

Santtu Toivonen

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Abstract

Social media is at its finest in the middle of the first decade of the third millennium. In particular, a steadily increasing amount of social media content is created with mobile devices such as digital cameras and camcorders. More and more content captured with these mobile devices is being uploaded on the Web, and the uploaded content receives ever more people downloading it in return, as well as tagging it, recommending it to friends, refining it for own purposes, and so on.

Killer applications such as MySpace, and especially the likes of YouTube and Flickr, enjoy and benefit from content created by mobile devices. It is crucial to note, however, that for the vast majority, the advantages of mobility have only been utilized in the content creation part, rather than the content consumption part. Mobile content consumption has until now been neglected in social media application design and provisioning.

This report aims at providing a glance on how mobility, and along with it the important notion of context-awareness, has impact on social media. Moreover, the report seeks to analyze the potential business opportunities for mobile social media. The research was conducted in the form of expert interviews.

Contents

Abstract.....	3
1. Introduction.....	5
1.1 Overview	5
1.2 Note to the Reader.....	6
2. Research Method	7
3. Interview Results	8
3.1 Current and Emerging Web Megatrends.....	8
3.2 Social Media in Mobile Environments.....	13
3.2.1 Opportunities for Mobile User-generated Content	14
3.2.2 Pitfalls of Mobile User-generated Content	17
3.2.3 Findings not Directly Related to Mobility	19
3.3 Community Aspects for Mobile Social Media.....	20
3.3.1 Findings not Directly Related to Mobility	24
3.4 Content vs. Service Provision	25
3.4.1 Discussion on the Nature of Services.....	25
3.4.2 General Business Implications of User-provided Services.....	26
3.4.3 Mobile User-provided Services.....	29
3.5 Automatic vs. Manual Content Consuming and Provision	31
3.5.1 Users' Point of View	32
3.5.2 Companies' Point of View	34
3.6 End-user Applications vs. Professional Applications	35
3.7 Differences with Regard to Application Domains	40
3.7.1 Do Application Domains Matter and Why?.....	40
3.7.2 Particular Application Domains Having Potential.....	41
4. Analyses and Conclusions	44
4.1 Web Megatrends and Social Media Business Models	44
4.2 Amplifying Real-time Interaction with Mobile Social Media	45
4.3 Dynamics between Individuals and Companies.....	47
4.4 Pros & Cons of Automatic Provision & Consumption	49
4.5 Benefits of Being Aware of User Characteristics.....	50
4.6 Work vs. Leisure ≠ Efficient vs. Lazy ≠ Boring vs. Fun.....	51
4.7 Assisting Discontinuous Cognitive Processes.....	52
4.8 Design Principles for Mobile Social Media	54
Acknowledgements	56
Appendices	
Annex A: Questions Asked	
Annex B: List of the Interviewees	

1. Introduction

1.1 Overview

Social media is emerging in the middle of the first decade of the third millennium. Mobility and mobile usage of Web content adds a new twist to that phenomenon. The notion of mobility is intended to capture first and foremost *user mobility*, that is, the specific features that the changes in the environment around a mobile user have. To create and consume content in a stationary mode with a PC sitting on a table is very different than doing it while on the move and typically with a limited capability device.

A mobile user's attention span has to be distributed among several processes. For example, someone walking through a busy downtown typically monitors the traffic around her, is possibly engaged in discussion with someone, observes the advertisements in store windows, plans her route ahead, adjusts to weather conditions, and so on. In a situation like this social media content – like any content – has to support the user's current tasks and contexts more precisely than is the case with the above-mentioned stationary + PC case.

In addition to the most essential questions on usability and user experience support that mobile scenarios require, other characteristics can be studied as well. This research aims to clarify at least the following issues:

- What general *megatrends* involving the Web are currently going on or emerging in the near future and whether mobile social media is among them.
- What new can social media bring to mobile applications and services and vice versa?
- What roles, characteristics, and opportunities do *communities* have in mobile social media?
- What if individuals in the mobile social media context were not only creating and consuming Web content, but *services* and *applications* too?
- What if content was created and possibly also consumed *automatically* in addition to manually?
- What are the respective strengths and weaknesses of *professional/business* applications as opposed to entertainment/end-user applications?
- What *application domains* have potential in this area (or is the phenomenon domain-independent)?

In addition to these top-level questions, most of them were complemented with horizontal topics spanning many of them. These horizontal topics directed the considerations in particular towards business models and opportunities, but also towards the issues on trust, privacy, and security.

1.2 Note to the Reader

The results of this report are solely based on expert interviews. The only external literature reference is accompanying Figure 1. The report does not aim at naming and discussing the latest success stories or hottest technologies. Instead, it tries to give a glimpse on what general characteristics does this so called mobile social media have, and how could one utilize them when doing business.

Section 3 presents the interview results. The material is aggregated into paragraphs typically containing insights from multiple interviews. For facilitating a quick read-through, key concepts and themes of most chapters are given in *italics*.

Section 4 analyses the results further, gives some illustrations, and draws concluding remarks.

2. Research Method

The method used for conducting this research was expert interviews. More specifically, 29 experts in the area of mobility/context-awareness and/or social media were interviewed. The interviews lasted one hour in average, and were qualitative in nature. Annex A lists the questions asked. The answers and observations are not quantified nor weighted; some of them appeared only once, while others were reported by several interviewees.

The research method adopted best practices of social media. In particular, after the initial few interviewees, which were contacted based on earlier acquaintances or media references, the rest were recruited by asking the interviewees after the sessions for potential candidates. Annex B lists the interviewees.

3. Interview Results

Section 3 presents the interview results. The results are grouped as subsections according to the interview questions (see Annex A).

3.1 Current and Emerging Web Megatrends

This section describes some current or emerging strong trends in the development of the Web. Unlike the subsequent questions, this question was not delimited by the research focus (mobile social media). The motivation of this question was on one hand to start the discussion with a quite broad topic without biasing the interviewee. On the other hand the intention was to see whether mobile social media or related phenomena would be recognized as important trends by the interviewees.

One megatrend is going to be the *search for business models* in the future Web. In some narrow segments certain business models work perfectly well but not in others. For example, music and news industry operate according to different business logics. At least *sharing revenues* between the content creator and the service provider is becoming easier and more popular in the future.

Storing and retrieving *video on the Web* is going to be more and more important. The penetration and capabilities of broadband connections are sufficient for downloading videos and other rich content. The rapidly increasing amount of video content on the Web makes demands for powerful video search engines. Video content on the Web also poses challenges with regard to business models. In the beginning advertising has been the only feasible model, but one should ask whether it is the only one or could others beside it be developed and successfully implemented. Things like *IPTV* and *VoIP* are going to be important technologies.

Mash-up techniques enable new kinds of applications especially for niche groups, the members of which can reside all over the world. Combining information and services is a foreseeable trend. This includes *tagging and folksonomies*, which have thus far had more impact than “top-down” technologies such as the Semantic Web. However, standards and ontologies are needed in some critical areas such as medical applications. More often than not it will be the case that one company cannot by itself compete with the population (folk knowledge), no matter how fancy, advanced, or big the company is.

Converting existing services to *mobile* ones is going to be important, but has both technological and social challenges. Mobile Web will actually be Web in the future, because so many mobile devices will be involved. There will no longer be a distinction

between mobile and “traditional” Web in people’s talk. This is going to have the impact that all or most of the Web content is designed so that mobile usage is taken into account from the get-go. Note that the user-mobility is here more important than the device-mobility. Generally, one can speak about the *convergence* of technologies, which is going to provide alternative means of accessing content. There are, however, still many issues to solve, such as battery-life, connectivity/bandwidth, and the overall usability of mobile devices. In general, technology will enable many *products to digitalize*, which has impact both on wireless and wireline Web.

Universal access anytime/anywhere and *convenient usage experiences* are important to take into account. One can predict that cell phones and other handheld devices are going to have an always-on IP feature within the next couple of years. One could for example have a two-week IP call open. PC and surfing the Web in 1997 is like the IP call functionalities in 2007: it is doable, but cumbersome, eats batteries, and so on.

On the other hand, the limited nature of mobile devices could be used as a guiding design principle, especially if considering *developing countries* and other emerging markets. So far the underlying idea when developing mobile systems and applications has been that in the future the bandwidth, processing power, battery life, and so on are in essence unlimited. If this principle is discarded, new and novel *disruptive innovations* can emerge. In developing countries the mobile device will likely become the most important terminal used to access Web content, and recognizing this will change the game.

As far as content creators and consumers are concerned, there will be *many different players*. The division into groups is far more complex than for example individuals versus companies versus communities. Also single players can assume multiple roles at different times. In the future individuals can start to make money by providing content and/or services. However, you always need the big players – or *hubs* – to keep the ball rolling. For example, big media houses remain even if they introduce blogs. In any case, Web as a structure will allow individuals and other “small players” to interact with the hubs in a more easy way than was possible before. It is probable that companies, communities, and individuals are going to form a *sliding scale*, in which the roles can vary. One view is that the ones to survive are the handful of megasites, and the vast number of super-special vertical sites, while the middle tier is going to suffer the most.

People will *hop between the real and the virtual worlds* (while socializing, working, innovating, and so on). This has not much to do with devices such as mobile phones; it is more of a phenomenon expressing the ways of being. Shift from the three core things (social life, geography, and materials) as being obstacles to them being enhancements. The users can choose to work virtually if they wish. An important question is how does this effect body, mind, society, and so on?

Web can introduce new players, such as communities, to be utilized in *marketing*. Once you have identified an influential hub in a community, you have a great channel for targeted marketing at your hands. This is often referred to as *viral marketing*. In general, convergence *from selling to marketing* is going to be a megatrend. Concentrating on marketing is in line with Web 2.0.

