

COMMUNICATION AND ADEQUACY OF CRISIS MANAGEMENT: LESSONS FROM THE
CRASH OF GERMANWINGS FLIGHT 4U9525

Berit Kirmse

University of Twente, Faculty of Behavioural, Management and Social Sciences

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Abstract

Whenever an unexpected event of high uncertainty threatens core values of a society (Arjen Boin & McConnell, 2007), crisis management becomes an indispensable job for leaders around the world. Extracting key lessons from the diverse research on crisis, this paper takes on a unique whereas practically oriented approach, scrutinizing crisis management in the immediate aftermath of the crash of Germanwings flight 9525. At different points in time, this approach aims to explain regularities subjected to different mechanisms embedded in a case-specific context. It analyses how these mechanisms affect crisis management over time. In that way it can be distilled which crisis management mechanisms have been best able to “break into the existing chains of resources and reasoning, which led to the existing problem”. (Ray Pawson, 1997) Crisis are at heart political; a fact that is suggested to affect crisis management. Furthermore, communication and especially the provision of information turn out to be crucial for crisis management in the aftermath of the crash of Germanwings flight 9525. Using this approach, I want to address the question: How did politicization, collaboration and information provision in the incident of the crash of Germanwings flight 9525 on March 24th 2015 in the French Alps affect the adequacy of crisis management? (A. Boin, 't Hart, Stern, & Sundelius, 2005)

COMMUNICATION AND ADEQUACY OF CRISIS MANAGEMENT: LESSONS FROM THE CRASH OF GERMANWINGS FLIGHT 4U9525

This paper will address the question: How did politicization, collaboration and communication in the incident of the crash of Germanwings flight 9525 on March 24th 2015 in the French Alps affect the adequacy of crisis management? In the case under study it is suggested that an inadequate crisis communication affected crisis management most significantly. Crises display disruptions that lead to losses. These losses are connected to the loss of lives but also to the losses of “assets, careers, reputations, legitimacy, credibility, support, trust, or goodwill” (Weick&Sutcliffe, 2007, p. 18) This paper aims at pinpointing at the important processes that were at play in the aftermath of the crisis and find out how they developed and ultimately influences crisis management. Looking at the way an organization performs on the road leading up to a crisis is the way to finding the actual causes of the crisis. They consist of small failures, oversimplifications, insensitivities to operations, lacking capabilities for resilience as well as rigid and vulnerable hierarchies. (Weick&Sutcliffe, 2007) An organization that prepares for such weaknesses and constantly allows self-reflection (a High Reliability Organization (HRO)) is more of an ideal than organizational reality. HRO’s need to prioritize reliability over efficiency and avoid failures “because the potential cost is unacceptable to society.” (Roberts 1990, p. 112) The effect that the politicization of events has on the adequacy of crisis management is also examined via the confounding variable of ‘collaboration of decentralized stakeholders’. National politicization is suggested to negatively affect the collaboration of decentralized stakeholders. The more stakeholders cooperate is in turn suggested to positively affect the adequacy of crisis management. I argue that the collaboration of stakeholders improves management of the crisis even more. Stakeholders ‘deviation from pre-established protocols is expected to be desirable if occurring within a clear coordinating structure. It is here noted that the hypotheses are studied from the occurrence of the incident to about 1 month after the crash. Geographically, the study is focused around the crash site as well as the German public institutions and the private entity Lufthansa, being in charge of crisis management.

1. Analysis and Methodology

Research design

The pilots' strategic importance in the incident distinguishes the case from Airbus 320 incidents of the past, which have in some instances been proven or suggested to be connected to technical failures. The research is conducted in an exploratory manner, critically testing hypothesis and their underlying mechanisms.

It is suggested and has been argued by many authors that a quantification of crisis data does not necessarily lead to a comprehensive understanding of it. (J. H. Blatter, M., 2014) A case-specific analysis, in contrast, provides a more complete picture and serves as an example from which crisis managers can learn. This points to the necessity for the research to be practically applicable. This study does not aim at generalization and is much more based on a configurational thinking, specified by Blatter and Haverland (J. H. Blatter, M., 2014) as well as the generative approach, arguing for the "utility of experimental thinking in evaluation" (Pawson&Tilley, 1997, p. 57). Making use of the generative mechanism allows for a much more comprehensive picture of social reality, which can complement existing research and lead to results that future crisis can consider and apply. (Pawson&Tilley, 1997)

The very definition of a crisis is suggested to reflect a process view (Coombs&Holladay, 2012, p. 22). This is why the mechanisms at work in the different processes are analyzed using process tracing methods. It is assumed, based on existing research and literature, that the activity of one actor affects the behavior of another.

Process tracing methods firstly provides the reader with a 'Comprehensive storyline' consisting of the most important causal conditions identified as well as the key critical conjunctions of the case. In order to establish a causal connection between two incidents, there needs to be a causal proximity between the two conditions. Turning points give reason to dig further into the causal processes at work.

The empirical fundament of causal-process tracing is presented by smoking-gun observations. A smoking gun observation “presents a central piece of evidence within a cluster of observations” which together “can be used inductively to make strong causal claims”. (J. Blatter & Haverland, 2014) Smoking gun observations are the second step of revealing the causal connection of events. Together with supporting evidence, the observation provides us with a strong piece of evidence that a specific event has taken place. By establishing a causal inference, social contiguity needs to be accounted for.

Confessions, that are revelations of motivations behind the actions of the actors, can be brought to light by combining interest constellations with the public discourse and empirical information, arriving at a conclusion, in line with a particular behavioral theory. Next to that, explicit confessions of stakeholders can lead us to the underlying motivations of these actors; but only if they are reflected on and considered in their context.

Using the approach by Blatter&Haverland, 2014, this study takes into account feedback loops, which we often find in a complex situation as that of a crisis. Such recursive models are not tested statistically, since that extends the scope of this research and is generally hard to accomplish. It still is key to take them into account since it enables a more comprehensive analysis of the crisis under study.

The full information on data sources is included in Appendix B. The effort to establish contact with Lufthansa did not result in an interview or email exchange, since only the press is usually eligible to contact the Lufthansa concerning an incident like the Germanwings 9525 crisis. Furthermore, the company was not expected to have any interest in revealing any sort of mismanagement from their side. The German Federal Foreign Office, for unknown reasons, did not respond either. This might have been due to an overload of emails coming in. Two journalists from two different newspapers did not respond either. However, a journalist from an aviation related newspaper agreed to a telephone interview.

When talking to journalists from PRReport, Mrs. Schaedler was likely to aim at upholding her reputation. The statement can nevertheless be considered relatively trustworthy since she makes it one year after the incident, when she is not working for Lufthansa any longer. (PRReport, 2016)

Case selection and sampling

In the case of Germanwings flight 9525, the way in which crisis communication was conducted deviates to a large extent from what any regulation, theory or best practice would advise.

(*Toetsingskader rijkscrisisstructuur*, 2012) It can in that respect be considered a deviant case.

I want to study the underlying mechanisms, paying special attention to mistakes made in the course of crisis management, in order to explain and pave the way to a further improvement of practical crisis management.

Within the study, the spotlight will be on high level politicians, implementers and private managing directors of Lufthansa. The aim is to determine in how far their preferences, saliences and bargaining powers determine performance and the adequacy of crisis management.

Interviews with Lufthansa officials (and German authorities) aim to clarify why information was provided in the immediate aftermath of the crisis. Interviewees are selected based on judgment sampling, aiming to make sense of the motives that Lufthansa representatives had, making them provide unverified information to the public.

The Quota sampling method is used to evaluate critical material from newspapers. A selection of articles is made on the basis of journalistic standards of the newspaper and their relevance for the study.

Operationalization and data collection

In order to establish mechanisms underlying certain relationships, the variables serve as a starting point and in their operationalized form help to extract the underlying mechanisms at work.

Determining the **adequacy of crisis management**, Dutch regulations require that crisis management is determined by analyzing the 6 critical processes in the Toetsingskader referred to above. (*Toetsingskader rijks crisisstructuur*, 2012)

Politicization is operationalized by determining the availability of knowledge on a crisis and the consensus about the values at stake.

It is suggested that the crisis at hand is of a technical nature, since the mental illness of the pilot lead to his morally unacceptable actions. His assumption will be scrutinizing by taking the process with which the crash was made possible.

The **Collaboration** between decentralized stakeholders is operationalized by examining consistency of statements released to the press by different (decentralized) stakeholders.

Degree of deviation from protocols

The degree of deviation from protocols in turn is operationalized comparing certain protocolled actions provided by the ICAO with the actual decisions taken.

Crisis communication

The adequacy of crisis communication is given attention in this analysis. The large media attention and public interest make this process key to the analysis, wherein ‘Situational Crisis Communication theory’ (SCCT) is used in order understand why crisis managers behaved in certain ways on different occasions.

Blame games

Blame games are analyzed and compared to the theoretical approach provided by Hood, 2002.

This approach supplements the SCCT, while at the same time digging deeper into who drew the fault lines and with which underlying motivations. It is thereby established who takes on accountability and who is actually responsible for an incident.

Data analysis

The aim of the study is to use relevant data available to explain the underlying mechanisms of what happened in the specific case of Germanwings flight 9525 rather than finding generally applicable causal inferences by collecting quantitative data. The data collected is therefore representative of what happened and what certain stakeholders did rather than representative of all future crisis to come.

Data retrieved from newspapers is analyzed with coding schemes. Citations are inserted via Endnote. Interviews are recorded and mainly aim at establishing clarity on the underlying motives and strategies in place among Lufthansa personnel. In that way the research is geared towards finding the incentives for Lufthansa's deviation from the guidelines for crisis communication, which triggered a mechanism that in the end damaged crisis management in itself.

2. Theory and hypotheses

The act of making the Germanwings crash a matter of national importance, that is, labeling the incident a crisis and managing the case on a national level can by itself be seen as a politicization of the incident. This fact makes it more crucial and arguably more difficult to manage the crisis in an adequate manner. So it is important to establish clarity on the question of when an incident becomes a crisis.

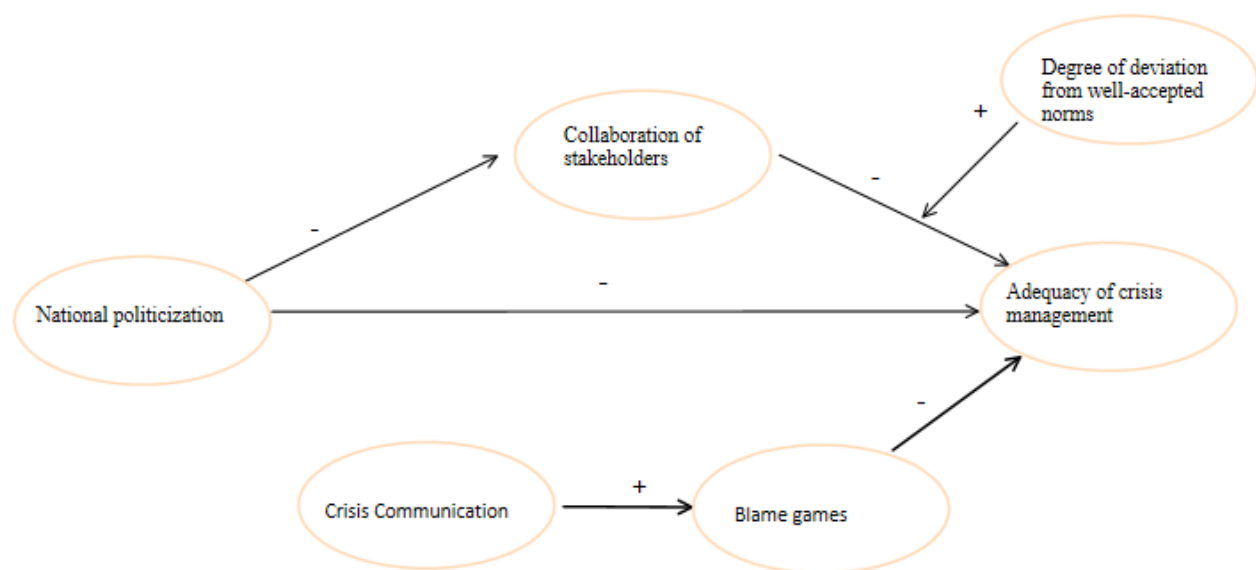
Crisis

There is no scientific consensus on what exactly defines a crisis. A crisis is marked by an extended period of high threat, high uncertainty and high politics that disrupt a wide range of societal, political and organizational processes. (Boin & T Hart, 2003) A crisis is accordingly not merely triggered and determined by the loss of lives but has much more to do with the "naming and framing" (Boin & T Hart, 2003, p. 546) of a crisis which then essentially becomes a major political issue. In this paper I want to use the approach provided by Seeger, Sellnow&Ulmer, 1998, which defines a crisis as "a specific, unexpected

and non-routine organizationally based event or series of events which creates high levels of uncertainty and threat or perceived threat to an organizations high priority goals”. (Seeger, Sellnow&Ulmer,1998)

The German authorities speak of a crisis if they encounter a highly complex, time comprehensive, unplanned and unusual situation which threatens vital protective goods, is hard to take control of and has unforeseeable, multitudinous consequences. (Innenministerium, 2012) They lift management to the national level if there is a concrete situation of danger or damage.

Within the field of crisis communication, scholars to a large extent agree upon the fact that the perceptual nature of a crisis is key. So the way in which stakeholders view a crisis “has ramifications for whether or not that event becomes a crisis”. (Coombs&Holladay, 2012)



2.1. Independent variable

Adequacy of crisis management – six critical processes of crisis management

The independent variable in the theoretical model is the adequacy of crisis management.

Important contributions to the field originate from Boin et al.2005, who in their book employ a cross case study of how political leaders act in times of crisis. They allocate five core tasks to proper crisis

management, namely sense making, decision making, meaning making, crisis termination and learning from a crisis.

These five core tasks are very useful for crisis managers in the field, but go beyond the scope of this study, which does not aim to include a learning process as a precondition for adequate crisis management.

In order to manage crisis adequately, the Dutch Ministry of Justice, 2012 suggests six critical processes which need to be performed in an effective way. By definition, these critical processes should not be hindered by factors such as the national politicization of an issue or communication failures. Assuming that in the case of Germanwings flight 9525 certain critical processes were not performed properly, this research aims to point to mechanisms causing an inadequate management and thereby exploit the “dynamic potential”(Boin & T Hart, 2003) of crisis. Researchers need to participate in the process of managing crisis in order to improve crisis management and ultimately benefit societies around the globe.(Boin & T Hart, 2003)

This concept is defined using the underlying procedures (Torenvlied, 2015), embedded in the Dutch Ministry of Security and justice.(*Toetsingskader rijks crisisstructuur*, 2012) German crisis management guidelines publicly available do not mirror a comparably comprehensive approach to crisis management. (Innenministerium, 2015)

Even though German guidelines on crisis communication define national crisis management (Innenministerium, 2012), other guidelines place their main focus on external crisis connected to armed conflict situations (Major, 2011).

Adequate crisis management is hence conceptualized looking at the critical processes of crisis management, established by the Toetsingskader, which are elaborated below.

- The process of crisis preparation.

According to the Toetsingskader, 2012, a crisis is properly prepared if the crisis respondents take control of the situation and set out a clear direction. It is key that clarity is established on who is responsible for what in any thinkable scenario. Next to that, there needs to be a structure in place

that consists of a signaling entity, a tactical entity leading the operation, taking decisions, advising and following up on decisions as well as an entity that coordinates the overall direction of the efforts made. (Torenvlied, 2015)

- The process of recognition and signaling.

This process involves timely information, alerting and alarming of the bodies involved, in order for them to avoid the crisis from developing into an even larger threat. The time-planning needs to accommodate time for the consultancy of the actors, the launching of preparations and well as reaction time for inactive bodies.

- The process of information provision.

According to the Toetsingskader, 2012, the existence of a national information plan is essential for the information process. All information relevant for the handling of the crisis needs to be assessed and actively distributed between the crisis management bodies.

In the information provision process, information is needed on: the incident and its effects, the outreach as well as the prognosis and the approach, the measures taken and their results.

- The process of analyzing, assessing and deciding on preparation.

This process aims at establishing a correct and topical insight in the course of the crisis and its effects.

- The process of decision-making.

The process aims at leading crisis organization and determining a strategy which is then being followed in the course of decision making.

- Crisis communication.

The way a crisis is framed and communicated to a large extent determines the outcome of a crisis and the reputation losses governments and private firms face. (Coombs, 2015)

The Toetsingskader, 2012 states that the effects of communication should contain a national plan for crisis communication, key to the communication process, the communication networks and systems. Furthermore, crisis communication should include regulations and mandates that guarantee that crisis communication is conducted in a timely and efficient manner. Important in the incident of Germanwings flight 9525 is that the media network is supposed to be used to pass current, correct and unequivocal information to the public. (Justice, 2012) This principle needs to be embedded in the communication strategy followed unitarily by all parts of the crisis management. If it is not embedded or is neglected by only one of the relevant stakeholders, it does not only constrain the communication process but ultimately the management of the crisis.

2.2. Dependent variables

2.2.1. Crisis communication and blame games

Crisis Communication

Building on the idea of an HRO (High reliability Organization) Marra suggests that “an organizational culture with the characteristics of an HRO was a better predictor of successful crisis communication efforts than having a crisis communication plan” (Marra (1998) in (Coombs&Holladay, 2012)

An HRO has been defined as a publicly intensely scrutinized organization, “which fears its potential for failure’ and reliability takes precedence over efficiency (La Porte and Consolini 1991 in (Coombs&Holladay,2012)

This does not only suggest that an HRO communicates more adequately but also argues for the importance of a more decentralized structure within an organization. This argument is also taken up in 3.4., where it is argued that less hierarchical structures in crisis management lead to more favorable results. The argument of an HRO being a detriment of good crisis communication is key, but serves more as a theoretical underpinning of the research rather than a foundation of the evaluation.

Analyzing the effects of immediate information provision, this study considers different theoretical backgrounds and applies the most commonly used theoretical framework of situational crisis communication theory (SCCT) developed by Coombs&Holladay, 2012 and others in the Handbook of Crisis Communication. SCCT is more evidence-based and assumes that “crisis are negative events, stakeholders will make attributions about crisis responsibility, and those attributions will affect how stakeholders interact with the organization in crisis. (Coombs&Holladay, 2012, p. 38)

They are concerned with “crisis events that may have impact on an organizations image, including”(Seon-Kyoung & Cheng, 2010) “ the identification, monitoring and analysis of trends in key publics”(Heath, 1997 in (Coombs&Holladay, 2012). This shows that there is no clear cut line between crisis communication and blame games. Communication impacts and may be directed at the dynamics blame games take on.

