Social Media:
A Tool for Open Innovation

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Despite the exponential rise of social media use in external stakeholder engagement, academic research and managerial practice have paid little attention to how it can be used for open innovation across the entire innovation funnel, spanning ideation, R&D, and commercialization. As a result, there is little understanding of how companies can organize for and implement social media for open innovation. Utilizing a multiple case study design, this article examines its application across the entire innovation process. It proposes a range of organizational and technological adaptations that managers can implement to ensure they realize the innovative benefits of social media application. (Keywords: Social Media, Open Innovation, Ideation, R&D, Commercialization)

The use of social media to connect, interact, and collaborate with consumers has dramatically increased in recent years. According to Naylor, Lamberton, and West, by 2011 approximately 83% of *Fortune 500* companies were using some form of social media to connect with consumers.[1] Advances in internet, collaboration tools, and web 2.0 technologies have been the key driver of this transition, allowing firms to collaborate more easily and at low cost with large numbers of consumers.[2] In particular, social media platforms such as Facebook and Twitter are increasingly being used as tools for external stakeholder engagement.[3] The increased outreach and richness offered by these platforms facilitates many-to-many interactions and are a powerful knowledge source.[4]

Online communities let companies draw insights from a deep, diverse knowledge pool that can be applied to organizational innovation.[5] The community character promotes creativity and quality of contributions, since participants from different backgrounds with different areas of expertise, skills, and experiences can work together.[6] Howe describes this new paradigm "as everyday people using their spare cycles to create content, solve problems, even do corporate R&D."[7] For instance, PepsiCo (Walkers Crisps) recently engaged consumers in co-creation via social media marketing campaigns on Facebook for the development of new flavor

crisps. By understanding what consumers' value and engaging in active dialogue and interaction, companies are able to develop superior value propositions that are more relevant to their target audience.[8] On top, consumer's direct involvement in internal activities helps forge a deep emotional bond with the company that can lead to enhanced loyalty, satisfaction, and brand perceptions.[9]

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To date, research has focused on the business applications of social media in relation to marketing activities for increased equity and profitability,[10] as well as business analytics.[11] Yet, despite the growing influence of social media on organizational processes, research is limited in examining its application to innovation,[12] particularly with regards to how social media can be used as a tool to facilitate open innovation and user collaboration at different stages of the innovation funnel–*ideation*, *R&D*, and *commercialization*. While there is a general understanding of the link between social networks and innovative activities with external stakeholders,[13] no research to our knowledge exists that addresses how and in what context social media can be used for open innovation across the entire innovation funnel.

To close this gap in the literature, we examine the application of social media for open innovation and evaluate the motivations, implementation, impacts, and challenges encountered that inhibit its use at different stages of the innovation process. As the research objective is new and existing studies limited, we adopt a multiple exploratory case study design[14] to extend the theory on social-media-driven open innovation. Accordingly, three cases are examined to reflect the application of social media at different stages of the innovation funnel: *ideation*—the AIDS program of the United Nation's (UNAIDS) use of social media to engage young activists in idea generation for social innovation and civil action; *R&D*—Nestlé UK's use of social media to engage consumers for new product development in the Rowntree's Randoms brand; and *commercialization*—Nestlé UK's use of social media to engage consumers during the launch of new product extensions in the Kit Kat brand.

Our study contributes to a new theory for social media application in open innovation activities across the entire innovation funnel. Building on previous studies that only focus on social media crowdsourcing during ideation,[15] we develop a framework that extends its application to R&D and commercialization. This issue remains largely unexplored in academic and practitioner circles, and managers remain unaware as to how to integrate social media internally.

Building on theories of organizational ambidexterity,[16] our study demonstrates how the application of social media creates a context for both radical and incremental development at ideation stages. Similar to March,[17] we define *radical* innovation as the capacity to pursue variation in existing knowledge, and *incremental* innovation as the capacity to refine and improve existing knowledge. As such, it addresses noted gaps in the literature that call for a more process-based perspective of the ambidextrous organization,[18] as our results emphasize the potential for social media crowdsourcing to enable dual exploration and exploitation processes during ideation stages of innovation.

Social Media for Open Innovation

Social media refers to a set of online tools open for public membership that support idea sharing, creating and editing content, and building relationships through interaction and collaboration.[19] The high levels of media-rich modalities for cooperation—including text, pictures, and videos, large membership, and wide range of thematic topics characterized by the technology—provide firms with a powerful means of knowledge exchange and generation[20] that can be applied to open innovation. Cachia et al. identify three areas in which social media is used for market foresight that can be summarized in the context of innovation, namely: creativity, expertise, and collective intelligence.[21]

- *Creativity* emerges from network interactions across of a mass of users with diverse knowledge (e.g., firms, consumers, universities, and any other social entity). Engagement with external stakeholders helps firms tap this knowledge, which in turn boosts internal creativity and innovativeness for exploration and exploitation[22] at different stages of the innovation funnel. For instance, end-user involvement at concept design stages helps reduce uncertainty at the fuzzy front-end stages of identifying customer wants and needs.[23] Especially in fast-paced or turbulent markets, cooperating with lead-users has been described as an important source of innovation for firms.[24]