Shift from the unidirectionality of media and point-to-point nature of telecom domain to *one big arena* is taking place and strengthening. The consumers / customers / end-users can choose to communicate to the media or to each other via same channels. Information is going to transfer *through the grapevine*, not only via big broadcasters. Content consumers and creators will more often be the same entities. *Micro payments* are one way of getting rid of the tyranny of mass media. This makes it easier for any content creators to join in and express themselves.

The current *mediators can be bypassed* and new kinds of mediators will emerge. In this kind of “support economy” the companies would no longer dictate. This represents a transition away from the industrial revolution. It also entails that the customer is no longer treated as a passive object, but rather as an active subject. The relationship between a company and its customer rises to another level and is more bidirectional than before, including discussions, idea exchange, and even joint product development.

Technology will enable ever more kinds of *devices to connect and communicate* with each other.

More and more applications, which have traditionally operated on desktops, are now appearing on the Web. *Boundaries will break* between applications on laptop, mobile devices, servers, and so on. The distribution is transparent to the user, who does not have to mind about the physical locations of the services and data she is accessing.

Massive collaborative activities via the Web is a clear trend. The Web has already changed from a platform for searching information into a community platform. People are social by nature and the Web is the best possible invention/media for facilitating this. One can say that *other people are the killer application*. For example *gaming communities* and other interest groups are going to be huge. Web is an easy publishing platform for the most of the people, but that is not enough; you must be able to stand out from the crowd. *Peer production* is gaining popularity.

A trend has been active in shifting the emphasis first from the content to context, and now from context to community. The communities could also jointly provide semantics for the material in the Web. In Wikipedia, for example, the meanings are “morphed” towards the “correct” one. *Empathy* is important, and it expresses the change in

behavior; people will try to understand each other rather than engage in debates. *Semi-private parts of the Web* are going to be more important in the future. This includes for example *invitation-only communities*. Inside the open Web people have already created closed circles. Communities can also have *negative side-effects* on people. Not just the difficulties of remembering many passwords, but things like alienation from the real world, flaming, bad manners, pretending to be someone else, and so on.

A very important trend is *rethinking the information/meaning*. Traditionally information has been seen as residing in bits. New approaches are emerging, such as the Semantic Web. Also Web 2.0 is relevant here; it is not just a new way of making money, but really an effort of rethinking the nature of information. Information is essentially a process, and the dynamicity of most Web 2.0 applications supports this.

In the future Web *humans should be seen as part of something bigger*. People act as part of a network consisting of other people, computers, and links connecting them. Therefore the design of socio-technical systems is a very important discipline and goes beyond designing standalone applications or user interfaces.

A big trend is going to be services, with which you can attach real world objects to the virtual world, and use *context* in doing this. Context is important to grasp and utilize in order to better facilitate people. Relevant attributes are for example “where” (location), “when” (time), “who” (social), and “what” (topological). The traditional Web addresses only the very last of these.

Joint attention is the proper way to view the Web. This is already recognized for example in Web-advertising and in services such as Amazon which take advantage of collaborative filtering. While a user is interacting with a service on the Web, she can have insights on how others (like her) have interacted with the service in question.

One goal worth striving for is educating Web users so that they do not take information posted by other users as true. A rule of thumb is that by default information content submitted by anonymous users should not be believed. Already now trolls are setting up reputation arguments. *Establishing trust* on the Web is a vital problem to solve, and there is a long way to go still.

Web as such is no big deal; *multiple channels* have to be recognized and utilized as a whole. This includes physical channels in addition to digital ones. The research should start from the everyday conventions of the users, and based on that develop services and applications, which can be used via the most appropriate available channel. In addition to the functional appropriateness, *fun and serendipity* are things that should be addressed. And these are things that more often than not originate from the users themselves; not from the engineers designing the systems.

Bottom-up approach (Web 2.0, social media, etc.) is emerging, and as a background there is the problem of *resource allocation*. There is a clear distinction between the traditional/"physical" and the emerging virtual world in that in virtual world you do not need – and cannot have! – leadership in its traditional sense. This is also related to the observation that information consumers and creators are going to be the same entities. In fact, the modern *company organization starts to resemble a wiki*. Content/information/knowledge creation is going to be a *discourse-like* process. *Being engaged in dialogues* with members belonging to several networks will be important in the future.

Incentives and feedback mechanisms for producing content anytime/anywhere in a comfortable manner are going to surface. For example, giving a restaurant review routinely as you pay will be part of daily life. However, some users are willing to give feedback without external incentives, too. It is safe to assume, in any case, that for many services the inclusion of users/customers in the loop will be of great relevance.

Shift from Reference Web (files) to *Incremental Web* (things). Note that the Incremental Web is not the same as the Semantic Web; Incremental Web effort tries to do what people want, whereas the Semantic Web tries to do anything that can be done with the technologies it has specified and developed. On the other hand, also the Semantic Web has potential. For example *Semantic Wikis* open up interesting possibilities. People who contribute to Wikipedia, for example, could easily take a few extra steps to provide more expressive annotations for their articles/comments. In any case, adding semantics to the Web is going to be important, either in a bottom-up or top-down manner.

Having *intelligent agents* on the Web doing things for people is one development scenario. It is important, however, that the agents be designed and implemented not from the technological perspective, but in a user- and business-oriented way. In fact, the users and communities themselves could create these agents, if the tools needed for it were designed well enough.

The *generation gap* has to be respected. There will be more and more people, for which using the Web is everyday activity (best place to watch sports, cheapest place to buy things, and so on). It is therefore of great importance to include these "millennials"¹ in the design-process of applications, because they have had the Internet/Web available to them for their whole life, and therefore think differently than older people. For the millennials the Web is a basic commodity such as electricity. A potentially useful mode of distributing labor would be letting the millennials to think of the applications and

¹ People born after the time-period of 1979–1984.

gadgets, and have older people identifying the appropriate technological and business opportunities.

One foreseeable trend is *the end of the cyberspace*. This means that space as a misleading metaphor is not emphasized anymore when talking about the Web. This phenomenon also entails the shift *from alternate to augmented reality*. In this shift mobile devices and technologies play an important role.

Concentrating on *smart people* rather than smart things is a paradigm shift about to take place. It has impact for example on the *intelligent home* research. Rather than do things on behalf of people, encourage them to do the things themselves, and by virtue of that improve health and other quality of life factors. This also entails a shift from one-way surveillance-like communication to *two-way interaction*.

Web is becoming the “new TV”, meaning that it is always on and used not only for entertainment, but more and more also for utility purposes. Related to this, *multitasking* is becoming more and more popular. People are simultaneously listening to radio and watching TV, as well as also surfing the Web and commenting all this with your friends on some instant messaging application. Currently the convergence of these tasks takes place via the users. However, there is a big potential for someone to solve parts of this with assisting technologies and applications.

The notion of *expertise is going to evolve*. Regular people can easily become experts and share their expertise. It used to be so that surveys and market researches treated individuals as objects. In contrast, since Web-based tools and applications are becoming easier and more convenient to use, people are more often than not becoming active subjects.

3.2 Social Media in Mobile Environments

After the introductory question discussed in the previous section, the interviewees were shown Figure A1 (see Annex 1). The next question focused on the intersection between the topmost circle (user-generated content) and the left circle (context-awareness). The intention was to find out, what mobility and mobile usage scenarios could offer to the development of user-generated content and the social media phenomenon based on it. On the other hand, the interviewee was also asked to consider, what new social media could offer to the development of mobile applications and devices. What good do these two things have in store for each other? In addition, what potential obstacles there are?

3.2.1 Opportunities for Mobile User-generated Content

Convenient *anytime/anywhere access* is the point of the Web, but a mobile device brings this further. It is a natural extension to the traditional Web. The Web as a whole is not going to be mobile, but only the appropriate parts.

Mobile devices are carried around as personal devices. This entails the possibility of having them *always on*. This is the single most important phenomenon. Location-awareness, digital cameras, and so on are also nice features and enable many applications, but are nevertheless secondary to the always-on feature. However, once you combine the always-on capability with, say, a digital camera, interesting possibilities start to emerge. There already exists a case where a stolen mobile phone was found based on photographs its camera took automatically and uploaded to the Web. Also bank robberies have been solved partly by virtue of camera phones. The new possibility that mobility brings to social media is the *automation* of some user-generated content. For more discussion on automated content creation and consumption, see Section 3.5.

Mobile phones have done harm to the markets of many “traditional” devices such as the alarm clock. This could be expanded beyond physical products. It could concern applications and digital products as well. This, given that the APIs are available for anyone, opens up a possibility for mobile user-generated content.

Boundaries between devices, such as PCs and mobile phones, are going to shrink. The advancement of mobile phones is going to diminish the need for using PCs and the business models and billing models of carriers / telecom operators are going to follow.

Mobility implies *movement* and therefore location-based services (LBS) become more important. There are already some LBSs which take into account also user-generated content. For example traffic jams and radars can be detected based on information shared voluntarily by other users of the system. However, the core of mobility is not movement but *context*. Adding context-awareness to services brings about complexity, but at the same time lots and lots of possibilities. In the long run, trying to do knowledge management without context does not make sense.

Mobility supports *real-time feedback* from the users and enables “*living in the moment*”. When you are surfing the Web with a stationary PC at home, you are either accessing information about some past events, or some real-time information about some event a distance away. In contrast, with mobile device you can take part in the event, capture it, provide comments and share all this with others. Mobility therefore provides richer social interactions. It is possible to talk about a shift from real-time information to *real-*

space information. People do not want a restaurant review from somewhere created eight months ago, but a review from today and “that place over there across the street”.

