

Editorial for Volume 13 Issue 4

Special issue on the Impact of Social Media in our Life

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Social media can be defined as a collection of online communication channels that increase and enhance interaction, content-sharing and collaboration. Although we usually refer to the applications based on social media, in fact the focus should be in the capacity these tools have to bring people together and to promote social relations, ideas sharing and knowledge creation.

If we analysed our activity every day we would realize that part of the tools and applications we use are based, precisely, on social media. We read the newspapers online or probably we look for the most important news in some pages of Facebook or Google+. We save our documents, videos, photos and other materials in the cloud. We keep in touch with our family, friends, students, clients, suppliers through Facebook and LinkedIn. Our CV is no longer only in paper. We have already a digital footprint that follow us where ever we go. Even when we need to prepare a document we can look for a text processor application in Google drive. Our calendar is available and shared with colleagues at work. And finding the way to our destination is no longer the same with Google maps. And these are only a few examples.

In fact, what social media is doing is to bring together everyone so each person, each citizen has a voice. Borders between our work and leisure are blurred. Barriers of time and space are broken. Instead, bridges are built between companies, employees, clients and suppliers. Between teachers and students, knowing that those worlds, apparently different, may contribute to the development of a more “democratic” society where everyone has the opportunity to express themselves.

Cesaroni et al. in the first paper “*Are small businesses really able to take advantage of social media?*” contribute to the discussion about how SMEs are using social media in order to share, collaborate and co-create. Are SMEs ready to take full advantage of the potential of these tools? Results show that there is still a long way to go before we can answer positively to this question.

In the second paper “*Science 2.0 and conference tweets: What? Where? Why? When?*”, **Mazarakis et al.**, analysed the use of microblogging, using Twitter, in science, in particular in the promotion of a scientific conference. Results help us to understand Twitter behaviour regarding time and content.

Finally, in the third paper “*Online social network citizen engagement on Instagram crowdsourcing: a conceptual framework*”, Zolkepli et al. discuss social media in the context of crowdsourcing. The objective is to elicit motivations (extrinsic - which is referred as technology-push forces and intrinsic- which is referred as need-pull forces) for a participative behaviour in this kind of activity.

We would like to thank all the authors for their valuable contribution and the reviewers for their time and constructive feedback during the rounds of review and revision.

A final word just to say that we hope readers enjoy reading this work as much as we enjoyed preparing them.

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Guest Editors
December 2015

Are Small Businesses Really Able to Take Advantage of Social Media?

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Abstract: In recent years the adoption of ICT by small enterprises has been growing thanks to prices reduction, diffusion of digital services in SaaS modality, cloud computing and ICT consumerization. However little is known about how small enterprises use these technologies and in particular social media. Social media open up a new way of doing business, based on innovative concepts such as sharing, collaboration and co-creation. However, this is a little-known model, with still unknown implications on management and organization. For this reason it is not enough to know how much small enterprises use social media, but it is necessary to understand how small enterprises use them. The aim of the paper is to understand if small enterprises are able to fully exploit social media potentialities. To this end a sample of 48 Italian small firms is analyzed. Data has been collected by websites' analysis, a questionnaire survey and interviews with entrepreneurs and/or ICT/Marketing managers. Results show that, although social media are quite common among small businesses, they are not always able to use these tools in a truly profitable way. Social media are often introduced because they are "fashionable", because companies feel "forced" to use them, as "all competitors do it". The research, however, has highlighted the existence of a wide range of different situations. Together with low innovative businesses, in fact, there are also other small businesses that are very open to the use of social channels and interactive technologies and able to take full advantage of their adoption. Entrepreneur's mentality makes a difference in these companies, and in particular entrepreneurs' ability to conceive new ways of doing business and his willingness to get involved with new initiatives.

Keywords: social media, web 2.0, enterprise 2.0, web-oriented technology, micro and small enterprises, innovative technologies.

1. Introduction

In recent years the adoption of ICT by small enterprises has been growing thanks to several factors: prices reduction, diffusion of digital services in Software as a Service (SaaS) modality, new online data storage (Cloud Computing) and ICT consumerization (integration of smartphones/tablets in the information system) (Assinform, 2011). In particular available data show an increasing use of web technologies by small enterprises. Web technologies, in fact, represent a great opportunity for small enterprises, as they can help to overcome the so-called liability of smallness, encourage small firms' growth and development, help to develop new products, acquire new market shares and gain new competitive advantages.

Even in Italy the rate of ICT adoption by small businesses has been steadily growing in recent years. In 2014, 69.2% of companies with at least 10 employees (88.9% of companies with at least 250 employees) had a website (67.3% in 2013). 31.8% of companies (51.9% among those with 250 or more employees) are using social media (24.7% in 2013); the most popular tools among enterprises are social networks (29.3%) and websites (10.3%). Although most small businesses have websites (67.4%), they are not yet able to grasp the opportunities offered by e-commerce; only 11.5% of small businesses can receive orders on-line on their websites, and only 7.3% in 2013 made online sales via the web or other networks (Istat, 2014).

However little is known about how small enterprises use these technologies and in particular social media. In fact use of social media is a very recent phenomenon and there are still few analysis, mainly concerning large firms. Social media open up a new way of doing business, based on innovative concepts such as sharing, collaboration and co-creation (Vasileiadou and Missler-Behr, 2011; Choi et al., 2014). However, this is a little-known model, with still unknown implications on processes, management and organizational structures. Therefore it's difficult to evaluate small enterprises' attitude and the way they use social media. For this reason it is not enough to know how much small enterprises use social media, but it is necessary to understand how small enterprises use them.

With this background in mind, the aim of the paper is to understand if small enterprises are able to fully exploit social media potential or if they conceive social media simply as a fashion or a fad. The problem arises because, although we have some information about the presence of social media in small enterprises, not much is known about how they use these technologies. The fact that small enterprises use social media doesn't mean that they are able to use them in a profitable way, to develop a winning and successful business strategy.

In order to obtain this information a sample of 48 Italian small enterprises using social media has been analyzed. Findings from sample survey are integrated with description and discussion of two small firms cases, drawn from the sample. They represent two very different approaches in the use of social media, characterized by different degree of strategic awareness about their potentiality.

The paper is structured as follows: the next section presents a literature review on social media and their use in small enterprise. Then methodology used for data collection and analysis is presented and main research results are described. At the end, some conclusions from the research are drawn.

2. Web 2.0 and social media Threats and opportunities for small enterprises

The concept of Web 2.0 was born, in 2005, during a brainstorming session of a conference on the web (O'Reilly, 2007). Since then, web 2.0 has evolved from simple information retrieval to interactivity, interoperability, and collaboration platform (Campbell et al., 2011). According to McAfee (2006; 2009) "Enterprise 2.0 is the use of emergent social software platforms within companies, or between companies and their partners or customers". It represents a breakdown with traditional organization models towards an open and cooperative architecture. Its main keywords are: sharing, cooperation and interactivity.

In the last decade Web 2.0 has enabled the development of social media, first as a friendly social networking between individuals in their private life and later as tools used by enterprises to achieve business goals. Social media offer an opportunity for social interactions both for businesses and individuals (Fischer and Reuber, 2011). For Kaplan and Haenlein (2010) social media are "A group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user generated content".

Thanks to social media enterprises can interact with their partners and create interactive bi-directional channels with customers and suppliers. Social media allow the implementation of a virtual community where firms, suppliers and customers can communicate, collaborate, co-produce and improve products/services. Customers become "prosumers" – consumers and producers at the same time (Tapscott and Williams, 2006). According to Levine et al. (2001) "markets are conversations" and with the digital revolution consumers have changed their role, from passive consumers to active prosumers.

Actually there is limited academic research in this area (Jansen et al., 2009) and much of it is focused on users' behavior and not on companies' perspective, and especially small firms ability to use social media is still a little known area. Some authors (Durkin et al., 2013) highlight the existence of a deficit in the literature on social media adoption within a small enterprise context and argue the need to further deepen the research on this topic (Aral et al., 2013).

While is well known that social media can positively impact small firms' performances, so far attention has been mainly focused on tactical aspects – for example the adoption of Twitter/Facebook and other social networks by small enterprises. These studies surely provide valuable insights to operational aspects of social media adoption and use, but "there is a deficit in the research with respect to a more strategic consideration of how social media can add value to the customer-SME relationships" (Durkin et al., 2013, p. 720).

Actually for small enterprises digital technologies, and in particular social media, represent a powerful opportunity, but also a potentially serious threat.

Opportunities come from the ability of small enterprises to adopt technologies until now inaccessible – as only available to large companies – and to use them to compete in international markets (Mazzarol, 2015).

Small enterprises are usually deep-rooted in their local area, but recently they may take advantage of web technologies as they can expand their geographical boundaries. E-commerce allows them to operate even in a global market as customers can be reached everywhere (Consoli, 2012). Small enterprises can use forums, blogs, groups and other social media to build relationships with key influencers (Eid and El-Gohary, 2013). They can use social media to implement projects of open innovation (Chesbrough, 2003), thus compensating their liability of smallness and the lack of internal research labs and structures. They can also exploit crowdsourcing opportunities (Howe, 2006) to find a solution for technical problems and accept ideas from external solvers.

According to Finotto and Micelli (2010) the adoption of web 2.0 technologies is independent from previous experiences with ICT (eg. ERP), and this represents another advantage for small firms, as they have invested in traditional technologies less than large companies. Skills required to manage virtual spaces are independent from know-how required by traditional ICT. According to Iulm Observatory (2011), Italian small enterprises using social media increased from 9.8% (2010) to 43% (2011). These firms have also reduced their gap compared to larger companies, since the latter have had lower increases in the use of web 2.0 technologies.

Moreover Kaplan and Haenlein (2010) and Barnes (2010) highlight that for firms the adoption and use of social media requires a low cost investment. This investment can result in higher levels of efficiency than traditional media. Social media can be very effective tools in helping small enterprises to reach their business goals. These firms have generally an advantage, as small size helps to reach customers and obtain valuable feedback about products/services.

Besides the numerous opportunities offered by social media, some authors also emphasize a number of threats. They mainly emerge from small firms losing business by not embracing the opportunities and becoming uncompetitive in increasingly digital and online markets (Mazzarol, 2015). Actually some small firms still question social media credibility and sustainability (Nakara et al., 2012) and are not able to fully exploit these tools' potential.

Small enterprises should understand social media's strategic importance for business's growth (Walsh and Lipinski, 2009). In order to create add value for customers, investments in social media should be included in a broad e-marketing strategy, and should be coherent with pre and post-sales marketing activities Eid and El-Gohary (2013). As first step small firms should set social media goals in managing customer relationships and marketing activities (Prohaska, 2011).

The ability of social media to help small firms in fostering engagement between organization and consumers has been much emphasized. Actually small firms could successfully use social media technologies to improve their ability to manage relationships with customers. Durkin et al. (2013) emphasize the importance of relationships with external stakeholders, especially with customers, as a main basis of small firms' competitiveness. Web technologies evolution and social media diffusion have offered businesses a new tool, with new and partially unexplored potentialities. These tools can enhance small firms' ability to manage relationships with customers and other stakeholders.

Nakara et al. (2012) observe that small entrepreneurs usually develop their networks randomly, taking advantage of spontaneous and fortuitous contacts. On the contrary a systematic use of social media could help small entrepreneurs to create a network by wisely selecting their contacts. Harrigan and Miles (2014) underline that social media "may be the most appropriate CRM technologies to date, as they are readily available, mostly free, scalable depending on the size of organization, and utilized by the majority of consumers". Authors point out that, even if small firms mainly adopt some intuitive form of CRM, social media technologies can be integrated with existing organizational capabilities in order to yield higher order capabilities and create competitive advantage.

However Durkin et al., (2013) fear that this technological innovation could be harmful precisely to small businesses. The latter, in fact, have so far taken advantage of their ability to treat and manage customer relationships with a very personal approach, in which entrepreneur is often personally involved. Caldwell et al. (2013) also confirm that small firms are worried for the risk of losing personal contact with key customers, as small entrepreneurs generally wish to engage with them on a face- to-face basis. Moreover small entrepreneurs are often reluctant to use web 2.0 tools like social media, as they are afraid of losing control over customers. In fact customers have gained great power thanks to web interactivity, as they can now post in the web their comments about firms' products and services. Indeed small enterprises have to take care to "Word of Mouth" (WoM) (Stokes and Lomax, 2002). WoM on virtual channels represents Internet firm's reputation. A good web reputation can help to acquire new customers. But customer opinions, mainly if they are negative, may have a dangerous viral effect in the web.

Several researches have highlighted the lack of a strategic approach in the decision of small enterprises to adopt and use social media. This decision, in fact, is more often caused by internal reasons rather than by market or customers' driven reason. Behind the decision to adopt and use social media, in fact, there is often the fear of "not being up to date" and the concern to forgo the use of a tool that is perceived as full of opportunities. But its use is often made out of a clear strategic plan and without careful consideration of the impact that it could actually have on customer relationships and the company's competitive position in the market. The main reason of such attitude is small enterprises' marketing approach. It has been described as informal, fortuitous, unstructured, spontaneous and

reactive (Gilmore et al., 2001; Hill, 2001; Reijonen, 2010). Small firms very often lack a well-defined marketing strategy and they simply respond to immediate and specific customers' needs.

As Timmons and Spinelli (2009) suggest, this means that the core challenge for small entrepreneurs is to put customers' needs at the center of their investments decisions and to never lose sight of that imperative (Durkin et al., 2013).

In addition to the difficulties of small businesses to adopt a strategic perspective in the use of social media, other research has revealed some difficulties in dealing with technical aspects. In particular many small firms lack time and resources to update blogs, groups and other social networks (Nakara et al., 2012). Moreover small enterprises have difficulties in effectively using the great amount of information achievable by social media. To be effectively used for marketing purposes, in fact, information should be systematically collected, sorted and organized. However the majority of small businesses lack time and skills needed to perform these activities (Nakara et al., 2012; Harrigan and Miles, 2014).

