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Social listening: a potential game changer in reputation management How big data analysis can contribute to understanding stakeholders' views on organisations

Arne Westermann
Department of Marketing, International School of Management, Dortmund, Germany, and
Jörg Forthmann
Department of Management, Faktenkontor GmbH, Hamburg, Germany and Department of Marketing, International School of Management, Dortmund, Germany

Abstract

Purpose – The purpose of this paper is to investigate to what extend an automated, algorithm-based analysis of online conversations of stakeholders in social media and other Internet media can be used for reputation management.

Design/methodology/approach – Examination of the reputation of the 5,000 companies with the largest number of employees in Germany based on communication with these companies in 350m online sources on the German-speaking Internet within one year. The method is grounded on an adapted reputation model based on Fombrun.

Findings – The central result of the study is the identification of the ideal balance between the different dimensions leading to the best overall reputation. The resulting correlation matrix with the respective correlation coefficients (according to Pearson) thus forms the basis for the optimal reputation architecture.

Research limitations/implications – The discovered "optimal reputation architecture" refers to a German context. Future studies should investigate in how far the adapted model and the "optimal reputation architecture" also work for other cultures. It can be assumed that there may be differences as different dimensions, for example, sustainability, may have a different importance in other cultural contexts. Apart from the question if the "optimal reputation architecture" is also valid for other cultural contexts, the concept has to be validated for German companies as well as it is just based on the two described studies.

Practical implications – The method used shows that social listening can deliver valuable results for research in the field of reputation management as it expands the possibilities to investigate reputation on a large scale. The approach shows in how far scientific research can be expanded beyond classic content analysis as the number of items which can be analysed exceeds that of classic analytical approaches by far. Explicit and implicit experiences, which are the drivers of reputation, can be systematically recorded and analysed using social listening, thus delivering valuable insights in how stakeholders perceive the performance of a company in different dimensions.

Social implications – Measuring the reputation on the basis of social listening is very important for practical applications in companies, because the data is available digitally and can deliver up-to-date reputation values almost in real time – so that the communication can be aligned very quickly with current events. This makes it easier to implement and control the interaction between companies and their environment in the digital space.

Originality/value – The classic approach in reputation management is traditional market research. It is relatively expensive and takes a relatively long time to produce results. Reputation management based on social listening

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digitises reputation measurement, lowers costs and delivers results in a very timely manner. It might be the future of reputation measurement. This is relevant not only for practical purposes but also for scientific approaches.

Keywords Reputation, Reputation management, Social listening, Automated content analysis, Big data analysis, Artificial intelligence

Paper type Research paper

1. Introduction

A good reputation is one of the central success factors for being accepted as a voice in public discourse and – regarding companies – also for being economically successful. This is widely accepted among both communication practitioners and scientists. But in practice there is often a diffuse understanding of reputation, which begins with a correspondingly vague use of the term. Reputation is often equated with image or reduced to elements such as credibility. Although both aspects play a central role when it comes to reputation, they are only partial features of the underlying concept.

The reputation of an organisation is a complex construct that is based on a range of factors. There are varying definitions and understandings of reputation in science, often depending on the different disciplines in which they have been developed. In communication science and in academic research concerning corporate communications, the concept developed by Fombrun in the late 1990s is widely used and accepted. He defines reputation as "the overall estimation in which a company is held by its constituents" (Fombrun, 1996, p. 37) and further as "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key constituents when compared with other leading rivals" (Fombrun, 1996, p. 72).

According to this definition, reputation can be understood as an aggregate of different images among different stakeholder groups. The reputation of an organisation is thus made up of the images it projects among the various relevant stakeholders. The strength of this understanding of reputation stems from the fact that it clearly distinguishes reputation from the concept of image and at the same time establishes it as a superordinate, collective construct. Still, the individual images may vary: a company may be appreciated by customers for its good products but at the same time criticised for its behaviour towards employees.

Aula and Mantere (2008) have made the presumption that a good reputation develops in a triad of good deeds, good communication and good relations. These dimensions show that reputation is formed by past actions both on the factual and on the communicative level. From the perspective of the stakeholders, reputation is the empirically based assessment of past behaviour that has one essential benefit: it enables probable future behaviour to be assessed.

Assessing future behaviour (and performance) is the central function of reputation in the social interaction of stakeholders with organisations and companies. Accordingly, ethical integrity, credibility and reliability, which function as prerequisites for trust, form a significant part of the intangible assets attributed to reputation. This may be briefly illustrated by the fact that many physical product characteristics such as durability are difficult for the customer to check in advance and a similar preliminary check is almost impossible with services. The quality of a management consultancy or the accuracy of a medical diagnosis, for instance, can only be assessed (if at all) afterwards. The same applies to shareholders, who rely on the future strategy of a company, or to employees, who are contractually bound to a company.

Luhmann (1973, pp. 23 ff.) understands trust as a risky investment – and reputation is the basis on which stakeholders decide whether to invest or not. Therefore, stakeholders first draw on their own personal experience in their risk–benefit considerations. If they have no experience of their own, external experiences and assessments are used.

This has always been the case, but the changing media landscape and the rise of the Internet and social media have changed the way reputation is formed. These new channels

allow much easier access to information about the experiences of others with a certain organisation. Moreover, they make not only the experiences of people from the same stakeholder group more easily accessible but also those of other stakeholder groups. Therefore, the different stakeholder dimensions increasingly influence each other: images that function in isolation in individual stakeholder groups are becoming the exception, whereas the perception of the collective, holistic reputation is rising.

However, it is not only the fact that experiences of other stakeholders are transparent and easy to access that leads to a growing importance of the Internet and social media for the formation of reputation. A recent German study (Die Medienanstalten, 2019) has shown that online media are gaining more and more importance in the forming of opinions especially for the younger generations, but also for people younger than 50. According to the results of this survey, Internet sources are most important for the opinion formation process of 55% of 14- to 29-year-olds and of 36% of 30- to 49-year-olds, even taking over television in this age category (see Figure 1).

Of course, these changes in how people form opinions naturally influence the way in which reputation is formed. As Aula already outlined in 2010 (Aula, 2010), online conversations on the Internet and in social media play a crucial role for the reputation of companies and organisations. Thus, the importance of the analysis of these conversations – the social listening – is evident and has been one important focus of the scientific (and practical) discourse concerning online communications and reputation management in recent years, where it is considered as a means of observing and managing an organisation's reputation (e.g. Holsapple, 2014).

Based on a review of past research concerning the influence of the Internet and social media on reputation and reputation management, as well as discussing Fombrun's concept to evaluate and measure an organisation's reputation, we will propose an adapted model for describing reputation taking the changing communicative environment into account. In addition, we will test to what extent the automated, algorithm-based approach of social listening can deliver reliable data for measuring the reputation of companies. To sum this up, this paper aims to answer the following explorative research questions:

(1) Can existing reputation models be applied to reputations formed in online conversations?