Mobility also implies *freedom*, being free from some predefined terminal configuration. Note that this has clearly more to do with user mobility than with terminal mobility. Freedom from time and space, which is often associated with the Web in general, can be taken one step further with the mobile Web. On the other hand, since mobile devices can be used for detecting location, the notion of space can be brought back to the Web as an enhancement.

Mobile user-generated content can bring a new kind of *warmth* and *deepness* to familiar things. For example, recommendations can have impact on decision making. If a restaurant review comes from someone having a particular relationship with you – be it a friend of yours providing a review of a new restaurant in your home town, or your fellow countryman providing a review of a popular tourist restaurant in a foreign city – it probably feels different than reading a review written by a professional restaurant critic.

In general, users experience mobile devices and communication as safer than the Web. For example demonstrations, catastrophes, and so on are reported with mobile devices. It is of great importance that this reputation is preserved also in the future. For many companies, it is useful to have presence both in the mobile side and wireline (traditional) Web. For example advertisements can be distributed in the wireline side and the actual application usage in mobile side.

Various kinds of *recommendation systems* could be formed. They can be based on the number of customers and their opinions, on the number of known acquaintances and their opinions, and so on. One application area is recommending available WLAN hotspots and the businesses (such as coffee houses and libraries) hosting them. In general, WiFi is going to be more popular and it will change the way people access content with mobile devices. Probably at least sharing text is going to be free.

Interest groups and friends are *closer* to you when you and they are mobile. People can engage in joint tasks with the mobile community in ways not possible with stationary communities. Also service providers are more important to you once you are in a suitable context. The context-aware interaction with service providers can take place either directly or, more importantly, via other individuals.

Context-awareness can create a new *filter* for information. Filtering the raw data and communication content could be very important and welcome. For example, one could configure the system so that when on vacation, only emergency messages get through.

The need for filters is especially true for always-on automatically shared content. Context-awareness itself can also create a new *need* for information. If people know that they can be aware of their friends' presence, for example, they crave for that information and frequently check their presence statuses.

Transparency of context is also relevant. Transparent context information is disclosed for others to observe. It is often useful for you to know the contexts of your friends or colleagues. It gives meaning of what you are doing to others, it creates reasons or excuses for you to contact people, it brings about companionship (by seeing that others are in the same context as you currently are), and so on.

There are few media-applications, which will not at some point end up being used with mobile devices. Of course, tradeoffs have to be made with regard to things like quality and convenience. People are happy to accept the fact that the resolution of some piece of film they download from the Web to their mobile device is worse than what they have on their high definition TV at home. The situations and expectations for watching a full length Hollywood movie or a funny clip shot by some individual differ so drastically, that comparing them as similar usage scenarios (of watching TV) makes no sense. In addition, for example in India there are not many cameras and so the camera phones are the first camera for many. The usual claim that "those are never going to replace the real and good-quality cameras" does not apply in places like this.

Context-awareness is tightly connected with *multimodality*: Context together with *preferences* determines the modality that is used. Preferences conjoined with context can also answer questions like: "What of my needed things I can buy in this neighborhood?" The system could also observe the user and update the preferences automatically or semi-automatically. This is in line with mobile environments of being dynamic. In such environments, the user does not necessarily know what is "best for her". Preferences could also be shared between the users.

Social context is an interesting feature to be utilized more in the future. To start a medical operation, for example, you could set the preconditions so that the doctor and the patient have to be in the same room.

Adaptation of usage scenarios is more important than the technical adaptation of content. Converting content from HTML to WAP, for example, is often not enough and many times not even possible. Better results are achieved by trying to figure out what the mobile users want as opposed to stationary users equipped with more powerful devices and connectivity.

Added value for mobile user-generated content is easy to imagine for a tourist who does not know the surroundings. Practical information created by other people who have visited the same area – depending on the need either other tourists or locals – would be of use as an alternative to “official information”, provided for example by local travel agencies. The same model could work for buying a TV: Access to user-generated information about TVs in an electronic store, as opposed to the information provided by the manufacturer or the seller, would assist the buyer. Currently, the barcodes attached to the devices hand out only information created by the manufacturer or alternatively by the store.

Adding *tags to physical world* instead of only in the Web is interesting. Physical places could be valued: Getting good service or alternatively stomach disease in some restaurant.

Mobile user-generated content enables personalized and targeted services, which in turn enable *targeted advertising*.

One interesting business model for mobile user-generated content is *product placement*. Popular users providing continuous stream of themselves for others to enjoy can make some money by saying good things of companies or including their logos in the stream.

A business model for some companies, or even individuals, could be to *provide semantics and metadata* for content on the Web. In general, metadata attached to pictures and other multimedia will be important. Mobile phones are already attaching basic metadata to multimedia automatically.

Blog access with mobile devices is going to be interesting. For example, based on the changes in the location, the application could select the active blogs/posts and present them to the user.

Mobile devices and applications can be seen as *remote controls for the Web*. At the moment the device is too small and the I/O capabilities are not good enough, and probably this trend will continue in the future too. However, public external keyboards and screens can help in this.

3.2.2 Pitfalls of Mobile User-generated Content

Trying to realize mobile user-generated content via the concepts of the user-generated content in the wired/PC environments was seen as one potential pitfall. The specific features of mobile usage scenarios, as well as limitations/possibilities of mobile devices as opposed to stationary PCs, should be respected.

User interfaces, both for input and output, are typically quite different in mobile devices and desktop PCs. The added value brought by the applications should be notable for its usage to surpass the “*irritation threshold*”. The devices and applications should not be *intrusive*. A push functionality is needed for many mobile services, but it cannot become spam and also cannot assume explicit acknowledgements from the user. Often the legislation demands that a permission from the user to advertise on her personal mobile device is required. This can seriously delay the growth of mobile social media, because it excludes an important functionality from the value network – namely advertising and marketing.

A bad design principle is to try and provide everything via all available channels. Having to download large multimedia files over slow links, for example, generates poor usage experiences. Also being forced to download and install applications is more challenging in mobile environments.

Ensuring *trustworthiness* is a big issue. Related to trustworthiness, contextuality brings about issues with regard to privacy, accountability, and so on. Not taking these issues seriously has potential of causing bad will and less usage of the future systems.

The notion of freedom, which is generally conjoined with both mobility and the Web, can be untrue for some people. Being accessible all the time can feel like *imprisonment*. Nowadays people shut down phones more often than before and this can be seen as a symptom of too much communication or information.

Mobile services and applications would benefit greatly from *audio interfaces*. However, speech recognition, especially speaker-independent speech recognition, is still far from being mature enough.

Mobility can actually *restrict sociality* if the application is designed and implemented poorly. For example, if one plays with the mobile phone all the time while physically present in some community, it gives the impression that the person in question is not interested in the presence of others.

General and broad context-awareness is a problem for AI research, by far not a trivial issue to solve.

3.2.3 Findings not Directly Related to Mobility

Considering the *value network* of mobile user-generated content is interesting; the commercial partners do not necessarily have rights for the shared content, but social networking might help in getting around this obstacle.

Advertisements are going to be an important business model also in the future. External incentives, such as payments, are not necessarily needed in the value network. If someone is passionate enough about something, (s)he will do it for free. It is many times enough just to build a reputation: everybody has the *inner nerd* for something!

In general people are sharing content voluntarily and not expecting money in return. This is the case at least if anyone can use the shared content. Things might change if the content is shared to some company/community specifically. *Micro-payments* or other concrete incentives for creating and sharing information would be useful for many application areas.

Cost-reduction is a business model, where companies can include volunteer individuals in important parts of business processes such as pre-sales, sales, customer support, and so on.

Online market places, where anyone can sell anything, will be more important in the future. By encouraging to recycle the market places also have a positive impact on the environment.

The Web creates *global markets* where user-generated content and one-man companies operate across borders. Cooking is an example application: A screen in the kitchen can be used for sharing recipes and the possibility to chat which supports the cooking activity. A business model in this application could be that the instructors would earn real or virtual credits, which can be used for example for ordering pay-per-view movies via the same distribution channel. And this same model could be used other applications such as safe living and companionship for elderly people.

The *digitalization of memories* (images, videos, audio, stories, and so on,) is an emerging and ongoing process. However, people have not yet invented a good enough solution for storing, sharing, and managing these memories. This activity should be as easy for the users as possible in order to take off, also for illiterates and analphabets.

3.3 Community Aspects for Mobile Social Media

The interviewees were asked to consider the community aspects of mobile social media. For some this was a surprise, since they had considered the previous question already to include the notion of communities. Many stated that often one person providing and consuming content is not that interesting, but communities are. Blogs, wikis, and so on would not exist without communities. Communities bring safety, learning, status, and so on. What special could mobility add to the communities? Mobility has not yet been utilized in community applications to a large extent, and therefore there are many potential application possibilities in this area.

The current fundamental question that the Internet is starting to address: *How to connect the questioner with the answerer* (rather than connect the questioner with some data as an answer)? Here the communities can help to a large extent. They assist people in finding each other.

No largely-applied business models for mobile community services exist at the moment, but some start to emerge. Companies, for example, are considering the utilization of communities in addition to their employees – this is called *mass collaboration* or *crowd-sourcing*. Until now, communities have been largely neglected. Only the consumers (individuals) or companies have been business-wise thought-of.

Stationary PCs and even laptops limit the boundaries of interaction: The user interacts mainly with the computer and the information accessible with it. In contrast, mobile scenarios enable the user to *interact with the physical surroundings*. In addition, mobile interaction is real-time interaction with phenomena (as opposed to PC, where commenting comes afterwards). If the user shares the information about this interaction, it opens doors for new kinds of social media applications and also business models. For example, sharing information about a book you are just now browsing in a bookstore.

