

# The impact of disasters on brand sentiment

*How corporate social responsibility activities affect brand reputation*



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## Highlights

- Local and national disasters and tragedies have the biggest impact on the level of social media conversation about companies.
  - Corporate social responsibility (CSR) activity tends to be a positive high point in conversations on social media. Readers tend to positively react to these stories, compared to other topics.
  - Overall neutral sentiment of a company can be shifted to positive sentiment by increasing the promotion of CSR project activities on social media.
  - Most chatter, for community engagement generally and disaster response specifically, occurs on discussion boards where many users are anonymous.
  - Promoting CSR activities through social media has a greater impact on lowering neutral sentiment than it does on decreasing negative sentiment.
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## Background

In the past 65 years, there have been 4,100 disaster declarations in the United States. Of those, 1,200 have occurred in the past decade, nearly twice the average rate. As the rate of disasters in the United States, and around the world, increase, companies are strengthening how they respond to help impacted communities.

Knowing how the public perceives these events is an important piece of information for companies as they frame the structure of their disaster resilience and recovery programs. Social media analytics is the best way for companies to secure that data.

Social media analytics gathers data from social media to help companies make more informed business decisions. Natural language processing (NLP) provides a powerful method to analyze, interpret, understand and influence what people discuss about a company on social media.

Mining customer perception is the process of analyzing and summarizing data to perform advanced analytics. Social media analytics is an ideal way to understand real-time consumer choices, intentions, emotions, sentiment and key focus areas.

The most common use of social media analytics is to determine customer sentiment to support marketing, product development and customer service activities. This analysis is used to improve customer research and market trend identification, while helping to better target communications and resolve public relations issues. With a varied constituency of volunteers, donors, partners, community members, businesses, government officials and beneficiaries, organizations must understand a variety of motivations.

Though companies often rely on surveys to solicit feedback from these key constituents, they can be costly, narrowly focused, and miss valuable insights and opinions across a broader audience. There can also be a distinct difference between what individuals say they do and what they actually do—particularly when it comes to online communications, feelings and behaviors.

Using IBM® Watson® Natural Language Understanding (NLU) application programming interfaces (APIs), IBM and the U.S. Chamber of Commerce Foundation (USCCF) have worked together to go beyond the common usage of social media analytics to determine the public sentiment of companies based on their CSR or corporate citizenship work. Our goal is to analyze brand reputation and how CSR activity has a major impact on how consumers view companies.

This work is our third iteration of this collaboration. By analyzing 30 of the best-in-class CSR corporate practitioners over the past two years, we've been able to show the real impact of CSR communications on brand reputation. Primarily, we've shown how effective CSR communications are in improving a brand, how much a company should be talking about its CSR work, and how it should be talking about that CSR work. (See inset box on page 7.)

This year we included an additional focus. One of the enhancements to the IBM tools includes a greater ability to place sentiment in context. Instead of relying solely on the sentiment of a statement or paragraph, Watson™ NLU scores the sentiment of an entity within a snippet of text within an entire document. For example, the entity could be a company or event, and the snippet of text a paragraph within a forum

discussion thread. This process allows us to more clearly analyze differentiations between a topic and the context in which it's presented. This process also allows us to connect topics and events more clearly across various social media.

This capability has been critical in addressing one of the challenges we've encountered in past iterations of this study. Disaster response and recovery has always been difficult for us to properly analyze since they are often seen as quite negative because of the overall negative context of disasters. A reader who's reading about a catastrophic event, such as a hurricane, doesn't have a positive lift when reading about a company's work in the midst of tragedy.

Disaster response and recovery efforts may be the most common type of CSR activity. We can now offer greater insights and actionable analysis.

## Company engagement in CSR and disaster response

The CSR work that a company performs in its communities influences how people feel towards a company and its brand. This connection between brand reputation and a company's engagement in society has significant anecdotal support. In fact, it often serves as one of the main reasons why companies get involved in systematic CSR work—to show the public that companies care about them and their communities.

