

Social media models, technologies, and applications

An academic review and case study

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Abstract

Purpose – In recent years, social media have attracted considerable attention. Hence, the purpose of this paper is to conduct a critical literature review of social media research with the aim of developing a conceptual framework to explain how social media applications are supported by various social media tools and technologies and underpinned by a set of personal and social behavior theories or models.

Design/methodology/approach – This study adopted a two-stage approach. The first stage involves a critical literature review of academic journals in social media research, followed by the proposal of a conceptual framework that highlights the tools and technologies as well as theories and models that serve as the foundation of social media applications. The second stage involves the use of an actual case to demonstrate how the proposed framework facilitates the development of a social media application for a regional division of an international non-government organization.

Findings – The literature review indicated that social media have been applied in diverse business areas with the support of various social media tools and technologies and underpinned by a range of personal and social behavior theories and models. Based upon such findings, a conceptual social media application framework was devised and its usability illustrated via a real-life case study. Managerial implications are also discussed.

Research limitations/implications – Social media covers a wide range of research topics and thus, the literature review presented in this study may not be exhaustive. Nevertheless, the proposed framework and case study can both serve as reference for future research and provide recommendations for practitioners in the design and development of their own social media applications.

Practical implications – This study not only explains the importance of applying social media in various business sectors, but also enhances the understanding of the infrastructure of social media applications. The study also provides insights for improving the efficiency of application solutions. Organizations are advised to adopt social media in their business based on the proposed conceptual framework.



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Originality/value – With a literature review of social media research and a real-life case study, this study presents a conceptual framework using extant theories and models to form a foundation for social media applications. The framework extends existing knowledge on the design and development of information systems.

Keywords Case study, Conceptual framework, Literature review, Social media applications, Social media models

Paper type Literature review

1. Introduction

Rooted in and enabled by internet technologies, social media have attracted considerable attention in recent years. Since its birth as a Web 2.0 innovation in the early 2000s, social media have opened new challenges and opportunities for both the private lives of individuals and the business activities of organizations, drawing interest on their benefits and applications from researchers and industrialists alike (Hanna *et al.*, 2011; Kietzmann *et al.*, 2011; Mangold and Faulds, 2009). The power of social media cannot be underestimated and is expected to continue to revolutionize personal and organizational communications and interactions worldwide.

The dramatic development of social media has shaped the interactions of people through different social media platforms (Colliander and Dahlén, 2011; Cho *et al.*, 2014). For example, in the global social media environment, one can share information and knowledge online, join virtual communities, and arbitrarily “friend” or “de-friend” a person (Curras-Perez *et al.*, 2014). Such social interaction was unimaginable in the past. Social media also drive a new set of business models that challenges traditional business processes and operations (Hanna *et al.*, 2011). The salient difference between new and traditional business models is that one-to-one mass customization has become the norm in business transactions, replacing the one-to-many marketing promotion model. In the era of social media, online customer reviews have also become an important yardstick by which marketers formulate their strategies. Social media platforms also serve as tools that facilitate numerous organizational activities, such as collaborative product development (Mangold and Faulds, 2009; Porter and Donthu, 2008), creation of knowledge sharing communities (Fernando, 2010; Kasavana *et al.*, 2010; Daghfous and Ahmad, 2015), social media deployment at financial institutions (Bonsón and Flores, 2011), and collaborative learning and creativity among peers, customers, business partners, and organizations (Peppler and Solomou, 2011). Thus, individuals and organizations must be prepared to embrace the challenges and opportunities brought by social media.

Social media encompasses a wide range of tools and technologies, as described by Mangold and Faulds (2009, p. 358):

[...] a wide range of online, word-of-mouth forums including blogs, company-sponsored discussion boards and chat rooms, consumer-to-consumer email, consumer product or service ratings websites and forums, Internet discussion boards and forums, moblogs (sites containing digital audio, images, movies, or photographs), and social networking websites [...].

These newly invented social media tools and technologies allow people to read, extract, and generate universal text, image, audio, and video content (Akar and Topçu, 2011). As different types of social media have different applications and purposes, a large number of “connection platforms” have therefore emerged. As far as terminology is concerned, the term “social media,” despite the occasional confusion, is commonly used interchangeably with social computing, social networking, Web 2.0, and virtual social

worlds (Kaplan and Haenlein, 2009). Several definitions of social media for various applications and purposes have been provided by different studies, for example:

Social media is a hybrid in that it springs from mixed technology and media origins that enable instantaneous, real-time communications, and utilizes multi-media formats and numerous delivery platforms with global reach capabilities (Mangold and Faulds, 2009, p. 359).

[...] social media is collaborative online applications and technologies that enable participation, connectivity user-generated content, sharing of information, and collaboration amongst a community of users (Henderson and Bowley, 2010, p. 239).

[...] a group of internet-based applications that build on the ideological and technological foundation of Web 2.0, and that allow the creation and exchange of User Generated Content (Kaplan and Haenlein, 2010, p. 61).

[...] social media are the tools that facilitate the socialization of content [...] social media services encourage collaboration, interaction, and communication through discussion, feedback, voting, comments, and sharing of information from all interested parties (Malita, 2010, p. 748).

The above definitions can be summarized by dividing the compound term “social media” into its two components, “social” and “media.” The “social” part refers to the activities carried out among people, whereas “media” refers to the internet-enabled tools and technologies used to carry out such activities. Several social media studies have focussed on understanding various social behavioral aspects, such as social influence, social interaction, social ties, and social identity (e.g. Kwon and Wen, 2010; Shiue *et al.*, 2010; Wang and Lin, 2011). Similarly, a number of studies have also revealed the applications of social media in real life and business settings (e.g. Baird and Fisher, 2006; Chao *et al.*, 2011; Eyrich *et al.*, 2008). The current study intends to investigate how different social media tools and technologies, as well as personal or social behavior theories and models support and underpin the establishment of a social media application system. The study is expected to extend knowledge on the areas of information system design and development.

Following this basic background on social media and its impact on the lives of people, the next section will discuss the research methodology adopted in the present study. Section 3 presents a review of social media research, particularly those related to the applications, tools and technologies, and related theories and models, and proposes a conceptual framework of social media application development. Section 4 uses a real-life case study to illustrate how the proposed framework facilitates the establishment of a social media application system for a regional division of an international non-government organization (NGO). The final section concludes the current study and discusses recommendations for future research in the subject area.

2. Research methodology

The objectives of this study are to examine how social media are applied in various domains and to develop a conceptual framework that highlights the foundations of social media applications. To achieve such goals, this study adopted a two-staged approach. The first stage involves a critical review of extant literature in view of the applications of social media, the use of tools and technologies to develop social media applications, and the link between personal or social behavior theories and models and the design of these applications. A framework is conceptualized subsequently to

explain these interrelationships. The second stage uses a real-life case study to illustrate the practical aspects of creating and implementing a social media system based on the proposed framework.

The studies reviewed are selected largely from journals ranked in the Social Science Citation Index (SSCI) or Science Citation Index (SCI), with the exclusion of conference papers, doctoral and master theses, textbooks, and documentaries. We employed this approach because we believe the SSCI/SCI journals cover majority of the high-quality refereed social science and management literature (Sharplin and Mabry, 1985) and that refereed journal papers represent advanced research outputs (Ngai and Wat, 2002).

We followed the approach developed by Ngai *et al.* (2009) in searching for relevant articles in the extant literature. The search process began by using media-related keywords such as social media applications and social media technologies to select literature. The selected papers were then studied individually to determine whether they were relevant to the topic under study. The selected papers are later analyzed and classified in terms of the tools or technologies used, as well as the underlying personal or social behavior theories and models adopted.

A conceptual framework was established based on the results of the literature review. The framework shows the major business areas in which social media is applied, the key tools and technologies used to support the development of social media, and most importantly, how personal and social behavior theories and models form the foundations of technology selection and design planning for the application of social media. The usefulness of this framework is demonstrated through a case study with an actual application, which was carried out in the second stage. Using the principles explained in the proposed framework, this case study revealed how a social media application system was devised and implemented for the regional division of Rotary International (RI) in Hong Kong. The main purposes of the exercise are for the division office to serve its members better, to attract more fans, and to manage its daily organizational operations better and enhance its overall performance.

3. Stage one – literature review study

3.1 Social media applications

Social media have numerous applications; a number of research papers report that individuals are using social media increasingly for specific purposes. In the following sub-section, we present the various applications of social media based on the literature review. Most of the studies reviewed relate to three main industry sectors: the public sector, which includes the government and NGOs, the education sector, and the commercial sector. In some cases, social media are used in all three sectors. For purposes of illustration, this study discusses the application of social media in the domains of marketing, customer relationship management (CRM), knowledge sharing, collaborative activities, organizational communications, education and training, and so on. Table I summarizes the articles on the application of social media in each group.

3.1.1 Marketing. Social media is considered an obvious choice as a marketing tool and is viewed as an integral part of the integrated marketing communication strategies of firms (Mangold and Faulds, 2009). Hence, social media can be considered as a new component in the marketing promotional mix. In the past few years, social media marketing has received increasing attention from the academia and from various industries. Such growing attention can be deduced from the wide range of studies on various marketing issues.