- *Expertise* refers to the ability of social media to provide an improved mechanism for insight and market foresight. The sheer volume of user-generated content available on social networks allows for sophisticated environmental scanning through data mining.[25] Environmental scanning improves a firm's ability to develop new second order competences, such as R&D and marketing capabilities, which help firms remain competitive and assist in the identification of emerging trends.[26] Bayus, for example, demonstrates how Dell effectively leverages its online social community IdeaStorm to crowdsource ideas that provides them with a constant ideation source for innovation.[27]

- *Collective intelligence* refers to the knowledge synergies that emerge from crowd collaborations on social media. This logic is derived from the assumption that access to a diverse range of skills, capabilities, and knowledge allows participants to blend disparate solutions in new and novel ways.[28] According to Steiger et al., "when mechanisms are employed that enable interaction, the collective intelligence of a crowd is accessible and the whole becomes greater than the sum of its parts."[29] Collective intelligence also helps reduce cognitive bias by allowing users to focus on processes, problems, and solutions that occur naturally.

Saxton et al. emphasize the importance of social media for enabling crowdsourcing and open innovation. Specifically, they argue that crowdsourcing occurs at the intersection of three key elements: the crowd, outsourcing, and the social web.[30] They define the concept as "a sourcing model in which organizations use predominantly advanced internet technologies to harness the efforts of the virtual crowd to perform specific organizational tasks."[31] Existing studies, however, tend to focus only on ideation processes of utilizing social media for open innovation, such as ideas competitions.[32] Scholars argue that individuals are motivated to participate in such contests by a mixture of *intrinsic incentives* (fun, pride, and

satisfaction),[33] *extrinsic incentives* (monetary rewards),[34] and *status incentives* (recognition and community reputation).[35] Similar incentives are observed for participation in co-creation processes for brand development.[36] However, social media crowdsourcing alleviates some of these potential issues, as participants have a vested interest in the brand, product, or firm,[37] and they actively choose to contribute and be part of the social community regardless of incentives.

A summary of the existing literature is important to establish the characteristics of social media and crowdsourcing that can be used to examine their utilization in the context of open innovation. The insights identified from previous studies form the basis of juxtaposition in our research.

Methodology

To fill the gap in research on social media use for open innovation, a multiple exploratory case study design was followed. The nascent nature of social media and its proliferation into mainstream management literature requires such analysis to help answer the "how" (how do firms implement and leverage the power of social media for open innovation?) and the "why" (the motivations and impacts of using social media for open innovation).[38] To this end, three large case studies of social media crowdsourcing were selected based on their degree of alignment at different stages of the innovation funnel, namely, *ideation*, *R&D*, and *commercialization*. Accordingly, UNAIDS, Rowntree's Randoms, and Kit Kat were chosen as representative cases based on a high level of fit and ease of categorization at each stage. Each case demonstrated high levels of social media engagement and collaboration, yet differed in their innovation orientation. Table 1 provides an overview of the cases used in this study and the levels of social media presence in terms of active users.

TABLE 1. Overview of Cases Used in the Study

Case	Description	Innovation Funnel Stage	Social Media Activity*
UNAIDS	Global policy initiative for coordinating efforts in combating AIDS	Ideation: Engage young activists in idea generation for social innovation and change to eradicate AIDS.	Facebook: 54,013 (Likes) Twitter: 69,900 (Followers)
Rowntree's Randoms	Chocolate and confectionary brand of Nestlé UK	R&D: Engage consumers in research activity for developing new radical innovations in the brand's portfolio.	Facebook: 1,044,407 (Likes)
Kit Kat	Chocolate and confectionary brand of Nestlé UK	Commercialization: Engage consumers during launch and implementation of incremental innovation in the brand's portfolio.	Facebook: 15,890,827 (Likes)

Note: The level of social media activity is a good indicator of crowd engagement.
* Social media pages for KITKAT, RANDOMS, and UNAIDS: <https://www.facebook.com/kitkatuk>, <www.facebook.com/rowntrees.randoms?fref=ts>, <https://www.facebook.com/youthaids?fref=ts>, <https://www.twitter.com/UNAIDS>, accessed May 2013.

Data were collected through a series of in-depth semi-structured interviews with senior managers involved with social media strategy from each case (see Table 2). Interviews were designed to capture the key areas with regards to the motivations, implementation, impacts, and challenges of using social media for collaboration at different stages of the innovation funnel. Interviews on average lasted 2.5 hours and were supplemented with follow-up activities in the form of conference calls, telephone calls, and e-mails to elucidate the use and context of social media application. All discussions were recorded and fully transcribed in adherence to the required documentation and transcription standards.[39] Data were triangulated with a log of all social media activity for each case during the time of each project for a total of 410 days (Table 2). In addition, firm websites, press releases, and internal records were used to verify empirical findings. This enabled us to develop a rich understanding of the phenomenon and provide strong support for the results derived.[40]

Due to the nature of the phenomenon understudy, a hybrid analytical approach was adopted that considers Eisenhardt's[41] two-step procedure as well as the systematic steps proposed by Gioia et al.[42] for achieving scientific rigor in new concept development. First, a case analysis was performed to systematically collect data according to the research objective. Second, a cross-case synthesis was used to identify common themes emerging from the utilization of social media across key

