Social media use: A review of innovation management practices

Document status and date:
Published: 01/04/2022

Document Version:
Publisher's PDF, also known as Version of record

Document license:
Taverne

Please check the document version of this publication:

• A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
• The final author version and the galley proof are versions of the publication after peer review.
• The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

Download date: 10 Apr. 2024

Social media use: A review of innovation management practices

Marie-Isabelle Muninger [a,*], Dominik Mahr [b,c], Wafa Hammedi [d]

[a] *ICHEC Brussels Management School, Department of International Management and Marketing, Rue au Bois 365a, B-1150 Brussels, Belgium*
[b] *Maastricht University, Department of Marketing and Supply Chain Management & Service Science Factory, PO Box 616, NL-6200 MD Maastricht, the Netherlands*
[c] *The Netherlands and Centre for Relationship Marketing and Service Management, Hanken School of Economics, Helsinki, Finland*
[d] *University of Namur, Business Department, Rempart de la Vierge 8, B-5000 Namur, Belgium*

A R T I C L E   I N F O

A B S T R A C T

The use of social media for innovation requires firms to manage rapid information transfers, big data, and multiway communication. Yet managers lack clear insights on the way social media should be managed and current literature is dispersed across various research streams. In this article, the authors aim to develop a better understanding of how social media use should be leveraged for innovation. To achieve this objective, they build a systematic review of evidence from 177 scientific articles across four key management disciplines. They analyze research perspectives and conceptualizations of social media use for innovation and provide a framework of the drivers, contingencies and outcomes related to this topic. Next, they attempt to identify what is currently known about social media use for innovation. Last, they suggest critical areas for future inquiry on this important subject.

1. Introduction

The growing adoption of social media by consumers and firms has enabled users to gather information, interact, and build relationships (Li et al., 2021). This has also led to a power shift from firms to users (Labrecque et al., 2013), prompting more customer-centric innovations (Bhimani et al., 2019). Because social media, defined as "online means of communication, conveyance, collaboration, and cultivation among interconnected and interdependent networks of people, communities, and organizations enhanced by technological capabilities and mobility' (Tuten & Solomon, 2018, p.4), are multifaceted, they offer opportunities for firms across all stages of the innovation process. For example, they might use social media to crowdsource new product ideas (Allen et al., 2018), facilitate knowledge sharing and communication in teams (Ali et al., 2020; Marion et al., 2014), and accelerate the launch of new products and services (Dwivedi et al., 2021; Mallapragada et al., 2012).

Popular and well-known social media platforms such as Facebook, YouTube, and Twitter also make it easy for users to exert influence on product marketing. User-generated content, in the form of text, pictures, and videos, creates a data-rich environment in which firms can gather feedback and competitive intelligence, and engage in social listening to find new ideas (Muninger et al., 2019). For example, after Netflix monitored social media conversations in which viewers complained

about dozing off while watching shows, it introduced the idea of smart socks, which pause streaming services when users fall asleep. However, even if social media can inform various stages of the innovation process, their ubiquity and complexity (e.g., vast amounts of data, rapid information diffusion, interactivity, and reach) make it challenging for firms to harness these benefits (Li et al., 2021).

Existing research on social media and innovation is fragmented, spanning various management disciplines such as innovation, marketing, information systems, and general management. In addition, extant findings conflict, such that some scholars cite social media as an important source of information, but others caution against overreliance (He & Feng-Kwei Wang, 2016; Piller et al., 2012). Social media for innovation is a critical but difficult topic for managers who seek more guidance on how to leverage these tools and their outcomes for innovation (Nijssen & Ordanini, 2020).

Therefore, in response to calls for research (Barczak, 2016; Mention et al., 2019; Roberts et al., 2016), this study seeks to understand how firms leverage social media for innovation by systematically analyzing and synthesizing prior research. The aim is threefold: provide insights on the discipline's evolution; bring clarity to social media's drivers, contingency factors, and outcomes for propelling innovation; and identify and discuss research gaps as well as areas for future research. This systematic review uses a framework synthesis approach to organize the

---

* Corresponding author.

E-mail addresses: Marieisabelle.muninger@ichec.be (M.-I. Muninger), d.mahr@maastrichtuniversity.nl (D. Mahr), Wafa.hammedi@unamur.be (W. Hammedi).

findings and analysis, and to provide highly structured data (Barnett-page & Thomas, 2009; Dixon-Woods, 2011).

The findings show that research on social media use for innovation is spread across three levels of analysis: organizational, network, and individual. The drivers and contingency factors that emerge from our systematic review and from these three levels shed light on social media's key role in gathering information, sharing knowledge, and diffusing innovation. Relatedly, they underpin the contingent role played by specific capabilities, such as IT, knowledge, and big data capabilities, as well as governance structures to manage social media's use. They also revealed that network interactions on social media require good network orchestration and structure, as well as richness of platform features and the right level of platform control. Finally, social media is perceived as a great opportunity by managers and contributors who understand its business value. Contributors displaying specific characteristics, such as prior knowledge of a topic and a high level of motivation and engagement, exert a positive influence on social media use outcomes. These outcomes are discussed from three major perspectives in the analyzed literature: market and financial performance, new product innovativeness, and new product efficiency. Gaps are also discussed and leveraged in the section discussing a future research agenda.

This systematic review enhances the understanding of: (i) how firms can effectively incorporate social media for innovation; (ii) the type of innovation outcomes firms can expect with the use of social media; and (iii) potential areas of future research to advance this management discipline. Finally, a wider contribution of this systematic literature review on social media for innovation is offering a comprehensive overview of findings spanning four management disciplines—innovation, marketing, general management, and information systems—that provide a holistic understanding of the topic.

The next section details the systematic review method. The descriptive statistics are followed by a presentation of the three levels of analysis. We then introduce a framework illustrating the resulting drivers, contingency factors, and outcomes. Finally, future research avenues are discussed.

2. Method

2.1. Data collection

Using the two largest academic research databases, Scopus and ISI Web of Science (WoS), we conducted keyword searches to identify relevant articles from leading journals, based on 2018 impact factors (SCImago) published between 2000 and 2021. We excluded publications in magazines and books, and Table 1 summarizes all the exclusion criteria applied.

The journals that publish the identified articles span multiple business domains, including innovation, marketing, information systems, and general management. Considering the relative novelty of our research topic, we included journals known for their proximity to the field (i.e., *MIT Sloan Management Review*, *California Management Review*) and willingness to publish insights about new trends before the top-ranked journals do (Randhawa et al., 2016).

In a systematic four-step process, depicted in Fig. 1, we screened the top-tier peer-reviewed journals from innovation, marketing, information systems, and general management, and then reviewed keyword and citation aggregations to capture subfields that might have gained or lost attention. Due to the multiple disciplines represented, with their distinct terminologies, we began the search with multiple keywords: "social media*" OR "social network* sites" AND "innovation" OR "new product*" OR "new service*" OR "crowdsourc*" OR "idea*" OR "launch*" OR "mining*". These search terms returned 835 articles in WoS and 672 articles in Scopus published in business and management journals that had the respective terms in their titles, abstracts, or keywords. After limiting the scope to articles written in English and 2018 impact factors

Table 1
Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Keywords	Search string iteration 1: ("social media*" or "social networking*") and ("innovation" or "new product*" or "new service*" or "crowdsourcing" or "idea*" or "launch*") Search string iteration 2: ("online communities" or "virtual communities" or "collaborati* platforms" or "collaborati* tools" or "blog*" or "wiki*" or "forum*") and ("innovation" or "new product*" or "new service*" or "crowdsourcing" or "idea*" or "launch*") Search string iteration 3: ("Facebook" or "Twitter" or "LinkedIn" or "Tik Tok" or "Instagram" or "WhatsApp" or "QQ" or "Snapchat" or "We Chat" or "YouTube")[1] and ("innovation" or "new product*" or "product development" or "new service*" or "crowdsourcing"or "idea*" or "launch*")	
Type of journal	(1) Top-tier peer-reviewed journals from innovation, marketing, information systems, and general management. Example of top journals screened for innovation: *Journal of Product Innovation Management, Research Policy, Strategic Management Journal, Academy of Management Journal, Academy of Management Review, Organization Science, Management Science, Journal of Management, Research-Technology Management, Technovation, Harvard Business Review,* and *Creativity and Innovation* (2) High-ranked peer-reviewed journals from business and management disciplines based on SCImago 2018 journal rank (3) Peer-reviewed journals recognized for their proximity to the field: *MIT Sloan Management Review, Harvard Business Review,* and *California Management Review*	Non-scientific journals, book chapters, magazines, low-ranked peer-reviewed journals in business and management (<1 based on SCImago 2018 journal rank), and conference papers
Perspective	Focus on organizational perspectives	Focus on consumer perspectives
Type of content	Empirical and conceptual articles (qualitative and quantitative)	
Language	English	Other languages
Date	2000–2021	Before 2000, which is not relevant for digital use
Relevance	Social media (or synonym) <u>and</u> innovation (or synonym)	Not directly related to the research questions (e.g., social media or innovation not the focus) OR not related to the business world (e.g., government)

Based on top 10 social media sites in 2021: https://datareportal.com/reports/digital-2021-global-overview-report

greater than one, we obtained a corpus of 394 articles. Excluding duplicates, conference papers, and book reviews, due to their limited content (van der Have & Rubalcaba, 2016), left us with 268 articles.

Following Lamberton & Stephen (2016), we next expanded our keyword search to integrate more specific terms, pertaining to social
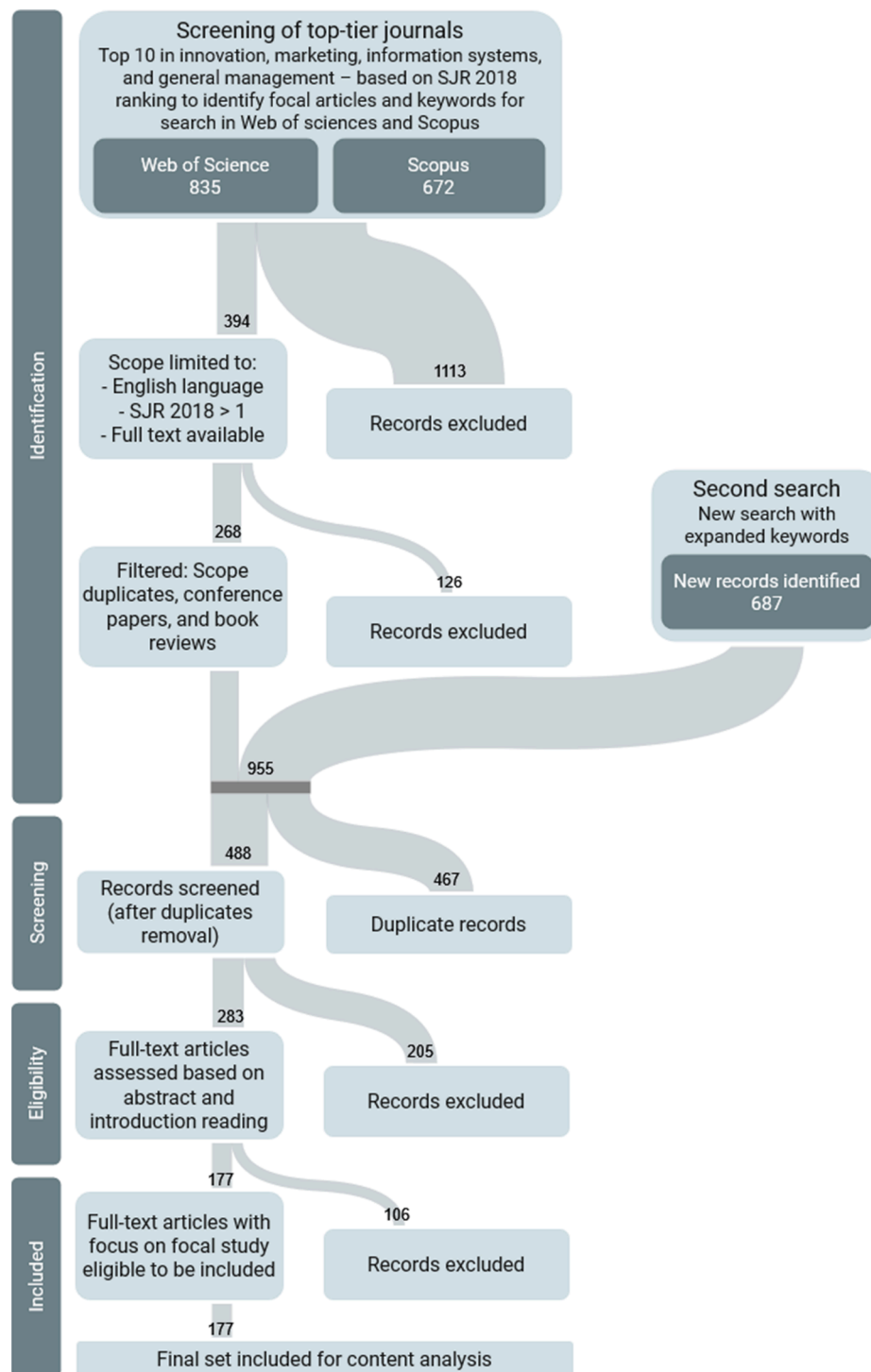
Fig. 1. Selection process.

media tools (Boyd & Ellison, 2008; Obar & Wildman, 2015), such as "online communities" or "virtual communities" or "collaborati* plat-forms" or "collaborati* tools" or "blog*" or "wiki*" or "forum*" and "innovation" or "new product*" or "new service*" or " crowdsourcing" or "idea*" or "launch*". After two further searches, we cleaned the data to avoid duplicates and then continued with a snowball procedure by running searches in the Social Sciences Citation Index to identify other pertinent articles published in the consulted journals. Articles from journals with lower impact factors were included if their content was relevant to our study. To ensure sample quality, we also checked the number of citations. Noting the rapid evolution of this research domain,

we requested forthcoming articles from scholars engaged in the relevant research. These new searches yielded full bibliographic records of 687 additional articles, from which 488 were excluded (many of them were duplicates).

