



# Analytics of social media data – State of characteristics and application

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## ABSTRACT

The spread and use of social networks provide a rich data source that can be used to answer a wide range of research questions from various disciplines. However, the nature of social media data poses a challenge to the analysis. The aim of this study is to provide an in-depth overview of the research that analyzes social media data since 2017. An extensive literature review based on 94 papers led to the findings that clear definitions are neither established nor commonly applied. Predominant research domains include marketing, hospitality and tourism, disaster management, and disruptive technology. The majority of analyzed social media data are taken from Twitter. Sentiment and content analysis are the current prevailing methods. Half of the studies include practical implications. Based on the literature review, clear definitions are provided, and future avenues for high-quality research are suggested.

## 1. Introduction

Social media have become increasingly important in recent years. In 2020, social media was used by an estimated 3.6 billion users, a number that is expected to grow still (Statista, 2020). The extensive spread and use of social networks provide a rich data source that can be utilized to answer a wide range of research questions from various disciplines (Dwivedi et al., 2020). More specifically, the analysis of social media data allows a potential better understanding of societal phenomena. It can also be used to generate various opportunities for businesses, such as competitive advantage. The possibility of using social media to influence political results or public opinions is also an option. The diversity of disciplines and individual observations entail different methodological approaches, especially when social media data are used for analysis. The reason is that social media analytics (SMA) represents a separate, still quite young field of research and thus does not yet have a consolidated methodological approach. For this reason, Stieglitz and Dang-Xuan (2013), Stieglitz et al. (2014, 2018) and Jungherr (2016, 2020), among others, emphasize the need to consolidate and review the findings in future work. The nature of social media data clearly poses a challenge to the analysis. Despite this concern, studies that analyze social media data have increased in the past few years to such an extent that a systematic review of this approach is needed to evaluate the methods and quality of studies using social media data. Therefore, the

main purpose of this article is to give an overview of the currently available literature since 2017 that addresses the analysis of social media data and to make visible the similarities and inconsistencies among the various approaches to ultimately work out a transparent, comparable approach. To achieve this goal, we present in this study an extensive literature review that includes the analysis of the definitions applied, the various fields of their application, and various study designs and methods. Furthermore, we also focus on the tools and artifacts, the coverage of social media platforms and, finally, the practical implications that were discussed in the literature reviewed.

Following the generally accepted principles for conducting a high-quality and systematic review (Jones & Gatrell, 2014; Macpherson & Jones, 2010), this paper seeks to answer the following main research question (RQ) and four subresearch questions (SRQs):

- RQ: How has the literature on the analysis of social media data developed over the last four years?  
SRQ1: How are the keywords in the field of social media data analysis defined?  
SRQ2: Which research domains are suitable for the analysis of social media data?  
SRQ3: How well does analyzing social media data reflect on currently accepted research quality standards for this type of research?

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SRQ4: How should the analysis of social media data-based research be designed to ensure high-quality contributions in the future?

This review includes 94 studies that used or discussed analyzing social media data as the main research topic. They are published in over 70 internationally recognized journals. The articles reviewed are a sample from a larger set of 160 identified articles that were extracted via a systematic literature search.

The importance of replications for warranting the development of an increasingly cumulative body of knowledge and thereby increasing the quality of research has received significant attention over the last few years (Ethiraj et al., 2016; Harzing, 2016; Hensel, 2019). Analyzing social media data is still considered to be a young research field (Dwi-vedi et al., 2020), and generating an overview of applied methods and study designs will thus support the accumulation of “repeatable cumulative knowledge” (Bettis et al., 2016).

The study is organized as follows: In Part 2, we introduce the theoretical framework based on Stieglitz et al. (2018), followed by a method and results section. Section five is dedicated to the discussion and evaluation of the results. Section six ends with conclusions, future research avenues and limitations of the study.

## 2. Theoretical framework

Stieglitz et al. (2013, 2014) developed a three-stage SMA framework in the context of political communication and extended this framework in 2018 (Stieglitz et al., 2018) with the aim of creating a comparable basis for conducting social media analyses. Methodological approaches from various disciplines, such as computer science, statistics, computational linguistics, communication science and sociology, were taken into account to create the framework (Stieglitz & Dang-Xuan, 2013).

The framework consists of four steps: discovery, tracking, preparation and analysis. The first step, discovery, was added as an extension of the original framework (Stieglitz et al. 2018), because research has increasingly highlighted the challenge of event and topic detection as well as the interdisciplinary nature (Chinnov et al., 2015). In the next step, tracking, there are different approaches, such as keyword- or topic-based, actor-, profile- or URL-based approaches. Depending on the tracking method, the database will then consist of structured or unstructured social media data. An associated issue is the software architecture. Subsequently, the collected data must be prepared in the next step (preparation). Typical challenges include data visualization and data quality. In the final step, analysis, suitable approaches such as structural attributes, opinion- and sentiment-related or topic- and trend-related approaches must be considered. In this step, different methods, such as statistical, social network, sentiment, content or trend analysis, are included as well, based on the chosen approach. A combination of methods is advised if many research questions are posed or if the content from social media data stems from different contexts, such as politics, business, sports, or entertainment (Stieglitz et al., 2014).

## 3. Methods

A systematic review design is adopted to provide a “systematic accumulation, analysis and reflective interpretation of the full body of” studies analyzing social media data (Rousseau et al., 2008, p. 475). The approach seeks to be comprehensive and transparent in identifying focal literature and the reflective interpretation of the selected studies (Rousseau et al., 2008). Bibliometric data are included for a better quantitative understanding of the field (Broadus, 1987). In this systematic review, the four-step procedure suggested by Rousseau et al. (2008) is implemented. First, a main research question and three sub-research questions were formulated, debated and revised until all authors deemed them to be appropriate for the envisioned objectives of the study. Second, a set of relevant and high-quality literature was identified on four scientific search databases. Third, the research questions were

then used to guide the analysis and presentation of the selected articles. Fourth, an integrative synthesis of the findings was developed to explain the consistencies and contradictions that appeared in the analysis.

The search approach included finding suitable search terms to identify the relevant articles that analyzed social media data between 2017 and 2020. The reasons for this rather short timespan are as follows: First, social media analytics is a very fast progressing field. Second, major platforms such as Facebook have changed their access possibilities in recent years. Third, measurable results or reactions such as “likes” were introduced as recently as 2016 and had a measurable impact on the algorithms from 2017 onward. For the purpose of this study, the search terms “social media monitoring” OR “social media analysis” OR “social media analytics” OR “social media listening” were entered with a Boolean operator in six major academic databases to do justice to the multidisciplinary topic. The academic databases of Taylor & Francis Journals, Elsevier, ProQuest, Web of Science, JSTOR and EBSCO were deemed to be suitable for this task. Scholars consider these databases to be a major source to study research contributions (Aghaei Chadegani et al., 2013). In general, studies published on these databases can be considered to meet high-quality standards. Due to the low number of results for the four search terms, the two platforms JSTOR (total 86) and EBSCO (total 22) were not considered further. The overall results of the search terms are presented in Table 1. Social media monitoring led to 396 articles, social media analysis resulted in 1017, and social media analytics resulted in 1106 articles. Because the last two search terms are often used interchangeably, this finding came as no surprise. Social media listening led to 128 studies.

The literature extracted from the databases was then organized according to the relevance of the studies. The relevance sorting option is based on a ranking system, which considers how many of the search terms are found in each article. Usually, more relevance is given to the title and abstract rather than the keywords.

