

The use of social media in different phases of the new product development process: a systematic literature review

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Using social media is high on the list of priorities for many firms looking to enhance their innovation performance in the different phases of the new product development (NPD) process. Mirroring this rising practical importance of using social media for NPD, scholars have presented a diverse range of perspectives and underscored the need for a systematic literature review. Accordingly, this study reviews 110 papers from 2002 to 2023, to synthesize the use of social media across three phases: discovery, development, and launch. Our analysis identifies nine NPD objectives that social media addresses and discusses challenges encountered. Building on this analysis, we develop an organizing framework to guide practitioners on how to adopt social media to achieve better NPD performance and propose directions for future research.

1. Introduction

In recent years, companies have increasingly turned to social media – internet-based applications rooted in Web 2.0 technology that facilitate the creation and exchange of user-generated content (Du et al., 2016) – to engage, collaborate, and interact with both internal and external stakeholders. Prior research has suggested that firms use a wide range of social media applications to support new product development (NPD), leading to performance improvement (Bashir et al., 2017; Zhan et al., 2020; Rakshit et al., 2021). Social media helps firms draw insights from a diverse information pool that can benefit the NPD process

(Iacobucci and Hoeffler, 2016), for instance, to develop new ideas, solve problems, and accomplish collaborative NPD. A prominent example is Adidas, which created the Adidas Creators Club, a platform where customers and athletes can share ideas, participate in the design process, and contribute to new product innovation (Dreher and Ströbel, 2023).

While researchers increasingly investigate the potential value of social media in the NPD process, the results remain inconclusive. Much of the literature is fragmented into case studies of heterogeneous study contexts (e.g., Cao and Ali, 2018; Zhang, Gupta, et al., 2020). Moreover, while some scholars celebrate the significance of social media

in facilitating product ideation and innovative product designs (Schemmann et al., 2016; Mirtalaie et al., 2017), others suggest that reliance on social media may lead to imitative and unimaginative products (Roberts et al., 2016). This state-of-the-research is problematic as the results generated from each individual study tend to be limited and, in their entirety, the multiple disjointed studies fail to offer a generalizable, in-depth understanding of how companies can use social media to create value in each NPD phase. What is missing is an integrated understanding of research findings across the various studies of social media as an enabler for innovation throughout the NPD process. To address this gap, we conducted a systematic literature review guided by the following overarching research question: *How does the use of social media differ in different phases of the NPD process, and what are the challenges of using social media in each phase?*

Like other novel domains that have benefited from systematic literature reviews – such as smart products (Raff et al., 2020) or big data analytics (Mikalef et al., 2018) – a rigorous systematic review of the literature on using social media in NPD helps develop a comprehensive overview of this interdisciplinary and multifaceted research domain (Watson and Webster, 2020).

Building on prior research (Durmusoglu and Kawakami, 2021; Giannakis et al., 2022) and following the recommendations of the Product Development Management Association (Cooper, 2008), we distinguish between the discovery, development, and launch phases of the NPD process. In the discovery phase, ideas are generated and customer requirements are analyzed (Marion et al., 2014). The development phase involves the finalization and subsequent testing of product design (Durmuşoğlu and Barczak, 2011). In the launch phase, commercialization and execution are carried out, with companies developing a marketing strategy to achieve a successful launch (Du et al., 2016).

After reviewing 110 related studies published between 2002 and 2023, we find that social media is used differently in each phase of NPD. For each phase, we identify distinct NPD objectives (e.g., idea generation, team collaboration, and new product promotion) addressed by four different types of social media: company-built social media, company collaboration platforms, public social media platforms, and innovation intermediary social media (Guinan et al., 2014; Bhimani et al., 2019). Along with the phase-specific utilization, we also explain those social media functions that can add value across phases, to the entire NPD process. Furthermore, we elucidate the challenges of using social media in

each phase as well as the overarching challenges that affect the whole NPD process.

Our systematic review makes several contributions to the literature and to practice. Academically, we respond to calls for a more comprehensive, systematic understanding of the use of social media in the NPD process (Ko et al., 2017; Roberts et al., 2017). To the best of our knowledge, this is the first study to examine the phase-specific uses of social media, specifically the types of social media employed, the objectives they address, and the associated challenges. Moreover, we identify several important questions for future research to advance our understanding of the role of social media in NPD and encourage more researchers to engage in this growing research area. Practically, our review reveals a lack of applied management guidelines to enable companies to integrate social media into their NPD processes. Accordingly, based on our synthesis, we develop an organizing framework that conceptualizes the usability of social media in different NPD phases to guide managers in achieving better NPD performance.

2. Methodology

To date, while more and more studies acknowledge the potential value of social media in NPD, few systematically synthesize the literature on companies' social media use.¹ A systematic literature review is a methodical approach to summarize existing evidence, identify gaps, and suggest future research directions (Thomé et al., 2016). Compared to other literature review methods, such as bibliometric analysis and meta-analysis, the systematic literature review offers distinct advantages (as also discussed in Chang and Taylor, 2016; Turzo et al., 2022) that align well with our aim to offer a generalizable and in-depth understanding of how companies can effectively leverage different types of social media across various NPD phases. For instance, while bibliometric analysis focuses on publication patterns and citations, it may lack the depth of understanding offered by a systematic literature review, which synthesizes and interprets content from selected studies. Additionally, while meta-analysis uses quantitative data, a systematic literature review incorporates diverse evidence, providing a broader understanding of the research topic.

The review process involves data collection, analysis, and synthesis, guided by widely accepted principles. Our search for relevant literature comprises four steps: database search, title/abstract screening, content evaluation, and backward citation analysis.

Figure 1 reports an overview of the literature search and selection process, which is described in detail in the following. It resulted in 110 articles and was conducted in March 2023.

2.1. Step 1: Data search across different disciplines

The Web of Science database provides a comprehensive collection of relevant academic literature for a systematic search (Bhimani et al., 2019). The overall structure of the literature search and filtration process was broad and inclusive, aiming at bringing together different literature streams to comprehensively gather all articles that may contain social media- and NPD-related content (Templier and Pare, 2018). Given social media and NPD are inherently interdisciplinary fields, a broad literature search was performed across all document types and business domains, including innovation, entrepreneurship, marketing, information systems, operations, and technology management.