Finally, all three authors independently reviewed the abstracts and introductions to assess the articles' relevance. If our readings of the abstracts and introductions were inconclusive, we examined the full papers, with a particular focus on the discussion sections, to determine whether they contributed to our research (West & Bogers, 2014). For example, many articles adopt a consumer perspective (e.g., Dahl, Fuchs, & Schreier, 2015). Other articles discuss crowdsourcing or co-creation,

but not specifically in relation to social media (e.g., Daly & Nataraajan, 2015; Flostrand, 2016). Through this iterative process of data reconciliation and validation, we obtained a final set of 177 articles.

2.2. Data analysis

Following a framework synthesis approach, the initial coding of our data aimed to structure the sheer wealth of information collected through team discussions and iterative analysis cycles. Toward that end, we entered all the selected papers into the NVivo12 software. We first structured the coding to identify relevant patterns, as suggested by Bandara, Furtmueller, Beekhuyzen, Gorbacheva, & Miskon (2015). One author started by coding: the authors of the manuscript, year of publication, journal of publication, citation number, management discipline, research perspective, central concepts, social media terminology used, role of social media in the paper (independent variable, context, or dependent variable), method, study design, unit of analysis, drivers, contingency factors, and innovation outcomes. Table 2 presents a summary of the first step.

After this first coding round, each author noted similarities, differences, and evolution of arguments over time. The next section describes the data analyzed using descriptive statistics.

Considering the multiplicity of perspectives and contexts involved in social media use for innovation, we conducted our systematic review with a focus on consensual elements across the literature streams— arguments that bring a large consensus among multiple perspectives (MacInnis, 2011). Therefore, we introduced new coding categories (nodes and subnodes in NVivo12) to facilitate the data conceptualization. Three categories were created for the levels of analysis, as illustrated in Table 3 and discussed after the descriptive statistics. By transitioning from an author- to a concept-centric approach, data could be presented in a more structured manner (Webster & Watson, 2002).

Following this categorization of articles, new categories emerged: five categories for drivers, eight categories for contingency factors, and three categories for innovation outcomes. After several iterations, we gained conceptual insights and identified the patterns and underlying properties more clearly. In the section discussing the conceptual framework, we show how these categories are related in the framework of social media use for innovation, and then explore the codes introduced in each category.

3. Descriptive statistics

Research on social media use for innovation is scattered across research streams, as shown in Fig. 2: (1) general management research (33%), with a strong focus on organizational behavior; (2) innovation management studies (24%), which mainly concentrate on innovation contributors' profiles and capabilities for input integration; (3) information systems literature (23%), which considers the means to improve collaboration through platforms; and (4) marketing studies (14%) that cover interactional behavior, such as customer participation, engagement, and co-creation. A few additional research domains offer relevant contributions, accounting for 6% of the sample.

Furthermore, 81% of the articles in this sample are empirical, and 54% are quantitative in nature, such that they tend to use surveys with random samples, often combined with regressions, factorial analyses, or structural equation modeling. Many of these quantitative studies test the impacts of different variables on elements of new product development (NPD) performance (Asdemir et al., 2006), idea implementation (Bayus, 2013; Huang et al., 2014), or user behavior (Balka et al., 2014; Carlson et al., 2018). Social media use plays various roles, including context, independent variables, and dependent variables.

In 26% of the sample, the authors adopted a qualitative approach, with a notable reliance on case studies. The relative newness of topics encourages exploratory efforts to understand the context and related challenges. For example, qualitative studies seek to identify factors such

as idea quality (Allen et al., 2018; Schweitzer et al., 2012) or innovation contributors' profiles (Brem & Bilgram, 2015; Dahlander & Wallin, 2006; Füller et al., 2014; Globocnik & Faullant, 2021), which might influence innovation outcomes. Social media's complex nature, with its rapid evolution and array of functionalities, including organizations that differ in size, structure, and processes, also imply various dimensions requiring exploration. Therefore, qualitative studies investigate the organizational capabilities that firms need to develop to leverage social media tools (Chan, Wang, Lacka, & Zhang, 2016; Muninger et al., 2019). Finally, as Fig. 3 reveals, 19% of the articles were conceptual; they were mainly published prior to 2010, together with most of the qualitative studies. After 2010, we found more surveys and panel studies, reflecting growing interest in the domain.

Many empirical studies (64) focus on the organizational level as a unit of analysis, seeking to understand social media strategy and capabilities, although 52 others use the individual level to investigate managers' behaviors toward social media adoption, ideas or product quality, performance, and factors that encourage contributions to innovation projects. When conducted at the project level (28), empirical studies often focus on team dynamics and knowledge management through social media. The remaining studies combined different units of analysis.

These descriptive statistics provided interesting insights. First, we note the diversity of methods and measures. For example, the authors adopt various units of analysis, although they rarely connect their findings across units, such as using a multilevel perspective. In sum, the current literature offers little understanding of how different strata interact in ways that impact innovation outcomes. Similarly, social media plays different roles across studies (e.g., context, dependent variables, and independent variables).

Second, the findings indicate substantial heterogeneity in analyses of social media characteristics, though we can classify three broad considerations: organizational capabilities (Benitez et al., 2018; Braojos-Gomez et al., 2015; Byrum & Bingham, 2016; Chirumalla et al., 2017; Dong & Wu, 2015; Mention et al., 2019; Mikalef et al., 2021; Muninger et al., 2019), collaboration and network features (Asdemir et al., 2006; Boudreau, 2010; Camacho et al., 2019; Chang & Taylor, 2016; Cheng & Shiu, 2020; Hurmelinna-Laukkanen et al., 2021; Mallapragada et al., 2012; Martini et al., 2013; Stanko, 2016) and contributors' types (Bilgram et al., 2008; Brem & Bilgram, 2015; Chang & Taylor, 2016; Chu & Chan, 2009; Divakaran et al., 2017; Füller et al., 2007; Globocnik & Faullant, 2021).

Third, the usage frequency and quality of various social media platforms have rarely been considered, despite their potential effects on innovation outcomes. Although elements of NPD performance are the focus for outcomes across levels, other metrics that relate to better use of social media are considered at the project and individual levels. For example, the effects on contributors' willingness to participate in innovation projects, or the identification of good ideas and ideal contributors' profiles.

In aggregate, across geographical sources of data, data types, and methods used, a dominant pattern emerges (i.e., North America, archival, and regression) in what has been explored so far. This state of the art suggests interesting research opportunities to analyze and mix new variables that may influence using social media for innovation.

4. Conceptualizing social media use for innovation management practices

Innovation management practices are tactics or methods implemented by organizations to conduct innovation activities, including managing innovation processes and securing the resources needed to support them (Aas et al., 2015). We also define different types of social media, in line with Tuten and Solomon's (2018, pp. 11–16) four-part classification: (1) social communities (sharing, socializing, conversing), which include social networking sites such as Facebook,

Table 2
Sample of literature pertaining to social media use for innovation.

	Source	Research perspective/central concepts	Method	Study design	Unit of analysis	Drivers	Contingency factors	Outcomes
1	Allen, B. J., Chandrasekaran, D., & Basuroy, S. (2018).	Knowledge management & crowdsourcing	Qualitative	Qualitative—executive interviews and quantitative sample of 86 products	Individual (managers)	Decision to crowdsource a product concept	Idea quality of the initial product concept	Product performance: 1/ unit sales, 2/ reliability, technical complexity, and usability
2	Arora, A. S., Sivakumar, K., & Pavlou, P. A. (2021).	Absorptive capacity & social capacitance	Conceptual					
3	Asdemir, O., Banker, R. D., & Bardhan, I. (2006).	Media richness theory & organizational science	Quantitative	Cross-sectional survey—a sample of 71 organizations	Organization	Collaborative product commerce (CPC)		Collaboration, product quality, product design and cycle time, product development costs
4	Balka K., Raasch C., Herstatt C. (2014)	Open innovation	Quantitative	Survey data (n = 309) from 20 online communities	Project	Openness of product design	Valuation of openness by users	User involvement and devotion effort
5	Barczak, G., Sultan, F., & Hultink, E. J. (2007).	IT usage & NPD adoption	Quantitative	Survey—online questionnaire—a sample of 212 managers	Project (NPD)	IT usage (project risk, existence of champion, autonomy, innovative climate, IT infrastructure and IT embeddedness).		NPD performance (speed to market and market performance)
6	Bartl, M., Füller, J., Mühlbacher, H., & Ernst, H. (2012).	The theory of planned behavior (TPB)	Quantitative	Survey—online questionnaire—a sample of 216 innovation managers	Individual (managers)	Managers' attitude toward VCI	Managers' cognition, attitude, subjective norms, and perceived behavioral control—hierarchical position of the innovation manager, manager's level of innovativeness, and market orientation of the company	Managers' behavioral intention to implement virtual customer integration (VCI)
7	Bashir, N., Papamichail, K. N., & Malik, K. (2017).	New product development	Qualitative	Qualitative research—5 companies—interviews with several managers & observations	Individual (managers)	SM use		Source of information for NPD
8	Bayus, B. L. (2013).	Cognitive fixation & knowledge base	Quantitative	Survey—IdeaStorm community—2-year data	Individual	Number of proposed ideas not in already implemented categories; Past success in generating implemented ideas & Diversity of past commenting activity		Individual's likelihood of proposing an implemented idea & Individual's likelihood of proposing diverse ideas
9	Benitez, J., Castillo, A., Llorens, J., & Braojos, J. (2018).	Organizational capabilities	Quantitative	Survey—a sample 100 small firms	Organization	IT Infrastructure	Social media capability	SM capability moderates positively the relationship between knowledge ambidexterity and innovation performance
10	Bhimani, H., Mention, A. L., & Barlatier, P. J. (2018).	Social media and innovation management	Conceptual		Organization			

Table 3
Level of analysis.

Level of analysis	Theoretical foundations	Central concepts	Authors
Organizational level			
	Resource-based view & dynamic capabilities (strategy) for NPD process	IT capability	Barczak et al. (2007); Ebner, Leimeister, & Krcmar, (2009); Kawakami et al. (2015); Marion et al. (2014).
		Analytics capabilities	Byrum & Bingham (2016).
		Big data capabilities	Mikalef et al., 2020, 2021; Shamim et al., (2021).
		Community management	Culnan et al. (2010); Nambisan (2002).
		Ideation and implementation capabilities	Dong & Wu, (2015).
		Resource integration	Singaraju et al. (2016).
		Social media capability	Benitez et al. (2018); Nguyen et al., (2015); Patroni, von Briel, & Recker (2020)
		Knowledge based-view	Allen et al. (2018); Asdemir et al. (2006); Bashir et al. (2017); Candi et al. (2018); Chen & Kuo (2017); Corral de Zubielqui et al. (2019); Du et al. (2016); (Brooks, Datta, & Sahaym, 2017; Chen & Kuo, 2017; Culnan, Mchugh, & Zubillaga, 2010; Jaring, Bäck, & Komssi, 2015; Zahay, Hajli, & Sihi, 2017) Durmuşoğlu & Barczak (2011); Faraj et al. (2016); Hannigan, Seidel, & Yakis-Douglas, (2018); Marion et al. (2014); Nambisan (2002).
		Absorptive capacity	Arora et al (2021); Banker et al. (2006); Culnan et al. (2010); Ooms et al. (2015).
		Social capacitance	Arora et al. (2021).
		Entrepreneurial orientation	

Table 3 (*continued*)

Level of analysis	Theoretical foundations	Central concepts	Authors
		Organizational capabilities	Brooks, Datta, & Sahaym (2017). Benitez et al. (2018); Chirumalla et al. (2017), Roberts & Candi (2014); Roberts et al. (2016), Wei et al. (2021).
	Organizing vision theory	IT innovation diffusion, clarity, and diversity	Miranda et al. (2015).
	Organizational information processing	Project novelty, product size, and task interdependence	Peng et al. (2014).
	Web-based methods for innovation adoption	Open vs. closed systems	Boudreau (2010); (Sethi et al. (2003)
		Collective intelligence	Bonabeau (2009).
	Austrian economics theory of entrepreneurial discovery	Prior knowledge and entrepreneurial discovery	Chandra & Leenders (2012).
Network level	Social capital, social exchange, involvement, and social identity theory	Sense of responsibility, self-image, expectations, and sense of partnership	Dissanayake, Zhang, & Gu, (2015); Nambisan & Baron (2010).
	Social comparison theory	Tournament and auction-related	Dissanayake, Zhang, Yasar, & Nerur (2018).
		Social support	Bugshan (2014).
		Deviant behavior	Gatzweiler, Blazevic, & Piller, (2017).
	Mangle's theory	Entanglement	Martini, Massa, & Testa, (2013).
	Network theory	Structural holes	Gray (2011); Verona et al. (2006).
		Network position	Camacho et al. (2019); Dahlander & Frederiksen (2012); Rullani & Haefliger (2013); van Eck et al. (2011).
		Network orchestration—networked innovation	Hurmelinna et al. (2021); Romero & Molina (2011).
		Social media-based supplier network structure	Cheng & Shiu (2020).
		Social interactions, social ties, and connectedness	Dahlander & Wallin (2006); Hienerth et al. (2014); Ooms et al. (2015); Singaraju et al. (2016).
		Fluidity	Faraj et al. (2011).
		Knowledge brokerage	Asdemir et al. (2006); Mallapragada et al. (2012);