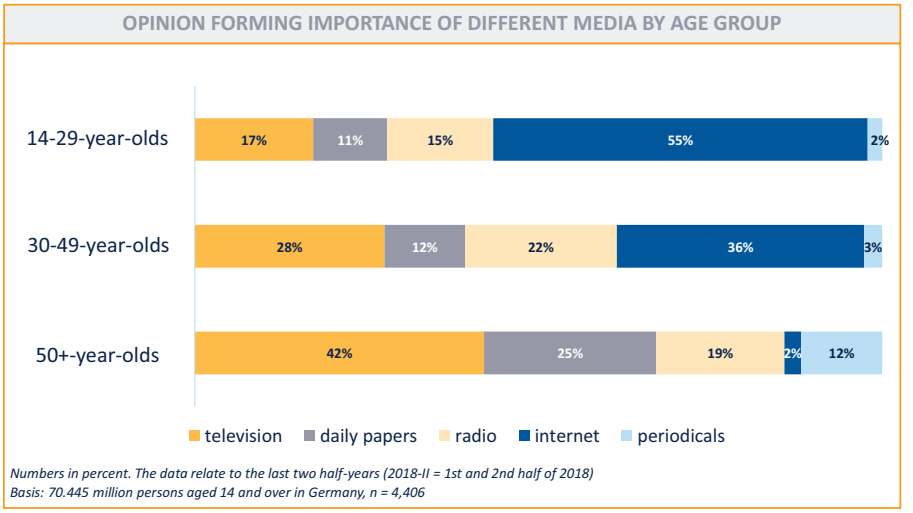


Figure 1.
Importance of different media types for opinion forming

Source(s): Die Medienanstalten, 2019

(2) If not, which adaptations are reasonable?

(3) To what extent can reputation be measured by analysing social media conversations with the help of social listening?

As this paper follows an explorative approach, classic hypotheses will not be tested. The working hypothesis concerning research questions 1 and 2 claims that it is necessary to make slight adaptations to achieve a fitting reputation model as the communicative environment has changed during recent years. The working hypothesis concerning research question 3 is that social listening is well suited to deliver valuable insights into the reputation of companies and other organisations.

2. State of research and research gap

During the last two decades, research concerning reputation management following the approach of Fombrun (1996) at the end of the last century has been *en vogue*. Due to the limited scope of this article, we will focus on those research areas which are of crucial importance given the background of our research questions. These are:

(1) The current state of reputation management and the influence of online communications;

(2) Social listening as an analysis method;

(3) Models for describing and measuring reputation.

2.1 The current state of reputation management and the influence of online communications

Since a good reputation is based among other things on "good deeds" according to Aula and Mantere (2008), this concerns the good conduct of the company – and thus the good conduct of management personnel and employees. This understanding is matched by a survey conducted by news aktuell, a subsidiary of the largest German press agency dpa, and the communications consulting company Faktenkontor. According to their findings, in 47% of companies initiatives aimed at enhancing the company's reputation could be ascribed to the executive board and/or management, which bear the responsibility for good conduct on the part of all management personnel and employees (news aktuell and Faktenkontor, 2015, p. 13).

In the same survey, however, there is also a disparity between the strategic claim and operative implementation of reputation management: a total of 99% of the communicators surveyed confirm that a good reputation is very important or important for entrepreneurial success (p. 3). Yet, a strategy for reputation development exists in only 58% of the respective companies (p. 8). The executive board and/or management of only 45% of the companies receive regular reporting on progress in reputation management (p. 23). And only a modest 24% of those surveyed report that reputation measurement occurs on a regular basis (p. 28). A cause for this may be that reputation measurement in many companies is based on market research, which is complex and entails considerable costs.

While the aforementioned study thus attributed the role of the central reputation driver to management, Einwiller *et al.* (2010, p. 311) came to the conclusion that reputation is strongly dependent on product and service quality. Depending on interests and demands, and possibly also on the sector, the prioritisation of image dimensions obviously depends on a range of individual factors and associations (Veh *et al.*, 2019, p. 315). In this context, the evaluations, perceptions and the respective associations that are linked at the societal and individual level to individual characteristics attributed to an organisation also play a decisive role (Einwiller, 2013, p. 293). From this it can be concluded that reputation is anything but a stable construct,

but rather inclined to be fragile and not very constant (Kaul *et al.*, 2015, p. 459), as it is not only composed of the different attitudes of all relevant stakeholders (Einwiller, 2013, p. 293), but is also subject to social developments and changes in social values.

Despite these divergences, there is widespread agreement in the research literature that a company's good reputation is based on a catalogue of certain characteristics (Einwiller, 2013, p. 293). These include above all concrete, objectively verifiable and physical factors relating to corporate strategy, management style and products and services: financial performance, corporate ability, products and services, social and environmental responsibility, management and leadership and treatment of employees. Consequently, they are largely based on Fombrun's original approach and are sometimes supplemented by other factors such as corporate social responsibility, marketing considerations (Einwiller, 2013, p. 302) or corporate culture (Almeida and Coelho, 2019).

In Carroll's view (2013), communication in particular must be considered as another influential perspective. Consequently, Carroll (2013, p. 4) defines the reputation of a company as "a widely circulated, often repeated message of minimal variation about an organisation revealing something about the organisation's nature". With the help of his AC4ID (actual, conceived, communicated, desired) model (2011, p. 467), he takes up this key role of communication in reputation building. He also elaborates the significance of the various channels that have an influence on a company's reputation.

In addition to communication by the company itself and the ability of management to use the power of language in a targeted manner (O'Rourke, 2013, p. 1), a company's reputation is influenced by many other external sources outside the company's sphere of influence, including the vast number of social networks.

The considerations of Aula and Mantere (2008, p. 179) are interesting in this regard. They ascertain that the company's own reputation does not really lie in the hands of the company itself, since it results from communication in networks both within and outside of the company – and thus to a large extent outside of the company's own direct sphere of influence. Its reputation thus lies in the hands of an abundance of third parties. Lee (2015) found that each platform is subject to its own rules and circumstances and, accordingly, each contribution must be adapted to the channel's requirements.

Especially against the background of the changing media landscape, the boundaries between the online and offline world are becoming increasingly blurred. Nearly every piece of information is shared, every post is commented on, and day after day data is sent around the world in large quantities (Szwajca, 2017, p. 162), so that virtually anyone can become a journalist with the help of their smartphone (Kaul *et al.*, 2015, p. 470). It thus becomes clear that social media and their massive use have led to a transformation of the business and communications world. It is therefore all the more crucial for companies to recognise this change and react accordingly (Kaul *et al.*, 2015, p. 455).