To establish boundaries for what should be included in our review, we developed the final search strings for identifying relevant studies through an iterative process of reviewing the extant literature with similar themes (Du et al., 2016; Roberts et al., 2016; Füller and Bilgram, 2017) and discussion with experts from academia and practice. We used two groups of search terms (i.e., social media and NPD) to find the most appropriate articles (see Table 1). We only included English articles for our review, and the initial search generated 1019 articles.

2.2. Step 2: Practical screening

Following recent reviews from the field that have faced equally large samples in their first search round (Micheli et al., 2019), we performed a cursory manual analysis of the articles based on title and abstract. Specifically, we applied practical screening making sure that all articles focused on social media and NPD. Similar to Mikalef et al. (2018), we excluded conference papers, books, chapters, and student dissertations to ensure our sample's quality. This step reduced the sample to 200 articles.

2.3. Step 3: Content evaluation

We thoroughly read and evaluated the 200 articles to ensure that their research objectives and findings are related to social media and NPD. We excluded papers that were only related to social media but not related to NPD (e.g., Paniagua and Sapena, 2014; Broekemier et al., 2015; Duane and O'Reilly, 2017) and papers only related to NPD but not related to social media (e.g., Ordanini and Parasuraman, 2011; Von Hippel et al., 2011; Chang and Taylor, 2016). This step resulted in 101 articles.

2.4. Step 4: Backward citation analysis

Backward citation analysis was performed on all cited references in the articles identified in steps 1 to 3 as it increases the comprehensiveness and reliability of the resulting literature list (Tranfield et al., 2003). Following this procedure, we identified 9 additional articles, bringing the final literature list

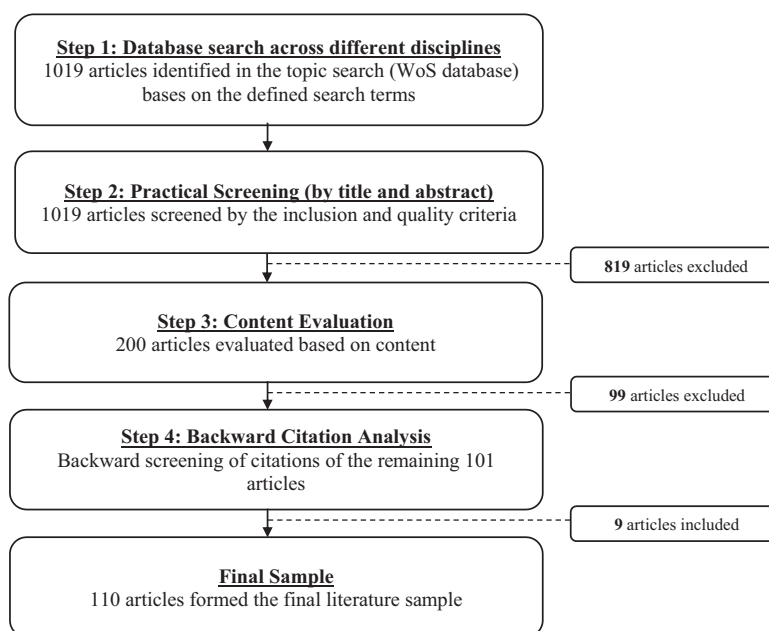


Figure 1. Literature search process.

Table 1. Search strings for identifying relevant studies

Topics	Search terms
Social media	Social media, social network, crowdsourcing, social community, social platform, social site, digital media, digital network, digital community, digital platform, online media, online network, online community, computing platform, computing community, Facebook, Twitter, YouTube, Instagram, WhatsApp, WeChat, TikTok, QQ, Douyin, Weibo, Snapchat, Reddit, LinkedIn, virtual customer communities
NPD	NPD, innovation, research and development, R&D, product development, service development, process development, ideation, idea development, idea generation, idea creation, prototype, product launch, marketing, and product promotion

for in-depth analysis to 110 articles. All articles in this final sample are listed in Appendix S1 of the supplementary materials.

2.5. Sample description

The 110 identified papers are published across 61 academic journals. About 86% of the papers are published in journals ranked on the ABS list,² with approximately 54% of the publications in three- or four-star journals. We present the distribution of articles by journal in Appendix S2 in the supplementary materials. Figure 2 reports the chronological publication distribution of the reviewed literature. It shows the increasing body of knowledge after 2015, mirroring the emerging nature and growing relevance of the research field. From the final literature sample, 21% (23 of 110) of the articles were published between 2002 and 2014, and 79% (87 of 110) were published between 2015 and January 2023.

2.6. Coding process

To obtain a comprehensive understanding of the themes and topics explored in the 110 articles included in our review sample, we conducted a detailed coding. Firstly, we categorized the 110 papers according to the NPD phases they studied. In the discovery phase, ideas are generated and customer requirements are analyzed (Marion et al., 2014). In the development phase, the product design is finalized and tested (Durmuşoğlu and Barczak, 2011). The launch phase involves commercialization and execution (Du et al., 2016).

Secondly, we identified the social media studied in the 110 papers and categorized them into four functional types recognized in the literature (Guinan et al., 2014; Bhimani et al., 2019). *Company-built social media* relates to platforms based on social networking functionalities developed in-house by companies. They are used to boost internal interactions (e.g., NASA@work) or

evaluate customers' perceptions externally (e.g., Dell IdeaStorm, My Starbucks Idea). Companies usually adopt company-built social media to build connections with stakeholders, crowdsource ideas, and provide customer service (Weinberg and Pehlivan, 2011). *Company collaboration platforms* refer to proprietary solutions designed by service provider organizations. This type of social media is typically used internally as a company's social networking and collaboration platform (e.g., Yammer, IBM Connections) (Bhimani et al., 2019). Firm employees use these tools to cooperate and communicate on their projects, collect and share unstructured information (e.g., video, images), and find subject-matter specialists. *Public social media platforms* such as Facebook, Twitter, YouTube, and Instagram, offer social technologies to companies for communicating with external stakeholders and create spaces for NPD discussions (Kaplan and Haenlein, 2010). Finally, *innovation intermediary social media* represents the recourse for online communities to specialized innovation intermediaries (e.g., Get Satisfaction, InnoCentive) to create innovation-customized services such as external or internal ideation contests (Guinan et al., 2014). Table 2 provides an overview of these social media types.