This step subsequently led to 160 articles, i.e., 40 on each database. All articles were downloaded and centrally stored in an Excel file, which was accessible to all authors. Duplications (20) were removed. Transparency was ensured by adopting an integrative approach (Rousseau et al., 2008), triangulating across the papers and relying on the researchers’ judgment to arrive at a synthesis. Thus, the remaining articles were read by all authors, and a further systematic search led to the final result of 94 articles. These articles are marked with an asterisk in the bibliography of this paper. The articles were published in 2017 (19), 2018 (27), 2019 (27) and 2020 (21).

## 4. Results

This section presents the main results found in the four databases dating between 2017 and 2020.

### 4.1. Multiple contributions and replications

There are clearly a number of scholars who made several contributions. Among these are He et al. (2017, 2018, 2019), Laurell et al. (2017,

**Table 1**  
Number of studies found per database and search term

Database	social media monitoring	social media analysis	social media analytics	social media listening	included studies
Taylor & Francis Journals	109	158	181	31	27
Elsevier	131	356	335	48	27
ProQuest	86	180	255	19	27
Web of Science	70	323	335	30	13
Total	396	1017	1106	128	94

2019), Ozturkcan et al. (2017, 2019), Park et al. (2018, 2020), Parsons and Lepkowska-White (2018, 2019), Widmar et al. (2020a, 2020b) and Yun et al. (2019, 2020). This circumstance might suggest that once an author has conducted an analysis of social media data, it can be reproduced for multiple purposes.

Replications of the studies reviewed are rarely mentioned explicitly, but a number of different implicit quasi-replications can be undoubtedly identified. Almost 24% of the included studies actively called for reproduction and specific refinement to validate the results. In addition, most papers have in common that their authors call for further development of their study results.

#### 4.2. Definitions

The use of social media data is still a very young research area. Therefore, some studies emphasize the need for a definition of the terms used in this field (e.g., Holsapple et al., 2018; Misirlis & Vlachopoulou, 2019), and some of them propose such definitions (see Tables 2, 3, and 4). However, no unified usage of a definition or a demarcation between the various terms (social media analytics, social media monitoring and social media listening) has been established yet. Therefore, the core elements of the individual definitions are summarized in tables to derive specific definitions and compare them to each other. In this way, similarities can be emphasized to coin synonyms. Furthermore, differences can be observed, and thus, conceptual demarcations can be clearly identified.

##### 4.2.1. Social media analytics (SMA)

There are 42 articles that provide a definition of SMA (see Table 2), including three papers (Belcastro et al., 2017; Crisci et al., 2018; Nazir et al., 2019) that use the term social media analysis. This term is here understood to be a synonym for SMA. Brooker et al. (2018), Manzira and Bankole (2018) and Misirlis and Vlachopoulou (2019) provide very detailed definitions. It is striking that the same sources are mentioned several times. The most frequent reference is to Stieglitz et al. (2014), i. e., thirteen times. Both Zeng et al. (2010) and Fan and Gordon (2014) are cited eight times each. These three sources are thus important points of reference for the definition of the term. Other sources were cited far less, such as Holsapple et al. (2014) and Stieglitz et al. (2018), with four mentions each, and Chen et al. (2012) and Gandomi and Haider (2015), with three references each. Stieglitz et al. (2018) is also included in this review. Table 2 lists the core statements of the articles and serves as the basis for the following definition:

SMA is an interdisciplinary research area that is concerned with developing, adapting and extending informatics tools, frameworks and methods to track, collect and analyze a large amount of structured, semistructured and unstructured social media data to extract useful patterns and information. This suggested definition is based on Fan and Gordon (2014), Stieglitz et al. (2014) and Zeng et al. (2010). It is used, inter alia, for the monitoring of social media communities, for understanding the behavior of groups or the dynamics of opinion, for the analysis of collective sentiments, and to make predictions (Belcastro et al., 2017; Liere-Netheler et al., 2019; Crisci et al., 2018).

Social media analytics is to be understood as a laboratory for natural experiments in social science and business research (Stieglitz et al., 2014). The fundamental difference between social media analytics and traditional business analytics methods is that it uses near-real-time data rather than structured, historical data (Liere-Netheler et al., 2019). Existing data are primarily retrieved instead of proactively creating data (Choi et al., 2020b). Thelwall (2018) argues that the approaches of combining different types of information (e.g., comments, likes, hit counts), making extensive method triangulations and allowing a phenomenon to be studied dynamically partially compensate for the low sample validity of social web data.

Despite the multidisciplinary field of research, a differentiation between social media analytics and social media monitoring is crucial. This

**Table 2**  
Approaches of social media analytics (authors listed alphabetically)

Authors	Social media analytics approaches
Ayele & Juell-Skielse, 2017	Social media analytics, which overlaps with social media mining, is an evolving interdisciplinary research with a broad scope that involves several research domains (Stieglitz et al., 2014). [...]
Balan & Rege, 2017	Social media analytics is a multidisciplinary field that enables the analysis of social media data through combining, adapting and extending methods for analyzing social media data (Kataria, 2017). In a business setting, social media analytics is a subset of Business Intelligence (BI) data from social media into meaningful information for business purposes (Stieglitz et al., 2014). [...] Social media analytics can be applied to understand the user sentiments about a company or a product (Mosley, 2012).
Belcastro et al., 2017	Social media analytics is a fast growing research area aimed at extracting useful information from this big amount of data (Talia et al., 2015). It is used for the analysis of collective sentiments (Pang & Lee, 2008), for understanding the behavior of groups of people (Cesario et al., 2016) or the dynamics of public opinion (Anstead & O'Loughlin 2015).
Brandt et al., 2017	For instance, Stieglitz et al. (2014) emphasized the relevance of SMA as a laboratory for natural experimentation in social science and business research, [...]
Brooker et al., 2018	[...] social media analytics to think about social media as facilitating explorations of large datasets (e.g. Bastos et al., 2013; Bruns et al., 2013; Proctor et al., 2013; Vis, 2013).
Orlandi et al., 2020	[...] social media analytics can be defined as all the activities and processes of monitoring, analyzing, and interpreting the information, relations, and contents created by users on social media in order to use the insights derived from these analyses in business decision-making.
Chang et al., 2019	Social media analytics involves techniques to collect, extract, analyze, and present user-generated data to support decision making, insight discovery, or other business-related operations (Holsapple et al., 2014). Similarly, Fan and Gordon (2014) specify three important stages: capture, understand, and present for social media analytics.
Choi et al., 2020b	Such academic interest in social media data has emerged as a scholarly attempt called social media analytics, which involves the process of gathering and analyzing various social media data and extracting valuable hidden information.
Choi et al., 2020a	In the literature, SMA (Zeng et al., 2010) refers to the use of analytical capabilities to analyze social media content so as to achieve a specific goal (Holsapple et al., 2014). It is mainly a passive approach which relies on retrieving the available data, instead of creating data proactively.
Crisci et al., 2018	Social media analysis is becoming a very important instrument to monitor communities, users' preferences, and to make predictions.
Nazir et al., 2019	A social media analysis can [...] be used to observe user's choices related to items and products (Bastos 2015).
Fischbach & Zarzosa, 2018	Social media analytics is the practice of gathering data from blogs and social media websites and analyzing that data to make better business decisions (TechTarget, 2016).
He et al., 2018	Social media analytics is concerned with "developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data to facilitate conversations and interactions to extract useful patterns and intelligence" (Fan & Gordon 2013).
He et al., 2019	Social media analytics is concerned with "developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data to facilitate conversations and interactions to extract useful patterns and intelligence" (Fan & Gordon, 2014). [...]
	Social media analytics process involves four distinct steps:

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Table 2 (continued)

Authors	Social media analytics approaches
	data discovery, collection, preparation and analysis (Stieglitz et al., 2018).
Holsapple et al., 2018	Social Media Analytics (SMA) as a distinct, albeit formative, sub-field within the Analytics field. Broadly speaking, SMA applies appropriate analytics capabilities to social media content in order to generate specific types of knowledge [...].
Kim et al., 2018	Social media analytics, an emerging area in big data analytics, refers to a broad range of computational tools and techniques used to collect, analyze and examine social media data to find hidden patterns and useful information (Fan & Gordon, 2014).
Kumar & Nanda, 2019	Social media analytics is concerned with developing and evaluating informatics, tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data, usually driven by specific requirements from a target application (Zeng et al., 2010).
Laurell et al., 2019	SMA is an interdisciplinary approach for the analysis of social media data (Stieglitz et al., 2014).
Lee, 2018	Social media analytics refers to the practice of gathering data from social media platforms and analyzing the data to help decision makers address specific problems.
Liere-Netheler et al., 2019	Social Media Analytics (SMA) help to collect and interpret unstructured data. The measurement of user behavior serves to form opinions and evaluate the influence of individual actors. This results in a multitude of application areas for SMA. [...] SMA comprises the development and evaluation of “[...] informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data, usually driven by specific requirements from a target application” (Zeng et al., 2010). The fundamental difference between SMA and traditional business analytics methods is that it uses real-time data rather than exclusively structured and historical data [...].
Manzira & Bankole, 2018	Social media analytics have been defined as the art and science of extracting valuable hidden insights from large volumes of data which can be structured or semi structured so as to allow insightful and informed decision making by organisations. In addition, it is considered as a field concerned with developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data, driven by specific requirements from a target application, (Zeng et al., 2010; Chen et al., 2012; Khan, 2015). [...] social media analytics [...] focuses on combining, extending, and adapting methods for analysis of social media data. (Stieglitz et al. 2014)
Micera & Crispino, 2017	The concept of SMA indicates the discipline that aims to help businesses, networks and territories to measure, evaluate and interpret the brand image in the web and initiatives on Social Media performance in the context of specific business goals in order to make useful suggestions emerge to enhance businesses, networks and territories” (Cosenza, 2012). [...] A fundamental element of this discipline is social media listening.
Michaelidou & Micevski, 2019	SMA refers to the acquisition, analysis and dissemination of brand-relevant or personal information [...] from social media sites to assist with business decisions and strategies (Hajli & Lin, 2016; Holsapple et al., 2014).
Misirlis & Vlachopoulou, 2019	SMA refers to the approach of collecting data from social media platforms and evaluating that data to support business decisions.
Pääkkönen et al., 2020	Social media analytics is a newly emerged business practice, [...], that aims to accumulate and analyze digital traces of the online activities of organizations and their customers to produce information for guiding business.
Park et al., 2019	This recently evolved, multidisciplinary research area is called social media analytics, and it aims to assess objective methodology and models to trace, mine, and analyse big social data for various purposes (Stieglitz et al., 2014).
Park et al., 2018	

Table 2 (continued)

Authors	Social media analytics approaches
	Social media analytics provides researchers and marketers with several options for investigating customer emotions as well as their voices (Bhadane et al., 2014).
Park et al., 2020	Social media analytics helped researchers and experts gather a large volume of data from social media networks and investigate customer perceptions.
Sharma & Jain, 2019	Social media analytics is concerned with development of framework and tools to collect, visualise and analyse the humungous amount of social media data in order to mine useful information and patterns to predict user behaviour. [...] social media analytics is categorized into four broad categories namely descriptive analysis, content analysis, network analysis and geospatial analysis (Singh et al., 2018).
Singh et al., 2020	[...] social media analytics analyzes communication pattern and behavior in relation to external phenomenon (Hidayat et al., 2019; Garg et al., 2019; Sobti, 2019; Cao et al., 2018; Dlamini & Johnston, 2018; Kaur et al., 2018; Stieglitz et al., 2018; Gandomi & Haider, 2015), thus investigating trends and patterns (Boyd & Ellison, 2007).
Singh et al., 2019	Stieglitz et al. (2014, p. 89) define social media analytics as “an emerging interdisciplinary research field that aims on combining, extending, and adapting methods for analysis of social media data”. The social media analytics process involves four distinct steps, data discovery, collection, preparation, and analysis (Stieglitz et al., 2018).
Sivarajah et al., 2020	[...] social media analytics is a highly complex process with different aspects regarding the respective application domain and the use of different methods. [...] The social media analytics process involves four distinct steps, data discovery, collection, preparation, and analysis.
Stieglitz et al., 2018	Social Media Analytics (SMA) which is an interdisciplinary approach that seeks to combine, extend and adapt methods for analysing social media data (Stieglitz et al., 2014, 2018).
Suseno et al., 2018	Social media analytics deals with the compilation, analysis and interpretation of part of this behavioural customer data to inform marketing decisions (Peters et al., 2013).
Tafesse & Wien, 2018	[...] social media analytics (Stieglitz et al., 2014), combines different methods to generate insights, [...]. This extensive method triangulation and the ability to study a phenomenon dynamically (Edwards et al., 2013) partially offset the low sampling validity of social web data by merging different types of information (e.g. comments, likes, hit counts) to look for deeper insights.
Thelwall, 2018	[...] social media analytics [...] is the process of extracting useful patterns and intelligence by “developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data, usually driven by specific requirements from a target application” (Zeng et al., 2010, p. 14).
Wang et al., 2020	Social Media Analytics (SMA) is a field that addresses this challenge by the development of strategies, methods and technologies to automate this filtering process.
Wittwer et al., 2017	[...] social media analytics, which refers to “developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data, usually driven by specific requirements from a target application” (Zeng et al., 2010, p. 14).
Wu et al., 2019	Social Media Analytics (SMA) is a field that addresses this challenge by the development of strategies, methods and technologies to automate this filtering process.
Xiang et al., 2018	[...] social media analytics, which combines Web crawling, computational linguistics, machine learning and statistical techniques to collect, analyse, and interpret user generated contents for business purposes, has been gaining currency in a variety of disciplines (Fan & Gordon 2014; Lazer et al., 2009; Xiang et al., 2015).
Young et al., 2020	[...] SMA enables continuous collection, monitoring, analysis, and summary of user-generated content and social interactions to provide in-depth analysis of real-time user preferences, choices, and sentiments (Stieglitz et al., 2014).
Yun et al., 2020	Social media analytics (SMA) is the process of using computational methods and tools to extract insights from social media data (Fan & Gordon 2013) as well as

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**Table 2** (continued)

Authors	Social media analytics approaches
	measure the performance of social media campaigns (Murdough, 2009).