TABLE 2. Data Sources

Data Source	Scope of Information
Primary Data	Multiple respondents per case were selected for interview. Respondents were selected on seniority and depth of involvement in social media activities. Over 20 hours of discussion were captured from interviews, conference calls, and telephone calls.
▪ Communications Manager (Nestlé UK)	
▪ Brand Manager (Rowntree's Randoms)	
▪ Brand Manager (Kit Kat)	
▪ Assistant Brand Manager (Kit Kat)	
▪ CEO (Codigital Ltd.)	
▪ Vice CEO (Codigital Ltd.)	
▪ Programmes Coordinator (UNAIDS)	
Social Media Activity	Kit Kat Facebook page 'Choose a Chunky Champion' campaign 2012 (16th January – 24th February) and 2013 (14th January – 15th March).
▪ Facebook	Rowntree's Randoms Facebook page for intelligence gathering and NPD (1st May 2012 – 1st March 2013) UNAIDS Facebook page for ideation (16th July 2012 – 20th July 2012)
▪ Twitter	UNAIDS Twitter page for ideation (16th July 2012 – 20th July 2012)
Secondary Data	http://www.nestle.co.uk/media/pressreleases
▪ Firm Websites and Intranet	http://rowntrees.co.uk/rowntrees http://app.codigital.com/p/youthaids2012 http://unaids.org/en/
▪ Press releases, internal records, and documentation	This data provided background information on the objectives and impact for each of the identified cases.

areas at different stages of the innovation funnel. Following the loose guidelines suggested by Gioia et al.,[43] we focused on systematically collecting evidence of social media application for open innovation from multiple data sources during these two stages. This helped ensure the reliability and validity of the research findings.

The analysis of the case studies followed an abductive approach, seeking new theoretical insights to facilitate a better understanding of the phenomenon.[44] The study is abductive as it emphasizes the use of social media for innovation without the application of a theoretical framework. Von Krogh et al.[45] argue that more phenomenon-based research is required in this context, as it facilitates the development of new insights that are not constrained by existing theory. Therefore, our study emphasizes emergent themes regarding the use of social media for open innovation, and effectively addresses the how and why questions surrounding the phenomenon without bias. For presentation purposes, narratives and visual mappings are used to document new theoretical insights.[46]

Exploring the Use of Social Media for Open Innovation

Following are the results of the data analysis for each case.

The Use of Social Media for Ideation

The use of social media in the UNAIDS project was for the generation of new ideas in response to AIDS at the national, regional, and global level. The stated objective was "A Declaration for Change: How young people will achieve an AIDS-free generation."[47] UNAIDS had previous experience in crowdsourcing ideas, utilizing conferences, workshops, and simple online tools, such as wikis and blogs, to create spaces of exchange for activists. CrowdOutAIDS is one such example of an on-going youth led policy based project, which includes the voices of over 5000 young activists in 79 different countries that collaborate to develop new strategic recommendations. In the preliminary stages of the project, UNAIDS found that it was difficult to coordinate the activities of a geographically dispersed network of activists, with information being fragmented and non-cumulative. In particular, one manager pointed out that "the post-processing burden of identifying ideas that could be developed into a coherent and tractable strategy was a particular problem."

In this regard, UNAIDS employed Codigital Ltd., an external crowdsourcing intermediary to manage the ideation and knowledge transfer process. Prior to using Codigital, a series of conferences and workshops were conducted to draft ideas among activists. "*Access," "partnership*," and "*equality*" were the three key ideation outputs of these events. To develop these outputs further into a declaration for change, UNAIDS wanted young activists from around the world to collaborate on a list of priorities to achieve an AIDS-free generation. Codigital utilized Facebook and Twitter as complementary platforms to access a wider audience of activists to achieve this aim. The motivation to use social media stemmed from its ability to provide an open and independent platform for equal access and contribution. As one manager added, "it was used as a way to enlarge the crowd, we had a group of activists and those activists had a number of people they could reach out to via social media."

Users of the UNAIDS Facebook (54,013 active users) and Twitter (96,900 active users) pages were directed to Codigital's platform via an integrated widget and web links that layered multiple pages to create a wider network. Users accessed the Codigital platform to openly collaborate, edit, and vote on each other's ideas. This enabled the most prominent ideas to emerge naturally, as the locus of user activity centered on the "best" solutions. Codigital's distinct editing and voting process only allowed modifications that were accepted by a majority vote from the collaborating group.

In this context, the use of social media facilitated a broad international perspective and cross-fertilization of ideas, with the activist user group growing by 80% and top 5 contributors coming from 5 different countries. A total of 130 ideas from 132 contributors, with 238 edits and 6091 votes, were collected within 4 days. A large proportion of new ideas were attributed to a small proportion of so-called "lead-users."[48] These consisted of both radically new ideas from lead-users and incrementally improved ideas developed over successive generations from more peripheral users. The Vice CEO of Codigital stated that, "some [users] were quite gifted creatively, which lead to a higher influx of novel ideas…while others focused their attention on refining and editing existing ideas for incremental improvement." Such open collaboration enabled ambidextrous processes,[49] as users could more easily combine and recombine knowledge for radical and incremental innovation.