Beyond these two main categories, we also coded the research methodologies, contextual settings, and key findings from the 110 papers. Appendix S1 in the supplementary materials contains the detailed outcomes of our coding.

3. Findings

Twenty-six articles in our sample focused solely on the discovery phase, while 28 articles studied the development phase. Twenty-two articles explored the launch phase and 10 articles examined both the discovery and development phases. A smaller number of articles (3) investigated both the discovery and launch phases, two articles studied both the

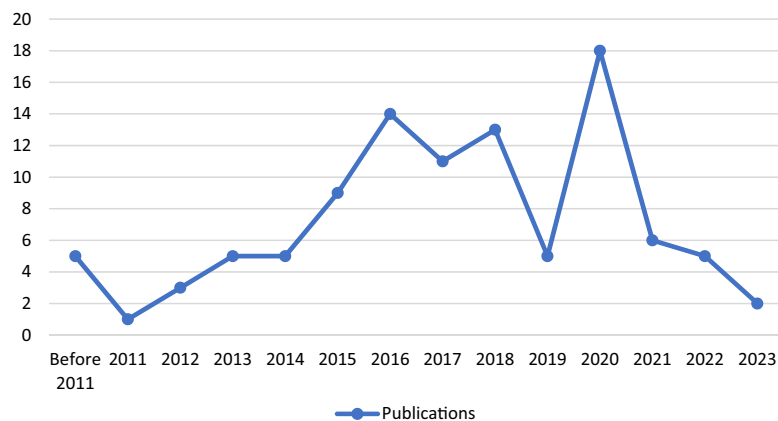


Figure 2. Publishing trend between 2002 and January 2023.

Table 2. Social media classifications

Social media types	Purposes	Examples
Company-built social media sites	<ul style="list-style-type: none"> • Generate customer ideas • Build connections with customers • Provide customer service 	<ul style="list-style-type: none"> • My Starbucks Idea • Dell IdeaStorm • Workplace
Company collaboration platforms	<ul style="list-style-type: none"> • Enable internal employees to cooperate and communicate on their projects • Collect and share unstructured information • Find subject-matter specialists 	<ul style="list-style-type: none"> • Mi community • IBM connections • Yammer
Public social media platforms	<ul style="list-style-type: none"> • Enable the connection between external stakeholders and internal employees • Create spaces for NPD discussions 	<ul style="list-style-type: none"> • Facebook • Twitter • YouTube • Instagram
Innovation intermediary social media	<ul style="list-style-type: none"> • Provide professional solutions • Crowdfund specialized information and ideas 	<ul style="list-style-type: none"> • Innocentive • Get satisfaction

development and launch phases, and 19 articles covered all three NPD phases. Table 3 presents the frequency of the reviewed papers categorized by social media types and NPD phases under investigation.

Our synthesis and integration of the studies' findings show that in each phase, three distinct NPD objectives, that is, goals or planned tasks for companies to accomplish, are addressed by different social media types. These overall nine NPD objectives allow companies to identify and address the key tasks that social media can facilitate in each NPD phase. Alongside its benefits, we also discuss challenges that – according to the reviewed studies – companies may encounter while using social media in each NPD phase. As a final aspect of our review, we briefly summarize the common benefits and challenges of adopting social media across the whole NPD process.

3.1. Social media in the discovery phase

Referred to as 'the fuzzy front-end of innovation', discovery – also termed ideation – is often regarded

as the most challenging phase in NPD (Colombo et al., 2015; Kim and Park, 2019; Bashir and Malik, 2021). Social media plays a critical role in the discovery phase and helps companies expand their knowledge and strengthen their customer relationships (Cao and Ali, 2018). Our review finds social media is used to pursue three objectives in the discovery phase of NPD as summarized in Table 4, namely, to (1) generate novel ideas/information from external users, (2) identify implementable business opportunities from target markets, and (3) screen and test new ideas/concepts collected from customers.

With regard to the first objective of generating novel information and ideas for new product development, researchers have extensively studied the use of public social media platforms and company-built social media platforms as means of conducting real-time communication with customers (Poetz and Schreier, 2012; Ko et al., 2017). From a company's perspective, social media serves as a powerful communication channel that enables understanding of customer behavior and

Table 3. Frequencies of reviewed papers categorized by social media types and NPD phases

NPD phases social media types	Discovery	Development	Launch
Company-built social media	26	27	20
Company collaboration platforms	1	5	1
Public social media platforms	29	31	29
Innovation intermediary social media	7	10	3

Table 4. Social media in the discovery phase

NPD objectives	Social media types	Outcomes	Example studies
To generate novel information/ideas for further product developing	Public social media platforms/company-built social media	Conducting real-time communication with customers	Mirtalaie et al. (2017), Dong and Wu (2015), Schemmann et al. (2016)
To evaluate business opportunities from the social media information	Company-built social media/innovation intermediary social media	Monitoring brand performance and user-created content on social media platforms	Ko et al. (2017), Chirumalla et al. (2018), Jeong et al. (2019)
To screen and test concepts/ ideas collected from customers	Public social media platforms/company-built social media	Gaining high-quality ideas and reducing the new concepts' failure rate	Schemmann et al. (2016), Hoornaert et al. (2017), Bugshan (2015)

preferences. For example, Bayus (2013) studies the use of company-built social media platforms in product innovation and found that these sites can foster collaboration between customers and companies, resulting in practical and valuable ideas. From the customer's standpoint, social media offers access to a wealth of information and communication with other customers and companies without geographic limitations. Public social media platforms are ideal for customers to voice their opinions about new products and engage in flexible collaboration with companies (Chirumalla et al., 2018; Bartosik-Purgat and Bednarz, 2021). Studies have shown that the use of social media improves customer-to-customer and company-to-customer communication, thereby enhancing customer satisfaction with new products, and reducing the risk of failure (Scuotto et al., 2017; Allen et al., 2018).