Table 3 (*continued*)

Level of analysis	Theoretical foundations	Central concepts	Authors
			Verona et al. (2006).
	Stakeholder theory	Sustainability & customer focus	Du et al. (2016).
		Acceleration	Jaring et al. (2015).
		Multistakeholder systems	Singaraju et al. (2016).
Individual level			
	Theory of planned behavior	Attitude, cognition, subjective norms, and perceived behavioral control	Bartl et al. (2012).
	Cognitive psychology	Cognitive fixation	Bayus (2013).
		Problem decomposition and stimulus ideas	Luo & Toubia (2015).
		Stimulus–organism–response paradigm	Carlson et al. (2018).
	Consumer behavior	Brand passion and brand knowledge	Füller et al. (2009).
		Trust	Hautz, Füller, Hutter, & Thürridl, (2014).
		Motivation	Camacho et al. (2019); Frey, Lüthje, & Haag (2011).
		Bayesian learning	Huang et al. (2014).
		Customer engagement	Franklin, Searle, Stoyanova, & Townley, (2013); Sawhney et al. (2005); Verona et al. (2006).
		Customer empowerment	Chou, Yang, & Jhan, (2015); Fuchs & Schreier (2011).
		Customer involvement	Candi et al. (2018); Saldanha et al. (2017).
		Consumer cocreation	Hoyer, Chandy, Dorotic, Krafft, & Singh, (2010); Piller et al., (2012).
		Crowdsourcing and semi-supervised learning	Ozcan et al. (2021)
		Proactive and reactive attention	Dahlander & Piezunka (2014).
	Lead user theory	User characteristics (e.g., expertise)	Bilgram et al. (2008); Brem & Bilgram (2015).
		Motivation	Nambisan (2002).
		Lead userness and expected recognition	Globocnik & Faullant (2021)
		Basic, excitement, and performance factors	Füller et al. (2007); Haavisto (2014).
		Traits, knowledge, and status	Hautz et al. (2014); Mahr & Lievens (2012).

Instagram, LinkedIn, and Snapchat; online communities; and wikis; (2) social publishing (editorial, commercial, user-generated) that includes blogging platforms such as Tumblr, video sharing sites such as YouTube, and photo sharing sites such as Instagram; (3) social commerce (customer relationship management, service, retail, human resources) achieved with review sites (e.g., Yelp), deal sites (e.g., Groupon), or the Facebook marketplace; and (4) social entertainment (games, music, art).

4.1. Level of analysis

The extant literature addresses research perspectives from three levels of analysis: organizational, network, and individual.

Organizational level. Efforts to leverage specific resources and capabilities (tangible and intangible) appear essential for gathering information from social media and creating a competitive advantage (Roberts & Candi, 2014). Two main capabilities emerge as key determinants of information gathering and use for innovation: information technology (IT) and knowledge. First, IT infrastructure and IT embeddedness can support idea generation, product testing, and product design and development (Asdemir et al., 2006; Barczak et al., 2007; Marion et al., 2014). An IT infrastructure—"the firm's ability to leverage its technical and human IT resource infrastructure"—(Benitez et al., 2018, p12) is key for exploring and exploiting vast amounts of social media data (Benitez et al., 2018). IT embeddedness, the centrality of information systems for managing interdependence in the NPD process, can successfully integrate web-based NPD systems (Barczak et al., 2007; Sethi et al., 2003). However, studies on IT capabilities in social media and innovation contexts mainly refer to idea collection, with far less attention given to the development and diffusion of innovations (Dong & Wu, 2015). Recent studies have focused on artificial intelligence (AI) and robots. Advanced voice analysis capabilities, AI methods that can help represent data in a meaningful way, capabilities to adopt and use machine learning, and capabilities to integrate AI algorithms that can predict future trends were also explored (Davenport et al., 2020; Dwivedi et al., 2021; Loureiro et al., 2021; Mikalef et al., 2018). Related to these nascent topics, big data analytics –the means to analyze and interpret digital information— are becoming a growing concern (Mikalef et al., 2018). Owing to the increasing volume and velocity of social media data production, firms need to process this continuous data flow quickly and accurately. Accordingly, big data analytics' capabilities –tools and processes applied to large and complex datasets to gather actionable insights – have captured growing interest from academics in the last decade (Mikalef et al., 2021).

Second, research has overwhelmingly focused on linking knowledge capabilities—which enable the acquisition, transformation, sharing and creation of knowledge gathered from social media—(Asdemir et al., 2006; Candi, Roberts, Marion, & Barczak, 2018; Nambisan, 2002) to social media and innovation. By enabling firms to overcome knowledge overload difficulties, market and technological knowledge-processing capabilities enhance the effect of social media use on NPD performance (Cheng & Krumwiede, 2018). Social media also can influence firms' absorptive capacity— "organizational ability to recognize, assimilate and use external knowledge that needs to be complemented with an internal R&D knowledge base"—(Ooms, Bell, & Kok, 2015, p137; Peltola & Mäkinen, 2014). Despite the benefits offered by social media to support absorptive capacity in organizational knowledge transformation, there is a dearth of studies that investigate the interconnection between social media and absorptive capacity. Nonetheless, a recent concept termed "social capacitance" has emerged in the literature and aims at addressing this research gap. The term refers to how social media can support organizations' absorptive capacity development, leading to organizational innovation, long-term success, and competitive advantage (Arora et al., 2021). Social media capacitance should enable firms to improve both knowledge sharing and creation on social media platforms.

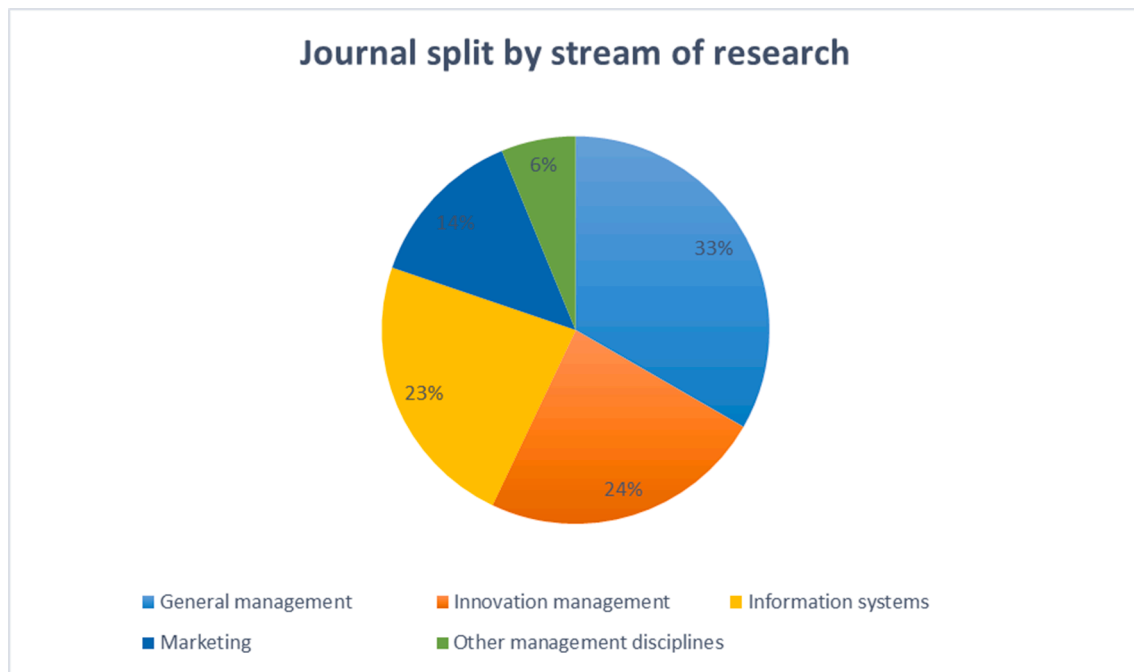**Network level.** The (social) network level is mainly rooted in
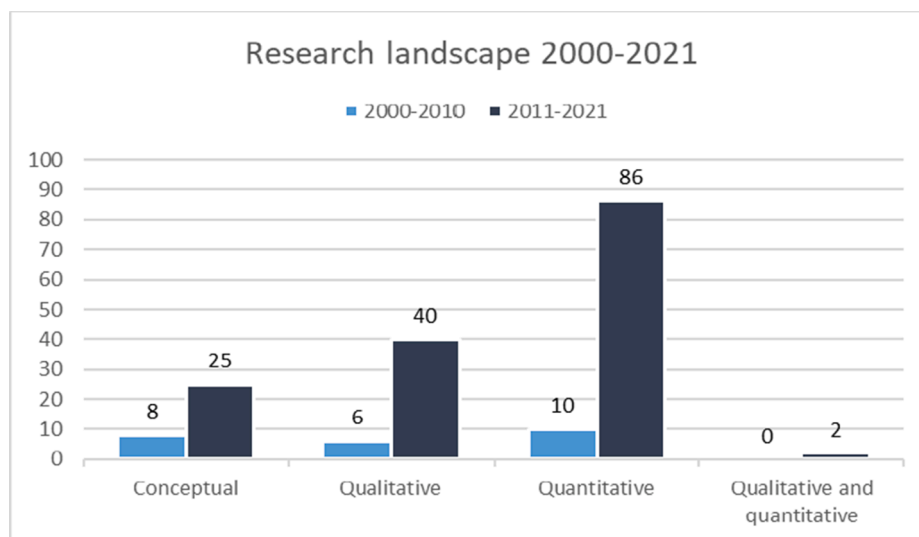
Fig. 2. Research domains.

Fig. 3. Evolution of research for social media and innovation. *2021 denotes from January to September 2021.

network theory (Hienerth, Lettl, et al., 2014; Hurmelinna-Laukkanen et al., 2021; Ooms et al., 2015). Social network theories assume that while each interaction with a counterpart has the potential to yield new information, interactions with socially distant individuals are more likely to do so (Gray, 2011). This theory is employed by authors to understand the nature of social ties that form among different actors in social media environments and their impact on innovation (Camacho et al., 2019; K. W. Chan et al., 2015; Cheng & Shiu, 2020; Mallapragada et al., 2012). The influence exerted by actors' positions within and outside social media also appears relevant. For example, Gray (2011) argued that members with easy access to other users' inputs in a network that has greater reach are likely to be more innovative. Furthermore, structural holes—absence of ties between members in a node's personal network— (Kane, Alavi, Labianca, & Borgatti, 2014, p6) in online social networks, facilitate new knowledge access, which can lead to innovative outcomes as well (Nylen & Holmstrom, 2015). Structural holes enable

firms to engage in technology brokering across industries and grant access to extended networks that do not usually interact (Sawhney et al., 2005). However, information (e.g., innovative ideas) shared on social media is also subject to conflict due to potential losses of control or ownership issues (Bonabeau, 2009; Chou, Yang, & Jhan, 2015; Fuchs & Schreier, 2011). Only two studies tackle these problems.

It has been argued that network interactions between multiple actors are critical in resource integration, especially customer-to-customer interactions, to increase engagement behaviors that will help firms improve their customer and market knowledge, which in turn can be leveraged as strategic resources (Li et al., 2021). Only one study addressed social media interactions with multiple types of stakeholders (Singaraju et al., 2016). Finally, our analysis uncovered different types of user-generated content within networks, created either collaboratively or independently on various platforms (Ransbotham et al., 2012). Evidence of a curvilinear relationship between the number of users and

user-generated content suggests a stronger effect for newer than established content sources (Bayus, 2013).

Individual level. Cognitive psychology theory provides insights into the individual behavior of internal and external contributors on social media, including their interactions and engagement with innovation activities. Three dimensions emerge from our analysis at the individual level: contributor motivation (Bilgram, Brem, & Voigt, 2008; Füller, Mühlbacher, Matzler, & Jawecki, 2009; Nambisan, 2002), contributor cognition (Miranda et al., 2015), and manager cognition (Bartl et al., 2012; Bayus, 2013).

The motivation to participate in innovation activities on social media depends on a contributor's perception that active participation leads to greater product or service quality (Nambisan, 2002). Firms should stimulate this motivation to encourage individual contributions to innovation projects facilitated by social media (Ogink & Dong, 2017). Monetary and non-monetary rewards can help firms achieve this goal (West & Lakhani, 2008).

Cognition, defined as the advantages and disadvantages anticipated from a certain behavior, influences engagement in innovation projects on social media (Miranda et al., 2015). Cognition has been examined from both the contributor and manager perspectives. This shapes managers' decisions to adopt virtual customer integration methods. Bartl et al. (2012) argued that decisions to implement innovation activities using social media stem from cognitive judgments of the potential advantages and disadvantages of such use. Complementary findings by Miranda et al. (2015) suggest the determinant role of an organizing vision (i.e., cognitive structure) in the diffusion of an IT innovation through social media.

