# Software Requirments Specification

# Social Media Development

**Team Members:**

**A. ANNAPOORANI**

**V. LAVANYA**

**S. NANDHINI DEVI**

**C.R. DIVYADHARSHINI**

# Introduction

This paper assesses the role of social media in social and economic development. The web and in particular, social media such as social network sites (e.g. Facebook) and microblogs (e.g. Twitter), allows ordinary citizens to connect with one another and share information via computer-mediated networks. This behaviour is often explicitly or implicitly networked (for example, people ‘friend’ one another on Facebook and ‘follow’ one another on Twitter, leading to the formation of social and information-sharing networks). For that reason, we use an analytical framework that draws from the extensive literature on social networks. We summarize research on social networks, social learning and development and use this as a basis for assessing the potential impact of social media on social and economic development.

There is no doubt that the advent of the web (which is not even 25 years old), and more recently social media, has had a huge impact on how people communicate with one another and access (and produce) information. However, for several reasons, it is difficult to draw definitive conclusions about the impact of social media on social and economic development at a global level. First, there is the obvious point that social media requires telecommunications infrastructure and education levels such that it is often only used by the relatively well-off in developing countries and there will be urban/rural disparities in social media use. Second, there is not a lot of academic evidence on the impact of social media in developing countries and where it has been shown that social media has a positive impact on economic outcomes, this has been for specific groups in society (e.g. business owners, middle class women in secondary-earner roles). The generalizability of these findings to other groups in society, and hence assessment of overall impact of social media, is not certain. Finally, the impact of social media on social and economic development within a given country will be

influenced by government policies (e.g. towards telecommunications infrastructure, education, censorship) and also the cultural setting of the country.

The structure of the paper is as follows. Section 2 provides a definition of social media and a summary of research findings on international patterns of social media use. Section 3 looks at how social networks impact on technology adoption and aspirational change (via social learning). The section summarizes economic perspectives on social learning but also covers social networks concepts from other disciplines (primarily sociology) such as weak/strong ties, structural holes and social capital, that are relevant for evaluating the impact of social media on social and economic development. The next three sections summarize social media research relating to particular topics: economic activity (Section 4), emergencies (Section 5) and community voice (Section 6). Section 7 provides conclusions.

# Social media – overview

This section provides a definition of social media and identifies the subset of social media that is the focus of this study. There is also a summary of cross-country data on social media use. Note that in this section, we use some social networks concepts and terminology which are formally introduced in the Annex.

# Definition of social media

The web is commonly understood to have had three overlapping phases of development or eras, Web 1.0, Web 2.0 and Web 3.0. Under Web 1.0, webmasters create content that is then read or consumed by users, while Web 2.0 allows the blurring of the distinction between users and webmasters, with blogging tools, social network sites (e.g. Facebook) and microblog services (e.g. Twitter) enabling non-technical people to both produce and consume web

content (this is referred to as ‘prosumption’ (Ritzer and Jurgenson, 2010) and ‘produsage’ (Bruns, 2008)). Web 3.0, or the Semantic Web, involves technologies that make the web more machine-readable, leading to a ‘web of data’, which is an evolution of the Web 1.0 ‘web of documents’ (Shadbolt et al., 2006).

We define social media as web platforms that enable users to create, share, and exchange their ideas, content, information, videos or photos in computer-mediated groups and communities. In this paper we focus on two main examples of social media: social network sites, and microblog sites. Social network sites (SNS) are defined as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within system" (Boyd and Ellison, 2008, p. 211).1 The best-known social network site is Facebook, but other prominent examples are LinkedIn (for professional networking) and Renren in China.

Microblogs allow subscribers to broadcast short messages to other subscribers of the service. The best-known microblog is Twitter, where the short messages are called “tweets” and are limited to 140 characters. Sina Weibo is a prominent example of a Chinese microblog (in China, both microblog services and the short messages are called “weibos”).

This paper is focused on social network sites and microblogs since – due to their relatively widespread use and also their functionality – these prominent examples of social media are most likely to be relevant to social and economic development. However, it is important to note that social media encompasses other types of computer-mediated interaction such as wikis, folksonomies or social tagging sites, mashups and instant messenger services (Beer 2008; Kietzmann et al., 2011, p. 519).