Real-timeliness of mobile community applications is very essential. Mobility enables quicker response. Communities can also be formed, joined, or left on the fly. It is important to acknowledge that people can belong and be active in *many communities simultaneously*. Related to this, joining these dynamic communities should be easy, as well as acting in them. External factors such as globalization, welfare, tempo of living, and so on are having impact on communities and belonging in them. As a consequence, communities will come and go and this calls for defining and predicting the relevant/active communities.

Understanding the shared value of a community is the most important thing to understand. There must be some *common denominator* – such as a hobby or other joint

interest – for a community to exist, and that has to be taken into account also in terms of mobile social media. The application has to add some value for the community, and that has something to do with the shared interest. The more focused a community is, the better value it can provide to its members.

For strangers, the common denominator can be something like a TV show or a sports team. In general, it can be some manually entered preference set. In contrast, for communities whose members know each other well, such as families or workmates, there is more trust and people can share more sensitive information. In the latter case, context could facilitate in updating the contact book of a group of colleagues who change their jobs or homes somewhat often.

The common denominator, which ensures the cohesion of the community, is often based on some *passion* shared by all the community members. This is also true of the mobile communities, and therefore also the mobile communities should be free for the users. “You cannot charge people for their passions”, as one interviewee stated. Once free-of-charge or other “Internet-models” for payments have been reached also for mobile community applications, the thing is going to lift off.

The community can provide *motivation* for an individual to do something. “My friends – or idols – are using this application, so I’ll try it out, too.” Therefore there is more business potential in community applications than those directed solely for individuals. Individual mobile applications, such as a calendar, will end up as “basic applications” equipped in a device, and do not provide so much potential and new business models.

Communication within and between communities is going to grow. In fact, communities provide new means for *communication*. One could say that all user-generated content, which is not solely for oneself, is dependant on communication of some sort. For example, providing instant messaging services for ad hoc communities could be interesting. Here the notion of context is very useful; for example, by knowing the context of the person you are about to call can have impact on your decision on whether or not you want to disturb her. Communities could also be utilized as *filters* separating relevant information from irrelevant. Communities could take responsibility on the trustworthiness and quality of communicated information (as opposed to certificates or spam filters provided by third party companies). When there is enough user-generated content, the most popular ones are going to stand out and in this process communities are essential (as opposed to traditional advertising).

There already exists services, where virtual teams or communities created on and for the Web have some functionalities in the physical world, too. For example, credits earned in an online game can be cashed in amusement parks as VIP passes.

People are bad in memorizing and sharing train schedules and the like, in which computers are good at. Instead, they are extremely interested and motivated in saying where the best pizza in town is. Powerful business model implies acknowledging the things people are willing to share, and utilizes computer resources in other cases. For example being in an unfamiliar city with children: One needs both info about bus schedules (commercial / public service, which can be dynamically generated based on the traffic status) and info about nice parks, malls, and so on (user-generated and manually entered to the system).

Location-based services might benefit from community aspects. For example to combine *tagging* with geolocation is a good application idea. One could take a picture of her hotel room and share it with some travel community. Location-aware restaurant reviews are another area leveraging both the mobile and the community aspects of social media. Web 1.0 enabled to break free from the localized communities. In a sense mobile Web 2.0 is closing the loop by bringing locality back to communities when needed. Mobility can be used to form and strengthen communities.

To see what *events* your friends are going to has a clear demand in the mobile side. For example, consider walking in downtown in Saturday and checking where your friends currently are. In addition to *leisure* events such as rock concerts and sports games, conferences and other *professional* events are potential target applications for this. In these professional events the community would be formed of one's colleagues instead / in addition to friends. The organizer of a fair or a conference could provide a system for creating and maintaining ad hoc communities. The amplitude and frequency of communication within communities increases due to mobility, and it has as a result shorter interaction cycles. As far as professional communities are concerned, this has potential of increasing productivity.

There are some things that make ad-hoc communities such as those created around events a bit difficult. This is on one hand because of the technologies; they should be really easy to adopt since they are used only once. On the other hand, there is the business challenge of making revenues; if a service is used only once during some event, it has to attract many times more users than a repeatedly used one in order to generate the same amount of revenues. Unstructured gatherings might be an application area for ad hoc communities. For example, if someone famous enters the site, and the attendees get information about this. Note that this functionality has privacy issues that should be considered.

It might be that the same services will be used via mobile devices and PCs. This presents a potential problem for context-based communities. Trying to repeat/redo all the community services in the mobile environment makes no sense. For example,

something like eBay for a mobile device would not necessarily work. It has already been investigated that people are not interested in betting and monitoring the auction with their mobile devices. Instead, they might react to alerts sent to mobile devices. For example the seller might complete a transaction with her mobile device. In other words, many community services might be *complemented* with mobile features rather than completely redone.

Match-making and *dating services* are one potential application area for mobile community services. These kinds of services have taken off better in places like Japan and Korea than in Europe or US. In addition to cultural differences, an explanation is the critical mass of users in big cities such as Tokyo and Seoul. In a densely crowded environment it is possible to find more exact matches to own profile and this makes dating services more interesting.

Marketing can give birth to commercially initiated communities and *mobile marketing* is one emerging trend. Social media communities are often *economics of scale*. Therefore, to target marketing to a hub of a community is wise since it has the best changes to spread to other peers of the community. It might actually be that network marketing as we know it dies. The topology in traditional network marketing is a tree where more often than not the leaves end up with nothing. Instead, the topology of a social network is a true network or graph. Social media -like marketing is therefore *fairer* for individuals than traditional network marketing.

Something surprising might happen in an event where several communities are present. For example in a football match there probably are two communities cheering for different teams. However, also other communities which cannot be thought-of beforehand might emerge. This serendipity requires open technologies, interfaces, APIs, and applications. In general, a “2.0 style” approach would be to let the users themselves design and implement the community-context applications.

Creating *tools and platforms* for ad-hoc communities might be a good business, at least in the beginning phase of mobile social media. Intelligent techniques for creating and managing communities are needed. For example *collaborative filtering* techniques can be applied in forming communities: Say some individuals frequently visit the same places and buy similar things. It can be deduced with certain probability that they belong to the same community and if they do not, maybe they should.

It is very important that the mobile community services are *priced appropriately*. For example, the extra price can be embedded within the price of a rock festival ticket. A festival ticket is expensive to start with, and it is not going to make difference if some 5% to the price is added for everyone.

3.3.1 Findings not Directly Related to Mobility

Community members differ from each other. It is important for the community to include *enthusiasts* who produce vast amounts of content, comment it, share it, and so on.

Implementing a *feedback* loop is essential in order to get the job done. For example, maintaining a blog is often dependent on whether other people comment it or not. Note, however, that here maintaining the credibility is very important (cf. fake blogs).

Community preferences and *recommendations* are important to take into account. People will generally rather check recommendations by other people than by (commercial) 3rd parties. Word of mouth recommendations are easier than ever thanks to the Web and its open infrastructure. Trust will emerge when there are enough recommendations, and/or if the recommender is known or belongs in a known community.

There is a reverse trend at the moment to wanting to belong in communities and disclose personal information, and this is *anonymity*. In general, lifestyles and anticipations of individuals have impact on how important the communities are to them (individualism vs. communalism). Anonymity and communities can also form new kinds of combinations; for example *anonymous voting* will likely be more popular in the future.

Among the interesting questions to be answered is that how do people get to be experts or hubs in some community, and how they can be identified from outside? Carefulness has to be practiced in thinking of the judgement-kinds of things, such as categorizing people as experts or non-experts.

Business models in community applications have to take into account that the trueness/credibility is even more important than in the “traditional” way of distributing media. It is important to acknowledge that *communities have more power nowadays* than they did before. Companies have to keep up a good reputation, since the word on misbehaviors spreads out very fast thanks to the Web.

Sometimes the *communities can own the devices* and other media used for interacting with other members of the community. Work community is a good example of this. This clearly can have impact on how the community members behave and for example cause some self-censorship. These aspects are bound with legal issues restricting for example whether – and to what extent – the employees and their communication can be monitored.

Stickiness is a very important attribute for realizing a successful community application. In other words, it has to lure the users back over and over again. Interesting *games* can be quite sticky. Games can be innovative and allow the users to have quite free hands in building the world within a game. Also tagging, where the users can review games and categorize them, would be a potential game-related innovation.

3.4 Content vs. Service Provision

This section discusses the question between providing and consuming services as opposed to content. First a general discussion on the concepts of ‘service’ and ‘content’ is given, and after that the particular business and application ideas related to user-provided services. This section is not very mobile-oriented, but nevertheless provides new insights. Probably the reason for getting few mobile-related considerations is the lack of existing examples.

3.4.1 Discussion on the Nature of Services

It was acknowledged that the concepts ‘service’ and ‘content’ are not trivial to define, but instead mean different things for different people. That is why the interviewer first gave an example of what a service in this context indicates. In particular, it was emphasized that majority of the current social media revolves around user-generated content, whereas user-provided services would be something different, such as an individual executing a part of some company’s business process.

Many times discussion on the nature of services emerged, regardless of the introductory example. One proposal was that especially with regard to individuals, the term ‘action’ should be used instead of ‘service’. It was noted, that in many cases content and services are difficult to distinguish from each other. In theory there are a lot of differences between providing services and providing content, but in practice it is not the case. They are intertwined concepts. Actually, the Web can provide an ecosystem for bundling products and services in new and interesting ways.