**Table 3**

Approaches of social media monitoring (authors listed alphabetically)

Authors	Social media monitoring approaches
Arnaboldi et al., 2017	Social media can also be used to find information about individuals and competitors. This function, often known as social media monitoring (Constantinides, 2014) [...] Hadi and Flesher (2016) define social media monitoring [...] as “a process of ongoing, systematic searches of social media websites for up-to-the-minute information on news or live events” (p. 775). Social media listening moves organizational communication beyond reliance on a push strategy to inform interaction and conversation.
Avery, 2017	[...] ‘social media monitoring’ is used to watch sentiments about brands and competitors, or to track the success of a recent advertising campaign.
Baur, 2017	Social media monitoring (SMM) may be defined as the degree to which a company monitors various social media to track inbound traffic, conversations, referral, and visitors’ engagement related to the company (Kim & Ko 2012).
Kim et al., 2020	Monitoring involves paying attention to online activity and deciding when and how to react to it. Consumers use social media on a constant basis and therefore, managers need to be in tune with their audience and monitor it daily or weekly as needed (Fox & Longart 2016).
Lepkowska-White & Parsons, 2019	Managers need to review what is happening on social media by mindfully monitoring customers, competitors, and their environment and effectively responding to online activity (Gallaughner & Ransbotham 2010). [...]

concern, of course, could have practical implications. However, it does not represent a business practice for entrepreneurial decision-making. Social media analytics is open to both topic and approach, according to the focus of the respective research. In contrast, social media monitoring and social media listening are used in daily business in the corporate or agency sector (see social media monitoring and social media listening), where a clear focus is placed on search queries in relation to one’s own company and competitors, products or services, and on target groups to make decisions on that basis. This process is an iterative process, which therefore works with standardized analyses and often with (commercial) tool support.

#### 4.2.2. Social media monitoring

Six articles of those studied give a definition of social media monitoring (see Table 3), with Parsons and Lepkowska-White (2018) providing the most detailed definition. It is noticeable that all studies refer to different sources to come up with a definition. It is also interesting that social media monitoring is viewed from different perspectives. This approach is how Arnaboldi et al. (2017) place social media monitoring in the context of the consultancy industry. Avery (2017) focuses on the emergency sector; Baur (2017) links the term to marketing and public relations; Kim et al. (2020) relate social media monitoring to business benefits and firms’ performances; and both Lepkowska-White and Parsons (2019) and Parsons and Lepkowska-White (2018) emphasize the managerial perspective. These diverse and heterogeneous attempts make it even more obvious that a universally valid definition must be found. Table 3, which lists the core statements of the articles, serves as the basis for the following definition:

Social media monitoring is a term coined from practice and agency. It can define an iterative process of continuous systematic searches of social media for current relevant information about topics, audience target group(s) and competitors related to the company (Arnaboldi

**Table 4**

Approaches of social media listening (authors listed alphabetically)

Authors	Social Media Listening approaches
Chumwatana & Chuaychoo, 2017	Social media listening is a process of monitoring the websites on the internet or social media channels to see what’s being said about brand, business and other topics related to products (Andzulis et al., 2012).
Ducange et al., 2019	[...] social media listening (Balduini et al., 2013; Schweidel & Moe, 2014; Rao & Rao, 2016), that is a strategic activity allowing for the extraction of useful insights and valuable inputs from social media.
Micera & Crispino, 2017	A fundamental element of this discipline [Social Media Analytics] is social media listening. It is the set of processes and activities that allow one to understand the “places” where conversations having a strong impact on the brand take place, identify the people talking about products/services of their interest and measure the volume of conversations.
Pomputius, 2019	Social listening is the “active process of attending to, observing, interpreting, and responding to a variety of stimuli through mediated, electronic, and social channels.” (Stewart & Arnold, 2017). The popular usage of the phrase refers to the strategy of tracking conversations, complaints, and trends occurring around topics or brands of interest through various social media platforms.
Reid & Duffy, 2018	[...] social listening defined as the ‘process of monitoring digital conversations to understand what customers are saying about a brand and industry online’ (Trackmaven, 2018). [...] a means by which practitioners gather social media data online by ‘listening’ to conversations (Hofacker et al., 2016; Killian & McManus, 2015; Schweidel & Moe, 2014).
Widmar et al., 2020a	Social media listening has evolved as an industry to facilitate the capture and analysis of social media data and measure the sentiment expressed through social media (Hofer-Shall, 2010).

et al., 2017; Bauer, 2017; Hadi & Flesher, 2016; Kim et al., 2020; Parsons & Lepkowska-White, 2018). To achieve this goal, the collected data are processed with the help of standardized analyses, with the aim of obtaining a quick overview and generating valuable insights to make business decisions (Manzira & Bankole, 2018; Orlandi et al., 2020) and thus involving being aware of online activities and deciding when and how to react to them (Lepkowska-White & Parsons, 2019).

The reference to the company’s social media activities by means of tracking incoming traffic, referrals, and visitor engagement, as well as the success of a current advertising campaign (in contrast to Baur, 2017; Kim et al., 2020), are deliberately not considered, because they clearly belong to the area of control.

Both social media analytics and social media listening are sometimes used as synonyms for social media monitoring (e.g., Avery, 2017). Whether this approach is justified will become apparent in the comparison of the definitions below.

#### 4.2.3. Social media listening

Six articles provided a definition of social media listening, i.e., social listening (see Table 4), with two papers (Pomputius 2019; Reid & Duffy 2018) using the term social listening. Ducange et al. (2019) and Pomputius (2019) provide the most detailed definition. Again, the articles refer to different sources regarding a possible definition, and only Schweidel and Moe (2014) are mentioned in two studies (Reid & Duffy 2018; Ducange et al., 2019). Social media listening is also viewed from different angles. Ducange et al. (2019) clearly relate the term to marketing. Reid and Duffy (2018) place social media listening in the context of understanding customer needs and demands. Widmar et al. (2020b) emphasize the task of social media listening to measure the expression of emotions.

Reid and Duffy (2018) bring two terms together, talking about social media monitoring tools on the one hand but also referring to the

methodological procedure as social listening at the same time. [Pompuitius \(2019\)](#) precisely addresses the difficulties of differentiating between the two terms. Some social media coordinators use social monitoring and social listening as synonyms, while others argue that social monitoring refers exclusively to the tracking of mentions and comments related to a specific company or brand. In addition, social listening takes a broader approach by looking at conversations on a topic-by-topic basis, allowing companies to obtain a larger picture of trends among competitors as well as user interests ([Parker, 2017](#)). Here, a broader approach can be made to define the term social media analytics (see definition below).

Furthermore, [Micera and Crispino \(2017\)](#) understand social listening to be an essential part of disciplinary social media analytics but do not clearly distinguish the individual parts, i.e., do not exactly determine which part they mean. If the core statements about social media listening (see [Table 4](#)) are compared with the definition of social media monitoring given above, it becomes apparent that all of the points listed are already included in the definition of social media monitoring. Therefore, these two terms can be understood as synonyms.

### 4.3. Discovery

The wide range and depth of social media data usage covers many different areas. Following the first step of the framework, discovery, according to [Stieglitz et al. \(2018\)](#), the reviewed studies were divided into different research domains based on the foremost mentioned subject area of each paper. However, the allocated subject areas of interest are not necessarily mutually exclusive. A number of studies are purely focused on the methodological development and advancement of analyzing social media data. Those studies are listed under the heading “other subject areas” below.

#### 4.3.1. Agriculture

One publication that belongs to the subject area “Agriculture” was published by [Wittingham et al. \(2020\)](#). In their study, the authors describe, drawing on data from 522 public Twitter accounts, how individual differences such as personality traits and personal values influence the perception of whether genetically modified food is considered to be safe or not. A similar topic was chosen by [Pilar et al. \(2018\)](#). To analyze the perception of organic food and the consumer motivation to buy it, they compare different studies that conducted a social network analysis with Instagram users.