As regard the Italian context, research relating to social media's use by small firms has mainly measured the presence of these interactive tools. Very little is known about how Italian small firms use social media and if they are really able to take advantage from their use. However small businesses represent the vast majority of the Italian companies (99.4%, with 95.2% micro-enterprises, with less than 10 employees) (Istat, 2014). So their ability to innovate and maintain their competitiveness through an effective use of new web technologies is crucial to the competitiveness of the whole country. For these reason it's important to know how small enterprises use and manage social media and if they are able to obtain real competitive advantage from them.

To respond to these questions an empirical research has been carried out. It is presented in the following pages.

3. The research

3.1 Research methodology

In this paper a qualitative method, based on inductive multicase research (Miles & Huberman, 1994), has been adopted to understand how small enterprises use social media. The reason of this methodological choice is that the aim of this analysis is neither verify a hypothesis nor falsify, confirm or modify an existing theory but better understand a still unknown phenomenon and explore it in depth. This methodology promotes the understanding of phenomena that are holistic, complex and that evolves over time (Eisenhardt, 1989; Wolcott, 1994), such as that of the present study.

In the selection of cases a purpose sample method has been used. Cases have been selected with the logic of predetermined criterion of importance (Patton, 1990), namely because they meet some essential requirements that are consistent with the object of the research. Thanks to an Italian local entrepreneurial association, a sample of 48 small enterprises, using social media for business activities, has been selected. Multiple case study also allowed us to analyze firms with different characteristics in terms of industry, size, technological level, entrepreneur's profile, and so on.

Firms in the sample operate in various industries – mechanical-electronic (19%), furniture (25%), fashion-artistic (23%), food and wellness (17%) and services-communication (16%) – and belong to different size classes – less than 3 employees (35%); 3 to 10 employees (23%); 11 to 30 employees (25%) and 31 to 50 employees (17%).

Empirical analysis has followed three main steps. First of all small enterprises' websites have been analyzed to understand if links to social media are in the home page. Then a questionnaire has been administered to small enterprises' owner/manager and finally in depth interviews and informal conversations with owners/managers have been conducted. Data was collected in the period 2012-2013.

3.2 Websites' analysis

It's well known that website is a very important space both for small and large firms. For customers it is important that companies have an easily navigable website, with a rich content and a rich description of firm's activity, mission, history, ownership, governance, markets, quality and environmental policies, social responsibilities, performances,

products/services. Nowadays it's also important for businesses to have in their websites a bar with links to social media. In line with research questions, firms' websites have been analyzed in order to find links to the most famous social media and e-commerce section (Table 1).

Table 1: Links to social media (%).

Tools	%	Tools	%
Facebook	79%	Pinterest	6%
Blog	25%	News	4%
Forum	4%	Skype	10%
Chat	2%	Rss	4%
Wiki	0%	E-Comm	8%
Twitter	37%	Google+	2%
LinkedIn	19%	Issuu	2%
Youtube	37%	Picasa	2%
Flicker	6%	Business television news	0%

The most frequently used social media is Facebook. The main reason is that companies must be present in channels most commonly used by customers. Facebook is a social media most used by people (young and old) and therefore companies need to be on this channel. It's interesting to note that in another research (Harrigan and Miles, 2014) the most used social network by small- and medium-sized firms was LinkedIn, while Facebook stood only 4th in the list. This difference can probably be justified in the light of the different composition of the sample in the two researches. Research presented in this paper, in fact, involves small and micro businesses. It does not include medium enterprises (with less than 250 employees), while they are involved in Harrigan and Miles' sample. Actually small and micro firms are often entrepreneurial business, where the owner/entrepreneur often extends to the company the use of tools that he initially used only in his private life.

Nowadays products/services are promoted and advertised by web and virtual channels (two-way direction), rather than traditional channels such as television, which is unidirectional. For companies it is also important to listen, even in real time, customers' opinions about products/service, in order to improve them.

Only few firms (Table 1) have an e-commerce section in their website. However interviews with entrepreneurs have shown that some small enterprises use external platforms to sell their products online. This means that small enterprises begin to understand the importance of online sales to reach domestic and international markets.

3.3 Questionnaire results

Based on results from websites' analysis, a questionnaire was formulated in order to understand how small enterprises manage websites and social media. In almost all small enterprises, website has been developed by external agencies. Sites using a Content Management System (CMS) technology are structured in separate sections easily accessible by appropriate credentials (username and password) and modifiable/upgradeable both in contents and in pictures. Several firms manage and update their websites by themselves, although external experts developed the structure. External consultants upgrade and manage websites in 35.4% of firms, while in the remaining 64.6% a person inside the company manage the website: entrepreneur (25%), chief information officer (CIO) (13.5%), entrepreneur's family members (5.8%), employees (5.8%), marketing manager (5.8%), internal web master (3.8%), sales manager (1.9%) (Table 2).

In small firms where entrepreneur's young children or relatives are involved in the business, they often take care of web technologies, thanks to their greater aptitude to digital tools. This is true both for the website and social media.

People who manage company's website does not necessarily also manage social media. In fact in 83% of firms virtual channels are internally managed. This happens even when external web agencies developed the structure of channels 2.0.

Table 2: Persons who manage social media

Subject	%	Subject	%
Marketing manager	12%	Family member	8%
Sales manager	8%	Communication manager	4%
Generic Employees	7%	External consultant	17%
CIO	4%	Web master	2%
Entrepreneur	27%	Nobody	11%

It must be noted that websites created by external webmasters are more difficult to manage internally, especially static websites without CMS technology. As regard social media, internal management is simpler and user-friendly, even if an external consultant created them. Some small enterprises have a social channel, but they don't use it and so nobody updates it (11%). In fact social channels have sometimes been create to imitate other firms, or to get a higher ranking thanks to their creation.

Main reasons to adopt social media are: visibility, promotion, advertising, acquisition of new leads (lead generation) (Gahan, 2012) to transform them in future customers (Table 3). In this regard, however, all enterprises admit their inability to know how many contacts are actually transformed into real customers.

Table 3: Reasons to use social media

Motivation	%	Motivation	%
Interactive channel	6%	Contacts	8%
Visibility	50%	Foreign	2%
Promotion	54%	Communication	0%
Customers	73%	Low Cost Investments	0%
Merchandising	2%	Increase of ranking	0%
E-Commerce	6%	Curiosity	4%

With regard to future plans, many enterprises are thinking to enhance their presence in social media (67%) and in some cases they express the intention to start with some experiments of e-commerce (29%) or enhance advertising (15%) (Table 4).

Table 4: Future actions

Future actions	%
Consolidation of social media	67%
Advertising	15%
E-commerce	29%
Facebook in other languages	2%
Youtube	2%
Integration of various websites	2%
Sales	0%
Do not enter in social channels	0%
Marketing	0%
Customer care	6%

Other data from the research are the following: 40% have post-sales contacts with customers; 60% is not active in sales service; 38% make some statistics on consumer preferences but nobody still uses specialized software of opinion mining to analyze customer reviews. Few firms think to do so in the future. 63% of the respondents use mobile devices for business activities. 85% of firms are not concerned about online reputation. Most of the companies have not yet implemented web 2.0 tools.

Questionnaire results show a widespread interest towards social media potential (development of new products, opening of new sales channels, management of the relationship with customers before and after sales). Building and managing web relationships with customers are not easy activities and require time and resources. Despite their willingness to interact and collaborate, many firms still have a one-way – and not two-way and interactive – communication. Most companies use web channels as an extension of traditional channels, to communicate with customers and promote their products.

It is not always true that companies using social media have long experiences in network technologies. These tools, however, are definitely most used by enterprises with younger entrepreneurs or employees, who frequently use social networks.

Generally small enterprises are supported by external agencies in developing their website and the structure of Facebook community. Anyway many companies are gradually able to manage virtual channels by themselves because they are very user-friendly. Instead the management of static websites, especially traditional non-CMS, is always entrusted to web agencies or external consultants.

Smaller companies, without organizational-bureaucratic constraints, create and manage in-house social media, while larger companies are supported from consultants who manage contents and the virtual community.

Integration of mobile, devices such as tablets and smartphones is also easier in small enterprises (IT consumerization), thanks to the lack of restrictive security's policies in their information systems. On the contrary, in larger companies, the integration is more difficult for the presence of more restrictions in the authorized access to the system.

3.4 Analysis of interviews and discussion on results

Interviews with entrepreneurs/managers have been analyzed to better understand how small enterprises use and manage social media and to know benefits they obtained using these tools. In this section, we refer to analyzed case studies. For privacy reasons, we assigned to each company an abbreviation including a number that refers to firm's employees.

Some entrepreneurs consider social media as a fad (Deme1, Clam8, Fpam16, Saab8) and they are not willing to change and adapt internal processes to new web technologies. However several entrepreneurs deeply believe in social media potential. This is especially true in some micro enterprises, whose owners personally manage relationships with business stakeholders (Ptma, Pisc1, Masc, Smma).

Generally entrepreneurs, especially in micro firms, personally manage Facebook pages and other social networks in their free time. Ptma's owner says: *"From the downstairs laboratory, in the evening after work, I go upstairs at home and after dinner I connect to Facebook to reply to my customers"*. But for many entrepreneurs time is a problem. Omna owner, for example, had started to use a business blog, but she later dropped it for lack of time. Writing in a blog is often very challenging and requires a lot of time, often subtracted to entrepreneur's free time. She says: *"My daughter helped me to start a blog. At the beginning I spent a lot of time, but I had no more time for my family and for housework. Now I've left the blog"*.

The analysis shows that not only young entrepreneurs use intensely social channels. Some exceptions are, for example, Ptma's and Masc's owners, who are adults and not digital natives. Coma1's owner – a 45-year-old woman – discovered Facebook some years ago. Since then, she decided to use the business old website only to show its contacts. Now she uses social channels to exhibit her products.

Most some entrepreneurs prefer to gradually introduce web technologies and social media in their business. Some firms (Acam27) are starting to use Facebook to promote only one product line, and not their entire catalogue.

Small enterprises hardly have a project integrating website and social channels. For example Lpam20 has three brands and three websites that are not connected with one another. In several cases, Facebook pages are not linkable (reachable) from the website. Main reasons are:

- Facebook page has been created just to increase the ranking (the position in search engines) (Alsc5, Bmam42);
- firms don't have time to update Facebook pages (Omna, Saab8, Vaam1);

- websites were created by external web agencies and the Facebook page is managed by the company (Fpam16, Gcam11, Coma1, Masc). Sometimes small entrepreneurs think that setting a link to Facebook pages in the website causes high additional costs. So in many cases the business virtual community is not accessible from the website. So the owner of Coma1: "A consultant created my website. Now I use it only to show my contacts. Now I have created a Facebook page and I post my collection of jewels. I don't care to link it to the website. I should re-contact and pay the consultant again for that".

Medium and large enterprises usually have an internal or external Community Manager that manages virtual communities. On the contrary in small firms it is very rare to find a community manager. In our sample virtual communities are managed by: firms' owner (8 cases), some family members (3 cases), a generic employee (5 companies) or employees working in marketing/ communications/commercial area (3 companies). Sometimes external non-professionals are involved in this role (Vaam1: "A girl manages the Facebook page; she is good and she costs a little"). For firms belonging to fashion and tourism industry virtual communities are often strategic and therefore it's important to involve expert consultants (Ccma20, Mhsc7).

The ease / difficulty to introduce and use social media is not influenced by firm's past experience with legacy technologies. In fact it seems possible to use web 2.0 tools without having past experience in complex information systems. This helps small firms to use social media. Moreover social media don't require high investments (Smma, Pisc1, Ptma), as interactive channels can be exploited in open source modality. However the presence of a "pivot" (facilitator) with some technological expertise can stimulate the use of social channels (9 case studies).

Small enterprises can obtain great benefits from social media. In most cases, small enterprises without a commercial network use social media to interact directly with their customers (Smma, Ptma, Vaam1, Masc). Smma's owner declares: "I can't have a commercial agent because it's too expensive for me. This is why I continually use social channels to acquire new customers and stay in touch with the old ones ". Often the result is a remarkable increase in sales and customers base. After Pisc1's owner began to show his products on Facebook, requests for his personalized pins increased a lot, as before they were very little known.

Some small businesses show a greater ability to take advantage of social media, and they use them not only to contact customers, but also to create a broader network, involving other supply chain partners. Dram50has has extended the concept of community, including not only customers and dealers, but also outside professional architects. The company wants to stimulate architects to use its design solutions. Its marketing manager says: "We must reach final customers not only directly but also by other professionals of the supply chain. They can suggest people to use our products".

Small enterprises can also acquire many benefits creating an e-commerce section in the website, in particular in they want to internationalize their markets (Tcab1, Dvab1, Ccma20, Brma8). Dvba1 and Tcab1's owners have implemented e-commerce sections using web platforms of other operators in order to reduce the cost of foreign intermediaries. Brma8 has implemented a proprietary e-commerce platform to reach foreign countries. Alsc5 is specialized in e-commerce business. It invests heavily on search engines and price comparison websites and receives opinions from its online customers.

Masc began selling online by eBay and other proprietary platforms. Later it has added an e-shop section in its website. Other companies are aware of e-commerce power but are not licensed to sell to final customers. To overcome this obstacle some firm partnered with owners of sales platforms (Saab8 and Tcab7). Other firms have gradually carried out e-commerce experiments (Cmme16, Cume7) and sell online only some products. Other firms (eg Cmma1) serves a local market and are not interested in internationalization, so it prefers e-mail to communicate with its customers.