Applications	Related areas	Articles
<i>Marketing</i>	Consumer attitude and behavior	Akar and Topçu (2011), Gamboa and Gonçalves (2014), Krasonikolakis <i>et al.</i> (2014) and Mathwick (2002)
	Consumer communication and recommendation	Chen <i>et al.</i> (2011), de Valck <i>et al.</i> (2009), Jin and Phua (2014), Kozinets <i>et al.</i> (2010) and Trusov <i>et al.</i> (2009)
	Consumer trust	Hajli (2014a), Hsiao <i>et al.</i> (2010) and Pentina <i>et al.</i> (2013)
	Branding	Barwise and Meehan (2010), Colliander and Dahlén (2011) and Tsai and Men (2013)
	Marketing management	Barger and Labrecque (2013), Moncrief <i>et al.</i> (2015), Stephen and Toubia (2010) and Weinberg and Pehlivan (2011)
<i>Customer relationship management</i>	Customer experiences	Karakaya and Barnes (2010) and Nambisan and Watt (2010)
	Relationship quality and customer satisfaction	Hajli (2014b) and Hsieh <i>et al.</i> (2010)
	Customer knowledge management and trust cultivation	Chua and Banerjee (2013) and Porter and Donthu (2008)
<i>Knowledge sharing</i>	Motivations	Chai and Kim (2010), Chang and Chuang (2011), Hau and Kim (2011) and Shiu <i>et al.</i> (2010)
	Professional virtual community	Chiu <i>et al.</i> (2006, 2011) and Lin <i>et al.</i> (2009)
	Emergency cases	Gruber <i>et al.</i> (2015), Smith (2010) and Yates and Paquette (2011)
	Impacts	Hsu and Lin (2008) and Wei (2009)
<i>Collaborative activities</i>	Learning	Peppler and Solomou (2011) and Remesal and Colomina (2013)
	Product design and project operations	Kaplan and Haenlein (2014) and Piller <i>et al.</i> (2005)
	Cooperative behavior	Hanaki <i>et al.</i> (2007)
<i>Organization communications</i>	Communication enhancement	Bonsón and Flores (2011) and Ligita and Kuvykaite (2012)
	Government and public sector	Bertot <i>et al.</i> (2010), Mergel (2013) and Picazo-Vela <i>et al.</i> (2012)
<i>Education and training</i>	Pedagogical role	Cao <i>et al.</i> (2013), Deng and Tavares (2013), Hussain (2012) and Kassens-Noor (2012)
	Teaching/learning environment	Chao <i>et al.</i> (2011) and McCarthy (2010)
	Curriculum development	Baird and Fisher (2006) and Pektaş and Gürel (2014)
	Educational instructions/facilities	Click and Petit (2010) and Sranamkam (2012)
<i>Others</i>	Tourist industry	Parra-López <i>et al.</i> (2010) and Xiang and Gretzel (2010)
	Public relationships	Eyrich <i>et al.</i> (2008) and Steyn <i>et al.</i> (2010)
	Medical sector	Brown-Johnson <i>et al.</i> (2015) and Denecke and Nejdil (2009)

Table I.
Social media
applications

In particular, numerous publications include media studies on consumer attitude and behavior. Mathwick (2002) investigated the relational norms and behaviors of online consumers and clustered the consumers into four groups: transactional community members, socializers, personal connectors, and lurkers. The author suggested that investing in community-building infrastructures (i.e. chat rooms, bulletin boards, and interactive events) has a positive effect on the future loyalty intentions of highly relational patrons (Mathwick, 2002). Gamboa and Gonçalves (2014) studied customer loyalty through the cultivation of social networks. The researchers discovered that Facebook enhances the relations that increase loyalty through trust, customer satisfaction, perceived value, and commitment. The results further revealed that these relations are stronger for fans of the brand than for non-fans, and that customer satisfaction is the strongest determinant of loyalty. Akar and Topçu (2011) analyzed customer attitude toward social media marketing and developed a consumer-based attitude scale for future studies. This scale uses seven factors to reflect the attitudes of consumers and their acceptance of social media marketing: attitudes toward social media marketing, social media use, social media knowledge, social media monitoring, foresight on social media, and fears regarding social media marketing. Krasnikov *et al.* (2014) investigated consumer behavior in the virtual world “Second Life”. The authors concluded that “core store features” and “security and privacy” are the most important factors in the choice of virtual retail stores of consumers, whereas frequency of visit and time spent within the store can be used to predict consumer spending in the virtual world shopping environment.

The marketing impact of customer communication and recommendation through social media platforms has also received significant attention from researchers. De Valck *et al.* (2009) examined how the decision-making processes of consumers can be affected by their communications and interactions, particularly information and experience sharing, with other consumers in the virtual communities. The authors affirmed that people prefer to obtain different types of information (i.e. informational, relational, and recreational) from various social networks and that social ties have a significant impact on consumer decision processes, including need recognition, actual behavior, and post-purchase evaluation. Trusov *et al.* (2009) studied word-of-mouth (WOM) communication strategies in social media and found that these strategies enjoy a higher financial incentive than traditional WOM. Kozinets *et al.* (2010) also studied WOM marketing in online communities. They proposed a narrative model that showed that communal WOM does not simply increase or amplify marketing messages; rather, marketing messages and meanings are altered systematically in the process of embedding them. Jin and Phua (2014) conducted experiments to examine the effects of celebrity-based WOM marketing on Twitter on consumer behavior. The results suggested that WOM endorsed by celebrities, particularly those with a high number of followers, positively influenced product involvement and buying intention of followers. Chen *et al.* (2011) examined the posting behavior of customers, the relationships between marketing variables, such as product price and quality, and consumer online posting behavior at the initial and mature stages of internet usage. The study explained the role of social media marketing in the formation of such relationships, and revealed that extremely low or extremely high product price and quality boosted posting on several leading online automobile consumer review sources.

Several studies have also attempted to explain how consumer trust affects buying intention. Hajli (2014a) proposed a structural model that suggested that social interactions have a positive effect on consumer trust and such trust, in turn, has

a positive effect on both the buying intention of customers and their perceived usefulness of social networks. Such perceived usefulness also has a positive effect on the buying intention of consumers. Pentina *et al.* (2013) examined the trust transfer phenomenon in Twitter usage in two different cultures. The online survey conducted in the USA and in Ukraine suggested that user trust on Twitter will positively affect their intentions to continue using the platform. However, the influence of user trust on “following” brands hosted on the social media platform is only statistically significant in the Ukrainian user group. Results further confirmed the role of similarity in personality traits between Twitter users and the Twitter brand in engendering trust in Twitter. Hsiao *et al.* (2010) studied the antecedents and consequences of trust in online product recommendations and uncovered the effects of social factors and perceived web value on the online purchase intention of consumers. The researchers also suggested that to influence the purchasing intention of consumers, social shopping web sites should improve the trustworthiness of their product recommendations by enhancing the perceived ability and integrity of their members and their willingness to share information.

Brand is a major element in marketing. Therefore, several studies focussed on branding issues in the social media environment. Barwise and Meehan (2010) discussed the significance of basic marketing elements, particularly brand building. The authors found that social media amplified company reputation when it delivers what it promises, and consequently suggested that companies should achieve the basic elements of developing and delivering a compelling brand promise. Colliander and Dahlén (2011) investigated and compared the effects of brand publicity in social and “traditional” digital media. The authors found that blogs generated better brand attitudes and purchase intentions than traditional online magazines, which is largely a result of the para-social interaction (PSI) effect. The authors also found that because of such effect, publicity is more sensitive to user perceptions of the credibility of writers and the relationship of users with the brand. Tsai and Men (2013) considered the participatory and communal nature of social networking sites (SNSs) and explored the effects of social media dependency and three social relationship factors, namely, PSI, perceived source credibility, and community identification, on consumer engagement with Facebook brand pages. The results confirmed that all factors except perceived source credibility were positive predictors of consumer engagement on SNSs (Tsai and Men, 2013).

As the use of social media in marketing has increased rapidly in recent years, a number of studies have directed attention toward effective marketing management. Weinberg and Pehlivan (2011) highlighted the different types of social media marketing mix and developed a framework for social media spending. Their framework used the half-life and depth of information to differentiate between social media types and guide marketers in the allocation of resources to social media in accordance with their social objectives. Barger and Labrecque (2013) described an integrated marketing communication perspective and identified seven key social media metrics: volume, share of voice, engagement, advocacy, return on investment, leads generated, and response time. With the exception of response time, these metrics cover the three traditional types of metrics used to evaluate integrated marketing communications, namely, attitudinal, behavioral, and financial metrics. Stephen and Toubia (2010) examined the economic implications of a social network of sellers in a large online social commerce marketplace. Their results showed that first, considerable economic value are generated from sellers connection via the social network, second, the primarily value of

the social network lies in making shops more accessible to marketplace customers, and third, sellers benefit most from the enhanced accessibility by the social network. Moncrief *et al.* (2015) conducted a study on sales management. Their study explored the impact of social media on different sales management functions, particularly how sales managers could use SNSs and virtual worlds to supervise, train, and compensate the members of the sales forces.

3.1.2 CRM. CRM is a system for managing the interactions of a company with its current and potential customers. At present, numerous companies have adopted social media to manage and improve their relationships with their customers, which in turn has drawn the attention of researchers to CRM.

In particular, several studies have been carried out to investigate how companies manage various customer experiences in the adoption of social media. Karakaya and Barnes (2010) examined and identified the impact of customer care experience, as a proxy of customer opinion, on brand or company selection in social web sites. Results of the study revealed that consumer opinions posted on such web sites have positive impacts on the engagement of consumers in online activities, which results in a positive influence on their choice of companies and brands. Nambisan and Watt (2010) analyzed the online community experiences of customers in relation to their attitudes toward product, company, and service quality. In light of the results, the authors suggested that companies could enhance the effectiveness of their online communities by delivering positive experiences to their customers.

