Enterprise-Related Crisis Communication on Twitter

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Abstract. The rise of social media as communication channels has enabled customers to provide feedback or to ask for assistance quickly and easily. In the context of brand crises, the microblogging platform Twitter is highly relevant because of its ability to support information sharing. By investigating communication on Twitter, the authors examine Twitter activity patterns based on a dataset of some 240,000 tweets during two major brand crises affecting the Australian airline Qantas – the volcanic ash cloud caused by the eruption of Chilean volcano Puyehue in June 2011, and the global grounding of Qantas flights by management in the course of an industrial dispute in October/November 2011. Through this case study we find that characteristics of communication change significantly during different stages of the crisis. Further, we demonstrate that different kinds of crisis result in different communication patterns on Twitter.

Keywords: Social media, crisis, Twitter, Qantas.

1 Introduction

Social media enable customers and stakeholders to provide public feedback on products and services, to ask for help and support, and to search for information. Twitter as a microblogging service with a focus on information sharing and mobile applicability is of increasing importance for brand communication and has been a subject of research for some years [1-3]. The large amount of data generated on Twitter also enables enterprises to investigate customer needs and preferences more efficiently. Additionally, companies have started corporate accounts in order to directly interact with their stakeholders. By doing so, enterprises aim to learn more about customers' preferences, increase customers' loyalty (e.g. by effectively responding to questions), and provide new information (e.g. about upcoming products). In this context social media might play an important role, as Kolo and Heinz [4] show. According to them, dialogic communication has a positive and direct impact on the decision-making processes of customers.

However, companies are also affected by corporate crises that challenge managers to engage satisfactorily and effectively with the criticism and complaints of customers and bear the risk of exacerbating negative perceptions. Acting helpfully and as a reli-

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able communication partner in a crisis situation might strengthen the relation between stakeholders and enterprises. In general, corporate crises can be categorized as events which arise primarily from enterprise activities (e.g. product recalls, financial scandals) and those events which arise independently of company activities (e.g. natural disasters, new competitor products) [5]. Within an enterprise context several types of crisis can take place, and as a consequence customers as well as companies act differently depending on the reasons and impact of a crisis. For example, if company operations are directly affected by a crisis, this may lead to customers requiring specific information urgently (e.g. what services are still being offered at the present moment). On the other hand, customers may feel the need to discuss wider implications among each other or with managers (e.g. when enterprises are responsible for damage caused to the environment).

Over the past few years, Twitter has become a popular communication channel for everyday users as well as for corporate enterprises to publicly share information. According to available data, more than 58 million tweets are published each day at present.[1] Limited to a maximum of 140 characters (given by the platform provider), these short messages are well suited to keep followers updated even in fast changing situations such as crises [6-7].

So far, little is known about the general nature of brand-related communication on Twitter during crisis situations. Even though several studies have been published in the last years that focus on isolated events (e.g. [8-9]), they did not search for general principles behind the communication patterns by extending their analysis across multiple events. Not only is current work in this field usually limited to a single event, but the dynamics of communication are often neglected, resulting in a snapshot analysis. Only very few studies reflect these issues and introduce approaches to shed light on the metrics behind Twitter communication (e.g. [10-11]. [11] state that metrics could be used to analyse (1) total activity and visibility of individual participants (e.g. original tweets sent, unedited retweets sent), (2) temporal flow of conversation (e.g. unique users active per period of time, tweets sent by each user per period of time), and (3) of specific forms of conversation (e.g. currently active users from the percentile for each time period, tweets posted by users from the percentile for each time period). However, none of these have considered enterprise-related crisis communication so far.

In this paper we seek to address the current lack of knowledge by investigating two data sets on brand-related public Twitter communication in crisis situations. In contrast to other studies, we concentrate our analysis on the metrics of the communication behavior, and consider the dynamics of communication over time. We captured about 112,000 public tweets referring to the airline Qantas over a timeframe of one year, during which the company was affected by two major crises. We identified this as an ideal opportunity to compare the metrics of both crises. While the reasons for the crises were different, most other variables generally remained the same within this period of time (e.g. affected company, impact on the customers, environmental conditions).

[1] http://www.statisticbrain.com/twitter-statistics/ (as of 2014-04-20)

The remainder of this paper proceeds as follows: first, we discuss key definitions and distinguish between different types of crises, based on a literature review. Further, we review the current state of research on crisis communication in social media. We then present the methodology and results of the *Qantas* case study. In the following section we discuss our results. The paper ends with a conclusion, discussion of limitations, and an outlook to further research.