In the vast universe of the Internet, every contact that a company has with any of its stakeholders can enhance or weaken its reputation. The resulting advantages and disadvantages are obvious: while on the one hand, public awareness can be built up very quickly with little effort using suitable measures, on the other hand it is possible that a single negative comment about the company, an individual employee or a product can immediately set off massive criticism (Szwajca, 2017, p. 162), and in this way a single negative post "can torpedo a brand" (Bernoff and Schadler, 2010, p. 95). Kaul *et al.* (2015, p. 456) describe social media communication as the new "mantra" for a company's reputation. With the words "online communication is your reputation" Fertik and Thomson (2010, p. 16) even equate the two and place communication at the core of reputation management. For this reason, "corporations need to embrace all possibilities" (Kaul *et al.*, 2015, p. 455) to analyse the communication in social networks and use the results for managing the (corporate) brand.

Venkataraman and Das (2014, p. 33) elaborate on these thoughts even further and show that social media involvement influences the strategic process of companies on account of the enormous dissemination of digital media among the population. The ability of company decision-makers and strategists to collect, filter and interpret data from social media is critical to the success of the strategic orientation of companies, in particular with regard to the company's reputation.

This is underlined by the fact that the proportion of people who use social media in Germany is 76% (IMWF Institute for Management and Economic Research *et al.*, 2017, p. 15). Hence, it becomes evident that communication in the real world finds its mirror image in the virtual world: print media corresponds to online media. Currently, most people communicate with personal reference groups on Facebook, Instagram and Twitter. Moreover, forums and blogs have been established as well-recognised guides and technical information sources.

The reason for this is that Internet and social media use is established and belongs to the everyday life of the population in most developed countries – this applies both to individual communication and to information behaviour. According to an ARD online study (Frees and Koch, 2018), the social demographic structure of Internet users now corresponds to the social demographics of the German population. Additionally, an international study by Reuters Institute for the Study of Journalism by Newmann *et al.* (2016, p. 9) found that online media and social media, that is, Web 1.0 and Web 2.0, are the most important news sources for 65% of people between the ages of 18 and 24. This figure drops to 25% among those older than 55 years of age. In 2017, 69% of Germans used the Internet to obtain information about a specific topic. Fifteen years prior, it had been just 25%. All other information sources – TV, newspapers, magazines and radio – now lag behind the Internet in their importance as a source of information (Schneller, 2017).

As a consequence of this development, O'Connell (2010, pp. 2 ff.) already reported several years ago that traditional surveying methods no longer function. In the case of policy surveys, traditional telephone surveys are already diminishing in their importance. As a cause, O'Connell assumes that people are becoming less and less accessible via landline numbers. The interviewers barely succeeded in achieving a good random sample. The increase in importance of social media could be the key to cheaper and more precise results, O'Connell states with reference to a report by PwC analyst Rao (2015, p. 1). It may be assumed that this statement holds true beyond political communications. Paying attention to the dialogues around the company and using the knowledge gained from this represents a new approach to the reputation management of a company (see Carroll, 2013, p. 4; Kumar, 2015, p. 459) and can be seen as a key future success factor.

2.2 Social listening as an analysis method

Considering this, social listening has established itself in many companies as an efficient method of obtaining information about their corporate reputation (Turban *et al.*, 2018). It allows companies to quickly determine their current reputation and to react immediately to the formation of critical opinions (Turban *et al.*, 2018).

In fact, there are already several cases in the research literature of content analyses by hand or semi-automated on the basis of Internet communication, for example, in the fields of the automobile industry, consumer behaviour or political communication. These include:

(1) Identification of trends in the US automobile industry (Du *et al.*, 2015, pp. 29 ff.),

(2) The influence of user- and marketer-generated content on consumer behaviour (Goh *et al.*, 2013, pp. 88 ff.),

(3) The development of a competitive market strategy (Harrysson *et al.*, 2012, pp. 1 ff.), and

(4) Social media analyses for political communication (Grubmüller *et al.*, 2013, pp. 1 ff.).

Internet-based content analyses are thus widely adopted (Lee *et al.*, 2020): in pilot projects, the technical and content possibilities were explored. Based on these initial experiences, the use of these tools is likely to become more professional in the near future. In general, it can be observed that Internet-based communication analyses are used particularly in market research and with the purpose of obtaining customer insights (Chui *et al.*, 2012, pp. 38–39). Moreover, with regard to the importance of social media analytics for reputation management, Aula (2010, pp. 45 ff.) explains that social media play a crucial role in the reputation of companies. Poynter (2010) sums it up nicely with "Listening is the new asking", thus stressing that the analysis of online conversations is crucial for understanding the reputation of organisations.

In this context, it should be noted that social listening, social media analytics, social analytics and social media intelligence are often used as synonyms in the discourse among experts (Holsapple *et al.*, 2014, p. 2). Above all, the evaluation of both online media and social media is relevant as a basis for reputation management. Thus, the terms "social media analytics" and "social media intelligence" focus too much on social media in the following regard: classic media also influence the discourse in social media and, therefore, a holistic view on the reputation of a company on the Internet needs to go beyond social media. Thus, journalistic reporting in online media should also be considered when analysing the company's reputation online, which makes the broader terms "social listening" and "social analytics" much more suitable. However, these terms describe two successive steps required for information processing for reputation management: first, statements on the Internet are collected – the listening – and second, the analytic consolidation takes place – analytics.

The continuously increasing number and availability of Internet sources in the context of "big data" and the "data deluge" provide valuable information on consumer decision-making, psychology, culture, opinion leadership, the development of consumer communities, understanding of social media firestorms and WOM communication. In order to handle the problem in terms of the "data deluge", a change in the analysis methods used is also necessary (Humphreys and Jen-Hui-Wang, 2018).