Several studies have concentrated on relationship quality and customer satisfaction. For example, Hajli (2014b) proposed a model to investigate the impact of social factors on relationship quality and social commerce intention in the context of social media. The study provided a clearer picture of consumer behavior in the era of social commerce and proposed a new theory in social commerce research. Hsieh *et al.* (2010) studied blog user satisfaction using the information and system quality of blog sites. Their study is useful to company-sponsored online communities, in which such information and system qualities are important for retaining customers.

Other studies examine CRM from the perspectives of customer knowledge management (CKM) and trust cultivation. Chua and Banerjee (2013) analyzed the extent to which social media use can support CKM in organizations that rely on a traditional bricks-and-mortar business model. The authors used the case of Starbucks, an international coffee house chain, to illustrate how social media could be used to transform customers from passive recipients into active contributors of innovation and to engage these active customers to support CKM in various ways. Porter and Donthu (2008) investigated how cultivating customer trust may create values for a firm through their sponsored virtual communities. The authors hypothesized that the perceptions of firm efforts to provide quality content, to foster member embeddedness, and to encourage interaction foster-favorable customer beliefs and trust in a virtual community sponsor. Such favorable beliefs and trust consequently motivate customers to behave relationally toward the sponsoring firm by sharing information, co-producing new products, and granting loyalty to such firm (Porter and Donthu, 2008).

3.1.3 Information and knowledge sharing. Knowledge sharing is an activity in which individuals, friends, families, communities, and organizations exchange information, skills, or expertise (Miller and Shamsie, 1996). Social media contribute and facilitate knowledge sharing in online communities, particularly knowledge related to product information, travel information, and/or customer experiences.

Because sharing information and knowledge online generates no obvious benefits, the search for reasons why users are keen to do so have aroused the interest of researchers. Hau and Kim (2011) studied the motivations for the promotion of innovative-conducive knowledge sharing among users of a large online gaming community in South Korea using the social capital perspective. Applying the planned behavior theory, the study revealed that intrinsic motivation, shared goals, and social trust are the salient factors in promoting innovative-conducive knowledge sharing of users. Chang and Chuang (2011) investigated the factors that influence knowledge sharing in a virtual community and discovered that the altruism, identification, reciprocity, and shared language of users positively affected knowledge sharing behavior. In particular, the researchers found that social interaction and trust could improve the quality but not the quantity of knowledge sharing, and that reputation is not positively related to overall knowledge sharing behavior. Chai and Kim (2010) investigated whether a positive relationship exists between the trust of bloggers and their knowledge sharing practices. The authors extend previous works on this area by dividing trust into four dimensions, namely, economy-based trust, trust in bloggers, trust in the internet, and trust in blog providers. The study further showed that the first three dimensions are factors positively related to knowledge sharing. Shiue *et al.* (2010) studied the intention of online communities users to share knowledge by focussing on the relationship between social loafing and group cohesion. Results showed that social loafing is a significant negative predictor of group cohesion of users, while social ties and perceived risk have, respectively negative and positive, impacts on social loafing. Furthermore, social ties and perceived risk are strongly affected by anonymity, offline activities, knowledge quality, and media richness (Shiue *et al.*, 2010).

Specifically, some studies examined the motivations and determinant factors of knowledge sharing in a professional virtual community setting. Chiu *et al.* (2006) studied the knowledge sharing behavior of members of a professional virtual community and found that social interaction ties, reciprocity, and identification could increase quantitatively the knowledge sharing of individuals, whereas shared language and vision could qualitatively enhance knowledge sharing. Lin *et al.* (2009) also studied knowledge sharing behavior in professional virtual communities. The authors found that trust could significantly influence the factors that affect knowledge sharing behavior, including knowledge sharing self-efficacy, perceived relative advantage, and perceived compatibility. However, reciprocity norm does not have a significant relationship with knowledge sharing behavior. Chiu *et al.* (2011) investigated the motivations behind the intention of individuals to continue knowledge sharing (continuance intention) in open-professional virtual communities and confirmed that satisfaction with knowledge sharing is a critical factor. Their study also found that playfulness could directly affect the satisfaction and the intention to continue membership for community members, whereas positive self-worth disconfirmation, distributive justice, and interactional justice could only affect their satisfaction.

Other researchers have taken an interest in the use of social media to share information in emergency cases. Smith (2010) used the case of the Haiti earthquake in January 2010 to investigate how the responsibilities of traditional public relations to share information are distributed to social media users. The study expanded the understanding of online interactivity and demonstrated the fulfillment of public relations objectives by social media users. Yates and Paquette (2011) used the same case to explore the application of social media tools in emergency knowledge

management. Developed through action research, the case study illustrated the methods by which social media technologies are used, their influence on knowledge sharing, reuse, and decision-making, and how knowledge can be maintained effectively in knowledge sharing systems. Gruber *et al.* (2015) used a case study to show how Twitter can improve information transparency and engage stakeholders in the crisis management of a public university. The case study exemplified the growing importance of social media channels for leaders and organizations to engage in meaningful discourse and real-time sense making.

Several researchers have also explored the impacts of knowledge sharing in the social media environment. For example, Hsu and Lin (2008) analyzed the knowledge sharing factors of blog users in relation to their attitudes toward blogging. The study revealed that altruism and reputation, which are two major knowledge sharing factors, have positive effects on attitudes toward blogging. Subsequently, positive attitude toward blogging, along with other social factors (e.g. community identification), was found to influence the intention of bloggers to continue using blogs. Another study by Wei (2009) examined the impacts of different types of knowledge production (i.e. filter blogs and personal journals) on the social power of bloggers. The author attempted to determine whether and why people have various forms of knowledge production in the form of different blogs. Results showed that bloggers with higher socioeconomic status contributed more filter blogs than those with lower status. Socioeconomic status, gender, and print media use are associated with social influence even among filter bloggers.

3.1.4 Collaborative activities. Collaborative activity involves two or more people working together to complete a task. One of the major benefits of social media environments is that it can be easily exploited to enhance collaborative activities among users as well as between customers and companies. A number of studies that investigate various collaborative activities through social media have been conducted.

Several studies focussed on collaborative activities in relation to learning. Peppler and Solomou (2011) investigated the building of collaborative learning and creativity in social media environments, where learners collaborate with each other to create 3D architectural buildings in a game-like mission-learning environment. The authors found that the cultural values of a social media community facilitate the emergence of collaborative creativity and that social interactions through conversations are vital to promoting and sustaining individual engagement in the collaborative learning process. Remesal and Colomina (2013) considered the construct social presence (SP) as an essential component and studied the computer-supported collaborative learning process. Their qualitative case study on a collaborative writing activity enabled them to redefine SP as a result of constructive and evolutionary-discursive group interaction.

Other researchers have also turned their interest to collaborative activities in the area of product design and project operations. Piller *et al.* (2005) observed the growing demand for product personalization in contrast to mass customerization and examined the role of a collaborative customer co-design process in online communities to overcome mass confusion over uncertainties and risks. In light of the results, the authors challenged the assumption made by most researchers on mass customization that offering customized products requires an individual (one-to-one) relationship between customer and supplier. Using Wikipedia to examine the application of social media in collaborative projects, Kaplan and Haenlein (2014) provided important insights into the classifications of collaborative projects, the concept of crowd wisdom,

and motivations of readers and contributors. They also advised on how firms can leverage collaborative projects to establish online presence for internally communication with employees as well as external communication with stakeholders.

Hanaki *et al.* (2007) examined the cooperative behavior between individuals in an evolving social network with respect to their behavioral and interaction dynamics (i.e. whether behavior affects interaction or vice versa). They found that sparse networks could support scalable cooperation, that is, high levels of cooperation in large populations, if individuals are able to sever ties unilaterally and new ties can be created only with the mutual consent of parties involved. They also highlighted that cooperation in dynamic networks must be achieved by trading-off between local reinforcement and global expansion. Consequently, higher levels of cooperation tend to be developed from the costly ties and largely absent local structure of networks than from those in which ties are made easily and friends of friends are very likely to interact (Hanaki *et al.*, 2007).

3.1.5 Organization communications. Effective internal and/or external communications are important in performing basic management functions in an organization. The superior communication and interaction features of social media have led to its wide usage by firms and institutions.

A number of studies focus on the use of social media to enhance the communications in specific organizations. Bonsón and Flores (2011) examined the use of social media in terms of corporate dialogue and reporting at global financial institutions. They formulated a sophistication index to score the adoption of relevant Web 2.0 technologies and social media by a global financial entity to open corporate dialogue with stakeholders. Their results indicated that the size of the corporate web site and region of operations influenced the utilization of social media for corporate communications. Ligita and Kuvykaite (2012) built a structural model for social media communications that covers the process of organizational communication, as well as the preparation and assessment of the implementation of a communication strategy. They used a case study to illustrate the application of their model for promoting studies at public higher education institutions via social media.

The use of social media for organizational communications is also common in the government and public sectors. Picazo-Vela *et al.* (2012) consolidated the perceptions of risks and benefits of social media applications obtained from a focus group study with public servants from Central Mexico. They addressed the trade-off between perceived risks and benefits of using various social media applications for communication with the public and further suggested guidelines to enable the public sector to tap the benefits while reducing the risks. Mergel (2013) examined the social media measurement needs of departments and additional agencies of the executive branch of the US federal government. The author highlighted the negative influence of the lack of measurements on current practices to implement the Open Government Initiative (OGI) and engage in higher levels of online communication with stakeholders. Based on the articulated needs for measurement, existing rules regulating the extent of measurement practices, and technological features of the main social media platforms, the author developed a framework that traces online interactions to support the transparency, participation, and collaborative missions of OGI. Bertot *et al.* (2010) also studied governmental openness and transparency by means of e-government and social media to explore whether these information and communication technologies (ICT)-enabled efforts exhibit potential to create substantive social change in the public's attitudes toward transparency.