Situational Crisis Communication Theory (SCCT) is applied to facilitate an in depth understanding of crisis communication in the aftermath of the crash of Germanwings flight 9525. The underlying idea of the theory is summarized in Figure 1. In order to determine the effect of crisis communication, SCCT connects several indicators to determine to what extent different concepts influence the reputation of an organization. It is theoretically suggested that ‘Crisis Response Strategies’ should be and are selected by crisis managers depending on the extent of ‘Crisis Responsibility’ that the organization has to account for. These factors influence the ‘Organizational Reputation’ and shape the ‘Affect’ the crisis has on its stakeholders and the public. The ‘Affect’ of stakeholders and the Organizational Reputation in turn determine which ‘Behavioral Intentions’ towards the organization become visible.

Two intensifying factors are potentially influencing the reputation. They address the organizations history of crisis and how the organizations' relationship with its stakeholders has been in the past.

In the case of the crash of Germanwings flight 4U9525, certain values are expected on these dimensions. Lufthansas crisis responsibility for the crash is suggested to be high due to the fact that the pilot (as part of the organization) acted intentionally, which according to Situational Crisis Communication Theory indicates a strong crisis responsibility and "base threat presented by the crisis" (Coombs&Holladay, 2012, p. 39) The crisis response strategies chosen are suggested to be rather accommodative, aiming at rebuilding perceptions of the organization.

The 'affect' of the crisis on its stakeholders is suggested to be moderate since the crisis evoked compassion and sadness rather than anger, which is supposed to have the strongest effect on behavioral intentions towards an organization.

The intensifying factors 'crisis history' and 'prior reputation/relationship' are not suggested to have significantly impacted the organizational reputation.

Blame games

Who is blamed has a lot to do with who dominates the process of "naming and framing" (Boin & T Hart, 2003), which then essentially transforms crisis management into "a major political act" (Boin & T Hart, 2003).

It has also been established that citizens are "more sensitive to what has been done to them than what has been done for them". (Weaver, 1986, p. 373) What is also being called the 'negativity bias' describes a consensus in social psychology which claims that "individuals in general tend to give more weight to losses or negative outcomes than to gains".(Hood, 2002) This is the reason why blame avoidance is often prioritized over credit claiming.

Weavers analysis of blame games is however criticized for not clearly separating agency and policy strategies in his analysis. Hood, 2002 therefore links the delegation of blame with contemporary conceptions of political and institutional behaviors, which determine how risk is managed.

He suggests that the way in which blame and credit are delegated, determines how blame games play out and who is ultimately blamed. And since avoiding blame is even more essential when the 'negativity bias' (Weaver and others) is taken into account, delegation becomes even more important.

Analyzing how blame was managed aims to complete the findings made regarding Crisis Communication using SCCT. (Hood, 2002)

It is argued, that the job of leaders doesn't stop when choosing to apply 'rebuilding crisis response strategies' (Coombs, 2012). The name of the strategy suggests that the organization, which chose the strategy, acts transparent and discloses who is objectively responsible for the crisis. As already suggested in the analysis of crisis communication, this is not the intention with which rebuilding strategies are applied. The organization, while rebuilding, is more keen to establish sympathetic attitudes rather than the objective truth. (Hood, 2002)

Coombs, 2012 does not clarify at which point in time an organization should accept responsibility. But in the field of crisis management, researchers agree that information should be provided to the public only if it is verified. Some go even further and suggest that a rapid disclosure of crisis information does not necessarily lead to an enhanced organizational credibility and less severe perceptions of the crisis. (Arpan & Roskos-Ewoldsen, 2005)

What is striking is that Lufthansa accepted responsibility before it was 100% proven that the company was indeed accountable for the crash. And even though the presumed cause of the crash was first made public by the BEA, it is likely that this was coordinated with Lufthansa since Lufthansa did not reject the finding.

So the question is why Lufthansa neglected the best practices and took on responsibility before both CVR and FDR were evaluated, which according to experts is the precondition for drawing fault lines.

Assuming that the aim of Lufthansa was at all times aiming to shape public attitudes to be more 'sympathetic' (Hood, 2002), it is suggested that there was reason for Lufthansa to go against best practices in order to make public attitudes more sympathetic towards the organization.

H1: How does the immediate provision of information and the following blame games affect the adequacy of crisis management?

2.2.2. *National Politicization*

Politicization can be described as the 'crisis after the crisis'. In the incident of Germanwings flight 9525, we find that very soon after the crash, political attention was being pulled to the incident, making it political in character. Political decision making was lifted to the national level, adding more parties and levels to the body of crisis management. This triggers the question of how these politicizing occurrences influenced the collaboration of stakeholders.

A review of current literature on politicization does not provide a coherent picture of what exactly defines a politicized situation. But if a topic is high on the agenda of politicians and private stakeholders, it is expectedly much more likely to become politicized. It furthermore displays a process rather than a single variable

A crisis in its technical terms is said to describe an underlying technical, scientific, ethical or political problem. A technical problem is mostly a tamed problem, defined by a large availability of knowledge and a large consensus on values. A scientific problem is seen as a tamable problem on which there is a small availability of knowledge, but a large consensus on values. A tamable ethical problem on the other hand is characterized by a large availability of knowledge while there is a small consensus on values. A political problem is wicked, since there is only a small consensus about values and a relatively small availability of knowledge. (Figure 14)

The case of Germanwings flight 4U9525 can be classified into these dimensions by looking at the amount of disagreement on the societal and technical dimension of the crisis.

In order to classify the crisis on the technical dimension, the disagreement of different stakeholders on the knowledge concerning the crisis will be examined. In order to analyze the societal dimension, the societal consensus on values will be analyzed.

By using this approach, the analysis aims to answer the question:

H2: To what extent and how did politicization affect the collaboration of decentralized stakeholders?

2.3. *Moderating variable*

2.3.1. *Collaboration of stakeholders*

How effectively stakeholders collaborate has an impact on how effectively a crisis is managed. But how do they effectively collaborate? And who is collaborating?

Research by Allison & Zelikow, 1999 suggests different actors at the core of crisis management. The categorization provides an important distinction and is useful to keep in mind when analyzing stakeholders and their relationships. However, it does not serve as the only tool for analyzing since in reality, the models to a large extent overlap and therefore cannot be consistently applied in the case under study.

In crisis situations, stakeholders which usually operate in different fields come together to centralize expertise, knowledge, skills and expand the capacity for action and decision making. By doing that they

often times come together in the form of informal networks, in which normal operating procedures dissolve. This is especially valid for emerging crisis on aircraft carriers (Rochlin, 1989).

This networking activity in times of crisis is however only realized, if protocols and other pre-established rules ensure a collaboration in the preparatory phase.

The paper thereby adopts an approach taken up by Scholtens, who argues that the “importance of managed collaboration in the preparatory phase is underestimated”. (Scholtens, 2008, p. 205)

In order to establish how high collaboration in the preparatory phase is, the analysis will examine whether collaboration provisions in the ICAO are binding and extensive enough to ensure close and effective collaboration in times of crisis. Other pre-established rules and provisions will however also be considered.

ICAO provisions, applicable to all 191 ICAO member states, are expected to best affect collaboration since air disasters largely occur independently of nation state borders.

H3: How does the collaboration of decentralized stakeholders affect the adequacy of crisis management?

2.4. Mediating variable

2.4.1. Degree of deviation from norms

Different conceptions of who is accountable are communicated and assigned among the stakeholders involved. But to which degree crisis managers cohered with well accepted norms can only be set out by looking at what Lufthansa actually did in the aftermath of the crisis.

Theory suggests that sticking to what protocols set out is the best way of managing a crisis well. So the question is whether actions required by norms were realized and if yes, to what extent.

The norms considered encompass ICAO Annexes 12, 13 and 17 as well as international and national provisions for injury awards after disasters. (Weller et al., 2015)

By analysing these provisions, this paper aims to answer the question:

H4: How does the degree of deviation from well accepted norms affect the relationship between the collaboration of decentralized stakeholders and the adequacy of crisis management?

3. The crash of Germanwings flight 9525

3.1. Germanwings flight 9525

The devastating crash of the Germanwings plane 9525 on March 24th 2015 triggered a sensitive crisis, which did not only leave the families and friends of the victims in grief. It also left the public in sorrow posing questions in the direction of the perceived safety of flying. Some Germanwings crews did not feel able to fly on the day after the incident, being shocked of what happened to their colleagues and friends.

In response to the crash, crisis management procedures at the top level of German government were set in motion, involving the establishment of a 'Krisenstab' as the center of German crisis coordination and a parliamentary committee. The incident also triggered inter-ministerial crisis management procedures, involving the foreign ministry, the Transport ministry as well as the chancellor. European coordination was key to this crisis, involving operations of German and French investigations. A European Level Task Force was established and presented with the task to analyze findings from the investigation, arriving at recommendations for EU air safety and security rules. The EU commissioner for transport initiated the collaboration and pointed to the European dimension of the crisis.

Key findings concerning the crash of Germanwings flight 9525 were for the first time officially published in the interim report by the BEA in May 2015 and finalized with the final report published on the 13th of March 2016. The report confirms many of the findings and speculations that have been presented by the media shortly after the incident. The chronology provided here covers details of the incidents leading up to the crash and describes important events in the aftermath of the crash. The sequence of events is in line with the reports provided by the BEA. Technical details in the report concerning the door locking system are based on information provided by Airbus and Germanwings and apply to the aircraft type D-AIPX. Specific signs ('~') indicate the approximate time of an event in case an exact determination of the time was not possible. Time indications are provided in GMT (Greenwich Mean Time).

Lufthansa

Lufthansa is the largest airline in Europe when it comes to passengers as well as fleet size, considering its wide range of subsidiaries including Eurowings, Austrian Airlines, Swiss International Air Lines and many others. Next to that, under the Lufthansa group, the company incorporates several other aviation-related companies.

Lufthansa bought in Germanwings on January, 1st 2009.

Germanwings

Germanwings GmbH was a low cost airline, wholly owned by the parent company Lufthansa. The airline was mainly operating on short haul flights from 2012 onwards, with its main hub being Cologne/Bonn airport (CGN). Secondary hubs were Berlin (TXL), Düsseldorf (DUS), Stuttgart (STR), Hamburg (HAM) and Hannover (HAJ). The 61 aircrafts of the fleet consisted of Airbus A319 (43) and Airbus A320 (18) aircrafts, which was the aircraft type that crashed over the French alps.

In October 2015 a merge with Germanwings' sister company Eurowings started and was completed in 2016. Since then, the brand 'Germanwings' is no longer in use. In this analysis it is nevertheless referred

to the company, since the plane was assigned to the Germanwings fleet and to a large extent also managed by Germanwings.

With the merge of Germanwings and Eurowings, Lufthansa aims at entering the long-distance low-cost market. One of the airlines main hubs is Düsseldorf airport, which is where flight 4U9525 was supposed to land on the 24th of March 2015.

The Germanwings CEO on the 24th of March reveals technical details on the plane and on the number of people on board.

In the aftermath of the crash the company offers an immediate financial assistance of 50.000 Euros per passenger to the families and additional compensation to each family member depending on the age and occupation of the persons as well as other country specific compensation claims. Latter compensation is taken over by the air carrier indemnity insurance (Spiegel online, 2016, The Guardian, 2015)

Families of the victims have demanded more money and hence decided to sue Airline Training Center Arizona, Inc. “ATCA” in the US, which was “one of the most important gateways or checkpoints in Lubitz’s desire to become a Lufthansa commercial pilot”. The suit on behalf of 80 families was filed by Kreindler&Kreindler on April 13th, 2016, along with co-counsel from law firms in Germany, Holland and the UK. The Training Center is accused of being “negligent, but also careless, and even reckless, in failing to apply its own well-advertised ‘stringent standards’”. (Kreindler&Kreindler, 2016)

The aircraft D-AIPX

The German The aircraft was officially registered under the name D-AIPX by the German national aviation authority (NAA). This internationally unique alphanumeric string serves to identify the aircraft. The aircraft was an Airbus A320, of which 6,191 were in operation at the time of the crash according to airbus. The aircraft is popular for medium-haul flights and belongs to the “world’s bestselling single-aisle aircraft family”

The last routine technical check, he states, has been conducted on the 23rd March whereas the last all-round check (c-check) has been conducted in summer 2013 (France 24 English, 2015)

The plane made its first test flight in November 1990 before being bought by Lufthansa, making its first commercial flight in February 1991. The aircraft would therefore have been near the end of its commercial life, according to experts.

The pilot

In a press conference on the 24th of March 2015, Germanwings CEO Thomas Winkelmann reveals that the captain has flown for Lufthansa and Germanwings for more than 10 years. With the Airbus model he has an experience of over 6000 flight hours.

The copilot

Prior to the crash investigators found that Lubitz had made searches on the internet concerning suicide and on how to lock the cockpit door. So the prosecutors conclude that he wanted to put an end to his life and that he was already figuring out ways of doing so. An analysis of Lubitz illness after the crash suggests that he might have suffered from a narcissistic personality disorder.

From 2008 onwards he attended Lufthansa's flight schools in Bremen, Germany and Goodyear, Arizona, USA.

In 2009, Lubitz interrupted his education and later informed the Flight Training School that he had previously suffered from a severe depression. He then completed his training and worked as a flight attendant before gaining his commercial pilot's license.

In the 5 years before the crash, he had consulted 41 different doctors and between the 21st of February and the 22nd of March 2015, he reached out to a doctor seven times.

3.2. Stage 1 – The time leading up to the crash

The outbound flight

An event on the flight preceding the one under study is important for the study of the course of events. On the outbound flight from Düsseldorf to Barcelona, the copilot had set the plane's altitude to 100ft five times while being alone in the cockpit.

Before the captain returned to the cockpit, the copilot returned the aircraft to its correct altitude. This action remained unnoticed since the action was performed in a phase of required decent. The irregularity in the selection of altitude could only be uncovered with data from the flight data recorder afterwards.

06:01:00 am	Outbound flight takes off in Düsseldorf, Germany
07:20:50 am	Flight altitude is decreased to 100 ft for three seconds and then increased again to the maximum value of 49,000 ft and stabilized again at 35,000 ft
~07:22:00 am	Noises indicating the pilots exit of the cockpit are recorded
07:22:27- 07:24:13am	In these 2 Minutes the selected altitude was 100 ft for most of the time and changed several times until it stabilized at 25,000 ft
07:24:15 am	The buzzer to request access to the cockpit was recorded
07:24:29 am	Noises like those of the unlocking of the cockpit door then its opening was recorded and corresponded to the Captain's return to the cockpit
07:57:00 am	Outbound fight lands normally in Barcelona, Spain

Routine events on Germanwings flight 9525

The scheduled flight from Barcelona back to Düsseldorf one hour later was carried out by the same crew members as the outbound flight. With a delay of 20 minutes, Germanwings flight 4U9525 takes off in Barcelona, Spain at 9.01am GMT (10.01am local time) and is expected to touch down in Germany, Düsseldorf 90 minutes later but never reaches. The plane is carrying 150 people of whom 144 are passengers and six belong to the crew.

When the flight takes off on the 24th of March 2014, normal conversations are recorded first between the two pilots and a board crew member and then between the pilot Sondenheimer and the copilot Lubitz. The

two pilots have a routinely discussion about the management of the delay that resulted from the late departure from Barcelona.

~9.00 am	The same aircraft under the flight name 4U9525 takes off from Barcelona Airport, Spain, runway 07R with a delay of 20min
09:02:54 am	The autopilot n°2 is engaged in CLIMB and NAV mode; Autothrust had been engaged about a minute earlier
09:12:15 am	A flight attendant requests access and enters the cockpit. The three crew members have a small conversation.
09:15:53 am	Noises of the opening then the closing of the cockpit door are recorded when the flight attendant leaves the cockpit.
~09.15am	Normal discussions are recorded in the cockpit between the pilot and co-pilot.
09:27:20am	The plane levels off at the cruising altitude of 38000ft (FL380) as it approaches France.
09:29:40 am	The flight crew is transferred to the 127.180 MHz frequency of the Marseille control center.
09:30:00 am	The captain reads back the air traffic controller's clearance allowing him to fly direct to the IRMAR point: "Direct IRMAR Merci Germanwings one eight Golf".
09:30:08 am	The captain tells the co-pilot that he is leaving the cockpit and asks him to take over radio communications.
09:30:11 am	The heading starts to decrease and stabilizes about a minute later at around 23°, which is consistent with a route towards the IRMAR point.
09:30:13 am	Noises of a pilot's seat movements were recorded
09:30:24 am	Noises of the opening and then, three seconds later, the closing of the cockpit door were recorded when the captain left the cockpit.

As the plane approaches France, it reaches a cruising altitude of 38000ft (Flight level 380). The flight crew is then in contact with the Marseille en-route control center on the 133.330 MHz frequency which at 09:29:40am is changed to the 127.180 frequency. The last communication between the crew and the

Marseille control center takes place at 09:30:00am, when the captain reads back the allowance to fly directly to IRMAR point (Figure 3) and thereby continue on their route near the settlement of Dignes. The captain then announces that he is leaving the cockpit and asks the copilot to take over radio communications, which the copilot acknowledges. With the decrease and stabilization of the heading at around 23°, the last routine action is executed at 09:30:11am. The Captain gets up to leave the cockpit at 09:30:13am, which is determined by the seat movements recorded. 11 seconds later the cockpit door is opened and closed three seconds later. From this point onwards, the copilot is in charge of the plane.

Continuation of the flight with only the copilot in the cockpit

When being alone in the cockpit on the flight back from Barcelona to Düsseldorf, the co-pilot changes the altitude of the autopilot from 38,000ft to 100ft as he had done several times on the outbound flight.

According to the BEA report, this action can only be completed voluntarily. Unlike on the flight from Düsseldorf to Barcelona, he this time denies the pilot access to the cockpit when he returns from the toilet. This in turn means that between 09:30:27am and 09:34:31am, the copilot must have locked the door to people outside the cockpit in a way that disables even the access via the keypad.

