Reaktionen darauf. Die untersuchte Zeitspanne reicht von Ende September 2015, jenem Zeitpunkt, zu dem der Skandal durch die US-amerikanische Umweltschutzbehörde öffentlich bekannt gemacht wurde, bis Ende April 2016, als eine erste Einigung mit den US-Behörden erzielt wurde.

Um die Antworten des Unternehmens zu erklären und einzuteilen, wird die Situative Krisenkommunikationstheorie herangezogen. Indem VW Pressemitteilungen einer Inhaltsanalyse unterzogen werden, soll

herausgefunden werden, welche Arten von Krisenreaktionen eingesetzt wurden. Zusätzlich wird die Effektivität der Antworten geprüft, indem sie der Aktienkursentwicklung des Unternehmens gegenübergestellt werden. Es wird angenommen, dass der Aktienkurs an Tagen, welche mindestens eine Art von Krisenreaktion beinhalten, steigt.

Die Testergebnisse zeigen tatsächlich, dass die Kursgewinne in der Gruppe der Tage mit Reaktionen typischerweise höher sind, als jene in der Gruppe der Tage, die keine solche Antworten beinhalten. Mit einem p-Wert von 0,0685 ist das Ergebnis allerdings statistisch nicht signifikant. Folglich gibt es keinen hinreichenden Grund zu der Annahme, dass sich die Reaktionen im Sinne der Situativen Krisenkommunikationstheorie positiv auf die Kursentwicklung auswirken.