The typology of online networks proposed by Ackland and Zhu (2015) helps to further distinguish the different types of social media studied in the present paper. The authors identify two dimensions of ties in online networks: *directionality* refers to whether a tie between any pair of nodes is directed versus undirected, while *manifestation* refers to the substantiality of the relations between nodes, with active acts (e.g., invitation, acceptance) leading to explicit ties, while implicit ties are more inferred (e.g., co-occurrence or interactions). The typology leads to four categories or types of online networks (Table 1). Explicitly undirected ties lead to networks which are the closest to the classic notion of social networks, i.e., friendships that require mutual consent to establish (Facebook is an example). Explicitly directed ties involve a one-way, public (or broadcast) mode of relations among users (Twitter is an example). Implicitly undirected ties are in some ways ‘hidden’ or ‘invisible’ connections, in that they are constructed or inferred by social network analysts *post hoc*, based on semantic similarity (e.g., co-usage or co-occurrence of keywords or tags) between pairs of nodes (the Flickr photo tagging site is an example). Finally, implicitly directed ties can be extracted from the interactions of people in newsgroups or blogs (the hyperlinks between web pages on the WWW are also examples); these ties are implicit because while a person might reply or respond to another person in a newsgroup, such “opinion exchanges” are really only indirect or inferred connections between the people.

1 This definition has been criticized by Beer (2008) since it is similar to the concept of Web

2.0 or user-generated content in terms of its broadness.

**Table 1: Direction and manifestation of ties in online networks (from Ackland and Zhu, 2015)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Direction of ties** | |
|  | | Undirected | Directed |
| **Manifestation of ties** | Explicit | Friendship networks | Microblog networks |
| (e.g. Facebook, Google+) | (e.g. Twitter, Sina Weibo) |
| Implicit | Semantic networks | Threaded conversation & hyperlink networks |
| (e.g. recommendation systems, social tagging systems) | (e.g. newsgroups, blogs, WWW hyperlink networks) |

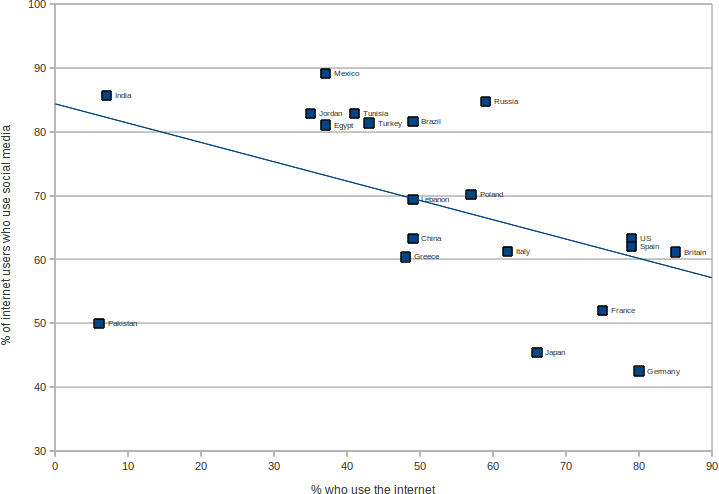
# International patterns in social media use

In this sub-section, we present evidence on general trends of social media use and differences by age, gender and nationality, using publicly available statistics and research.

First, we look at prevalence of social media use in different countries. The Pew Research Center surveyed adults in 21 countries (including developing countries) about their use of social media (Kohut et al., 2012).2 The percentage of people reporting they use the internet varied from a high of 85 percent in Britain to a low of 6 percent in Pakistan. At a country level, there is a negative relationship between internet use and the propensity to use social media (Figure 1). This is due to the fact that in richer countries a relatively wider range of

2 While the Pew report refers to “social networking sites” in fact it collected data on usage of sites other than what we have defined above as “social network sites” (e.g. Facebook), and hence we refer to the Pew report in the context of “social media” usage. The surveys listed country-specific examples of social media sites. For example, US participants were asked about their use of sites such as Facebook and Myspace, while in Britain the list included Facebook, Twitter, YouTube and Flickr and the list for China included Facebook, Renren, MySpace, and Weibo (a generic term for microblogging).

socio-demographic groups have access to the internet; specifically, older people are more likely to be using the internet, and older people are much less likely to use social media. In contrast, in lower-income countries internet use is more common among more professional (and younger) people, who are more likely to be active on social media.



## Figure 1: Percentage of internet users who use social media, by internet use

Source: Author calculations based on data from Kohut et al. (2012)

Figure 1 shows that in all but three countries, a majority of the people who use the internet also use social media, leading the Pew report authors to comment that “Social networking has spread around the world with remarkable speed” (p.1). The usage of social media in Pakistan is much lower than would be expected (given the percentage of the population who use the internet) and among the richer countries, social media use is relatively lower in Germany and Japan. Among the middle-income countries it appears that Mexico and Russia might have a relatively higher propensity to use social media.