Traditional, manual content analysis requires very good text comprehension and human cognition, which is why, according to a study by Kietzmann and Pitt (2020), much valuable information is ignored or misinterpreted (Lee *et al.* 2020). Even purely computer-based methods of analysis fall short in real content analysis, as they only provide a pure reflection of the language and sentence structure, but are not capable of breaking down contexts and sentiments. In contrast, automated analysis methods using artificial intelligence (AI) are considered particularly proven at present, as they are able to extract important components from the "sea of language" (Humphreys and Jen-Hui-Wang, 2018, p. 1,274) that neither clients nor researchers can detect and give them meaning (Lee *et al.*, 2020). Following Zerfass *et al.* (2020, p. 3), AI is "based on technologies like natural language processing, data retrieval and knowledge representation, semantic reasoning and machine learning". The advantages of AI-enabled content analysis in terms of reliability, validity and efficiency are highlighted in a study by Lee *et al.* (2020) showing that this type of content analysis will become increasingly important in the future, especially against the background of the new emerging forms of unstructured data and types of media (video, text, voice) (Kietzmann and Pitt, 2020). Despite the high level of attention in academic research and the numerous chances and possibilities that can bring marketing and communication management to a new level, as yet AI is used only very little in practice (Zerfass *et al.*, 2020). For this reason, there is extensive evidence of the need to adapt AI for content analysis (Zerfass *et al.*, 2020; Lee *et al.*, 2020; Humphreys and Jen-Hui Wang, 2018) in order "to extract meaning and value from the oceans of text" (Kietzmann and Pitt, 2020, p. 473).

2.3 Models for describing and measuring reputation

The first and probably most cited approach for measuring reputation is Fombrun's Reputation Quotient (Fombrun and Van Riel, 2004). With this structured approach, Fombrun was a pioneer in reputation measurement in the late 1990s. This counts both for research and practice, where the regular publication of the list of the most admired companies in America in Fortune magazine made his approach popular (Davies *et al.*, 2003); the ranking continues to appear annually. The Reputation Quotient is based on six dimensions, which are in turn subdivided into 20 key performance indicators (see Figure 2).

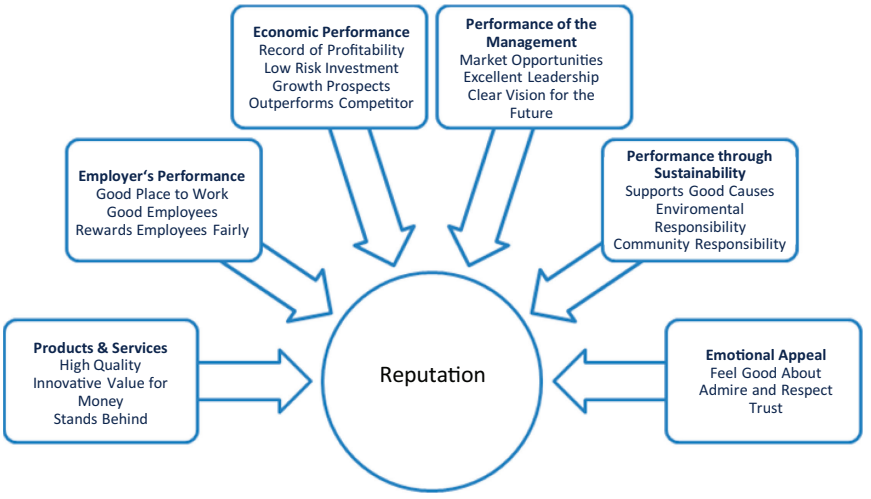
Criticism of the Reputation Quotient has been targeted, among other things, at the bias that is created by the survey of only key stakeholders, as for example, in the Fortune ranking (Fombrun *et al.*, 2004). In addition, Schwaiger *et al.* (2011) criticise that reputation drivers outside the company's influential sphere are not clearly distinguished from direct consequences of good or bad communication practices and initiatives. At the same time they criticise that five functional reputation dimensions (Products and Services, Employer's Performance, Economic Performance, Performance of the Management and Performance through Sustainability) are supplemented by the dimension of "Emotional Appeal", signifying an emotional component that contradicts the inherently functional orientation of the Reputation Quotient.

In the following years, Fombrun further developed the Reputation Quotient model and presented the RepTrak Model (Chan *et al.*, 2018) in 2006. It is based on 23 key performance indicators that are grouped into seven "rational" dimensions. Next, four emotional dimensions were added with RepTrak Pulse (Jakab and Happ, 2016) (see Figure 3). The new model approach therefore separates rational and emotional dimensions.

3. Adaptation of the model and methodology

3.1 Adaptation of the model

As has been noted earlier, Fombrun's Reputation Quotient method was the first more complex approach for measuring reputation (Jakab and Happ, 2016). In a series of tests, the Reputation Quotient achieved broadly successful results (Gardberg and Fombrun, 2002).



Source(s): Fombrun and van Riel, 2004, p. 53

Figure 2.
The six dimensions of companies' Reputation Quotient

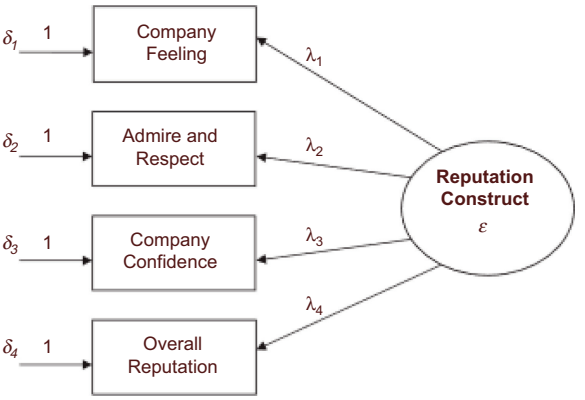


Figure 3.
The RepTrak pulse model

Source(s): Ponzi *et al.*, 2011, p. 23

Even though the Reputation Quotient has limitations and has received criticism, it is still one of the most widely used examples of a reputation measurement tool, with proven success across many countries and continents. As such, its use as a reliable measure of corporate reputation is deemed justifiable, and consequently this is the method used to measure corporate reputation in the work presented here (Araci, 2015; Gardberg, 2006).

However, in the previous practice, as the Reputation Quotient was determined using classical market research, three changes have been made for the present study:

(1) The basis of the evaluations is social listening, not market research.

(2) This means there is no focus on specific stakeholders. The entire spectrum of public opinion is considered.

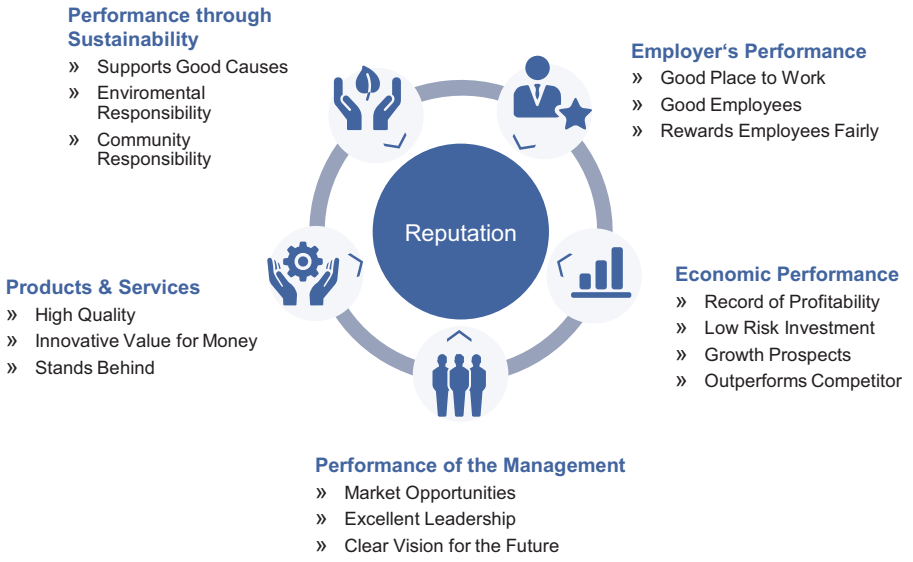
(3) Social listening implicitly takes emotionality into account, because emotionality leads to the positive or negative sentiments that are included in the evaluation.