In the end it might be that the distinction between service and content will go away. Also, things like tour-guiding and giving reviews can be *servicized*. Say that you first read a review (content), then you ask for more from the review creator, and finally the review creator can provide you with additional services. One model for a fruitful combination can be to expand content or product with services realized with Web 2.0 technologies. It was also indicated a couple of times that the new subject of service science should take individuals into account not only as passive receivers, but also as

active providers. In addition to lowering costs, this provides an interesting opportunity for companies to gain new insights of their customers.

Advertising is interestingly combining services and content. One can ask, for example, whether it is a service or content when people are having Google ads on their Web sites. The consumer can make money merely by listing some favourite books in his own home page with links pointing to respective entries on an online bookstore site. If someone surfing the Web ends up buying the books in question via these links, the booklist keeper gets a reward. A mobile counterpart to this would be location-based appraisals for these books, located for example close to a bookstore. Also new kinds of things can be advertised. For example providing and *advertising own know-how* is becoming easier. Instead of having a book advertisement on your Web site, there can be an ad pointing to your personal LinkedIn profile.

One suggestion for distinguishing between services and content was the answer to: What is the potential danger that having an individual as a subservice provider can cause? In other words, having individuals as service-providers a company is dependent upon has far more implications with regard to issues like *trust and security*. One straightforward solution to this is to have people identifying themselves instead of acting anonymously. This can be enforced easily by providing payments afterwards if the user has behaved well and delivered what had been agreed. However, a very important aspect when designing a business model for a phenomenon such as this is to respect the fact that no-one is commanding others in the traditional sense but that all players are peers instead. The users should see your company as important for them in order for them to use its services and provide their own services via it; you cannot make them to do so. Good reputation and interesting brand have key roles in this.

It was also discussed whether there can be *services without content*. This depends on the nature and definition of content. If content is conceived as static and somewhat long-lasting, instant messaging (IM) and other synchronous communication means can be seen as a services without content. IM applications and discussion fora are services provided by individuals, in which the communicating parties can be both other individuals and companies.

3.4.2 General Business Implications of User-provided Services

Many interviewees thought that user-provided services is a great idea and definitely something that is going to emerge. In many domains the threshold for providing services has in general lowered. From the point of view of companies it was stated that they should be excited about an opportunity like this. Companies *could take advantage*

of people without having to hire them. If neither part feels abused in the end, it creates a *mutual win-win* situation. The publish/subscribe nature of communication on the Web is creating an open marketplace for anyone to operate.

If applied to the large extent, this has the potential of *altering the value network* and introducing new models. In the future there is going to be a clearer role for the users in the value network. In other words, in addition to traditional business-to-business (B2B) and business-to-consumer (B2C), the emergence of consumer-to-consumer (C2C) and even consumer-to-business (C2B) can be envisaged. The last one would be for example the above-mentioned user participation in business processes of companies. It might even be the case that in the future B2B, B2C, and so on will no longer have significance in defining a company's business area.

The barriers between individuals, companies, and other traditional actors have already started to blur in many areas. It will be easier and easier for individuals to provide services and act like companies. It is trivial for anyone to put up online presence and act for example as a T-shirt selling store. Related to this, similar ethical regulations as in the traditional societies/economies do not fit the Web, where anyone can provide (also) services.

Recruiting short-term partners and subcontractors is becoming easier and easier. Say a company lays out an announcement along the lines: "Someone should get this-and-this done". Suitable candidates would for sure emerge. A *reputation-based model for trusting* would work, especially since payment for the work/results takes place after the work is done. So there is a small risk and a big business opportunity. Another way to ensure good behavior is to demand some *investments from the users' part*. It would ensure that they behave well and that would further raise companies' interest in cooperating with them in the future. Willingness to invest for possible future income is highly culture-dependant, and would likely work well as a requirement in some countries, but fail in others.

There is a transition from concentrating on the interaction between the company and its customers to the *interaction between the company's customers*. The company's role in this kind of network would in essence be to facilitate the communication between the customers. Allowing users to *publish their services* is an important thing to achieve, and this might be one functionality for many companies in the future – to act as a facilitating platform.

One important question that should be answered in scenarios like this is whether the company can ensure a sufficient enough *quality of service* (QoS). Some sort of *certification* is needed. However, certificates can be given by user communities.

Currently a big difference between B2B and B2C is that B2C does not need “industrial strength” certification for doing various things and depending on others. However, it would be of use also for individuals, and therefore, new kinds of “agents” will emerge. These agents give statements on parties – individuals or companies, it does not matter – on whether or not they behave well.

The user-provided service approach can be applied in various functions of a company. *Beta phase* of applications with restricted user communities involved was identified as one potential business case.

Sharing WLAN bandwidth was identified as one potential – and already available – social-media like service provision. Users can share their bandwidth either for free or in exchange for money or bandwidth shared by other users. Also peer-to-peer (P2P) networks can be seen as user-provided services.

It was identified a couple of times, that the possible rise of user-provided services is not going to wipe out the companies providing services – at least not the big ones. Many times content is easier to create and provide than services. Take a starting rock band, for example. Even though they can bypass many of the services originally provided only by the record labels, such as distribution, marketing, and selling, they can still benefit from many of their other services such as producing.

Sometimes the traditional (physical) *user interface* of products such as books is the key for some companies to survive. In principle, books (content) can be offered for free on the Web. However, people generally prefer to read books on paper than on the screen. Therefore bookstores and publishers along with their services are needed when providing books to the people in the form they prefer the most.

There already exist examples of people making their living by *selling virtual goods* via various services and virtual environments on the Web. There might be potential for people in the future to be partly in charge of distributing music. People are used to a music record lasting over time. How to ensure this with digitally distributed songs? If you have multiple users, as opposed to far fewer digital record stores, there is a better chance that at least someone has the copy.

People can *personalize and extend Web searches*. Sharing these modified search templates could be a service, as is already the case for example with MP3 playlists.

Honesty, trueness and genuineness are even more important than before. Controlling for example the annotations and user-generated alterations of content originally produced by a company is not possible on the Web. Commercials can turn into *anti-commercials*,

and there is not much a company can do about this. However, often the anti-commercials can actually boost the popularity of a company, so many times no actions are even needed. This of course varies case by case, but the phrase “any publicity is good publicity” seems to apply here.

Technologies for providing services should be as transparent and easy-to-use as possible. Many times the user should not even be aware that she is providing services. People could act as service providers, but templates for providing services in a standardized manner do not exist and probably creating such is far from trivial. Templates for content creation and provision, for example a form for a Web site, are far easier to create than such for services.

User-provided services also raise the possibility for *targeted marketing*: Service providers typically host a number of content providers. If the service provider is also an individual, it makes sense to direct the marketing efforts to her, since she likely has influence to the content providers she is hosting.

Bottom-up nature is a natural approach for starting service provision in Web 2.0 era: Once your community is interesting enough, someone creates a service on top of it and starts making money. In addition, some services applying revenue sharing between the parties have already emerged.

The commitments made by *underage people* is a special case deserving more attention for example from the legal point of view. This has more implications with regard to providing services than content.

3.4.3 Mobile User-provided Services

User-provided services could assist companies in many *support functions*. For example delivering undelivered newspapers would make sense. The publisher would call to a neighbor for delivering her already read newspaper as opposed to the expensive option of sending a delivery man to bring just one copy.

Mobility helps in *abstracting the location* of the service away. The service can store the state and the user can continue to access it later on from any location.

In addition to virtual goods, also *selling physical products* was identified as suitable for users. “Modern day Tupperware” distribution could take advantage of the new technologies and the social media approach. Context-awareness would be of use in this kind of application in answering questions like: “What is the closest place I can find and

buy the item I currently need?” The network distributor could disclose information about the items for sale to multiple communities: To friends and acquaintances (never mind how far they are), to the local community within some range from her, and so on.

Users could provide *real-time answering services*, also bound to locations. Someone could act as a tour guide for close-by tourists. A similar service would be to rate clothes you try on by someone of the opposite sex present in the same store you currently are.

Various kinds of *drive-by announcements*, such as discount coupons to near-by stores, could in the future be on one hand personalized and extended by the users, and on the other hand created and provided by the users from scratch. In general, user preferences are important to take into account in order to not annoy the users with too many and irrelevant messages sent to their mobile devices.

In *health care* area there might be application potential to user-provided services, also mobile ones. Say that a doctor is to give treatment to a patient. The background information needed in order to get started can be combined from multiple sources, such as the hospital, drug company, nurse, and the patient himself. In addition to the information originating from the patient in question, the doctor would benefit from normalized and anonymized information provided by multiple other patients in similar enough conditions. Provision of this information can be seen as user-provided services, and the other patients could get something in return of disclosing their health-related data.

Uploading videos and other content from scenes-of-accident should be of interest to news companies in the form of a service. There are already some companies doing business with this. Sometimes people can *unintentionally* become parts in service chains. Say that someone takes a photograph of a robbery and uploads it to the Web. If the news agencies catch this exclusive photograph and embed it into their news streams, it becomes part of the news stream serving the people. More and more services, where the original content creators get paid for their efforts, are surfacing.

Micro-payments enable interesting service provision models. Especially in developing countries we already see some innovative services provided by users. In India, for example, there are “cell phone ladies” who act as the local phone booths of villages. Having technological solutions for paying these ladies from a distance is a necessary prerequisite. There are still many issues to solve in order to come up with an actually clever/usable/seamless *mobile payment service*.

3.5 Automatic vs. Manual Content Consuming and Provision

This question considered bringing a new feature to social media, namely the possibility for the user to *automatically* create and consume content and services. It was included, because mobility adds triggers which can be automatically detected and utilized without disturbing the user. Typically while on the move, the user has to direct attention to something else than the mobile device. At the same time, however, there can be interesting things and events around the user, the sharing of which would be relevant to companies and other users.