The second objective of evaluating potential business opportunities from social media information has led researchers to investigate the use of company-built social media and innovation intermediary social media platforms for monitoring brand performance and user-created content (Ko et al., 2017; Chirumalla et al., 2018; Jeong et al., 2019). Füller et al. (2008) find that social media users are more willing to contribute to and create value by sharing their needs and insights. This customer willingness helps companies to be more creative and profitable by developing innovative new products. A case study of Coca-Cola's online community illustrates the use of a company's social media platform to discover new business opportunities and target the

right market (Puventheran et al., 2021). Coca-Cola is able to access a large number of lead users through its social media platform, which not only facilitates opportunity identification but also strengthens Coca-Cola's relationships with its customers. By leveraging the insights gained from social media, companies can gain a better understanding of their target market and make informed decisions about the development of new products (Bugshan, 2015; Zhao and Balagué, 2015).

Innovation intermediary social media also enables companies to use online information crowdsourcing to seek feasible business opportunities (Zhu et al., 2019). Online crowdsourcing assumes that companies should use external information for new product ideation (Schemmann et al., 2016). For instance, Quirky – an online crowdsourcing social media platform – creates value by bringing together a community of inventors, filtering the information with screening algorithms, and community voting (Allen et al., 2018). Ko et al. (2017) find that innovation intermediary social media provides companies with public crowdsourcing platforms for new product developers tasked with identifying feasible business opportunities for radical innovations.

Regarding the third objective, we find that many companies utilize social media to test new product concepts and increase their chances of success (Hoornaert et al., 2017). By interacting directly with customers through these platforms, companies can evaluate the market viability and customer demand for their new product concepts (Roberts and Piller, 2016). Such interactions can also provide valuable feedback to improve or fine-tune the

concept (Hossain and Islam, 2015). Iacobucci and Hoeffler (2016) highlight the importance of using social media in the discovery phase of NPD to gather insights about the concept's potential. Both public social media and company-built social media are commonly used for this purpose. Public social media provides a wide reach and accessibility, allowing companies to gauge consumer acceptance of new product concepts before investing in their development (Bugshan, 2015). Company-built social media, on the other hand, allows companies to interact with a more targeted group of existing and subscribed customers and gather high-quality feedback (Hoornaert et al., 2017).

As discussed above, using social media in the NPD discovery phase benefits NPD. However, research shows that it also entails significant challenges (Roberts et al., 2016; Hoornaert et al., 2017). For instance, it can be difficult to control the quality of new product ideas collected from social media. Studies show that these ideas may be of low quality and lack creativity. Some platforms generate large amounts of ideas, but only a few are useful for product development. For example, only 2.2% of the 25,186 ideas submitted to Dell IdeaStorm since 2007 have been adopted. Roberts et al. (2016) emphasize the importance of controlling the quality and reliability of public social media data to improve NPD efficiency and suggest developing technologies to screen social media information.

3.2. Social media in the development phase

The product development phase focuses on transforming a product concept into a new product entity (Chan et al., 2016; Ernst and Brem, 2017; Zammit et al., 2018). An integration of findings across studies shows that social media is used to (1) improve NPD team communication and collaboration efficiency, (2) facilitate suppliers' involvement, and (3)

enable product co-development between customers and companies. Table 5 summarizes these objectives in the development phase and how social media addresses them.

First, companies are using social media as a powerful communication tool to facilitate team collaboration, innovation, and productivity in the development phase (Ketonen-Oksi et al., 2016). Gao and Bernard (2018) argue that using social media in NPD teams can encourage employee engagement and increase employee satisfaction. Compared with the traditional teamwork methods (i.e., face-to-face meetings), company collaboration social media platforms (e.g., Slack and Trello) allow team members to communicate, share knowledge, and follow up without time and location restrictions. For instance, Banker et al. (2006) show that an NPD team using social media performs better than a face-to-face team not using social media in high-tech companies. Additionally, they found social media to be more flexible and convenient in improving decision-making speed and quality for developing new products. Marion et al. (2016) state that company collaboration social media has become an essential team collaboration tool in the product development phase, especially for many multinational companies. In these companies, typically the development of new products needs to be supported by multi-teams located in different countries. Due to the geographical distance, using social media to conduct NPD team training, meetings, and collaboration becomes more efficient and less time-consuming, and costly (Leonardi, 2014). Also, social media use brings an 'informality' to communication, bridging hierarchical gaps and distance. For instance, as an internal enterprise microblogging platform, Yammer has been widely used by Fortune 500 companies for NPD team members' internal interaction. Employees can share their ideas, company activities, and working

Table 5. Social media in the development phase

NPD objectives	Social media types	Outcomes	Example studies
To improve the efficiency of team communication and collaboration	Company collaboration platforms/Innovation intermediary social media	Speeding up problem-solving and reducing costs and uncertainty	Qin et al. (2016), Zhu et al. (2019), Kock et al. (2006)
To facilitate suppliers' engagement and connection with companies	Company collaboration platforms	Ensuring the smooth manufacturing of new products and reducing risk	Cripps et al. (2020), Cheng and Shiu (2020), Cheng and Krumwiede (2018)
To encourage customers to participate in new product co-development	Public social media platforms/company-built social media	Ensuring new products fit in the current market demand and increasing their acceptance rate	Mahr and Lievens (2012), Wu et al. (2017), Piller et al. (2012)

results on Yammer anytime and anywhere (Cheng and Krumwiede, 2018).

Second, social media facilitates supplier involvement in product design and prototyping (Ketonen-Oksi et al., 2016). Cheng and Krumwiede (2018), by drawing on a longitudinal survey of 367 manufacturing firms, reported that social media plays a vital role in enhancing NPD performance in these firms' collaboration with their suppliers. Specifically, they find that manufacturing companies adopt company collaboration social media (e.g., Line and WhatsApp) as knowledge-sharing platforms for collaboration with their supply chain network partners to develop their new products efficiently and effectively. Cripps et al. (2020) observed a positive relationship between social media use and the effect of supplier involvement on NPD performance in terms of new product innovativeness, market and financial performance. For instance, suppliers can share their unique market knowledge resources regarding customer requirements and decision-making patterns and thereby help companies develop successful new products (Cheng and Shiu, 2020). Companies that involve suppliers in their NPD projects can foster deeper relationships with their suppliers through social media, which helps establish mutual commitment and trust in NPD activities and in turn, enhances NPD outcomes over time (Zhang, Gupta, et al., 2020). Social media use, coupled with solid marketing knowledge processing capability, can enhance the NPD performance gains from supplier involvement (Devi and Ganguly, 2021). To leverage suppliers' NPD knowledge obtained through social media effectively, companies need to consider market trends against individual suppliers' suggestions (Cheng and Shiu, 2020).