Analysis shows that by using social media for ideation, the speed and quality of the ideas developed significantly improved. Compared with a 3-4 month turnaround time of conducting and collating results of a survey, UNAIDS were able to generate output of higher quality in just 4 days. The open nature of social media allowed users to edit and collaborate on ideas for incremental improvement, with the final idea emerging after 11 generations. Such incremental development embodied by successive generations increased the quality of ideas, as users further refine and improve output.

A key challenge that emerged was the lack of regulation and control associated with social media. With the target audience of the project being young activists aged between 16 and 24, controlling who contributed to the ideation process was important. The open nature of Facebook and Twitter, however, made it difficult to isolate contributors to within the target group. Users that accessed the Codigital platform through social media often contributed anonymously, and were only identifiable by a self-created username. As a result, isolating contributions within the target group was extremely difficult. The CEO of Codigital stated:

> "Definition of the group is a key issue. If you open that up to everybody on Facebook and Twitter, it is going to become counterproductive.…While you want the group open to as many users as possible, you also want to control who is contributing."

Although controlling contributors was identified as a challenge, UNAIDS adapted their use of social media by imposing a "like" or "follow" threshold for users to cross before they could access the integrated Codigital widget. As one interviewee pointed out, "liking a page is a significant hurdle to cross. Once you have pressed that 'like' button, you are conforming to a group standard, so this is a good way of managing the boundary."

The Use of Social Media for Research and Development

Rowntree's Randoms are a jelly sweet product aimed at 18-24 year olds that combine different textures, shapes, and flavors. With the product reaching market maturity, Rowntree's identified the need to rejuvenate interest in the Randoms' brand by extending their product range. Access to an existing Facebook fan page with over 900,000 users provided a perfect insight tool to support R&D and reduce the costs and reliance of using more traditional market research methods. Users of the fan page were actively engaged in dialogue with both the brand and other users. Thus, with access to a mass crowd of loyal consumers, Rowntree's was able to identify and exploit new insights and emerging market trends to develop superior value propositions relevant to their customer base.

Social media was implemented within the brand to fulfill two primary roles: R&D and communication. In terms of R&D, Facebook was used as a test-and-learn tool. Rowntree's used built-in opinion polls, competitions, and pictures that were easily consumable to generate new insights and identify emerging trends, which fed back into internal development processes. Each "click" or "comment" provided a vital piece of consumer information that combined user profiles with preferences and behaviors. As the brand manager indicated:

> "What we realized through Facebook and the million fans that Randoms almost has, is that they speak in random…this was one piece of insight. The second piece of insight was that their favorite sweet was the foamy textured one."

By combing the two insights, Rowntree's came up with "Squidgy Speak"—a foamy textured sweet made up with a variety of random words so that customers can combine them to make playful sentences. Opinion polls, pictures, and conversation threads on Facebook were used as an interactive market research tool to initiate dialogue and establish consumer preferences. It was from the utilization of these built-in technological modalities that led to the exploration and development of new product lines.

A key challenge encountered by Rowntree's was an internal lack of capability to analyze the sheer volume of user-generated content on Facebook. The use of digital agencies to manage their social space was thus critical to ensure that new insights and emerging market trends were identified and internalized to feed R&D processes. From the perspective of communication, Rowntree's adapted their use of built-in modalities (opinion polls and conversation threads) as a mechanism to direct user-generated content towards the brand's R&D goals. In this regard, digital agents were more passive and utilized for data collection and analytics—"our agents work alongside the brand teams that execute content for test-and-learn objectives, while agents handle the numbers, trends, and outcomes." At the organizational level, Nestlé UK is involved in a partnership with Facebook and approaches social media on a brand-by-brand basis. As the communications manager pointed out:

> "We work alongside Facebook and digital agencies to help us use the data and make the most of it. They help us to realize the capability on there [social media] keeping us up to date with how our demographics are changing and the trends they see from our social space."

Facebook was chosen as they are the largest social media platform by reach and volume, and analytics are filtered down to the local level. By utilizing social

media, Rowntree's was able to develop new expertise for R&D that assisted in new product development. Squidgy Speak was a direct result of using Facebook. It was indicated by the Brand Manager that social media as a tool for R&D helped increase brand innovativeness, speed to market, and lowered the cost of market research by 50%: "Unlike a traditional research study or survey, social media lets the masses in and takes that survey onto a grander scale,...providing us [Rowntree's] with real-time feedback to bring new products faster to market." Rowntree's is now less reliant on traditional survey-based methods of exploration, as social media provides a cheaper, more effective means of R&D.

A closed organizational culture, hierarchical structure, and large size, however, were identified as key challenges limiting Rowntree's ability to fully embrace the openness required to exploit social media as a tool for R&D. Senior managers were reluctant to embrace empowered consumers for fear of leaking valuable proprietary information, ceding managerial power, and losing control of how the brand is communicated.[50] As one manager stated:

> "Being risk averse and a bit too closed door limits our ability to be proactive...our size, procedures, and processes currently don't allow us to be as proactive as desired. As a general rule, you really need to be open. You need to let people in to get the most out of it."