In most aspects of CSR work, larger companies engage a sophisticated formal system to leverage their employees, business units and resources to address major societal challenges, such as education, community health and wellness, and environmental sustainability. In previous projects, IBM and USCCF have analyzed the impact of that work on brand sentiment in social media. We wanted to quantify how conversations about CSR activities affect a company's brand and reputation, instead of the activities themselves. The positive impact that CSR makes should encourage companies to get more involved in their communities. Then, companies can earn credit for their contributions by communicating them effectively through social media.

However, disaster response and recovery can be different than the rest of a company's community involvement. While many companies set aside specific dollars for disaster recovery efforts, even the most structured and formalized plans can be rendered moot if a major event occurs near a company's headquarters or one of its major markets, necessitating a massive grant or initiative. Often, especially during Hurricanes Maria and Harvey in 2017, companies offer help that significantly exceeds their expected budgets for disaster recovery.

In the previous iterations of these analyses, we found that discussion about disaster response and recovery efforts in social media channels didn't lift corporate reputations and brands to the same extent that work in education or community health did. We found that too often, the type of work that goes into disaster recovery necessitates negative connotations that elicit negative feelings from the reader. This response is true regardless of the type of disaster, whether natural or man-made, large in scope or in a specific location.

If companies don't publicize the impactful work they do after a disaster, it can stall overall recovery. Many companies don't publicize their community engagement work—in disaster response and generally—because they feel they should be doing so privately. However, this attitude, particularly in the disaster response space, can be counterproductive.

Primarily, conducting work quietly stops companies from receiving constructive insights or criticisms on what they're doing, leaving out an important feedback loop from stakeholders. Also, many companies wait to benchmark their own efforts after a disaster using a tool, such as the [USCCF Corporate Aid Tracker](#). And if companies are quiet about their own disaster recovery and resilience work, it doesn't encourage other companies to do the same.

Regardless of these challenges, IBM and USCCF want to inspire more companies to share more of their work in the CSR space. By analyzing effective CSR communication strategies using social media analysis, particularly around disaster response programming, companies can improve their brand value and reputation.

To support this assertion, IBM, through its Social Media Analytics Impact Grant offering, worked with USCCF research and subject matter experts to measure social sentiment by analyzing what people posted about companies and their CSR activities.

IBM social analytics methodology and Watson NLU capabilities capture and consolidate insights from a wide range of social media channels, providing insights into the opinions and motivations of the general public and a company's specific constituent base. This understanding allows organizations to be more responsive to their constituents' needs.

When a topic of interest is identified, IBM analytics tools quickly identify relevant content from social media, automatically presenting relationships and patterns and displaying them on a dashboard. IBM social analytics examines the connection between companies socializing their CSR work and its impact on the drivers of public sentiment.

## Scope of the analysis

IBM conducted a national query of data on 30 companies that have mature programs in CSR strategies and campaigns in place to benchmark best-of-breed CSR companies. Of those 30 companies, USCCF chose those known for their extensive disaster response programs to help ensure we could build strong queries about that specific topic.

These queries were conducted over a six-month period by extracting excerpts of user-generated text from blogs, forums, news sites and various other public social media. The total number of social media mentions aggregated during this period was 782,183, while the number of CSR-related mentions represented 99,786 of the total mentions, or 12.8 percent. A total of 2,405 of those snippets were focused on disaster response, with the biggest responses coming as a result of Hurricanes Maria and Harvey, and the shootings in Las Vegas. See figures 1 and 2 and table 1.