Third, adopting social media in the product development phase can attract customers to participate in the co-development process (Cheng and Krumwiede, 2018). Companies must effectively utilize social media to engage customers and other stakeholders (Sun and Liu, 2021). User co-development, which refers to knowledge synergies that emerge from collaborative NPD on social media, is becoming increasingly popular. For instance, companies like Lego, Samsung, and Xiaomi have launched highly customizable smartphone applications for developing new products (Luo and Zhang, 2013; Hienerth et al., 2014; Wu et al., 2017). These applications allow customers to provide real-time feedback and suggestions, making them an important part of the development process. Social media platforms such as discussion forums, ratings and reviews, blogs, branded social networks, and online innovation hubs are

also useful for gathering customer feedback. The best-performing companies, as shown by a survey conducted by Markham and Lee (2013), gather significantly more customer feedback than underperforming ones by using these tools. Encouraging customer involvement via social media can also improve new product acceptance and satisfaction rates during the launch phase.

Studies also identified challenges associated with using social media in the development phase. Although social media can improve NPD team collaboration, its overuse can distract employees from their work, resulting in lower efficiency and productivity (Leonardi, 2014). For example, Marion et al. (2016) compared social media and traditional information technology tools used within small and medium companies' NPD teams during the product development phase. They observed employees to be spending too much time viewing and managing their social media platforms without making many work-related contributions.

3.3. Social media in the launch phase

NPD launch constitutes the final and often the costliest phase of the NPD process. This phase involves decision-making about the launch timing, the launch region, the targeted customers, strategic marketing, branding, and promotion (Xiao et al., 2018; Seidel et al., 2020; Yang and Su, 2020). The articles reviewed for this phase concentrate on social media use for the objectives of (1) creating brand awareness, (2) product promotion, and (3) customer feedback generation (see Table 6).

During the product launch phase, companies' first objective is to create awareness of their brand, products, and offerings. Thus, companies try to maximize their touchpoints with target customers, so that traffic is built toward their public social media platforms for improved brand awareness (Wang et al., 2016; Sung et al., 2018). Studies show that social media has a significant influence on raising customers' awareness of a brand (Sung et al., 2018; Gruner et al., 2019). For instance, Wang et al. (2016) conducted a survey study to investigate the effects of using company-built social media sites and public social media platforms on building brand awareness of companies' new products. Their results reveal that adopting these types of social media in the launch phase can attract more customers, enhance new product awareness, and increase sales volume. Sung et al. (2018) also find that social media can build customer awareness of the company's products. In turn, brand awareness will affect customer satisfaction and help to establish customer brand loyalty.

Table 6. Social media in the launch phase

NPD objectives	Social media types	Outcomes	Example studies
To consolidate and prioritize brand awareness to accelerate the launch of new products	Public social media platforms	Sharing brand information and concept, speeding up the launch process, and reducing cost	Wang et al. (2016), Naylor et al. (2012), Seyyedamiri and Tajrobehkar (2021)
To quickly promote new product advertisements and offers	Public social media platforms/company-built social media	Leveraging the word-of-mouth marketing strategy to enhance the new product promotion	Zhang, Liang et al. (2020), Sandor et al. (2018), Liu et al. (2015)
To improve new products according to customer feedback and reactions rapidly	Company-built social media/innovation intermediary social media	Promoting diversity to improve customer experience and facilitating the process of product modification and launch	Lipizzi et al. (2015), Luo and Zhang (2013), Sun (2012)

Second, social media provides various platforms and vast opportunities for companies to promote their new products. Hoyer et al. (2010) describe how firms can set up company or product blogs as part of a formal advertising and public relations campaign, helping to communicate in an informal and personalized manner. Word of mouth can loosely be defined as sharing information about a product or promotional campaign between customers and their friends, colleagues, or other acquaintances (Sung et al., 2018). Indeed, positive word of mouth about products on public social media platforms can be seen as one of the most influential sources of marketplace information, affecting customers' attitudes and purchasing decisions (Rathore and Ilavarasan, 2020), as increasingly customers are turning to others (e.g., social media influencers) for new product recommendations and evaluation (Liu et al., 2015). Online social media advertising can easily gain customers' attention and quickly spread information about new products and brands. Therefore, an increasing number of companies prefer to work with various social media – for example, influencers – to promote their products on public social media platforms (Seidel et al., 2020). Also, compared with traditional promotion methods, companies can obtain a better financial return with less investment using social media for promotion (Rathore and Ilavarasan, 2020). Besides, Wang et al. (2016) indicate that positive reviews such as 'likes' on Facebook and 'thumbs up' on Instagram can help generate interest in new product promotion activities and increase early product acceptance.

Third, customers' real-time online feedback on new products is essential for enhancing NPD performance and improving companies'

sustainable innovation development (Roberts and Candi, 2014). For instance, company-built social media sites and company collaboration social media sites (e.g., Dell IdeaStorm, Mi Community, Muji Community Market) are the most popular social platforms to collect customers' feedback after product launch (Liu et al., 2020). Firms can generate real-time feedback by reading customers' comments, online chatting, or surveying purchased customers. Bosch-Sijtsema and Bosch (2015) state that companies can gain rich data concerning customers' actual purchasing behaviors by gaining their feedback after the product has been deployed. Thus, the purpose of customers' feedback and reviews in the launch phase is different from the purpose of the feedback received in the other two phases. Companies can adjust their marketing strategies according to different customers' preferences and such social media data can be further analyzed for supporting future product innovation management (Hoyer et al., 2010). Moreover, companies can identify problems with new products quickly because information on social media platforms updates very fast (Yang and Su, 2020). Finally, companies can reply to customers' negative messages in time to protect their reputations.