Finally, discussions of contributors' involvement have become relatively more prominent in recent research. Contributor engagement on social media, in the form of providing feedback or ideas for innovation projects (e.g., g; Globocnik, & Faullant, 2021; Chirumalla, Oghazi & Parida, 2017), appears to increase idea quality, business performance (Camacho et al., 2019), NPD performance (Cheng & Shiu, 2020) and creativity (Martinez, 2015). However, research on the types of content and interactions driving such engagement seems sparse.

Several patterns emerge from Table 2 and the three levels of analysis. First, it focused on the drivers of social media use for innovation. *Organizational drivers* include information gathering (e.g., finding new product ideas), knowledge sharing, learning (Arora et al., 2021; Benitez et al., 2018; Cappa et al., 2021; Corral de Zubielqui & Jones, 2020; Mikalef et al., 2020, 2021; Muninger et al., 2019; Shamim et al., 2021), and the diffusion of innovation (Aral et al., 2013; Di Gangi & Wasko, 2009; Hienerth, Von Hippel, et al., 2014; Hoyer et al., 2010; Kim & Hanssens, 2017; van Eck et al., 2011).

Network drivers are linked to interactions inside and outside the firm (Benitez et al., 2018; Dobusch et al., 2019; Faraj et al., 2011; Foss & Lindenberg, 2013; He & Feng-Kwei Wang, 2016; Hurmelinna-Laukkanen et al., 2021; Li et al., 2021; Martinez, 2015; Mikalef et al., 2018, 2021). *Individual drivers* relate to contributors' and managers' acceptance of using social media for innovation (Bayus, 2013; Bilgram et al., 2008; Camacho et al., 2019; Füller et al., 2009; Globocnik & Faullant, 2021; Miranda et al., 2015; Ogink & Dong, 2017; West & Lakhani, 2008).

Second, we included seven contingency factors that impact social media use for innovation. Notably, social media capabilities (e.g., IT, knowledge, big data, and AI capabilities) (Arora et al., 2021; Candi et al., 2018; Durmuşoğlu & Barczak, 2011; Mikalef et al., 2021) and social media governance (Mikalef et al., 2020; Roberts et al., 2016; Wei et al., 2021) play moderating roles at the *organizational level*. At the *network level*, network orchestration and structure (Bilgram et al., 2008; Carlson et al., 2018; Chirumalla et al., 2017; Chuang, 2020; Dwivedi et al., 2021; Frey, Lüthje, & Haag, 2011; Hautz, Füller, Hutter, & Thürridl, 2014; Hienerth, Lettl, et al., 2014; Jeppesen & Laursen, 2009; Li et al., 2021; Mahr, Lievens, & Blazevic, 2014; Marchi, Giachetti, & De Gennaro, 2011; Martinez, 2015) together with platform features' richness

(Hienerth, Von Hippel, et al., 2014; Piller et al., 2012; Stanko, 2016) and platform control (Boudreau, 2010; Luo & Toubia, 2015) moderate the impact of social media use for innovation on NPD performance. Contributors' knowledge (e.g., prior knowledge, lead user profile (Brem & Bilgram, 2015; Füller et al., 2014; Globocnik & Faullant, 2021; Jeppesen & Laursen, 2009; Marchi et al., 2011; Ogink & Dong, 2017) and level of engagement (e.g., Carlson et al., 2018; Mallapragada et al., 2012) also act as contingency factors in the relationship between social media use and NPD performance at the individual level.

Lastly, all three levels of analysis encompass *outcomes*, expressed in terms of market and financial performance (Barczak et al., 2007; Benitez et al., 2018; Cheng & Krumwiede, 2018; Divakaran et al., 2017; Du et al., 2016; Levine & Prietula, 2014; Roberts et al., 2016; Scuotto et al., 2017), new product innovativeness (Brem & Bilgram, 2015; Mollick, 2016; Yan et al., 2018), and new product efficiency (Asdemir et al., 2006; Barczak et al., 2007; Mallapragada et al., 2012; Marion et al., 2014; Roberts et al., 2016).

These three patterns (*drivers*, *contingency factors*, and *outcomes*) are illustrated in the conceptual framework in Fig. 4. This framework's constitutive elements seek to explain interactions among managers, contributors, and outcomes in the context of social media use for innovation management practices.

4.2. Drivers

Information gathering. The transparency provided by social media allows firms to act as boundary spanners and reduces users' reluctance to search for external information (Candi et al., 2018; Ooms et al., 2015). Social media offers opportunities to gather customer data that can be digitally transformed into knowledge to support innovation activities (Benitez et al., 2018). Many companies leverage social media to gather rich, specific, large-scale data from external contributors in real time, which in turn represents a tremendous source of information and innovative ideas (Allen et al., 2018; Bashir et al., 2017). Online communities offer rich and diverse knowledge (Hajli et al., 2017). Each of these sensed market opportunities must be subject to screening, product development, and commercialization (Dong & Wu, 2015). Surprisingly, only three articles investigated the risks related to the veracity of information collected from social media (Cappa et al., 2021; Nambisan & Baron, 2010; Roberts & Candi, 2014). This review provides evidence that social media data represent a rich source of information that firms can leverage, but the increased data velocity and volume involve the development of continuous processes for gathering, analyzing, and interpreting these data.

Knowledge sharing and learning. Social media is helpful for knowledge collaboration and innovation because they enhance tacit knowledge flow (Faraj et al., 2016). In line with network theory, tensions linked to these resources (e.g., social disembodiment of ideas, time, and passion) can stimulate knowledge collaboration on online platforms (Faraj et al., 2011). Knowledge acquired from social media can facilitate optimized and optimal learning behaviors, through experience accumulation (Nguyen, Yu, Melewar, & Chen, 2015). Accordingly, learning is an important driver in joining and contributing to online innovation communities (Riedl & Seidel, 2018).

However, open collaboration on social media may lead to disappointing knowledge outcomes if participants free-ride or exhibit poor cooperation (Levine & Prietula, 2014). In terms of learning, simple peripheral participation in online communities will not suffice as developmental feedback and rich direct interactions are lacking (Riedl & Seidel, 2018).

Diffusion of innovation. Not all firms value social media in all stages of NPD development, and many invest more heavily in social media tools in the pre-launch and launch stages. In the prelaunch stage, they might conduct advertising campaigns and posts to increase consumers' interest in their offerings, which is particularly relevant for products with short lifecycles (Kim & Hanssens, 2017). During the
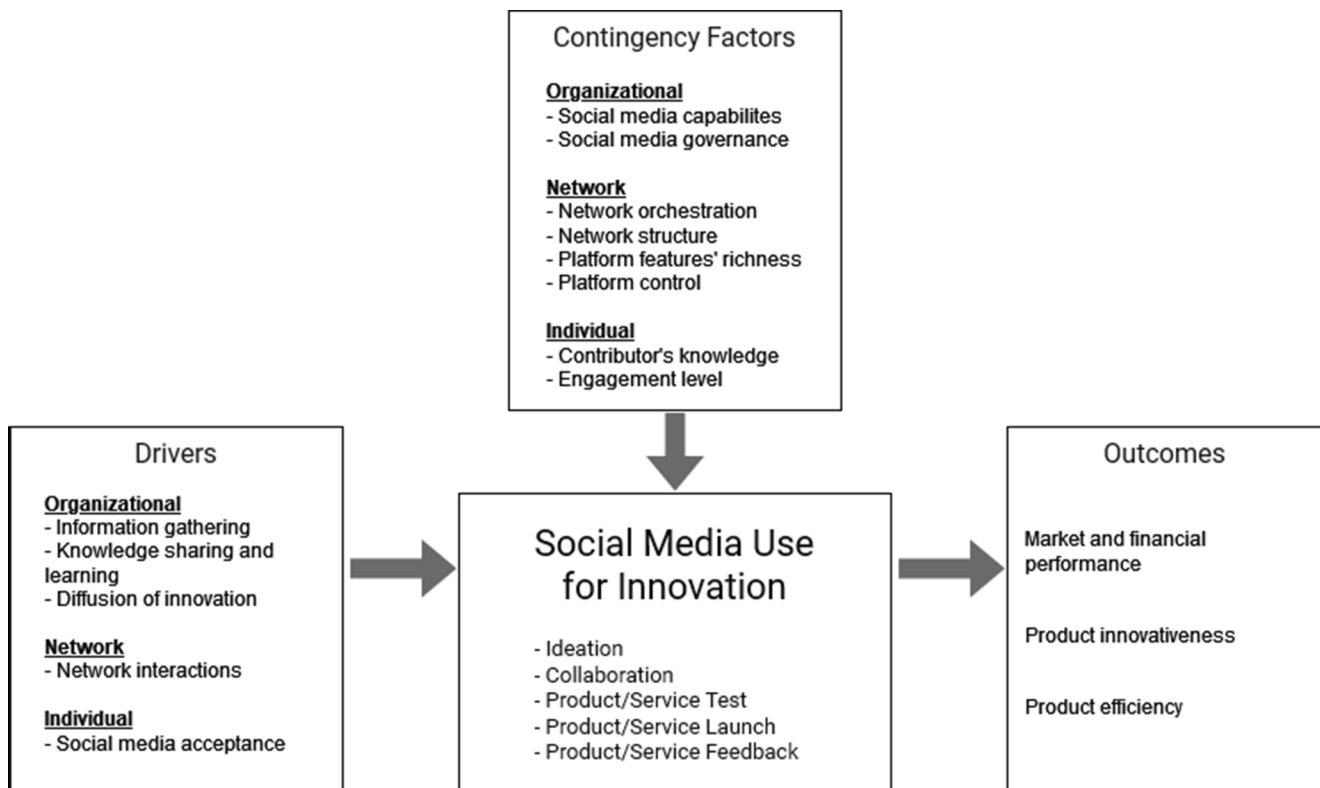
Fig. 4. Conceptual framework of social media use for innovation.

launch stage, they leverage social media to accelerate product and service diffusion and adoption through viral designs specifically engineered to encourage sharing and communication campaigns (Aral et al., 2013). In this regard, social media acts as a diffusion channel enabling large-scale acceptance by targeting wide customer segments (Hienerth, Von Hippel, et al., 2014). Two studies identified negative comments and word of mouth as potential risks (Di Gangi & Wasko, 2009; Hoyer et al., 2010).

Influencers and opinion leaders can diffuse innovation. Opinion leaders who exhibit innovative behaviors, and are less sensitive to normative influences, have positive impacts on adoption rates, information sharing speed, and the product-adoption process (van Eck et al., 2011).

Network interactions. Social media enables user-generated, interactive, and dynamic exchanges that build on collective community intelligence (Du et al., 2016). The substantial information and easy feedback available on social media platforms (e.g., tutorials on YouTube) enhance interactions among social media users, which strongly influences innovation success (Peng et al., 2014; Piller et al., 2012). On social media, knowledge collaboration can occur without preexisting relationships; Faraj et al. (2011) argue that this shift, from traditional collaborations to more open ones, is eased by resource fluidity and dynamic flows (e.g., time, passion, identity) in and out of social media.

Intense interactions between firms and users on social media, marked by frequent communication, mutual support, and peer recognition, can also increase value creation during the innovation process by enabling the application of new ideas and concepts (Bashir et al., 2017; Schröder & Hölzle, 2010; Singaraju et al., 2016). However, virtual interactions between firms and online users require enhanced environments (Romero & Molina, 2011). Firms need to cultivate customers' online interactions with peers and firms, such as by implementing capabilities that address the size of social media to avoid diminishing returns (Chan, Li, & Zhu, 2015).

Social media acceptance. Despite the advantages offered by customer involvement in the innovation process, social media data may appear subjective or controversial, such that a firm's employees may reject them (Allen et al., 2018; Chan et al., 2016; Dahlander & Wallin, 2006). Some employees remain skeptical about their ability to articulate their needs, and believe that users' input is not valuable or insightful, often because these ideas appear too narrow or insufficiently disruptive (Bartl et al., 2012; Bashir et al., 2017). The features of social media exacerbate these perceptions. Despite the opportunity offered by this rich information source (Ooms et al., 2015), some organizations express a paradoxical need for closure. The openness and transparency that characterize social media and the sheer amount of content shared among external users engender negative organizational attitudes (Dobusch et al., 2019): openness and transparency issues resonate particularly strongly in industries that produce complex and information-sensitive products, for which secrecy concerns create barriers to adopting social media for innovation (Muninger et al., 2019). A dilemma can be solved using rules and procedures designed to improve strategic decisions and openness (Dobusch et al., 2019).

4.3. Contingency factors

Social media capabilities. Many firms appear to struggle to absorb and leverage the valuable knowledge created on social media (Teigland et al., 2014), mostly because of the large amount of unstructured data available for innovation activities (Hoornaert et al., 2017). This sheer volume of information generated on social media in real time can accumulate quickly, and the validity of data gathered from multiple platforms in various formats remains questionable for many firms (Hoornaert et al., 2017; Wieneke & Lehrer, 2016). Researchers have stressed the need for analytical and computational capabilities to (1) analyze social media data using statistical methods, (2) create bug reporting systems, and (3) improve social media experience with features that support innovation (Dahan & Hauser, 2002; Moe & Schweidel, 2017; Mount et al., 2014; Teigland et al., 2014).