If the Cockpit door switch (inside the cockpit) is in the 'Norm' position, the crew can access the cockpit with a code. If the switch is moved in the 'lock' position, "red LED lights light up continuously on the keypad to indicate locking is voluntarily. Any interaction with the keypad (outside the cockpit) is then disabled for 5 minutes" unless the emergency access code is dialed on the keypad (BEA Final Report, 2016, p. 21). When the emergency access code is dialed, acoustic signals sound in the cockpit for about 15 seconds (and a green LED light starts to flash). If the person(s) in the cockpit do(es) not respond to these signals within the 15 seconds, the door automatically opens for 5 seconds and then locks again. "If the flight crew toggles the switch during those 15 seconds, the acoustic signal stops and the system reacts according to the command (UNLOCK/LOCK)." (BEA Final Report, 2016, p.22)

The person(s) in the cockpit can at any time cancel this locking by moving the switch in the 'unlock'-position.

There has not been a clear identification of the sound of the door being locked, since the turning of the switch is hard if not impossible to identify with the cockpit voice recorder (CVR). But by looking at the proceeding of events and the cockpit voice recorder as well as the flight data recorder it can be established that the copilot must have locked the door voluntarily and intentionally.

It is important to note here that the BEA and subsequently the media based their initial finding merely on data from the voice recorder, which, according to experts, does not provide enough evidence to suggest that the plane was deliberately crashed. This fact will be further examined within the analysis.

According to the flight data recorder and flight tracking systems, at 09:30:53 the selected altitude is changed from 38,000ft to 100ft, which is the minimum value that can be selected on an airplane of the type A320. The autopilot is then changed to OPEN DES mode, which manages the target speed based on the flight plan entered or selected manually. Furthermore, the THR IDLE mode was activated.

According to Boeing flight procedures, a flight plan is entered before takeoff and the Autothrust is engaged according to that plan. The Autothrust makes it possible to specify flight characteristics such as power for the entire flight and in the different phases. During the flight, a manual override of the Autothrust is at all times possible. When the manual override is stopped, the throttle automatically shifts back to the position fixed by the Autothrust. This is not the case, if the mode is changed to the IDLE or THR HLD mode. In these two modes, the throttle remains at the manually commanded position throughout. The aircraft then approaches the manually determined position.

In the case of Germanwings flight 9525 the copilot deactivated the Autothrust mode in order to have full manual control of the direction and speed of the aircraft. The airplane then started to descend with both engines' speed initially decreasing.

At 09:33:12 the speed management mode changes to the selected mode, enabling the copilot to choose the target speed. The airplane's speed is increased along with the airplane's descent rate and varies between

1,700ft/min and 5,000ft/min, with an average of 3,500 ft/min. In the following seconds, the flight speed changed again until reaching 302kt.

At 09:33:47 the Control Center in Marseille tries to make contact with the flight crew, inquiring about the cruise level the plane has been cleared for. The request remains unanswered. With the aircraft being at an altitude of 30,000ft in descent, the Controller tries to establish contact again twice, without success.

In the meantime, the speed towards the target increases to 323kt.

At 09:34:31am, the buzzer for the request of cockpit access is sounding in the cockpit, as the captain wants to return to the cockpit. Seven seconds later, the controller from the Marseille control center again tries to contact the flight crew on the same frequency and then also tries the same on frequency

133.330MHz -without receiving an answer. At 09:35:03, the selected speed again increases to 350kt, which is the maximum speed the flight crew can select.

The cockpit recordings, from 09:35:04 to 09:39:27, show that four cabin calls were made for about three seconds. Parallel noises indicate that the pilot was knocking at the cockpit door on six occasions. His last knocks were accompanied by voices asking for the door to be opened.

Between 09:35:07 and 09:37:54, the Marseille control center for the last time tries to contact the flight crew over frequency 121.500 MHz on three occasions on, and on frequency 127.180 MHz on two occasions. Another attempt to contact the flight was made by an air traffic controller from the French Air Defense system at 09:38:38am, who tried to contact the flight crew on three occasions on frequency 121.500 MHz, also without receiving an answer. Recordings show that the pilot, at 09:39:30, made a last desperate attempt to open the door by violently blowing the cockpit door. From 09:39:33 to 09:40:07, there were also low amplitude inputs being made by the copilot using the sidestick. These actions did not change the descent of the aircraft since they were not strong enough to override the preset autopilot.

At 09:39:54, the crew of another aircraft tried to contact the flight crew of Germanwings flight 9525. It was ordered to do so by the Marseille control point.

The DETRESFA (distress phase) was triggered by French air traffic controllers at 09:40:00am. A distress phase is characterized by a situation wherein there is a reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger and require immediate assistance.

09:30:27- 09:34:31am	The copilot moves the switch to lock the cockpit door and keeps toggling it.
09:30:53 am	The selected altitude on the FCU is changed within one second from 38,000 ft to 100 ft (the minimum value that is possible to select on the A320). One second later, the autopilot is changed to OPEN DES mode (which manages the target speed based on the flight plan entered or selected manually). Autothrust is changed to THR IDLE mode. The airplane starts to descend and both engines' speed decreased.
09:31:37 am	Noises of a pilot's seat movements are recorded
09:33:12 am	The speed management mode is changed from managed mode to selected mode (in which target speeds are chosen by the flight crew). The airplane's speed starts to increase along with the airplane's descent rate, which subsequently varied between 1,700 ft/min and 5,000 ft/min
09:33:35 am	The speed decreases to 288 kt. Then, over the following 13 seconds, the value of this target speed changes six times until it reaches 302 kt.
09:33:47 am	The controller asks the flight crew what cruise level they are cleared for without receiving answer. The airplane was then at an altitude of 30,000 ft in descent. Over the following 30 seconds, the controller tries to contact the flight again twice, without answer.
09:34:23 am	The selected speed increases to 323 kt towards the new target.
09:34:31 am	The buzzer to request access to the cockpit is recorded for one second
09:34:38 am	The controller again tried to contact the flight crew; without receiving an answer
09:34:47am	The Marseille control center tries to contact the flight crew on 133.330MHz, without any answer. The plane is then at altitude 25,100ft in descent

09:35:03am	The selected speed again increases to 350kt (the maximum speed that the flight crew can select)
09:35:04- 09:39:27am	The cockpit call signal from the cabin (cabin call) is recorded on four occasions for about three seconds
09:35:32- 09:39:02am	Noises similar to a person knocking on the cockpit door are recorded on six occasions.
09:37:11- 09:40:48am	Muffled voices are recorded, one asking for the door to be opened
09:35:07- 09:37:54am	The Marseille control center tries to contact the flight crew on three occasions on 121.500 MHz, and on two occasions on 127.180 MHz, without any answer
09:38:38- 09:39:23am	An air traffic controller from the French Air Defense system tries to contact the flight crew on three occasions on 121.500 MHz, without any answer
09:39:30- 09:40:28am	Noises similar to violent blows on the cockpit door were recorded on five occasions
09:39:33- 09:40:07am	Low amplitude inputs on the co-pilot's sidestick are recorded
09:39:54 am	The flight crew of another airplane tries to contact the flight crew of flight 4U9525 after being ordered to do so by the Marseille control center
09:40:00 am	The DETRESFA emergency phase is triggered

Final warnings

Shortly after the DETRESFA phase is triggered, the Ground Proximity Warning System of the aircraft (GPWS) issues an aural warning "Terrain, Terrain, Pull up, Pull up". The warning system is designed to alert the flight crew whenever a certain threshold is exceeded. In the case of Germanwings flight 9525, the GPWS is triggered due to an 'Excessive Terrain Closure Rate' (Mode 2) which is determined by the monitors mach number, radio altitude and the radio rate of change as well as the barometric altitude and

the airplane configuration. (Figure 7) (Boing, 2001). The determination of mode 2 results in the aural alert ‘Terrain, Terrain, Pull up, Pull up’ as the one recorded by the CVR.

09:40:41 am	Aural warning “terrain, terrain, pull up, pull up” from the GPWS are triggered and remain active until the end of the flight
09:40:56 am	Master Caution is recorded
09:41:00 am	Master Warning is triggered and remains active until the end of the flight
09:41:06 am	The CVR recording stops at the moment of the collision with the terrain

At 09:40:56 a Master Caution is recorded. A master caution is displayed by amber colored lights which aim to direct “the pilot toward the problem area concerned”. (The 737 Technical Site, 2016)

A Master Caution means that the system needs timely attention. The following Master Warning aims to show the ones in charge that the systems’ condition is critical and requires immediate attention. This Warning remains active until the aircraft collides with the terrain of the French Alps, which is also when the CVR stops recording. According to French authorities, the airplane crashes into the mountain range with a speed of about 700km/h at 09:41:06am.

3.3. Stage 2 – immediate reactions on the 24th of March 2015

Seven minutes after the crash, a fighter jet from the French air force takes off from the military airbase in Orange, having been ordered to do so by French national operators. Since a controller from the French air defense system was also trying to establish contact and observing the course of the flight, it can be suggested that the organization acted on its own behalf and information. At 10:01 it reaches the vicinity of the accident site.

At 10:15 The Marseille en-route control center informs the BEA of the accident to an airbus A320. As stated in the final report, the EU regulation n°996/2010 of the European Parliament and Council of the 20th October 2010 provides for a Safety Investigation, which was immediately initiated by the BEA.

Seven BEA investigators visited the crash site in the afternoon of the same day and safety investigators were able to access the crash site the following day after having coordinated with judicial authorities and the French police.

Germanwings first publicly responded to the crisis via Twitter at 10:52am, stating that they have recently become aware of media reports speculating on an incident but they say they do still not have any own confirmed information. “As soon as definite information is available”, the company says, it wants to inform the media. For the public to monitor proceedings, the company refers to their website. (Eurowings, 2015)

Websites like flightradar.com are faster in taking over the information provision to the public. The website allows people to track flights, so the disappearance was immediately visible to those following the flight. At 11:04am the company makes the flight route available to the public on its website and announces it on Twitter.

Even though this information is not officially verified at that point, flightradar.com is the first reliable source to publish estimations on the flight course and the flights last position. Flightradar.com bases its flight route estimations on ADS-B, MLAT and radar data sources, which are aggregated with the schedule and the flight status data from airlines and airports. (flightradar24, 2016)

A speaker of the Airport Düsseldorf says by the afternoon there were between 40 and 50 people waiting for information on the flight 9525. The Persons affected were taken away from the rush of the airport to get across the sad news. He states that people arriving at the airport later on had already retrieved the news from the media and were treated differently.

At 12:16pm, the French President Francois Hollande expresses his condolences to the families of the victims on Twitter, speaking of a tragedy. Shortly after, Britain’s’ deputy prime minister Nick Clegg also expresses his condolences to the victims’ families.

Between 12:34 and 12:41pm Lufthansa releases a statement on Twitter saying that “If our fears are confirmed, this is a dark day for Lufthansa. We hope to find survivors.” (Carsten Spohr)

France’s Interior minister reveals that debris have been found at around 2000 meters above sea level.

Around half an hour later, the Spanish Prime Minister expresses his dismay.

At 01:23 Lufthansa and Germanwings visually express their grief and reflect the tragedy on social media by changing the color of their Twitter account images to black and white.

At 1:46 Germanwings reveals more technical details. The company states that the A320 type aircraft was carrying 144 passengers and six crew members, whose family members and friends will be cared for. At 12:21, the ‘Auswaertiges Amt’ opens a crisis hotline and at 12:23 the Vice President of Lufthansa Europe briefs the media on the incident, without revealing new information.

At 02:49 the German chancellor states “we are going through hard hours” (scibblelive.com, 2015) and announces to travel to the crash site the following day.

09:48 am	A fighter jet from the French air force takes off from the military airbase of Orange, having been ordered to do so by the national operations
10:01 am	The French military plane flies over the vicinity of the accident site
~10:15 am	The Marseille en-route control center informs the BEA of the accident to an Airbus A320, registered D-AIPX
10:30-afternoon	Families arrive at Düsseldorf airport and receive the news
10:52 am	Germanwings tweets that they “have recently become aware of media reports speculating on an incident” but they say they do still not have any own confirmed information.
10:53 am	Eurowings again releases a Tweet saying that “as soon as definite information is available” they want to inform the media immediately”. Furthermore they refer Twitter users to their website for updates.
11:04 am	Flightradar24 tweets that the playback of flight 4U9525 is available on their homepage and pictures of the plane are available on https://www.planespotters.net/airframe/Airbus/A320/147/D-AIPX-Germanwings
12:16 pm	The French President expresses his condolences to the families of the victims on Twitter
12:21 pm	Britains Deputy Prime Minister Nick Clegg expresses his condolences

~12:34- 12:41 pm	Lufthansa releases a statement on Twitter, stating “we do not yet know what happened to flight 4U9525. My deepest sympathy goes to the families and friends of our passengers and crew.” The company further states that if their fears are confirmed “this is a dark day for Lufthansa” and that they hope to find survivors.
12:39 pm	France's Interior Ministry reveals that debris has been found.
01:12 pm	The Spanish Prime Minister says he's dismayed by the tragedy in the Alps.
01:23 pm	Lufthansa and Germanwings change the color of their Twitter pictures to black and white
~01:30 pm	Reports emerge, that 16 German exchange students were on the doomed aircraft
01:46 pm	Germanwings reveals that the plane was a A320-type aircraft with 144 passengers and six crew members on board.
02:21 pm	The German foreign ministry (Auswaertiges Amt) opens a crisis hotline
02:23 pm	Lufthansas vice president for Europe briefs the media on the incident (wsj, 2015)
02:41 pm	German chancellor states “we are going through hard hours” and announces to travel to the crash site the next day
03:09 pm	A Germanwings press conference with Germanwings CEO Winkelmann takes place
04:01 pm	BEA investigators were able to access the crash site according to the French Prime minister, where they are able to find the CVR after ~2 hours
~04:05 pm	First picture of the crash site emerge, showing scattered pieces of the aircraft, no bigger than a small car
04:48 pm	Lufthansa Tweets that their CEO and German government representatives are on their way to France.
05:29 pm	White house officials in Washington state that the incident does not appear to be terror related
07:18 pm	Press Conference by Lufthansa where the company promises every conceivable help to the relatives of the victims
~08:15 pm	A lot of people from Haltern am See (Germany) gathered in front of a local church.
08:52 pm	The search at the crash site is stopped and is planned to be resumed on Wednesday morning.
09:31 pm	A Lufthansa spokesman says they had to cancel “seven Germanwings flights departing from Düsseldorf today because of difficulties with crew members. They told us they felt unfit to fly” (Deutsche Welle, 2015)

At 03:09 pm, another press conference with Germanwings CEO Winkelmann takes place. At around 04:01pm, the French prime minister confirms that BEA investigators and support teams were able to access the crash site via helicopter, which had managed to land near the crash site. Shortly after, pictures of the crash site emerge, showing scattered pieces of the aircraft, no bigger than a small car. Weather

conditions hamper the search and recovery process in a place which as such is already difficult to access.

(Figure 9)

During that operation, investigators find the Cockpit Voice Recorder (CVR). The Flight Data Recorder (FDR) however remains undiscovered.

At 4:48 pm, Lufthansa announces on Twitter that their CEO and German government representatives are on their way to France. Meanwhile, the White house in Washington states that the crash “doesn’t appear to be Terror related “(Scribblelive.com, 2015)

At 07:18 pm, a press conference is initiated by Lufthansa, where the company promises every conceivable help to relatives of the victims. As soon as further information is available, they want to communicate it to the people affected as well as the public.

Until around 8 pm, a lot of people had gathered in front of a local church in Haltern am See, where a large number of victims originated from.

The search of the crash site is paused at 08:52pm. Police and military stays at the crash site overnight to secure it.

At 09:31pm a Lufthansa spokesperson states that over the day, seven flights departing from Düsseldorf had to be cancelled due to crew members reporting that they felt ‘unfit to fly’.

3.4. Stage 3 – the first days following the crash

The CVR found at the crash site on the 24th of March is transferred to the BEA on the 25th of March 2015 under judicial seal. The final report provided by the BEA suggests that the BEA itself may have engaged in an unlawful inference (BEA final report, p.10) by not immediately communicating CVR data to French judicial authorities.

The BEA associates foreign counterparts with the investigations, namely the BFU (Germany), CIAIC (Spain), AAIB (UK) and the NTSB (USA). It also associated technical advisers and medical experts.

According to ICAO Annex 13, Australia, Israel and Japan were allowed to appoint experts following the investigations.

In the early morning of the 25th March, Australia's foreign minister Julie Bishop states that her "thoughts and prayers are with families & victims" of the crashed Germanwings flight 4U9525, of which two were Australian nationals. The Australian Government also offers details on the way they are proceeding, they have a hotline in place for people concerned but do not reveal detailed information on the victims of the crash at this point. The EU Parliament starts its session on the 25th of March 2015 with a minute of silence. A second press conference is convened by Lufthansa, in which the CEO confirms that the plane apparently has been deliberately crashed.

Later on the same day, leaders visit the crash site and pay tribute to the victims.

On the 26th of March news media reveal that one of the pilots was locked out of the cockpit, banging against the door to get back in.

In a press conference on the 26th, the BEA chief prosecutor says that there is merely the CVR available at this point and reports on the evaluation of the recordings. He says that the breathing sound of the pilot proves that he was alive. He reports on the copilots' unresponsiveness to air traffic controllers and knocks on the cockpit door. He also says that no emergency signal was triggered by the pilot. The most plausible interpretation, according to him, is that the copilot through deliberate passive behavior prevented the pilot from entering and deliberately initiated the descend (Phoenix, 2015).

On the following day, German police officials find a torn sick note for the day of the crash at Lubitz' home, which was issued by his treating psychologist. Later on the same day, Germanwings stated that "no medical note was presented to the firm for this day" (Ruptly, 2015)

On the the 27th "France's leading pilots' union also announced it is filing a lawsuit over leaks about the investigation into the Germanwings plane crash." (Ruptly,2015) It is not naming an alleged perpetrator, leaving it up to the French investigators to determine who is at fault.

On the same day the EASA issues a Safety Information Bulletin relating to authorized persons in the cockpit (EASA, 2015). The airlines Norwegian, easyjet, Air Canada and Air Berlin also announce that they will be immediately adopting the 2-persons-in-cockpit rule.

On the 31st, French President Hollande promises that all victims will be identified by the end of the week.

The FDR was found in two separate pieces. It was complete and could be analyzed on the 02nd of April.