If equipped with appropriate sensors and devices capable of transmitting the stream from these sensors to a Web server, either as raw data or aggregated to more meaningful information, the user could automatically upload various information. Examples are her location, weather conditions around her, services nearby her, amount and/or profiles of other people within certain reach from her, and the state of her device (available memory, battery life, and so on).

The overall opinion was that automatic content sharing entails both positive and negative features, but that the positive scenarios outweigh the negative ones. In other words, that there are *more possibilities than threats*. Automatic content creation and provision is interesting, because it opens doors to *large quantities of information*. In the beginning, it is important that services building on top of automatically shared content are *very cheap* for all parties. Only this way for the phenomenon has potential to take off and these large information quantities to be reached.

One interviewee stated that basically all the mobile services and applications that are really interesting will end up being automatic. People are not going to manually tell the system that they are in a certain context. And even if they do, they often do it wrongly. Not all information can be automatically detected with good accuracy, however, and for those also manual input is many times needed. Take *activity* or goals of the user as an example. Even though activity can often arguably be said to be the single most important context attribute of a user to grasp, doing so automatically has proven to be very difficult. By merely observing a user walking on the street while talking to his mobile phone, how can you deduce whether he is working or not? In sum, it depends on the nature of the shared content/context, whether doing it manually or automatically is more accurate.

Like the question on service vs. content provision, also this one generated some conceptual considerations, although not that many. One issue was whether raw *data*, *information*, or *knowledge* is shared. At data level, privacy-issues are not so crucial than at information and particularly at knowledge level. Another connection with the service-

provision issues was about having the automatic uploads running in the background. Content sharing becomes more a service-like process, if it takes place continuously or periodically without the need for a direct conscious user interaction each time.

3.5.1 Users' Point of View

Important motivation for designing applications that make use of automatically generated content is that the *readiness for users to provide information about themselves for everyone to see has improved*. Therefore, acceptance to services like this is probably better than it would have been in the past. Also *semi-automatically* shared content is relevant. For many rich data, parts can be automatically generated, while others have to be manually entered. For example, to digital photographs the device already now automatically attaches various context data such as the time/date. This is probably going to be extended to cover more context attributes in the future as the technology advances.

Accountability is important from the point of view of users and companies making use of the shared contents of others. From the point of view of the content sharers, a more important issue is *privacy*. How to ensure that one's privacy is preserved and the content she is disclosing is well enough anonymized? The user might want to tell the system that people like her visit certain places, not necessarily that she personally does. The user should have access to the information about for what the uploaded content is being or will be used for, and in open environments this has serious technological, business-related, legal, and ethical challenges. Furthermore, these questions are not separate but intertwined; For example, in Finland there is a law which says that you can take a picture of someone on a street, but you cannot reveal private things associated with that person and especially not make business with exposing those things.

From the *legal* point of view, it is important to be aware of who is going to do the automation. If the user performs it herself, or gives permission for someone else to do it, and by doing this understands the consequences, then it is ok. Actually, it was noted by one interviewee that a more important question than automatic vs. manual provision is whether the content creator *consciously* allows the usage of provided content. Another interviewee raised a related question on whether the user always *remembers* that she is currently uploading content. Copyright legislations should change so that for example someone caught in a photograph does not end up paying royalties to a large corporation, if she happens to be in the same picture with a celebrity working for or otherwise associated with that corporation. The Creative Commons licence can solve some of the copyright problems, but not all. Note, however, that the general opinion was that there is nothing illegal with the automatic version as such, only that it is easier to harness it for illegal purposes.

It would be useful if there were a *standard for setting control details* such as privacy for content sharing, so that the users could easily state the entities allowed to utilize their shared content, as well as restrict the usage policies for various entities. This has clear impact on automatic sharing, because the control would not have to be set or modified so often. Usable control mechanisms would provide one effective shield against *phishing* and other forms of misuse.

Setting control details would be a good a priori mechanism for the users. However, it is likely that people still would share content in ways they later on regret. For this, there should be an *a posteriori* mechanism for “undoing” or “taking it back”. Of course, in the open Web, ensuring this is next to impossible. Or if the content cannot be completely taken back, at least *altering* or *annotating* it would be useful. One could tell the system that he was walking through the red lights district in order to get to an important meeting. Both *opt-in* and *opt-out* mechanisms should be easily available for the user. In other words, the user should get to choose the particular entities she wants to automatically share the content with (opt-in), and then have the backdoor of easily terminating interaction with any entities, for example if they behave maliciously (opt-out).

It was noted that *sharing content with yourself* is important, too, and there are neither trust- nor privacy-issues here. You can reminisce the places you have visited, check how many calories you have burnt, or compare your shopping habits between winter and summer.

From the user’s point of view a simple *revenue share* mechanism would work well as a business model with automatically shared content: If you agree to share your location or the values of your other context attributes, you can get discounts or other rewards. For some applications even a social reward such as good reputation will do, but a more solid business model builds upon sharing economic value. And the better quality your shared content is, the better rewards you should receive in order for the business model to be realistic and satisfying for all partners.

Technologies, at least the server-side ones, are beginning to be ready for automatic content sharing. For example, storage capacity allows even today that a lot of the relevant data with regard to one’s life be stored. Things like emails, calendar entries, calls, and pictures are such data. The principle of *technological determinism* applies here: What can be done, will be done. It will be interesting to see how this (that is, acting in public all the time by virtue of automatic content sharing,) has impact in people’s psyche and actions. Existing applications which disclose people’s profiles and habits have indicated that people actually behave differently. As an example consider TiVo, which can be set to record TV shows that you would like based on the shows you have watched or recorded in the past. What has happened is that people have set the

system to record high quality documentaries in order to appear more sophisticated, even though they would truly be interested in sports and reality TV.

3.5.2 Companies' Point of View

Having access to the traces users leave behind is very interesting to many companies. For example, you leave a mark of *what you have bought* to supermarkets and this is automatic content creation. Typically people do not have problems with the fact that information about them is collected and that they are profiled and segmented accordingly. There are naturally extremes, but this is the average. If you ask people about sharing for example their shopping habits, they tell you a more negative picture than is the case in reality.

Traffic was identified by many interviewees as a natural application area for automatically shared content. People in cars could share their locations and speeds and this information can be used to inform about accidents, predict traffic jams, and so on.

Fleet management is a professional application area that would benefit from automatically shared content. Companies could monitor their employees such as maintenance men in the field guiding and interacting with them as appropriate.

Citizen journalism benefits from automatically shared content. Many events are over by the time you have taken out the phone, set up the camera or microphone, and started recording. Automatic media stream to a server would be an answer in some cases.

Automated advertising in cell phones and the like might be a good approach for *local companies operating in developing countries*, where there no alternative channels such as billboards, local TV channels, and so on exist. The same channels could be used by individuals also in developed countries.

Automatic provision of *health care* information is a clear application area, which is applied already, but still has a long way to go. A heart attack victim cannot manually upload his current data to the hospital, so automating this is very relevant. The patient or the environment surrounding him can be equipped with tags and sensors monitoring and uploading information, either continuously, periodically, or if something unusual in the vital functions of the patient takes place.

Generally, the *street credibility* and *brand* of a company depends on how its customers' see it. This has impact on the manual content sharing, too, but especially on automatic. If the customers value the company, or think of it as cool, it is more likely that they

allow the consumption of automatically generated and shared content. Also the personal brand of the content creator, or rather her *reputation*, is important. Both official reputation classifications created by companies and word-of-mouth information can be applied here.

Accountability can be seen as one design-issue in automatic content creation and provision. The company, as well as customers of that company, might want to verify that the content is indeed created by the individual that claims having created it. In many services this is not that important. For example, does one care who has created a funny video clip on YouTube? However, in some critical content, and especially with regard to services, accountability needs to be taken into account. Often the community can be used for establishing trust and reasoning on traceability and accountability. For example, you might trust your 1st hand links with 80% certainty, the 2nd hand with 65%, the 6th hand with 5%, and so on. The community can also provide a self-regulating mechanism such as that of Wikipedia, where the malicious users are discarded.

For companies the added value of *revenue sharing* would emerge at least from having enough users disclosing their contextual data, combining this with their shopping and other habits, and doing various things such as marketing and product development based on this. Also here the payments to the users could flow afterwards in order to prevent misbehavior.

3.6 End-user Applications vs. Professional Applications

As most Web-based phenomena, also social media and Web 2.0 have started in the consumer sector, focusing on entertainment-like applications. End-users are a good starting point and test group for many Web applications. However, it is envisaged that also utility applications and even professional solutions will emerge. This question focuses on discussing the similarities and differences between the end-user and professional applications.

It was also asked as a subquestion whether end-user applications or professional applications will in the end have more impact on the society and economics. *Nowadays end-user applications come first*, professional applications subsequently. It is a very different situation than was the case twenty years ago. Even the Web itself, developed in the early 90s, was invented by scientists. Also publishing on the Web is was first put forward by professional applications.

User-driven development is nowadays happening even in critical areas such as military. In the past, military applications influenced many high tech products. These products

were first top secret and used by the army only, then over time via a couple of steps they finally became available to end-users. The GPS system is a good example of this. These days, the trend is sometimes opposite: Most advanced innovations emerge bottom-up, as *open source* or according to the *open innovation* principles and habits. This same phenomenon opens doors for new businesses and value networks in the corporate/professional sector. The customer relationship can be deepened so that the individuals no longer feel (only) as customers, but as active partners of the company they are interacting with.