This finding suggests that when using social media, existing routines can become dysfunctional, as prior competences become core rigidities[51] that inhibit implementation. To combat afflictions of size and culture, Nestlé UK deployed a decentralized cross-functional team to handle social media strategy across all brands, which helped create flatter decision structures and reduce bureaucracy imposed by senior managers.[52]

The Use of Social Media for Commercialization

Kit Kat Chunky is a sub-brand within Kit Kat, a global chocolate brand aimed at a wide consumer demographic. Kit Kat's motivation to use social media stemmed from the need to increase penetration, awareness, and frequency of purchase among 18-24 year olds. Realizing the popularity of social media among the target demographic, Kit Kat decided to engage the 200,000 users of the Facebook fan page in co-creation as a mechanism to reward loyalty. In one interview, the brand manager stated, "it made sense for us to have a presence there and make our brand properties and identity available and accessible to anyone who wanted to be included as part of our [brand] proposition."

The "Choose a Chunky Champion" campaign first aired on Facebook in January 2012 and then again in January 2013. The campaigns allowed consumers to freely "comment," "like," and "vote" for their favorite new flavors, with the winners becoming permanent brand fixtures. Co-creation, using social media, empowered users and opened the brand up to the consumer crowd, thus helping to break corporate barriers. As the brand manager of Kit Kat pointed out:

> "It gave our fans a forum to discuss flavors, whether that be Kit Kat flavors in other markets like Japan, where we have green tea and Swiss cheese....The product is why they are there, they want to talk about the brand. This was a perfect lead for

us to use our Facebook audience to drive commercial success of the Chunky brand by allowing them to co-create on flavors that would become a permanent fixture."

The implementation of social media for the brand is very decentralized and approached on a product-by-product basis. Therefore, it has many different touch points as a commercialization tool, including customer service, viral marketing, and brand engagement. Social media allowed Kit Kat to conduct the largest marketing and research project in terms of scale and scope ever conducted in the brand's history.[53] Backed by a £6,000,000 media investment (TV, radio, and print) Kit Kat urged consumers to vote between orange, white chocolate, double chocolate, and peanut butter over a 40-day period during the 2012 campaign. In one interview the assistant brand manager stated:

> "There were 600,000 consumers talking about us on-line, that's massive and that's people actively choosing to talk about us and it's us creating excitement for them and giving them a space and a forum to express that. For me that is the key thing."

By engaging consumers in collaborative efforts for a new flavor, Kit Kat were able to better align products with consumer needs, which ultimately brought them closer to their target audience when introducing new brand extensions. Results showed that the utilization of social media led to an 8% increase in market penetration among 18-24 year olds and the development of new brand advocates. Brand advocates exhibit strong word-of-mouth effects and drive commercialization by bringing in new customers through peer recommendation.[54] Brand favorability, reach, and market success of the Kit Kat Chunky brand all increased during the 2012 campaign. The Facebook fan community doubled from 200,000 to over 400,000, indicating a 50% increase in brand engagement. Furthermore, the "Choose a Chunky Champion" winner was voted product of the year by The Grocer Magazine.[55] Off the back of the huge success of the first campaign, Kit Kat recently initiated the 2013 "Choose a Chunky Champion" that sees mint, chocolate fudge, coconut, and hazelnut go to the public vote over a 60-day period.

Despite the acknowledged benefits, internal lack of capability to manage the platform and collate the volume of data was again an issue at Nestlé UK. Built-in voting modalities and conversation threads were adapted over the duration of the campaign to minimize "junk" content generated by users. However, the use of digital agencies and the global Facebook partnership were essential for handling back-end analytics. Inflexible organizational processes and procedures[56] hampered Kit Kat's ability to be proactive and respond quickly to trending topics. The combination of a risk-averse culture and management inertia[57] towards openness were major barriers. As one manager indicated, "the issue with Nestlé is that social media requires a completely different way of thinking." Due to past experiences with bad publicity in the early 1980s, social media was perceived as risky due to a lack of regulation and centralized control. Internal social media "champions" were deployed within the brand to help socialize senior managers and organizational processes in this context. Yet, this is still very much a work in progress, as the Internal Social Media Champion pointed out:

> "We are still playing catch-up, but this is difficult for a company like Nestlé with an unbelievable amount of processes and procedures. It means a complete internal culture

change, far more open. Rather than seeing it [social media] as a solution, it should be the starting point that drives the brand. My job as 'champion' is to drive this mind-set to become 'social by design.'"

Towards a Framework of Social Media for Open Innovation

Results of the within case analysis demonstrate the application of social media for open innovation during ideation, R&D, and commercialization. The findings reveal the motivations, implementation, challenges, emergent adaptations, and firm-level impacts. Table 3 provides a cross-case synthesis of these findings. Interestingly, similar to studies on technology and organization,[58] our results indicate a strong distinction and interaction between the social media technology and forms of internal organization to facilitate its application at different funnel stages.

Cross-case results show distinct differences in the implementation of social media for open innovation moving from front-end ideation stages towards R&D and commercialization stages. At ideation stages, we found that less control was imposed on how users utilized the technology for interaction, as to not restrict the innovation process during the generation of new or improvement of existing ideas. Thus, social media is implemented more openly by layering multiple platforms to enlarge "crowd" interactions and facilitate novel combination and recombination of knowledge[59] from a diverse network of users.