The model used in the study focusses on five functional reputation dimensions regarding the emotional dimension as an implicit dimension of all functional reputation dimensions. An explicit separation of the emotional dimension and its separate consideration would be neither possible nor purposeful in the methodological approach. In general, online communication takes place on a rather informal level, where affective and rational components are often mixed. According to Carroll (2013, p. 4), in many cases the individual contributions can be therefore classified as noise or feedback, whereby emotions always play a role. This is due to the very open way in which feelings and perceptions are communicated in a very transparent manner.

These changes lead to the reputation model shown in Figure 4, which was used to measure reputation based on social listening.

3.2 Social listening study

In order to test to what extent social listening can measure the reputation of companies using the model just explained, an approach with a broad data basis was chosen which also takes into account the specific strengths of social listening, because the evaluations refer to a data set that cannot be evaluated practically by traditional means. All identifiable online statements concerning the 5,000 German companies with the highest number of employees were defined as the basis.



Source(s): Own representation

Figure 4.
Adapted reputation model for social listening

The prerequisite for social listening is the so-called crawling of websites, which uses search terms to find statements from online communications about the respective companies in order to store them in a database in a second step. Due to the large number of Internet sources that can be read by search engines at present, this technology is in principle a very mature, common and widely used process.

The database generated for this study is based on the crawling of 350m online sources (online media, forums, blogs, communities, Twitter, Facebook, etc.) and covers almost the entire online communication in the German-speaking world concerning the 5,000 German companies mentioned earlier.

The statements identified in this way were then analysed with the help of AI and processed for the subsequent reputation analysis. A total of 30m statements were evaluated for the purpose of this study. In the process, the contributions were separated by AI into individual statements and each sentence into its individual fragments in order to be able to evaluate statements in a post that is topic-specific.

An online report on a press conference of a listed company, for example, is therefore divided into several statements if the text reports on several topics, for example, on economic development, measures to improve the quality of employers and a new sustainability initiative of the company. The individual statements are then analysed by different AI instruments. In this case, there are five different tools that identify the five reputation dimensions and one AI tool to determine the tonality. To determine tonality, the AI tool uses a corpus of signal words with which it has been "trained" to correctly recognise and interpret evaluations. As soon as a statement has been examined by the AI instruments, the data set is supplemented by information on the reputation dimension and tonality addressed.

Basically, the category system for content analysis based on AI consists of two main types. On the one hand, it includes the object of reporting – the entity – which in this specific case is the company under observation. On the other hand, it includes the event type, in this

case the dimension of the reputation model to be examined. Then the tonality of the statement is determined.

In order to obtain relevant data, it is necessary to define the specific characteristics and coding schemes for both types in advance. Using concrete terms as well as additional spellings, "sentence killers", invalid URLs and possibly Facebook pages, it is possible to determine the respective entity quite reliably. To illustrate this with an example, at "Continental AG" the following words and expressions can be assigned to the company or lead to statements being classified as not relevant because they do not apply to the company:

(1) Notations, for example, Continental, Conti,. . .

(2) Exclusionary terms, such as Intercontinental, Continental Airlines,. . .

(3) Prohibited URLs, for example, www.autoscout24.de . . .

To ensure a more effective assignment to the respective entity, the event type is also defined by a concrete term and supplemented by various keywords. Taking sustainability as an example:

(1) Positive keywords: future-oriented, recycling, fairness, responsible

(2) Negative keywords: wasteful, immoral, environmentally harmful

For example, the sentence "In a new recycling plant, the tire manufacturer Continental wants to produce new tires from used bus and truck tires" can be clearly assigned to the unit "Continental AG" and the event type "sustainability".

Within the framework of this event type matching, comprehensive text corpora are created for the event types sought on the basis of which an AI tool, a so-called "neural network", is trained. This network stores typical patterns for each event type and learns to assign new text fragments to the events using specific probability algorithms. Even complex sentences with several events can be analysed in this way. To ensure that content and tonality are correctly categorised, the AI tool's error rate was controlled by manual intervention. The examination of 1,500 fragments revealed an error rate of between 8 and 18%.

Technologically, AI is based on methods of Natural Language Processing (NLP). Following methods are used in the NLP processing:

(1) Keywords-based search

(2) Search based on regular expression

(3) Rule-based analysis

(4) Deep learning

Keywords-based search is a quite simple and fast method for searching possibly relevant articles. Keywords-based searches are an effective NLP method only in limited situations, for example, when searching data for very specific domains (e.g. polymer pretreatment) or for companies or brands whose names are unique (e.g. Zalando or BMW). Keywords-based search is employed to search potentially relevant text fragments, which are then further processed using more accurate methods.

A Regular Expression is a sequence of characters which are used as search patterns. A Regular Expression is more flexible than a simple keywords-based search, because it allows searching several word forms using only one pattern (e.g. one pattern to search for eat, eats, eaten, etc.). Regular Expressions also allow searching for keywords, keywords concatenation, delimiters and so on.

Rule-based analysis is similar to Regular Expression, but it allows searching for Tokens. A Token is a placeholder representing several terms (usually defined through a Regular Expression). A token could be, for example, a verb describing investment or a list of terms describing technological innovation in IT. A rule-based search would then look like

<InvestmentVerb><ITTechnology>*

Rule-based analyses are more flexible and precise than simple Regular Expressions. Unfortunately, they also require more computational power and are thus more expensive. For this reason, rule-based analyses are performed on text fragments which have been already processed using other methods.

Deep learning *algorithms* use a set of pre-labeled sentences to train a neural network which is then used to find similar sentences. Currently deep learning algorithms are used for Event Types and Sentiments. The quality of Event Types depends on the size and quality of the training corpus. This method is very efficient in terms of computing resources; it thus allows analysis of millions of sentences with reasonable costs.