It has been noted that many Facebook users in developing countries are not aware that they are using the internet (<http://qz.com/333313/millions-of-facebook-users-have-no-> idea-theyre-using-the-internet/). This situation comes about because Facebook Corporation, via its internet.org initiative, seeks to ensure that Facebook is an easy and accessible application on mobile phones in developing countries, with users requiring a data plan in order to access other sites on the [WWW.](http://WWW/) While the development implications of this are unclear, this does mean that some users are effectively constrained to accessing information and services under the Facebook corporate umbrella, rather than the open

web.

## Box 1: Many Facebook users do not know they are using the internet

Next, to what extent do individuals access social media? Ofcom (2013) (Figure 5.26) indicates that among the surveyed countries in 2013, a majority of internet users accessed social media at least once a week. Spain has the highest access rate, with 72 percent of internet accessing social media at least once a week, while Japanese users are least likely to access social media (45 percent). Also, in the U.K., Italy, Australia and China, over 60 percent of internet users

accessed social media weekly. Around 50 percent of respondents from the rest of countries such as France, Germany and the U.S. had accessed social media at least once a week.

Different social media platforms are used in different countries. While Facebook is the most popular social media service in the world, its popularity varies across countries. For example, Facebook is remarkably dominant in Indonesia with 95.7 percent of survey respondents having used the application, according to data compiled by Winkels et al. (2013). However Facebook use in other Asian countries such as China, South Korea and Japan, is not as high as Indonesia or India. Since Western social media such as Facebook, Twitter and Google+ is blocked by the Chinese government, Chinese indigenous social media such as Qzone and Sina Weibo are more popular among the Chinese. There are other examples of popular indigenous social media such as KakaoStory in South Korea and Mixi in Japan, respectively. These services seem to play a role in limiting the popularity of Facebook in these countries, and this phenomenon is also seen outside of Asia. Facebook is not the dominant social media platform in Russia, for example, where homegrown social networking sites VKontakte and Odnoklassniki.ru are more popular than Western social media.

# Cultural differences in social media use

People living in different places behave differently, and this is reflected in social media use. For instance, Poblete et al. (2011) found that Twitter users in Indonesia tend to make many more connections (not only with friends and family, but also acquaintances), compared with Twitter users in Australia. Yanai et al. (2009) identified cross-country differences in photo sharing behavior on Flickr, finding that shared photos of wedding cakes in the U.S. are taller than those in Europe.

Where do such differences in social media use come from? Hofstede’s work on “cultural dimensions” (Hofstede, 1980), despite being widely criticized (Ailon, 2008), has been influential in recent computer science research into cultural differences in social media use. Analyzing survey data on IBM employees around the world, Hofstede identified five cultural dimensions: 1) power distance, 2) individualism vs. collectivism, 3) masculinity vs. femininity, 4) long-term orientation vs. short term orientation, and 5) indulgence vs. restraint. The literature on social media use has tended to highlight two of the dimensions, namely, power distance and individualism vs. collectivism. Power distance reflects “the degree of acceptance of inequality between a boss and a subordinate” (Ailon, 2008, p. 889), that is, it is a measure of the extent to which the less powerful members of a society accept that power is distributed unequally. Individualism vs. collectivism is defined as “the relationship between the individual and the collectivity which prevails in a given society” (Hofstede, 1980, p. 213), and gives a measure of the extent to which a society encourages individuality and uniqueness versus conformity and interdependence.

Garcia-Gavilanes et al. (2013) collected data on Twitter users from 30 countries for 10 weeks. The authors found that in countries that are more comfortable or accepting that power is distributed unequally (i.e., there exists significant power distance), there is more likely to be connections on Twitter between pairs of users with markedly different levels of popularity (i.e., the number of followers). In contrast, people in countries with low power distance (i.e., have the expectation that power is or should be equally distributed among citizens) are less likely to make connections with those who have significantly more or less followers. The authors also found a significant negative correlation between the number of tweets that include mentions of other Twitter users and the Tweet author’s measure of individualism (based on their country of origin). This suggests that Twitter users from cultures with a higher

level of collectivism are more inclined to mention other users in their tweets (and supports the above finding regarding differences between Indonesia and Australia).

Gao et al. (2012) compared the behavior of Twitter and Sina Weibo users, and given that more than 80 percent of the Twitter users in their sample were (according to their profiles) from the U.S., while more than 95 percent of the Sina Weibo users were located in China, the authors contend that their study in fact comprised a U.S.-Chinese comparison. They found that Twitter users retweet more quickly than their Sina Weibo counterparts, and that information propagates more quickly on Twitter compared with Sina Weibo. The authors contend that this reflects differences in power distance between the two countries (U.S. microbloggers act as if they have the power to propagate information and thus potentially challenge existing hierarchies).