In contrast, as ideas become more concrete in post-ideation stages, the need to control user interactions becomes more apparent. Accordingly, during R&D and commercialization, Rowntree's and Kit Kat implemented social media with a higher specificity by using technological features such as opinion polls, voting pages, pictures, and conversation threads to control user interactions. In the case of Rowntree's, built-in modalities were deployed for generating specific insights for brand rejuvenation, while Kit Kat deployed modalities for increasing penetration and commercial awareness. Despite differences in the technological implementation of social media across funnel stages, it was a common finding that the use of external partners was a critical driver for organizational implementation. In particular, external expertise is required to facilitate knowledge transfer and internalization to the organization from the masses of user-generated content created on social media.

Significant challenges, however, were identified post implementation. In terms of the technology, a lack of centralized control and regulation was identified as a common challenge across all funnel stages. During ideation, UNAIDS wanted to limit user contributions to within the 16-24 year old target audience, while at R&D and commercialization stages, Rowntree's and Kit Kat wanted to control the focus and direction of user interactions. In response, we found that in all cases, organizations adapted the use of technological features available on social media as a control mechanism to negate these barriers. At ideation stages, a "like" or "follow" barrier was implemented to control the age boundary on Facebook and Twitter pages before users could access the Codigital platform. While at R&D and commercialization stages, built-in modalities were adapted to control the focus and direction of user-generated content on the Facebook fan pages.

TABLE 3. Summary of Cross-Case Findings (*continued on next page*)

	Ideation	R&D	Commercialization
Motivation	• UNAIDS used social media platforms to increase the size and global reach of the young activist network during idea generation activities.	• Rowntree's used social media as an insight tool for R&D during innovative activities for brand rejuvenation.	• Kit Kat used social media as a commercialization tool for new innovations to increase penetration, awareness, and frequency of purchase.
Implementation	***Technology*** • UNAIDS used integrated widgets and parallel page links to layer multiple social media platforms (on Facebook and Twitter). ***Organization*** • The use of external partners in the form of intermediaries, social media service providers, and digital agencies were critical for implementation, knowledge internalization, and knowledge transfer across all innovation funnel stages. Time burdens of processing (UNAIDS) and lack of capabilities (Rowntree's and Kit Kat) to process the sheer volume of user-generated content into usable knowledge were key drivers for forming external partnerships.	• Rowntree's and Kit Kat used built-in technological modalities available on Facebook to implement social media for open innovation internally, these included opinion polls, voting pages, pictures, and conversation threads.	
Challenges	***Technology*** • Lack of regulation and centralized control over external social media platforms emerged as an underlying challenge across all innovation funnel stages, particularly when control was required for limiting the content generated and contributions to a specific target audience (e.g., 18-24 year olds). ***Organization*** • Processing challenges were common across all innovation funnel stages due to the huge amounts of user-generated content produced on social media platforms.	• A closed organizational culture, hierarchical structure, and large size were limiting factors for both Rowntree's and Kit Kat in implementing social media for R&D and commercialization activities. • Senior managers were also reluctant to embrace social media due to fear of losing control and leaking valuable proprietary information.	
Adaptation	***Technology*** • The technological features of social media were adapted across all innovation funnel stages to overcome technological challenges. UNAIDS implemented a 'like' and 'follow' barrier as a boundary control mechanism to limit contributors to within the target audience. Similarly, Rowntree's and Kit Kat adapted the use of built-in modalities (e.g. opinion polls and discussion threads) over the duration of each innovation task as a control mechanism to negate technology challenges and direct user-generated content towards the needs of the innovation task.		

(*continued*)

TABLE 3. Summary of Cross-Case Findings (*continued on next page*) (*continued from previous page*)

	Ideation	R&D	Commercialization
	Organization ■ NA		■ A decentralized cross-functional team was deployed to handle social media strategy across Rowntree's and Kit Kat brands to negate organization challenges related to culture and management inertia. ■ Internal social media champions were deployed within Kit Kat to socialize managers and reduce inertia towards change.
Impacts	**Technology** ■ UNAIDS documented an 80% increase in the activist ideation network across the Codigital, Facebook, and Twitter platforms. **Organization** ■ Ambidexterity—social media facilitated dual exploration and exploitation processes during ideation. ■ Higher quality ideas. ■ The speed of ideation and time to market (development to production) were documented as benefits for UNAIDS and Rowntree's respectively in the implementation of social media.	■ NA ■ Exploration—social media facilitated radical development during R&D. ■ Reduced cost of market research by 50%	■ Kit Kat documented a 50% increase in brand engagement on Facebook fan page. ■ Exploitation—social media facilitated incremental development during commercialization. ■ Increased brand's market penetration in target group by 8% and developed brand advocates. ■ Higher return on investment (ROI) compared with traditional commercialization channels.