Total Number of Social Media Mentions (782,193)

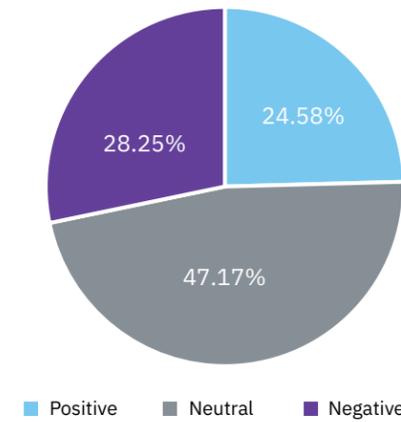


Figure 1: Distribution of positive, negative and neutral social media mentions.

Number of CSR Social Media Mentions (99,786)

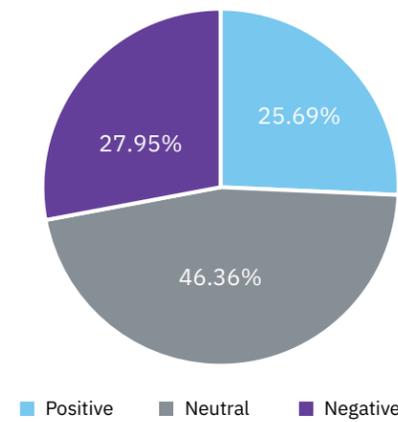


Figure 2: Distribution of positive, negative and neutral social media mentions of the top ten websites.

	Number of snippets	Percent of CSR chatter (99,786)	Percent of all chatter (782,193)
Philanthropy	2,405	2.41%	0.31%
Health	57,859	57.98%	7.40%
Entrepreneurship	12,528	12.55%	1.60%
Education	13,124	13.15%	1.68%
Environment	11,465	11.49%	1.47%
Disaster	2,405	2.41%	0.31%

Table 1: Percentage of CSR topic by market sector

**Summary of the 2017 IBM Watson analysis**

By validating that there's a positive impact on a company's brand and reputation through the effective use of social media about its CSR activities, IBM and USCCF found compelling evidence for companies to do even more good in their communities. The following insights provide guidance for promoting a company's CSR activities:

- Framing discussions in ways that encourage a thoughtful and emotional response can elicit more interest from users of social media and encourage them to write about a company's CSR initiatives. Blogs, testimonials and local interest articles tend to perform better than press releases.
- More than 700,000 corporate mentions were analyzed — less than 3 percent came from a company-tagged URL — and the analysis deliberately kept out anything tagged as an advertisement. This analysis means there's value in having consumers or third parties validate company efforts and an opportunity to communicate more formally.
- Promoting a company's CSR work converts people who think about a company "neutrally" to "positively." It's less effective at removing "negative" sentiment.

- Over time, companies who increased promotion of CSR work online experienced improvements in how they are viewed by social media users. By tracking the same companies year-over-year, we found that increasing the percentage of CSR snippets — compared to company snippets overall — decreases the number of neutral snippets and increases positive ones. This impact is exponential, so companies that are starting from fewer CSR mentions have more to gain.
- The most impactful finding of the analysis was that companies can benchmark the expected volume of social media chatter based on their net income. Over two years of data, we found that, of the best-in-class companies in our analysis, the production of snippets about their work fit in an exponential curve compared to their net income. **That equation:  $32.133e^{0.0002x}$**   
The "x" stands for annual net income in millions, which tells a company how often its CSR work needs to be discussed online to be known for its efforts. In short, this benchmark translates to roughly 16 snippets per week for a company with annual net income of USD 100 million, 20 snippets per week for a company with annual net income of USD 1 billion, and 110 snippets per week for a company with annual net income of USD 10 billion.

Read the complete 2017 report [here](#).

## IBM Watson Natural Language Understanding Service overview

IBM worked with the USCCF to provide enriched data regarding public opinion and views on major company humanitarian and community outreach programs in 2017. IBM Watson® NLU Service processed and enriched social media conversations. The project had three stages:

- Testing query parameters to ensure accuracy
- Processing raw social media data to mine relevant mentions
- Enriching company and topical data to add context and quantitative scores for analysis

### Testing query parameters

IBM acquired publicly available social media data using natural language querying techniques, including wildcards, boosting and other elastic search query methods. To compare the output of various queries, IBM evaluated the effectiveness of different query terms and structures using Watson™ NLU to produce a quantitative metric for comparison. For every query tested, a small sample of approximately 1,000 documents were taken for each company.