Greater technology integration brings the innovation process into a firm through improved collaboration with social media users (Sethi et al., 2003). Organizational processes can enhance each step of the innovation process and promote network collaboration. For example, IT capabilities facilitate communication, information sharing, and dissemination (Kawakami et al., 2014), by providing efficient collaboration platforms (Saldanha et al., 2017) and by encouraging knowledge acquisition from dispersed sources. Roberts et al. (2016) also noted a significant positive effect of social media use on product innovativeness when process formalization is high. Firms with more process maturity are more prone to adopt mature project management techniques and are less likely to be exposed to disturbances in their internal processes when they apply integration strategies (Asdemir et al., 2006).

Social media governance. The literature reveals that a lack of formal processes for external input management is an impediment to efforts aimed at successfully leveraging social media (Roberts et al., 2016). Specifically, insufficient coordination within the firm leads to time and budget alignment issues, resulting in the poor integration of valuable sources of information. In NPD, tasks and components are inherently interrelated; therefore, they require both excellent coordination and the ability to communicate tacit information for problem solving (Allen et al., 2018; Chang & Taylor, 2016). Effective coordination can be impeded in the absence of a single platform or clear policies to structure data exchange (Asdemir et al., 2006).

An internal firm governance structure can support internal cooperation and responsible use of social media for NPD (Bashir et al., 2017). A recent study that investigates the interplay between BDA capabilities and information governance practices in shaping innovation capabilities shows that information governance positively moderates the relationship between BDA capabilities and radical innovation capability. This moderating effect is not significant for incremental innovation capabilities (Mikalef et al., 2020). Nonetheless, few studies have discussed this organizational feature (Felix et al., 2017),

Network orchestration. Innovation networks that combine firms and external contributors are becoming increasingly important (Hurmelinna-Laukkanen et al., 2021). Considering the multiplicity of social media and the number of potential contributors on these platforms, careful management of tensions, together with encouragement to collaborate, are needed (Saldanha et al., 2017). Network orchestration is defined as "the discreet and dynamic coordination of network formation and collaboration that involves elements such as knowledge mobility, network stability, and innovation appropriability promoting value capturing among participants" (Hurmelinna-Laukkanen et al., 2021, p1). Networks involve socially reciprocal behaviors; a strong sense of reciprocity can increase knowledge sharing across NPD stages and improve outcomes, such as idea generation, design, and product launch (Chu & Chan, 2009). Therefore, firms that manage content sharing and exchanges between participants are more likely to reap positive benefits from social media use in an innovative setting.

Network structure. Social network theory posits that relationships and links, which can be made in the form of exchanges among individuals, businesses, and organizations, enable a firm to gain efficient access to rich and diverse knowledge (Cheng & Shiu, 2020). The specific characteristics of social media include the presence of structural holes and high levels of heterogeneity in terms of user profiles (Kane et al., 2014). These two aspects create opportunities to discover unique combinations of information sources (Gray, 2011).

Social media also differs in terms of technological interfaces and functionalities, both of which promote strong ties among platform members (Hurmelinna-Laukkanen et al., 2021). Thus, a social-media-based network structure is considered a contingency factor between network interactions and innovation performance (Cheng & Shiu, 2020).

Platform feature richness. Key design features of platforms include the means used to moderate interactions, access restrictions, and options for maintaining anonymity during interactions (Nambisan, 2002). For example, toolkits may establish a development environment, guiding customers to transform their needs into concrete solutions with iteration loops. These toolkits can also enhance social exchange between firms and users during the product development phase (Piller et al., 2012). They might increase preference fit and willingness to pay, though with some limitations: toolkits tend to be costly, may reduce users' creativity, and can lead to marginal innovativeness (Hienerth et al., 2014). However, firms that carefully select features to incorporate into their social media platforms are likely to achieve greater success in their innovation efforts (Nambisan, 2002).

Platform control. The degree of control granted by a platform owner to communities may influence innovation outcomes. For example, in the software industry, providing access to foundational platform technologies can stimulate innovation (Boudreau, 2010). A firm might also customize its platform's task structure, depending on its users' specific knowledge, because high-knowledge users are better equipped with the abstract cues offered by problem decomposition (Luo & Toubia, 2015).

Contributors' knowledge. Contributors' competence and experience determine the quality of their input. Prior experience with successful ideas may increase expectations of the output (Hoornaert et al., 2017). However, generating too many ideas can be counterproductive if an ideator repeats similar ideas (Bayus, 2013). Creative and innovative forums can be a good source of insight, as long as they are hosted by an expert who stimulates interesting discussions (Haavisto, 2014). Lead users are more likely to offer innovative solutions (Brem & Bilgram, 2015), so they are sought after by firms for their knowledge, status (Mahr & Lievens, 2012), and the ability to come up with breakthrough innovations (Hienerth et al., 2014). Contributions from lead users, shared proactively, also contain more novel insights than reactive contributions (Mahr & Lievens, 2012).

Engagement level. A higher level of online userengagement, in terms of persistence and intensity, can increase the creativity and quality of social media contributions (Martinez, 2015). Virtual engagement behaviors depend on both environmental stimuli (e.g., content and contact quality, opportunities to interact, and sociability) and virtual experience (e.g., hedonic and learning value) (Carlson et al., 2018). The level of engagement can be assessed according to interactions within an online community through feedback and collaboration (Carlson et al., 2018; Mallapragada et al., 2012). But user engagement alone is insufficient; direct engagement implies limited network access, with potentially negative impacts on innovation (Verona, Prandelli, & Sawhney, 2006).

4.4. Outcomes

Social media use during the innovation process influences outcomes in different ways. Its success appears to depend on NPD context. According to Cui and Wu (2017), in an experimental NPD context, companies should rely on customers as sources of information; however, when experimentation is lower, codevelopment with customers is preferable. This proposition relates to other findings that link the complementary effects of social media use to NPD performance, and highlights the benefits of using social media to gather information about both needs and solutions (Roberts et al., 2016). The use of social media seems primarily relevant for radically innovative products (Gruner et al., 2013), technologically turbulent projects, business customers, and small firms (Chang & Taylor, 2016). Among the many outcomes associated with social media use, this section focuses on several prominent new product performance elements: market and financial performance, new product innovativeness, and new product efficiency (Bashir et al., 2017; Cheng & Krumwiede, 2018; Roberts & Candi, 2014; Sethi et al., 2003).

Market and financial performance. Economic returns on innovation can be measured as returns on investment or profit. Social media that supports peer learning can reduce firms' operational costs (Lu et al., 2017), particularly in the launch stage, when users raise questions about

specific innovation features. Social platforms can also reduce product development costs by improving team collaboration, which lowers downstream adjustment costs (Asdemir et al., 2006). However, contributors' profiles may also increase the costs. For example, leading users tend to be expensive because they find it difficult to identify and integrate (Mahr et al., 2014). The effects of social media use on financial performance might also be moderated by different knowledge capabilities, such as market and technological knowledge-processing capabilities, the potential value of customer knowledge, knowledge management difficulties, actors' characteristics, and NPD knowledge-management efforts (Chang & Taylor, 2016; Cheng & Krumwiede, 2018). Empirical evidence on the impact of social media use on market performance is scarce and conflicting. Roberts and Candi (2014) test the relationship between social media use and market growth and find a negative effect. Cheng et al. (2018) note a significant, positive, moderating effect of social media use on market performance. Taking a different angle, another study indicated that the use of online communities to predict prelaunch market performance for short-life cycle products has strong positive effects (Divakaran et al., 2017).

New product innovativeness. Social media designed to improve communication and knowledge flows across team members can increase teamwork, which enhances product designs and quality (Asdemir et al., 2006; Marion et al., 2014; Nursiam et al., 2016), although design solutions can be moderated by the initial product concept (Allen et al., 2018). Various studies suggest that creativity prompts searches for external sources of input, which may lead to enhanced product innovativeness (i.e., degree of product newness) due to knowledge diversity (Cui & Wu, 2017). Several authors have also indicated social media's positive effect on product innovativeness (Gruner et al., 2013; Roberts et al., 2016), especially when lead users are involved (Brem & Bilgram, 2015; Mahr & Lievens, 2012).

New product efficiency. The use of social media might shorten the time to market because it enables real-time information acquisition and accelerates development speed (Roberts et al., 2016). In the development stage, social media use encourages collaboration such that team members share concepts and prototype updates, leading to faster feedback and decision review by management (Marion et al., 2014). This process also enables efficient data storage, product design reuse, and electronic retrieval, leading to compressed NPD times (Asdemir et al., 2006). Similarly, the active integration of open-source online communities in the development phase can reduce the time to product release if project founders possess both high brokerage and embeddedness (Mallapragada et al., 2012). Such cycle time reductions emerge only if the firm maintains strong knowledge of social media tools and has sufficient resources to interact with the platforms (Barczak et al., 2007; Mallapragada et al., 2012).

Although new product outcomes have been discussed in terms of market and financial performance, innovativeness, and efficiency, potential shortcomings associated with interpreting the findings also exist. This is mainly because of the variety of indicators used to measure innovation performance. Another drawback is the lack of alignment in the findings. More empirical evidence is needed to overcome this challenge.

5. Discussion and research agenda

This study addresses calls for a better understanding of how firms use social media for innovation. It synthesizes existing knowledge spanning four management disciplines that focus on innovation, and develops a framework of social media use for innovation. This article complements other reviews by focusing on the key drivers, contingency factors, and outcomes of social media use for innovation. Although existing research offers insightful information on social media for innovation management practices, there is still plenty of room to expand this growing research field. The conceptual framework in Fig. 4 suggests that many topics deserve further exploration. In this section, we focus on three

areas that deserve particular attention to support academic research and managerial concerns. Therefore, we carefully analyzed our results to identify knowledge gaps and present a comprehensive overview of research opportunities, as presented in Table 4. Empirical research on these subjects can contribute to innovation, marketing, general management, and information systems.

5.1. Structuring social media information gathering and AI integration

Information gathering is one of the main drivers of social media use. The big data supplied by social media platforms can be transformed into insights to support different stages of the innovation process (e.g., accelerating ideation and increasing sales predictions' accuracy). Although companies invest in AI to support data extraction, they still struggle to deliver personalized products or services based on reliable customer insights (Davenport et al., 2020).

Social media data differs from other types of data because of their velocity, volume, and variety (Surbakti et al., 2020). Their unstructured and subjective nature limits exploitation by firms that must group them into large databases (Chan et al., 2016). For example, it remains difficult to weigh the importance of individual opinions in large datasets, because data extraction mainly relies on demographic variables (Rathore et al., 2016). Capturing the sociocultural and psychographic aspects of human interactions can also be challenging. AI algorithms have the potential to interpret real-time behavioral data to uncover latent needs (Loureiro et al., 2021).

Future research could, therefore, investigate how predictive models supported by algorithms can improve the quality of the gathered information and customer understanding. Qualitative metrics, new statistical and econometric models, fine-grained algorithms, and improved machine and deep learning techniques represent promising options for dealing with social media complexity, particularly with the assistance of artificial intelligence tools. Research on these new technologies is expected to increase in the coming years. New social media mining techniques and models offer opportunities to improve data quality (Ozcan et al., 2021).

5.2. Improving social media capabilities and governance

As the use of social media analytics and artificial intelligence continues to expand, firms must prepare to improve their digital and analytical capabilities internally. IT and knowledge capabilities have been the two major focuses of the literature (e.g., Barczak et al., 2007; Candi et al.,2018; Nambisan et al., 2017; Sethi et al., 2003).

Other capabilities have also emerged in recent studies. For example, Saldanha et al. (2017) suggested that relational and analytical processing capabilities are needed to support the processing and management of customer information flows. In other publications, the authors investigated the analytical capabilities of big data that combine data, technology, and talent (Mikalef et al., 2020). Nevertheless, despite the current focus on big data analytics, almost 90% of firms evaluate their analytical maturity level as low, and they still lack the skills of data scientists (Loureiro et al., 2021). Organizations can also build new capabilities by pursuing innovations to exploit external resources (Zahay, Hajli, & Sihi, 2017). They may introduce agile decision-making processes to leverage social media by introducing iterative cycles of testing and learning (Muninger et al., 2019).

Although much has been written about AI in recent years (Arora et al., 2021; Davenport et al., 2020), many challenges remain unaddressed in prior research. More studies dedicated to AI embeddedness in other firm processes, including the management of social media and innovation, are warranted.

Interactions between social media users and firms also require governance structures to align information processing efforts and objectives (Schröder & Hölzle, 2010). The literature review underpins governance standards as means to guide reviews of the copious ideas

Table 4

Further research directions.