#### 4.3.2. Banking

[Manzira and Bankole \(2018\)](#) performed a systematic literature review on banks analyzing social media data to advance their business and risk assessment. They also developed an integrated framework for decision-making processes in the banking industry. Banking is also partially addressed by [Dai and Vasarhelyi, 2017](#), filed under “disruptive technology”.

#### 4.3.3. Business intelligence

The use of social media data opens many opportunities for business intelligence. In this literature review, six studies were included that focused on this area. In a systematic review, [Choi et al. \(2020b\)](#) evaluate customer-driven business intelligence. [Lee \(2018\)](#) created an overview of applications, focusing on businesses that use social media intelligence. [Holsapple et al. \(2018\)](#) maintain that the analysis of social media data definitions is inaccurate and examine different conceptual frameworks for businesses analyzing social media data. Thus, the authors conducted a survey to validate their proposed framework.

The development of predictive models concerning the reception of scheduled TV programs based on Twitter data is the topic of [Crisci et al. \(2018\)](#). Another predictive model - in this case to measure brand personality - was developed by [Hu et al. \(2019\)](#). A major challenge in applying social media data is to distinguish between relevant and

nonrelevant content. [Wittwer et al. \(2017\)](#) conducted an experiment using two social media and two business intelligence applications and compared the results and the analytical processes to separate the relevant from the nonrelevant data.

#### 4.3.4. Communication

[Baur \(2017\)](#) created a framework to address a large amount of user content in foreign languages, with the rationale that transparency, participation and collaboration are crucial for any type of communication from businesses and governments. By using multisource social media content, the framework was tested with two cases. Fake news is another area of interest, especially concerning health information, because it can endanger people’s lives. Hence, [Pulido et al. \(2020\)](#) analyze social media from Reddit, Facebook, and Twitter to identify which of the shared information is fake and how to overcome that problem.

#### 4.3.5. Disaster management

Disaster management is another area in which social media data can convey instant and relevant information to authorities in charge. [Kankanamge et al. \(2020\)](#) use Twitter data of a real case to identify affected areas. Furthermore, they propose a framework for analyzing social media data. In another study, situational awareness during a disaster for effective response and recovery management also played an important role. [Ragini et al. \(2018\)](#) apply a hybrid method to develop a machine-learning algorithm that helps emergency responders reach people at risk. Virtual operations support teams are a new way to respond to emergencies and disasters. The challenges and technical requirements to analyze social media data that is useful to such teams are also studied by [Fathi et al. \(2020\)](#). [Park et al. \(2019\)](#) explore how tourists utilize social networks in unpredictable crises. The authors developed a framework to assess the information exchange structure between tourists, tourism organizations and other actors involved. [Xu et al. \(2017\)](#) also created a framework and suggested using Weibo data on real-time emergency events for storytelling.

#### 4.3.6. Disruptive technology

Disruptive technology has also been studied by several authors. [Orlandi et al. \(2020\)](#) explore the role of SMA in enhancing technological opportunism competency by applying a mixed-method approach. A similar study was conducted by [Laurell et al. \(2019\)](#) to assess the diffusion of virtual reality technology. [Sarin et al. \(2020\)](#) use Twitter data in a sentiment analysis to investigate the discussion of technology enablers and the future of work. [Wu et al. \(2019\)](#) developed a framework and tested it, inter alia, for new product adoption (iWatch and Google Glass).

Linked to the banking industry and considered to be a disruptive technology is the emerging usage of blockchain technology ([Dai & Vasarhelyi, 2017](#)). Blockchain technology allows secure transactions in peer-to-peer networks ([Magazzeni et al., 2017](#); [Nakamoto, 2008](#)). [Choi et al. \(2020a\)](#) explore how blockchain technology can support SMA for supply chain operations management by using case studies. [Grover et al. \(2019\)](#) researched whether Twitter users accept blockchain. They conclude that Twitter users are indeed in favor of using blockchain due to its security features ([Grover et al., 2019](#)).

#### 4.3.7. Education

Four studies focused specifically on raising awareness in terms of educational campaigns. [Bolat and O’Sullivan \(2017\)](#) use netnographic analysis for higher education institutions with the aim of intensifying psychological engagement with students. [Fischbach and Zarzosa \(2018\)](#) emphasize the importance for students to have an in-depth understanding of how to evaluate and interpret user-generated content. For this purpose, the authors use an experimental learning scheme and created guidelines for instructors. [Widmar et al. \(2020a\)](#) researched the role and value of the veterinary medicine profession. The authors use a

sentiment analysis to discern associations with the profession and make suggestions on how an educational campaign could lead to an increase in veterinarians. [Shah et al. \(2019\)](#) use Google reviews to analyze the quality and reputation of Australian universities.

#### 4.3.8. Ethics

[Michaelidou and Micevski \(2019\)](#) address the ethical dimension of analyzing social media data in their study. They identify and model outcomes of ethical perceptions based on data from 316 social media users. [Kumar and Nanda \(2019\)](#) also discuss the ethical implications of analyzing social media data. [Pääkkönen et al. \(2020\)](#) interviewed social media analysts and their clients' companies to shed light on the expectations regarding the interactions between humans and machines.

#### 4.3.9. Government

Public opinion has become increasingly more important to governments. [Singh et al. \(2020\)](#) present an approach that combines cloud computing and analyzing social media data for monitoring and controlling governmental policies in India. [Brooker et al. \(2018\)](#) use politically relevant discussions on Twitter to conduct a longitudinal study on welfare in the UK. [Juma'h and Alnsour \(2018\)](#) studied an American president's tweets and their impact on the world's stock market and share prices. [Maynard et al. \(2017\)](#) present a framework for collecting and analyzing a large volume of social media content. They apply their framework to three case studies in the political domain by using Twitter data. [Mehmet et al. \(2018\)](#) focus on the stakeholder analysis of environmental policies and how social media comments can be used to address the attitudes and preferences of communities. [Ozturkcan et al. \(2017\)](#) use Twitter data to analyze the information behavior of protesters during the Turkish Gezi Park protests. Twitter data were analyzed concerning the usage of urban public space by [Kim et al. \(2018\)](#).

#### 4.3.10. Health care and public health

[Nagowah and Joaheer \(2018\)](#) analyze social media data in the health care area to classify people who could be at risk of diabetes mellitus. They envision a model that would support patients and people at risk. Based on a social media monitoring framework, [John et al. \(2018\)](#) conducted a study on how medical tourism providers disseminate information, interact with online users and influence travel decisions. [Kordzadeh and Young \(2020\)](#) develop and test a framework to improve social media outcomes in health care. The implementation of sexual health interventions in social media was researched by [Young et al. \(2020\)](#). The authors suggest closer collaboration between software developers and behavioral health scientists. [Kang et al. \(2017\)](#) performed a study using Twitter data on public opinion about a new meals policy in schools in connection with childhood obesity prevention. [Avery \(2017\)](#) conducted a survey on using social media monitoring with public information officers of American health departments concerning the Zika virus and health communication.

#### 4.3.11. Hospitality and tourism

In the area of hospitality and tourism, [Kirkwood et al. \(2019\)](#) used Twitter data to analyze the strategies of a counterinstitutional movement of a restaurant chain. They also address the phenomenon of trolling. [Lepkowska-White and Parsons \(2019\)](#) conducted a qualitative study in which eighteen small restaurant managers were interviewed on their usage of monitoring their social media channels.