Also B2B companies can obtain great benefits thank to social media. In our sample, B2B firms with a good commercial network (5 business cases) use social media to promote and launch new products, in order to reach global customers. They also invest in ads on Google AdWords in order to make sure that the company website I easily identified by search engines using specific keywords.

4. Small enterprises and social media: two very different approaches

Findings from sample survey are integrated with description and discussion of two small firms cases, drawn from the sample. Cases presented in this section are interesting as they represent two very different approaches in the use of social media, characterized by different degrees of technological innovation and strategic awareness about social

media potentiality. Their analysis is useful to note the existence of different approaches in how small enterprises are using social media. They also confirm that it is necessary to know how small businesses use social media, in order to understand whether their technological tools are really useful for their business and are really able to contribute to their competitiveness.

4.1 Nouveaux bijoux: A traditional company

*Nouveaux bijoux*¹ is a very small enterprise where the owner and only one employee are working. The owner is a very creative woman. She designs and manufactures jewellery in gold and other metals. Her customers are retailers or end customers; 90% of customers are in Italy and 10% abroad. The entrepreneur often participates in exhibitions and other events that allow her to introduce her products and expand her customer base. She collaborates with art galleries, shops and designers and exhibits her jewels together with other objects, produced by other companies: pottery, clothes, furnishing, and so on.

In the company there is only one computer Macintosh used for trade relations, Internet, e-mail and Facebook. Initially, the company was equipped with a website, created by an outside professional and used as a showcase for company's products. But the site has not been updated since then and it is now used only to expose corporate contacts (address, phone, e-mail). Recently a Facebook company profile has been created. Facebook pages are constantly updated with catalogues and pictures of new jewels. For this purpose, her assistant helps the entrepreneur. He is younger and thus more skillful at using social networks and managing relationships with the virtual community. Entrepreneur's future plans also include opening an e-shop. But at the moment the project has been postponed. In fact it would require hiring another person to take charge of the management of e-commerce, but for the company it would be too costly.

The enterprise described in this section is characterized by a very limited presence of ICT and social media, and by a very low ability to conceive ICT and social media in a strategic perspective. The technological tools available, in fact, are under-utilized and the company manages relationships with the market in a very traditional way, favoring personal contacts and without using social media to interact with it. The presence of social media, therefore, seems at the moment unable to bring real benefits to the firm. The use of Facebook seems to be the result of a fashion, or even a fad. It is conceived as a tool "that all companies should use", even if the entrepreneur is currently unable to use it to improve her relationship with customers and to implement an effective marketing strategy.

4.2 Le monde en un clic : a web 2.0-oriented business

The founder of this company – Le monde en un clic – is well known in the photography world and for several years he has held senior positions at the Kodak Spa. The company promotes two brands: the first is intended for professional photo labs and amateurs, while the second is targeted at end users. With the first brand the company offers software and hardware solutions (e.g. printers and plotters) for layout and photo printing customized on different items such as gadgets, cups and pillows. The second is a web 2.0-oriented brand. It consists of an online service through which clients/users can design by themselves a customized cover for their smartphone. After having received the design by a customer, the company prints it on a cover of rigid plastic, with the dimensions defined by the user, using a dye sublimation process. The final product is then delivered, by post, to the user's home. The whole delivery process takes 3-4 days. It is inserted in an electronic tracking system and each customer can thus check, at every moment, the delivery flow. Payments can be made by cash, PayPal or credit card. Customers are also invited to share their covers with their friends on Facebook, in order to trigger a process of word of mouth, which aims to increase company's public visibility and reputation and to increase the number of contacts and customers. In this way, customers are actively involved in company's production process: when the company gives them the option to draw their own customized cover, in fact, they become prosumers, producers and consumers at the same time. In this company, an external web marketing agency has been charged with developing and maintaining the website and with managing e-commerce activities.

In 2011, the project launch year, the company's platform, unique in Italy, got an immediate success. The following year it increased its revenues by 225% and in 2013 the growth was about 40%. The company's success has immediately attracted a number of competitors. In 2013, and especially in 2014, new Italian and international players entered the market, with a particularly aggressive pricing policy.

¹ For privacy purposes, fantasy names are used in this paper.

Last year the company launched a contest via social networks. It invited graphic designers and architects to submit their works to print them on its covers. The contest obtained a great success with the participation of over 100 artists. The competition was disclosed on several websites specialized in graphic design. Many works were posted on company's Facebook pages, thereby increasing discussion and interest in design.

The company's web marketing consultant constantly promotes the project through affiliations on other social networks. Moreover he is in contact with a number of bloggers, press officers, associations and other companies. He has recently contacted some major national blogs who write about trend and fashion. Many of them consider the project very interesting and now they are planning to work together and to launch new ideas.

In 2015 a new version of the web-based platform has been presented. The radical novelty is that now customers not only can create their customized covers. Customers now can sell their covers, putting them in a specific area of the website. So the technological infrastructure no longer appears as a platform of pure e-commerce, but it is rather a marketplace of covers. The company is engaged in production of covers but creative and authorial activities are now reserved to portal's users / clients.

The case "Le monde en un clic" is particularly interesting because it shows that even in a micro enterprise, with only 5 employees, it is possible to introduce marketing and management innovations, exploiting the potential of 2.0 technologies. In particular, the company seems to have fully learned the concepts of collaborative customization and open innovation. In fact, the company is able and willing to make products / services with features and specifications set by customers, in line with their preferences and needs. Moreover, the company is open to innovative contributions from outside. It is indeed aware that internal company resources may not be sufficient to develop adequate innovation abilities, as it is required by the current competitive scenario. The company also takes advantage of crowdsourcing, because the end product is based on contributions and creative ideas that anyone (crowd) brings in, designing personal images that will be printed on their cover. In this way, production becomes social, because production process is no more an internal function, but it is carried out with the participation of customers and designers / artists / graphs, which are outside the organization.

5. Conclusions

The results from this research show that, although social media is quite common among small businesses, the latter are not always able to use these tools in a truly profitable way.

Small firms are starting to realize the importance of social media and virtual channels to achieve business goals and are gradually learning to take advantage from the use of such technologies. However social media are often introduced because they are considered "fashionable", because companies feel "forced" to use them as "all other companies do it." Very often entrepreneurs transfer in the company the use of technological tools that until then they have used only in their private life. In such cases, however, the social media are not able to change the company's competitive position and add value for the customer. Their use is in fact largely underestimated, precisely because social media are not involved in a comprehensive strategic plan that includes process management and marketing strategies.

The first case presented in the paper well describes this kind of situation. The company in fact shows a very limited ability to exploit the full potential of existing interactive technological tool, which at the moment contribute very little to the development of the business and to the enhancement of its competitive ability. The main reason has to be attributed to the entrepreneur's limited technological skills and to its limited awareness of the potential of 2.0 technologies. However, the business small size and its limited financial resources also play an important role. This situation in fact prevents the hiring of people with adequate technological skills, which are necessary to manage social media and change the business model in order to exploit the potential of these tools.

The research, however, has highlighted the existence of a wide range of different situations within the world of small business. Alongside low innovative businesses, in fact, there are also other small businesses that are very open to the use of social media and interactive technologies, and able to take full advantage of their adoption, like the one described in the second case presented in the paper. Enterprises of this type organize their activities leaving wide space to information and knowledge exchange with customers, suppliers and other companies and make extensive use of social channels and virtual channels. In these companies the equipment of digital technologies may be richer

and more innovative, but the main difference comes from the strategic awareness that accompanies their use in the company. While in the first case the introduction of social media is the consequence of motivations push, in this second group of companies it comes from mainly pull reasons. The decision to adopt social network in fact is inspired by the willingness of the entrepreneur to create a new business model, characterized by interactivity, openness to clients, collaboration and visibility. To make a difference in companies of this type is the mentality of the entrepreneur, his ability to conceive new ways of doing business and its willingness to get involved with new initiatives, taking advantage of new technologies.

This variety of situations confirms that, when the analysis is focused on the relationship between small firms and social media, it is not enough to know *how much* small enterprises use social media, but it is necessary to understand *how* small enterprises use them. This also means that qualitative analyses should be encouraged, in order to get further information about obstacles that hinder small businesses' ability to fully take advantage of these technological tools.

Data obtained from this analysis give a contribution in such a direction. They can also be used as a basis for further quantitative investigations, involving a larger sample of companies and using specific statistical tools. Analysis of this type may give more generalizable results, useful to validate some findings from qualitative analysis about the adoption and use of social media in small enterprises.

To conclude we can say that in this research there are some limits. Results come from a small sample of companies (48 cases). So this research can be considered as a first step, useful to identify some research hypotheses that should be subsequently verified by further investigations involving a higher number of companies. Interviews should be addressed to enterprises segmented by size, in order to focus the analysis on homogeneous segments of companies. In this way it would be easier to know dynamics related to companies belonging to the same size class and make comparisons between them. Indeed we are aware that issues and dynamics that arise within a small enterprise are different from those of more structured organizations.

Another limitation of this research is that we have only interviewed one person in each company. To get a complete description of the state of the single firm, we should know views and opinions of more enterprise representatives and stakeholders, especially customers and suppliers.

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Science 2.0 and Conference Tweets: What? Where? Why? When?

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Abstract: Microblogging activity as supported by Twitter has rapidly gained a lot of attention within the scientific community. For example, the organizers of scientific conferences started exploiting Twitter for various reasons, e.g., engaging customers via backchannel, or providing awareness support for stakeholders. We assume that there is no equal distribution of Twitter activity over time. Instead we argue that there are particular events or occasions that lead to peaks in the number of tweets. Clearly distinguishable peaks can be used by conference organizers to promote or announce information. At the Science 2.0 conference 1,879 conference-related tweets (including retweets) were collected between 14.03.2014 and 14.04.2014. In total 822 tweets (68%) came from conference attendees versus 392 unique tweets (32%) from external contributors who were also more likely to retweet (24% vs. 74%). Additionally, we conducted a content analysis of all tweets by using a self-provided codebook with three classes: purpose of tweet, target of web link (if embedded in the tweet), and topical relation to "Science 2.0". The purpose of over 80% of the tweets was to share conference content or resources. Pictures and the conference website were the most often tweeted link targets (65%). The top four content categories occurred in 11% to 15% of tweets and were "scientific working methods," "web topics," "projects & research programs," and "open science & open data" reflecting what the audience was most interested in. These results help to understand Twitter behavior regarding time and content. This study provides a threefold additional value: 1) conference organizers know when to announce important conference-related information to the audience via Twitter, 2) the first two classes of the validated codebook are transferable to studies in a similar vein and can be easily reused from the community, and 3) supports recording of user feedback to conference topics and highlights.

Keywords: twitter; tweets, user engagement; conference backchannel, conference tweets, scholarly communication, content analysis

1. Introduction and Motivation

Microblogging activity as supported by tools like Twitter has been growing rapidly since its launch 2006 and usually people use Twitter to talk about daily activities or retrieve and share different kinds of information (Java et al., 2007). Microblogging is a form of communication, where users can use a short post to describe for example their present status. But, microblogging also has become the center of attention both in scientific discourse (Reinhardt et al., 2009) as well as in discussion within the scientific community (Ross et al., 2011). Especially the organizers of scientific conferences and the users of conference management systems could use social networking services (such as Twitter) to provide awareness support for all stakeholders (Reinhardt et al., 2011) and to intervene when problems become obvious (Sopan et al., 2012). But of course Twitter as tool is not only dedicated to one specific scenario and additionally consists of users with different backgrounds and motivations (Weller, Dröge and Puschmann, 2011).

Tweeting, especially during scientific conferences, is a popular activity amongst scholars and it is mainly used for sharing information with followers and other peers (Mahrt, Weller and Peters, 2014). Here, two types of information sharing actions (i.e., Twitter citations) have been identified: external citations appear when resources outside of Twitter are referenced in the original tweet, e.g., via URLs, whereas there are internal citations when original tweets are forwarded by third parties, i.e., retweets (Weller, Dröge and Puschmann, 2011). Such uses of Twitter strengthen its position as effective tool for information dissemination which has also been acknowledged by conference organizers and participants. Three main scenarios for Twitter at conferences have been identified (Reinhardt et al., 2009; McKendrick, Cumming and Lee, 2012):

- Before a conference: To promote the conference, general information and other related aspects (dates, keynotes, workshops and other events) can be posted on Twitter. Another important aspect is to remind people of upcoming deadlines for conference submissions or early bird fees. The final goal is to increase excitement for the conference and to have a community of early adopters talking about it and spreading the word via their follower-networks.
- During a conference: Last minute changes or the announcement of meetings are principal points during the conference and can be quickly distributed with tweets. But also discussions on conference presentations among conference attendees (and lurkers on Twitter not attending the conference) can

take place on Twitter. Questions can be raised and answered by the microblogging audience as well as the conference speakers or attendees (e.g., if publicly displayed on so-called Twitter walls onsite). The use of a specific conference hashtag is favorable, because otherwise thematic grouping of tweets is more difficult.

- After a conference: The conference organizers can use tweets to thank the attendees and speakers as well as for asking for feedback. Also references (e.g., URLs) to other media outlets concerning the conference (e.g., blog posts or newspaper articles) can be tweeted.

Hence, microblogging at conferences is a promising way to discuss presented topics and also to exchange additional information with other participants. Twitter enables participation in different topics and discussions related to the conference in an active and virtual way. Here, especially the hashtag-feature, which is a “#” sign followed by a specific string like a name, date, or a unique code is valuable. Tweets can be grouped with a hashtag and enable easy following of topics often used for a specific period of time (Reinhardt et al., 2009). Moreover, microblogging at a conference can be seen as a kind of backchannel communication linking the speakers and the audience more intensively. Technically this is supported by using the “@” sign followed by a user name to directly reference other Twitter users and raising the attention of this particular recipient (Ross et al., 2011).