2 Related Work

2.1 Analysis of Social Media Content

There is increasing scholarly interest in developing a better understanding of communication in social media. Researchers from various disciplines such as information systems, communication studies, marketing, political studies or media studies are currently working in the field of 'social media analytics'. Following Stieglitz et al. [12, p. 90] "its primary goal is to develop and evaluate scientific methods as well as technical frameworks and software tools for tracking, modelling, analysing, and mining large-scale social media data for various purposes." A broad range of methods is used to analyse structured and unstructured data of social media communication. Depending on the underlying research questions statistical analysis, sentiment analysis, text mining, content analysis, and social network analysis are frequently used.

Often studies in this field generate static snapshots while neglecting the network's dynamics [13-14]; only a handful of studies can be identified which explicitly analyse the contents of social media discussion. Moreover, most studies do not consider that different types of actors are involved into social media communication. E.g. in a study of users and their behaviour in the Twitter network, Krishnamurthy et al. [15] identify three types of users (broadcaster, acquaintances and miscreants) by analysing a crawled data set covering some 100,000 users. The 'broadcasters', also described as 'lead-tweeters', are notable for publishing a large amount of original posts. One finding in this study was that these users update their status more often and post more tweets than users in the two other categories. Other approaches categorize users e.g. based on their communication activity [16]. Research in social media analytics considers communication on various relevant social media platforms such as Twitter [17-18], Facebook [19], and Blogs [20].

2.2 Crisis Communication in Social Media

In recent years a growing body of literature has emerged in the field of social media and crisis communication [7], [10]. A significant amount of this literature deals with natural disasters and their impact on society and NGOs. By contrast, enterprise-related crises have not been discussed intensively. In a business context, issue management aims at an early and proactive reaction to and interaction between the company and their stakeholders. From this perspective, issues are topics which (1) actually or potentially concern the organization (they are of relevance). Furthermore, they (2) are characterized by heterogeneity of different expectations of stakeholders and of

the organization itself (there is a lack of shared expectations) and (3) they can be interpreted in various ways. Furthermore, issues contain a potential for conflict and are of interest for the public [21]. An issue may evolve to a crisis, depending on the issue's relevance to the enterprise's performance. Traditionally, issue management focuses on observing mass media such as television, radio, and printed media. As a result of the growing importance of social media in public communication, enterprise-related topics (e.g. brands) are increasingly discussed in social media as well.

The degree to which relevant stakeholders anticipate specific events may be a factor influencing the magnitude of a crisis. Coombs [22] suggests that communicative patterns on Twitter (e.g. role of most active users, presence of retweets, URLs, etc.) differ between different types of crisis. He states "it does matter if stakeholders view the event as an accident, sabotage or criminal negligence. The crisis types or frame determines how much stakeholders attribute responsibility for the crisis to the organization". Based on various case studies, Coombs [22] adapted the 'situational crisis communication theory' (SCCT) to explain the reputational protection afforded by post-crisis communication. This theory differentiates three clusters including nine different types of crisis. Based on these clusters the SCCT explains how the crisis and stakeholder-based reputation is influenced by the crisis's characteristics. The three clusters are (1) victim cluster (e.g. natural disaster, rumor, and product tampering/malevolence), (2) accidental cluster (e.g. technical-error accidents and technical-error product harm) and (3) preventable cluster (e.g. human-error accidents or human-error product harm). There already exist some empirical case studies in this field. E.g. Stieglitz and Krüger [9] investigated a brand crisis involving car manufacturer Toyota in 2010 (cluster (2)-type crisis) and showed that peaks and quiet periods in the communication of enterprise-related issues characterize crisis communication. Park et al. [23] investigated a crisis of Domino's Pizza (cluster (3)-type crisis) and analysed the spreading of bad news through Twitter, focusing on the sentiments on two types of information (corporate news and apologies by the company). They pointed out that the spreading of bad news is faster than other types of information, like apologies; and that the more often bad news is discussed, the softer the negative sentiment is in the discussion [24]. The social media performance of brands during crisis can therefore be analysed and evaluated by examining patterns in brand-related communication both between customers themselves as well as between official brand accounts and customers [9].