25/03/15	Australia's foreign minister Julie Bishop says her "thoughts and prayers are with families & friends of victims" of the Germanwings flight 4U9525 crash, of which two were Australian.
25/03/15	The European Parliament starts its session with a moment of silence in memory of the victims of the crash.
25/03/15	In a second Press conference held by the Lufthansa, the company states that French authorities have revealed information. After an evaluation of the voice recorder, Carsten Spohr says they have to acknowledge that the plane has apparently been deliberately crashed. The CEO also reveals that Germans, Spaniards, Britons were on board with other passengers from Holland, Japan, Belgium, Argentina, Iran and the US
25/03/15	Leaders from Germany, France and Spain visit the crash site
26/03/15	News media reveal that one of the pilots was locked out of the cockpit, banging against the door to get back in.
26/03/15	During a press conference of the French investigators, prosecutor Brice Robin reveals the preliminary findings from the Cockpit Voice Recordings.
27/03/15	Police finds a torn sick note at Lubitz's home
27/03/15	"France's leading pilots' union is filing a lawsuit over leaks about the investigation.
27/03/15	The EASA issues a Safety Information Bulletin (SIB n°2015-04)
27/03/15	Several airlines announce that they are adopting the 2-persons-in-cockpit rule
27/03/15	Germanwings states it was unaware of Lubitz' medical note
31/03/15	French President Hollande says that all the victims "will be identified by the end of the week" (Ruptly,2015)
02/04/15	The FDR is complete and analyzed by investigators

3.5. Stage 4 – The aftermath of the crash

April- August 2015	The Civil Aviation Authority (CAA) reviews and considers changes to the current assessment system.
April – November 2015	A German task force is established to determine conclusions on the crash
06/05/15	The BEA publishes its preliminary report
06/05/15 - 16/07/16	The EASA establishes a Task Force to arrive at EU level recommendations
21/09/15	The Aerospace Medical Association's Mental Health Expert Working group publishes its reviewed recommendations
13/03/16	The final report is published by the BEA

Between April and August 2015 the civil aviation Authority (CAA) reviewed and considered changes to the current assessment system within the CAA Mental health working group, being tasked by the department for Transport of the UK.

From April to November 2015 a task force is appointed German BMVI (Bundesministerium für Verkehr und digitale Infrastruktur) under the auspices of the German Aviation Association (BDL) to determine conclusions on the crash. (BDL, 2015) As the EASA, the task force focusses on the “diagnostic awareness of psychological/mental health problems”. (BEA Final Report, 2016, p.77) It also draws conclusions regarding cockpit door regulations, aeromedical expertise and pilot support groups.

The American Fitness Aviation Rulemaking Committee (ARC) has as of May 2016 not provided its recommendations to the US Federal Aviation Administration (FAA) yet. But it “may consider changes to medical methods, aircraft design, policies and procedures, pilot training and testing, training for Aerospace Medical Examiners, or potential action that may be taken by professional, airline or union groups” (BEA Final Report, 2016)

On the 06th of June 2015 the BEA publishes its preliminary report on the crash.

From the same day on and until the 16th of July 2015 the EASA establishes a Task Force, initiated by the European Commission, to look into the incident and give recommendations to European regulators. Its final report includes five recommendations to the European Commission. (EASA, 2015)

Therein, the Task Force focusses on medical aspects such as aeromedical checks but also paid attention to issues like the two-persons-in-the-cockpit recommendation.

On the 21st of September the Aerospace Medical Association’s Mental Health Expert Working group publishes its reviewed recommendations.

The group argues against in-depth psychological testing as part of a periodic assessment. They suggest entry tests and periodical examinations of those who have a history of mental illness. Furthermore, they

argue, “more attention should be given to less serious and more common mental health issues and conditions during the aeromedical assessment”. (BEA Final Report, p. 81) They also call for more awareness, medical expertise and a nonthreatening environment, in which reporting in a “safe zone” is possible. (Aerospace Medical Association, 2015)

The final BEA report is published almost one year after the incident, on the 13th of March 2016. This event concluded the investigation. (BEA, 2016)

The international reactions of stakeholders from different fields, triggered by the crash of Germanwings flight 4U9525, highlight the weak spots within guidelines worldwide.

4. Analysis

4.1. Crisis communication and blame games

Crisis Communication

What triggered the immediate information provision by Lufthansa remains largely unclear. But the revelation made by the BEA and Lufthansa on day three after the crash goes against what scientists consider good crisis communication. In the investigation period, Lufthansa CEO Carsten Spohr provides information to the public, which was to remain disclosed and handled with care. The interpretations of the voice recorder, which were made public, could not be verified to 100%, since the investigators did not have access to the Flight Data Recorder (FDR) at that point in time.

The analysis of Crisis Communication after the Germanwings 4U9525 incident aims to draw on “Situational Crisis Communication Theory” (SCCT) established by Coombs, 2012. SCCT aims to establish the “frame stakeholders are using to categorize the process”(Coombs&Holladay, 2012, p. 39).

SCCT draws conclusions on how the 'Organizational Reputation' and ultimately the 'Behavioral Intentions' towards the organization were affected by the way communication was conducted.

Crisis responsibility

After the CVR and the FDR are evaluated, it is clear that the crash was caused deliberately by the pilot. He intentionally locked the pilot out of the cockpit, triggered the descent of the aircraft and remained unresponsive to requests made by the control center, the French military, another airplane and the pilot. The responsibility of the co-pilot becomes Germanwings' and ultimately Lufthansa's responsibility, which is the employer of the pilot at the time of the crash. With the co-pilot being part of the organization Germanwings, it can be suggested that a part of the organization acted intentionally. Weick and Sucliffe would argue that with Lubitz's employment at Germanwings, a part of the organization malfunctioned, which manifested itself and came to light with the crash of the aircraft.

This alone serves as evidence for the fact that crisis responsibility can be assigned to Lufthansa.

An additional aspect which indicates Lufthansa's responsibility can be established by looking at Lufthansa's crisis response strategy. Lufthansa recognizes the intentional aspect of the crash by apologizing for the incident and offering compensation to the victims' families. This response strategy, according to Coombs, 2012, is an indicator for an intentionally caused crisis. The underlying motivation for Lufthansa to respond in that manner is to keep reputation loss and the negative behavioral intentions towards the organization low.

So the fact that the crash was triggered intentionally, is mirrored in the response strategy picked by Lufthansa. These observations imply a high crisis responsibility of Germanwings and ultimately Lufthansa.

Affect

The question of how the crisis nature shaped the perceptions and attributions of stakeholders is referred to as the 'Affect' of the crisis on its stakeholders. SCCT disregards the reactions to a crisis and instead

argues that the nature of the crisis and who is held responsible determines in how far there are negative behavioral intentions towards an organization, posing a “threat to the organizations’ reputation”.(Coombs&Holladay, 2012, p. 38) It is theoretically suggested that the more an organization is held responsible for a crisis, the more anger is expressed towards it by the stakeholders involved in the crisis.

Crisis responsibility has been evaluated as high in the above. But how the Affect turns out to be also depends on the Response Strategy.

Lufthansa responded to the crisis offering condolences to the victims’ families, initially assuming an accident. When the deliberate nature of the crash was indicated by the BEA investigators, Lufthansa was quick to adopt the finding and offer condolences and compensation to the victims’ families. Whether it was appropriate to adopt the unverified finding is disregarded here. Key is that the communication strategy was aiming at a repair of the organizational reputation.

An accommodative response, according to theory, is the most fitting way to respond to an intentionally caused crisis.

Tweets and comments of the general public as well as mainstream media reports show overall expressions of compassion and concern following the incident while also evoking a sense of fear.

This fact indicates that Lufthansa’s accommodating response strategy has been accepted by its stakeholders. The causal connection between the ‘Response Strategy’ and the ‘Affect’ on the stakeholders is also supported by theory. ‘Crisis Response Strategy’ does to a large extent explain the ‘Affect’ of the crisis on stakeholders (Figure 1).

So the Response Strategy is suggested to have mediated the anger of stakeholders, turning it into insecurity, sadness and compassion rather than anger.

However, Coombs and Holladay, 2007 also state that the affect of stakeholders is linked to Behavioral Intentions, which manifest themselves in purchase intentions and negative word of mouth.

Lufthansa stocks reacted to the crash and shares were dropping by more than five percent (to 13.07 Euros per share) (International Business Times, 2015). Even though by the end of the day, the company slightly recovered, it was still the worst performing firm at the Frankfurt stock market of the day and shows the insecurity of the market concerning the cause of the crash. The European aircraft producer Airbus, which is the manufacturer of the aircraft suffered a drop of more than two percent in Paris initially (to 59.14 Euros per share), but ended the day with a small plus.

Lufthansa was also impacted by the incident and in its shareholder information of August 2015 ensures investors of the future viability of the Lufthansa group.

Ensuring investors of a quick recovery from the crisis makes clear that Lufthansa aimed at avoiding negative word of mouth. The relatively quick recovery of Lufthansa shares, suggest that the company faced 'reduced purchase intentions' in the immediate aftermath of the crisis, but managed to avoid longer lasting negative effects on the company.

Crisis response Strategy

Crisis responders are advised to choose more accommodative response strategies and help the victims when a crisis has intentional elements to it and thereby poses a high threat to the organizations' reputation. A strong intentional aspect to the crisis remains uncontested after the investigations, pointing to a high crisis responsibility of Lufthansa. Acting in an accommodative manner would mean that the organization seeks to rebuild and improve the perception of the organization through compensation and apologies.

Lufthansa's response therefore reveals, whether the company indeed chose an accommodative strategy and the theoretical assumption holds true.

It is hereby assumed, though theoretically not explicitly referred to by Coombs, 2012, that an accommodative response strategy might also include the revelation of information prior to its verification. This does not change the goal the strategy aims at, namely at rebuilding the organizations' image, but it neither implies that the crisis with this strategy is managed in line with 'good crisis management'. So

even though the organization aims at full revelation, investigation and openness, it does not necessarily do so for the good of all stakeholders but for tactical reasons. This aspect will be further examined when evaluating the blame games at play, since this early response strategy was arguably used to divert/relocate blame.

Communication impacts and may be directed at the dynamics blame games take on.

An examination of the official statements made by Lufthansa in the aftermath of the crash show that the company indeed chose an accommodative approach to address the public and the victims. The crisis respondents repeatedly use phrases like ‘deep sorrow’ (on Twitter: ‘#indeepsorrow’), ‘our thoughts and prayers are with the victims’, ‘we need to take care of the relatives’ (France 24 English, 2015), ‘condolences’ and ‘shocked’ in its public statements following the crash. (Wsj video, 2015)

In contrast there are no signs of reinforcing strategies, which would suggest that the company added positive information or reminded people of past good events as a response. There was also no room for a denial of responsibility, since the copilot was trained by Lufthansa, employed by Germanwings and underwent Lufthansas’ medical examinations.

Responses from the side of Lufthansa or Germanwings, diminishing the severity of the crash are also not visible, at least not as an immediate reaction of Lufthansa. The former PR-chef of Lufthansa, Barbara Schädler has revealed that she received mails from communication consultants in the first hours following the crash, which said that she should be careful to not connect the Lufthansa-brand with the incident. She said she did not consider such an action, which would not have been in line with a moral and humane behavior. (PRReport, 2016) So she, has consciously decided that Lufthansa will take on responsibility for its daughter company instead of diverting the attention and responsibility away from Lufthansa.

Crisis response strategies have hence been accommodative, which has slightly weakened the attributions of responsibility to Lufthansa. The accommodating crisis response has also less severely damaged the organizational reputation and limited the stakeholders anger towards the company.

Prior reputation/ Relationship

Lufthansa has a well established reputation worldwide for its high standards. This is reflected in the strict crew selection process and the neat safety checks of aircrafts. Lufthansa CEO Spohr, in one of his first addresses to the public, even mentions that the Lufthansa employs only the best people. This view is reflected in the opinions of a wider public. So it can be suggested here that Lufthansas reputation did not significantly intensify the damage the crisis had on the organization.

Crisis history

The number of incidents that can potentially strike an airline is of course largely affected by the number of years the airline has been operating. Considering Lufthansa's history, we find that between 1959 and 1993, 4 commercial aircrafts crashed fatally. Taking into account the fact that Lufthansa is rated as one of the world's safest airlines and considering the fact that the last crash (prior to the Germanwings 4U9525 crash) occurred in 1993, it can be assumed that Lufthansa's crisis history does not show to be significantly different than the crisis history of other airlines.

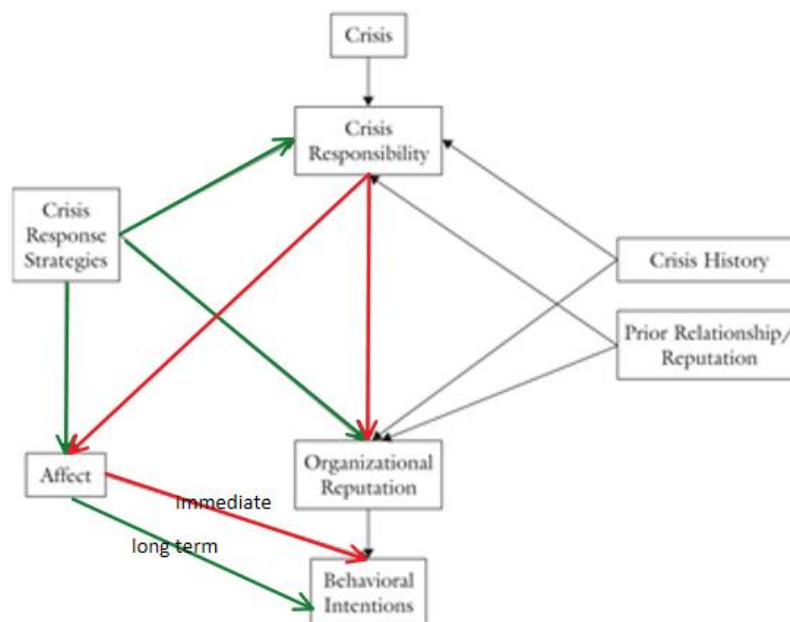
The Preliminary BEA report points out that in the history of public transport accidents, twelve public transport incidents or accidents have been brought to light:

- "caused by 'intentional maneuvers by one of the flight crew members' (BEA final report), or
- for which it is not possible to rule out the hypothesis of intentional maneuvers by one of the crew members that was intended to lead to the loss of the aircraft and its occupants, or
- where the behavior of one crew member was significantly affected by a mental disorder and had an impact on the safety of the flight" (BEA Preliminary Report, 2015, p.71)

Six of these incidents, which displayed an immediate threat to the lives of the people on board or ended deadly, have a proven connection to a (previous) mental disorder of one of the crew members.

Four incidents are, considering the proceedings also very likely to be connected to mental problems of crew members.

The Figure beneath (Figure 12) summarizes how crisis communication has played out from the crisis managers' (Lufthansa's) perspective. Green arrows point out an overall more positive impact of one variable on another while the red arrows show that there is a rather negative impact on a certain variable. As visualized the crisis response strategy alleviated the negative effect, which crisis responsibility and affect had on the organizational reputation/the behavioral intentions towards the organization. The organizational reputation has suffered from the crash and immediate concerns and negative behavioral intentions were visible as was pointed out. However, Lufthansa managed to uphold positive long term behavioral intentions towards the organization and was hence able to continue its business routine.



Blame games

The aftermath of a crisis situation is shaped by blame games, since blame is central to politicized situations. Hood, 2002, provides a tool for the determination of blame games with ‘Malign’ outcomes and ‘Sympathetic or ‘Vindictive’ Public Attitudes. (Figure 11) It is hereby assumed that blame avoidance is as much desired and practiced by private entities as it is by public bodies.

He distinguishes the different outcomes of blame games by classifying the incidents according to the choice of policy control and Public Attitudes following the incident.

In this analysis, Lufthansa’s blame management is analyzed. While it is not assumed merely Lufthansa is to be held accountable for the crisis, it is the entity that officially took on responsibility in the direct aftermath. The analysis also points out which wrongful practices of other entities (Weick&Sucliffe, 2007), largely managing to avoid blame, contributed to the crisis.

The BEA was the main entity responsible for the analysis of the event. It therefore (indirectly) shaped the blaming process in how it formulated the proceedings and whom it held responsible for the occurrence of certain events. On March 26th 2015, it held a press conference, where the chief Marseille prosecutor Brice Robin stated that permitted investigation results point to the finding that the plane had been deliberately crashed. He said that the sound of breathing in the cockpit could be heard until the impact, which according to him means, that the copilot was alive when the plane crashed. (Phoenix, 2015)

The BEA has later been criticized for that statement, since experts held that even if the copilot was alive, it does not necessarily mean that he was conscious.

The fact that the CEOs of both Germanwings and Lufthansa addressed the public right after the crash points out that blame was not delegated by the two companies. Public attitudes in the immediate

aftermath of the crash mirrored compassion, sorrow and insecurity. This shows that Lufthansa was connected to a limited amount of blame.

On day two, Lufthansa took on responsibility for the crash after the BEA had put forward its preliminary findings, even though the cause of the crash could not be ultimately verified.

The response strategy also shows that the aim was to resolve the crisis by accepting blame.

The immediate drop in Lufthansa shares, the media pressure, the insecurity of Lufthansa customers and the high probability of Lufthansa being accountable arguably contributed to the decision from the side of Lufthansa to confirm the cause presented in the media, before it was verified.

Negative developments on all of these factors would have meant further asset losses for Lufthansa.

For this reason, it can be suggested that Lufthansa did not await verified information -also concerning the copilot- before confirming reports concerning the presumed cause and hence go against theoretical suggestions concerning 'good crisis management'. (Coombs&Holladay, 2012) But this has arguably also led the public to be more vindictive towards Lufthansa.

Looking further, Lufthansa's governing policies reveal that the company may have wanted to hide certain practices.

Carten Spohr on the 26th March 2015 made a statement concerning Lufthansa crew, which he says is selected, trained and qualified to be among the world's best. He further says that this is single case, which no safety system in the world can completely rule out.

But with that statement he also points to the pressure on the Lufthansa pilots to be among the best. (CNN, 2015) The atmosphere of always being the best (Diepgen in DasErste, 2015), does not create the space for mentally sick crew to report their problems. There is hence a clash between Lufthansa's working moral, reflecting the company's expectations, and the psychological problems that can come up in the personal life of a pilot.

Several experts have said that pilots suffering from a depression may fly safely under close medical supervision and medication. But if suffering a psychological illness means dismissal, fewer pilots will actually report problems, continue to fly with their illness and pose a much higher threat to society.

I want to point out here that it remains unclear what exactly Lubitz suffered from in that particular moment but that it is clear that his behavior does not merely reflect a depression.

People suffering from a depression, according to research, do not have the intention of killing a large number of strangers, even if they have suicidal tendencies. Prof. Florian Holsboehr points out, his behavior was atypical for a depressive person. One of his doctors had before the crash diagnosed a psychosis, which apart from moments of depression contains

This fact makes it important not to generalize Lubitz acts to possible behaviors of depressive pilots, even though he suffered a depression at some point prior to the crash.