Despite similarities in the technological challenges and technological adaptations across funnel stages, distinct differences are observed in the organizational challenges encountered post implementation. While processing and internalizing user-generated content from social media was a common organizational challenge, core rigidities in organizational culture, structure, and size, as well as management inertia emerged as significant problems at R&D and commercialization stages.[60] We attribute this finding to the fact that a movement from front-end ideation stages to formal R&D or commercialization stages represents a higher level of integration with the organizational system.[61] Accordingly, significant internal adaptations are required to successfully implement social media into operational R&D and commercialization processes. In this context, Rowntree's and Kit Kat deployed decentralized cross-functional teams and internal change agents (champions) to create flatter decision structures, an open culture, and more socialized managers,[62] which helped overcome an internally risk averse, closed organizational culture and management inertia towards social media utilization. Thus, it is evident that a high level of congruency is required between social media technology and internal organization for successful open innovation beyond front-end ideation.

Examination of the firm-level impacts of using social media for open innovation at different innovation funnel stages yields interesting results. From a technological perspective, positive growth in the UNAIDS social media ideation network and Kit Kat's Facebook fan page for commercialization were documented. However, little technological impact was reported during R&D stages. We attribute this finding to the inward nature of the R&D process and need to protect intellectual property and proprietary knowledge pre-commercialization.[63]

From an organizational perspective, the implementation of social media had a positive effect on innovativeness across all stages, albeit slightly differently. During ideation, we found that by allowing users to interact and contribute without restrictions, firms were able to pursue dual processes of innovation exploration and exploitation. Users were able to propose radically new ideas as well as incrementally improve existing ideas without being constrained by internal procedures. As a result, social media enabled a context for organizational ambidexterity during ideation.[64] However, as ideas move from the front-end towards formal R&D stages, the propensity for ambidexterity is reduced, as development activity becomes geared towards either incremental or radical innovation, not both. In the case of Rowntree's, R&D activity was geared towards more radical innovation through the exploration of new Randoms' product lines (Squidgy Speak). In contrast, during commercialization stages, we found that the implementation of social media had a positive impact on exploitation and incremental innovation. Kit Kat documented an 8% increase in market penetration and the development of brand advocates for the existing Chunky brand.

These innovative capabilities helped drive other positive organizational impacts. In particular, during ideation, UNAIDS documented a higher influx of quality ideas emerging from the flexibility afforded by social media for exploratory and exploitative innovation. A faster speed and throughput time was also documented at ideation and R&D stages, as the inclusion of users via social media helped reduce uncertainty at the fuzzy front-end.[65] As a result, Rowntree's was able to reduce the

cost of market research by 50%. Finally, Kit Kat reported a higher ROI compared with more traditional commercialization channels such as TV. It was found that social media typically provides £1.40 per pound spent compared to £1.25 with TV.

Discussion and Conclusions

This article provides empirical insight into the dynamics of social media utilization for open innovation with user crowds across the entire innovation funnel. The potential use of social media for business has become a topic of much debate in management literature and considered an improved tool for "open" practices and engagement with users.[66] However, how social media is utilized for open innovation at different stages of the innovation process remains largely unexplored in the literature. Previous studies have focused on applications at ideation stages[67] rather than understanding its application during R&D and commercialization.

Our study explains how social media is utilized and implemented for open innovation across all stages of the innovation funnel, as illustrated by the framework in Figure 1. We find that the need for technological and organizational alignment intensifies moving from front-end ideation stages towards commercialization, as social media becomes more integrated within the organizational system. This is because during ideation, ideas are not yet internalized, thus the need for control and adaptation is limited. However, as ideas become internalized into operational

FIGURE 1. Social Media for Open Innovation Implementation Framework
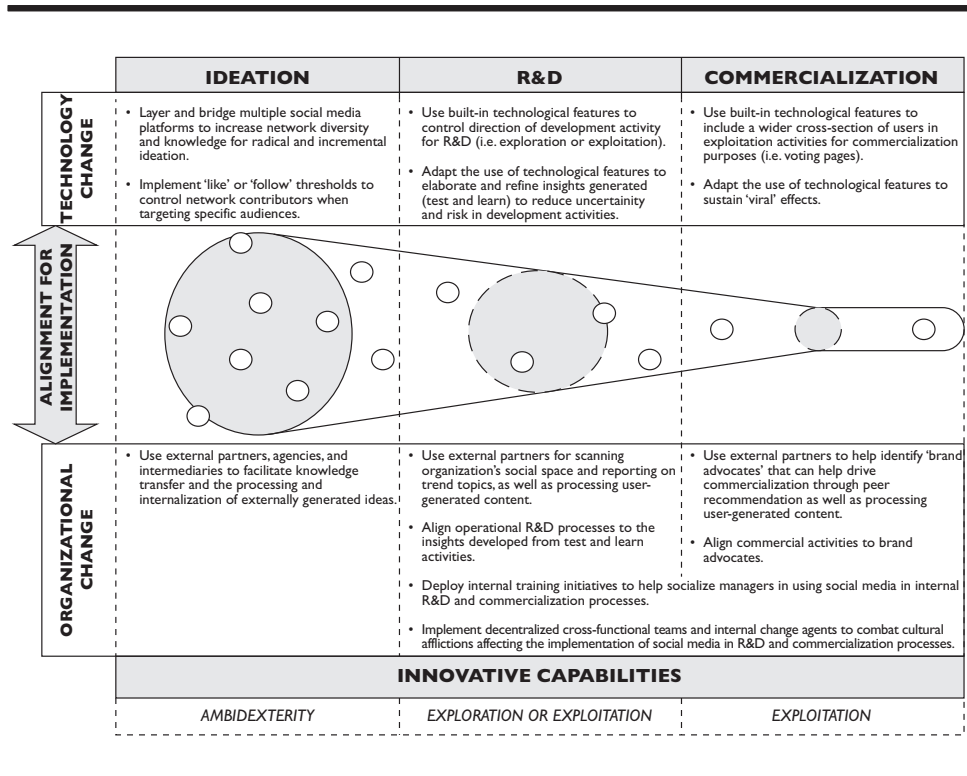
R&D and commercialization processes, the need for technological and organizational adaptation increases in order to facilitate alignment. These results coincide with Leonard-Barton,[68] who argues that the implementation of new technology requires cycles of change between the technology and organization to successively address misalignments.