The identification of scientific tweeting is difficult, because a tweet at a scientific conference does not need to be scientific at all. Additionally, there is no general definition of what are the properties of scientific tweeting. Three possibilities are most likely to occur: a tweet consists of scientific content or links to scientific content; a tweet that is published by a scientist; a tweet includes a science-related hashtag (Weller, Dröge and Puschmann, 2011).

Since Twitter automatically saves a time stamp for every tweet, a timeline of conference-related tweets can be built and Twitter conversations can be chronologically followed. That Twitter function allows for time-specific analysis of tweets in order to get information on when Twitter usage is intensive and conference attendees, presumably, can best be reached via tweets. Also, times of heavy tweeting can be linked to the conference program (or more specifically particular presentations) to reveal highly discussed, and therefore relevant conference content which might spark further discussions (or boring topics if we assume that people tweet when the conference is less engaging). Thus, understanding time-specific tweeting behavior of conference attendees would help conference organizers distribute important information more effectively and add value for tweeting conference attendees. It is important to note, that Twitter recently announced a change of this principle (Sherr, 2014).

Hence, the main purpose of this study is to analyze of conference tweets over time. Previous studies often analyzed tweets only on a daily basis (Ross et al., 2011), but facing tight conference schedules we are interested in a more granular analysis. Therefore, we take a more detailed look at tweets and analyze them on an hourly and half-hourly basis. The underlying research question is that there is no equal distribution of tweets over time but that there are particular events or occasions that lead to peaks in Twitter activity. If there is evidence for clearly distinguishable peaks found in the mass of conference tweets the peaks can be used by conference organizers to promote or announce information, because many people use Twitter during these moments and Twitter awareness is high. One possible application might be the automatic detection of peaks. It has already been shown that such applications can be effectively used, because peaks can suggest that something is very important due to the fact that many people need to comment or retweet (Nichols, Mahmud and Drews, 2012).

Finding whether peaks are content related or related to the structure of the schedule, the prediction of such peaks might help to give additional support to conference participants when it is actually needed. To master this challenge the analysis and categorization of “normal” tweet-behavior and the comparison with tweet-behavior at scientific conferences is necessary. In order to create a reproducible and reliable method of tweet categorization for content-based analyses of peaks particular effort was put on the development of a codebook to guarantee high inter-rater-reliability.

This study aims to successfully master the first steps in this direction. Additionally we are interested in the different kind of tweets as can be described by the purpose of the tweet, the target of a web link (if embedded in the tweet), and finally the content itself.

2. Methods for Evaluation and Analysis

We will now present the purpose and the design of this study and its analysis. Our testbed for data collection is the Science 2.0 conference which took place from 26th to 27th March, 2014 in Hamburg, Germany. The conference had 153 registered attendees and joined people interested in the changing landscape of scholarly communication, research and publication technologies as embraced by increased use of social media. The Science 2.0 conference organizers maintained their own Twitter account (@lfvscience20) and the use of Twitter was actively encouraged by the conference organizers, e.g., by having promoted the conference hashtag and having set up Twitter walls around the conference venue. The conference only had one track at a time and several breaks during the day.

All tweets related to the Science 2.0 conference were collected with the tool TwapperKeeper. The following hashtags and keywords were used to filter the tweets:

- #sci20conf
- science 2.0
- science 20
- “science 2.0”
- “science 20”
- science20
- science2.0

The tweets were observed and collected between 14.03.2014 and 14.04.2014. In total 1,879 tweets were collected. Since TwapperKeeper collects tweets in different archives double counted tweets had to be removed before the analysis (665 tweets were deleted). Redundancy is a feature of TwapperKeeper, which helps collecting all tweets and therefore reduces the risk of losing any tweets. Also, all retweets (489, indicated by RT) and modified tweets (49, often indicated by MT) were removed resulting in 676 tweets for the content analysis. This has been done to avoid a bias by retweets, because we are not interested in the popularity of users or tweets, but we are looking with our content analysis behind these descriptive statistics to get a better understanding of the scholarly communication.

The tweets were analyzed separately: first for the group of conference attendees and second for people that did not attend the conference in person. This was possible, because we had access to the participant list. Then we manually compared the Twitter accounts and the email-addresses of the attendees with the different Twitter accounts and checked for concurrence. The split analysis for in-person participants and remote participants is a novel, yet unique procedure, which is rarely used to differentiate the different stakeholders of scientific conferences (Sopan et al., 2012).

3. Results

The analysis of the user-specific tweeting behavior reveals a power law distribution of all conference tweets. Only few users tweet very often, whereas the majority of users tweets only occasionally resulting in a small amount of sent tweets (maximum number of tweets for an individual user: 95; mean of tweets per user: 6.83; standard deviation of tweets per user: 15.62; the median number of tweets is 1, because 51.5% of the users sent only one tweet). The distribution can be seen in Figure 1. This phenomenon is popular for analyses of web data (Letierce et al., 2010; Ross et al., 2011).

As depicted in Figure 2 there are two dominant peaks in the Twitter activity during the conference. The first one is on the first day at 10am and the other one is on the second day at 11am. By observing the conference schedule and matching it with the peaks, we found out that peak number one is close to the beginning of the conference and peak number two is close to the end of the first coffee break on the second day.

We can identify four additional peaks. The peaks three and five are close to the end of the lunch at day one, respectively day two. The peaks four and six are close to the end of the coffee break, again at the days one and two. In

Figure 2 the height of the peaks after lunch never went back to the previous peak level, which seems to be a normal situation in tweeting activity at scientific conferences (Sopan et al., 2012).

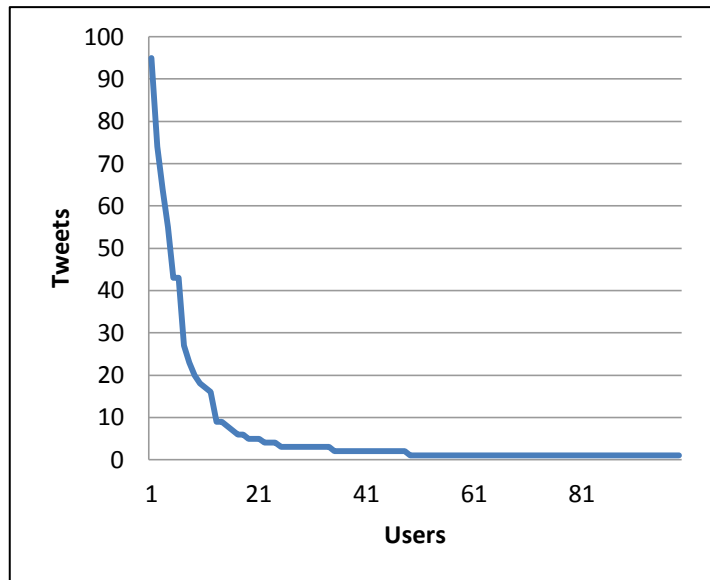


Figure 1: Distribution of all tweets

489 from the 1,214 tweets are retweets (40%) and the remaining 725 (60%) are not retweets. Also 718 tweets (59%) contain the “@” sign. This ratio is comparable to other studies (Ross et al., 2011). But this ratio might be misleading, because also retweets are counted. Therefore we take a different approach to counter a retweet-bias and look additionally at tweets with a “@” sign, which are no retweets. This results in 229 remaining tweets (19%).

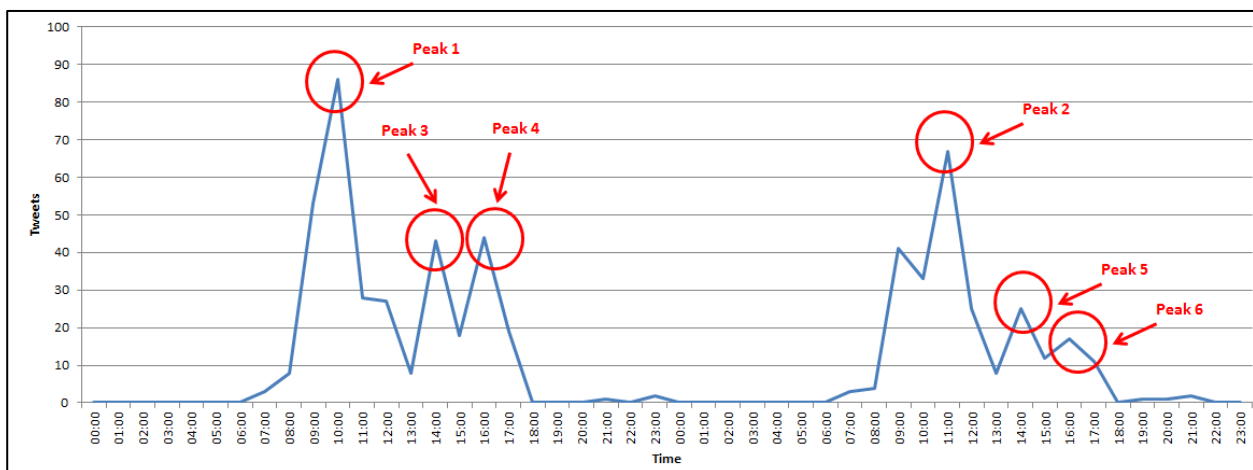


Figure 2: Tweets and peaks for the two conference days

648 tweets (53%) included a link. But again this number might be too high, because links can be retweeted. The removal of tweets with a link and which are also retweets led us to 287 remaining tweets (24%). The ratio is actually identical to the results of Ross et al. (2011). The analysis also revealed that we have a similar number of “@” signs and tweets with a link in the set of sent conference-related tweets.

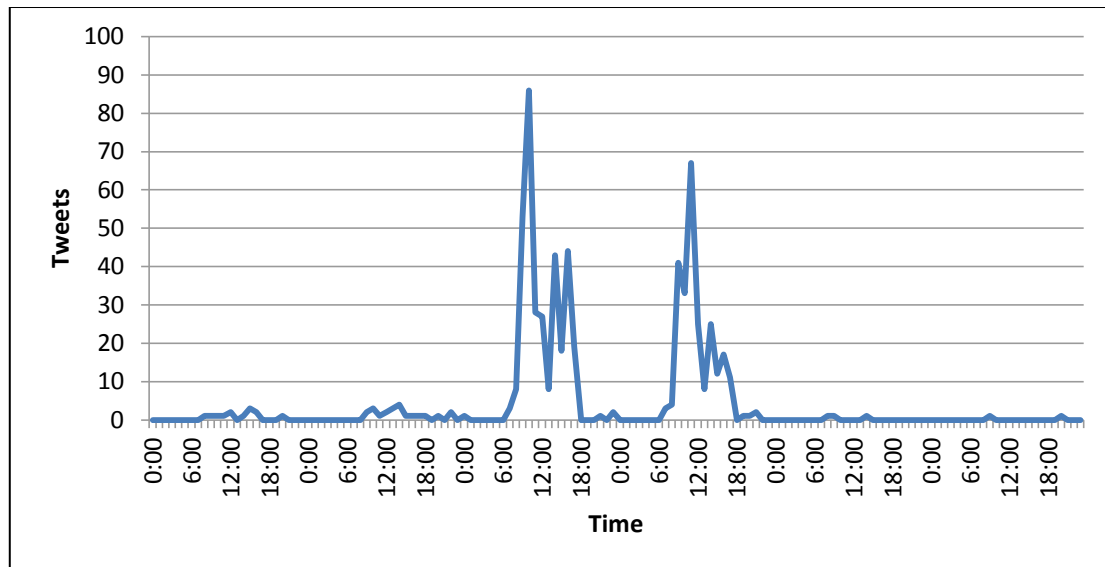


Figure 3: Tweets per hour for the period between 24.03.2014 and 29.03.2014

Figure 3 shows the tweets per hour for the period of 24.03.2014 until the 29.03.2014 which includes the conference days (26.03.2014 and 27.03.2014). Here we can find a brief overview of the distribution of tweets before, meanwhile and after the conference took place.

A final result which we want to report is the comparison of tweets of conference attendees versus the number of tweets from people which were not in person at the conference. In total 822 tweets (68%) came from conference attendees versus 392 tweets (32%) were from external contributors. This finding counters the results from Ebner et al. (2010) by showing that a significant amount of non-participants of the conference took part in the discussion on Twitter about the Science 2.0 conference. Non-participants embrace the idea of live streaming and follow the whole event. User using the live stream can feel engagement or some kind of relatedness, which has been already demonstrated in previous research (Sopan et al., 2012).

It can be further stated, that conference attendees had 200 tweets with a retweet (24% from a total of 822 tweets). Whereas 289 tweets (74% from a total of 392 tweets) from the external contributors were retweets. This indicates that external contributors are more likely to retweet first-hand conference-related content than to post anything else. As such they act as multipliers spreading the information to their network of followers. For conference organizers this means that not only conference attendees should be addressed but also remote participants.

3.1 Content analysis

Despite that the chronological accumulation of tweets is important for conference organizers, also the information about the content of the tweets at different points in time is valuable in order to better understand reasons for peaks. Therefore we conducted a content analysis of all tweets with regard to three classes: purpose of the tweet, target of a web link (if embedded in the tweet) and finally if the content is at least loosely connected to Science 2.0. A content analysis of public tweets can for example reveal different aspects of personal life (Humphreys, Gill and Krishnamurthy, 2014).

The creation of categories for each class was inspired by two past works:

- Reinhardt et al. (2009) proposed six categories (sharing resources; communicate with others; participate in parallel discussion; jot down notes; establish online presence; post organizational questions);
- Ross et al. (2011) proposed seven categories (comments on presentation; sharing resources; discussion/conversation; jot down notes; establish online presence; post organization questions; ambiguous).

Our qualitative analysis differs in the number of categories per class. This will be explained further in the upcoming subsections. If a tweet might fit in two or more categories, the raters were advised to choose this category, which fits best, disregarding any additional categories. In total three different raters analyzed a subset of 100 randomly selected tweets and conducted the coding with the help of a codebook. Statistical findings about the inter-rater-reliability will be provided for each class.