Spatial analysis of social media data has also recently received attention. A methodological framework for the analysis of tourist destinations was proposed by [Micera and Crispino \(2017\)](#) for the city of Naples. In their first study, [Park et al. \(2018\)](#) combined the analysis of social media data with a geographic information system (GIS) to identify emotional expressions and hot spots of interest in California's Disneyland. In a second study, the authors aim to visualize spatial patterns of visitors' sentiments in Disneyland ([Park et al., 2020](#)). They used Twitter

data in a text mining analysis and added GIS-based spatial data for their study. Theme parks (Disney World and SeaWorld) are also of interest to [Widmar et al. \(2020b\)](#), who use SMA. The results are then compared to publicly available performance measures. [Bozanta and Kutlu \(2018\)](#) use visitors' Foursquare check-ins on Twitter to analyze behavioral clustering. [Brandt et al. \(2017\)](#) conducted a study on smart tourism ecosystems by using Twitter data in San Francisco. [Liu et al. \(2017\)](#) use Sina Weibo data to analyze the behavior of Chinese tourists in Switzerland.

Another area of interest concerns hotel reviews. [Chang et al. \(2019\)](#) use hotel reviews to propose a framework to analyze big data sources regarding customer satisfaction. July appears to be the month with the lowest satisfaction of business travelers. [Yadav and Roychoudhury \(2019\)](#) study hotel reviews and the changing expectations of customers. Hotel reviews are also the main topic in a study by [Xiang et al. \(2018\)](#). The authors use reviews on TripAdvisor to study its reliability by developing a text classifier to predict the travel purpose. [He et al. \(2017\)](#) suggest an approach that uses natural language preprocessing, text mining and sentiment analysis to understand online customer reviews related to hotels in China. [Xiang et al. \(2017\)](#) use text analytics to study online hotel reviews in Manhattan (NYC).

#### 4.3.12. Journalism

For journalists, the documentation of the social media landscape can be challenging. For this reason, a literature review on NodeXL and its application was conducted by [Ahmed and Lugovic \(2019\)](#). The author also created guidelines for newsrooms. [Thurman \(2018\)](#) performed a research project on how social media platforms permeate news coverage.

#### 4.3.13. Management

A broader subject area is general management. [He et al. \(2018\)](#) use Twitter data to analyze social media data to develop a framework to improve the service quality of American supermarkets. The start-up ecosystem of India was researched by [Singh et al. \(2019\)](#). The authors also analyze Twitter data but opt for sentiment analysis and topic modeling. Digital transformation and web participation of B2B organizations is the topic of interest in an exploratory study by [Sivarajah et al. \(2020\)](#). [Suseno et al. \(2018\)](#) explore value creation in digital innovation ecosystems for a Swedish publishing company. Using a mixed method approach, the hybridization of organizational boundaries toward a digital community is researched by [Arnaboldi et al. \(2017\)](#). A focus on small businesses is included by [Balan and Rege \(2017\)](#). The authors study the potential of social media data for small businesses by using Twitter data in data mining with IBM Watson Analytics. The alignment of business and social media strategies of organizations is researched by [Zadeh and Jeyaraj \(2018\)](#).

#### 4.3.14. Marketing

Marketing is the subject area with the greatest interest in using insights from social media data. User-generated content in social media can be considered to be a dream come true for marketing managers. [Ducange et al. \(2019\)](#) propose a decision support system with a sentiment analysis engine, which supports businesses in handling promotional and marketing campaigns on several social media channels. A framework to classify schemes and procedures to support researchers and marketers in their decision-making processes was developed by [Misirlis and Vlachopoulou \(2019\)](#). [Parsons et al. \(2018\)](#) emphasize the challenges when using social media in marketing strategies. In their study, the authors develop a new framework to use social media as a marketing tool, including the analysis of social media data. [Pomputius \(2019\)](#) performed a study on how libraries can use social listening to stay ahead of trends and assess their community needs. [Tafesse and Wien \(2018\)](#) analyze companies' strategic marketing in social media implementation. Sports marketing, namely, football, is a large market. [Ozturkcan et al. \(2019\)](#) use Twitter data to explore the opportunities for marketers to support their decision-making processes as to whether they



should launch their marketing plans. With a new analytical approach and a benchmark dataset, [Tian et al. \(2019\)](#) analyze the service quality of airlines. Service quality also plays an important role in the sharing economy. Hence, a new software toolkit was developed in a study by [von Hoffen et al. \(2018\)](#). [Laurell and Sandström \(2017\)](#) investigate the Swedish sharing economy landscape using SMA. Branding is also a rather large interest of the authors of the studies included. [Holiday et al. \(2020\)](#) conducted a study on how the cause involvement of brands is associated with the brands themselves. They use Twitter data of 3090 random people who responded to the campaign. Customer knowledge of laptop brands and manufacturers on Twitter is analyzed by [He et al. \(2019\)](#). Predicting users' brand loyalty by using Facebook photos was studied by [Kaiser et al. \(2020\)](#). [Yun et al. \(2019\)](#) use computational methods to analyze the resemblance between a brand's Twitter personality and their followers' personality. In their later study, they focused on advertising and the usage of SMA techniques ([Yun et al., 2020](#)). [Chumwatana and Chuaychoo \(2017\)](#) conducted a study using social media listening in the airline industry with a focus on branding. However, not only potential benefits but also negative aspects of social media are researched. The misuse of social media data for scamming and defamation activities and its consequences on branding and image building was researched by [Sharma and Jain \(2019\)](#). Generating trust among customers is especially valuable in the airline industry. [Ahuja and Alavi \(2018\)](#) use structural Facebook features to develop a theoretical framework to increase the trust of JetAirways' clients. [Kim et al. \(2020\)](#) study online rumors to understand the market and the impact of company reactions to them.

#### 4.3.15. Terrorism

Two studies focused on analyzing social media data to gain insights into terrorist networks. In the MENA region, the communication and discourse of political salafists and jihadists are compared to each other by [Ranko et al. \(2018\)](#). [Saini and Bansal \(2019\)](#) use data from four dark web forum websites on weapons procurement of terrorist groups using a technique called machine learning classification.

#### 4.3.16. Other subject areas

Not surprisingly, the keyword search also produced a number of purely academic literature reviews without a focus on a specific subject area. [Ayele and Juell-Skielse \(2017\)](#) compile a systematic literature review of social media analytics and internet of things (IoT) integration. [Liere-Netheler et al. \(2019\)](#) focus their literature review on the main application and current state of SMA research. [Stieglitz et al. \(2018\)](#) wrote an often-cited literature review on challenges and solutions for the various stages of social media data discovery, collection and preparation and furthermore proposed an extension of an existing framework. [Wang et al. \(2020\)](#) conducted a thematic content analysis of the literature that analyzes social media data in marketing and marketing research.

Furthermore, studies without a clear subject area that seek to advance the field methodologically are also included in the section on other subject areas. Among these is the study by [Camargo de Andrade et al. \(2021\)](#), in which the authors focused their study on the modifiable areal unit problem and applied their framework to a case study by investigating spatial data of tweets on rainfall to optimize the areal units. [Belcastro et al. \(2017\)](#) propose a Java library named ParSoDA (parallel social data analytics) that has the aim of reducing programming obstacles for SMA. [Nazir et al. \(2019\)](#) use Twitter data to propose a signal detection approach using sentiment analysis. The authors assessed three algorithms, which are all tested on two publicly available datasets. In their study, [Reid and Duffy \(2018\)](#) focus on netnographic sensibility within the domain of social listening. [Thelwall \(2018\)](#) uses social media mining on YouTube dance videos to evaluate a systematic SMA strategy.