### Processing the raw social media data

The resulting raw, unstructured data was then processed by Watson NLU to identify keywords and entities within the text, and the sentiment and emotions towards each, as well as their relevance to and context within the full discussion on that site. These keywords and entities were then compared to the target company's common names. If there was a match, both the count of matches and marginal relevance percentage were recorded.

## Enriching the company and topical data

Once all samples were analyzed, various metrics were calculated:

- **Entity Match Rate.** The count of entity matches divided by total samples
- **Average Entity Relevance.** The sum of marginal entity relevance divided by count of entity matches
- **Keyword Match Rate.** The number of keyword matches divided by total samples
- **Average Keyword Relevance.** The sum of marginal keyword relevance divided by count of keyword matches

In addition to the results for the target company, the keywords and entities with the highest counts were also returned. This information identified noise in the results, which could be filtered on the next iteration of the query. Multiple iterations of each query were performed to remove noise to acceptable levels.

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### Definition of terms

- **Document:** An entire social media post. For example, a discussion thread.
  - **Snippet:** A portion of or response to a social media post. For example, a comment on a discussion thread.
  - **Entity:** A mention of a person, place, company, location, or brand extracted from social media posts using natural language processing. For example, a mention of a hurricane in Houston, Texas from a discussion.
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## How does this process change measuring business sentiment?

The Watson NLU capabilities used in this year's study allow us to go deeper into our analysis of the topics. Previously, we uncovered significant findings with this analysis, including that, on average, CSR activities generate more organic social media chatter than other business activities, and that there's a set benchmark for the level of conversation about a company's activities. However, we couldn't determine much in the way of significant differences between various types of community activities—especially disaster response work.

The new methodology and tools, leveraging Watson NLU, allows for much more nuanced analysis. First, each snippet's sentiment is ranked with a continuous numerical score of how positive or negative it is. Each sentiment is given a score of negative one for most negative, to positive one for most positive. Using these scores, we can analyze if there's any impact on snippet location, topic or date on how negative or positive it is. This method enables an inherently more nuanced analytical approach by leveraging continuous variables, numerical scores negative one to one, instead of categorical variables, positive, negative or neutral).

Second, the new methodology and tools give context on the snippet's sentiment in relation to the document it appears in. This insight is incredibly important, especially if the sentiment of the snippet is markedly different than the sentiment of the document. We can investigate if mentions of CSR work—or corporate activity in general—tends to decrease or increase the sentiment of a conversation.

Last, the new methodology and tools can determine the degree to which a snippet “went viral.” By looking at both the popularity of the source website and how often that snippet is referred to on that site, IBM researchers were able to

quantify how well organically created content was picked up. An important consequence of this response is the new ability to differentiate a single mention with numerous comments against one that doesn't elicit any. It also helps ensure that multiple posts generated by a single author with no or low comments aren't given unnecessarily higher weight—helping to somewhat offset aspects of spamming, trolling or grieving.

### The 2018 results

The new tools and methodology in the 2018 analysis allow us to make new findings, including what types of events cause spikes in chatter volume, where that chatter comes from and how powerful those snippets are.

**Chatter Volume.** We found that the largest spikes in social media chatter about companies, in general and in regard to their community engagement, came from external events over which companies had no control.

The largest-scale events that occur beyond company control are natural disasters. When a natural disaster strikes, be it a hurricane, flood or fire, companies are ready to mobilize to offer their support through monetary donations or in-kind support. When these types of engagements are discussed on social media, however, they're usually seen as “negative” because of the fact that the disaster itself is so negative.