Their results showed that such efforts can be a cost-effective and convenient means to promote governmental openness and transparency and thus reduce corruption.

3.1.6 Education and training. Although social media platforms are not designed primarily for education and training, using social media to facilitate teaching and learning is a growing trend in the education sector, particularly for the use of “digitally native” students. Extensive studies on social media in the education sector have been conducted.

The pedagogical role of social media in the aspects of communication, collaboration, learning, and instruction in educational institutions is one of the areas that have been frequently explored. Hussain (2012) evaluated social media trends among university students in Pakistan and found that the vast majority of students use Facebook to communicate on academic activities and develop social networks throughout the world. This finding confirmed that social media plays a crucial role in the promotion of collaboration and connection of a virtual-educational community. Kassens-Noor (2012) explored the teaching practice of using Twitter as an active learning tool and investigated whether Twitter aids students in learning a specific subject matter. Through a comparative experiment in a small classroom setting, the study confirmed that Twitter facilitates sharing of ideas and instantaneous peer-to-peer communication in the knowledge creation of group learners. However, the study also found that the character limit constrained students’ critical thinking and self-reflection. Cao *et al.* (2013) focussed on educational outcomes and proposed a research model for investigating antecedents and consequences of using social media. Analysis of the quantitative responses of 168 faculty members using social media in their teaching indicated that their proposed model can provide educators with a depiction of how the educational use of social media improved performance in the classroom. Deng and Tavares (2013) conducted a qualitative study to examine the motivating and inhibiting factors that influence student engagement in online discussions in Moodle and Facebook. They found that the online engagement patterns of students are influenced by a set of factors concerning the technical tools, subjective perceptions, goals of online discussion, SP within a community, rules for participation, and roles of the participants. The findings of the study can inform educators and software designers on the methods for improving the promotion online discussions among students and the creation of a web-based environment that is conducive to learning.

Other researchers focussed their attention on the use of social media to construct an interactive environment for teaching and learning. McCarthy (2010) explored the blending of virtual and physical learning environments to enhance the university experience of first-year students through social and academic interactions between peers. The results showed that blending a traditional learning environment with social media could break language barriers and overcome social inhibitions to increase peer interaction and academic engagement of both local and international students. Chao *et al.* (2011) focussed on interactive social media-based teaching and learning environment and developed a software system that provides an environment in which students can log in with a mobile device to receive learning materials, “chat” online with other users during a lecture, tweet to their followers, post items to their Facebook page, and collaborate with each other on specific topics. In this environment, students can even ask, rate, and answer questions online. The instructors can also synchronize their lecture slides on students’ mobile devices, administer quizzes throughout the lecture, and display visual results for the quizzes.

Other researchers studied how the adoption of social media can support the design of pedagogical curricula. Baird and Fisher (2006) investigated the formation of a rapidly developing digital pedagogy for today's internet-centric students who are ready to embrace the new student-centered, technologically and socially rich learning environment. Using current adult and social learning theories and aligning them with user-experience design strategies, the authors found that social networking media and other emerging technologies can be integrated into the new curriculum to support the special learning styles of neo-millennial students, facilitate the formation of learning communities, foster student engagement and reflection, and enhance the overall user experience for students in synchronous and asynchronous learning environments. Pektaş and Gürel (2014) focussed on blended learning in design education and discovered that considerable effort is needed to develop effective courses and tools consonant with the unique characteristics of the blended disciplines. Based on student experiences in a "blended design studio" that combined the Moodle learning management system, live videoconferencing, and social networking media (Facebook) with traditional face-to-face learning (design studio), the study revealed that the characteristics of soft-applied fields required various customizations of blended courses and educational system designs.

Social media can also be adopted to support the development of educational instructions and facilities. For example, Sranamkam (2012) developed a web-based instruction model by using social media applications to enhance the knowledge management skills of teachers on computer tablets. Through the use of a quasi-experimental case study of 48 teachers in Thailand, the author found that the proposed model outperformed the general standard criteria in terms of efficiency and could significantly improve the knowledge management skills of teachers. Click and Petit (2010) analyzed the deployment of social media tools and technologies for library instruction and information literacy training. From the practical operations in libraries, the study contended that these social media tools not only allowed libraries to improve their understanding of users but also aided library users in becoming information creators. The tools also facilitated professional development among researchers.

3.1.7 Others. In addition to the above-mentioned disciplines, social media applications can be found in many other areas. Several studies focussed on the use of social media in tourism industry. For example, Xiang and Gretzel (2010) investigated the extent to which social media appeared in search engine results in the context of travel-related searches. Analysis of the search results showed that social media constitute a substantial part, thereby confirming the growing importance of social media in the online tourism domain. Parra-López *et al.* (2010) proposed a theoretical model that explained the factors determining the intention to use social media to obtain information when organizing and taking vacation trips. The study revealed that the perceived benefits of that use (i.e. functional, psychological, hedonic, and social) and incentives on use and adoption significantly affect the intentions to use social media, however, the costs of use do not.

Other researchers concentrated on the public relationships (PR) sector and examined the effects of social on corporate messages. Eyrych *et al.* (2008) studied the use of social media in PR practices and surveyed 283 working PR practitioners on their adoption of 18 social media tools, as well as their perception of the growth of social media trends in PR practice. The results provided an overview of the practitioners' adoption of social media and also revealed that the more advanced users who were using more specialized

social media tools had a greater feeling that social media have been integrated widely into the industry than general users using the more common tools. Steyn *et al.* (2010) studied the major factors that influenced bloggers to use social media release (SMR), a blend of the traditional press release and digital social media, within the PR community. Using the technology acceptance model (TAM) as a theoretical framework, the authors specifically examined bloggers' perceptions on the usefulness and ease of use of SMR. The findings implied that current use of SMR and blogger's perception on the effectiveness and use of SMR by others influence bloggers' intentions to use SMRs in the future. The authors also determined that business opportunities for PR firms may be able to provide education and training on the use, construction and deployment of SMRs.

Several other studies focussed on the medical sector. Denecke and Nejd1 (2009) used content analysis to study health-related information provided on the web to obtain an overview of available medical content. The authors presented a method for classifying blogs based on content, which exploits high-level features and describe the medical and affective content of blog posts. Results showed that in terms of contents, substantial differences could be observed between various health-related web resources. The authors further suggested that the content differences on knowledge or information can be exploited by search engines to improve ranking, and search, and direct users to appropriate knowledge sources. Brown-Johnson *et al.* (2015) evaluated the feasibility of using a three-dimensional health game to coach lung cancer patients and address emotionally charged issues. The findings indicated that the games can strength communications between clinicians and patients, as well as self-management of patients.

3.2 Social media tools and technologies

Social media is not a technology breakthrough *per se* but rather could be considered as an ongoing evolution of Web 2.0 platform (Kaplan and Haenlein, 2010). The term "Web 2.0" was coined by Tom O'Reilly in 2004 to refer to the type of web site where people can retrieve, share, write, and store information as desired. The underlying technologies of Web 2.0 include basic internet technologies for publishing static web pages in the first stage of the World Wide Web (e.g. HTML and server side programming languages) and additional tools and technologies for creating dynamic web environment to facilitate user interaction and collaboration (e.g. Adobe Flash, RSS, and AJAX). In recent years, the significance of the term became blurred with the proliferation of different web technology terminologies.

Social media technologies comprise a wide range of tools and technologies, such as media sharing sites, blogs/microblogs, social bookmarking sites, virtual/online communities, SNSs, and virtual worlds. These tools provide people with various ways to interact and share information and knowledge with friends and the public. Although Kaplan and Haenlein (2010) proposed two dimensions, including the SP/media richness and self-presentation/self-disclosure, for categorizing social media tools, this classification scheme is not widely accepted in the literature. For simplicity, we classified the tools by the level of interaction enabled through them, given that interaction is an essential driver of social community formation. With respect to intensity of interaction, media sharing sites that mainly allow individuals to share videos and photos to the public or selected groups of people are the weakest, whereas virtual worlds that allow people to interact directly within the simulated environment are the strongest. The other tools are within this continuum.

This sub-section provides a list of the major types of tools and technologies together with a succinct discussion on how they are adopted in support of the system development of social media applications. Representative tools for each group of social media technologies and the respective potential applications as outlined in the papers reviewed are summarized in Table II.

3.2.1 Media sharing sites. Media sharing sites allow users to upload, organize, and share multi-media materials, including videos, audio, and photos, with people and/or selected communities. Examples of such sites are YouTube, Instagram, and Flickr. Media sharing sites were developed originally for individuals to share personal information and/or materials to friends and other people but have gradually evolved to become a sophisticated communication channel for companies to promote their products and corporate image through conveyance of organization messages to stakeholder groups or communities (e.g. Bonsón and Flores, 2011), as well as for educational organizations to support student learning by distributing digital learning resources (e.g. Baird and Fisher, 2006; Click and Petit, 2010; Sranamkam, 2012).