Unlike rule-based patterns, deep learning algorithms have no specific language knowledge, they do not assign to words any semantic meaning. They simply infer that similar sentences have similar meanings.

For the present studies, a combination of rule-based analysis and deep learning in AI was applied due to the complexity of the text content.

In the neural network, rule sets are developed through continuous training with sample data sets in order to correctly answer the underlying questions with the highest possible probability. The sets of rules in the neural network cannot be understood from the outside, so that no transparency can be established in the scientific discourse. A neural network consists of several layers of nodes. In the evaluation of a statement, a decision path is chosen within this multi-layered node system. The path depends on probabilities that the AI forms in the individual nodes based on extensive test data. There is therefore no classic set of rules for a decision by the AI. Ultimately, AI is only a technological aid to be able to encode large amounts of data. Since the training data sets were coded manually and the quality of the AI was checked manually (as described on page 20), the analysis result of the AI within the error tolerances corresponds to that of a manual coding.

In order to make the reputation of a company measurable, an individual score can be determined for it. This score is made up of evaluations of the individual reputation factors and can be calculated using the following three criteria:

(1) Ratio of the number of positive and negative mentions in each category and the number of neutral mentions in each category

(2) Ratio of the number of positive and negative mentions in each category to all mentions in each category

(3) Ratio of the number of positive and negative statements in all statements compared to the proportion of positive and negative statements concerning all companies investigated; this helps to identify if the conversations are extraordinarily emotional. If the discussion is positively emotional, this is positive for the reputation rating. If, on the other hand, the conspicuously strong emotional discussion is negative, this has a negative impact on the reputation rating.

The resulting five individual scores are then consolidated into an overall reputation score. First of all, the calculation follows the basic assumption that not only do the individual tonality balances of the respective dimensions, that is, the general sentiment, play a role, but also – as the agenda-setting theory (e.g. Carroll and McCombs, 2003) suggests – the general

visibility of a company on the Internet makes a decisive contribution to building its reputation. The procedure for determining the overall score on the basis of weighted or unweighted individual scores is based on the PSM method (points sum method) or index method, which, due to its simplicity, has become established to a large extent in the form of a multivariate procedure within the framework of social science research for measuring complex variables (Kladroba and von der Lippe, 2004, p. 115ff).

Since it can generally be assumed that the individual dimensions make different contributions to the development of an overall reputation, the weightings were determined with the help of a correlation matrix. Based on the Pearson correlations calculated with SPSS, the respective arithmetic means for the individual dimensions and thus the weighting for each individual dimension could be derived. The exclusion of outliers, which were mainly found on the "Employer Performance" dimension, was waived for reasons of content. The exact procedure is explained as follows:

Basis for the index calculation:

(1) The visibility of a company = number of reputation-relevant statements

(2) The tonality of the statements = positive/neutral/negative

To calculate the index, the following three values are calculated for each of the five reputation dimensions.

Example: 1,000 total nominations (150 x positive/600 x neutral/250 x negative), of which 300 nominations are assigned to the dimension "sustainability", for example. Of these 300 mentions in the dimension, 50 are positive, 180 neutral and 70 negative. The following is now calculated:

(1) Tonality and visibility absolute, per dimension

Balance of the number of positive and negative nominations and the number of neutral nominations (0.5 times) per dimension

$$\text{Value}\,1 = 50 - 70 + (0.5 \times 180) = 70$$

(2) Tonality balance in the dimension in relation to the total denominations of the dimension

$$\text{Value}\,2 = (50 - 70)/300 = 0.07$$

(3) Tonality balance and visibility in the dimension in relation to tonality balance and overall visibility

Balance of the number of positive and negative mentions and the number of neutral mentions per dimension

$$\text{Value}\,3 = ((50 - 70)/(150 - 250) + (180/600)) \times 100 = 30$$

In the final analysis, the values were normalised to 100 for better comparability and to counteract distortions. In addition, it was possible to avoid small companies being completely displaced by large companies with much higher values. Consequently, a score of 100 indicates an excellent reputation (best reputation of the companies examined, high visibility, positive ratings on all dimensions). The lower the score, the worse the respective company is in the overall comparison of all companies.

In the course of the study, all 5,000 German companies initially considered were analysed with the adapted model and then rated using the procedure presented in the previous section.

In this way, a ranking was created, and the 50 companies with the best reputation were identified.

Based on these results, it is possible to work out an ideal relationship between the various dimensions in order to achieve a good overall reputation in the public eye. In this way, the correlations form a conceivable foundation for an optimal reputation architecture. This was also used for weighting the individual dimensions when calculating the overall score and is therefore explained in more detail as follows.

4. Results

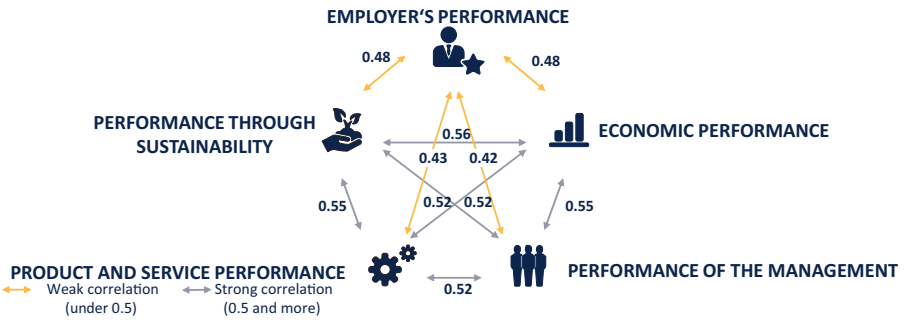
All 5,165 German companies initially considered were analysed using the adapted model and afterwards ranked. Thus, the 50 companies with the best reputation scores were identified and the correlation of the five reputation dimensions was then evaluated (see Figure 5).

The underlying idea was to find the ideal balance between the different dimensions leading to the best overall reputation. Thus, the resulting correlation matrix with the respective correlation coefficients (according to Pearson) forms the foundation of the optimal reputation architecture.

In total, it is shown that "Employer's Performance" is rather of secondary importance for the total reputation. Its correlations with other reputational factors are rather weak, lying between 0.42 and 0.48. The management, with better correlations lying between 0.42 and 0.55, however, has a large effect on how the company is perceived, which may be explained by the personification of the company by the CEO. The CEO makes the company more tangible for people, and it is easier to develop emotions towards a person than towards an abstract company.

The importance of sustainability for the reputation can also be clearly seen. At a value of 0.56, the highest correlation is with economic success. Sustainable business is therefore a strong argument for economic performance in the eyes of the public. The second highest correlation (0.55) is with the performance of products and services, which will be driven by consumers' desire to buy products that are as sustainable as possible. This effect may have increased even more in countries such as Germany since 2016, as the importance of sustainability topics is rising continuously.