3 Empirical Study

3.1 Background

We concentrated our work on investigating two crises of the same company that happened within one year. The company we focused on is *Qantas*, an Australian cultural and commercial icon with some 35,700 employees. As one of the leading carriers for long-haul air travel, *Qantas* carries up to 30 million passengers per annum in 44 dif-

ferent countries.[2] Its status as a leading global airline means that there is substantial interest in public communication about *Qantas* and related issues.

Over the year 2011 we monitored two major, transnational crises affecting *Qantas* unfolded. The first of these was caused by the eruption of the Chilean volcano Puyehue in June 2011, generating an ash cloud which drifted across the southern globe and caused flight disruptions and cancellations in South America, New Zealand and Australia. In Australia, in particular, *Qantas* and other flights to and from the major population centres in the south of the continent were cancelled in two separate episodes in mid-June, as the ash cloud circled the southern hemisphere twice. In a country that relies on air travel as an indispensable form of public transport, this caused significant disruptions to public life and generated substantial mainstream and social media coverage. In its connection to a natural disaster, this crisis belongs to the 'victim cluster (1)' of the SCCT model, therefore. Qantas is not responsible for the emergence of this crisis. In the following this first crisis is described as C1.

A second major crisis involving *Qantas* occurred in October 2011, when in response to prolonged minor industrial action *Qantas* announced a comprehensive staff lock-out, and the immediate grounding of its entire fleet of aircraft on a global basis. The grounding, which lasted for several days, severely disrupted the travel plans of tens of thousands of passengers worldwide. This second case differs markedly from the first: here, *Qantas* management itself caused the brand crisis, and the crisis has a significant political dimension in Australia. This crisis must thus be allocated to the 'preventable cluster (3)' of the SCCT model. Qantas is responsible for the crisis. In the following this second crisis is described as C2.

Communication on Twitter is based on a number of simple but effective instruments for managing conversation and discussion. Common tools include the hashtag (a brief keyword, prefixed with the hash symbol '#'): a hashtag is usually included in a tweet to mark it as part of a specific topical discussion. By using established hashtags, users enable their tweets to become visible to other users following the topic [25]. Further, by sending @replies (the tweet contains the recipient's username, prefixed by the '@' symbol) users address their tweets to specific other users. Contrary to direct messages to other users, @replying is public, and all other participants in the network are able to access such messages. A special form of the @reply is the (manual) retweet. Here, users quote all or part of another user's tweet, prefixing it with 'RT @username' to acknowledge the original sender, and thereby share interesting tweets with their own audience (their network of followers). Retweeting users may also edit those retweets before sending, for example in order to include their own comments. Finally, to provide new or additional information, Twitter users are also able to include URLs with their tweets, thereby providing pointers to off-site content.

3.2 Methods

To identify enterprise-related crises that were of public interest, we monitored the mainstream media including the feeds of news agencies. Simultaneously, we tracked

[2] www.qantas.com.au

tweets containing the names or hashtags of fifty major global brands in 2011. Since Qantas was affected by two major crises of different types within the data-tracking period, we chose to concentrate our analysis on this case.

The study method involves an in-depth, longitudinal examination of a single enterprise. This allows us to systematically collect Twitter data, examine events, and analyse the dynamics of the discussion. By referring to Coombs [22] we were able to distinguish patterns of communication for two different types of crisis.

In our study of these crises, we focused on the Twitter network because: (1) the number of participating users and tweets is high, (2) Twitter communication, in response to emerging issues, is fast and spontaneous (also due to mobile-based participation possibilities), making it an effective platform for the sharing and discussion of crisis-related information [6], (3) Twitter provides an API which enables us to gather data at scale on specific issues, and (4) Twitter is characterized by a high topicality of content. To track Twitter data we used a modified version of the open source tool yourTwapperkeeper[3]. This tool enabled us to capture all those tweets that contain the keyword *Qantas* in their content, in the username of the sender, or in a URL. We also identified tweets that, in spite of containing the '*Qantas'* keyword, were obviously not related to *Qantas* at all (e.g. Twitter spam). We were able to identify those tweets by searching for identical tweets that were posted with a very high frequency. Often such messages are generated by (automatic) bots and therefore are not relevant to our analysis. By reading the 100 most frequent messages we could classify them as being either related to the crises or not. Following, we removed such not crises-related tweets from our dataset. Overall, this resulted in a dataset of some 240,000 tweets between mid-May and mid-November 2011. From these data we selected those tweets which were published within the timeframes of each of the crises: some 14,200 tweets for the 11-24 June ash cloud crisis, and some 98,600 tweets for the 26 October to 8 November airline grounding crisis.