3.2.2 Blogs/microblogs. Blogs and microblogs are considered as a push technology in which the authors post their writings or information in the hope that someone will read them. Blogs are widely used by writers who aim to record or share messages, information, interests, and daily activities with other people whom they may or may not know. Blogger.com is an example of a blog site. Microblogs are considered to enjoy a short half-life (Weinberg and Pehlivan, 2011) because messages are quickly replaced and disappear. Twitter, Plurk, and Weibo are examples of microblogs. The advent of internet phones introduced microblogs that limit messages to 140 characters instead of long passages. Both blogs and microblogs have been widely used in marketing, CRM, knowledge sharing, organization communications, and education and training (e.g. Baird and Fisher, 2006; Bonsón and Flores, 2011; Chao *et al.*, 2011; Chua and Banerjee, 2013; Click and Petit, 2010; Colliander and Dahlén, 2011; Fisher and Baird, 2005; Hsieh *et al.*, 2010; Jin and Phua, 2014; Kassens-Noor, 2012; Kozinets *et al.*, 2010; Pentina *et al.*, 2013; Smith, 2010; Wei, 2009).

3.2.3 Social bookmarking sites. Instead of providing a platform for users to upload and share media contents directly, social bookmarking sites provide services and facilities for individuals to store and share bookmarks of web contents. Examples of such sites are Delicious, Pinterest, and Digg. People can use tags collaboratively in these social bookmarking sites to annotate and categorize the content they found interesting. The application of social bookmarking in education has drawn the attention of educators since the conception of social media (e.g. Baird and Fisher, 2006). Recently, marketers have also found ways of using social bookmarking sites for promotion, such as creating viral campaign or conducting collaborative activities (e.g. Kaplan and Haenlein, 2014).

3.2.4 Virtual/online communities. Virtual/online communities are social networks of individuals on a web site who share specific information and interests through interactive tools, such as e-mail, chat rooms, forums, and discussion boards. Examples of such communities are Lonely Planet and Yahoo Answers. The involved individuals are normally not acquaintances but may subsequently build a community of influence in specific areas, such as discussions of product performance, collaborative opportunities, and knowledge sharing. Web sites are not limited by geographical or political boundaries, and thus, virtual/online communities receive increasing attention and become influential in practice. A number of social media studies have been

Table II.
Social media tools
and technologies

Level of interaction	Groups of tools/technologies	Application areas
Weakest	<p>Media sharing sites</p> <p>Allow users to upload, organize and share multimedia materials with people and/or selected communities (e.g. YouTube, Vimeo, Instagram, Flickr)</p> <p>Blogs/microblogs</p> <p>Allow authors post their writings or information on the web, hoping someone will read them (e.g. Blogger.com, Twitter, Plurk, Tumblr, Weibo)</p> <p>Social bookmarking sites</p> <p>Allow users collaboratively use tags to annotate and categorize the web contents they found interested (e.g. Delicious, Pinterest, Digg, Foursquare)</p> <p>Virtual/online communities</p> <p>Allow individuals share specific information and interests through interactive tools on a web site (e.g. Lonely Planet, Yahoo Answers)</p> <p>Social networking sites</p> <p>Facilitate individuals build social relationships and interests among friends and acquaintances (e.g. Facebook, LinkedIn, Google Plus+)</p> <p>Virtual worlds</p> <p>Provide computer-simulated environments in web sites where people can live in a virtual world (e.g. Second Life, Active World, Kaneva, Onverse, SmallWorlds, There.com, Twinity)</p>	<p>Organization communications (e.g. Bonsón and Flores, 2011)</p> <p>Education and training (e.g. Baird and Fisher, 2006; Click and Petit, 2010; Sranamkam, 2012)</p> <p>Marketing (e.g. Colliander and Dahlén, 2011; Jin and Phua, 2014; Kozinets <i>et al.</i>, 2010; Pentina <i>et al.</i>, 2013)</p> <p>Customer relationship management (e.g. Chua and Banerjee, 2013; Hsieh <i>et al.</i>, 2010)</p> <p>Knowledge sharing (e.g. Hsu and Lin, 2008; Smith, 2010; Wei, 2009)</p> <p>Organization communications (e.g. Bonsón and Flores, 2011)</p> <p>Education and training (e.g. Baird and Fisher, 2006; Chao <i>et al.</i>, 2011; Click and Petit, 2010; Kassens-Noor, 2012)</p> <p>Public relationships (e.g. Steyn <i>et al.</i>, 2010)</p> <p>Medical sector (e.g. Denecke and Nejd, 2009)</p> <p>Collaborative activities (e.g. Kaplan and Haenlein, 2014)</p> <p>Education and training (e.g. Baird and Fisher, 2006)</p> <p>Marketing (e.g. de Valck <i>et al.</i>, 2009; Hsiao <i>et al.</i>, 2010; Nambisan and Watt, 2010)</p> <p>Customer relationship management (e.g. Chua and Banerjee, 2013; Porter and Donthu, 2008)</p> <p>Knowledge sharing (e.g. Chang and Chuang, 2011; Hau and Kim, 2011)</p> <p>Collaborative activities (e.g. Piller <i>et al.</i>, 2005)</p> <p>Marketing (e.g. Gamboa and Gonçalves, 2014; Moncrief <i>et al.</i>, 2015; Trusov <i>et al.</i>, 2009; Tsai and Men, 2013)</p> <p>Customer relationship management (e.g. Chua and Banerjee, 2013; Hajli, 2014b)</p> <p>Organization communications (e.g. Bonsón and Flores, 2011)</p> <p>Education and training (e.g. Chao <i>et al.</i>, 2011; Click and Petit, 2010; Deng and Tavares, 2013; Hussain, 2012; McCarthy, 2010; Pektaş and Gürel, 2014; Sranamkam, 2012)</p> <p>Marketing (e.g. Krasonikolakis <i>et al.</i>, 2014; Moncrief <i>et al.</i>, 2015)</p> <p>Knowledge sharing (e.g. Hau and Kim, 2011)</p> <p>Collaborative activities (e.g. Peppler and Solomou, 2011)</p> <p>Medical sector (e.g. Brown-Johnson <i>et al.</i>, 2015)</p>
Strongest		

undertaken in the areas of marketing, CRM, collaborative activities, and others (e.g. Chua and Banerjee, 2013; de Valck *et al.*, 2009; Dholakia *et al.*, 2004; Hsiao *et al.*, 2010; Piller *et al.*, 2005; Porter and Donthu, 2008; Ren *et al.*, 2007, 2012). Marketers and politicians alike should keep a close eye on how products of a firm fare and how online communities comment in the virtual/online communities.

3.2.5 SNSs. SNSs focus on building social relationships and interests among friends and acquaintances. Examples of SNSs are Facebook, LinkedIn, and Google Plus+. SNSs mainly attract specific groups of users with common ties to share social interactions. The use of SNSs has rapidly become pervasive in the daily life of the online population. Marketers and organizations have tapped business opportunities provided by SNSs and found a vast number of useful applications in marketing, CRM, organization communications, and education and training (e.g. Bonsón and Flores, 2011; Chao *et al.*, 2011; Chua and Banerjee, 2013; Click and Petit, 2010; Gamboa and Gonçalves, 2014; Hajli, 2014b; Hussain, 2012; Deng and Tavares, 2013; McCarthy, 2010; Moncrief *et al.*, 2015; Pektaş and Gürel, 2014; Sranamkam, 2012; Trusov *et al.*, 2009; Tsai and Men, 2013; Zhong *et al.*, 2011).

3.2.6 Virtual worlds. As the power of computing and web technologies grows, people build computer-simulated environments in web sites that lead to virtual world environments, such as Second Life and Active World. These are also known as second lives, where people can live in a virtual world with a job, house, car, and social activities. As such, the virtual world is becoming a platform for business transactions and product introductions. The virtual worlds represent a big business opportunity and thus attract interest from many researchers in marketing, knowledge sharing, collaborative activities, and other areas (e.g. Brown-Johnson *et al.*, 2015; Hau and Kim, 2011; Krasnikolakis *et al.*, 2014; Moncrief *et al.*, 2015; Pepler and Solomou, 2011).

3.3 Theories and models for social media

Theories and models can be used to explain a phenomenon or topic under investigation. They also work as paradigms to underpin research design. In social media research, many personal/social behavior theories and models have been used as foundations for the design and development of application systems. Several studies have utilized of a combination of theories and models to study the socio-psychological behavior of social media users and different stakeholders, including marketing professionals and customers. Other studies examined the links between social media structure and human agency behavior, whereas others explained the influence of mass communication characteristics and the functions of social media on user behavior. Figure 1 and Table III shows that the theories and models proposed in the social media