One significant difference between end-user applications and professional applications lies in the goals they try to achieve. Professional applications are created for increasing productivity and therefore have the *company as target*. Professional applications are intended for facilitating the worker, but only because in the end it will increase the productivity of the company. In contrast, consumer applications are created for facilitating the needs of a user and therefore have the individual as target. However, also for leisure time efficiency is often one driver. People aim at being efficient at what they do, and this fact should be of interest to companies as well. Nevertheless, the company creating consumer applications does not necessarily even know the needs of the user a priori, and this calls for applications which leave room for adaptation by the users.

Engaging in mobile social media applications for professional usage has *both positive and negative implications* from the worker's point of view. The most significant negative implication is the big brother type of scenario, where the employer is monitoring whether or not an employee is working hard enough. It can actually encourage people to start fooling the system by trying to appear more productive than they are. The positive implication is equality: People could surpass the hierarchy in many cases by seeing what their bosses are doing; whether they are available, and so on.

In addition to having companies producing useful material for customers, as has traditionally been the case, it is now possible to have the customers produce useful material for companies, and therefore create a *responsive ecosystem*. One interviewee stated that this feedback system is so powerful that it will cause the Web to surpass other media as the most important place for advertising.

The concept of *employer is going to undergo some changes*. People are going to work somewhere, with some tools, and for somebody. In parallel, management is going to change from managing the infra to orchestrating the social clusters and contexts. An interesting analogy was made by seeing future *company as a theater*: Projects are like plays, employees are actors with unique capabilities, management is like directing a play where you have to leave artistic freedom, and so on. Also the categories of work and leisure intermingle and blur in some cases.

The border between entertainment and utility is blurring. When one thinks of Maslow's hierarchy of needs, in the end *people aim at transcending themselves*, regardless of whether they are having fun or working. Related to this is the fact, also stated elsewhere in this report, that the consumer should not be seen as a passive object, but instead as an active subject. Future companies and individuals jointly form a *transformational economy*, which combines for example entertainment and learning.

Shifting away from licenses in the B2B sector was identified as one phenomenon related to the emergence of social media in business applications. It was considered that the SMEs would be the likely first candidates for adopting services in this area.

Many domain areas and business processes fit for this phenomenon were identified. Example processes where many companies could reduce the costs of *pre-sales*, *sales*, and *customer support*. *Advertising* will change along the Web 2.0 phenomenon. It is going to be a new way of connecting the customers with companies. Some *publishers* have already utilized customers both as authors and as reviewers of books and this has been showing good results. *Stock markets* are already being followed and manipulated with services like these. *Business travel* is a good professional application area for this. Putting it forward from the existing services could include a "concierge" for all things needed in a foreign city. Having *spectators reporting on site* is of interest to media unless/before they have their own staff there.

The *entertainment industry* has a broadcast connotation, meaning top-down entertainment stream from companies to customers, but the social media phenomenon is going to change this. In the new form of entertainment business the individuals are heavily involved, also in the content creation.

Companies might sell *service compositions* to be stored in and initiated from mobile devices. For example a video rental store might reserve DVDs for the consumer and notify when her context is appropriate. The system would be open but anonymized in the sense that the user does not want the video rental to tell others about her particular movie wish list. Having users disclosing their wish lists would be of use to the video rental stores, too, not just the users. Also the users themselves could create these service compositions, or *activity templates*. Here revenue sharing is an important business model. When one creates content, with which revenue can be made, it is likely that also the creator wants to get some portion. And not necessarily only content per se, but also the created usage situations and ways of operating, namely these activity templates.

Manufacturing processes might benefit from mobile social media. Content from the site would be shared between the relevant individuals in ways that could not be achieved from the distance. Also *transportation* and *logistics* benefit from this. Actually, many

truck companies are already engaged in something like this. Trucks are equipped with GPS receivers, which enable fleet management transit management. By including also the customers to this equation would bring new possibilities. The customers could for example track the delivery men and notify them if they are about to deliver some package to a wrong address. Furthermore, a *maintenance* man could share information about the object he is repairing.

Trust, security, and accountability were identified by far the most important things to be taken into account from a company's point of view when engaging in social media applications. When using employees bound by contracts, working hours, and so on, the company is in a commanding position. The situation differs drastically if utilizing individuals outside the company. In one way or another, the company has to ensure that the users do not abuse the system. So even though there is a lot of potential, such as savings in time and money, at the same time many challenges calling for attention exist. *Reliability, permanence, precision, and accuracy*, were identified as related issues which are more important to handle in the business sector.

In consumer markets, communities are often not very predefined and static. Traditional working communities are, however, and therefore call for a more structured approach in order to perform well. The general conception still seems to be that 8 hours of work every day is performed and then rest of the day free time at home or somewhere. In reality people nowadays have far more variation with regard to how, where, and when they work. One interviewee noted that forcing the social media phenomenon to fit working habits and environments generates as a danger of killing the best features of the phenomenon. On the other hand, it was stated by another interviewee that also end-user applications done badly can denigrate the reputation of the whole initiative and in that sense slow down the advancement of the phenomenon and even prevent the professional applications from ever seeing daylight.

Development in B2B domain calls for *specifications, standards, legal* considerations, and so on, the development of which is often quite slow. As a consequence, if a professional social media application is done badly, there is more chance for ending up in court than is the case with end-user applications. In consumer markets people try what is fun and interesting, and if some business model can be built on top of some fun application, that is just extra. Often these applications can have impact on businesses even without explicit business models. People do what they think is fun and if someone – a company or a big enough mass of users – likes it, it is starting to have impact on businesses and their operations.

Brand is important for companies and probably slows down the advancement of professional social media in many cases. It was stated by one interviewee that the

information emerging from social media will likely have impact on the strategic level of companies rather than the application/service level. The companies fear losing control of what they offer and how they offer it. *Fake advertisements* created by users, which are remixes or remakes of the original advertisements put forward by the companies themselves, are an epitome causing this fear. The users have to be willing to contribute, not to abuse. This should be taken into account already in the application design process phase, way before the company launches some professional social media application.

One important thing to grasp when designing social media applications especially for mobile use is the *attention span* of the user. Entertainment works so well, because it can be provided in short and compact doses. The user can watch some funny cartoon while waiting on a bus, comment it, and share with friends. When designing professional mobile social media applications, they should respect the attention span question as well. Possibly *addressing only very urgent needs* would be the best choice. The workers on the move would react only to time critical tasks, and perform the rest of the work with a PC. At least for now; things might improve as the technology advances. Today, however, keeping the mantra “not only mobile” in mind is wise.

It might be that some company is going to have a *competitive advantage* by combining both effective and fun working methods. One new application would be a *joint blog* which is updated by both the representatives and the customers of a company. Also *wikis* are already being used in companies, but this presupposes a healthy and open enough culture. An environment where information is kept in the dark does not fit an open tool such as a wiki. Also Web-based CRM, ERP, and other legacy applications can be implemented with Web 2.0 technologies. What would a wiki-based CRM look like, for example? Quite often the *technological developments in the end-user sector come first*, but end up in professional usage. As an example, consider instant messaging (IM). It started with personal usage, and slowly made its way to companies, and currently is a vital and strategically enforced tool in many large companies.

Depending both on the person and on the domain area, *people prefer professional or peer opinions*. In other words, I might prefer restaurant critics over my friends as far as picking up a proper place to eat is concerned. In contrast, you – although belonging in the same circle of friends as I – prefer our friends for picking restaurants. But when it comes to suggesting movies or buying cars, we can have the exact opposite opinions. It would be very valuable for a company operating in customer interface to know to whom provide professional opinions and recommendations, and to whom offer access to communities.

3.7 Differences with Regard to Application Domains

The last question of the interview tried to capture the differences between “traditional”, yellow page like business domains, as far as mobile social media is concerned. The interviewees were asked whether this is domain-independent phenomenon and if not, which domains have more potential than others and why. Note that some application domains have been identified already before in this report, especially in the previous section.

3.7.1 Do Application Domains Matter and Why?

So far we have seen horizontal applications, but more and more vertical ones targeting specific business branches are emerging. It was mentioned by many interviewees, however, that the exact winner among the business domains is difficult to pinpoint. At the moment basically *all domains are hot*, and the most important media are music, video, and pictures. Instead of domain areas or business branches, the functions are here more important. The phenomenon will also create completely new kinds of networks and players in them. *Social networking* can also be seen as a new business branch itself.

How the business is made matters more than what the particular business is. The company has to accept the fact that the users can give negative feedback of its products and services. Particular *keywords* are probably more appropriate than traditional classification schemes when selecting companies fit for this phenomenon. Also *geographical areas* associated with businesses can have more impact than industry sectors. Geography and industry sectors also have influence on each other. For example, in USA car-related services such as dynamic gasoline price sharing are likely to be more important than in Europe or Far East, whereas in the case of public transportation the situation is contrary.

Application domains are different from each other and they should *respect the customer segments* they are interacting with. Different application domains will have different kinds of communities operating differently and it should be taken seriously when designing services for them. For example, automotive industry is very different from healthcare. People intending to buy or sell cars are looking for different kinds of services than people seeking for medical treatment. Also privacy- and trust-issues vary in different industry sectors. It was also noted that the sectors with *high frequency of events and transactions* are more important. In this sense, applications supporting grocery shopping have more potential than applications supporting buying cars.

Areas which involve *digital products or services* were considered more important and proceeding faster than the ones dealing with physical goods. The bottom line is that *content* of some kind should be involved. Internet companies will lead the way and others will follow. Support for *delivery* processes of physical goods was envisaged. Also *design* processes, both for digital and physical goods, was mentioned. It was also noted that things can often be converted from physical to digital. This has already happened for many products and services. Furthermore, the physical world can be included in this in other ways besides physical products. Geographical places, for example, can have impact on the delivery of digital goods. People can already today attach digital information to locations. Various business models on top of this can be thought of.