We further processed these tweets to identify a number of tweet types: in the first place, we distinguish between original tweets, @replies, and manual retweets. In this latter category, we count those tweets that contain any one of the common indicators for passing along an original tweet made by another user: (1) "RT @user Qantas flights cancelled due to ash cloud." (RT = retweet), (2) "MT @user Qantas flights cancelled due to ash cloud." (MT = manual retweet), (3) "@user Qantas flights cancelled due to ash cloud." ("quoted" tweet), and (4) "Qantas flights cancelled due to ash cloud." (via @user) (received via @user). In addition to such 'straight' retweeting, we also count as retweets any tweets which follow the formats above, but add further commentary – e.g. "Oh no! RT @user Qantas flights cancelled due to ash cloud". While retweets are technically also @replies, we count as genuine @replies only those tweets which include '@user', but do not follow any of the manual retweeting formats above. Finally, any tweets which are neither genuine @replies nor retweets – that is, tweets which do not reference another user – we count as original tweets: new contributions to the discussion. These three types of tweets, then, combine to cover the entirety of all tweets in our dataset: tweets are either original tweets,

[3] See: http://mappingonlinepublics.net/tag/yourtwapperkeeper (2014-11-13)

genuine @replies, or retweets. Further, in a separate category we also count all tweets (regardless of whether they are original tweets, @replies, or retweets) which contain URLs.

In addition to tracking the incidence of these tweet types, we also distinguish between three categories of users as suggested by [11]. First, we identify the *most active users* in our dataset: the one percent of the total participant base who have contributed the highest number of tweets containing the keyword '*Qantas'*. Next, we distinguish a second category of *highly active users*: the ten percent of users who have contributed the highest number of tweets, from which we remove the most active users already identified in the first step. Finally, we categorize as *peripheral users* those participants who are not included in either of the other two groups.

4 Results

In the following, we first present the results of the descriptive analysis (patterns) and afterwards the findings of the manual content analysis for both crises. As both events relate to flight disruptions caused by the grounding or partial grounding of the *Qantas* fleet, they are immediately comparable; given the global impact of the October/November 2011 airline shut-down, the significantly greater volume of tweets during that time is hardly surprising. In table 1 we present general numbers for both crises.

Table 1. Twitter activity during the two crisis events

	C1: Ash cloud	*C2: Airline grounding*
Timeframe of analysis (year 2011)	Jun 11 – Jun 24	Oct 26 – Nov 8
Total number of tweets	14,226	98,636
Total number of unique users	9,546	42,145
Average tweets per day	1,016	7,045
Average unique users, per day	790	4,571
Average tweets per capita, per day	1.27	1.45

A closer examination of the two periods reveals the patterns of each event in more detail. C1 (fig. 1) clearly divides into two peaks, corresponding to the two separate disruptions caused by the first and second circulation of the ash cloud around the southern hemisphere. In between the two events, *Qantas* and other airline flights in Australia and the region resumed, albeit only briefly. Notably, while the first disruption constitutes a longer period of heightened Twitter activity, the second takes place in the main on two days, 21-22 June. This reflects the less unforeseen nature of the repeat event (second eruption), and the greater experience of airline, passengers and the general public in dealing with it.

Additionally, fig. 1 indicates (on the scale to the right of the graph) the average number of tweets made by each participating user for each day. Here, overall ratios remain relatively stable throughout. The peak periods are characterized by a slight increase in the number of tweets per user. Not only do peak crisis periods attract more

users, therefore – an average of over 1,700 for the first disruption on 12-15 June, for example, compared to an average of below 470 for the brief resumption of flights 16-20 June. They also lead those users to become more engaged in tweeting about the brand experiencing a crisis.