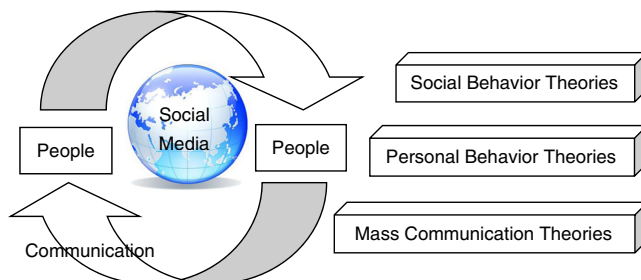


Figure 1.
Groups of
theoretical models
of social media

Groups of theory/model	Related theories/models	Application areas
<i>Personal behavior theories</i>		
	Personality traits (Digman, 1990) Explain how personal characteristics affect one's subsequent behavior	Marketing (e.g. Pentina <i>et al.</i> , 2013)
	Technology acceptance model (TAM) (Davis, 1989) Analyze the effect of people's perceived ease of use and perceived usefulness on their attitude toward new technology adoption	Marketing (e.g. Hajli, 2014a) Education and training (e.g. Chao <i>et al.</i> , 2011)
	Theory of reasoned action (TRA) (Ajzen and Fishbein, 1975, 1980) Predict people's volitional behavior based on their attitudes and subjective norms	Public relationships (e.g. Eyrich <i>et al.</i> , 2008; Steyn <i>et al.</i> , 2010) Knowledge sharing (e.g. Hsu and Lin, 2008)
	Theory of planned behavior (TPB) (Ajzen, 1985) Extend TRA to include perceived behavior control to moderate the effects of attitudes and subjective norms on people's behavior	Knowledge sharing (e.g. Hau and Kim, 2011)
<i>Social behavior theories</i>		
	Social capital (Bourdieu, 1985) Explain the influence of social connections and social relations on goal achievement	Customer relationship management (e.g. Porter and Donthu, 2008) Knowledge sharing (e.g. Chai and Kim, 2010; Chang and Chuang, 2011; Chiu <i>et al.</i> , 2006; Hau and Kim, 2011; Lin <i>et al.</i> , 2009)
	Social cognitive (Bandura, 1986) Describe how individual learns from observation, modeling, and motivation of others	Knowledge sharing (e.g. Chiu <i>et al.</i> , 2006; Lin <i>et al.</i> , 2009)
	Social loafing (Latané <i>et al.</i> , 1979) Explain how individual exert their effort while working in groups and when alone	Knowledge sharing (e.g. Shiue <i>et al.</i> , 2010)
	Social power (French and Raven, 1959) Explain and predict one's ability to influence others	Knowledge sharing (e.g. Gruber <i>et al.</i> , 2015; Wei, 2009)
	Social identity (Tajfel, 1974) Examine how categorizing people (including oneself) into ingroups or outgroups affects one's perceptions, attitudes, and behavior	Marketing (e.g. Jin and Phua, 2014)
	Interpersonal attraction (Festinger <i>et al.</i> , 1950) Explain the force generated from the positive feelings about another people that can draw these two people together	
<i>Mass communication theories</i>		
	Para-social interaction (PSI) (Horton and Wohl, 1956) Analyze the one-sided influence of celebrities on consumer behavior in various media	Marketing (e.g. Colliander and Dahln, 2011; Jin and Phua, 2014; Tsai and Men, 2013)
	Uses and Gratifications Theory (UGT) (Blumler and Katz, 1974) Explain why and how people actively seek out specific media to satisfy specific needs	Customer relationship management (e.g. Porter and Donthu, 2008)

Table III.
Theories and models
for social media

literature can be categorized into three groups based on the aspects focussed upon, including personal behavior theories, social behavior theories, and mass communication theories.

3.3.1 Personal behavior theories. Personal behavior theories focus on explaining the behavior of individuals displayed in response to certain internal and external stimuli. This group of theories, which include personal traits, TAM, theory of reasoned action (TRA), and theory of planned behavior (TPB), elicit the personal factors that can be utilized to evaluate, motivate, and manage user behavior in social media.

Personality traits are accepted as individual characteristics by which to qualify personalities and predict behavior. In his five-factor model, Digman (1990) categorized personality traits into five broad dimensions, namely openness, conscientiousness, extraversion, agreeableness, and neuroticism. These five traits, representing a cluster of correlated personalities, are frequently adopted by researchers to explain the behavior of the users of innovative technologies individually or collectively. Many studies have sought to discover people's motivations for using social media or participating in online communities. For example, Correa *et al.* (2010) investigated the relationship between the use of social media and three dimensions of the big-five model of personality traits (i.e. extraversion, emotional stability, and openness to experience). Results revealed that while extraversion and openness to experiences are positive predictors, emotional stability is a negative predictor, of social media use after controlling for socio-demographics and life satisfaction. Zhong *et al.* (2011) probed the associations between SNSs use and the two factors of personality traits, that is, need for cognition (NFC) and ICT innovativeness. The findings showed that SNSs use is negatively associated with NFC and positively associated with ICT innovativeness. People who spent a long time on SNSs are more likely to be multi-taskers who spend considerable time both in studying or working online and in surfing the web with no specific purpose. System developers can use these traits as basis for classifying user behavior into different groups and evaluating the responses of each group toward each specific system. The same can also be used to predict or anticipate customer behavior in the use of information systems (Wang *et al.*, 2012). In this way, system developers can improve system design. Personality traits theory can also be extended to many social media applications (e.g. Pentina *et al.*, 2013).

Davis (1989) developed a theory of TAM to model the effect of perceived ease of use and perceived usefulness on users' attitude toward the adoption of new technologies. TAM is widely exploited in information system to examine users' acceptance of different innovative technologies and applications. This system also includes social media applications particularly in marketing, education and training, and public relations (e.g. Chao *et al.*, 2011; Eyrych *et al.*, 2008; Hajli, 2014a; Steyn *et al.*, 2010). TAM can provide a theoretical framework for establishing measures to evaluate and predict the value of social media applications. These measures can help managers and system developers to develop more successful social media applications.

Ajzen and Fishbein (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) established another theory of TRA to predict people's volitional behavior based on their attitudes and subjective norms. This theory is cited widely in social media research on the motivation of voluntary participation and involvement in social media activities (e.g. Hsu and Lin, 2008). Ajzen (1985) further extended TRA to form the TPB by adding perceived behavior control to moderate the effects of attitudes and subjective norms on volitional behavior. TPB has also been used in social media

research to predict the behavior of social media users from intention to action (e.g. Hau and Kim, 2011). Both TRA and TPB allow companies to develop effective plans that utilize volitional behavior to improve customer engagement with social media applications.

3.3.2 Social behavior theories. Social behavior theories are the frameworks of empirical evidence used to study and interpret social phenomena. Unlike personal behavior theories, social behavior theories focus on group behavior, from which, group dynamics are found to directly affect user behavior and their involvement in social activities. A wide range of theories and models can be found in this group, such as social capital, social cognitive, social loafing, social power, social identity, and interpersonal attraction. Companies can apply these theories to identify key social factors that stimulate users to participate in collective actions in their social media platforms. These factors in turn, can be used in developing strategies to foster the necessary environments for building and maintaining social communities.

Social capital theory, which was first analyzed by Pierre Bourdieu (1985) for modern sociology, is the most popular theory used in social media research and emphasizes the importance of using social connections and social relations in achieving goals for individuals, social groups, organizations, and communities (Lin, 1999, 2001; Portes, 1998). This theory is particularly useful in the areas of CRM and knowledge sharing to analyze the socio-psychological and volitional behavior of social media users (e.g. Chang and Chuang, 2011; Chai and Kim, 2010; Chiu *et al.*, 2006; Hau and Kim, 2011; Lin *et al.*, 2009; Porter and Donthu, 2008).

Social cognitive theory, which started as the social learning theory in the 1960s by Albert Bandura, states that people learn behaviors through observation, modeling, and motivation from others in social communities (Bandura, 1986). This type of social learning would be strengthened if the observers identified with their “model” and if an individual models a behavior that he or she has seen to be rewarded. This theory is commonly used in social media research, particularly in the study of knowledge sharing (e.g. Chiu *et al.*, 2006; Lin *et al.*, 2009).

Latané *et al.* (1979) developed another social behavior theory, social loafing theory, to reflect the fact that people put less individual effort when working in groups than when working alone. The theory helps companies understand the social loafing effect, particularly the “free-rider” and “sucker” effects (Shepperd, 2001), to devise methods for reducing these effects and stimulating individuals to contribute more to social communities. Social loafing theory is often used in conjunction with social ties in social media research to investigate the social loafing phenomenon of sharing knowledge on social media platforms (e.g. Shiue *et al.*, 2010).

French and Raven (1959) suggested five sources of social power (which they called the Five Bases of Power) that relate to one’s ability to influence others: reward, coercive, legitimate, referent, and expert power. Social power is a potent means by which social media can exhibit its influence on users. Such power has exhibited increasing significance in the age of the internet. Social power theory suggests ways for organizations to cultivate social power to strengthen the influencing power of their social media applications (e.g. Gruber *et al.*, 2015; Wei, 2009).

Two more social behavior theories are frequently used in social media research, namely social identity theory and interpersonal attraction theory. Social identity was developed by Henri Tajfel (1974). This theory examines the effect of categorizing people (including oneself) into ingroups or outgroups based on one’s perceptions, attitudes,

and behavior. The interpersonal attraction theory, which was proposed by Festinger and his colleagues (Festinger *et al.*, 1950), refers to positive feelings of another person, including love, friendship, lust, and admiration (Johnson *et al.*, 1983). These two social behavior theories are two distinct views of the formation of social groups or communities. Social identity stresses the importance of group identity, whereas interpersonal attraction highlights the significance of individual relationships in building member attachment. These two very different perspectives continue to attract significant research efforts that focus on investigating its effects on the attachment of members in online communities, including various social media platforms (e.g. Jin and Phua, 2014; Ren *et al.*, 2007, 2012).

3.3.3 Mass communication theories. Mass communication theories are concerned with the effects of mass communication on the activities of individuals in social communities. Theories of this group reveal distinct characteristics of effective social communications that can assist in the use of social media for communication and marketing. Many studies have been conducted to develop theories to understand the characteristics and patterns of social communications. Some of the most relevant theories to social media are further explained below.