## 4.4. Research design

Although [Stieglitz et al. \(2018\)](#) propose starting after the discovery immediately with the decision on how to collect data, we strongly believe that the chosen research design (based on the research question, and so on) is an important step that will influence the data collection approach and the subsequent methods. We therefore propose adding this step to the existing framework. This approach allows using the entire range of SMA without limiting the type of data to social media datasets. In addition to [Stieglitz et al.'s \(2018\)](#) framework, the classification and definitions of terms follow [Creswell's \(2014\)](#) rationale. There are three research designs, namely, qualitative, quantitative and mixed methods. [Creswell \(2014\)](#) points out that qualitative and quantitative designs cannot be seen as rigid, separate categories. A study can be more qualitative than quantitative, or vice versa. The mixed methods design contains both qualitative and quantitative elements. According to [Creswell \(2014\)](#), research designs are types of investigation within qualitative, quantitative and mixed methods designs that provide a specific direction for procedures. In the 94 reviewed studies, different research designs were chosen. Most papers (46) opted for a quantitative design. A purely qualitative design was chosen in 17 studies. Thirty-one papers rely on a mixed-methods research design that employs both qualitative and quantitative methodologies.

## 4.5. Tracking

Following the second step, tracking, from the framework by [Stieglitz et al. \(2018\)](#), we examined the applied data collection approach, which countries the studies refer to, and which social media platforms were considered.

### 4.5.1. Data collection approach

Using a social media dataset in data collection, 45 studies address this issue and thus belong to the group that uses the most frequently chosen approach. With regard to pure literature reviews, 13 studies were designed and thus show that a reflection on the scientific treatment of the topic area is taking place. Three more recent studies from 2019 and 2020 use interviews as a data collection method. One must note, however, that different tracking methods were also frequently combined, such as an experimental approach and the examination of a dataset. This combination was selected most often, i.e., six times. The combination of a case study and a dataset, as well as the combination of surveys and datasets, were each chosen three times.

### 4.5.2. Country of origin

Analyses of social media database-based studies are mostly focused on national contexts. In 36 studies, a country is explicitly mentioned. Only six studies performed a multiple country study; these exceptions are the studies by [Nazir et al. \(2019\)](#) on social media signal detection, [Kaiser et al. \(2020\)](#) on social media monitoring, [Kim et al. \(2020\)](#) on understanding social media monitoring and online rumors, [Ragini et al. \(2018\)](#) on mining crisis information, [Ranko et al. \(2018\)](#) on communication networks and discourse of political-salafists, and [Widmar et al. \(2020a\)](#) on public perceptions of veterinarians from social and online media listening.

In Europe, studies are focused on Italy (5), the UK (3), Sweden (2), Germany (2), Turkey (2), Norway (1), and Finland (1), while in North America, the United States (15) accounts for all studies. In South America, studies include Costa Rica (1) and Brazil (1). Studies in the Asia Pacific include Australia (3), China (2), India (3), Mauritius (1), South Korea (1), Pakistan (1), and Thailand (1). However, it is remarkable that in 56% of the studies, the country of origin of the data gathered was not identified.

Therefore, the countries of the home universities of those authors who acted as forerunners in the field are also included in this literature review to shed some light on which countries the research focus



concerns when analyzing social media data. The United States clearly leads with 32 lead authors, followed by India (10), Germany (8), the UK (8), Italy (6), Australia (4), Sweden (4), Turkey (2), Canada (2), China (2), South Korea (2), Brazil (1), the Czech Republic (1), Finland (1), Greece (1), Mauritius (1), the Netherlands (1), New Zealand (1), Norway (1), Pakistan (1), South Africa (1), Spain (1), Switzerland (1), Taiwan (1), and Thailand (1).

#### 4.5.3. Social media platforms

Social media are applications and interactive platforms that allow the creation, discussion, exchange and modification of content created by users hosted on the web (Aichner & Jacob, 2015, p. 258). In fact, social media can be segmented into thirteen different types, such as blogs, business networks, forums, microblogs, photo and video sharing or products and services (Aichner & Jacob, 2015, p. 259). Another aspect of segmentation is discussed by Kietzmann et al. (2011, p. 242) in their honeycomb model of seven functional blocks of social media. According to them, social media can be divided into identity, conversations, sharing, presence, relationships, reputation and groups. Even though certain social media platforms have now become firmly established, such as Facebook, Twitter and YouTube, the market is highly dynamic. Providers decide to discontinue their offerings, such as Google +, or platforms simply lose relevance because they have sharply declining user numbers, such as Snapchat. In addition, some platforms have a strong national focus, such as Zalo in Vietnam. Furthermore, new platforms continue to emerge, such as caffeine.tv. Therefore, it was important to clarify which social media platforms were considered in the scientific handling (see Table 5).

The category “other” includes platforms that have been studied less than four times, such as Foursquare or Google +, which were each included in three papers (Bozanta & Kutlu, 2018; Micera & Crispino, 2017; Ozturkcan et al., 2017; Lepkowska-White & Parsons, 2019; Micera & Crispino, 2017; Misirlis & Vlachopoulou, 2019). Asian platforms receive conspicuously little attention. For example, TikTok and WeChat are considered in only one paper (Micera & Crispino, 2017), and Sina Weibo is considered twice (Liu et al., 2017; Xu et al., 2017).

#### 4.6. Preparation

In the previous chapter, some gaps have already been pointed out, such as the fact that 56% of the studies do not indicate the country of origin of the data. Traditional empirical research designs, such as literature reviews or interviews, usually describe the preparation of the data quite well, while the studies that use a social media dataset have gaps. Too often it remains unclear whether the records have been cleaned or not.

#### 4.7. Analysis

Based on the fourth step, analysis, of the introduced framework, we analyzed the chosen research approaches, which methods were applied in the reviewed studies, and which artifacts and tools were used for this purpose.

The 57 studies that contained social media datasets were reviewed for their analytic methods. One study was not taken into account because the social media dataset was first enriched with data from

**Table 5**  
Number of platforms used sorted by year

Publication year	Facebook	Twitter	Instagram	YouTube	TripAdvisor	LinkedIn	Other
2017	4	11	3	4	2	2	10
2018	8	15	4	3	1	1	3
2019	7	17	3	1	4	1	5
2020	6	12	3	0	1	0	3
<b>Total</b>	<b>25</b>	<b>55</b>	<b>13</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>21</b>

financial market indices and companies’ share prices (Juma’h & Alnour, 2018). Many different analytical methods (28) and combinations of these methods were used. Sentiment analysis, regardless of the version, was used most often, i.e., 28 times; word frequency analysis was used 18 times, topic modeling 17 times, and content analysis 16 times. The scientific development of efficient techniques to analyze the massive amounts of data that social media generates on a daily basis is still in full swing. Therefore, the papers were examined for their own developments, such as applications, algorithms or artifacts. In 2017, artifacts were developed in seven studies (Baur, 2017; Belcastro et al., 2017; Chumwatana & Chuaychoo, 2017, He et al., 2017; Maynard et al., 2017; Xiang et al., 2017; Xu et al., 2017). In the following year, artifacts were designed (Crisci et al., 2018; He et al., 2018; Ragini et al.; Ranko et al., 2018; von Hoffen et al., 2018; Zadeh & Jeyaraj, 2018; Xiang et al., 2018). In 2019, new artifacts were presented in seven studies (Chang et al., 2019; Ducange et al., 2019; Nazir et al., 2019; Laurell et al., 2019; Saini & Bansal, 2019; Yadav & Roychoudhury, 2019; Yun et al., 2019). In 2020, the number declined to three studies with their own artifacts (Kaiser et al., 2020; Park et al., 2020; Singh et al., 2020).