Lubitz himself, diagnosed with a psychosis should of course not have been allowed to fly, exhibiting the symptoms of psychological abnormalities, reactive depression and personality disorders.

(Kreindler&Kreindler, 2016) But a less severe depression in the beginning of his career could arguably been more effectively dealt with, if the company had had a system for reporting in place.

So Lufthansa did not provide room and alternatives for pilots with mental health problems other than withdrawing their license. The need for a creation of space for reporting has also been called for in the BEA report, which can be seen as blame on Lufthansa for not having installed such a reporting system within their organization yet.

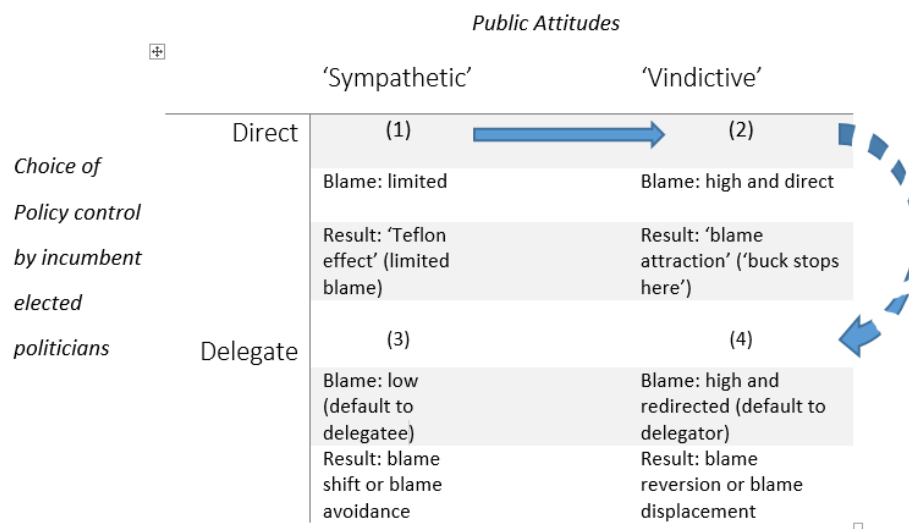
The limited blame the company received directly after the crash is therefore suggested to have increased after the first three days due to:

The confirmation of unverified information because of:

- At a first hindsight: the fall in shares, media pressure, customer concerns etc.

- After a closer look: the cover up of a reporting system lacking a 'safe zone' for pilots to report illnesses within Lufthansa

In terms of Coombs categorization, blame was limited in the very beginning (1) and then turned into high



and direct (2) or even high and redirected blame (4).

4.2. National politicization

Looking at the reactions that were triggered by crash indicate in how far it indeed was a technical crisis as theoretically assumed or whether it was more politicized than it appears. The psychological illness of the pilot, which is the simplest explanation for the crisis, would depict a technical problem.

Social and political reactions and the way the crisis-situation was used as a window of opportunity by politicians and other stakeholders in turn can determine how important the event was politically.

The cause of the Germanwings flight 9525 crash does at first sight seem like a technical problem. With the quick responses from governments, the BEA and Lufthansa, there seemed to have been a large availability of knowledge. A large consensus on the values connected to the incident apparently manifested themselves in the consensus on the wrongfulness of the action conducted by the copilot of flight 4U9525. Here, this initial assumption will be scrutinized.

Why there was not a large availability of information:

1. In the aftermath of the crash, the incident has received a lot of media attention. Media sources show a vast coverage on how the crisis unfolded and who is to blame for the crisis. While this does mean that there is a large availability of information, the dynamic also makes speculations spread with an increased speed.

Germanwings and Lufthansa did not clearly point out to the public who is responsible for the provision of knowledge and information on the incident in the direct aftermath of the crash.

Germanwings was slow to update the public and was soon outpaced by flightradar.com.

This unclarity does not necessarily impact the availability of knowledge but the accessibility of knowledge. The accessibility of knowledge through a clear coordinating entity is key to manage a crisis adequately (Toetsingskader, 2012). So the crisis manager (Lufthansa) was supposed to be the one making information accessible to the public first.

2. Furthermore, Lufthansa did not wait with the provision of information until a technical defect could be eliminated as the cause of the crash. The uncertainty regarding the cause of the crash would have been part of a complete provision of knowledge on day two after the crash. Several experts have also confirmed that it could at that point in time not have been clearly established what exactly the cause of the crash was.

The fact that a strategic communication was prioritized resulted in steep cuts in the information provision regarding their truthfulness.

These incidents, in their combined nature point to the fact that the availability of knowledge in the immediate aftermath of the crisis was smaller than initially assumed.

This points to the fact that the information provided to the public by the BEA on day two can to a large extent be described as speculation rather than information.

Why there was less societal consensus than assumed:

The consensus on values is established with regard to the initial public shock, concern and compassion after the incident. These emotions mirror the significance of an incident in which 150 people lost their lives in an event that could've occurred to everyone of us.

It can therefore be said that there is a large consensus that such incidents are to be avoided with every measure available.

1. Arguably, this is not the direction media reports were heading in since especially the German Newspaper 'Bild' personified the issue after leaking CVR recordings from French BEA investigators. They focused on the person Andreas Lubitz, who was suspected to be the perpetrator of the crash. So the actual value of preventing further similar incidents did in the aftermath of the crash not receive enough public attention.

The reason media reported in that manner can in part be found in the general negativity bias referred to above, which it aimed to satisfy.

2. By focusing on the person of Lubitz, too little public attention was paid to Lufthansa's' medical examinations and how they could be improved (by law), to the promotion of an introduction of a two person in cockpit rule, the handling and distribution of secret information and other important issues
- So it appears, that the values connected to the incident were clear and undisputed in the beginning and in the general sense but that the reporting on these values led to their distraction. Instead of turning to the roots of the problem which can be mainly found in German privacy laws, European aviation laws and the control mechanisms of Lufthansa, the societal values turned or were turned to the person of Lubitz.

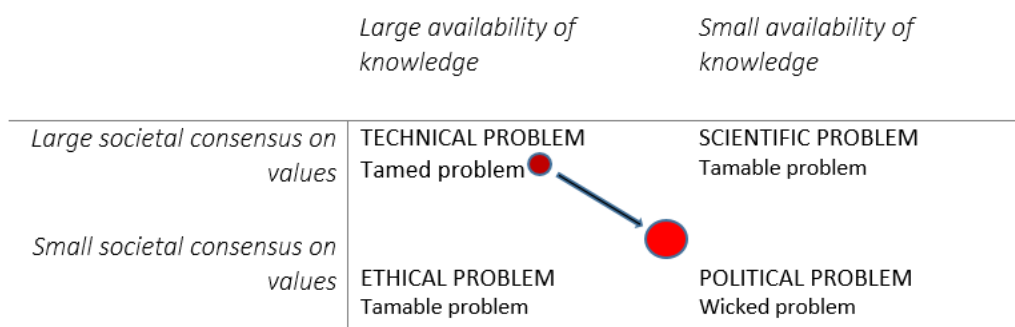
This leads to the overarching conclusion that technical aspects to the crisis exist, but that there are indications suggesting a further reaching political problem. This analysis does not go as far as to say that an adequate management of the Germanwings crisis poses a wicked problem and is hence an almost unsolvable problem facing crisis managers. It rather aims to point out that it is of utmost importance for crisis managers to be timely in their crisis response and information provision while at the same time ensuring a verification prior to publication. Furthermore, media needs to be aware of their impact on

societal values as the public needs to be aware of its responsibility to get informed on how their initial values are linked to improvements within the norms and systems. Only then can there be a large availability of (verified) knowledge to a unified society promoting its values.

Figure 15 presented below aims at visualizing the theoretical shift this analysis arrived at. The larger red point describes the position of the Germanwings crisis on a 2-dimensional scale of politicization with the insights from the analysis in mind.

National politicization of an issue affects the adequacy of crisis management since the time planning (as part of an adequate crisis management) as well as the assessment and distribution of information are hampered.

With the issue being more politicized than initially assumed, though not entirely political in nature, an enhanced pressure on crisis managers can be suggested, which negatively affects their collaborative efforts. If there is an enhanced pressure on crisis managers because an incident affects the stakeholders' values and there is no clear knowledge available on the incident yet, collaboration efforts of crisis managers are distracted and it becomes more difficult for them to accommodate time for consultations set out by protocols.



4.3. Collaboration of stakeholders

This analysis adopts the theoretical argument made by Scholtens and assumes that collaboration efforts in times of crisis are only realized, if protocols and other pre-established rules ensure a collaboration in the preparatory phase, hence before a crisis unfolds.

In order to establish how high collaboration in the preparatory phase is, this analysis will examine whether collaboration provisions in the ICAO agreements are extensive enough to ensure close and effective collaboration in times of crisis. Other pre-established rules and provisions will however also be considered.

Within the ICAO provisions, provisions on collaboration in Annex 19 and in parts of Annex 1 are considered. While Annex 19 outlines key safety management responsibilities, Annex 1 provides rules concerning licensing within which collaboration is analyzed. Annex 19 was specifically established to consolidate existing provisions and is applicable since November 14th 2013. (ICAO, 2013)

The provisions considered are therefore case-specific as well as generally applicable to crisis management collaboration which is based on preparatory collaboration and pre-established rules.

Annex 19

Two important recommendations are described in Chapter five (5.4 Safety information exchange), which concern the forwarding and exchange of information. States should hereafter forward safety information in their databases if it is of interest to other states. Recommendation 5.4.2 calls for the “establishment of safety information sharing networks among users of the aviation system”, facilitating exchange on safety deficiencies. A similar appeal for cooperation, also in the form of a recommendation, is issued in 8.9 of Annex 13. The recommendation calls for a promotion of “safety information sharing networks among all

users of the aviation system” which aim to facilitate a free exchange of information on actual and potential safety deficiencies.

As the Germanwings crash shows, these provisions did not prevent the crash from occurring. This can be attributed to the fact that it is merely a recommendation and does not bind states to engage in an exchange. It becomes clear that such an exchange in the preparatory phase could potentially have prevented the crash from occurring when looking at practices of other countries (e.g. the US). So an active suggestion from other countries to for example introduce the two-person-in-cockpit rule, a flight allowance only after having completed 1,500 hours of flight time and laws enabling doctors to reveal a patient’s records under given circumstances, could have improved practices and hence prevented the crisis.

This gives reason to suggest that the recommendations 5.4.1 and 5.4.2 of Annex 19 should be turned into standards, giving ICAO member states a stronger incentive to abide by them.

Annex 1

Provision 2.1. in Attachment C of Annex 1 can, with regard to Scholtens approach, be said to provide little incentive to practice and further review operating requirements, regulations and implementation policies on a more continuous basis. The legal document should therefore comprise the requirement for a perpetual communication of changes, experiences and organizational developments. Only in that way can the Safety Management Systems be sufficiently improved.

Appendix 4 to Annex 1 of the ICAO agreement specifies the ‘safety management’ of an organization.

Therein, provision 1.4. points to coordinating efforts that need to be practiced among organizations dealing with crises, with regard to the transition phases “from normal to emergency operations and the return to normal operations”. (Annex 1 Personnel Licensing, 1947, 1.4)

This, in the eyes of Scholtens and others, this is an important and essential provision to make sure crisis collaboration is fully functioning whenever a crisis unfolds. Arguably this has been practiced by crisis

managers in Germany and France and the EASA on the European level, since the overall deployment of experts and the precision of investigators was satisfactory.

The statement made in the beginning of Attachment C (Framework for the State Safety Programme (SSP)) explains that a State Safety Programme “is commensurate with the size and complexity of the State’s aviation system, and may require coordination among multiple authorities responsible for individual elements of civil aviation functions in the State.” (ICAO Annex 1, Attachment C)

Theory would in this case suggest a more binding nature of the statement: “The implementation of an SSP is commensurate with the size and complexity of the State’s aviation system, and does require coordination among multiple authorities.”

Other important collaboration provisions are laid down in Annex 13 and concern the collaboration in the investigation. When the crisis has unfolded, the ICAO agreements provide for more specifications for collaboration possibilities or requirements. The legitimacy of the German participation in the investigation is set out in 5.27, which allows states having suffered “fatalities or serious injuries to its citizens” specific rights upon making a request.

The establishment of a EASA task force with the objective of investigating and preventing further incidents is also a protocolled in Annex 13 and L295/36 Published in the Official Journal of the European Union. The EASA is therein authorized to carry out “on behalf of the Member states the functions and tasks of the State of Design, Manufacture and Registry”. (Parliament and Council of the European Union, 2010)

These requirements for collaboration among others can be said to have been adopted in the aftermath of the Germanwings crash.

The European Commission tasked the European Aviation Safety Agency (EASA) with the establishment of a Task Force. It brought together 14 senior representatives from airlines, flight crew associations, medical advisors and authorities while the EASA’s executive director acted as the chair.

The EASA's efforts supplemented the efforts undertaken by the French BEA and resulted in future-oriented recommendations for the European level. (EASA, 2016)

This analysis reveals that concerning certain practices, collaboration was indeed practiced according to protocols (Annex 13, 5.27; Annex 1 Appendix 4, 1.4). However, the overall conclusion is that collaboration was often times not practiced at all or to a too small extent (Provision 2.1. in Attachment C of Annex 1), which can mostly be attributed to the fact that collaboration was protocolled in the rather weak form of recommendations (5.4.1 and 5.4.2 of Annex 19)

4.4. Degree of deviation from norms

By analyzing this variable, the paper aims to establish in which cases Lufthansa deviated from well accepted norms in their crisis management. The well-accepted norms analyzed are relevant Annexes of the ICAO agreement, namely Annexes 12, 13 and 17, as well as international and national provisions for injury awards after air disasters. (Weller et al. 2015)

Assuming that the adherence to norms enables an adequate management of the crisis, it will be examined, which well-accepted norms were neglected in the management of the Germanwings crisis. The norms that are of critical importance for the management of the Germanwings crisis will therefore be the focus of this analysis.

Annex 1. Personnel Licensing

The recommendation 1.2.4.2 advises states to conduct “routine analysis of in-flight incapacitation events and medical findings during medical assessments”.

A Medical Assessment according to 1.2.5.2 is valid for 12 months for the commercial pilot license.

This provision is necessary but arguably too sparse considering the fact that medical findings made during medical assessments cannot observe personal developments.

Including assessments on a more regular basis and with less at stake for pilots, as also suggested in the final BEA report, could help reducing the bias and lead to a better detection of illnesses. Psychological medical tests are, as pointed out in the BEA report, often times biased since a medical improvement is necessary for pilots to receive and extend their license. This also makes the medical certificate a precondition for pilots to exercise their profession.

If during the more regular assessments, there was no imminent threat of dismissal and hence less at stake, this would also lead to a higher probability to ascertain diseases; especially those of psychological nature. This can also reduce the pilots' bias, since showing symptoms of psychological diseases does not immediately mean a withdrawal of the pilots' license.

Annex 12. Search and Rescue

The cooperation between 'Search and Rescue services' and "those responsible for investigating the accidents" (ICAO Annex 12, Standard 3.2.3), which is the BEA, is suggested to have been unsatisfactory and incomplete. This fact is implied by the forthcoming of the investigators on the 26th of March 2015. An informant from the press also points out that there have been problems arising from the way the BEA conducted the investigation, which has been characterized by a very quick determination of the cause. Good practice of aircraft accident investigation requires an evaluation of both CVR and FDR prior to causal claims. Furthermore, there was no need for a publication of recordings with respect to recommendation Standard 3.3.3 of Annex 12 either since there was no reason to believe that the situation could be prevented from repeating itself, if no general emergency response was triggered.

Concerning the wreckage removal recommendation provided in chapter 4.5 (ICAO, Annex 12), practical adjustments were made during the recovery of the aircraft. This is however not valued a deviation from

well-established norms since the provision is a recommendation and practicalities would not have allowed an investigation prior to the removal of parts of the aircraft.

So the overall conclusion regarding Annex 12 is that norm 1.2.5.2 specifying medical examinations needs to be improved and cannot sufficiently prevent further incidents.

Furthermore, Standard 3.2.3 of Annex 12 concerning the cooperation between search and rescue services and those responsible for investigating the incident was not adhered to.

Annex 13 Aircraft Accident and Incident investigation

With respect to provision 4.1 of Annex 13 it can be questioned whether the format and content of the notification provided by the French government was complete (according to Annex 13, 4.2) especially regarding the nationality of crew and passengers. The German government did according to reports not have access to these details before the 25th of March. The lack of information on the victims' nationalities is however not attributable to the French government, which is likely to not have had access to this information either.

This implies the call for an addition to provision 4.1, requiring the operator and the state of occurrence, in a coordinated effort, to make the information outlined in 4.2. available to the State of Registry, the State of the Operator et cetera (ICAO, Annex 13 4.1)

France as the state of occurrence of the incident took on the responsibility for the investigation. Germany (through the BFU), Spain (through CIAIAC), the UK (through the AAIB) and the USA (through the NTSB) took on a part in the Safety Investigation after mutual agreement and consent, as is provided for in Chapter 5.1. (ICAO Annex 13). The possibility of such an assistance is also in line with the provisions in chapter 5.24 and 5.27 of ICAO Annex 13.

Concerning the accident investigation, it can be said that France, as the conductor of the investigation, fulfilled its duties with respect to Chapter 5.4.

The requirement in Chapter 5.6 stating that the investigator-in-charge” shall have unrestricted control over” (ICAO Annex 13, Chapter 5.6) the wreckage and “all relevant material, including flight recorders and ATS records” (ICAO Annex 13, Chapter 5.6) is however seen as problematic with regard to the investigation proceedings conducted by the French chief BEA investigator Brice.

The chief investigator did not handle the information he had access to on day two after the crash with care and seemingly did not coordinate his press-statement on March 26th with experts.

This fact points out that sticking to norms does not automatically lead to an adequate management of a crisis. It is key that the leeway within these norms is filled with considerate, reflected action and incorporates expert advice.

In order to make sure the leeway in Chapter 5.6. is adequately used, and thereby avoiding the chance of information mismanagement, the provision should be supplemented in the following way:

“5.6 The investigator-in-charge shall have unhampered access to the wreckage and all relevant material, including flight recorders and ATS records, and shall have unrestricted control over it after due consultation with the other investigating entities, to ensure that a detailed examination can be made without delay by authorized personnel participating in the investigation.”