These correlations were then used to weight the individual dimensions in the calculation of the total value. It was assumed that the influence on the other reputation dimensions would have a corresponding influence on the overall reputation. In concrete terms, the calculation



Source(s): Own representation

Figure 5. Optimal reputation architecture of the 50 companies with the best reputations in Germany

was performed as follows: overall reputation = 0.160 x individual value employer + 0.23 x individual value employee + 0.23 x individual value product and service + 0.2 x individual value profitability + 0.18 x individual value sustainability.

In order to represent a generally applicable, sector-independent reference value for determining the reputation score, the weighting is not subject to any sector-specific differentiation.

The empirical findings were then compared to another study conducted by the authors with a focus on publicly traded corporations in order to investigate the reputation of these companies and to test the reliability of the employed social listening analysis method. In this case, 160 publicly traded corporations were studied in cooperation with the economics magazine *Capital*. The basis of the study was communication about the companies on the German-language Internet from 1 January to 30 September 2017. Around 4.5m statements were evaluated. Using the example of the DAX companies, it can be seen that the reputation profiles of the companies are very different (see Figure 6). The colour coding in the table shows how well a company performs in the respective reputation dimension. Dark green stands for a very good reputation score, dark red for a very bad one. For example, the company with the best reputation score, Continental, is strong in sustainability but is somewhat weaker in management. In contrast, the company in second place, Adidas, has a good reputation for its products.

As the "optimal reputation architecture" has shown, the importance of the management for the reputation of the entire company is extraordinarily high. The reputations of the CEOs were therefore also analysed in this study and correlated with the reputations of their companies. The measured reputation scores are shown here in a scatter diagram (see

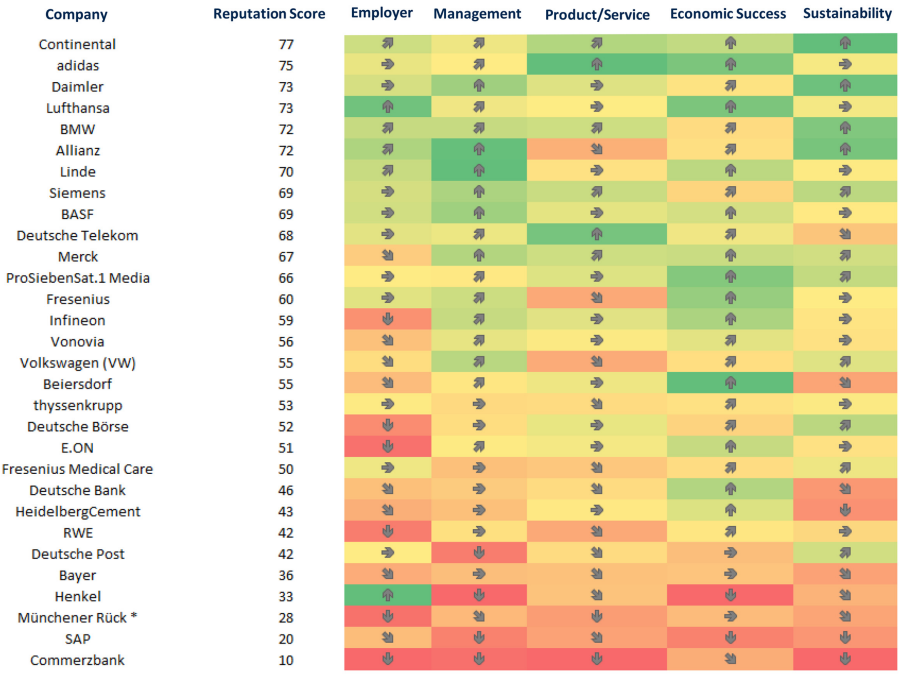


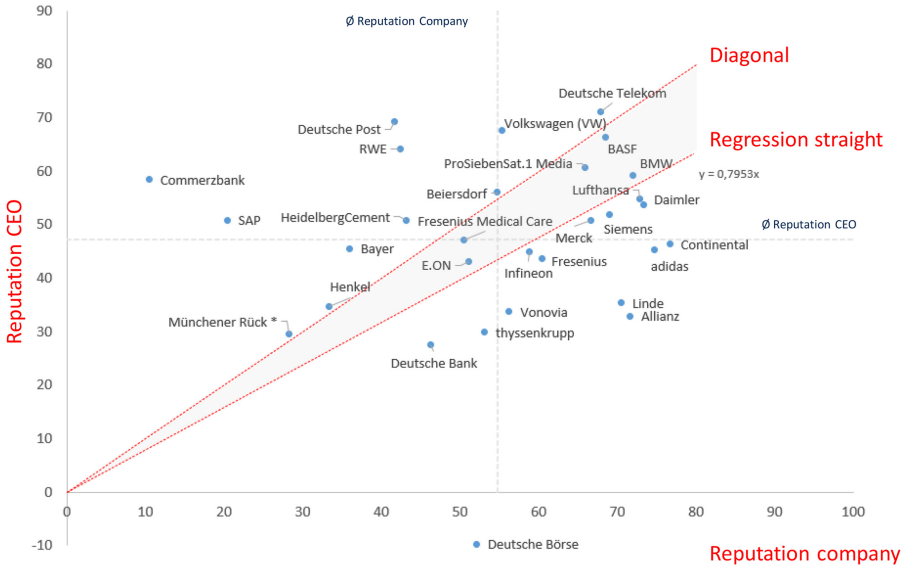
Figure 6.
Reputation profiles of DAX companies

Source(s): Own representation

Figure 7). The *X* value represents the reputation of the company and the *Y* value represents the reputation of its CEO.

The red diagonal lines assist in optical orientation, since this diagonal area, together with a linear regression line through the origin, defines a range within which the reputation of the CEO correlates relatively strongly with that of the company. On the one hand, this clearly shows companies lie above this threshold at which the reputation of the CEO exceeds the reputation of the company – the CEO functions, so to speak, as a reputational support for the company. On the other hand, this indicates that in companies below this level, the reputation of the CEO lags behind that of the company. This contrast shows that only some of the CEOs have a reputation that positively influences the reputation of the company (top left of the graph). Many other CEOs, however, are perceived by the public in such a way that they are more of a burden to the reputation of the company (bottom right of the graph).