3.1.1 Purpose

The first class of the content analysis is the class “purpose”. Raters used six categories for the coding of 676 tweets (see Table 1). Almost the same number of tweets deals with conference content or shares resources (see Figure 4).

Table 1: Class “Purpose” with six different categories

Acronym	Category	Description of the category	Tweet examples
I	Conference content	Tweets which report concrete contents of the conference, mostly about a presentation, or provide new perspectives to discuss Science 2.0 topics.	“Culture clash between Libraries and Library customer. Cause different languages. #sci20conf”
O	Organizational aspects and announcements	Tweets which are about organizational information concerning the conference, for example tweets about the conference schedule.	“Will the recordings of #sci20conf talks be made available as video files?”
N	Note/Snapshot	Tweets which have no professional contents or are no starting point for discussions. They are mostly small talks.	“On my way to #sci20conf”
B	Conditions of the conference	Tweets with reference to the conference, which have no professional contents but discuss some contextual aspects (food, equipment, etc.)	“I agree, #sci20conf was pretty much perfectly organized, thanks a lot! Only one little point: Next timer better coffee, please ;)”
T	Sharing of resources	Tweets which share and spread resources through links.	“I'm sharing great #sci20conf posts on my site. Come take a look: http://t.co/gissYxTffu ”
A	Other events	Tweets which advertise other conferences or compare them with the Science 2.0 conference.	“Today's conference hashtags to follow: #dhd2014 (continued), #sci20conf, #c4114”

Together, conference content and sharing of resources account for more than 80 % of the class purpose. Note/snapshot is also popular, but each of the remaining categories fails to achieve more than 4 % of tweets. Fleiss' kappa is .60, with Cohen's kappa for the comparison of the three raters having values of .46, .66 and .67. The total level of agreement among all raters is 68%, with individual comparison values of 69%, 81% and 82%. The overall inter-rater-reliability can be considered as moderate with two comparisons achieving substantial strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

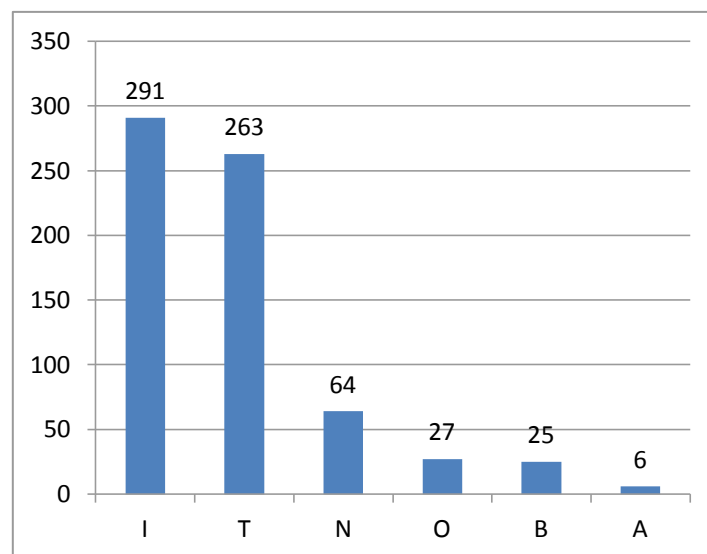


Figure 4: Distribution of tweets for the class "purpose" (x-axis=categories; y-axis=number of tweets)

3.1.2 URL

The second class used in the content analysis is the class “URL”. This content analysis considers only tweets with a web link, 415 tweets are without URL. Raters used the nine categories shown in Table 2 for the coding of 261 tweets. Most tweets link to pictures or to the website of the conference (see Figure 5).

Table 2: Class “URL” with ten different categories

Acronym	Category	Description of the category	Tweet examples
KO	Website of the conference	The first link of the tweet leads to the website of the conference Science 2.0 or to one of its subdirectories.	“How will #socialmedia change research and publication processes? Registration for http://t.co/zS0sxFmmvb still open #openscience #sci20conf”
DO	Documents	The first link of the tweet leads to a document, usually a PDF or to a download page.	Paper by Salganik, Dodds and Watts 2006 paper on the rich get richer phenomenon in music markets http://t.co/ANytRUPTh7 #sci20conf”
BI	Pictures	The first link of the tweet leads to a picture.	“More on Scholarlib from poster session #SCI20CONF http://t.co/cBTS72fy58 ”
FO	Presentation slides	The first link of the tweet leads to presentation slides (mostly in Slideshare).	““VIVO for Scientific Communities - slides from @inablu & me for our #sci20conf lightning talk today 14:00 CET: http://t.co/OUqdFBNSKw ”
VI	Video	The first link of the tweet leads to a video.	“Explaining Video to EEXCESS http://t.co/OMbYyyBwH2 . #sci20conf”
BL	Blog	The first link of the tweet leads to a blog (typical blog structure with articles in chronological order and comment function).	“check out the blog of the Swiss Special Interest Groups Science 2.0 http://t.co/fikDEpw6gV #sci20conf”
AR	Article	The first link of the tweet leads to an article on a website, which isn't a blog.	“Information about open research data in Horizon 2020 http://t.co/8Cnu9N3Xyn #sci20conf #servicetweet”
WE	Web portal	The first link of the tweet leads to a web portal, which stores data, for example Lanyrd or Eventifier.	“My Facebook Album about #sci20conf with a few boat trip pictures ;-) https://t.co/C3oER4Ar6G ”
OR	Organization	The link of the tweet leads to the website of an organization without referring to a specific article. In this category belong also project websites.	“Interesting EU project on book sprints at http://t.co/V9iTiMxLNI #sci20conf”

Roughly 5 to 6% of tweets fall into the categories article, web portal, and video. The remaining categories apply to only 3 % of tweets each.

Fleiss' kappa is .85, with Cohen's kappa for the comparison of the three raters having values of .79, .79 and .96. The total level of agreement among all raters is 88%, with individual comparison values of 89%, 89% and 98%. The overall inter-rater-reliability can be considered as substantial with one comparison even achieving almost perfect strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

An additional inter-reliability-analysis has been conducted to analyze, if the detection of links was successfully accomplished by the raters. Fleiss' kappa is .99, with Cohen's kappa for the comparison of the three raters having values of .98, .98 and 1.00. The total level of agreement among all raters is 99%, with individual comparison values of 99%, 99% and 100%. The overall inter-rater-reliability can be considered as almost perfect strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

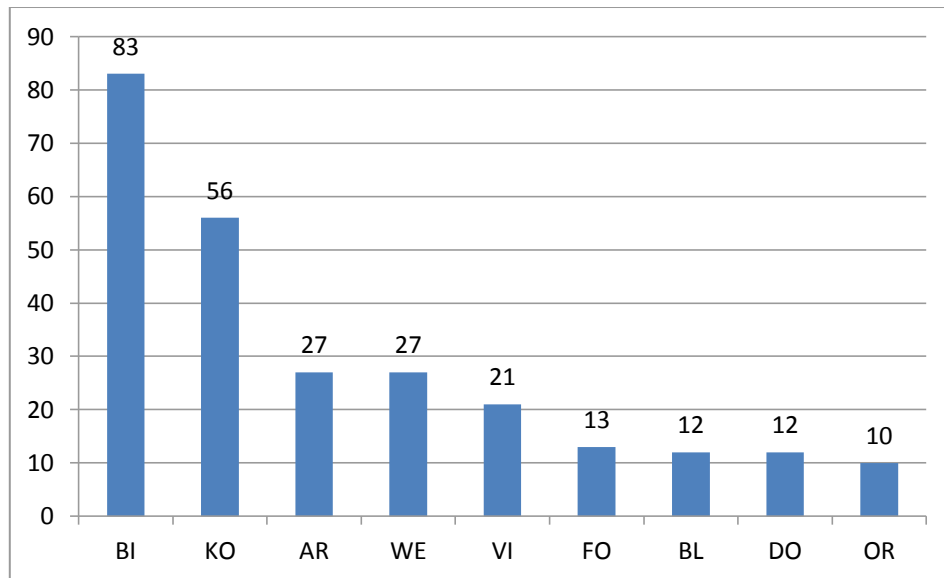


Figure 5: Distribution of tweets for the class "URL" (x-axis=categories; y-axis=number of tweets)

3.1.3 Content

The third class of the content analysis is the class “content”. Of the 676 tweets only those were considered which relate to the context “Science 2.0” in general. Raters used the ten categories shown in Table 3 for the coding of the remaining 414 tweets.

Table 3: Class “Content” with eleven different categories

Acronym	Category	Examples of topics	Tweet examples
WIS	Scientific working method	scientific evaluation, Science 2.0-tools, eScience, scientific communication, publication method, Book-Sprints, Exposés, Citizen Science, Science-Hackathons	“citizen science is closely related to science 2.0 through the common tools #sci20conf”
SOC	Social Web	Social Media, Social Media-Usability, Altmetrics	“Social Media users: Ms Maker, Mr Tech, Mr Classic & Mr Nerd. Mr Classic (photo) is dying out though 2/2 #sci20conf http://t.co/QfloZSmN4e ”
OPE	Open Science & Open Data	Open (Digital) Science, Open Access, Open Data, Copyright	“most important: eu as a public funder of research focus on open access of funded science #sci20conf”
PRO	Projects & Research programs	Horizon2020, CIBER, VIVO, EEXCESS, ScholarLib	“Pilot on Open Research Data in H2020: What data? http://t.co/nxtKfQbrH2 #sci20conf”
BIG	Big Data	Big Data	“Interesting to see a social science take on what big data means Schröder #sci20conf”
KON	Conferences & Lectures	Science 2.0 - Conferences, presentation methods	“Have to stress it again: this format is not discussion friendly. Two short questions and thats it? We need more discussion! #sci20conf”
BIB	Libraries	Libraries, Usability	““libraries could be the first casualty” (of the new online scholarly system) says David Nicholas #sci20conf”
UNT	Enterprises & Organizations	Google, Twitter, Elsevier, Wikipedia/-media	“Nicholas: When Science Direct opened physics journals to google, traffic from google accounted for 70% of total within a month #sci20conf”
BEG	Terms & Concepts Analyses	Distinction between terms, Data concept	“is there a difference between escience and science 2.0? iam puzzled. #sci20conf”
SON	Other	Software development, Science 2.0 in politic, food	“@R_Koenig: Software dev today is neither cathedral nor bazaar, it's mall: highly structured, permanently monitoring customers #sci20conf”

Most tweets are categorized as description of a scientific method (18 %). The same amounts of tweets (15 % each) fall into the categories project & research programs and social web.

Fleiss' kappa is .58, with Cohen's kappa for the comparison of the three raters having values of .50, .53 and .73. The total level of agreement among all raters is 48%, with individual comparison values of 55%, 58% and 77%. The overall inter-rater-reliability can be considered as moderate with one comparison achieving substantial strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level. Figure 6 displays the distribution of tweets for the class "content".

An additional inter-reliability-analysis has been conducted to analyze, if the detection of the topic Science 2.0 was successfully accomplished by the raters. Fleiss' kappa is .17, with Cohen's kappa for the comparison of the three raters having values of .08, .28 and .32. The total level of agreement among all raters is 81%, with individual comparison values of 82%, 84% and 96%. The overall inter-rater-reliability can be considered as slight, with two comparisons achieving fair strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 5% level.

The last result needs some anticipated explanation. A closer look at this finding reveals that the raters had a high level agreement when they categorized actual Science 2.0 tweets. But the raters disagreed somewhat if a tweet is truly Science 2.0 related or not. This explains at one hand the high level of agreement and at the other hand the low kappa values. Additionally one has to keep in mind, that for this class the raters had to choose from eleven different categories. This task is more difficult than the usual categorization with two or three categories. Also the measurement of the strength of agreement needs lower kappa levels (Landis and Koch, 1977).

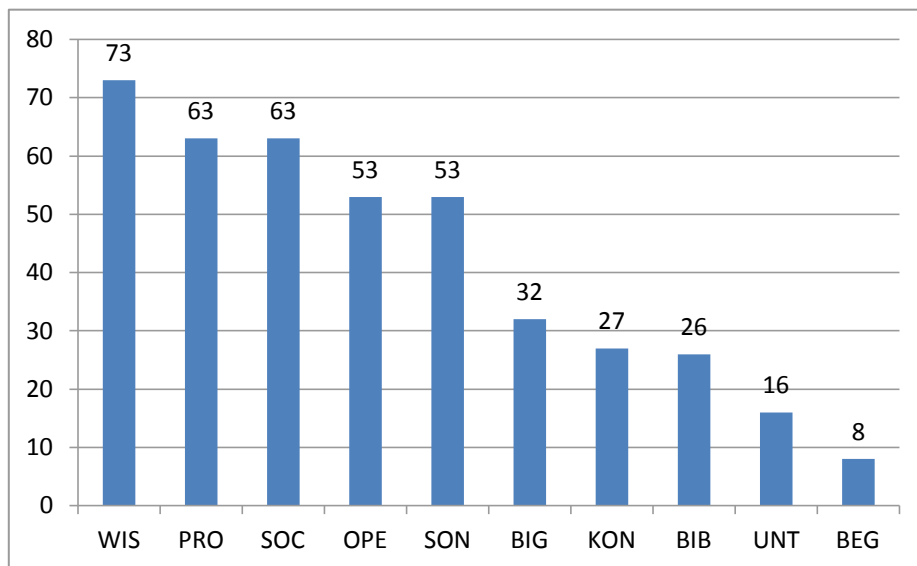


Figure 6: Distribution of tweets for the class "content" (x-axis=categories; y-axis=number of tweets)

3.2 Content analysis of the peaks

As already depicted, we identified six peaks during the two days of the conference. For these six peaks we conducted an additional peak analysis. Figure 7 illustrates the key idea behind this analysis.