Recent survey data also indicates marked cross-country variation in how people use social media. The surveys conducted by the Pew Research Center showed that Arabic users tend to access social media in order to express their political views, whereas users in Western countries are more likely to share recreational content such as photos, music, movies, and sports (Kohut et al., 2012).

# Social networks and social learning

This section defines **social learning**, which we then use as a framework for assessing the potential impact of social media on social and economic development.3

**Technology adoption** refers to households and individuals deciding whether to adopt technologies that can improve productivity and well-being. The process involves actors

learning about an underlying state of the world (for example, the usefulness of a new technology or practice related to farming, or a health innovation) and as a result, changing their behavior (adopting the technology). Under what conditions will this occur, and importantly, under what conditions will the actors make the correct decision e.g. adopt a technology or behavior that will improve their circumstances (and that of society as a whole)?

The role of social interactions in technology adoption in poor rural communities has been studied by authors such as Duflo et al. (2009) in the context of adoption of fertilizer in Kenya, and Kremer and Miguel (2007) in the context of de-worming drugs (also in Kenya).

The other aspect of economic development that we consider in this section is **aspirational change**, which refers to the process whereby poor households become more “future-oriented” in their thinking (Appadurai, 2004; Ray, 2006), leading to investments in education and productive capacity. Ray (2006) introduces the concept of the “aspiration window” and argues that more expansive future-oriented behavior (a widening window) can result from an individual’s social interaction with peers and near-peers. Macours and Vakis (2009) found evidence of improvement in aspirations of people randomly connected to women in leadership positions in their community.

We refer to the above as **economic aspirational change** since it refers to changing aspirations that are likely to impact on the economic well-being of a household. However in this paper, we are also concerned with the potential impact of social media on social development more broadly and so we can also define **political aspirational change** as referring to changing aspirations relating to the political situation within a community or country.

# Social media and economic activity

Social media can benefit business owners and entrepreneurs in developing economies by reducing the cost of communication and increasing opportunities to find business partners and customers (similar arguments are made with respect to mobile phones). However compared with developed economy contexts, there is not much literature on social media and economic activity in developing countries. Nwabueze et al. (2013) claim that social media plays a crucial positive role in achieving microfinance banking goals in Nigeria by facilitating information flow to the poor and small business owners who are the primary target of microfinance. However, it should be emphasized that it is very difficult to disentangle social media effects on business outcomes from other factors (e.g., innate skills and drive of entrepreneurs and business leaders, and the business environments in which they operate), because of data availability and also the general problem of identifying a network effect (Box 10).

adjudicate), and organizational capacity (the government’s stock of human and physical capital).

Is social media good for business? It is tempting to assume that because social media opens up channels for businesses to efficiently connect with customers, suppliers and investors that it must be positive for business outcomes. However, empirically establishing a causal link between social media use and business outcomes is challenging, and relates to the general problem of identifying a “network effect” – the causal link between network structure and the behavior and outcomes of actors (the foundational reference in economics is Manski (1993)). It is in the interests of businesses to use all means available (including social media) to strategically acquire connections (e.g. with customers, suppliers or investors), and those who succeed at this will have improved performance. But is it the social media use and improved network position that is causing the outcome (higher profitability) or is it an unobserved attribute of the business actor (for example, talent or drive) that allowed it to successfully acquire the best network structure and to perform better than its competitors? Establishing a network effect is thus complicated by the possibility of unobserved heterogeneity – variation in network position across agents also reflects the intrinsic ability of the agents, which will also affect performance.

## Box 10: Identifying a network effect

In addition, social media enables entrepreneurs to create and maintain weak ties and bridging social capital. While Facebook is generally regarded as being useful for maintaining strong ties such as close friends or kin, Twitter enables entrepreneurs to expand and use their weak ties such as acquaintances. In Fischer and Reuber’s (2011) study of entrepreneurs’ use of Twitter one interviewee said “Facebook is a cocktail party and so when you are engaged in Facebook you’re surrounded, sometimes very peripherally but surrounded, by people that you know and you like and that are part of your social graph. Twitter’s not that. Twitter is more like somebody standing on the street corner with a megaphone saying, ‘Hey, if you’re interested in the Toronto Maple Leafs, check out this article! ’ And I may be interested and I

might check it out or I may just walk right by” (p.3). Through interviewing entrepreneurs, the authors provide evidence that Twitter increases social interaction. Likewise, from a point of view of job opportunities, LinkedIn (a social networking site for professionals) allows users to make connections with those who are in the same circle and out of the circle. This is also helpful for utilizing weak ties, so that individuals can find new job opportunities.