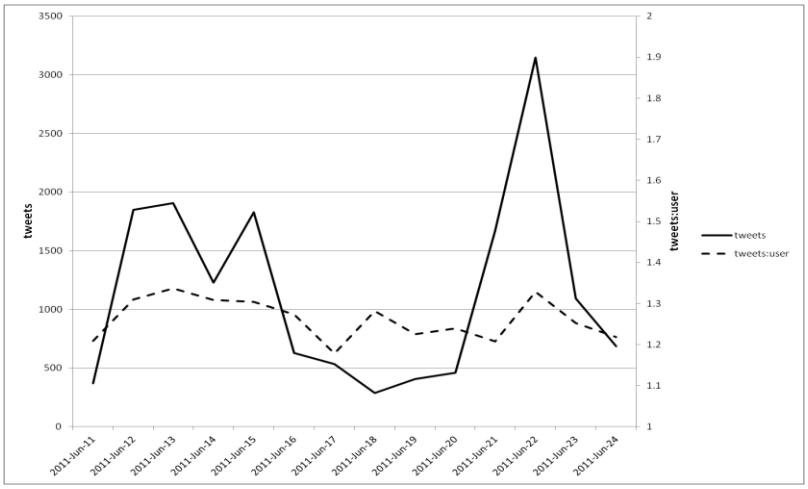

Fig. 1. Tweeting patterns per day during C1

The corresponding activity patterns for C2 shows some notable differences (fig. 2). In the first place, the overall volume of tweets is substantially greater (peaking at nearly 20,600 tweets containing the term '*Qantas'* on 30 October – a rate of over 14 tweets per minute, on average). This is hardly surprising, given both the immense global effect and the unprecedented nature of this action. Twitter volume gradually decreases again as a temporary ruling by Australia's industrial relations tribunal forces the airline to resume flights.

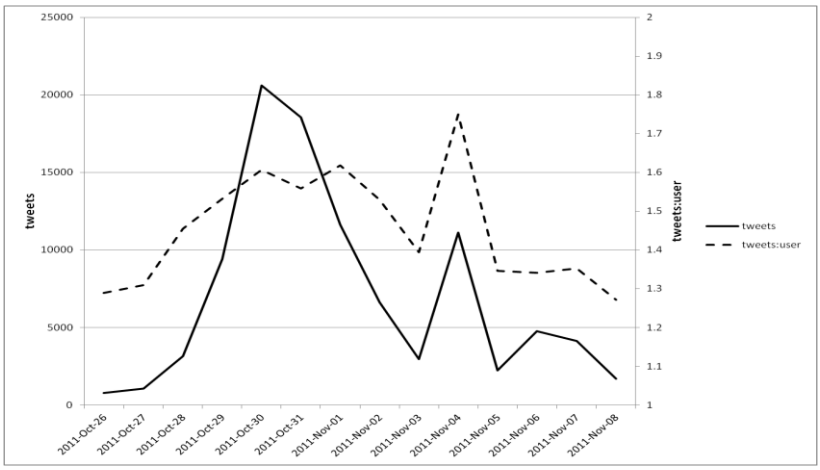

Fig. 2. Tweeting patterns per day during C2

What is notable about this second crisis event is that (from initial levels around 1.3, similar to those observed for the first event) the average ratio of tweets per participating user rises significantly during the peak periods – to over 1.6 tweets per user, per day, during the grounding and its resolution, and to nearly 1.75 tweets per user during a follow-up spike on 4 November. This indicates a higher level of user persistence in the discussion: rather than merely posting single tweets complaining that the ash cloud has affected their *Qantas* flights, as they might have done in June, in C2 more Twitter accounts are posting multiple tweets discussing the grounding, its politics, and its implications.

The differences between the two events can also be documented by examining the types of tweets made by participating Twitter users during these periods.

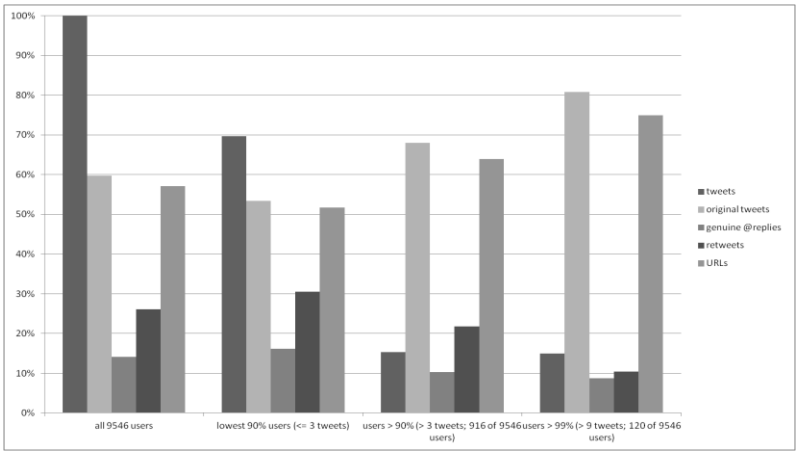

Fig. 3. Types of tweets during C1

Examining the distribution of tweet types both in general and across the three groups of participants first for the ash cloud crisis (fig. 3), we note first that at 60%, a substantial percentage of tweets across the two weeks examined here were original tweets; retweets and @replies account for a much smaller number. That percentage rises even higher if we consider only the top percentiles of users: 68% of tweets made by the second most active group, and 81% of tweets by the top one percent of most active users are original tweets rather than engaging discursively with other Twitter users. At the same time, the percentage of URLs in tweets rises in a similar pattern (from 57% in all tweets to 64% in the tweets of the second most active group to 75% in the tweets of the most active users). While these users do not engage much with other Twitter participants, they do engage substantially with other information available on the web, and share it in the form of URLs with their followers.