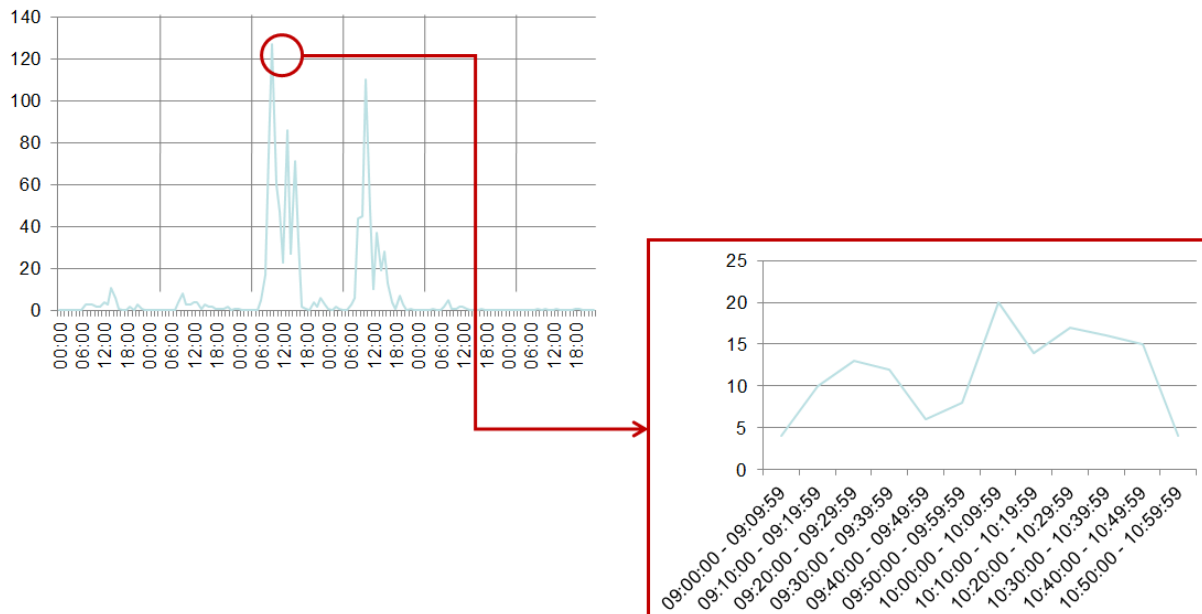


Figure 7: Illustration of the idea and the method used in the additional peak analysis

With respect to the three classes purpose, URL and content, we can provide the following findings:

- On average 32% more conference content is tweeted during the peaks (63% vs. 43%) except for the last peak (28%).
- The class URL has no noticeable differences of preferred tweet categories for the six peaks.
- The content of the tweets varied very much for the different peaks, in accordance to the concurrent presentation.

Presumable controversial presentations with above-average discussions received more attention on Twitter but this effect is only short-termed. Merely one presentation led to a discussion which was still ongoing one hour after the end of this presentation. Other discussions about controversial presentations did not last longer than 30 minutes.

3.3 Preliminary results for the 2015 Science 2.0 conference

The Science 2.0 conference took again place in 2015 from 25th to 26th March, 2015 in Hamburg, Germany. It is of course highly interesting to check, if the proposed codebook is useful in general or if the codebook is only useful for one conference. The conference had 140 registered attendees and again joined people interested in the changing landscape of scholarly communication, research and publication technologies as embraced by increased use of social media. Like in 2014 the Science 2.0 conference organizers maintained their own Twitter account (@lfvscience20) and the use of Twitter was actively encouraged by the conference organizers, e.g., by having promoted the conference hashtag and having set up Twitter walls around the conference venue. Again the conference only had one track at a time and several breaks during the day.

All tweets related to the Science 2.0 conference 2015 were collected again with the tool TwapperKeeper by again using all relevant keywords as determined before (#sci20conf. science 2.0, science 20, "science 2.0", "science 20", science20 and science2.0). From our experience with the last years conference, we checked if there are additional conference related tweets, besides the one with the original conference hashtag #sci20conf. We did not find any additional tweets, hence we will use only the official hashtag for the analysis.

The tweets were observed and collected between 16.03.2015 and 16.04.2015. In total 2,314 tweets were collected. Since TwapperKeeper collects tweets in different archives double counted tweets had to be removed before the analysis (1,134 tweets were deleted). We repeat again, that redundancy is a feature of TwapperKeeper, which helps collecting all tweets and therefore reduces the risk of losing any tweets. Also, all retweets (655, indicated by RT) and modified tweets (24, often indicated by MT) were removed resulting in 501 tweets for the content analysis.

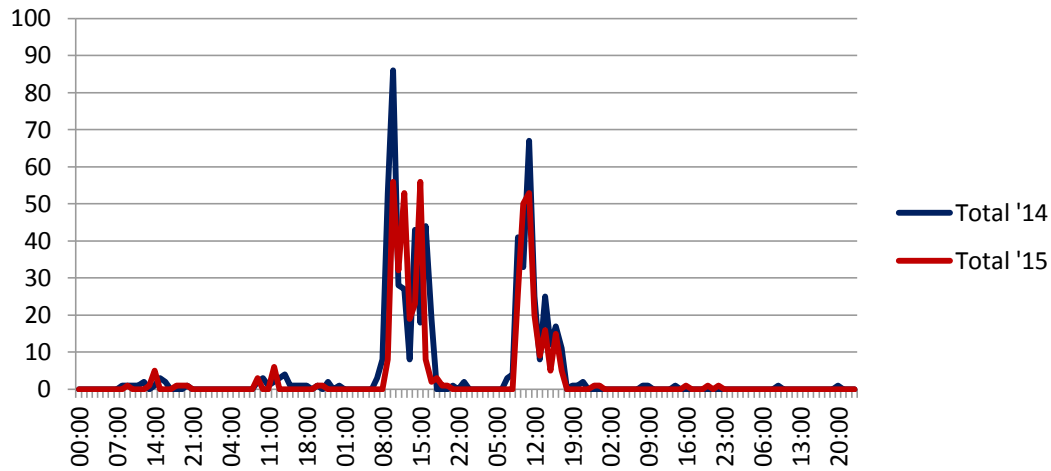


Figure 8: Distribution of tweets from 2014 and 2015

Figure 8 shows that the total distribution of tweets for the years 2014 and 2015 are quite similar. There is no obvious discrimination between both years. Of course the absolute level for the Science 2.0 conference 2015 is lower, because fewer tweets were available for analysis. Small differences in the peaks are due to the fact that some talks in 2015 were longer and therefore there is a small shift of the peaks. Altogether Figure 8 reveals the comparability of both data sets.

Like in the study on the Science 2.0 conference 2014 the tweets were analyzed separately: first for the group of conference attendees and second for people that did not attend the conference in person. This was possible, because we had access to the participant list. Then we manually checked the Twitter accounts and the email-addresses of the attendees with the different Twitter accounts and checked for concurrence.

Table 4: Distribution of tweets for the class "purpose" for the Science 2.0 conference 2015

Category of purpose	#sciconf2015
Conference content (I)	257 (51%)
Organizational aspects and announcements (O)	4 (1%)
Sharing of resources (T)	173 (35%)
Note/snapshot (N)	55 (11%)
Conditions of the conference (B)	11 (2%)
Other events (A)	1 (0%)

Table 4 shows the distribution of the tweets for the class "purpose" in the year 2015. A brief comparison with the 2014 results shows no significant differences. In both data sets the categories conference content and sharing of resources account for more than 80% of the relevant tweets in the class "purpose".

Cohen's kappa is .64 for the comparison of the two raters. The total level of agreement among all raters is 76%. The overall inter-rater-reliability can be considered as substantial strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

Table 5: Distribution of tweets for the class "URL" for the Science 2.0 conference 2015

Category of URL-target	#sciconf2015
Website of the conference (KO)	25 (14%)
Documents (DO)	6 (4%)
Pictures (BI)	80 (46%)
Presentation slides (FO)	9 (5%)
Video (VI)	0 (0%)
Blog (BL)	7 (4%)
Article (AR)	15 (9%)
Web portal (WE)	14 (8%)
Organization (OR)	17 (10%)

As shown in Table 5 we can also not find any significant differences between the tweets of the Science 2.0 conferences in the years 2014 and 2015. In both years the two most often referenced URLs belong to the categories website of the conference and pictures, accounting for more than half of all categorizations in the class "URL". Interestingly no video links have been shared in 2015.

Cohen's kappa is .96 for the comparison of the two raters. The total level of agreement among all raters is 97%. The overall inter-rater-reliability can be considered as almost perfect strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

Table 6: Distribution of tweets for the class "content" for the Science 2.0 conference 2015

Category of content	#sciconf2015
Scientific working method (WIS)	82 (21%)
Social Web (SOC)	49 (13%)
Open Science & Open Data (OPE)	74 (20%)
Projects & Research programs (PRO)	41 (11%)
Big Data (BIG)	23 (6%)
Conferences & Lectures (KON)	16 (4%)
Libraries (BIB)	10 (3%)
Enterprises & Organizations (UNT)	13 (4%)
Terms & Concepts Analyses (BEG)	19 (5%)
Other (SON)	50 (13%)

Finally we show in Table 6 the results for the class "content" of the tweets of the Science 2.0 conference 2015 are shown. We can observe some minor differences for the categories Open Science & Open Data, projects and research programs and libraries. Overall the differences are so small, that the main proportions still remain the same, with scientific working method as most used category for the class "content".

Cohen's kappa is .83 for the comparison of the two raters. The total level of agreement among all raters is 90%. The overall inter-rater-reliability can be considered again as almost perfect strength of agreement (Landis and Koch, 1977). All results are statistically significant to at least 1% level.

We can conclude that our codebook performed excellent for categorization and classification of the tweets of the 2015 Science 2.0 conference. The inter-rater-reliability range is between .64 and .96 and the total agreement range among the raters is between 76% and 97%. We identify substantial and almost perfect strength of agreement. Subsequently we succeeded to validate again our codebook.

4. Conclusion and Future Work

A four-weeks-period of tweets related to the Science 2.0 conference was analyzed regarding Twitter activity and tweet content. During the conference Twitter activity is very high, but there is almost no activity noticeable directly before or after the conference. Moreover, Twitter activity is highest after lunch and coffee breaks, which corresponds to the results of another Twitter related study (Puschmann, Weller and Dröge, 2011). Additionally we find evidence that there is no equal distribution of the tweets over time. We may conclude that any Twitter related activity, information or regulation of the conference organizers should happen at these moments, because the Twitter awareness reaches a maximum level then.

The analysis itself is more elaborated than previous analysis of researchers in other domains, e.g. for medical conferences (McKendrick, Cumming and Lee, 2012). We did not only take into account the purpose of a tweet, but also the content. This makes it also possible to develop an enhanced codebook for tweet categorization. Additionally we used 25 categories in three different classes to capture the richness and diversity of tweets surrounding scientific conferences. Our sound statistical results prove that this effort was fruitful by achieving high scores of inter-rater-reliability. We plan to publish and make our codebook available for everybody, with having in mind especially other interested scientists and conference organizers.

Even more important is the analysis of the time to find peaks in Twitter activity with automatic and manual tools, to identify high Twitter awareness. Again, other research falls short, by e.g. only differentiating between tweets that were sent in the conference or before and after the conference (McKendrick, Cumming and Lee, 2012) or by just

providing basic descriptive results like the total number of tweets without much interpretation of such results (Hawkins, Duszak and Rawson, 2014). This has already been criticized but it is unfortunately still common practice (Sopan et al., 2012).

For future work more in-depth analyses will be done, using sophisticated quantitative and qualitative methods, which are a feasible and proved way to continue the analysis (Ross et al., 2011). For example after the qualitative analysis of the hashtags we will conduct a factor analysis. The categories of this study will be matched for example to the work of Reinhardt et al. (2009), who proposed six categories (sharing resources; communicate with others; participate in parallel discussion; jot down notes; establish online presence; post organizational questions) and Ross et al. (2011) who proposed seven categories (comments on presentation; sharing resources; discussion/conversation; jot down notes; establish online presence; post organization questions; ambiguous).

Also, the comparison of “normal” Twitter behavior with Twitter behavior at scientific conferences is possible. This challenge can be taken, because we successfully validated our codebook in the years 2014 and 2015. With the help of an elaborated codebook for both years we received moderate inter-rater-reliability values for the categorization of tweets’ content and purpose, but high values for the class “URL”. That shows that a content-based analysis of tweets can reveal separate classes of tweets which might be a starting point for the development of algorithms to predict the evolution of a given Twitter discussion according to the different categories used in this study and certain points in time. The long term objective of the usage of such an algorithm is to distinguish between tweets related to conferences and others, to moderate Twitter activity (e.g., stirring up debates during less interesting presentations), and to keep awareness of all twitterers high.

Also the use of customized conference-microblogging software like e.g. “Conference Monitor” might help to identify such events (Sopan et al., 2012). A custom made software is obviously more appropriate to satisfy the needs of conference organizers in conjunction with proper algorithms. These algorithms could also then serve as a service to solve the challenge of lower peak levels after lunch, compared to the peak level right after lunch. This motivational aspects needs further investigation in future work.

For the scope of this study, retweets and modified tweets had to be removed from the analysis. But of course retweets are promising for the identification of important users or at least of users who receive a lot of attention (Weller, Dröge and Puschmann, 2011). Retweets may also reveal which content or topics are important to the audience. By using social network analysis methods these retweets could lead to the development of a social network of the conference participants which would give more insights into e.g., the density of the network or topical communities. This approach could also lead to some easy understanding visualization of the social network of the conference users, divided between conference attendees and external participants. Some proprietary solutions for such visualization of social networks analyses already exist (Sopan et al., 2012), but are far away from providing more than basic descriptive results.