Research opportunities	Domains	Potential research questions
Drivers	Structuring data gathering	What new methods could contribute to big data extraction and structuring? What data analytics are needed to extract and provide reliable and representative social media information? How can psychographic data be integrated to better answer customer needs in a more personalized way? What new methods address the constraints of data protection?
	AI integration	How can deep learning and artificial intelligence in big data processing be integrated for innovation? How algorithms be leveraged to predict innovation outcomes using big data sources?
Contingency factors	Social media capabilities	What are the skills employers and employees need to acquire in priority to manage social media practices for innovation? What are IT/Big data/analytical capabilities needed for the development and diffusion of innovation on social media? How can firms embed AI in other firm's processes? How can firms leverage virtual reality and artificial intelligence capabilities to enhance interactions in the context of innovation?
	Social media governance	How can data privacy management (e.g., anonymization constraints) in innovation strategies be integrated on social media? What type of processes, rules, and procedures should be put in place to manage firms' sensitive information? How can firms align information processing efforts and objectives? What individual routines determine creating, using, selecting, and communicating social media-based insights, and how should the proficiency of such routines be measured? What governance systems need to be implemented by firms to coordinate innovation efforts that involve social media?
	Big data business models	What distinctive social media creation and use strategies can firms employ, and how does each of them enable incremental or radical innovation? What managerial skills and practices foster teams' use of social media for innovation? What managerial practices align diverse social media expertise levels in teams? What kind of process formalizations are needed, and how can firms trade off among flexibility/creativity or procedures/policies?
	Social media innovation ecosystems	What processes and actions do firms need to ensure privacy? How can firms increase the speed of internal social media adoption, and which processes, training, and skills are needed? How can firms integrate multiple

Table 4 (*continued*)

Research opportunities	Domains	Potential research questions
		stakeholders concurrently (e.g., commercial partners and suppliers) in the innovation process? How can firms integrate users at each step of the innovation process, and what strategies can they implement? What strategies should be implemented to manage online communities on social media and engage stakeholders over time? What are the trade-offs in incentivizing customers and other stakeholders for social media involvement for innovation? Under which conditions can stakeholders produce substantial ideas for innovation? Which engagement mechanisms improve stakeholders' experience on social media platforms when they collaborate for innovation projects?
Outcomes	Measures	What additional measures could be studied in the context of social media and innovation? What are the distinctive capabilities needed to increase innovation performance in SMBs, SMEs, and large firms? What methods can contribute to measuring the effects of social media on innovation performance?
	Innovation outcomes	What new scales can be developed to measure social media use for innovation? What moderators should be included in upcoming studies? How can firms measure the progress of social media learning capabilities inside the firm? How can firms better assess big data quality? How can firms impact customers' trust in their offers? How should social media be leveraged for radical versus incremental innovation?

emerging from social media (Bayus, 2013), designate centralized or decentralized approaches to social media platforms (Culnan, Mchugh, & Zubillaga, 2010), and limit chaos in distributed innovation systems (Nambisan, 2002). Governance structures can also clarify intellectual property rights (Boudreau, 2010). Noting how recent data protection and privacy regulations (e.g., GDPR) may impact trust and limit firms' options for improving customer experiences (Lăzăroiu et al., 2018), future research should help firms design new governance structures and data policies that align with their purposes.

5.3. Evolving to big data business models and social media innovation ecosystems

A quote from Henry Chesbrough states, "Business models matter. A better business model will often beat a better idea or technology" (Chesbrough, 2007, p12). Two important features of a business model are value creation and capture (Chesbrough, 2007). Considering that current switch firms are becoming more customer-centric with the use of social media, time has come to reevaluate the constitutive elements of their business model to bring customer value and capture value in

return. A customer-centric approach should allow for a better fit between market dynamics (e.g., shortened time to market) and information dissemination (Romero & Molina, 2011).

However, there is a dearth of research discussing new business models that would support the integration and exploitation of the sheer amount of big data, the number of simultaneous interactions occurring on social platforms, and the specific technologies needed to leverage social media. Building platforms and strategies to match such business models requires strong dynamic capabilities to sustain a competitive advantage over time (Teece, 2018). Therefore, increased attention should be devoted to defining appropriate sets of social media capabilities, instead of focusing on capabilities in isolation. To achieve this objective, researchers could conduct multilevel studies to detail the dynamics and interactions among internal and external stakeholders who contribute to innovation processes.

Data-driven business models should also integrate the notion of digital innovation ecosystems involving value creation through dynamic social media interactions between stakeholders within ecosystems (Suseno et al., 2018). Despite attention paid to descriptions of social media users and online communities of users (e.g., Boudreau, 2010; Brem & Bilgram, 2015; Füller et al., 2009), the integration of various stakeholder profiles remains largely underexplored (Suseno et al., 2018). The focus on consumers comes at the expense of other stakeholders (e.g., suppliers and commercial partners), which may also benefit from the innovation process. Future studies should investigate how stakeholder profiles contribute to innovation outcomes. Studies can also compare stakeholders' profiles in terms of motivation and engagement.

5.4. Focusing on new outcomes and measures

Despite its pivotal role in innovation management, the extant literature has not yet reached agreement on the specific measurement of social media use for innovation. The outcomes of social media use in the context of innovation are mainly expressed in terms of market performance (Bashir et al., 2017; Chang & Taylor, 2016; Cheng & Krumwiede, 2018; Cui & Wu, 2017; Gruner et al., 2013; Roberts et al., 2016; Roberts & Candi, 2014), product innovativeness (Allen et al., 2018; Asdemir et al., 2006; Brem & Bilgram, 2015; Cui & Wu, 2017; Mahr & Lievens, 2012; Marion et al., 2014; Nursiam et al., 2016), and product efficiency (Asdemir et al., 2006; Barczak et al., 2007; Mallapragada et al., 2012; Marion et al., 2014; Roberts et al., 2016). However, other measures should also be considered. Social media and innovation involve many experimentation loops, and not all employees are digitally savvy. In this regard, measuring the learning progress inside firms could be a relevant indicator of social media capabilities and extend the findings of Riedl and Seidel (2018) on individuals' learning processes in crowdsourced innovation contexts. In addition, a better distinction between the short- and long-term outcomes of social media use requires evaluation in terms of costs, profit, market share, and sales.

Another concern relates to the outcomes of data privacy, especially following the COVID-19 pandemic. Because customers are concerned about their data privacy, they may hinder innovation by refusing to adopt AI-related applications (Davenport et al., 2020). Hence, following the number of downloaded social media add-ins and AI apps or the evolution of e-consents could also become useful measures to investigate over time.

Little is known about the quality of data gathered on social media. Scholars are invited to focus their attention on measures that could be used along the funnel, from gathering information on social media to data selection and exploitation. Therefore, there is an urgent need to develop new scales to measure social media use throughout the NPD process. A challenge faced by scholars is determining how social media multidimensionality can be measured accurately across different NPD stages.

This review also sheds light on similarities across studies in terms of

data collection and analysis. The focus on North America, archival data, and regressions could be extended to new geographical areas, new data collection techniques (e.g., more text-, image-, and video-driven analytics or neuroscientific approaches such as eye tracking), and include other methods (i.e., more experiments and multilevel analyses).

Finally, further studies are needed to bring nuances to innovation outcomes. For example, only three manuscripts in our systematic literature review mentioned the firm size used for their study in the title. In doing so, research could determine the parameters that impact social media use in SMBs, SMEs, and LSEs. Similarly, additional research on the relationship between social media use and the type of innovation outcome (i.e., radical or incremental) is required.

6. Conclusion

Social media has been heralded as a tool to support innovation, but many firms still struggle with its use, and many questions remain. In response to calls to flesh out the understanding of social media use in innovation contexts (Mention et al., 2019; Nambisan et al., 2017), we conducted a systematic, in-depth analysis of the current literature, which also reveals several pertinent research avenues. To enhance conceptual clarity, we synthesize current knowledge along with a list of questions to stimulate novel research initiatives. The cross-disciplinary approach suggests options for original research that combine different disciplines, which in turn can facilitate new theory development. In light of our findings and the rapid evolution of social media platforms, we advocate closer collaborations between academics and managers as complementary channels for input and comprehension of fast-evolving practices. Ongoing relationships can help researchers bridge boundaries by accessing practical insights to feed future research projects and also provide managers with new models and methods to apply to their businesses.

Despite the rigorous approach we applied in our systematic review, some limitations remain. We sought to include all relevant studies in the corpus; however, our focus on high-ranking, peer-reviewed journals might have omitted some emerging research. Moreover, we find that many studies highlight the advantages of social media use without detailing the potential risks for firms and users. Other unexamined elements could provide further interesting areas for research.

CRediT authorship contribution statement

Marie-Isabelle Muninger: Conceptualization, Methodology, Data curation, Writing- Original draft preparation, Visualization, Investigation, Formal Analysis. **Dominik Mahr:** Data curation, Supervision, Validation, Writing- Review & Editing. **Wafa Hammedi:** Data curation, Supervision, Validation, Writing- Review & Editing.

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.

References

Aas, T. H., Breunig, K. J., Hydle, K. M., & Pedersen, P. E. (2015). Innovation management practices in production-intensive service firms. *International Journal of Innovation Management, 19*(5).

Ali, A., Bahadur, W., Wang, N., Luqman, A., & Khan, A. N. (2020). Improving team innovation performance: Role of social media and team knowledge management capabilities. *Technology in Society, 61*(May 2020), 1–12.

Allen, B. J., Chandrasekaran, D., & Basuroy, S. (2018). Design crowdsourcing: The impact on new product performance of sourcing design solutions. *Journal of Marketing, 82*(2), 106–123.

Aral, S., Dellarocas, C., & Godes, D. (2013). Social media and business transformation: A Framework for research. *Information Systems Research, 24*(1), 3–13.

Arora, A. S., Sivakumar, K., & Pavlou, P. A. (2021). Social capacitance: Leveraging absorptive capacity in the age of social media. *Journal of Business Research, 124* (December 2020), 342–356.

Asdemir, O., Banker, R. D., & Bardhan, I. (2006). Understanding the impact of collaboration software on product design and development. *Information Systems Research, 17*(4), 352–373.

Balka, K., Raasch, C., & Herstatt, C. (2014). The effect of selective openness on value creation in user innovation communities. *Journal of Product Innovation Management, 31*(2), 392–407.

Bandara, W., Furtmueller, E., Beekhuyzen, J., Gorbacheva, E., & Miskon, S. (2015). Achieving rigour in literature reviews: Insights from qualitative data analysis and tool-support. *Communications of the Association for Information Systems, 34*(8), 154–204.

Barczak, G. (2016). Innovation research: What's next? *Journal of Product Innovation Management, 33*(6), 650.

Barczak, G., Sultan, F., & Hultink, E. J. (2007). Determinants of IT usage and new product performance. *Journal of Product Innovation Management, 24*(6), 600–613.

Barnett-page, E., & Thomas, J. (2009). Methods for the synthesis of qualitative research : A critical review. *BMC Medicine, 9*(59).

Bartl, M., Füller, J., Mühlbacher, H., & Ernst, H. (2012). A manager's perspective on virtual customer integration for new product development. *Journal of Product Innovation Management, 29*(6), 1031–1046.

Bashir, N., Papamichail, K. N., & Malik, K. (2017). Use of social media applications for supporting new product development processes in multinational corporations. *Technological Forecasting and Social Change, 120*, 176–183.

Bayus, B. L. (2013). Crowdsourcing new product ideas over time: an analysis of the dell ideastorm community. *Management Science, 59*(1), 226–244.

Benitez, J., Castillo, A., Llorens, J., & Braojos, J. (2018). IT-enabled knowledge ambidexterity and innovation performance in small U.S. firms: The moderator role of social media capability. *Information and Management, 55*(1), 131–143.

Bhimani, H., Mention, A.-L., & Barlatier, P.-J. (2019). Social media and innovation: A systematic literature review and future research directions. *Technological Forecasting and Social Change, 144*(July 2019), 251–269.

Bilgram, V., Brem, A., & Voigt, K.-I. (2008). User-centric innovations in new product development — Systematic identification of lead users harnessing interactive and collaborative online-tools. *International Journal of Innovation Management, 12*(3), 419–458.

Bonabeau, E. (2009). Decisions 2.0: The power of collective intelligence. *MIT Sloan Management Review, 50*(2), 44–53.

Boudreau, K. (2010). Open platform strategies and innovation: Granting access vs devolving control. *Management Science, 56*(10), 1849–1872.

Boyd, D., & Ellison, N. (2008). Social network sites : Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*, 210–230.

Braojos-Gomez, J., Benitez-Amado, J., & Javier Llorens-Montes, F. (2015). How do small firms learn to develop a social media competence? *International Journal of Information Management, 35*(4), 443–458.

Brem, A., & Bilgram, V. (2015). The search for innovative partners in co-creation: Identifying lead users in social media through netnography and crowdsourcing. *Journal of Engineering and Technology Management, 37*, 40–51.

Brooks, S., Datta, A., & Sahaym, A. (2017). Role of Entrepreneurial Orientation and Social Media on New Product Creation: A Socialnomics view. *Academy of Management, 1*, 11915.

Bugshan, H. (2014). Co-innovation : The role of online communities. *Journal of Strategic Marketing, 23*(August), 37–41.

Byrum, J., & Bingham, A. (2016). Improving analytics capabilities through crowdsourcing. *MIT Sloan Management Review, 57*(4), 43.

Camacho, N., Nam, H., Kannan, P. K., & Stremersch, S. (2019). Tournaments to crowdsource innovation: The role of moderator feedback and participation intensity. *Journal of Marketing, 83*(2), 138–157.

Candi, M., Roberts, D. L., Marion, T., & Barczak, G. (2018). Social strategy to gain knowledge for innovation. *British Journal of Management, 00*, 1–19.

Cappa, F., Oriani, R., Peruffo, E., & McCarthy, I. (2021). Big data for creating and capturing value in the digitalized environment: Unpacking the effects of volume, variety, and veracity on firm performance*. *Journal of Product Innovation Management, 38*(1), 49–67.

Carlson, J., Rahman, M., Voola, R., & De Vries, N. (2018). Customer engagement behaviours in social media: Capturing innovation opportunities. *Journal of Services Marketing, 32*(1), 83–94.