What is more, the adapted model offers possibilities of combining some of the five primary factors to provide meta-factors or secondary dimensions that may be distinguished by a superordinate social or economic motive perspective. These dimensions also serve to compare the general tendencies of public opinion and to identify action potential (see Figure 8). Moreover, when "Performance through Sustainability" and "Employer's Performance" are combined to form the "Social Reputation" and "Performance of the Management", "Products and Services" and "Economic Performance" are combined to form the "Economic Reputation", it becomes clear how strong the "social value" of a company is – or rather, what value it provides for the company beyond economic success. The "social value" displaces the "stakeholder value", which is oriented solely towards economic success, so that the upper half of Figure 8 shows companies that tend to fulfil the expectations of their added social value. On the top right are the companies that are successful in combining "Social Reputation" and "Economic Reputation", signifying an idealised position.



Source(s): Own representation

Figure 7.
Reputations of CEOs of DAX companies in relation to the reputations of their companies

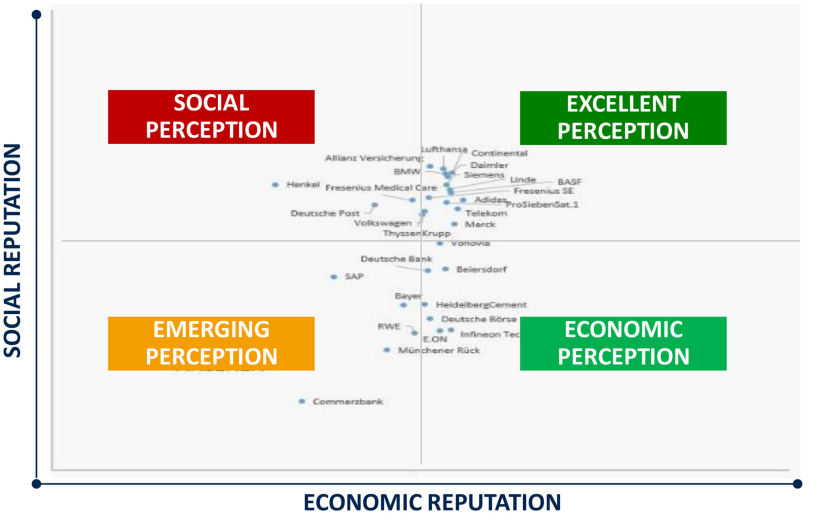


Figure 8.
Social and economic reputation of DAX companies

Source(s): Own representation

5. Conclusions

The results show first that existing reputation models can be applied to the online conversations of stakeholders. However, as the different stakeholder perspectives cannot be clearly separated from each other, models should not describe the reputation as an aggregate of different stakeholder perspectives, but they should understand reputation as an aggregate of images concerning certain topical dimensions. Moreover, a clear separation between rational and emotional factors does not seem to be applicable, as the factual and the emotional levels are mostly mixed in online conversations. The adapted model of Fombrun suggested in this article shows one option for adapting reputation models to the online environment and can be further discussed, especially the "optimal reputation architecture" discovered during the studies.

The method used shows that social listening can deliver valuable results for research in the field of reputation management, as it expands the possibilities of investigating reputation on a large scale. The approach shows to what extent scientific research can be expanded beyond classic content analysis, as the number of items which can be analysed exceeds that of classic analytical approaches by far. Explicit and implicit experiences, which are the drivers of reputation, can be systematically recorded and analysed using social listening, thus delivering valuable insights into how stakeholders perceive the performance of a company in different dimensions.

Measuring reputation on the basis of social listening is very important for practical applications in companies, because the data is available digitally and can deliver up-to-date reputation values almost in real time – so that the communication can be aligned very quickly with current events. This is almost impossible with classical market research, and if it is done, then with a high financial outlay. In addition, the reasons for a change in reputation values can be identified immediately in the underlying data sets – that is, causal communication. In classical market research, however, additional surveys are required to determine the causes. This reduces the requirements for professional reputation management in companies, so that the prerequisite is created that more companies than at present will be able to measure and control their reputation.

6. Limitations and future research

The two studies conducted analyse the reputation of German companies with the online conversations of German stakeholders as the source. As a consequence, the general statements made concerning the model used and especially the "optimal reputation architecture" discovered refer to a German context. Future studies should investigate to what extent the adapted model and the "optimal reputation architecture" also work for other cultures. It can be assumed that there may be differences, as different dimensions, such as sustainability, may differ in importance in other cultural contexts. Apart from the question of whether the "optimal reputation architecture" is also valid for other cultural contexts, the concept needs to be validated for German companies as well, as it is just based on the two studies described.

The method of social listening as such needs to be improved and developed further. In the two studies mentioned, it was used for attaching expressions to an event and checking if the expressions were negative, positive or without evaluation. It will be highly interesting to see if it is possible to create an algorithm which is able to analyse complex aspects like discourse structures as well. And though the algorithm led to satisfying results with respect to mistakes, it will be of importance to improve it to reduce the number of incorrect codings further.

It would also be relevant to design the algorithms in such a way that they are able to determine an overall value for reputation first. In this way, it would be possible to use regression to determine the effect sizes and the respective influence of the individual dimensions on reputation.

With regard to future research, one of the major tasks will be to combine social listening with traditional forms of opinion research like surveys. Social listening cannot deliver results which are representative for the total population, especially as it can be assumed that indifferent people may not express themselves in social media about companies and their activities, but only "fans" and "haters". Therefore, a mixed method approach would be promising to analyse the reputation of organisations in a 360-degree view. Furthermore, future research should deal with a specification of the model, taking into account aspects such as differentiation in the relevance of the online channels – online media, forums, blogs, communities, social media – for reputation development.

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About the authors

Prof. Arne Westermann, International School of Management, Dortmund. He, PhD, born in 1972 in Bochum/Germany, is professor for Communications and Marketing at the International School of Management (ISM) in Dortmund. He is the Program Director for the Master Program Strategic Marketing Management and Head of the Brand and Retail Management Institute @ ISM. Additionally, he is in charge of Marketing in the ISM's educational division. He is author of several books, studies and essays dealing with corporate communications as well as online communications and social media. In addition to his academic career, he draws on vast experience as a practitioner and consultant in corporate and brand communications.

Jörg Forthmann, postgraduate student at University of Strathclyde, Glasgow. Dipl. Ing oec. Jörg Forthmann, born 1968 in Heerlen (Netherlands), is the founder and managing partner of the communication consulting company Faktenkontor in Hamburg. He is currently doing his PhD at the University of Strathclyde in Glasgow in the marketing department for reputation measurement based on digital communication on the Internet. As an expert in reputation management and crisis communication, he has published several books and articles. In addition, he comments on current crisis cases in his blog. Forthmann worked in the press and public relations of the Bundeswehr, worked parallel to the study as a journalist for the Axel Springer publishing house and learned the PR craft at Nestlé Germany. Jörg Forthmann is the corresponding author and can be contacted at: Joerg.Forthmann@faktenkontor.de

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