Even though companies gave hundreds of millions of dollars to hurricane recovery after Hurricanes Harvey and Maria, and were instrumental in the rebuilding of Texas and Puerto Rico, we could not find in the data a major increase in positive sentiment for companies that engaged in that work. However, we did find that as these disasters were discussed on social media, the engagements of companies were viewed as a positive highlight among the conversations. See the “Snippet strength” section.

We also found that many of the large spikes in traffic came from major catastrophes that occurred at or adjacent to a company location. Of these catastrophes, the Las Vegas shootings were the most prominent.

On the evening of October 1, 2017, a single shooter from a hotel room on the Las Vegas strip fired on a music festival, killing 58 and injuring another 851 between gunfire and the ensuing panic. We found that since this tragedy happened at a physical location of a number of major companies covered in our analysis, it dominated much of the social media discussion we observed in early October. Smaller scale, but still significant, tragedies—ranging from workplace shootings to major accidents around the country in mid-2017—had similar, but lesser effects.

Companies can't be held accountable for every tragic event that occurs at or near their locations. However, when something that garners a visceral response, such as a mass shooting, happens at a company location, it results in a negative drag on sentiment. While having a high level of positive sentiment certainly can't stop these events negatively impacting brand sentiment, having avenues opened and primed to positive news about a company can accelerate recovery.

**Snippet Sources.** In this iteration of the analysis, we were able to find additional information about where the snippets came from, especially how those websites may offer different environments for social media sentiment.

The top 10 website sources for these snippets are responsible for 243,797 of total snippets out of 782,193, or 31.17 percent. There were 108 websites responsible for at least 1,000 snippets each.

The top 10 websites are a mix of social media sites, such as 4chan, BlogSpot, Reddit, WordPress and bulletin boards about specific industries. These websites attract a lot of users and conversations regardless of the topic. While these sites are the top grossing websites, we found that many local news sites have higher penetration on specific stories, particularly in the disaster space. These local news sites don't appear in the top ten because they don't have concentrated reach across brands, geographies or topics. See figure 3.

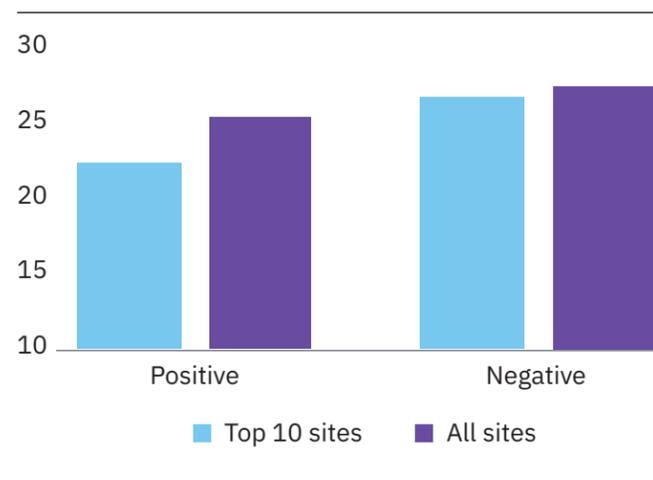


Figure 3: Comparing the percentage of positive and negative sentiment on the top ten social media websites with that of all websites.

We found that many of these sites are places where users go to talk about negative experiences, whether they converse about them in a constructive manner or not. While it might be attractive to attempt a campaign on these heavily trafficked sites, we don't recommend that companies engage in specific campaigns on these sites, since most attempts to do so fail.

What's important, however, is being knowledgeable about your company's reputation on these sites, from inside and outside your organization, because they are representative of how many people—especially millennials—consume media.

**Snippet Strength.** Not all snippets are created equal. Besides being positive, negative or neutral, this year's analysis allowed us to see how strong they were in one direction or another. Ranging from positive one for most positive, to negative one for most negative, this year's analysis identified trends in how CSR-based snippets can distinguish an initiative or a company for its efforts.

For all 782,193 snippets, positive snippets, on average, tend to be slightly stronger than negative snippets by 7 percentage points, which is interesting to note since negative snippets actually outnumber positive snippets.