Chan, H. K., Wang, X., Lacka, E., & Zhang, M. (2016). A mixed-method approach to extracting the value of social media data. *Production and Operations Management, 25* (3), 568–583.

Chan, K. W., Li, S. Y., & Zhu, J. J. (2015). Fostering customer ideation in crowdsourcing community: The role of peer-to-peer and peer-to-firm interactions. *Journal of Interactive Marketing, 31*, 42–62.

Chandra, Y., & Leenders, M. A. A. M. (2012). User innovation and entrepreneurship in the virtual world : A study of Second Life residents. *Technovation, 32*, 464–476.

Chang, W., & Taylor, S. A. (2016). The effectiveness of customer participation in new product development: A meta-analysis. *Journal of Marketing, 80*(January), 47–64.

Chen, P. T., & Kuo, S. C. (2017). Innovation resistance and strategic implications of enterprise social media websites in Taiwan through knowledge sharing perspective. *Technological Forecasting and Social Change, 118*, 55–69.

Cheng, C. C. J., & Krumwiede, D. (2018). Enhancing the performance of supplier involvement in new product development : The enabling roles of social media and firm capabilities. *Supply Chain Management: An International Journal, 23*(3), 171–187.

Cheng, C. C. J., & Shiu, E. C. (2020). What makes social media-based supplier network involvement more effective for new product performance? The role of network structure. *Journal of Business Research, 118*(June), 299–310.

Chesbrough, H. (2007). Business model innovation: It's not just about technology anymore. *Strategy and Leadership, 35*(6), 12–17.

Chirumalla, K., Oghazi, P., & Parida, V. (2017). Social media engagement strategy: Investigation of marketing and R&D interfaces in manufacturing industry. *Industrial Marketing Management, 74*(September), 138–149.

Chou, C., Yang, K. P., & Jhan, J. (2015). Empowerment strategies for ideation through online communities. *Creativity and Innovation Management, 24*(1), 169–181.

Chu, K.-M., & Chan, H.-C. (2009). Community based innovation: Its antecedents and its impact on innovation success. *Internet Research, 19*(5), 496–516.

Chuang, S. H. (2020). Co-creating social media agility to build strong customer-firm relationships. *Industrial Marketing Management, 84*(June 2018), 202–211.

Corral de Zubielqui, G., & Jones, J. (2020). How and when social media affects innovation in start-ups. A moderated mediation model. *Industrial Marketing Management, 85*(May), 209–220.

Cui, A. S., & Wu, F. (2017). The impact of customer involvement on new product development: Contingent and substitutive effects*. *Journal of Product Innovation Management, 34*(1), 60–80.

Dahan & Hauser. (2002). The virtual customer. *Journal of Product Innovation Management, 19*(5), 332–353.

Culnan, M., Mchugh, P., & Zubillaga, J. (2010). How Large U.S. Companies Can Use Twitter and Other Social Media to Gain Business Value. *MIS Quarterly Executive, 9*(4), 243–259.

Dahl, D. W., Fuchs, C., & Schreier, M. (2015). Why and when consumers prefer products of user-driven firms : A social identification account. *Management Science, 61*(8), 1978–1988.

Dahlander, L., & Frederiksen, L. (2012). The core and cosmopolitans : A relational view of innovation in user communities. *Organization Science, 23*(4), 988–1007.

Dahlander, L., & Piezunka, H. (2014). Open to suggestions: How organizations elicit suggestions through proactive and reactive attention. *Research Policy, 43*(5), 812–827.

Dahlander, L., & Wallin, M. W. (2006). A man on the inside : Unlocking communities as complementary assets. *Research Policy, 35*, 1243–1259.

Daly, T. M., & Nataraajan, R. (2015). Swapping bricks for clicks : Crowdsourcing longitudinal data on Amazon Turk ☆. *Journal of Business Research, 68*(12), 1–7.

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 48* (1), 24–42.

Di Gangi, P. M., & Wasko, M. (2009). Steal my idea! Organizational adoption of user innovations from a user innovation community: A case study of Dell IdeaStorm. *Decision Support Systems, 48*(1), 303–312.

Dissanayake, I. I., Zhang, J. J., Yasar, M., Nerur, S., & Gu, B. (2015). Task division for team success in crowdsourcing contests: Resource allocation and alignment effects. *Journal of Management Information Systems, 32*(2), 8–39.

Dissanayake, I., Zhang, J., Yasar, M., & Nerur, S. P. (2018). Strategic effort allocation in online innovation tournaments. *Information and Management, 55*(3), 396–406.

Divakaran, P. K. P., Palmer, A., Søndergaard, H. A., & Matkovskyy, R. (2017). Pre-launch prediction of market performance for short lifecycle products using online community data. *Journal of Interactive Marketing, 38*, 12–28.

Dixon-Woods, M. (2011). Using framework-based synthesis for conducting reviews of qualitative studies. *BMC Medicine, 9*(39), 9–10.

Dobusch, L., Dobusch, L., & Müller-Seitz, G. (2019). Closing for the benefit of openness? The case of Wikimedia's open strategy process. *Organization Studies, 40*(3), 343–370.

Dong, J. Q., & Wu, W. (2015). Business value of social media technologies: Evidence from online user innovation communities. *Journal of Strategic Information Systems, 24*(2), 113–127.

Du, S., Yalcinkaya, G., & Bstieler, L. (2016). Sustainability, social media driven open innovation, and new product development performance*. *Journal of Product Innovation Management, 33*(S1), 55–71.

Durmuşoğlu, S. S., & Barczak, G. (2011). The use of information technology tools in new product development phases: Analysis of effects on new product innovativeness, quality, and market performance. *Industrial Marketing Management, 40*, 321–330.

Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management, 59*(May 2020), 102168.

Ebner, W., Leimeister, J. M., Krcmar, H., & Ag, D. T. (2009). Community engineering for innovations: The ideas competition as a method to nurture a virtual community for innovations. *R and D Management, 39*(4), 342–356.

Faraj, S., Jarvenpaa, S. L., & Majchrzak, A. (2011). Knowledge collaboration in online communities. *Organization Science, 22*(5), 1224–1239.

Faraj, S., von Krogh, G., Monteiro, E., & Lakhani, K. R. (2016). Online community as space for knowledge flows. *Information Systems Research, 27*(4), 668–684.

Felix, R., Rauschnabel, P. a., & Hinsch, C. (2017). Elements of strategic social media marketing: A holistic framework. *Journal of Business Research, 70*, 118–126.

Flostrand, A. (2016). Finding the future : Crowdsourcing versus the Delphi technique. *Business Horizons, 60*(2), 229–236.

Foss, N. J., & Lindenberg, S. (2013). Microfoundations for strategy : Of value creation. *Academy of Management Perspectives, 27*(2), 85–102.

Franklin, M., Searle, N., Stoyanova, D., & Townley, B. (2013). Innovation in the application of digital tools for managing uncertainty : The case of UK independent film. *Creativity & Innovation Management, 22*(3), 320–333.

Frey, K., Lüthje, C., & Haag, S. (2011). Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. *Long Range Planning, 44* (5–6), 397–420.

Fuchs, C., & Schreier, M. (2011). Customer empowerment in new product development. *Journal of Product Innovation Management, 28*, 17–32.

Füller, J., Hutter, K., Hautz, J., & Matzler, K. (2014). User roles and contributions in innovation-contest communities. *Journal of Management Information Systems, 31*(1), 273–308.

Füller, J., Jawecki, G., & Mühlbacher, H. (2007). Innovation creation by online basketball communities ☆. *Journal of Business Research, 60*(August 2006), 60–71.

Füller, J., Mühlbacher, H., Matzler, K., & Jawecki, G. (2009). Consumer empowerment through internet-based co-creation. *Journal of Management Information Systems, 26* (3), 71–102.

Gatzweiler, A., Blazevic, V., & Piller, F. T. (2017). Dark side or bright light: Destructive and constructive deviant content in consumer ideation contests. *Journal of Product Innovation Management, 34*(6), 772–789.

Globocnik, D., & Faullant, R. (2021). Do lead users cooperate with manufacturers in innovation? Investigating the missing link between lead userness and cooperation initiation with manufacturers. *Technovation, 100*(August).

Gray, P. H. (2011). Innovation impacts of using social bookmarking systems. *MIS Quarterly, 35*(3), 629–643.

Gruner, R. L., Homburg, C., & Lukas, B. A. (2013). Firm-hosted online brand communities and new product success. *Journal of the Academy of Marketing Science, 42*(1), 29–48.

Haavisto, P. (2014). Observing discussion forums and product innovation – A way to create consumer value ? Case heart-rate monitors. *Technovation, 34*, 215–222.

Hajli, N., Shanmugam, M., Papagiannidis, S., Zahay, D., & Richard, M. O. (2017). Branding co-creation with members of online brand communities. *Journal of Business Research, 70*, 136–144.

Hannigan, T. R., Seidel, V. P., & Yakis-Douglas, B. (2018). Product innovation rumors as forms of open innovation. *Research Policy, 47*(5), 953–964.

Hautz, J., Füller, J., Hutter, K., & Thürridl, C. (2014). Let users generate your video ads ? The impact of video source and quality on consumers ' perceptions and intended behaviors. *Journal of Interactive Marketing, 28*(1), 1–15.

He, W., & Feng-Kwei Wang, B. (2016). A process-based framework of using social media to support innovation process. *Information Technology and Management, 17*(3), 263–277.

Hienerth, C., Lettl, C., & Keinz, P. (2014). Synergies among producer firms, lead users, and user communities: The case of the LEGO producer-user ecosystem. *Journal of Product Innovation Management, 31*(4), 848–866.

Hienerth, C., Von Hippel, E., & Berg Jensen, M. (2014). User community vs. producer innovation development efficiency: A first empirical study. *Research Policy, 43*(1), 190–201.

Hoornaert, S., Ballings, M., Malthouse, E. C., & Van den Poel, D. (2017). Identifying new product ideas: Waiting for the wisdom of the crowd or screening ideas in real time. *Journal of Product Innovation Management, 34*(5), 580–597.

Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). Consumer cocreation in new product development. *Journal of Service Research, 13*, 283–296.

Huang, Y., Singh, P., & Srinivasan, K. (2014). Crowdsourcing new product ideas under consumer learning. *Management Science, 60*(9), 2138–2159.

Hurmelinna-Laukkanen, P., Nätti, S., & Pikkarainen, M. (2021). Orchestrating for lead user involvement in innovation networks. *Technovation, 108*(November 2019).

Jaring, P., Bäck, A., Komssi, M., et al. (2015). Using Twitter in the acceleration of marketing new products and services. *Journal of Innovation Management, 3*(3), 35–36.

Jeppesen, L. B., & Laursen, K. (2009). The role of lead users in knowledge sharing. *Research Policy, 38*(10), 1582–1589.

Kane, G. C., Alavi, M., Labianca, G. J., & Borgatti, S. (2014). What's different about social media networks? A framework and research agenda. *MIS Quarterly, 38*(1).

Kawakami, T., Barczak, G., & Durmuşoğlu, S. S. (2014). Information technology tools in new product development: The impact of complementary resources. *Journal of Product Innovation Management, 32*(4), 622–635.

Kim, H., & Hanssens, D. M. (2017). Advertising and word-of-mouth effects on pre-launch consumer interest and initial sales of experience products. *Journal of Interactive Marketing, 37*, 57–74.

Labrecque, L. I., vor dem Esche, J., Mathwick, C., Novak, T. P., & Hofacker, C. F. (2013). Consumer power: Evolution in the digital age. *Journal of Interactive Marketing, 27*(4), 257–269.

Lamberton, C., & Stephen, A. T. (2016). A thematic exploration of digital, social media, and mobile marketing : Research evolution from 2000 to 2015 and an agenda for future inquiry. *Journal of Marketing, 80*(6), 146–172.

Lăzăroiu, G., Kovacova, M., Kliestikova, J., Kubala, P., Valaskova, K., & Dengov, V. V. (2018). Data governance and automated individual decision-making in the digital privacy general data protection regulation. *Administratie Si Management Public, 31*, 132–142.

Levine, S. S., & Prietula, M. J. (2014). Open collaboration for innovation: Principles and performance. *Organization Science, 25*(5), 1414–1433.

Li, F., Larimo, J., & Leonidou, L. C. (2021). Social media marketing strategy: Definition, conceptualization, taxonomy, validation, and future agenda. *Journal of the Academy of Marketing Science, 49*(1), 51–70.

Loureiro, S. M. C., Guerreiro, J., & Tussyadiah, I. (2021). Artificial intelligence in business: State of the art and future research agenda. *Journal of Business Research, 129*(January 2019), 911–926.

Lu, Y., Singh, P. V., & Sun, B. (2017). Is core-periphery network good for knowledge sharing? A structural model of endogenous network formation on a crowdsourced customer support forum. *MIS Quarterly, 41*(2), 1–44.

Luo, L., & Toubia, O. (2015). Improving online idea generation platforms and customizing the task structure on the basis of consumers' domain-specific knowledge. *Journal of Marketing, 79*(5), 100–114.

MacInnis, D. J. (2011). A framework for conceptual contributions in marketing. *Journal of Marketing, 75*(4), 136–154.

Mahr, D., & Lievens, A. (2012). Virtual lead user communities: Drivers of knowledge creation for innovation. *Research Policy, 41*(1), 167–177.