Finally it might be interesting to know for the conference organizers and the users as well what the impact of the different tweets is. Usually citations and references in Twitter do not serve the same reasons like traditional citations and references (Weller, Dröge and Puschmann, 2011). But as (re-)tweets can help to identify influential users and important topics, URLs in tweets could be analyzed and considered as altmetric impact assessment for mentioned publications, presentations slides or citations (Priem et al., 2010). As such they can help evaluating the event and add to the methods of collecting user feedback, e.g. in surveys.

Acknowledgements:

We thank Steffen Lemke and Ermeline Jaggi for the initial tweet analysis and preliminary evaluation. This article is an extended version of paper “Tweets and Scientific Conferences: The Use Case of the Science 2.0 Conference” presented at European Conference on Social Media, presented by the same authors (Mazarakis and Peters, 2015).

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Online Social Network Citizen Engagement on Instagram Crowdsourcing: A Conceptual Framework

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Abstract: The emergence and popularity of online social network platform has greatly transformed the way businesses work in terms of collaborations, communications and crowdsourcing with the boom of Web 3.0 technology. Crowdsourcing is regarded as voluntary participative group behaviour engaging in company activities within online social networks. Previous studies have identified some basic characteristics of crowdsourcing initiatives from business to business perspectives which defined crowd, clear goal, benefits received by the crowd, online task assigned process and more. However, from the consumer's perspective; motivation for such participative behaviour is still not well researched. Finding the right type of motivation in order to establish this behaviour is essential for the success of crowdsourcing. Two primary motivation categories described in the literature are extrinsic (which is referred as technology-push forces) and intrinsic (which is referred as need-pull forces) motivation. To understand this requires an exploratory study that discloses the psycho-social motivations of crowdsourcing, since currently there is no established unitary and shared knowledge on consumer engagement on crowdsourcing. For this research, crowdsourcing is examined through the Instagram platform. Instagram is an online mobile photo-sharing, video-sharing and social network service that enables online social network citizens (OSNC) to take pictures and videos, and share them on Instagram as well as on other social networking platforms. Instagram's simple design allows images and short videos to fill the screen with nothing to clutter the experience of viewing. Similarly, images and short videos of brand posted on Instagram gives equally compelling visual experience that inspire followers to share, post comments and encourage conversations. Instagram taps into the collective intelligence of their followers, the followers receives benefits from crowdsourcing in terms of personal and social recognition. In this regard, this research will explore on motivating factors underlying OSNC behaviour on crowdsourcing. This research will help with understanding relationship building between the consumer and the brand through crowdsourcing, and in return adds value to the brand in long run.

Keywords: crowdsourcing, Instagram, online social network, motivations, engagement

1. Introduction

Traditional marketing strategy is now becoming a thing of the past. Strategies concentrated on content-generation give more ROI than traditional marketing methods. One overwhelming content-generated marketing component that recently creates impact on brand image and value is crowdsourcing. Crowdsourced content encourages participation from the general market; including the brand loyalist and non-loyalist to deliver inclusive, strong, interesting and genuine content. Due in large part to the proliferation of the internet, mobile technologies, and the recent explosion of social media (Kietzmann, et al., 2011), organisations today are in a much better position to engage distributed crowds (Lakhani & Panetta, 2007) of individuals for their innovation and problem-solving needs (Afuah & Tucci, 2012) (Boudreau & Lakhani, 2013). Examples of companies that have been successful in crowdsourcing are Coca Cola and Lego Inc. (Antorini & Muniz 2013). Coca Cola in 2011 announced a shift in their marketing strategy from usual above and below the line to content concentrated marketing, where Coca-Cola relied on its consumer-generated content to drive part of its marketing activities. In their case, they outline a strategy where consumers are encouraged to develop a brand story through the experiences of others that they know. This, in return increased 45% of their global sales.

Brabham (2008) suggests that approaching crowds and asking for contributions can help organisations develop solutions to a variety of business challenges. In this context, the crowd is often treated as a single construct, that refers to a general collection of people that can be targeted by firms (Prpic, et al., 2015). Another instance is Lego Inc. in 2005 started to crowdsource its construction of Legos launched under the name 'Lego Factory'. This allows consumers to design their own Lego models using a computer program which can then be uploaded to the Lego website. Their designs can be made to order and are available for actual delivery. The brand also covers a small selection of Lego products designed by Lego fans and were also made available for online purchase.

These examples show the engagement between online social network citizen (whom also consume the product directly or indirectly, or at least know or heard about the product) and the brand. Content-generated marketing cannot be a success without engagement by these crowds i.e. the OSNC. Engagement reflects consumers' level of

interest on brand relevancy on them which gained significant attention of theirs (Coulter et al. 2003). However, despite important insights gleaned, emphasis on engagement studies pertaining to crowdsourcing is so far concept-based which explain and predict the dynamics characteristic of consumer and brand relationships (Bolton & Saxena-Lyer 2009; Malthouse & Hofacker 2010). Within this concept, engagement which explicitly accounts for consumers interactive brand-related dynamics is gaining traction in the literature thus it needs to fit within the broader theoretical perspectives of consumerism (Brodie et al. 2011). Hence, the purpose of this research is to propose a preliminary conceptual framework disclosing the technology-push and need-pull of crowdsourcing drawing upon Instagram unique characteristics and extant literature in the area of consumer motivation. In this study, OSNC is referred as the active users of online social network. OSNC relatively spend significant amount of time on online social network activities, contributing on the online social network content and participate actively in major online social network sites. This group of people is called citizen because they are abiding under the custom or law that bestow upon them as a registered member of online social network. Having said this, the specific research question devise for this study is:

RQ1: What are the motivations behind the participative behaviour perform by the OSNC on Instagram?

RQ2: What are the pull and push forces of Instagram that motivate crowdsourcing engagement?

Based on the idea of technology-push and need-pull, grounded by uses and gratifications theory proposed by Katz, Blumler, and Gurevitch (1974), these research questions will at this preliminary stage, contextually draw a model that predicts motivation of OSNC engagement in Instagram crowdsourcing and determine the push and pull forces of Instagram crowdsourcing. This research is hoped to contribute to the literature on OSNC-brand engagement by focusing on crowdsourcing. It will uncover central themes that help to characterise OSNC motivation on crowdsourcing and develop typology of OSNC-brand engagement by identifying push and pull forces that is uniquely important in the context of Instagram crowdsourcing in the future. Since this proposed research is at a conceptual stage, this paper is organised by firstly highlighting on the idea of Web 3.0 and crowdsourcing that initiates the inauguration of Instagram, it will then further explain on OSNC engagement in the context of Instagram. Finally, the push and pull forces of Instagram is illustrated and summarised in a table form to give the general picture on how the model proposed can be tested.

2. Literature review

2.1 Web 3.0 and the idea of crowdsourcing

New advances in Internet technology has transformed Web 1.0 into Web 2.0, which then later preceded these integration into Web 3.0 (Berners-Lee et al. 2001). Web 3.0 is viewed as semantic Web technologies integrated into and powered with large-scale applications that developed networked digital technologies that support by human cooperation (or intelligent agents) which automatically manipulate Web services, integrate data and applications from different resources and are able to infer relationships between data in different applications or in different parts of the same applications (Fuchs et al. 2010). From business perspective, Web 3.0 technology is used to adapt and personalise products, brands and services by and for different users or companies according to their own needs whereas, from consumer perspective, it allows users to do what they want with the brand and behave as how they want the brand to behave, whenever they want, allowing instant cross-marketing (Garrigos et al. 2011). The concept of Web 3.0 brought forward radical transformation of technology which revolutionizing brand and consumer engagement, based on the creation and management of networks and participation of people who live, interact, learn, create and contribute content via the web (Garrigos-Simon et al. 2012). In this sense, engagement is the principal feature.

Together with this advancement, consumer is transformed from the passive user of a brand/product into highly active one who wants or at some extent willingly to participate in all production process, forcing company to create an interactive link with the consumer, to be open and cooperative with consumers in the whole communication process, from the definition of the product through to the development, production positioning, communication, brand management or even sales service (Schiffman 2008). In a way, it is a creative segue for consumers to actively consume not only the physical aspect of the product, but also the idea or essence of it through supported or expressed notions online that inculcates virtual participation. Participation is essential, as it increases the engagement, improves reputation and enhances diverse innovations. In the realm of Web 3.0, crowdsourcing is regarded as a type of participative online activity in which a large group of people collaborate on solving a wide variety of problems (Doan

et al. 2011). Some of the earlier studies have identified basic characteristics of crowdsourcing initiative that include clearly defined crowd, task with a clear goal, benefits received by the crowd, online task assigned process and Internet-based collaborative activity (Estelles-Arolas & Gonzalez-Ladron-de-Guevara 2012).

The term crowdsourcing was first used by Howe (2006) that described users' activities on content co-creation. Content co-creation or user-generated content in some cases is termed as customer made content. Customer made content is referred as corporations of creating goods, services and experiences in close cooperation with experienced and creative consumers, tapping into intellectual capital, and in exchange giving them a direct say in and rewarding them for what actually gets produced, manufactured, developed, designed, serviced or processed, while user generated content on the other hand is referred as a regular people who voluntarily contribute data, information, or media that then appears before others in a useful or entering ways (Gatautis & Vitkauskaite 2014).

A more profound thought of crowdsourcing was noted by Estelles-Arolas & Gonzalez-Ladron-de-Guevara (2012) that explained it as a type of participative online activities in which individual, institution, non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity in nature via a flexible open call to voluntarily undertaking a task. The undertaking of the task of variable complexity and modularity in which the crowd participate in bringing together knowledge and experience entails mutual benefit. The crowd will receive the satisfaction from the given task, be it in a form of reward/incentives, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the crowd has brought to the venture depending on the type of activity with predetermined goal is undertaken. However, one would argue if it were really seen as a task to actually contribute in the sphere of social media, especially when generated content by OSNC are thought to be indeed; expressions and voluntary. The potential transformative nature of crowdsourcing communities as a channel of organisational innovation for companies has urged both researchers as well as practitioners to understand how crowdsourcing communities can be nurtured to generate novel ideas and solutions (Afuah & Tucci, 2012). This is why most businesses see it as valuable and has high retainable value to them.

Although companies have long recognised the importance of retaining, sustaining, and nurturing customers, interactions and engagement, they are now becoming more complex. They now represent a multi-party conversation rather than a brand-dictated monologue. Within these interactions, crowdsourcing has become an integral element for brands to develop and foster more intimate online consumer relationships. Ford, et al. (2015) further elaborates that crowdsourcing enables organisations to enhance research and development budgets, invent innovative solutions for existing problems, relieve overwhelmed in-house employees, or complement limited employee talent and expertise to successfully find technologically complex solutions. The internet online communities and mass-collaboration technologies have all enabled a diverse and dispersed crowd of strangers to work together toward a common goal. By crowdsourcing a need, firms can outsource it for resolution to anyone in the world with a computer and internet access.

Crowdsourcing deployment in branding activities allows crowd to publish and disseminate personal evaluations of products and services. Having said this, crowdsourcing deployment in this context of research will look at only Instagram, due to the fact that Instagram is a fast growing social network platform that is projected to take over Facebook as a more exclusive platform for content-generated marketing activities. Instagram is now being used by top brands to create compelling visual experiences for their followers for instance; Coach has successfully used crowdsourcing to help sell their products through shared photographs of women in different cities all over the world wearing Coach footwear under the hashtag of #coachfromabove.

2.2 Instagram and OSNC participative behaviour

Instagram; a mobile photo sharing application is one of many crowdsourcing marketplaces aimed at popularizing image-intensive social software. Sun, et al., (2015) mentioned that crowdsourcing marketplaces as platform; should enable OSNC corroborate with each other on various tasks as well as provide a positive climate for creative behaviour (Martinez, 2015). The adoption of Instagram among OSNC is significant in that it signals visually predominant, ostensibly organic mode of sharing image which differs from professional photography (McNely 2012). Instagram uses image to communicate, which gives the ability for OSNC to post pictures and 15-second videos, and share it with the world. Instagram's growing popularity has made it an ideal platform of choice for communicators because it provides a versatile stage that can host a number of strategic initiatives to market a business, brand or product.

Since its inception, Instagram has become one of today’s top social network sites among OSNC despite its limitation on only being able to upload photo and video content via mobile device. Created by Kevin Systrom and Mike Krieger in October 2010, it managed to garner over one million users within two months’ time after launching. As of December 2014, Instagram has over 300 million active users assessing the site per month which hosts over 20 billion photo uploaded from all over the world, largely by the urban youth with a skew towards women. Instagram exhibits high levels of engagement where 57% of its user checks the site at least once a day with 35% visiting multiple times a day. Out of this, 70 million photos and videos are shared everyday with 25 billion likes that boils down to 8500 likes per second and 1000 comments posted per second. Instagram user engagement is noted to be 15 times higher than Facebook engagement. There are about 88% of brands on Instagram shared at least one video, which accounts for 6% of all posts. The top 50 brands on Instagram have an average of 722,000 followers, with an average of 1.5 million Instagram posts mentioning these brand names (Duggan et al. 2015). Table 1 shows the growing Instagram in percentage as compared to other top mobile apps in the year 2013.