Different methods were used for the analysis, and different software and tools were employed. For example, four contributions used platforms developed in research projects (Baur, 2017; Brooker et al., 2018; Crisci et al., 2018; Thurman, 2018); and six studies utilized seven different commercial social media monitoring and listening tools (Yun et al., 2019; Thurman, 2018; Wittwer et al., 2017; Widmar et al., 2020a; Widmar et al., 2020b; Whittingham et al., 2020).

#### 4.8. Practical implications

In 45 of the 94 reviewed studies, practical implications were

**Table 6**  
Practical implications mentioned per year and authors

Publication year	Practical implications	Authors
2017	6	Belcastro et al., 2017; Brandt et al., 2017; He et al., 2017; Micera et al., 2017; Ozturkcan et al., 2017; Wittwer et al., 2017
2018	16	Ahuja & Alavi, 2018; Fischbach & Zarzosa, 2018; He et al., 2018; Holsapple et al. 2018; John et al. 2018; Lee, 2018; Mehmet et al., 2018; Park et al., 2018; Kim et al., 2018; Parsons & Lepkowska-White, 2018; Stieglitz et al., 2018; Suseno et al., 2018; Tafesse & Wien, 2018; Thurman, 2018; von Hoffen et al. 2018; Zadeh & Jeyaraj, 2018
2019	9	Ahmed & Lugovic, 2019; Grover et al., 2019; He et al., 2019; Kaiser et al., 2020; Laurell & Sandström, 2019; Lepkowska-White & Parsons, 2019; Park et al., 2019; Tian et al., 2019; Wu et al., 2019
2020	14	Choi et al., 2020b; Fathi et al., 2020; Holiday et al., 2020; Kankanamge et al., 2020; Kordzadeh & Young, 2020; Orlandi et al., 2020; Pääkkönen et al., 2020; Park et al., 2020; Singh et al., 2020; Sivarajah et al., 2020; Wang et al., 2020; Widmar et al., 2020b; Young et al., 2020; Yun et al., 2020
<b>Total</b>	<b>45</b>	

mentioned implicitly (see Table 6). However, the implementation for practitioners without previous programming or coding knowledge might be challenging.

## 5. Discussion

In this section, the main research question and the subquestions are discussed. The first subquestion (SRQ1) concerns the difficulty of coining an appropriate definition of social media data analysis. A clear gap is identified concerning the differentiation between various terms used in the area of social media data analysis. SMA definitions are provided by many authors and are often based on either Stieglitz et al. (2014), Zeng et al. (2010) or Fan and Gordon (2014). However, a discussion of the terms is rare, and a clear demarcation between related terms such as social media listening or social media monitoring is rather difficult to find. One of the reasons might be that social media data are used in many different areas, and thereby, different perspectives influence the expressions used. Another issue is the missing comparison between the terms in the studies included. The relationship between those keywords is addressed in this paper. The second subresearch question (SRQ2) concerns suitable research domains. Since social media data are generated by very different types of users who have an opinion or experience to share, clearly analyzing social media data can be used in a large number of subject areas and in various disciplines. Therefore, it is not surprising that marketing in particular receives much attention from scholars. Nevertheless, in areas that are in need of instant information such as disaster management, analyzing social media data offers great opportunities. The subject area of hospitality and tourism is also of great interest. One of the reasons might be that it is a highly competitive market but also that there are specific platforms (e.g., TripAdvisor or Expedia) that appraise one's own experience.

The third subresearch question (SRQ3) concerns the quality standards for this specific type of research and concerns the last three steps (tracking, preparation and analysis) of Stieglitz et al.'s (2018) framework. We suggest adding a clear description of the research design, which clearly has an impact on the following procedures, as suggested by Stieglitz et al. (2018). In the tracking step, our results show that most studies indicated where they generated the data but did not necessarily provide further details, which would allow us to assess the data quality. Additionally, many studies did not explicitly mention the origin of the data. Although the data type is mentioned, the country of origin is often not declared. Again, an explanation for this circumstance could be, of course, that the geolocation of the user is not provided, and therefore, the country of a social media user cannot be determined that easily. However, in some studies, the origin of the data was clearly identified. It is striking that studies from the USA are dominant here. In this context, the privacy protection of different countries will have an effect on the data usage of social media platforms. This circumstance might also be one of the reasons why there are only a few studies that include Asian platforms such as TikTok, WeChat or Sina Weibo. What is also striking is the fact that there are very few studies from India or China. However, the availability of social media data is essential for the scientific community. Another crucial point concerns the languages of the social media data. Currently, research is focused predominantly on English social media data. Based on this review, we must depart from the assumption that the topic is mainly analyzed from a Eurocentric perspective, which might lead to a distorted view.

The fourth subresearch question (SRQ4) asks how the analysis of social media data could be designed to ensure high-quality contributions. First, the field needs clearly defined and clearly distinguishable keywords. Second, in terms of methodology, the entire string of data usage is often not described clearly enough. The traceability of the process remains unclear, e.g., how the authors pulled the data from platforms, if the datasets were cleaned and how the data was analyzed. Furthermore, the methods used should be described in much more detail (Stieglitz et al., 2018). Third, such a description would also allow a

replication of the study, which would be beneficial to the scientific community. It has been suggested that researchers publish on suitable platforms such as GitHub. Fourth, the practical transfer of the suggested frameworks requires an in-depth understanding of the procedures. For this reason, the usage of commercial tools is understandable. However, this approach also creates the issue of missing transparency and a lack of validity if those tools do not share their analysis. Fifth, data accessibility is crucial for any research; countries with restrictive privacy protection hinder research using social media data. Sixth, research on social media data is a quickly evolving business, and therefore, the timeliness of data is very important, which implies that publishing processes must become faster if researchers should be able to benefit from each other's work.

## 6. Conclusions

The large amount of user-generated data, the technological possibilities, and the knowhow to use this type of data are still growing. Clear and distinguishable definitions are rare, which is why this review proposes such definitions to move the research area forward. In social media, the timeliness of data is crucial. Studies using perished platforms such as Google+ or Foursquare, which did not penetrate the European market, cannot be replicated or validated. Furthermore, the replication of studies is only possible if researchers provide a clear description of their processes that are indeed repeatable. Moreover, even though it was possible to identify the area of interest of the studies, not all authors have a clear idea of which purpose they have developed a new method for or which framework to use on social media data. Future research is needed to advance the still young field of social media analytics. Future research avenues also include finding suitable procedures that allow a transparent process of identifying, collecting, processing, and analyzing social media data. Additionally, we suggest a stronger focus on the ethical and legal dimensions of using social media data.

To conclude, several limitations in this literature review must be addressed. Although the four chosen major academic databases (Taylor & Francis Journals, Elsevier, ProQuest, Web of Science) surely have a very high level of quality, and other academic databases such as EconLit or Google Scholar could have been used as well. The material discussed in this study was collected from January 2017 to July 2020. Therefore, the results only give a picture of this specific period, and it is expected that publications that analyze social media data will grow considerably. Finally, the study does not exhaust the subject matter, nor does it present an ultimate list of publications that are currently available.

### CRedit authorship contribution statement

**Cécile Zachlod:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Olga Samuel:** Writing – review & editing, Methodology, Conceptualization, Writing – original draft. **Andrea Ochsner:** Writing – original draft. **Sarah Werthmüller:** Formal analysis.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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