When discussing different areas of CSR activity, it's easy to see that variation. Philanthropy, education and entrepreneurship lead the way in having the greatest difference in strength between positive and negative snippets, averaging a gap of 12-14 percentage points.

	Philanthropy	Health	Entrepreneurship	Education	Environment	Disaster
<b>Snippet score</b>	0.142	0.019	0.145	0.114	-0.013	-0.065
<b>Document score</b>	0.093	-0.076	0.127	0.037	-0.029	-0.184
<b>Difference in positivity</b>	0.049	0.095	0.018	0.077	0.016	0.119

Table 2: Average snippet strength

However, in the other areas—health, the environment and disasters—the returns aren't as good. Positive and negative strength differences in those fields are, respectively, 2 percent, negative 0.1 percent and negative 7 percent.

While these numbers aren't good news, there's a benefit to these snippets. When compared in context to the document in which they occur, each of the six areas significantly outperforms the overall conversation.

On a webpage or conversation that relates to a company's community activities, on average, that company's work is viewed significantly more positively than the surrounding document. The impact is significantly stronger for health and disasters—two of the three areas where sentiment is weaker. Table 2 includes the average snippet strength with "1" representing the most positive and "-1" the most negative, the average document strength, and the differences in positivity.

Individual snippets about a company's CSR engagements may not be viewed as strongly positive. In the environments in which they are presented, they outperform the surrounding conversation most of the time, and usually by a wide margin. This strength is especially true in the disaster space where much social media conversation can be negative; when company work is talked about, it's viewed in a positive light. Since these topics also garner high engagement, positive company actions relative to negative events may present an opportunity for high reach —lower cost of earned media— and positive company sentiment.

## Conclusion

Many companies want to keep their community engagement work quiet because they either believe that they should do so quietly and not gain attention from it, or they are concerned about negative consequences from stakeholders. These concerns are often greater in the disaster space, where company attitudes about doing work privately can become even stronger.

At a glance, this hesitation seems worthwhile, as we have found that this work, indeed, is seen more negatively than other types of community engagement. However, the real takeaway is that the occurrence of the event is what causes the negativity, and business engagement within that can have a positive impact on public sentiment within the context of the disaster itself.

This report gives companies compelling evidence for doing more good work in their communities and making sure that there are plenty of opportunities for communities and individuals to see and share the impact they're having.

This IBM Impact Grant helped USCCF validate this premise by capturing and consolidating insights across multiple social media platforms, segmenting social media audiences and measuring social media sentiment impact.

The following insights provide guidance for promoting CSR activities:

- Companies gain real value by strategically framing and discussing their CSR efforts online, and those efforts can improve brand image and company reputation.
- The main benefit of promoting your CSR work isn't in swaying the opinion of people who think about your company negatively, it's in converting people who think about your company neutrally to positively.
- Negative and tragic events that are associated with a company because of its location have significant impact on its sentiment. However, it can recover quickly, especially if there's already positive chatter in place about the company's community work.
- CSR activity tends to be a positive high point on a webpage, regardless of the topic or the sentiment. Readers tend to positively value these stories higher than their context.

## For more information

To learn more about social media sentiment and its impact on brands:

**U.S. Chamber of Commerce Foundation**  
[uschamberfoundation.org](http://uschamberfoundation.org) or email: [lbowdish@uschamber.com](mailto:lbowdish@uschamber.com)

**IBM CSR initiatives**  
[ibm.com/ibm/responsibility](http://ibm.com/ibm/responsibility) or email: [ibmgrant@us.ibm.com](mailto:ibmgrant@us.ibm.com)

**IBM Watson Analytics for Social Media**  
[ibm.com/us-en/marketplace/social-media-data-analysis](http://ibm.com/us-en/marketplace/social-media-data-analysis)  
 or call (800) 426-4968 to speak with a representative

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