Utomo (2015) notes that the role of social capital in facilitating womens’ access to income has been well-documented (see, for example, Mayoux, 2001; Silvey and Elmhirst, 2003) and assesses how Facebook is transforming womens’ economic opportunities in Indonesia. The author conducts interviews of women who use Facebook for selling products and presents evidence that the social network site does foster the entrepreneurial activities of these women. However Utomo (2015) is careful to point out that the positive impact of Facebook on entrepreneurial activities may be quite specific to the particular setting of her study. In particular, the author points to the importance of gender and class, since she studied middle-class women in Jakarta who are secondary earners in their families, and for whom conducting income-generation activities via Facebook fitted well with family responsibilities. She also highlights the importance of culture, arguing that Indonesian collectivist culture impacts on the way people use Facebook and hence the ability of Facebook to foster weak ties that could lead to potential sales and finding commercially-relevant information.

## Box 11: Facebook and female entrepreneurship in Indonesia

The study of Utomo (2015) is important for the present paper since it highlights the fact that the positive impacts of social media such as Facebook on economic activity will be localized to specific segments of society and this may temper our conclusion regarding the overall potential of social media to transform economic opportunities in a particular country. Further, it is important to be careful not to generalize impacts of social media across countries, since

culture may impact how social media is being used (and hence its potential for influencing entrepreneurial activity).

Social media provides another way of potentially improving economic outcomes in developing economies, namely as a source of business-related “big data”. Big data is often discussed in the context of the ‘internet of everything’ or ‘network of networks’ and can be thought of as data from networks of (1) people (social web) e.g. phone logs/GPS, social network sites (e.g. Facebook), microblogs (e.g. Twitter); (2) information (traditional web - the WWW) e.g web pages, clickstreams, website logs and (3) things (sensor web) e.g. temperature sensors, medical instruments. Big data refers to not only data that is beyond traditional analytical techniques and computational capacity, but also a phenomenon whereby analysts can access data that are unprecedented in terms of size, dynamics and variety and use these data to uncover and predict a wide range of societal phenomena. Social media is a major source of big data, especially with respect to data on human behavior. The Global Pulse project in Indonesia10 aims to predict daily food prices using food-related tweets by users in Twitter. The goal is to provide an alternative means of officially monitoring food prices, thereby reducing cost of data collection (incurred by both government and business operators).

Social media also provides opportunities for businesses to conduct experiments, for example, to better understand how social networks affect consumer demand. Aral and Walker (2014) have conducted a large-scale experiment on Facebook and note that social media such as Facebook “enables developers to customize application features for particular users, enabling feature and design randomization” to test product designs, consumer demand and so on (p.1354).

10 <http://www.unglobalpulse.org/nowcasting-food-prices>

Crowd-sourcing sites such as Mechanical Turk and freelancing websites such as eLance are online labor markets that are providing job opportunities for people in emerging economies such as India and The Philippines (Aguinis and Lawal, 2013; Ross et al., 2010). However, some researchers and commentators argue that these types of platforms can be used for exploiting cheap labor.

# Social media and emergencies

Twitter co-founder Jack Dorsey credits his childhood interest in listening to law enforcement and emergency services on police scanner radios as part of his inspiration for creating the microblogging platform11. Today Twitter is increasingly used for coordinating communication and for gathering and disseminating information during emergency, disaster and crisis situations. Government use of social media can educate the public on how to respond/act when disasters or emergencies occur. When a disaster or emergency is unfolding, social media can provide a way for government to provide correct information. However the ability of government to provide useful information to citizens will depend on how influential government is on social media i.e. its centrality or ‘nodality’ in relevant conversations.

Alexander (2014) reviews social media use by governments during disasters and major incidents. He identified seven functions of social media in disaster situations; (1) a listening function, (2) monitoring a situation, (3) integration of social media into emergency planning and crisis management, (4) crowd-sourcing and collaborative development, (5) creating social cohesion and promoting therapeutic initiatives, (6) furthering causes (e.g. collecting donations after disasters), and (7) research. Reeder et al. (2014) contend that organizational use of social media for emergency response can have two purposes: information dissemination and as a

management tool (e.g. receiving requests for assistance). They summarize research which suggests that social media is generally used only for the former.