The use of social media in product launches also comes with challenges. Social media platforms are difficult to control as users can freely share their opinions and promote new products to their network, leading to the rapid spread of rumors (Sun and Liu, 2023). This can harm a company's reputation and financial performance of its new product (Lin et al., 2018). To mitigate these risks, companies can work with their public relations departments to prevent and stop the spread of rumors.

3.4. Social media use across the new product development process

As the three NPD phases are interdependent, the functions of social media use in the phases can be closely related (Ram and Liu, 2018). Accordingly, in addition to the various phase-specific benefits and challenges of social media use, the studies in our review sample also showcase that social media adds value broadly throughout the entire NPD process. Specifically, social media use encourages customer involvement (Jiao et al., 2020; Giannakis et al., 2022) and enhances information management (Marion et al., 2016; Candi et al., 2018) throughout all phases.

Customer involvement via social media has been extensively employed in the whole NPD process as an approach to provide innovative information in the discovery phase, co-create new products in the development phase, and facilitate valuable feedback in the launch phase (Füller and Bilgram, 2017; Rakshit et al., 2021). Additionally, social media eliminates the barriers between companies and customers to communicate effectively with less expenditure (Mirtalaie and Hussain, 2020). Andersen and Mørch (2016) state that social media-driven customer involvement leads to superior new products, but they argue that further insights are necessary from diverse sources to acquire and analyze customer inputs obtained from social media. Company-built social media platforms and public social media sites are frequently used for interacting with customers. Through company-built social media, companies can reach out to their lead users, to better understand their purchase intentions, preferences, and actual demand (Piller et al., 2012). Public social media sites can provide massive user resources to companies for catching market trends and attracting potential customers (Zhang, Liang, et al., 2020). However, companies do need to analyze and control the customer insights and suggestions received.

Another benefit of social media use throughout the NPD process is information management. Bashir et al. (2017) find that NPD managers use social media to search for new information and synthesize multiple sources of information for new product discovery, development, and commercialization. The value of social media is supported by its vast information database (Iglesias-Sánchez et al., 2019). Companies leverage social media to acquire insightful information in the discovery phase, integrate information in the development phase, and disseminate information in the launch phase (Abbas et al., 2019). Company-built social media sites and public social media platforms are very useful for effective information

management. Innovative intermediary social media can help companies target professional suggestions and problem-solving information from other experts' information sharing (Cheng and Shiu, 2020).

As an overarching challenge, companies need to be aware of the significant financial investments and technical support required for social media platforms' long-term maintenance and upgrading with uncertain returns. Dong and Wu (2015) state that the business value of social media is gained over time by companies using it but maintaining social media platforms requires continuous investment from companies, which can be a challenge because they may not get any immediate return (Lam et al., 2016). Thus, companies should consider using social media for NPD carefully based on their financial resources and technical ability.

4. Discussion

In this section, we interpret the findings of our systematic literature review. Then, we derive a practitioner-oriented organizing framework that condenses various social media uses in each NPD phase and serves to alleviate the confusion and uncertainty expressed by many managers about adopting social media in NPD (Gruner et al., 2019). Finally, we present future research directions based on our findings.

4.1. Interpretation of findings

Our review provides a comprehensive overview of research on how companies leverage social media to enhance their NPD performance, with a separate focus on the discovery, development, and launch phases. This phase-specific analysis offers a nuanced understanding of the roles and functions of various social media platforms – company-built social media, company collaboration platforms, public social media platforms, and innovation intermediary social media – in addressing phase-specific objectives in the NPD process.

In the discovery phase, we identify three primary objectives for using social media: generating novel ideas, identifying business opportunities, and screening/testing concepts. When reviewing the social media use in the discovery phase, most of the previous literature only addresses a single social media type (e.g., public social media) (Ko et al., 2017; Cao and Ali, 2018; Rakshit et al., 2021). Based on our review, however, we conclude that both public social media platforms and company-built social media platforms serve as effective communication channels between companies and customers.

Next, we identify that the development phase is the only phase where social media is used for internal purposes, as this phase requires a high level of employee collaboration and efficiency (Roberts and Candi, 2014). While prior studies discuss using company collaboration social media platforms to overcome geographical barriers and facilitate real-time team communication, they do not clarify which NPD phase can benefit more from such social media-driven internal collaboration activities. Beyond this, in continuation of previous research on the use of social media between companies and suppliers (Ketonen-Oksi et al., 2016), our findings emphasize social media's role in supplier involvement, enabling companies to tap into suppliers' insights and market knowledge for more effective product design and prototyping. Also, we highlight how social media enables customers to participate in co-development processes, providing valuable real-time feedback and suggestions (Mahr and Lievens, 2012).

Regarding the launch phase, our findings underscore social media's impact on creating brand awareness, promoting new products, and generating customer feedback. We provide a comprehensive explanation of how and what type of social media should be adopted to contribute to companies' brand awareness and successful promotion. For instance, we highlight the significance of positive word-of-mouth promotion through social media, which influences customer attitudes and purchasing decisions. Additionally, the importance of real-time customer feedback on social media platforms for improving NPD outcomes and enhancing product acceptance and satisfaction rates during the launch phase stands out.

For all phases, we draw attention to the significance of challenges in using social media. The extant literature seems to be content with an assumption that the challenges of using social media are common for all NPD phases (e.g., Cheng and Shiu, 2020). However, a systematic analysis of this literature has allowed us to identify that while some challenges apply across all NPD phases, others are phase-specific, for instance controlling the quality of ideas emerging through social media in the discovery phase, excessive social media use leading to distractions and inefficiencies within NPD teams in the development phase, and preventing the spread of rumor that harms companies' reputation in the launch phase. This phase-specific knowledge allows for addressing each challenge in a more targeted way and will hopefully incite future research to offer effective recommendations on how to do so.

Finally, we recognize the interconnectedness of the NPD phases and how social media supports collaboration, engagement, and innovation across all phases. Our review demonstrates that social media's multifaceted role in the NPD process goes beyond individual phases, as it fosters a seamless flow of information and ideas. However, a challenge lies in the significant and uncertain costs associated with long-term maintenance. Therefore, companies need to carefully assess their financial resources and technical capabilities when considering social media for NPD.