PSI is a theory developed in the mid-1950s by Horton and Wohl (1956) to study the one-sided influence of celebrities on consumer behavior in television and film media. In a study of web site visitation rates, Eighmey and McCord (1998) observed that the PSI between web sites and their visitors (i.e. users) is related to the repeat visits to web sites. Although the application of the PSI theory to social media research is limited, the PSI effect is apparent in social media communities. Companies can use PSI theory as a foundation for formulating an effective social media marketing strategy, particularly in marketing campaigns and brand building, to create para-social relationships and influence customer behavior (e.g. Colliander and Dahlén, 2011; Jin and Phua, 2014; Tsai and Men, 2013).

Uses and gratifications theory (UGT) provides a foundation for understanding why and how people actively seek for a specific media to best fulfill their needs (Blumler and Katz, 1974). UGT is an audience-centered approach and is widely applied to understand mass communication in traditional media. For example, Eighmey and McCord (1998) studied the UGT factors required to engage web site visitors. In social media research, UGT is used to identify factors to satisfy customer needs and encourage participation in social networks. Dholakia *et al.* (2004) developed a social influence model to study consumer participation in virtual communities. Their findings supported the assertion that group norms and social identity are the key determinants of participation and that virtual community moderates consumers' reasons for participating, as well as the strength of their influence on group norms and social identity. Another study by Jeong and Lee (2013) examined the effect of online media platforms on the intention to join a cause and discovered that SNSs are more effective in increasing the intention than non-SNSs. The study also revealed that the perceived visibility of SNS has superior effect on the intention to join the cause for people with a high public self-consciousness but not for people with a high self-cause image congruence, and self-cause image congruence itself exhibits positive influence on the intention to join the cause. Zolkepli and Kamarulzaman (2015) studied the role of media needs and innovation characteristics with regard to social media adoption. Their findings suggested that social media use is significantly driven by three types of need, including personal, social, and tension release. These needs, in turn, are

motivated by various social media innovation characteristics that increase the likelihood of usage. Overall, UGT provides a basis for managers to plan and design their social media applications to improve customer experience and to engage them.

3.4 Conceptual framework for social media applications

Using the findings of the above-mentioned literature review, we can see that social media are widely applicable to various business domains. In light of the purpose and nature of the application, we found that researchers have used different information and computer-enabled social media tools and technologies to set up these systems. We also found that a number of personal and social behavior theories and models were adopted by researchers to underpin the design planning and development process of social media applications. Accordingly, we propose a conceptual framework to illustrate these interrelationships.

Figure 2 shows that the field of social media applications is multi-disciplinary, including such areas as marketing, knowledge sharing, CRM, collaborative activities, organizational communications, education and training, and several other areas. The design and development of each application system are underpinned by different personal and social behavior theories and models, including personal behavior theories (e.g. personal traits, TAM, TRA, and TPB), social behavior theories (e.g. social capital, social cognitive, and social power), and mass communication theories (e.g. PSI and UGT), and are encompassed by a wide variety of social media tools and technologies, such as mediasharing sites (e.g. YouTube and Instagram), blogs and microblogs (e.g. Twitter and Weibo), social bookmarking sites (e.g. Delicious and Pinterest), virtual and online communities (e.g. Lonely Planet and Yahoo Answers), SNSs (e.g. Facebook and LinkedIn), and virtual worlds (e.g. Second Life and Active World). Using this model, we argue that when researchers and system developers design and develop social media applications, they should first understand the theoretical foundations of a system, and based on these foundations, choose the right tools and technologies and process the design, development, and implementation of the system.

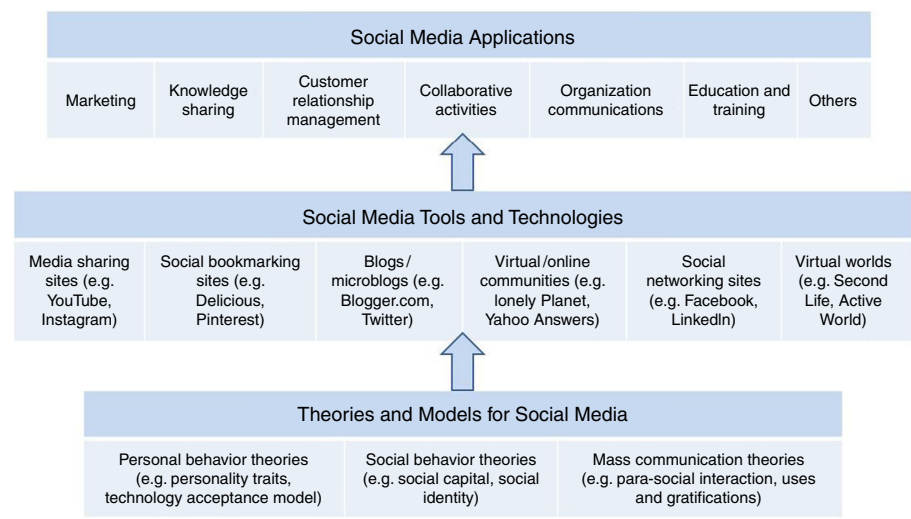


Figure 2.
A conceptual
framework for social
media application
development

4. Stage two empirical case study

The literature review in stage one has found a variety of social media research related to applications, tools and technologies, and theories and models. This review shows that good progress has been achieved in producing theories to explain and model user behavior, intentions, and actions in social media. However, the key practical value of these theories and models, which provide a solid theoretical framework for developing real social media applications to engage users, remains largely unexploited. Hence, to fill this “application gap,” the second stage of this study outlines an empirical case study to investigate the adoption of various personal and social behavior theories and models to support the development of social media applications, which includes the rationale of the selection of social media tools and technologies as well as the theoretical basis for the design and implementation of the system.

4.1 Problem background

Established in 1905, RI is the world’s first service club organization. Today, RI has more than 1.2 million members in 34,282 clubs worldwide. Following the motto “Service above Self,” rotary club members are local, regional, and international volunteers devoted to “combat hunger, improve health and sanitation, provide education and job training, promote peace, and eradicate polio”. Rotary International District 3450 (RID3450) is the regional office of RI in Hong Kong, which encompasses 73 clubs with 2,000 members in Hong Kong, Macau, Mongolia, and Guangdong Province of the People’s Republic of China.

As early as April 2012, RID3450 launched its first social media marketing campaign through the development of its Facebook page (<https://www.facebook.com/Rotary3450>), but the results were disappointing. By the end of April 2013, the Facebook page had attracted only 100 fans and included members with poor interaction and poor engagement rates. Members also expressed that they did not even visit the web site (www.rotary3450.org) regularly. On May 1, 2013, the Chief District Secretary (CDS) of RID3450 was asked to revive their Facebook page and web site with an aim of improving this situation.

4.2 Revamping the social media application and the web site

Having reviewed the previous system, the CDS found that both the Facebook page and web site had not been thoroughly designed and linked for marketing purposes. To benefit from social media research, the CDS began to consider a re-design of their social media system. Specifically, the CDS aimed to build a fan community, engage members, and encourage them to share knowledge. The revamping process began with a consideration of various personal and social behavior theories and models and the selection of the most appropriate social media tools and technologies to build the new system. Finally, the re-developed system was launched officially by RID3450 in early 2014.

4.2.1 Theoretical considerations. In the design and development of the new system, the research team took reference from our proposed conceptual framework of social media application development (see Figure 2). The theoretical considerations for aligning social media efforts of RID3450 with its objectives are discussed with respect to people, social, and communication aspects in the following subsections.

People aspect. According to TAM, perceived ease of use and perceived usefulness are two critical factors for user acceptance of new technologies. Facebook is the most popular social media platform, providing a simple interface for individuals to establish

and maintain social relationships with family members and friends. Facebook can also help disseminate and share information rapidly and can be trusted as a tool for perceived usefulness. Moreover, the attitudes of Facebook users can be measured by reviewing their “Like” responses to events or photos and can be predicted by their participation and engagement, as stated in TRA and TPB.

Social aspect. Following the social power theory, district leaders and club leaders can exert “referent power” if they “Like” or show support for any photos or events, as this act will certainly affect the responses, participation, and engagement of members. Therefore, management can alert leaders to new items posted on the Facebook page to enhance members’ attachment. In addition, as indicated in social capital theory, the social capital of members helps to promote social interactions and social ties. The social capital of a member, such as trust, is believed to help build more social ties with his or her friends and encourage their interests in the activities launched by RID3450.

Establishing the group identity of RID3450 by incorporating the features of social identity and interpersonal attraction on its Facebook page and web site can engage more members and improve their attachment. Creating private user groups on the Facebook page for different stakeholders will facilitate the establishment of a group identity and sharing of group information. Encouraging members to use the sharing functions of the Facebook page to share personal interests and communicate with each other will strengthen the social bonds among members.

Communication aspect. According to the PSI theory, inviting celebrities to promote service projects and fellowship events of RID3450 could attract the attention of existing or potential members. In addition, by uploading information of such activities and related photos, according to UGT, the fans of RID3450 who are members are likely to build brand loyalty, and those who are non-members are likely to decide to become members. Through the analysis of the fans’ responses and activities on the Facebook page, the district leaders of RID3450 can better understand the needs of their members.

4.2.2 Selecting social media tools and technologies. RID3450 must select appropriate social media tools and technologies to implement the target applications to achieve its objectives of engaging members and encouraging knowledge sharing. In 2012, when RID3450 began to experiment with Facebook for marketing purposes, they did so without duly considering their social media requirements and strategy. In the new revamping exercise, RID3450 should clearly define the social behaviors and communication needs of their members before selecting the right social media tools and technologies to reach out to them. They should also adopt social media theories and models to serve as a solid foundation for identifying the requirements of a membership community and suggesting solutions best suited to RID3450.