Technical requirements concerning the flight recorder, specified in 5.7 and 5.8 (Annex 13) were adhered to by the French investigators. The requirements for autopsy examinations specified in the ICAO were also met. Qualified pathologists examined the body parts of the fatally injured crew and passengers.

The BEA not fully adhering to Chapter 5.12 (Annex 13) has arguably had a significant negative impact on the adequacy of crisis management. The provision states that “the state conducting the investigation of an incident shall not make the (cockpit voice recordings and transcripts from such recordings) available for purposes other than accident or incident investigation” (ICAO Annex 13, 5.12) This provision does not only forbid publication but contains a clear task for investigators to actively ensure that sensitive

materials cannot be accessed by third parties. The fact that these records are not even to be disclosed in the final report, if to pertinent to the analysis, stresses the (strategic) relevance of this information. As a journalist from an aviation newspaper confirmed, the New York Times managed to leak the CVR recordings on day two of the crash. The proceeding of events on the 26th of March 2015 also confirm media access to the CVR.

The note concerning provision 5.12 suggests that “if such information is distributed, it may, in the future, no longer be openly disclosed to investigators”, even though this “would impede the investigation process” (ICAO Annex 13, 5.12 Note)

A different consequence of a leak, only applicable in case the leak was not actively enabled by investigators, would arguably be a precise protocolling of the way both CVR and FDR are to be evaluated. The exchange of critical data should be conducted amongst as few people as possible to effectively and reliably evaluate the recordings, using the most secure technology available. This provision is to go further than the recommendation provided in 8.7 and 8.8 of ICAO Annex 13.

The standardization of critical data examinations would serve to investigate the cause of a crash in an independent and reliable manner and thereby positively affect the adequacy of crisis management.

Concluding it can be said that within Annex 13 the note concerning provision 5.12 does not hold due to the negative consequences it bears for the overall investigation process.

Provision 5.6 in needs to be supplemented to make sure that entities involved in crisis management coordinate their approach to the incident.

And concerning provision 5.12 it can be said that investigators did not adhere to it since they did not ensure that sensitive information could not be accessed by third parties

Annex 17. Security

Provisions in this Annex are mostly related to actions that should be taken by governments regardless of whether there is a crisis situation or not. When the provisions below are adhered to, their consequences

can be expected to positively impact crisis management. The provisions should therefore not be seen as part of an immediate reaction to a crisis. However, this analysis aims to include provisions of this Annex in order to point out how important precautionary measures become in crisis situations, as with the Germanwings crisis.

Regulation 2.1.3 of Annex 17 will be examined below. The provision requires contracting states to “ensure the organization that is responsible for their regulations, practices and procedures” (ICAO Annex 17, 2.1.3) protects “the safety of its crew (...) and” safeguards “the general public (...) from acts of unlawful interference” (ICAO Annex 13, 2.1.3)

The provision is specified in 2.2.2, where contracting states are called upon to implement measures designed to safeguard against lawful interference within domestic operations.

The German entities to a large part ignored this call for safeguards, by continuing to use doctor-patient confidentiality laws without clearly offering room for reporting in specific cases.

So the German government and its responsible bodies have supposedly not done their best at actually safeguard the general public of acts of unlawful interference.

It is important to note that German laws do allow for the breach of the doctor patient-confidentiality, but only if, after a weighing of interests and the finding that the prevention of concrete danger to person's life or a legally protected interest, is to be valued higher than the right to confidentiality of the patient. What could have advanced the cause of provision 2.1.3, are more specific rules by which doctors can abide and which would arguably have created more certainty and less fear of breaching the law when reporting.

Regarding provision 3.1.3 it can also be said that crisis managers of Lufthansa and German authorities have not properly and extensively enough reviewed the level of threat the procedures in place posed to aviation.

Even if the two-persons-in-cockpit rule in the US and other countries did evidently create a safer environment, leaving two persons in the cockpit, the organizations did not make an effort to adopt such

rules. Furthermore, both the German government and Lufthansa should have, during a review, have found that the medical assessments contain loopholes and that there are strong incentives for pilots to not reveal an illness (especially illnesses of psychological nature). This fact presents a deviation from provision 3.1.3 of Annex 19.

For the application of requirements laid down in 3.4.8, the presupposition that government bodies were concerned about acts of unlawful interference, needs to be established. However, even if government was aware of the weaknesses in the system, there is no evidence or reason to suggest they were fully aware of the danger of someone making use of several loopholes in order to conduct an act of unlawful inference. The suggestion here is that as a result of lack in reviews (provision 3.1.3), states are less likely to be aware and concerned with acts of unlawful interference.

So within Annex 17, regulations 2.1.3, 2.2.2 and 3.1.3 were not adequately addressed, since the level of threat was not extensively enough reviewed and since Lufthansa could not manage to protect the safety of its crew and passengers.

Compensation for personal suffering. International and national law provisions

Since the judicial process is still ongoing, it cannot be determined in how far Lufthansa will comply with compensation requirements for the victims' families. It is still interesting to point out what families can expect by law and to look at what they have received in compensation so far.

The money each family should receive for the victims' suffering (not their own) pretty clearly determined by the convention but has no limit.

Relatively timely after the incident, Lufthansa offered an immediate financial assistance of 50.000 EUR per passenger to the families. This payment amounts to around 1/3rd of what the families can legally expect for each victim.

The indemnity that is due to the surviving dependents in the case of the crash of the Germanwings flight 4U9525, is passed on to them at the death of their relative involved in the crash. Art 17 1, 21MUE determines a damage claim of at least 113 100 special drawing rights (which on the 26th June 2016 amounted to 142 305,70 EUR) per passenger.

The determination of the amount of additional injury awards each family member can expect is by far more difficult to determine and mostly depends on country specific compensation claims. (Spiegel online, 2016) Latter compensation is taken over by the air carrier indemnity insurance. (The Guardian, 2015)

The regulations concerning injury awards are much more inconsistent and therefore more contentious. Injury awards for family members are laid down in the 'Montreal Convention' of 1999. The Convention determines a non-discriminatory framework of liability for damage claims.

But within this framework of liability, national law is applied (in Germany §36ff. LuftVG). And since legal orders of the contracting states put different numbers on damage claims and the Montreal Convention does not provide the extent of liability, the non-discriminatory framework of the Montreal Convention cannot be practically applied.

So the families of the victims can expect different sums of money even though their family members who were victims of the crash suffered and died in the same way.

What the families can expect depends on national laws and is thus depended on the nationalities of the victims. Because this poses a discrimination within a community of fate, several authors have argued against such a regulation and propose solutions.

A solution taking into account the equal treatment in communities of faith would be the application of the legislation of the administrative headquarters of the airline.

Such a regulation, suggested among others by Prof. Dr. Marc-Philippe Weller, would conform to the requirements in the Montreal Convention and the principle of non-discrimination within a community of fate.

4.5. The adequacy of crisis management

Lufthansa was not the only entity which can be held responsible for the incident. The German lawmaker, doctors treating Lubitz', the ICAO and other bodies can be held accountable for providing too few laws and regulations that could have prevented the crash. Since the Lufthansa AG however has however largely managed the crisis, for which it is more directly accountable than other actors are, this analysis concerns the adequacy of crisis management conducted by Lufthansa.

Whether the crisis was managed adequately is established by looking at six processes (Toetsingskader, 2012)

The process of crisis preparation

The crisis is expected to have been properly prepared if crisis respondents take control of the situation, set out a clear direction and point out who is responsible for what. Apart from that, a structure with a signaling entity, a tactical entity leading and an entity coordinating the overall direction of the efforts should be in place in order for the preparation to be complete.

- Taking control and setting out a direction

Respondents can be said to have taken control of the crisis, even though Lufthansa's crisis managers were at times surpassed by news media such as flightradar.com concerning information provision. However, the overall response was coherent and immediate, with the managers of both Lufthansa and Germanwings taking hold of the situation and reassuring customers and investors. This fact becomes clear when looking at statements of both companies in the immediate

aftermath of the crash. It is also confirmed by a reporter from an aviation related newspaper that the Lufthansa actively made sure to appear united.

- Responsibility

In approaching the public, the two managers take on responsibility on day two already. Even though this was a too early stage to claim responsibility (as elaborated in 7.1), the statements aimed at doing the latter. However, it was not pointed out by the two managers, who exactly is held responsible for what. Doing that would have meant to reveal that the flight school is responsible for overlooking the copilots' previous sickness and for not conducting regular psychological examinations. Apart from that the way in which these psychological examinations were conducted should have been called into question and supplemented by a 'safe reporting zone' for pilots. Furthermore, Lufthansa would have needed to take on responsibility for not adopting the two-person-in cockpit-rule, which probably would have made the crash impossible.

- Organizational structure

With the control center in Marseille, which tried to establish contact with the plane up to the point the plane collided with the terrain, there was a clear signaling entity that saw the crisis occurring. It could report this incident directly to Germanwings and Lufthansa.

The tactical entity leading the operations, taking decisions, advising and following up on incidents, was in the case of the Germanwings 4U9525 crash the CEO of Germanwings and the CEO of the parent company Lufthansa.

This entity was arguably at the same time the coordinating entity, because the crisis was lifted to the highest with regard to operations. By doing that Lufthansa aimed to take on responsibility and quickly resolve the crisis. The coordination of effort of important stakeholders is therefore likely to have been managed by top level-employees at Lufthansa, even though not the CEOs themselves.

Lufthansa is expected to have adequately recognized and signaled the crisis if responsible bodies were alarmed and informed in a timely manner. It is furthermore required that their schedule accommodates for the consultancy of actors, the launching of preparations and reaction time for the bodies involved.

- Information and alarming

With the control center as well as the French air defense unit being immediately aware of the incident, the entities are able to immediately inform rescue units and investigators as well as Germanwings and Lufthansa. The quick deployment of rescue units and the responses from heads of state as well as psychological medical teams arriving at Düsseldorf airport show that information was quickly available to stakeholders and bodies concerned with the management of the crisis, who were alerted and alarmed in a timely manner.

- Time-planning

The aftermath of the crash was characterized by a quick revelation of information from the side of the BEA and newspapers which had access to data from the Cockpit Voice Recorder.

Whether this revelation was part of a larger plan from Lufthansa's side cannot be conclusively answered here.

But theory suggests that release of unverified information was at least bringing further damage to the managing organization (Coombs&Holladay, 2012) while it also openly displayed a miscommunication between some actors. More specifically this miscommunication occurred between the French BEA prosecutors and aviation experts, who were working together on the crash site, which makes this fact even more striking. If they had communicated, the BEA chief prosecutor would probably not have been making suggestions concerning the crash cause on day two.

This indicates that the schedule, which is assumed to have existed was defeated after this revelation made by the BEA. Of course, Lufthansa will have adjusted that schedule but it could not accommodate a consultancy of actors and further preparations.

Bodies related to the incident were arguably already active at the time of the crash since aviation control points are observing planes and prepared for incidents around the clock and the aviation industry in general is comparably well intertwined.

The process of information provision

The information provision has been of importance in the Germanwings 4U9525 and was assessed earlier in this analysis focusing on the leak of information and information releases in the immediate aftermath of the crisis. A more specific look on how information has been provided by Lufthansa is provided here. An adequate provision of information is accordingly established, if there is a national information plan, an assessment and an active distribution of information between Crisis Management bodies. Additionally, information on the incident, its characteristics and measures taken need to be available.

- National information plan

Crisis management mechanisms on the German government level were set out and coordinated by the ‘Auswärtiges Amt’, which involves the Foreign Ministry if a crisis occurs abroad.

(Bundesministerium des Inneren, 2015) The fact that the entity opened a hotline at 02:21 pm on the 24th of March shows that the national crisis plan, of which the information plan is part, was implemented when the crisis unfolded. (des Inneren, 2015) (des Inneren, 2015) (des Inneren, 2015) Bodies lower in the hierarchy, such as the ‘Bundesstelle für Flugunfalluntersuchung’ (BFU) were also associated. This shows that there was an existing national information plan as part of a larger crisis management plan in place.

- Information assessment and distribution

Due to the fact that information was available very timely after the incident and was also quickly communicated between the Marseille control center, Lufthansa and national bodies, which informed rescue teams, it can be said that there was an active distribution of information. Within the BEA however, it appeared that the information was not assessed thoroughly since it did not

consider knowledge from aviation experts before drawing conclusions. It can therefore be said that the information assessment and distribution was only to some extent appropriately conducted.

- Information

The amount of information available was large from the very beginning; partly because of the technical possibilities of websites like flightradar.com, which can very precisely track flights. Since such incidents have occurred before and present the worst possible but possible scenario for an airline, Lufthansa will have thought through such an incident and established an approach and measures as well as an outreach for such an incident. There is no direct prove for that, since Lufthansa does not reveal its crisis protocols for tactical reasons. But the suggestion was in part prepared was confirmed by a journalist. The outreach was observable and comparably quick, endeavored and taking place on the highest level.

When it comes to the prognosis and results the crisis would have, Lufthansa was arguably less informed. One reason for this is that crises per se in part characterized by high uncertainty (Boin & T Hart, 2003). The accommodative response strategy Lufthansa chose of course aimed at impacting the result of the crisis in a way that was favorable for Lufthansa. But as argued in 4.1., the company did not completely manage to do so. A comprehensive prognosis of what would happen, for instance the quick release from the side of newspapers and the BEA, could also not possibly been established before.

For these reasons, it can be said that the airline had information on the incident but that it had lacking insight into what would happen after and what results the crisis would have, even though it managed to influence them to a certain extent.

The process of analyzing, assessing and deciding on preparation

For the process of analyzing, assessing and deciding on preparations concerning the crisis, theory requires the establishment of a correct and topical insight in the course of the crisis and its effects.

- Correct and topical insight

There was no lack of insight regarding the crisis following the crash. However, insights that were key to the perception of the crisis and the effects it would have, were not verified. The suggestions made by the BEA concerning the crash turned out to be correct later, on the 2nd of April, when the FDR was found. So the information provided by investigators on the 26th of March cannot be denoted as being correct at that point in time.

For this reason, even though insights were topical, the findings put forward and their effects cannot be said to have been correct at that particular point in time.

The process of decision making

Decisions are made in the right manner if there is an entity responsible for leading the crisis organization, which also determines a strategy to be followed in the course of decision-making.

- Organizational Leadership in crises

Lufthansa (and Germanwings) were the organizations which were immediately concerned with the incident, since the aircraft belonged to Germanwings, which is a daughter company of Lufthansa. So whether it was an accident or not did not make a difference to the fact that Lufthansa was the organization responsible for leading the crisis organization. The airplane clearly belonged to the company and the passengers had made a purchase agreement with the company beforehand, which are the factual reasons why Lufthansa took on responsibility.

- Strategy

Following the BEA revelations, Lufthansa immediately took on responsibility. This action can, especially with regard to the swiftness and voidness of the affirmation, be evaluated as part of a larger strategic plan which aimed at organizational repair. Even though the company did not

specifically assign responsibility to different parts of their organization, it tried to lower public anger at the organization following the crash. By doing that they managed to reduce organizational damage and calm stakeholders, customers and the wider public.

Crisis communication

Theory suggests that crisis communication can only be conducted in a timely and effective manner when regulations and mandates are respected and the media network is used to pass current, correct and unequivocal information to the public.

- Regulations and mandates in Crisis Communication

Using social media and especially Twitter as well as press conferences as a means of communicating with the wider public, proved to be an effective way of getting across messages to the public in a timely and effective manner.

- Use of media network

The Media network was in part taking control of the news faster than Lufthansa could. With a general negativity bias in place, media had its own incentives of investigating and finding the latest (controversial) news on the issue. (Weaver, 1986) Lufthansa was still able to get their messages across but they could not control the information flow to their advantage since information which was not intended for publication reached the media. Having that in mind, the media could to a limited extent be used to pass current, correct and unequivocal information to the public.

	Well managed/ good	More or less well managed/ medium	Badly managed/ negative effects
Preparation			
- Taking control and setting out a direction	×		
- Who is responsible for what		×	
- Complete organizational structure	×		
Recognition and signaling			
- Timely information and alarming	×		
- Time planning			×
Information provision			
- National information plan	×		
- Information assessment and active distribution		×	
- Information available	×		
Analyzing, assessing and deciding on preparation			
- Correct and topical insight			×
Decision making			
- Organizational leadership in crisis	×		
- Determined crisis strategy	×		
Crisis Communication			
- Regulations and mandates in Crisis Communication	×		
- Use of the media network		×	

As the figure above points out, there were definitely ways which would have led to more adequate results concerning crisis management. That some of the determinants presented were managed unsatisfactory, can be explained by misconducts that were made concerning the collaboration of stakeholders, affected by the politicization of the issue and determinants of crisis communication, which influenced the blame games at work. A greater adherence to norms and recommendations within the ICAO but also considerations of legal scholars regarding injury awards could have further increased the adequacy of crisis management. However, it also needs to be said that the norms within the ICAO do in some instances not provide for every scenario

and do have loopholes which need to be filled in order for crisis management to become consummate.

8. Conclusions

The theoretical framework established in the introduction can be said to have held true in its predictions to a large extent. However, other mechanisms were observed when analyzing the different variables. Politicization has indeed negatively affected crisis management, more specifically the time-planning and the assessment and distribution of information within crisis management. The politicization of the incident has also led stakeholders to manage the crisis less adequately. Here, the media arguably pressured stakeholders to gain knowledge and satisfy the general negativity bias.

Collaboration was hence under political pressure and even though most actions taken were in line with norms, some deviations could be observed. However, it was also established that norms could not always provide for enough incentives for collaboration, which could have avoided a lot of mistakes made in the Germanwings 4U9525 incident.

This deviation from norms was further examined. It showed that in a few instances, norms were inappropriately formulated for crisis management to be adequate. In some more cases, norms should arguably be supplemented with a phrase specifying or including a provision. And in quite a few cases, norms were not adhered to by crisis managers.

The overall efforts of abiding by the rules could have been stronger as deviations from the rules have shown. Since crisis managers however to a large part stuck to the rules, the variable has arguably still positively mediated the relationship between collaboration efforts of stakeholders and crisis management. It is to be noted here, that norms were not perfect, and abiding by them would not in all cases have led to

a better crisis management. This urges lawmakers to improve upon the rules as elaborated in 4.4, in order to overall crisis management.

The Crisis Response strategy, which was arguably a response to the realization of crisis responsibility was accommodative and has also had a direct impact on the effectiveness of communication within the adequacy of crisis management. Furthermore, it influenced crisis management through the variable of 'blame games'. Within the crisis communication model, especially the determination of crisis responsibility is suggested to have affected blame on Lufthansa to be high and direct. This again has affected the way in which Lufthansa could make use of the media communication network and generally communicate the crisis, which constitutes an important part of an adequate crisis management.