4.2. Practitioner-oriented organizing framework

In the quickly evolving landscape of NPD, the integration of social media has become almost a necessity for practitioners – one that introduces a critical managerial challenge: the strategic selection and effective utilization of diverse social media platforms tailored to distinct phases of NPD. These phases, each with their unique characteristics and requirements, require a bespoke approach to the application of social media. Managers face the complex task of not only having to choose the most appropriate platform for each phase but also aligning its use with the specific objectives and processes inherent to that phase. This alignment is crucial for ensuring that the integration of social media adds tangible value to the NPD process, enhancing both efficiency and effectiveness in a rapidly digitalizing business environment. To achieve this alignment, we propose an organizing framework derived from our review and synthesis of the literature as illustrated in Figure 3. This framework offers practical guidance to managers for using specific social media types to address distinct NPD objectives in each NPD phase. It is intended to reduce uncertainty and help managers be more confident in using the appropriate social media types in each NPD phase to achieve better performance.

The focal point of the framework is the four distinct social media types crucial for managers to distinguish in all phases of NPD. Our review underscores each social media type's unique role. For example, collaborative platforms like Microsoft Teams have been instrumental in facilitating cross-department problem-solving, which allows for streamlining product development and cutting costs. This is exemplified by Siemens' use of Microsoft Teams to enhance their NPD process (Steiber et al., 2021). Similarly, innovation intermediary platforms such as Innocentive allow firms

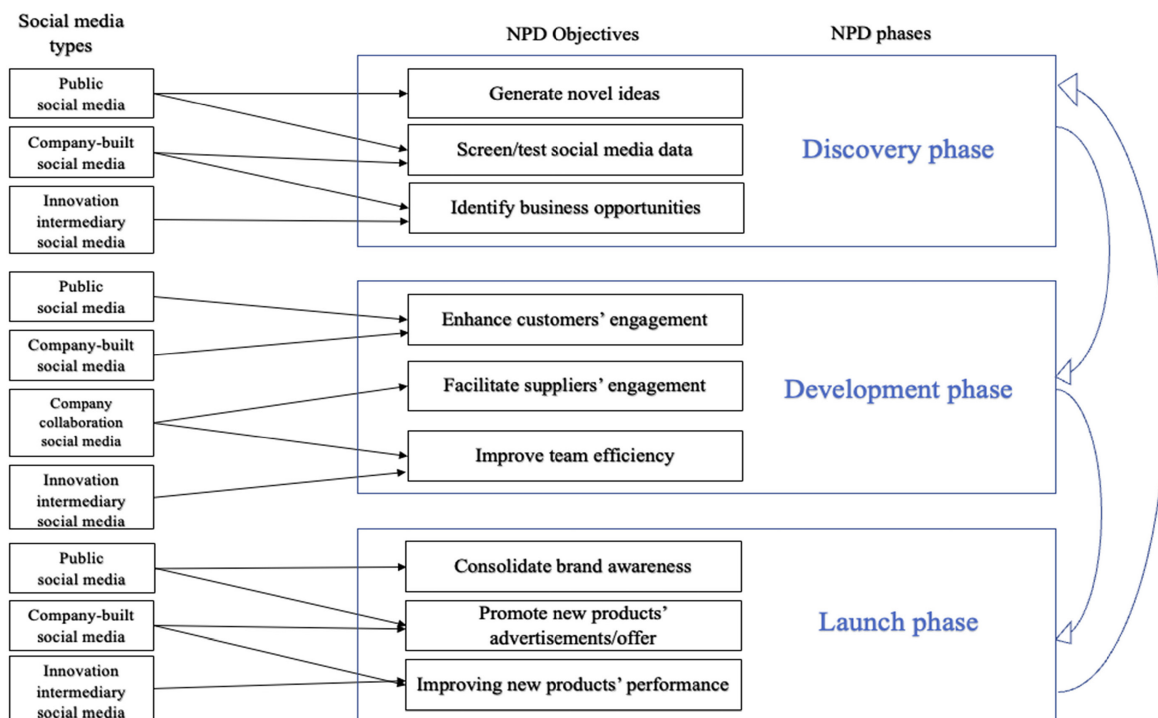


Figure 3. The organizing framework.

to efficiently source external expertise, as demonstrated by NASA's use of the platform for complex problem-solving during the product development phase (Keeton et al., 2017). In contrast, public social media and company-built social media platforms are crucial in amplifying promotional performance during the product launch phase, offering wide outreach and customer interactions. For instance, GoPro uses Instagram and YouTube to showcase user-generated content that resonates with their audience, driving both engagement and sales (Burton and Schlieman, 2021). LEGO's release of customer-designed sets through the LEGO Ideas platform consistently generates buzz and anticipation, reflecting the successful integration of company-built social media into product launches (Beretta et al., 2023). Notably, public social media is most frequently used across the whole NPD process with favorable outcomes and low costs. Thus, public social media is a strategic starting point for practitioners venturing into social media to enhance NPD performance.

Simultaneously, our review emphasizes the importance for practitioners to align their NPD objectives with appropriate social media types. Three objectives were identified for each phase, with a focus on the most frequently utilized and efficient social media types based on the reviewed papers. For instance, improving team efficiency emerges as a key objective in the development phase. To reach this objective, firms like Deloitte have integrated

Yammer (a collaboration social media platform) to enhance internal communication, fostering a more cohesive and agile development environment (Stieglitz et al., 2014). Innovation intermediary social media such as Quirky provides a platform for external technical guidance, exemplified by General Electric's use of crowdsourcing to foster innovation and propel product development initiatives (Dykman, 2013). While there are no one-size-fits-all social media types for all NPD objectives, the nine uncovered objectives can act as a guiding compass to empower practitioners to grasp the primary tasks in each NPD phase and strategically select the ideal social media type to improve NPD performance.

4.3. Agenda for future research

Along with the academic insights and practitioner-oriented organizing framework, our systematic literature review allows us to identify areas for future research based on the three NPD phases. This is important as research on NPD has changed and grown rapidly over the past two decades, making this topic an autonomous and well-established field of research (Marzi et al., 2020). Our specific suggestions for future research are summarized in Table 7 and discussed below.