The analysis shows that Facebook, which is the most widely used social media in Hong Kong and in the region, provides adequate functions to build virtual communities to connect with members and implement strategies to motivate them to share their experiences and knowledge. With its great popularity as a platform, Facebook would be most convenient tool for RID3450 to engage current members and recruit new members. However, Facebook cannot provide the flexibility of creating an infrastructure for knowledge sharing. Thus, instead of relying solely on the Facebook page, RID3450 should also use Web 2.0 technologies to build an online resource center to distribute resources to members and direct them to those resources through the social media platform. Moreover, as Facebook can only support asynchronous communication, RID3450 should also use the web-based

videoconference software, Webinar, as a platform to provide synchronous communications between members for online seminars and training courses.

4.2.3 Practical implementation of the system. The new social media system developed for RID3450 serves a number of application areas in its daily operations, including marketing, CRM, knowledge sharing, collaborative activities, organizational communications, and education and training. The practical issues of implementing the new social media system of RID3450 with respect to these areas are discussed in the following sections.

Marketing. The Facebook page can be used as a channel for communicating with members promote and for promoting the service projects and fellowship events of RID3450. The page can be used intensively for the following purposes:

- to add all district and club events and services to the event calendar to keep members and fans updated on the daily developments of RID3450;
- to create and add events and to send invitations; and
- to upload photos of events and services at the district and club levels to build a public image.

CRM. On the Facebook platform, customer care experiences can be enriched by the interactions of fans, such as their “Like” responses to photos, sharing with friends, expressing their opinions, and indicating attendance at events. Members’ opinions and praise for service projects or fellowship events at the district and club levels reflect their positive experiences, which will facilitate understanding of the needs of their members and fans on the part of the club leaders.

Knowledge sharing. For information and knowledge sharing, an online resource center was developed for district officers, club presidents, and secretaries. The resources, comprising resource files for public relations, minutes of the meetings of joint presidents and secretaries, training materials, and relevant PowerPoint files, can be posted on the online resource center for the district and club leaders to download. In facilitating the sharing of knowledge among different stakeholders, the following four private Facebook groups were created:

- (1) “President Group” composed of presidents and core district officers, 91 members;
- (2) “District Officer Group” composed of club secretaries and core district officers, 49 members;
- (3) “Executive Assistant Group” composed of assistant governors and district secretary teams, 13 members; and
- (4) “Secretariat Group” composed of district secretary teams, 17 members.

The purpose of these private groups is to link the district governor with the relevant core leader groups among the assistant governor teams, district secretary teams, club presidents, and secretaries. The Facebook page and web site of RID3450 can serve as a hub to share with members the news, latest trends, notices, training resources, and public relations news received from the headquarters of RI.

Collaborative activities. Through fan-taken and contributed photos from service projects or fellowship events, the Facebook page of RID3450 serves as a collection of resources and builds a record of the experiences of its members. Indeed, allowing members to tag fans in photos can help them co-develop the Facebook community.

Organizational communications. Upon the implementation of the new system, a message from the district governor was broadcast on the Facebook page RID3450. A weekly e-newsletter covering the activities and events of the regional division will be posted on the web site every Friday, and reminders with direct web links will be sent to the registered e-mail addresses of members. E-mail alerts will help alleviate the negative customer experiences of failing to receive news updates on RID3450, which had occurred in the past because all notices were sent only to club presidents. Online monthly reports on club membership and attendance have been posted since July 2013. Up to July 2014, the District Secretary has received 700 reports from clubs online, which reflects an 81 percent adoption rate from 864 reports (online and paper).

Education and training. Information on both RI and RID3450 will be stored in the online resource center to assist club presidents and secretaries in carrying out their duties. The web site provides links to RI resources for education and learning purposes. Training on membership and social media development can be conducted through “Webinar Workshops” for the district and club leaders in Hong Kong, Macau, and Mongolia.

4.3 Deliverables and lessons learned

By applying the theories and models specified in our proposed social media application development framework to the design and implementation of its Facebook page and web site, RID3450 successfully increased its fan base by more than ten times after 14 months up to a total of 1,212 fans as of July 22, 2014. The fans are observed to be engaged actively in the page. More than 150 photo albums comprising 16,000 photos related to 140 events were uploaded to the Facebook page and the web site. These photos were well-organized, with one photo album per service project or fellowship event. The online resource center is password protected to restrict access to designated private group users, who can access it anywhere and anytime. More than 100 files and notices were uploaded to the resource center of the President Group for easy retrieval. This act significantly aided the information office of RID3450 in Hong Kong in responding to individual requests for resources.

A celebrity was invited as an ambassador to promote the “End Polio International Charity Campaign” as well as other events. A photo album was uploaded to the Facebook page and attracted 2,100 “Likes” from existing and new fans. When the same photo album was sent to 80 members with the same background, it generated 5,200 responses and interactions from the fans of RID3450. Currently, this photo album is the most popular photo album in the Facebook page of RID3450. This scenario further indicates the PSI effects in social media applications.

Building up fan groups can take significant time, and thus, utilizing the social influence of members as well as the social power of the club and district leaders would be a logical step. In fact, the build-up of fans relies largely on WOM via members and friends of friends. The social media manager should take every opportunity to invite the involvement of friends of existing and new fans. Encouraging them to share and respond with “Likes” and post their feedback on others’ posts can also make the Facebook page more active, which in turn can attract more engagement from new fans. The manager should also monitor the responses of fans closely to refine strategies to cultivate volitional behavior and motivate user participation. Real-time reports with photos and short captions are likely to receive “Likes” with a 10-30 percent improvement in the response rate. Tagging members in photos is also likely to draw a fast response that builds interactions and engagement.

According to TAM, perceived ease of use and perceived usefulness are the keys to promoting user acceptance of social media applications of RID3450. In terms of ease of use, a single appealing photo was found to create more interactions and “Likes” than a photo album because users focus more easily on a single photo than on an album containing hundreds of photos. In terms of usefulness, event calendars with details can raise member awareness of district events and improve information transparency. This feature also allows club leaders to manage attendance forecasts better, understand members’ responses, and motivate members to participate in district events and services. The online resource center with training materials, administration files, and public relations files is also a valuable resource for members, helping the club save time and costs in archiving and retrieving useful documents, which is vital for any voluntary organization.

5. Discussion and conclusion

Numerous studies have been conducted to explore the challenges and opportunities as well as to broaden our understanding of the applications of social media and their effect on our daily lives (Vasalou *et al.*, 2008; Correa *et al.*, 2010; Fischer and Reuber, 2011). This study performed a comprehensive literature review on social media research and proposed a conceptual framework to illustrate the principles involved in the design and development of a social media application. The practical value of the framework was validated through the use of a real-life case study of a regional division of an international NGO.

In this study, we found that people, internet-enabled tools, and technologies (i.e. media) form the basis of a social media application system and that communication through social media is the realization of the interaction among people using internet technologies. Devising suitable social media strategies and establishing guidelines or principles for the design and implementation of a social media system involve exploiting individual and social behaviors and attitudes on social media with respect to specific areas of application.

In the context of information systems, Gregor (2002) classified the relevant theories into five different types according to their primary purposes: theory for analysis and description (i.e. what is); theory for understanding (i.e. how and why); theory for predicting (i.e. what will be); theory for explaining and predicting (i.e. what is, how, and what will be); and theory for design and action (i.e. how to do). The last type is called the “design theory,” and focusses on the methodologies, tools, and design principles necessary for practitioners to develop An information system. These five theory types are inter-related and have bi-directional influences on one another. Design theory can be informed by or even built on by other types of theories, and working on the design theory can also lead to advances in these theories.

In our literature review, a considerable number of theories have been propounded in extant literature, covering all three key aspects in social media, namely, people, social, and mass communication aspects (see Table III). These theories have great potential for explaining user behavior and the development of social media applications. For the last type of design theory, limited discussions can be found in the information systems literature (Gregor, 2002), despite its key role in providing practical guidance for the design, development, and use of the systems. Researchers should explicitly show a principle they used as basis during the system design and development process, which should be able to predict the likelihood of the success or failure of a design (Weber, 1987).

Our proposed conceptual framework of social media application development integrates the various personal and social behavioral theories and models, providing a holistic view and forming a basis for the design and development of social media applications. Companies and system developers can use this framework to formulate and implement their own social media application strategies. Although the theoretical value of this framework is obvious, several studies have been conducted to realize the practical value of such design theory. A gap between theory and practice is thus created. The real-life case study described in Section 4 is the first attempt to illustrate the practical value of applying our proposed conceptual framework to assist an organization in bringing the extant theories and models to underpin the selection of tools, technologies, and processes during the design and development of a social media application.

Although the mappings between theories and social media applications in the case study are ad hoc to some extent, we believe our conceptual framework can assist practitioners to obtain a better understanding of the design and development of their social media applications. Nonetheless, further investigation should be carried out to initiate more design principles into practice in this direction. First, more investigations can be conducted to determine which existing theories and models can be used to characterize different dimensions of social communications. Second, guidelines can be developed to assist managers in selecting and applying relevant theories to design their social media applications. Finally, key performance indicators can be formulated based on the above-mentioned theories to help managers evaluate and improve their application systems.

In conclusion, findings from this study extend our knowledge in the subject area of information system design and development. Certainly, we note that a limitation of this study is that the review study may not be comprehensive and may have missed some recently published social media papers in the literature. Additional empirical journal papers within the boundaries of social media should be sought using different keywords because social media research is still in its early stages.

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