Patterns during C2 are notably different (fig. 4). There are a substantial number of original tweets (accounting for 52% of all tweets in the dataset), but the top one percent of most active users (some 434 of the total number of 42,145 users) account for proportionally fewer of such original tweets. Only 46% of their tweets fall into this category. Rather, in marked difference from the C1 period, exactly one third of their tweets retweet the messages of other users and 21% of their messages @reply to others. Further, only a comparatively low 37% of their tweets contain URLs. The second group of users shows similarly divergent patterns.

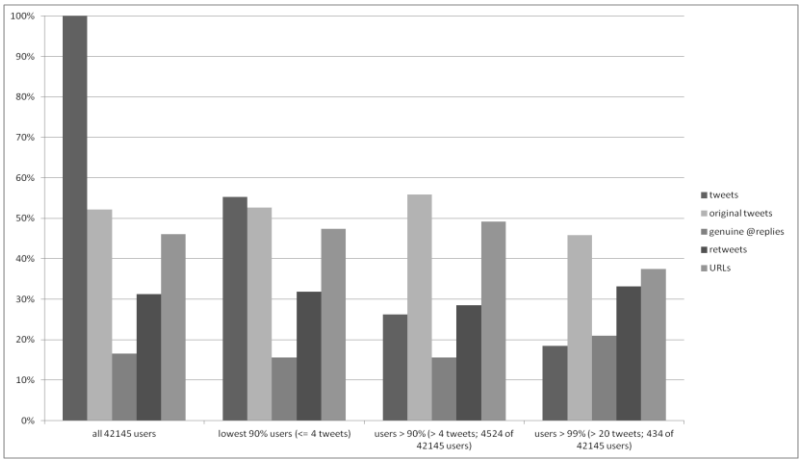

Fig. 4. Types of tweets during C2

The distribution of most active user activity during C1 shows a familiar long-tail distribution pattern (fig. 5). A few of the twenty most active users account for a disproportionately high amount of tweets. We found that the official *Qantas* account *@QantasAirways* is not in one of the active groups. While we captured nearly 50 tweets from this account over the C1 period, this number is dwarfed by the activity of *@AustFreqFlyer*, the account of an Australian high-end travel Website. Indeed, the majority of the most active accounts during this period are related to airline and travel

industry (including the accounts of a handful of individual enthusiasts). In comparison with these users, who mainly post original tweets, *@QantasAirways* is notable for the markedly different use of its account. In an effort to address the situation, tweets originating from this account are largely genuine @replies to customers and others affected by flight cancellations.

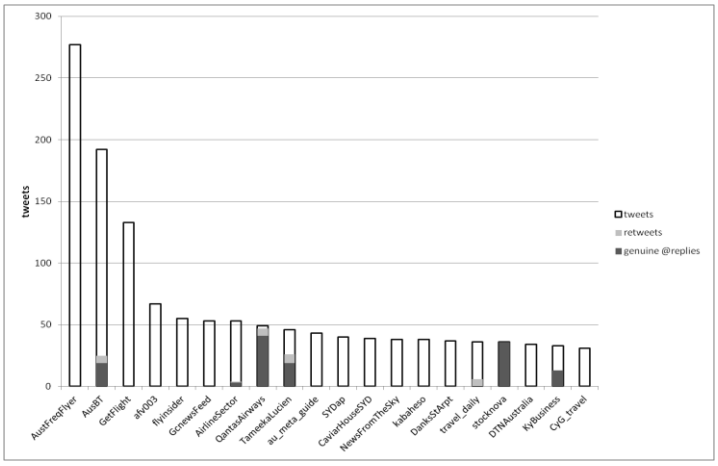

Fig. 5. Activities of the most active accounts during C1

By contrast, activity by the most active users discussing the management-initiated temporary shutdown of *Qantas* flights in C2 shows markedly different patterns once again. Distribution of activities across the twenty most active accounts is more even (the 'long tail' curve is less pronounced), and in keeping with the overall patterns we observed, a substantially greater number of retweets and @replies can also be noted.