The implementation of social media, however, lends itself more towards organizational adaptations to facilitate alignment, as the scope for technology adaptation is limited for social media technologies that are external to the organization. As the technology becomes integrated into operational R&D and commercialization processes, significant adaptation in organizational culture and structure is required to socialize managers, combat cultural afflictions, and promote openness to users.[69] Coping strategies include the deployment of decentralized cross-functional teams and internal change agents. This is in line with Salter et al.,[70] who argue that internal adaptations to formal practices and incentive systems are essential response strategies for coping with open innovation.

In terms of knowledge transfer, the volume of user-generated content on social media[71] often hinders the internalization of knowledge for open innovation. Accordingly, the use of external partners and intermediaries are critical to ensure inward transfer at all stages of the innovation process. In a similar manner, Cross and Gray[72] point out that managing internal collaboration burdens through the deployment of organizational interventions is essential for reducing network inefficiencies. Despite the lack of scope for technology change, small adaptations in the utilization of built-in technological modalities at R&D and commercialization stages, such as opinion polls and conversation threads available on social media, can also help knowledge transfer by directing interactions with users and making external knowledge more digestible.[73]

Our research adds to the debate on exploration and exploitation and the ambidextrous organization. Moving away from Tushman and O'Reilly's[74] arguments for structural separation of exploration and exploitation in business units to facilitate ambidexterity, our results suggest that the implementation of social media technology can create a context[75] for ambidexterity during open innovation in ideation. Prior to ideas becoming integrated within the organizational system, users are free to explore and exploit new ideas for radical and incremental improvement. As ideas enter formal development processes, however, the scope for ambidexterity decreases, as organizations either select an exploratory or exploitative development path. Building on Cachia et al.,[76] the applications of social media for exploration and exploitation at each stage can be summarized using the three objectives for market foresight that can now be formalized for open innovation:

- *Creativity* is facilitated by collective action. Social media acts as a knowledge repository, which users with diverse knowledge use for novel combination and recombination during open ideation activities to facilitate ambidexterity.

- *Expertise* is developed through the analysis of user-generated content and the ability to access local knowledge via engagement. Expertise generated from social media can be used to drive exploratory R&D as well as exploitative commercialization activities, as demonstrated in the Rowntree's and Kit Kat cases.

- *Collective intelligence* emerges from the many-to-many interactions supported by social media during open innovation activities, which is applied to support ambidexterity, exploration, and exploitation across the sequential stages of the innovation funnel—ideation, R&D, and commercialization.

Managerial Implications

The results of this study have important implications for managers and organizations seeking to operationally implement and utilize social media for open innovation. Depending on the locus of social media integration across the innovation funnel, managers need to coordinate a specific process of organizational and technological adaptation to align the technology with internal procedures. To benefit from ambidexterity during ideation, managers need to create an open and inclusive virtual environment in which participants with diverse knowledge can easily contribute, share, and edit content. This requires an extensive network of users that can be created by bridging and linking multiple platforms.

In terms of R&D, a more intense routine of technological and organizational reconfiguration is required for organizations to benefit from increased innovativeness during either exploratory or exploitative development. Therefore, interactions on social media require a higher specificity to dictate the direction of user-generated content towards development goals. Managers thus need to become more socialized and engaged with users through adapting the use of built-in modalities to communicate and stimulate knowledge generation that is closely aligned with internal processes. To ensure internalization, however, managers also need to select and work closely with external partners or intermediaries that are capable of managing the knowledge boundary for inward transfer. The deployment of internal training initiatives and autonomous teams helps drive cultural change and ensures that external knowledge is absorbed into the organization.

Finally, when implementing social media for exploitation during commercialization, a similar process of internal reconfiguration to R&D is required. Managers need to coordinate technological and organizational adaptations to harness user interactions on social media for exploitative development. By using the technology's built-in modalities for mass communications, it is possible to reach a wider cross-section of users to stimulate viral effects among influential peers, which drives commercialization. Our results suggest that by empowering users in simple co-creative activities, such as for new flavors and colors, organizations can significantly increase brand favorability. Again, similar to R&D activities, managers need to become socialized with users, work alongside external partners for internalization, and deploy internal initiatives for knowledge absorption.

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