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 Scribblelive.com, <https://embed.scribblelive.com/Embed/v7.aspx?Id=1160243>, 2015

4. company statements

Kreindler&Kreindler, <http://www.kreindler.com/Recent-Developments/Kreindler-Brings-Suit-Against-Flight-School-that-Trained-Andreas-Lubitz-Pilot-of-Germanwings-Flight-9525.shtml>, 2016
 A-Kreindler&Kreindler, <http://www.kreindler.com/ATCAPressRelease.pdf>, 2016
 Boeing, <http://www.boeing-727.com/Data/systems/infogpws.html>, 2001
 Germanwings, <https://twitter.com/germanwingsfly>, 2015
 Lufthansa Group, Shareholder information, <http://investor-relations.lufthansagroup.com/fileadmin/downloads/en/financial-reports/shareholder-info/LH-shareholder-info-2015-08-e.pdf>, 2015

5. people/functionaries interview

Reporter from an aviation related newspaper, telephone interview

C. Research reports

1. Legal essays

Prof. Dr. Weller et al. (2015). Schmerzensgeld nach Flugzeugunglücken. *Neue Juristische Wochenschrift* 27/201. Doi: http://www.ipr.uni-heidelberg.de/md/jura/ipr/personen/weller/weller_rentsch_thomale_njw_schmerzensgeld.pdf

2. Crisis related essays

Rochlin, G.I. (1989). Informal organizational networking as a crisis-avoidance strategy: US naval flight operations as a case study. *Organization and Environment*, 3(2), 159-176.

D. questions asked during the interview

- 1) Did the German government as a Lufthansa shareholder have an interest in resolving the crisis early in order to calm down the fall of Airbus and Lufthansa shares?
- 2) Do you think it was out of negligence that the CVR was leaked to the press or do you think it was a deliberate act by the BEA?
- 3) The prosecutors' affirmation of the crash being deliberately caused by the copilot followed the evaluation of only the Cockpit Voice Recorder(CVR). Would you agree that this could not have been verified by the French prosecutors (relying on the BEA for their information) without evaluating the Flight data recorder aswell?
- 4) Would you say that the Germanwings-Tweets that were released at around 10:53 GMT were pre-written statements to be used in times of crisis? Do you think they were part of the crisis protocol?
- 5) Do you think the responsibility for crisis communication in the case was not clearly assigned to either Lufthansa or Germanwings? If yes, on which event/how would you say that that is visible?
- 6) Did you receive confirmation on the fact that the Germanwings website was temporarily down after the crash?

11.2. Tables

Table 1. Timeline of the Germanwings 9525 incident

06:01:00 am	Outbound flight takes off in Düsseldorf, Germany
07:20:50 am	Flight altitude is decreased to 100 ft for three seconds and then increased again to the maximum value of 49,000 ft and stabilized again at 35,000 ft
07:22:27- 07:24:13am	In these 2 Minutes the selected altitude was 100 ft for most of the time and changed several times until it stabilized at 25,000 ft
07:24:15 am	The buzzer to request access to the cockpit was recorded
07:24:29 am	Noises like those of the unlocking of the cockpit door then its opening was recorded and corresponded to the Captain's return to the cockpit
07:57:00 am	Outbound flight lands normally in Barcelona, Spain
~9.00 am	The same aircraft under the flight name 4U9525 takes off from Barcelona Airport, Spain, runway 07R with a delay of 20min
09:02:54 am	The autopilot n°2 is engaged in CLIMB and NAV mode; Autothrust had been engaged about a minute earlier
09:12:15 am	A flight attendant requests access and enters the cockpit. The three crew members have a small conversation.
09:15:53 am	Noises of the opening then the closing of the cockpit door are recorded when the flight attendant leaves the cockpit.
~09.15am	Normal discussions are recorded in the cockpit between the pilot and co-pilot.
09:27:20am	The plane levels off at the cruising altitude of 38000ft (FL380) as it approaches France.
09:29:40 am	The flight crew is transferred to the 127.180 MHz frequency of the Marseille control center.
09:30:00 am	The captain reads back the air traffic controller's clearance allowing him to fly direct to the IRMAR point: "Direct IRMAR Merci Germanwings one eight Golf".
09:30:08 am	The captain tells the co-pilot that he is leaving the cockpit and asks him to take over radio communications.
09:30:11 am	The heading starts to decrease and stabilizes about a minute later at around 23°, which is consistent with a route towards the IRMAR point.
09:30:13 am	Noises of a pilot's seat movements were recorded
09:30:24 am	Noises of the opening and then, three seconds later, the closing of the cockpit door were recorded when the captain left the cockpit.
09:30:27- 09:34:31am	The copilot moves the switch to lock the cockpit door and keeps toggling it.
09:30:53 am	The selected altitude on the FCU changed within one second from 38,000 ft to 100 ft (the minimum value that is possible to select on the A320). One second later, the autopilot was changed to OPEN DES mode (which manages the target speed based on the flight plan entered or selected manually). Autothrust was changed to THR IDLE mode. The airplane started to descend and both engines' speed decreased.
09:31:37 am	Noises of a pilot's seat movements were recorded
09:33:12 am	The speed management mode was changed from managed mode to selected mode (in which target speeds are chosen by the flight crew). The airplane's speed started to increase along with the airplane's descent rate, which subsequently varied between 1,700 ft/min and 5,000 ft/min

09:33:35 am	The speed decreased to 288 kt. Then, over the following 13 seconds, the value of this target speed changed six times until it reached 302 kt.
09:33:47 am	The controller asks the flight crew what cruise level they are cleared for without receiving answer. The airplane was then at an altitude of 30,000 ft in descent. Over the following 30 seconds, the controller tried to contact the flight again twice, without answer.
09:34:23 am	The selected speed increases to 323 kt towards the new target.
09:34:31 am	The buzzer to request access to the cockpit is recorded for one second
09:34:38 am	The controller again tried to contact the flight crew -without receiving an answer
09:34:47am	The Marseille control center tried to contact the flight crew on 133.330MHz, without any answer. The plane was then at altitude 25,100ft in descent
09:35:03am	The selected speed again increases to 350kt (the maximum speed that the flight crew can select)
09:35:04- 09:39:27am	The cockpit call signal from the cabin (cabin call) is recorded on four occasions for about three seconds
09:35:32- 09:39:02am	Noises similar to a person knocking on the cockpit door are recorded on six occasions.
09:37:11- 09:40:48am	Muffled voices are recorded, one asking for the door to be opened
09:35:07- 09:37:54am	The Marseille control center tries to contact the flight crew on three occasions on 121.500 MHz, and on two occasions on 127.180 MHz, without any answer
09:38:38- 09:39:23am	An air traffic controller from the French Air Defense system tried to contact the flight crew on three occasions on 121.500 MHz, without any answer
09:39:30- 09:40:28am	Noises similar to violent blows on the cockpit door were recorded on five occasions
09:39:33- 09:40:07am	Low amplitude inputs on the co-pilot's sidestick were recorded
09:39:54 am	The flight crew of another airplane tried to contact the flight crew of GW118G after being ordered to do so by the Marseille control center
09:40:00 am	The DETRESFA emergency phase was triggered
09:40:41 am	Aural warning "terrain, terrain, pull up, pull up" from the GPWS triggered and remained active until the end of the flight
09:40:56 am	Master Caution was recorded
09:41:00 am	Master Warning triggered and remained active until the end of the flight
09:41:06 am	The CVR recording stopped at the moment of the collision with the terrain
09:48 am	A fighter jet from the French air force takes off from the military airbase of Orange, having been ordered to do so by the national operations
10:01 am	The French military plane flies over the vicinity of the accident site
~10:15 am	The Marseille en-route control center informs the BEA of the accident to an Airbus A320, registered D-AIPX
10:52 am	Germanwings tweets that they "have recently become aware of media reports speculating on an incident" but they say they do still not have any own confirmed information.
10:53 am	Eurowings again releases a Tweet saying that "as soon as definite information is available" they want to inform the media immediately". Furthermore they refer Twitter users to their website for updates.

11:04 am	Flightradar24 tweets that the playback of flight 4U9525 is available on their homepage and pictures of the plane are available on https://www.planespotters.net/airframe/Airbus/A320/147/D-AIPX-Germanwings
12:16 pm	The French President expresses his condolences to the families of the victims on Twitter
12:21 pm	Britains Deputy Prime Minister Nick Clegg expresses his condolences
~12:34-12:41 pm	Lufthansa releases a statement on Twitter, stating “we do not yet know what happened to flight 4U9525. My deepest sympathy goes to the families and friends of our passengers and crew.” The company further states that if their fears are confirmed “this is a dark day for Lufthansa” and that they hope to find survivors.
12:39 pm	France's Interior Ministry reveals that debris has been found.
01:12 pm	The Spanish Prime Minister says he's dismayed by the tragedy in the Alps.
01:23 pm	Lufthansa and Germanwings change the color of their Twitter pictures to black and white
~01:30 pm	Reports emerge, tht 16 German exchange students were on the doomed jet
01:46 pm	Germanwings reveals that the plane was a A320-type aircraft with 144 passengers and six crew members on board.
02:21 pm	The German foreign ministry (Auswaertiges Amt) opens a crisis hotline
02:23 pm	Lufthansas vice president for Europe briefs the media on the incident (wsj, 2015)
~02:29 pm	French Air Force Boeing C-135FR Stratotanker flying over #4U9525 crash site is visible on flightradar24.com (Figure 8)
Check time	German chancellor states “we are going through hard hours and announces to travel to the crash site the next day
04:01 pm	BEA investigators were able to access the crash site according to the French Prime minister
~04:00 pm	First picture of the crash site emerge, showing scattered pieces of the aircraft,no bigger than a small car
04:48 pm	Lufthansa Tweets that their CEO and German government representatives are on their way to France.
05:29 pm	White house officials in Washington state that the incident does not appear to be terror related
Check time	Press Conference by Lufthansa where the company promises every conceivable help to the relatives of the victims
06:12 pm	CVR is found at the crash site
07:57 pm	German Foreign Minister Steinmeier thanks the French emergency units at the Germanwings crash site via Twitter
~20:15 pm	A lot of people from Haltern am See (Germany) gathered in front of a local church. The priest reads out the names of the 16 teenagers who dies in the crash
20:52 pm	The search at the crash site was stopped and is planned to resumed on Wednes day morning. Police and military stays at the crash site overnight to secure it.

21:31 pm	A Lufthansa spokesman says they had to cancel “seven Germanwings flights departing from Duesseldorf today because of difficulties with crew members. They told us they felt unfit to fly” (Deutsche Welle, 2015)
22:05 pm	The German government does still not have precise information on the number of German citizens on the crashed plane. Germanwings only stated that there were 150 passengers no board. “it will take time to identify all victims because of the area’s remoteness” (Foreign office in Berlin)
25/03/15	Australia’s foreign minister Julie Bishop says her ”thoughts and prayers are with families & friends of victims” of the Germanwings flight 4U9525 crash, of which two were Australian.
25/03/15	The European Parliament starts its session with a moment of silence in memory of the victims of the crash.
25/03/15	The CVR is transferred to the BEA which analyses the data
25/03/15	In a second Press conference held by the Lufthansa, the company states that French authorities have revealed information. After an evaluation of the voice recorder, Carsten Spohr says they have to acknowledge that the plane has apparently been deliberately crashed. The CEO also reveals that Germans, Spaniards, Britons were on board with other passengers from Holland, Japan, Belgium, Argentina, Iran and the US
25/03/15	Leaders from Germany, France and Spain visit the crash site and pay tribute to the victims
26/03/15	News media reveal that one of the pilots was locked out of the cockpit, banging against the door to get back in.
26/03/15	In a press conference of the French investigators, prosecutor Brice Robin reveals the final Cockpit Voice Recordings. He says that there is merely the CVR available and reports on the evaluation of the recordings. He says that the breathing sound of the pilot proves that he was alive. He reports on the copilots’ unresponsiveness to airtraffic controllers and the knocks on the cockpit door. He also says that no emergency signal was triggered by the pilot. He said that the most plausible interpretation is that the copilot through deliberate passive behavior prevented the pilot from entering and deliberately initiated the descend (Phoenix, 2015)
27/03/15	Police find a torn sick note for the date of the crash at Lubitz’s home
27/03/15	“France's leading pilots’ union has announced it is filing a lawsuit over leaks about the investigation into the Germanwings plane crash.” (Ruptly,2015) It is not naming an alleged perpetrator, leaving it up to the French investigators to determine who is at fault.
27/03/15	The EASA issues a Safety Information Bulletin (SIB n°2015-04) relating to authorized persons in the cockpit (EASA, 2015)
27/03/15	The airlines Norwegian, easyjet, Air Canada and Air Berlin announce that they are adopting the 2-Persons in the cockpit rule
27/03/15	Germanwings states that “no medical note was presented to the firm for this day” (Ruptly, 2015)
31/03/15	French President Hollande says that all the victims “will be identified by the end of the week” (Ruptly,2015)
April- August 2015	The Department for Transport of the UK tasked the civil aviation Authority (CAA) to review and consider changes to the current assessment system within the CAA Mental health working group.
April – November 2015	The BMVI appoints a task force, under the auspices of the German Aviation Association (BDL), to determine conclusions on the crash
May 2015	The Fitness Aviation Rulemaking Committee (ARC) was established by the FAA (Federal Aviation Administration)
06/05/15	The BEA publishes its preliminary report

06/05/15 - 16/07/16	The EASA establishes a Task Force, initiated by the European Commission, to look into the incident and give recommendations to European regulators
21/09/15	The Aerospace Medical Association's Mental Health Expert Working group publishes its reviewed recommendations
13/03/16	The final report is published by the BEA

Table 2. Blame game according to Hood, 2002

'Blame Game' with 'Malign' Outcomes and Sympathetic or Vindictive Public Attitudes

		<i>Public Attitudes</i>	
		<i>'Sympathetic'</i>	<i>'Vindictive'</i>
	Direct	(1)	(2)
<i>Choice of policy control by incumbent elected politicians</i>		<i>Blame: limited</i>	<i>Blame: high and direct</i>
		<i>Result: 'Teflon effect' (limited blame)</i>	<i>Result: 'blame attraction' ('buck stops here')</i>
	Delegate	(3)	(4)
		<i>Blame: low (default to delegatee)</i>	<i>Blame: high and redirected (default to delegator)</i>
		<i>Result: blame shift or blame avoidance</i>	<i>Result: blame reversion or blame displacement</i>

11.3. Figures

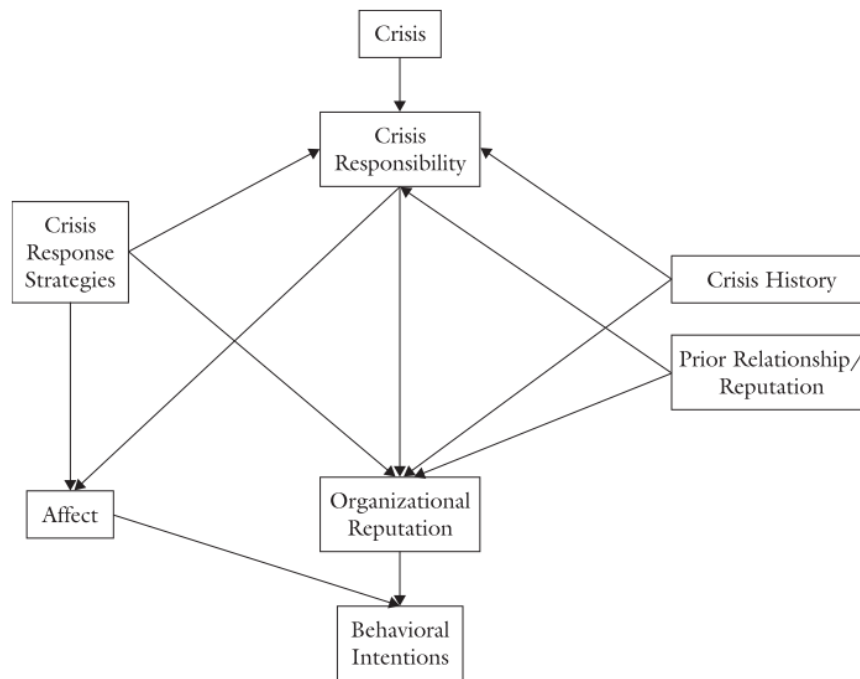


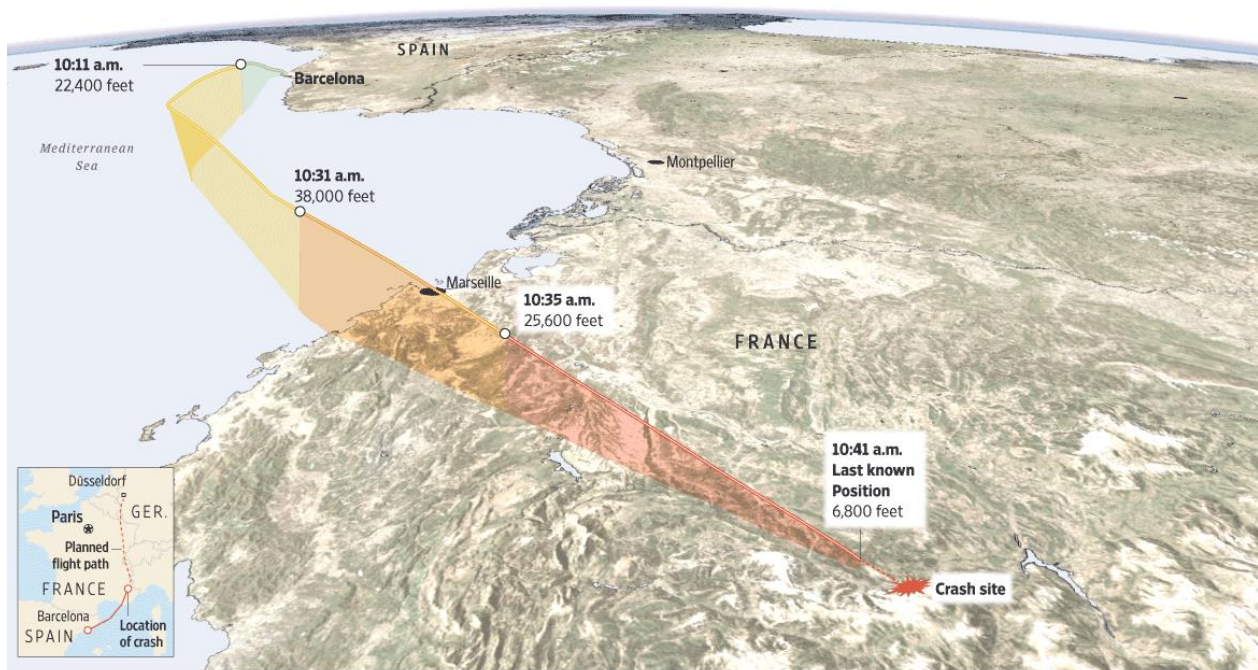
Figure 1. Coombs model of Crisis Communication (*The Handbook of Crisis Communication*)