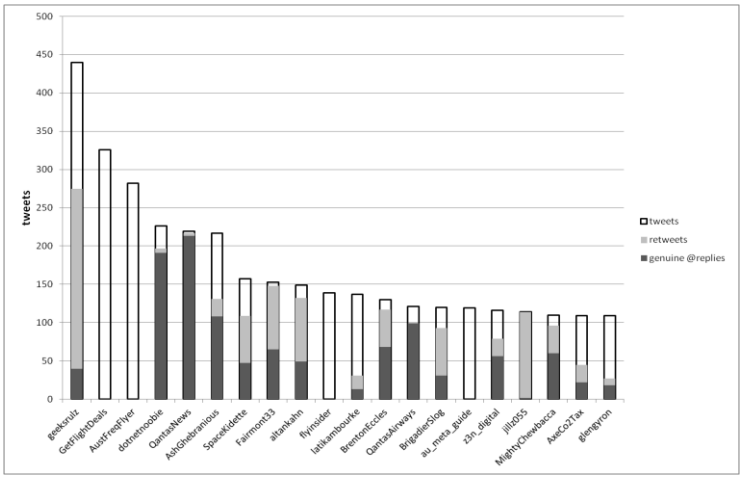

Fig. 6. Activities of the most active accounts during C2

Most importantly, the make-up of this lead group also diverges significantly from C1. In C2, we note the presence of a much greater number of individual, non-corporate accounts, many of them well known as regular *Twitter* commentators on Australian politics. In tenth position, the Australian Broadcasting Corporation's political reporter *@latikambourke* is also represented here. Common especially to these accounts (and contrasting for example with corporate accounts *@GetFlightDeals* and *@AustFreqFlyer*) is their significant focus on @replying to and retweeting the messages of other users. We may assume that discussion of the grounding itself and of its political and economic implications in Australia dominates most active users' activities. The position of official *Qantas Twitter* account *@QantasAirways* (and its focus on @replying to disgruntled passengers) should also be noted; by contrast, the more prominent *@QantasNews* account, which is similarly highly engaged in @replying activities, is *not* an official account, but is operated by the independent site *Flight.org.*

5 Discussion

We can see some notable differences in the metrics of these two crises, pointing to divergent patterns of development for these events. First, we observed that the overall volume of tweets in the first crisis (C1) is much lower than in the second (C2). This may be explained both by the fact that the ash cloud flight cancellations affected a smaller (if nonetheless considerable) geographical area across the southern states of Australia and the region than the global grounding of the entire *Qantas* fleet, and by the fact that the global grounding was entirely unforeseen (and deliberately kept secret by management ahead of its coming into effect), while disruptions from the ash cloud were a least partly foreseeable (especially the second disruption of the volcano). In other words, we suggest that the magnitude of *Twitter* discussions about any given brand crisis is related at least in part also to the degree to which the crisis comes as a surprise to the brand's stakeholders.

This is also evident from the interaction patterns that our analysis has uncovered. Especially amongst the more highly active user groups, we found a substantially larger percentage of original tweets (i.e. tweets which are neither @replies nor retweets) and tweets containing URLs during C1, while tweets posted by these groups during C2 were significantly more dialogic and interactive (as expressed in the higher percentage of @replies and retweets). On the basis of these figures, we suggest that during C1 there is a greater focus on sharing immediate news about the ash cloud groundings and their impact on travel arrangements, while during C2, more users are engaged in a discussion of *Qantas* management decisions and their implications for the *Qantas* enterprise as well as for Australian industrial relations policies. Notably, the average of tweets sent per user, per day, is also greater during C2 (at 1.45) than during C1 (at 1.27), supporting our characterization of C2 as a more discursive event during which longer conversations between users are more likely.

These communication patterns differ especially strongly when we examine the tweeting behaviours of the most active user group only. During C2, most active users post a much smaller percentage of original tweets than during C1; on the other hand,

the share of genuine @replies is much higher (C1: 8%, C2: 20%). Both observations point to the more dialogic character of communication around the management-initiated crisis (C2) than during the ash cloud crisis (C1); in the second group of highly active users, similar patterns can be observed. As these most active groups of users are responsible for a disproportionately large amount of all tweets referring to *Qantas* during these crisis events, these divergent patterns are especially important in setting the tone and pattern for overall Twitter conversations around these events.