Mahr, D., Lievens, A., & Blazevic, V. (2014). The value of customer cocreated knowledge during the innovation process. *Journal of Product Innovation Management, 31*(3), 599–615.

Mallapragada, G., Grewal, R., & Lilien, G. (2012). User-generated open source products: Founder's social capital and time to product release. *Marketing Science, 31*(3), 474–492.

Marchi, G., Giachetti, C., & De Gennaro, P. (2011). Extending lead-user theory to online brand communities: The case of the community Ducati. *Technovation, 31*(8), 350–361.

Marion, T., Barczak, G., & Hultink, E. J. (2014). Do social media tools impact the development phase? An exploratory study. *Journal of Product Innovation Management, 31*(1995), 1–12.

Martinez, M. G. (2015). Solver engagement in knowledge sharing in crowdsourcing communities: Exploring the link to creativity. *Research Policy, 44*(8), 1419–1430.

Martini, A., Massa, S., & Testa, S. (2013). The firm, the platform and the customer: A "double mangle" interpretation of social media for innovation. *Information and Organization, 23*(3), 198–213.

Mention, A. L., Barlatier, P. J., & Josserand, E. (2019). Using social media to leverage and develop dynamic capabilities for innovation. *Technological Forecasting and Social Change, 144*(July 2019), 242–250.

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2020). The role of information governance in big data analytics driven innovation. *Information and Management, 57* (7), Article 103361.

Mikalef, P., Pappas, I. O., Krogstie, J., & Giannakos, M. (2018). Big data analytics capabilities: A systematic literature review and research agenda. *Information Systems and E-Business Management, 16*(3), 547–578.

Mikalef, P., van de Wetering, R., & Krogstie, J. (2021). Building dynamic capabilities by leveraging big data analytics: The role of organizational inertia. *Information and Management, 58*(6), Article 103412.

Miranda, S. M., Kim, I., & Summers, J. D. (2015). Jamming with social media: How cognitive structuring of organizing vision facets affects IT innovation diffusion. *MIS Quarterly, 39*(3), 591–614.

Moe, W. W., & Schweidel, D. A. (2017). Opportunities for innovation in social media analytics. *Journal of Product Innovation Management, 34*(5), 697–702.

Mollick, E. (2016). Filthy lucre ? Innovative communities, identity, and commercialization. *Organization Science, 27*(6), 1472–1487.

Mount, M., Martinez, M. G., & Mount & Martinez. (2014). Social media- a tool for open innovation. *California Management Review, 56*(4), 124–143.

Muninger, M. I., Hammedi, W., & Mahr, D. (2019). The value of social media for innovation: A capability perspective. *Journal of Business Research, 95*, 116–127.

Nambisan, S. (2002). Designing virtual customer environments for new product development: Toward a theory. *Academy of Management Review, 27*(3), 392–413.

Nambisan, S., & Baron, R. A. (2010). Different roles, different strokes: Organizing virtual customer environments to promote two types of customer contributions. *Organization Science, 21*(2), 554–572.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *Management Information Systems Quarterly, 41*(1), 223–238.

Nguyen, B., Yu, X., Melewar, T. C., & Chen, J. (2015). Brand innovation and social media: Knowledge acquisition from social media, market orientation, and the moderating role of social media strategic capability. *Industrial Marketing Management, 51*, 11–25.

Nijssen, E. J., & Ordanini, A. (2020). How important is alignment of social media use and R&D–Marketing cooperation for innovation success? *Journal of Business Research, 116*(April), 1–12.

Nursiam, S., Handayani, P. W., & Trisnanty, I. A. K. (2016). Effect of virtual community involvement on new product development: Case studies on Indonesian online commerce companies. *International Journal of Business Information Systems, 22*(4), 397.

Nylen, D., & Holmstrom, J. (2015). Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation. *Business Horizons, 58*(1), 57–67.

Obar, J. A., & Wildman, S. (2015). Social media definition and the governance challenge : An introduction to the special issue. *Telecommunications Policy, 39*(9), 745–750.

Ogink, T., & Dong, J. Q. (2017). Stimulating innovation by user feedback on social media: The case of an online user innovation community. *Technological Forecasting and Social Change, 144*, 295–302.

Ooms, W., Bell, J., & Kok, R. a W. (2015). Use of social media in inbound open innovation: Building capabilities for absorptive capacity. *Creativity & Innovation Management, 24*(1), 136–150.

Ozcan, S., Suloglu, M., Sakar, C. O., & Chatufale, S. (2021). Social media mining for ideation: Identification of sustainable solutions and opinions. *Technovation, 107* (April 2020), 102322.

Patroni, J., von Briel, F., & Recker, J. (2020). Unpacking the social media–driven innovation capability: How consumer conversations turn into organizational innovations. *Information and Management, September 2018*, 103267.

Peltola, T., & Mäkinen, S. J. (2014). Influence of the adoption and use of social media tools on absorptive capacity in new product development. *Engineering Management Journal, 26*(3), 45–52.

Peng, D. X., Heim, G. R., & Mallick, D. N. (2014). Collaborative product development: The effect of project complexity on the use of information technology tools and new product development practices. *Production and Operations Management, 23*(8), 1421–1438.

Piller, F., Vossen, A., & Ihl, C. (2012). From social media to social product development: The impact of social media on co-creation of innovation. *Die Unternehmung*, 7–27.

Randhawa, K., Wilden, R., & Hohberger, J. (2016). A bibliometric review of open innovation: Setting a research agenda. *Journal of Product Innovation Management, 33* (6), 750–772.

Ransbotham, S., Kane, G. C., & Lurie, N. H. (2012). Network characteristics and the value of collaborative user-generated content. *Marketing Science, 31*(3), 387–405.

Rathore, A. K., Ilavarasan, P. V., & Dwivedi, Y. K. (2016). Social media content and product co-creation: An emerging paradigm. *Journal of Enterprise Information Management, 29*(1), 7–18.

Riedl, C., & Seidel, V. P. (2018). Learning from mixed signals in online innovation communities. *Organization Science, 29*(6), 1010–1032.

Roberts, D. L., & Candi, M. (2014). Leveraging social network sites in new product development : Opportunity or hype ?*. *Journal of Product Innovation Management, 31* (S1), 105–117.

Roberts, D. L., Piller, F. T., & Lüttgens, D. (2016). Mapping the impact of social media for innovation: The role of social media in explaining innovation performance in the PDMA comparative performance assessment study. *Journal of Product Innovation Management, 33*(1), 117–135.

Romero, D., & Molina, A. (2011). Collaborative networked organisations and customer communities: Value co-creation and co-innovation in the networking era. *Production Planning and Control, 22*(4), 447–472.

Rullani, F., & Haefliger, S. (2013). The periphery on stage: The intra-organizational dynamics in online communities of creation. *Research Policy, 42*(4), 941–953.

Saldanha, T. J. V., Mithas, S., & Krishnan, M. S. (2017). Leveraging customers involvement for fueling innovation: The role of relational and analytical information processing capabilities. *MIS Quarterly, 41*(1), 267–286.

Sawhney, M., Verona, G., & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of Interactive Marketing, 19*(4), 4–34.

Schröder, A., & Hölzle, K. (2010). Virtual communities for innovation: Influence factors and impact on company innovation. *Creativity & Innovation Management, 19*(3), 257–268.

Schweitzer, F. M., Buchinger, W., Gassmann, O., & Obrist, M. (2012). Crowdsourcing : Leveraging innovation through online idea competitions. *Research-Technology Management, 55*(3), 32–38.

Scuotto, V., Del Giudice, M., & Carayannis, E. G. (2017). The effect of social networking sites and absorptive capacity on SMES' innovation performance. *Journal of Technology Transfer, 42*(2), 409–424.

Sethi, R., Pant, S., & Sethi, A. (2003). Web-based product development systems integration and new product outcomes: A conceptual framework. *Journal of Product Innovation Management, 20*(315), 37–56.

Shamim, S., Yang, Y., Zia, N. U., & Shah, M. H. (2021). Big data management capabilities in the hospitality sector: Service innovation and customer generated online quality ratings. *Computers in Human Behavior, 121*(June 2020), 106777.

Singaraju, S. P., Nguyen, Q. A., Niininen, O., & Sullivan-Mort, G. (2016). Social media and value co-creation in multi-stakeholder systems: A resource integration approach. *Industrial Marketing Management, 54*, 44–55.

Stanko, M. A. (2016). Toward a theory of remixing in online innovation communities. *Information Systems Journal, 27*(4), 773–791.

Surbakti, F. P. S., Wang, W., Indulska, M., & Sadiq, S. (2020). Factors influencing effective use of big data: A research framework. *Information and Management, 57*(1), Article 103146.

Suseno, Y., Laurell, C., & Sick, N. (2018). Assessing value creation in digital innovation ecosystems : A social media analytics approach. *Journal of Strategic Information Systems, 27*(4), 335–349.

Teece, D. J. (2018). Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world. *Research Policy, 47*(8), 1367–1387.

Teigland, R., Di, P. M., Flåten, B., Giovacchini, E., & Pastorino, N. (2014). Balancing on a tightrope: Managing the boundaries of a firm-sponsored OSS community and its impact on innovation and absorptive capacity. *Information and Organization, 24*, 25–47.

Tuten, T., & Solomon, M. (2018). *Social media marketing* (Matthew Waters (ed.)). Sage Publications Limited.

van der Have, R. P., & Rubalcaba, L. (2016). Social innovation research: An emerging area of innovation studies? *Research Policy, 45*(9), 1923–1935.

van Eck, P., Jager, W., & Leeflang, P. (2011). Opinion leaders' role in innovation diffusion: A simulation study. *Journal of Product Innovation Management, 28*(2), 187–203.

Verona, G., Prandelli, E., & Sawhney, M. (2006). Innovation and virtual environments: Towards virtual knowledge brokers. *Organization Studies, 19*(4), 765–788.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly, 26*(2).

Wei, R., Wang, X., & Chang, Y. (2021). The effects of platform governance mechanisms on customer participation in supplier new product development. *Journal of Business Research, 137*, 475–487.

West, J., & Bogers, M. (2014). Leveraging external sources of innovation: A review of research on open innovation. *Journal of Product Innovation Management, 31*(4), 814–831.

West, J., & Lakhani, K. R. (2008). Getting clear about communities in open innovation. *Industry and Innovation, 15*(2), 223–231.

Wieneke, A., & Lehrer, C. (2016). Generating and exploiting customer insights from social media data. *Electronic Markets, 26*(3), 245–268.

Yan, J. K., Leidner, D. E., & Benbya, H. (2018). Differential innovativeness outcomes of user and employee participation in an online user innovation community differential innovativeness outcomes of user and employee participation in an online user innovation community. *Journal of Management Information Systems, 35*(3), 900–933.

Zahay, D, Hajli, N, & Sihi, D (2017). Managerial perspectives on crowdsourcing in the new product development process. *Industrial Marketing Management, 71*, 41–53.

Dr. Marie-Isabelle (Marisa) Muninger has been a Marketing lecturer and consultant at ICHEC Brussels Management School since 2013. She's also scientific director of the digital marketing certificate at ICHEC. Marisa holds a PhD in Economics and Business Management. Prior to academia she had ten years international marketing experience with MNC's such as 20th Century Fox, Sara Lee and Reckitt Benckiser. Her areas of research and teaching interests cover marketing strategy, international marketing and innovation management. Her dissertation is about social media use in innovation. More specifically, her work examines how social media tools can be leveraged in the frame of the innovation process. She published her first doctoral project in Journal of Business Research and presented her research at international conferences including Innovation and Product Management, Global Innovation and Knowledge Academy and Frontiers in Service.

Dr. Dominik Mahr is a full professor of digital marketing and innovation at Maastricht University, The Netherlands. He is also head of the Marketing & Supply Chain department and scientific director of the Service Science Factory. He holds a PhD in Applied Economics from the University of Antwerp (Belgium). His research centers on recent marketing and innovation phenomena including open innovation, virtual social communities, online innovation brokers, customer co-creation, service design and the development of new services. His work emphasizes technology-driven media such as user communities, expert networks, robots and mobile channels. He has published in top management journals, among others, in Journal of Marketing, Journal of the Academy of Marketing Science, Journal of Product and Innovation Management, Journal of Retailing, Journal of Service Research, Research Policy and MIS Quarterly. Prior to his academic career, Dr. Mahr worked for several years in different management and marketing consultancies, operating in industries such as high tech, automotive, real estate, and insurance.

Dr. Wafa Hammedi is a professor of Service innovation and marketing at the University of Namur-Belgium. She is the head of the research group in marketing and service management at UNamur. She joined the board of directors of mulidisciplarny institute NADI (Namur Digital Institute) member of the university's Research Council. She received her PhD from the Institute for Management Research of the Radboud University Nijmegen, The Netherlands. Her primary research interests are Service Innovation & Marketing – investigating the dynamic capabilities of innovation management in service firms. She's also interested in Knowledge co-creation mechanisms during open innovation and within digital platforms. She is passionate of service research - her work focuses on virtual communities, customer engagement and customer co-creation experiences. She was among the top young service marketing thought leaders in 2012. She serves as the chair at the IPSIM-Largest worldwide innovation management network. She published in highly recognized journals, among others, in journal of Interactive Marketing, Journal of Product and Innovation Management, Industrial Marketing Management, Journal of Business Research and Journal of Service Management. She won several Awards, and she was granted the 2013 IBM Faculty Award.