Figure 2. General view of the accident site (BEA, final report p.29)



Figure 3. IRMAR aviation waypoint



Sources: FlieghtRadar24; French authorities

Figure 4. Route of Germanwings flight 4U9525

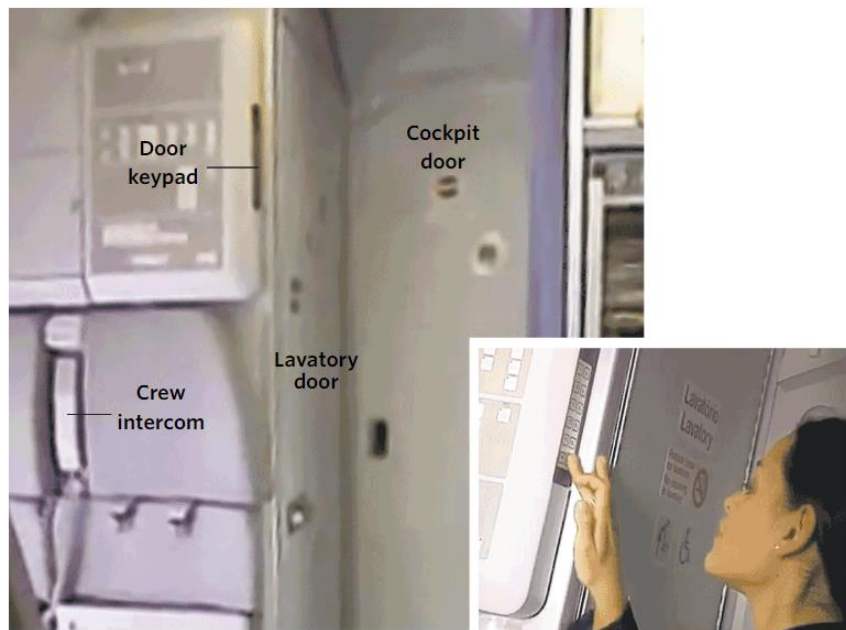
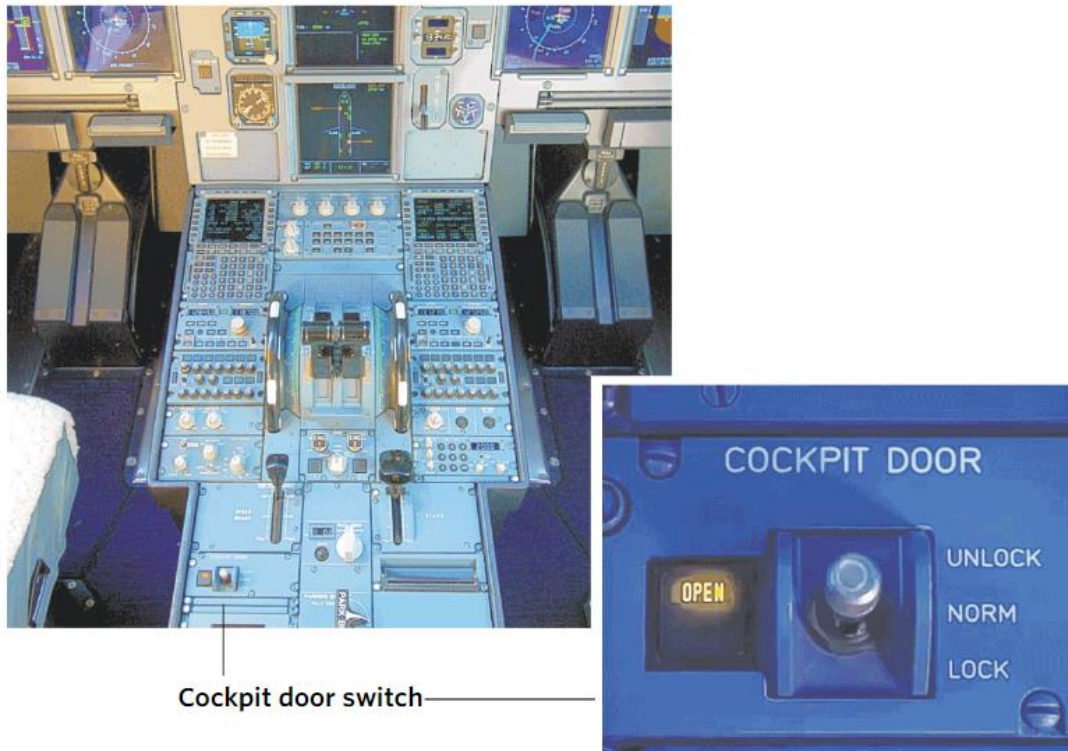


Figure 5. Airbus' description of cockpit intercom and keypad



Source: Airbus. Photos: Airbus (screengrabs from a training video); Jon Ostrower/The Wall Street Journal (Airbus A320 cockpit)

Figure 6. description of the cockpit door switch

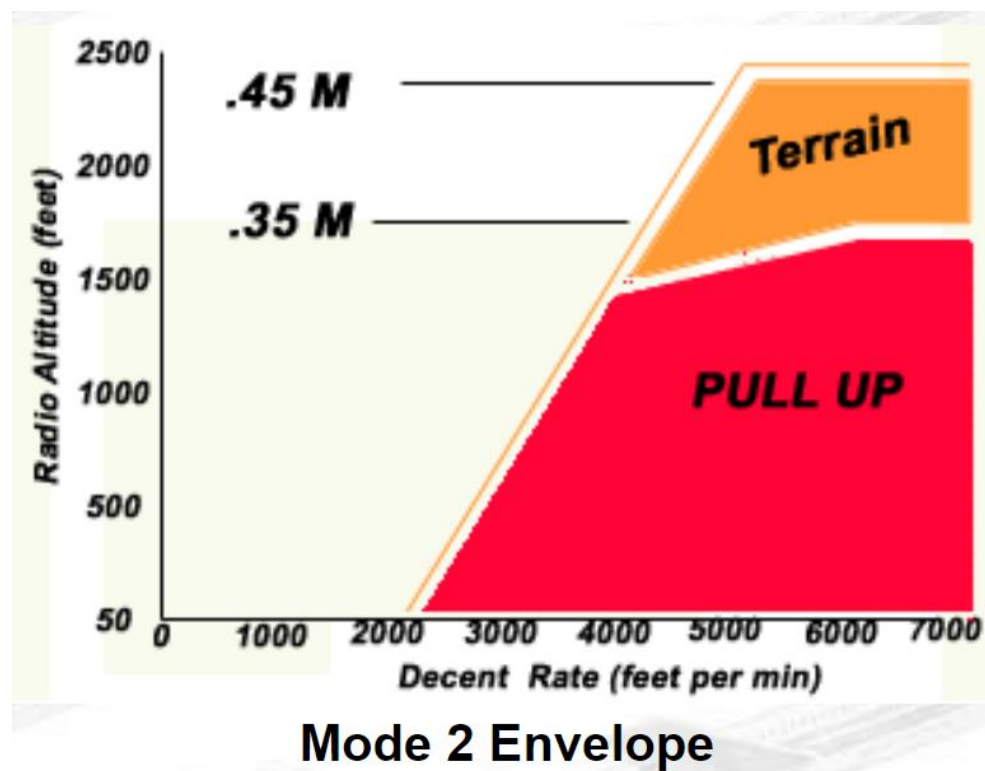
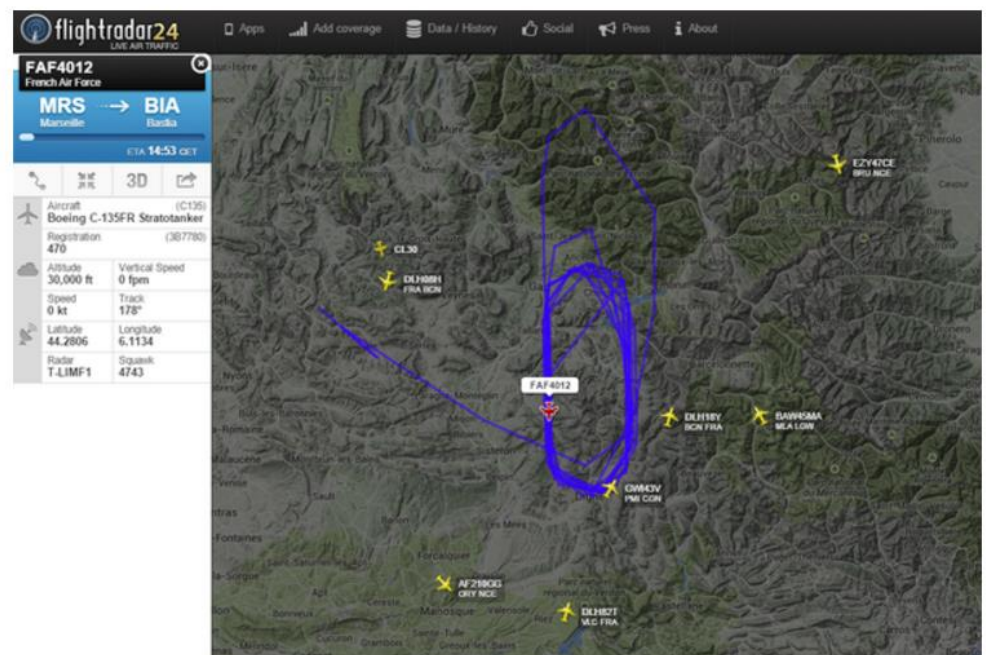


Figure 7. The Excessive Terrain Closure Rate and corresponding aural warnings of the Ground Proximity Warning System



Flightradar24
@flightradar24



French Air Force Boeing C-135FR Stratotanker flying over #4U9525 crash site flightradar24.com/FAF4012/5d444c9e

Figure 8. Air Force Boeing C-135FR Stratotanker over the crash site at around 02:29pm on March 24th 2015



Weather deteriorating for #GermanWings #4U9525 search & rescue operation with snow above 1500m in S French Alps. CF

2:21 PM - 24 Mar 2015

Figure 9. BBC Weather report of March 24th, 2015



How Lufthansa shares reacted to news of the A320 crash

Shares in Lufthansa and Airbus fall following #Germanwings flight #4U9525 crash over French Alps - #ANN

Figure 10. Lufthansa shares development after the crash of flight 4U9525

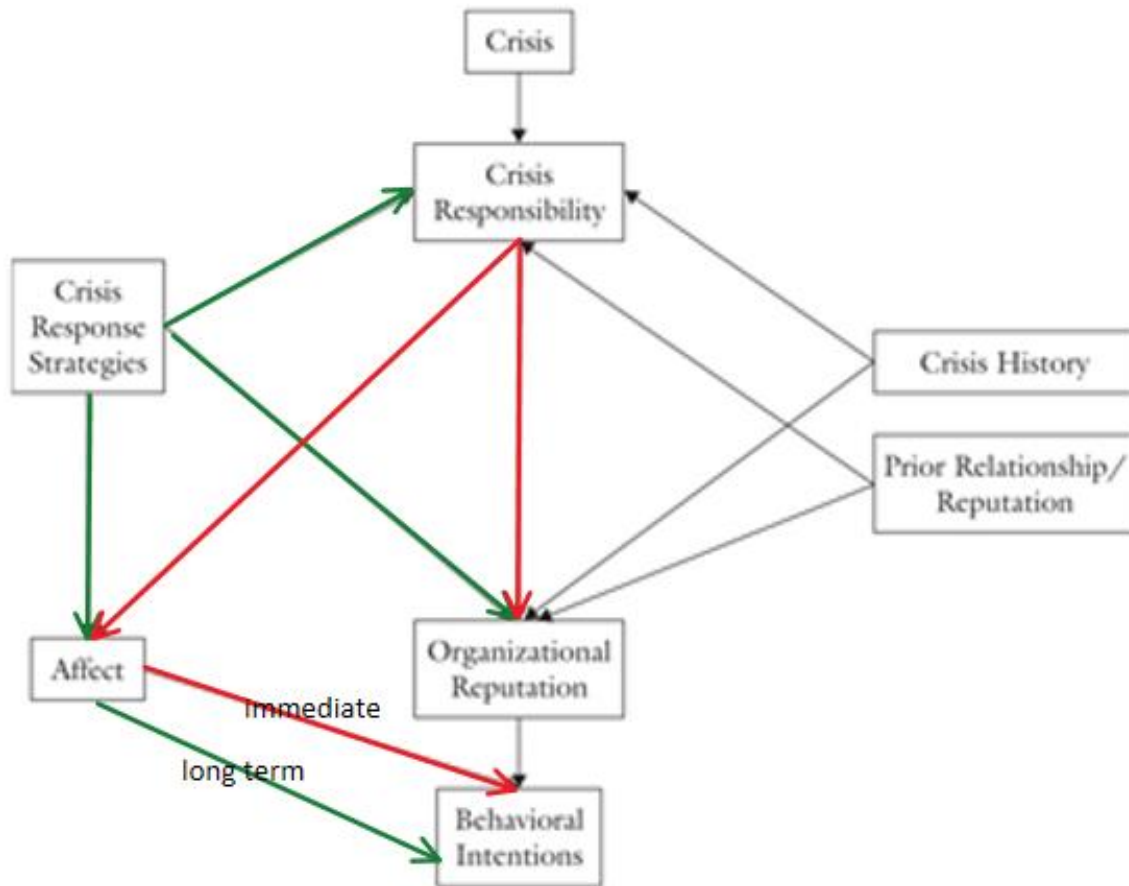


Figure 11. Results of Crisis Communication in the incident of Germanwings flight 4U9525 according to Coombs, 2012 from Lufthansa's point of view

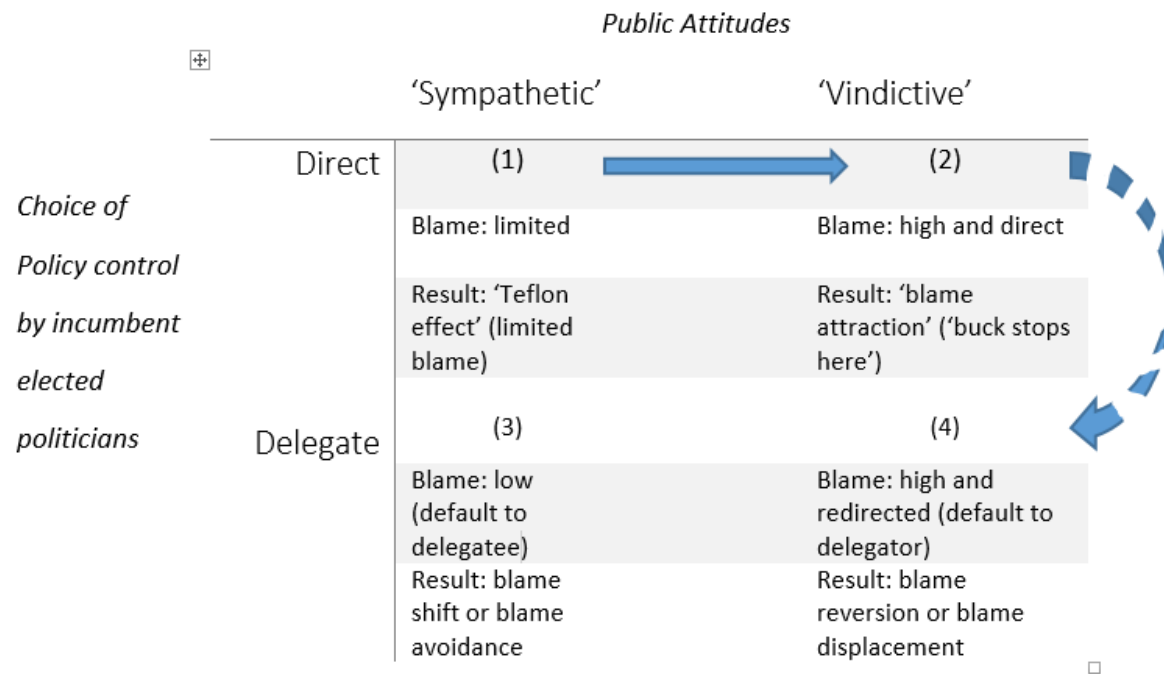


Figure 12. Outcome of Coombs (2002) model of the ‘blame game’ applied to the Germanwings 4U9525 incident

	<i>Large availability of knowledge</i>	<i>Small availability of knowledge</i>
<i>Large societal consensus on values</i>	TECHNICAL PROBLEM Tamed problem	SCIENTIFIC PROBLEM Tamable problem
<i>Small societal consensus on values</i>	ETHICAL PROBLEM Tamable problem	POLITICAL PROBLEM Wicked problem

Figure 13. Levels of politicization

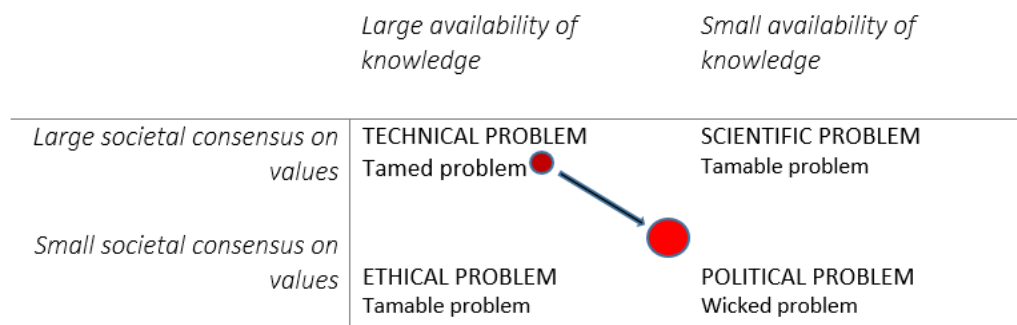


Figure 14. Location of the Germanwings crisis on the 2 dimensional politicization scale