As observed above, very few studies have investigated the factors influencing the quality of the new

Table 7. Summary of future research questions

Future directions	Proposed research questions
Discovery phase	<ul style="list-style-type: none"> • What factors affect the quality of ideas collected from social media during the product discovery phase? • How can social media improve the performance of the new product discovery phase?
Development phase	<ul style="list-style-type: none"> • What factors influence the relationship between social media use and NPD team efficiency? • What are the downsides of internally using social media in the product development phase?
Launch phase	<ul style="list-style-type: none"> • What is the effect of social media influencers on promoting new products? • What is the impact of using social media in product launches on firms' value?
Research perspective richness	<ul style="list-style-type: none"> • What factors can influence NPD outcomes while using different types of social media in the different phases? • How do companies use social media in NPD to improve their profitability? • What are the challenges of using social media in the NPD process and how could these challenges be mitigated?
Contextual diversity	<ul style="list-style-type: none"> • What are the differences in using social media in NPD between developing and developed countries? • How does social media bring economic benefits to NPD in developing countries?

product ideas received via social media in the discovery phase. Ideas of low quality and poor creativity negatively influence NPD performance and result in low working efficiency (Schemmann et al., 2016). Researchers could examine the determinants of the outcome of new product idea generation or develop an algorithm that can accurately extract valuable and feasible ideas in the discovery phase. These determinants could be internal, company-specific factors (e.g., innovation capacity and firm size) or external factors (e.g., customer diversity and industry type). Researchers can collect data from a large sample either through existing databases or surveys depending on different factors in their studies. Moreover, future research can apply other techniques (e.g., artificial intelligence – AI and big data analytics) on social media data to examine the quality of new product ideas (Tan and Zhan, 2017). For instance, Ozbay and Alatas (2020) developed an AI algorithm to monitor online social media data and detect fake information, demonstrating that the combination of social media and AI can deliver better results.

In the development phase, we still lack understanding of the negative influence of inappropriate social media uses by product development employees and how to address this problem. Some studies show that overusing social media in the development phase distracts employees and decreases their working efficiency (Montoya et al., 2009; Marion et al., 2014). Zhang, Liang, et al. (2020) argued for the development of systematic social media usage regulations to supervise NPD employees to mitigate unnecessary use. Additionally, future research should study the relationship between social media use, NPD team

collaboration, and creative performance. To understand the problems of using social media internally during the development phase and potential remedies, an exploratory study involving in-depth interviews with NPD managers and staff.

In the launch phase, developing effective social media promotion strategies for achieving better market performance is a vital topic for future research. Abbas et al. (2019) argue that excessive social media advertising will displease consumers about the over-advertised product and negatively affect the company's brand reputation. Compared with promoting new products on all types of social media platforms, accurately promoting new products on targeted social media platforms can help achieve better results at a lower cost. Researchers can use the netnography method (Kozinets, 2019), which investigates a set of social actions within and about social media, to understand customer reactions to social media promotion by analyzing the real-time data collected from social media platforms.

Additionally, there is a dearth of research on using social media in NPD from different research perspectives. The literature either examines the relationship between social media and NPD from a general perspective, investigates the use of social media in a single phase of the NPD process, or studies a single type of social media in NPD phases (Roberts and Candi, 2014; Rathore et al., 2016; Gao and Bernard, 2018). Also, the impact of using social media in NPD on company-level performance (i.e., firm profitability, productivity, innovativeness) needs more investigation. To approach this issue, researchers

should collect data from a large sample obtained from different companies and estimate models to identify significant mediators between using social media in NPD and company performance. Moreover, this review finds that more than 90% of the reviewed papers study Western developed countries and only 10 papers obtained their data from developing countries (e.g., Zhang, Gupta, et al., 2020). However, social media has been growing rapidly and has gained billions of active users worldwide over the past few years. Thus, cultural differences and countries' economic development could be interesting factors influencing the outcome of using social media in NPD.

Finally, we observed a lack of a unifying theory that explains the challenges of using different types of social media across NPD phases. More conceptual research can help establish the theoretical foundations of the challenges and the possible mitigation strategies.

5. Conclusion

In this study, we have identified four types of social media that can facilitate new product performance across three NPD phases, addressing a total of nine NPD objectives. Our analysis brings a new phase-specific perspective to analyze the use of social media in the NPD process and shows that social media plays distinct roles in each phase. Moreover, we demonstrate that firms encounter different challenges with using social media in different NPD phases, showcasing that the technology has not matured yet. Based on our review findings, we proposed an organizing framework to guide NPD managers in using social media applications to obtain better performance in their NPD projects. Finally, we highlighted several significant future research avenues on the topic.

Like all research, our study has limitations. First, the findings are based on papers published through early 2023. With the rapid development of social media and NPD studies, similar research in the future may produce different outcomes. Secondly, while a systematic literature review is an effective means to investigate the research topic, the next logical stage for future studies is to conduct further empirical research on this subject to address the open questions that we identified. Lastly, our study develops an organizing framework to guide practitioners on how to adopt social media to achieve better NPD performance. Undoubtedly, there is a significant scope of studies in this fast-changing area and the developed framework may not work perfectly in all business contexts. We believe future research can draw on the findings identified in this review to advance the science and practice of technology-driven NPD. Despite these

limitations, our systematic review offers novel insights for researchers as well as practitioners interested in using social media throughout the entire NPD process.

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Data availability statement

The data that support the findings of this study is available from the Web of Science database, which is accessible through institutional subscriptions (the authors access via the University of Liverpool subscription). The dataset includes reference data from academic journals and other documents in various academic disciplines. Access to the data may be subject to certain restrictions, such as institutional affiliation or subscription status. To obtain access to the data, please consult with your institutional librarian or contact the Web of Science support team directly.

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Notes

¹As a notable exception, Bhimani et al. (2019) conducted a systematic review about social media as an enabler of innovation in general (rather than NPD and its different phases) with a specific focus on methodological perspectives, regions, and research topics. Of the 110 studies included in our review, only 17 are also included in Bhimani et al.'s (2019) review, indicating a low degree of overlap in content.

²<https://charteredabs.org/academic-journal-guide-2021/>.

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