Table 1: Top mobile apps 2013

Rank	Mobile Apps	Average Unique Users	Year Change
1	Facebook	103,420,000	27%
2	Google Search	75,984,000	37%
3	Google Play	73,677,000	28%
4	YouTube	71,962,000	27%
5	Google Maps	68,580,000	14%
6	Gmail	64,408,000	29%
7	Instagram	31,992,000	66%
8	Maps (Apple)	31,891,000	64%
9	Stocks	30,781,000	32%
10	Twitter	30,760,000	36%

Source: Duggan, Ellison, Lampe, Lenhart, & Madden (2015)

Mancuso and Stuth (2015) proposed that Instagram is offering an exceptionally efficient image-based storytelling application unlike another. Distinct features such as hashtags, ‘@mentions’, geotagging, biography space, follower/following button and photo editing functions were designed to facilitate this ability. Instagram has cleverly understood from its inception that they have to let the OSNC to simultaneously post their photos in other social media platforms. This connectivity to other platforms such as Facebook, Twitter, Tumblr, Posterous and Foursquare facilitate users in disseminating their message to other social circles (Linascshke, 2011). The storytelling process is thus made easier across different platforms, with different audience.

Instagram enables OSNC to participate in building and engaging with the application. According to Hempel (2014), there are various examples of users’ participative behaviour in Instagram. Various cases saw amateur photographers quitting their day job to sell prints of their images empowered by popularity gained through the application. Professional photographers are also using Instagram to complement and promote their work. Celebrities use the application as their marketing vehicle and announcement tool. Another prominent example is the trend of “InstaMeet”, where Instagram users get together and socialize while capturing pictures and uploading them to the application along with a certain hashtags to commemorate the event. This kind of devotion signifies a certain level of motivation and engagement with the application.

Hempel (2014) mentioned a study that was conducted on academics, photographers and investors in order to uncover the reason Instagram gained so much popularity in a short span of time. It was found that people has shifted to visual communication in order to share their life experience with onlookers. The photo filters could create aesthetically pleasing posts as they have the ability to transform Instagram images into abstraction, as they do so, followers can escape to whatever feelings, memories and experiences the images evoke (Jang et al. 2015; McNely 2012). The image-power nature of Instagram also provides a unique advantage for brand on Instagram to trigger their followers’ emotion, which entice desired actions towards the visual posted. This would be particularly helpful to companies marketing their product and brand.

Small businesses are especially thriving through Instagram due to its unrestricted access to fan base. With more than 300 million users, it is indisputably operational in connecting brands with potential customers through visuals (Mancuso & Stuth, 2015). The location search enables OSNC to look for images that has been tagged with a location

pin. This feature is particularly useful for business premises to publicize their location (Linachke, 2011). The newest addition to Instagram features is the ability to measure clickable advertising messages. The application enables OSNC to test ad visuals, hashtags of product names or subject matter, form factor, colour of product and other visual elements (Mancuso and Stuth, 2015). A particular feature in Instagram, which some OSNC might not favour, is the capability for the images to be reposted via additional mobile application. Nevertheless, this feature is highly approved by corporations, as any kind of free publicity for their goods is highly welcomed.

Nonetheless, the reason underlying engagement of OSNC and Instagram is not limited to its startling features only. Beyond that, there are other contributing factors of Instagram participative behaviour. According to Katz et al. (1974) in media uses and gratification, media users held varying motives for choosing different forms of media which introduce link between how media is used and why it helps media users achieve gratifications. The key concept of media uses and gratifications is that the choice media users made when consuming media motivates their desire to gratify a range of needs, which refers to individual characteristics such as psychological setup, social position, life history and society. This includes a media structure that produces perceived problems and perceived solutions to the user. The problems and expected solutions are modelled into motives for communication, hence lead to media behaviour. Such work places media uses and consequences within the larger context of media user everyday social habits and routines (Zolkepli & Kamarulzaman 2015). Media uses and gratifications suggest ways in which motivations and traits lead to the consumption of the media over other avenues, for the fulfilment of individual needs. Sustainability of virtual communities heavily relies on the persistent effort of participants (Fang & Neufeld, 2008), it is important to understand the motivators and/or inhibitors determining OSNC's participation effort (Sun, et al., 2015). Instagram being one of the communicative media, by understanding on the underlying reason on why OSNC engage in Instagram and perform crowdsourcing can help brand tailor their communication strategy at their core consumer segments.

2.3 OSNC engagement on Instagram

Considering the numerous definitions of engagement concerning online social network proposed by scholars and practitioners, the concept of engagement is closely tied to the trend toward interactive experience and value co-creation (Hollebeek et al. 2014). Recent trends show that consumers are increasingly seeking more involved roles in the branding process and in contributing to brand identity (Doorn et al. 2010). Engagement is the antecedent to outcomes such as usage, affect and response. The fundamental insight of engagement comes from experiencing Instagram in certain way. To understand engagement is to understand the experiences that consumers have in connecting with the site. Martinez (2015) found that greater psychological involvement and emotional attachments in engagement yields greater attention to detail thus makes for more creative contributions. Martinez (2015) further illustrates that should consider creating compelling virtual experience to inspire OSNC to make contributions. With special emphasis on Instagram and brand identities, given the particular personality traits of knowledge community while avoiding excessive, anxious control and respecting individuals (Martinez, 2015) may allow brands to better engage OSNC with their goals. Hence, online social network engagement on Instagram is believed to fit into the OSNC life. For instance, Instagram content can be engaging because OSNC have a utilitarian experience with it where they believe that the site provides information in helping them make important decisions and accomplish something in their lives. On the other hand, other available content from Instagram can be engaging because it provides OSNC with an intrinsically enjoyable experience, enabling them to unwind and escape from the pressures of daily life. This platform; coupled with its active users in a way promotes creativity and with it quality contributions through participative engagement. Experiences are not necessarily mutually exclusive and some content could engender high levels of multiple experiences. It is necessary to realise that there is more than one path to engagement and that the different paths are realised by offering different experiences.

There are many independent streams of research examining consumers' engagement online and with media in general. According to Parent, Plangger and Bal (2011), engagement specific to social media has more directly been conceptualised as consisting of several elements including creating and posting online content that is relevant and meaningful to consumers, relinquishing some degree of control over this content so that it becomes sharable, and even modifiable, among friends, engendering a sense of online community among existing customers and facilitating conversation and dialogue rather than delivering one-way marketing communications monologues. While Zolkepli and Kamarulzaman (2015) found that needs on using social media is motivated by personal (entertainment and enjoyment), social (social influence and social interaction) and tension release (companionship, belongingness, playfulness and escapism) that each triggers the social media user to connect and adopt social media.

While there can be substantial common ground between the experiences posited by the social network platform, unfortunately they are not entirely consistent. Certain experiences exist in some frameworks but not others, among the experiences that consistently exist in multiple frameworks; there are often subtle differences in the way in which they are conceptualised. In some cases, multiple experiences under one framework are subsumed by a single experience of another. Therefore, in this proposed research, OSNC engagement is compartmentalised into technology-push and need-pull forces to gain more in-depth understanding on the motivation that lead to participative behaviour of Instagram users on crowdsourcing.

3. Conceptual framework: Technology push and need pull forces

Push forces is conceptualised as motivational factors or needs that arise due to a disequilibrium or tension in the motivational system, which include factors that motivate or create a desire on human behaviour. Meanwhile, pull forces in contrast is conceptualised as feature-related factors that create attractions towards certain motivation (Klenosky 2002). Push and pull factors are two separate decisions made at two separate points in time. It has been noted that while the internal forces push people towards certain motivation, the external forces of the motivation itself simultaneously pull them to choose that particular behaviour (Cha et al. 1995).

In the light of push and pull forces, the concepts of technology-push and need-pull were introduced by Schon (1967) as the underlying motivations and driving forces behind the innovation of a new technology (Chidamber & Kon 1994). Technology-push suggests that innovation is driven by science, and thus drives technology and application. The technology push force stems from recognition of a new technological means for enhancing performance. With appropriate structure and strategy, adoption of new technology could create substantial and sustainable competitive advantages (Porter & Miller 1985). On the other hand, need-pull proponents argue that user needs are the key drivers of adoption. Langrish (1972) concluded that both, the technology-push and need-pull forces existed, but that the need-pull forces was generally more prevalent. Some researchers proposed that a successful innovation would occur when a need and the means to resolve it simultaneously emerge (Fischer 1980). Thus, adoption of a new technology may be induced by the recognition of a promising new technology, a performance gap, or the motivating forces of both.

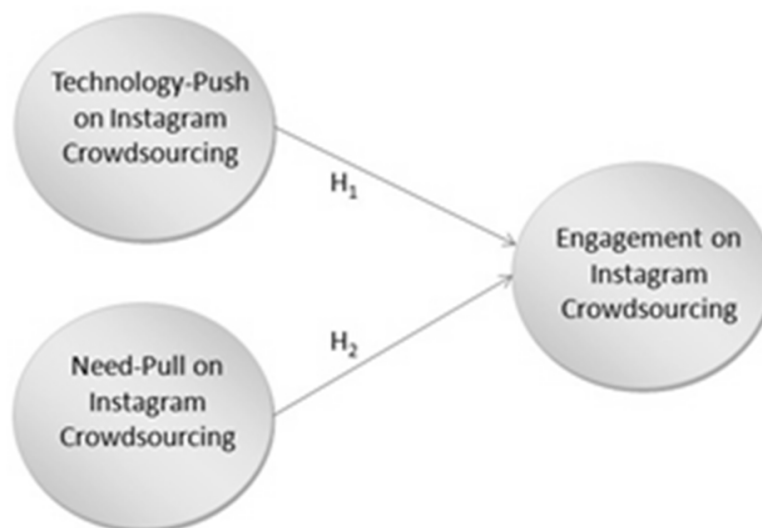


Figure 1: Conceptual framework

Based on this, the preliminary conceptual framework that consists of two main constructs: (i) technology-push on Instagram crowdsourcing and (ii) need-pull for Instagram crowdsourcing is hence proposed. These two main constructs are assumed to influence OSNC engagement on Instagram crowdsourcing. The proposed model is illustrated in Figure 1. Based on the conceptual framework, the proposed hypotheses are as follows:

H1: The higher the technology-push forces perceived towards Instagram, the greater the possibility of participative behaviour of crowdsourcing

H2: The greater the need pull by the Instagram, the higher the participative behaviour on crowdsourcing

From this set of hypotheses, it is deduced that technology-push on participative behaviour of Instagram crowdsourcing can be themed into two types of engagement that is: (i) personal engagement that consists of eight (9)

motives that is enjoyment, entertainment, interactivity, ego enhancement, playfulness, immediacy, stimulation and inspiration, temporal and creativity and (ii) social engagement consists of eight motives also that is trendiness, social interaction/socializing, social influence, materialism, social facilitation, civic-mindedness, utilitarian, and community. On the other hand, need-pull on participative behaviour of Instagram crowdsourcing is proposed to have ten (10) items that is social tagging, geo-tagging, conversation, photo sharing, image power, timely content, promotions/incentives, celebrity factor, exclusivity and privacy and trust. These motives are the driving factors that lead OSNC to perform a participative behaviour on Instagram crowdsourcing. These motives also work as antecedents, where brand on Instagram can tap into. The proposed method for this conceptual model is quantitative research using either survey or online survey instrument due to the fact that the unit of analysis of this study is those that use online applications. Table 2 summarises the proposed constructs and its testable variables.

Table 2: Proposed constructs and variables

Variables	Literature Support	
Personal Engagement		
1	Enjoyment	Calder, Malthouse, & Schaedel (2009); Mehmetoglu (2011); Zolkepli & Kamarulzaman (2015)
2	Entertainment	Rohm, Kaltcheva, & Milne (2013); Zolkepli & Kamarulzaman (2015)
3	Interactivity	Zolkepli & Kamarulzaman (2015)
4	Ego-Enhancement	Mehmetoglu (2011)
5	Playfulness	Zolkepli & Kamarulzaman (2015)
6	Immediacy	Omar (2014)
7	Stimulation & Inspiration	Calder, Malthouse & Schaedel, 2009
8	Temporal	Calder, Malthouse & Schaedel, 2009
9	Creativity	Martinez (2015)
Social Engagement		
1	Trendiness	Zolkepli & Kamarulzaman (2015)
2	Social Interaction/Socializing	Calder, Malthouse, & Schaedel (2009); Mehmetoglu (2011); Zolkepli & Kamarulzaman (2015)
3	Social Influence	Zolkepli & Kamarulzaman (2015)
4	Materialism	O’Cass, 2004
5	Social Facilitation	Calder et al. (2009)
6	Civic Mindedness	Calder et al. (2009)
7	Utilitarian	Calder et al. (2009)
8	Community	Calder et al. (2009)
Instagram Usage Experience		
1	Social Tagging	Jang, Han, Shih, & Lee (2015)
2	Geo Tagging	Jang, Han, Shih, & Lee (2015)
3	Conversation	Jang, Han, Shih, & Lee (2015)
4	Photo-Sharing	Jang, Han, Shih, & Lee (2015)
5	Image Power	Jang, Han, Shih, & Lee (2015)
6	Timely Content	Rohm et al. (2013)
7	Promotions/Incentives	Rohm et al. (2013)
8	Celebrity Factor	Caroll (2008)
9	Exclusivity	Rohm et al. (2013)
10	Privacy & Trust	Shen, Lee, & Cheung (2014)

4. Conclusions and implications

A major challenge facing the study on engagement lies not only in understanding of the engagement itself, but also on the understanding of engagement role together with other variables in guiding the participative behaviour of crowdsourcing. This study has outlined important constructs and variables that should be taken into consideration as antecedents of participative behaviour of crowdsourcing, which can be used by a company as a blueprint to maximize efforts in strengthening brand value through Instagram. The proposed framework also appears to be a valuable aid in guiding companies to understand the factor that entice Instagram followers to highly participate on brand crowdsourcing activities. Such approach can enhance the effectiveness of brand strategy as well as brand-consumer

relationship at both theoretical and practical level. Given the ongoing struggles to keep up with the fast moving technology and innovation, a model that explains OSNC engagement on crowdsourcing is a crucial tool for emerging and growing technological era of consumerism.

Acknowledgements

Sincere gratitude to Universiti Sains Malaysia for funding (304/PCOMM/6313213) this research throughout.

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