The divergent communicative patterns observed amongst the most active users in the two cases may thus also reflect longer-standing communicative patterns in these established *Twitter* networks. As outlined above, we found that most active users discussing the global grounding event responded much more discursively than most active users during the ash cloud event – but as they did so, they engaged less prominently in sharing information sourced from outside of *Twitter*. Rather, what they did share were the tweets posted by their fellow *Twitter* users; such tweets were more likely to contain insightful, clever, or funny commentary on the airline grounding than detailed information on how the event itself was unfolding. Further research in this context could examine the communicative patterns in general, longer-term hashtags relevant to these two groups – the well-established #flyertalk and #auspol, for example – and compare these overall patterns of activity to those we have observed for the two crisis events. In the process, we would expect to find that leading air travel industry accounts generally post more URLs and engage in less discussion than leading Australian political commentators.

Finally, we found that the official *Qantas* account, @QantasAirways, is not especially prominent in the lead group. We captured some 50 tweets from this account during the ash cloud crisis, and some 125 tweets during the grounding crisis; while these numbers are not insignificant, they remain relatively small for a globally active corporation encountering severe disruptions to its operations, and are dwarfed by the activity levels of other, independent Twitter accounts. Other than the fact that many of the company's tweets appear to be @replies to specific Twitter users, this comparatively small number of tweets (considering the tens of thousands of *Qantas* customers affected by both crisis events) does not point to a particularly active use of Twitter for brand crisis communication, and it means that *Qantas* is unable to retain effective control of its brand identity during these events.

6 Conclusion

In our study we were able to provide empirical data that indicate that communication on Twitter about certain brand crises can show some major differences even though the events were generally comparable regarding the affected enterprise, the consequences for customers, and the environmental conditions (due to the short timeframe). We suggest that the degree of foreseeability of each event, as well as the perceived need for public discussion (e.g. because major facts are unknown), heavily influence the dynamics of communication. Through our study we clearly showed that communication of one brand-related crisis was based more strongly on news sharing (C1),

while the other was focused more strongly on discussion (C2). We also found that this distinction is most pronounced for those user groups that are very active within the overall communication process, as measured through the volume of their contributions. Therefore, the accounts of most active users, including the relevant companies themselves, play pivotal roles within overall discussion.

For any research dealing with Twitter data, it must be noted that researchers rely on the accurateness of the Twitter API. As the API is the only access point to large-scale Twitter data that is available to researchers outside of Twitter itself, there is no opportunity to independently verify the quality of the dataset. This is a necessary and unavoidable limitation that does not invalidate the findings of studies such as ours. Given the substantial volume of the tweets that we did capture, our results retain their validity even if they are based only on a large percentage of all '*Qantas'* tweets rather than on an exhaustive dataset comprising all such tweets. Moreover, we can not state that 100% of all tweets in our data set are related to one of the crises situations (even though we did our best to remove unrelated tweets). However, this limitation is true for all other big data studies in this field and is not avoidable without having a manual content analysis on the full data set.

Rather than focusing on absolute numbers, therefore, we suggest that our findings point to key patterns and tendencies of dynamic brand communication on Twitter. We also note that our conclusions are case-specific and cannot be generalized without examining a number of further brand crisis situations. In our further work, therefore, we intend to conduct similar research (investigating different industries and brand issues, for example) to develop a more comprehensive portfolio of case studies which enables us to draw comprehensive conclusions through a more systematic comparison between diverse case studies. This paper contributes to scholarly discussion by providing rich empirical data of enterprise-related crisis communication on Twitter. In practice, these first results may help companies to better understand the importance of taking part in the communicative activities surrounding their brands on Twitter, and to develop strategies for engaging more efficiently in social media spaces.

A substantial amount of further research is now needed: the observations we have made here must be tested against a catalogue of other brand crises, to test whether the communicative patterns we have observed are particular to these two specific crises or exemplary of general patterns in the use of Twitter during brand crisis situations. It should also be investigated to what respect technology developments and improved communication channels might change behaviour in crises communication leading towards new SCCT clusters. Further, a range of additional metrics to measure communicative processes on Twitter may also be developed, and may again be compared across a wide range of communicative situations relating to various brands and brand crises. From a practical view it would also be interesting to learn more about how the company might see if it performs well or not according to twitter patterns and how the company can track this indicator during different types of crises.

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