Domain areas which deal with *large masses of users* will be the first to react to the mobile social media phenomenon. Communities interested in some specific things are going to fragment ever more in the future and therefore it might be more difficult for a service provider to attract them. However, by virtue of the long tail the Web helps to find the small and specialized actors and therefore attracting users is easier.

Naturally, domain areas which are relevant to users when they are *mobile* are important. Related to this observation, *businesses which target short moments* have a lot to give in this area. As mentioned earlier in the report, mobile users have to concentrate on the environment around them, and therefore mobile social media applications have to be usable in short periods. *Drive-by announcements* and advertisements reaching users' mobile devices as they pass businesses will become more common. Along with these announcements the problem of spamming emerges, and filtering – either automated or for example community-based – is needed. Mobility can be realized on many scales, from sofa to kitchen or from home to the other side of the globe.

3.7.2 Particular Application Domains Having Potential

Hurry on one hand and loneliness on the other are probably not going to disappear in the near future. On the contrary, they are likely to grow and social media could be harnessed to prevent them as much as possible. *Making everyday life easier* and more convenient is a goal to strive for. For example *car-pooling* can be facilitated with mobile social media techniques.

Well-being in its broad sense is going to be influenced by the social media phenomenon. Awareness of well-being increases, and as a consequence people will start to do more things to ensure it, and demand support for well-being in the services they use. Well-being is not just about material things and getting richer, but has also to do with things

such as aging and life-long learning. People can form communities and share their experiences with each other with new technologies and applications and thereby increase the quality of life. *Healthcare* in general is definitely going to be an important domain area. It is nowadays often considered whether a patient should be in hospital or at home. If she stays at home, the importance of mobility and mobile information sharing increases.

In the future the process of *collaborative editing*, rather than the document which is edited, is going to be the value-add. Therefore areas, where collaborative editing is needed, will be among the first to succeed. Related to this, *communication*-intensive domains will become essential. There will be a more distinct division into synchronous and asynchronous so that IM- and SMS-like communication modes will implement the synchronous communication. Wikis, blogs, and so on will dominate in the asynchronous communication. Email as such will lose importance.

Applications and services in the area of *entertainment* were generally considered of having potential. Entertainment services which can be tailored to meet the user's current context are interesting. A service could have an answer to the mobile user's question: "I am bored, what can I do right now, right here?" Again, not only location is recognized as relevant context. Also changes in emotional states, social surroundings, and so on can be taken into account.

Travel was recognized by many interviewees as very important domain area for mobile social media. In addition to typical *tourism*, with visits to museums and the like, *business-travel* was also highlighted. If implemented properly, applications supporting business travellers might increase their productivity. Also "*everyday-travel*" of people was mentioned. It entails supporting things like taking your children to a park in the neighboring city you have not visited before. Also support for *traffic* was seen as important. The users could share information about traffic conditions. They could create the information themselves from scratch, or annotate/correct official traffic information based on their experiences and observations. This traffic information might even be something the users are willing to pay for, if the service is implemented well and is easy to use.

Media is currently going through a change, and this phenomenon is in line with the rise of social media. Media houses do not own the whole value network any more. For example, traditional TV can be contrasted with YouTube. Unlike with TV broadcasters, anyone can submit material to YouTube. Also the content creator and the person sharing it by uploading are often different. In addition, people can comment and rate the uploaded material. This differs drastically from a traditional television company, which controls everything from shows to the advertisements aired between and during them.

Big media corporations are starting to react to this by publishing blogs, paying for user-submitted pictures and videos, and so on. “*Mobisodes*”, that is, short episodes of popular TV shows which are intended especially for mobile devices and usage scenarios, are related to mobile social media.

Any *markets*, where people and companies sell and buy things, fit social media. Probably the companies who were the first to go online in general will also be the first to apply social media. This will mostly – or at least first – realize in consumer markets. However, also B2B applications are possible. *Stock markets* were mentioned as a special case; often the brokers are on the move and need the real-time information of stock prices in order to buy and sell. Also *Ethical and aesthetic factors* could get the consumers to act in commerce. Fair trade, climate change, poverty prevention, and so on are important for attracting users.

4. Analyses and Conclusions

This section presents some analyses and further considerations based on the interview results of Section 3.

4.1 Web Megatrends and Social Media Business Models

In the spring of 2007, VTT published a report on current and emerging social media business models². Figure 1 depicts the business models which were identified in the report as interesting new approaches with potential, namely *revenue share*, *professional applications*, *enabling technologies*, and *crowd-sourcing*. Some of the findings of the question on general Web megatrends (see Section 3.1 of this report) are plotted on the figure.

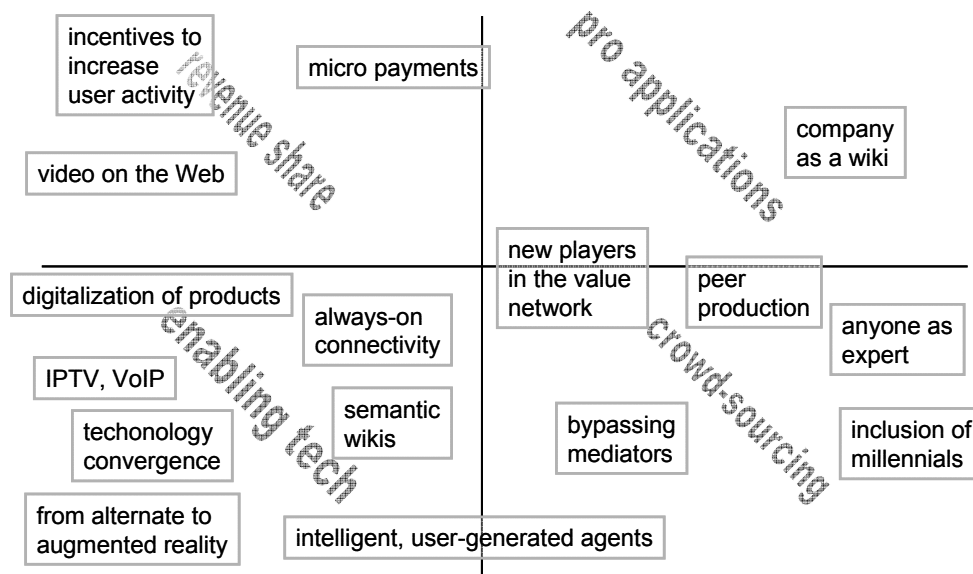


Figure 1. Some findings plotted on the fourfold table of emerging social media business models identified by VTT.

Figure 1 shows that many of the phenomena identified by the interviewees are in line with the new social media business models. For example, sharing revenues smoothly as micro payments either between businesses or between a business and a user/community was pointed out. A concrete observation was made about the need for a video (or other multimedia content) creator of getting his/her share of the revenues, especially if the

² P. Kangas, S. Toivonen, and A. Bäck (eds.). "Ads by Google" and other social media business models. VTT Tiedotteita – Research Notes 2384. VTT, 2007. <http://www.vtt.fi/inf/pdf/tiedotteet/2007/T2384.pdf>.

content in question ends up being popular. Some online video and picture services are already acknowledging this and sharing the revenues.

The changing nature of work calls for some social media applications, and also thinking of the new workplace in terms of social media. A wiki metaphor, for example, fits the way some companies are nowadays operating, with transparency and very flat hierarchy in operational processes and information/product creation processes. These processes can also more often than not include members outside a company, and this requires safe but usable and easily accessible tools.

Lots of technological innovations identified by the interviewees were related to social media as enablers. Many traditionally physical products are becoming digital and therefore more easily modified and shared between users; wikis are becoming more powerful when semantics to content in them are provided; people are going to have the possibility for always-on connectivity; and so on. In general, technological convergence, realizing for example as mash-ups combining two or more underlying services, is advancing the social media phenomenon.

Crowd-sourcing means harnessing the power of individuals and communities for performing some specific task. Crowd-sourcing can be initiated by a company, a community, or an individual. In the case of companies, it comes very close to professional applications. Individuals and loosely coupled communities can introduce themselves as new players in value networks of several business branches, and at the same time several existing players can be bypassed. Millennials were identified as a specific group of individuals, who are going to be more and more included in product design and development processes.

4.2 Amplifying Real-time Interaction with Mobile Social Media

The rise of broadcast media in the 20th century dramatically increased the speed of news to reach people. First radio and then satellite TV facilitated the news stories to travel anywhere in the planet in a matter of seconds. However, the nature of broadcast media is such that it requires people to tune in at certain times. If news broke, and you did not happen to be within the reach of some mass media, you missed it. The publish/subscribe nature of the Web enables to break free from this weakness that broadcast media has. Web sites of news agencies are nowadays updated roughly simultaneously with airing big stories in mass media. For minor ones, the Web often spreads the news before TV or radio. And once the news hits the Web, it can be retrieved there later on.

Also the traditional Web, call it Web 1.0, has its own drawbacks. The news coverage is first witnessed by some reporter, who composes a story, which is then uploaded to the Web. Web 2.0, where regular people can act as citizen journalists, is bringing a change to this. Figure 2 depicts this shift. The upper left part of the figure captures the traditional distribution of an online story about some phenomenon (P). It is first observed and uploaded to a Web server by someone (1). It then reaches the audience (2). More and more often, the audience has a possibility of giving feedback of the stories (3), for example in news fora. However, this feedback is no longer real-time. The phenomenon to which the people online are reacting is often over or at least has proceeded to a different state in the meantime.

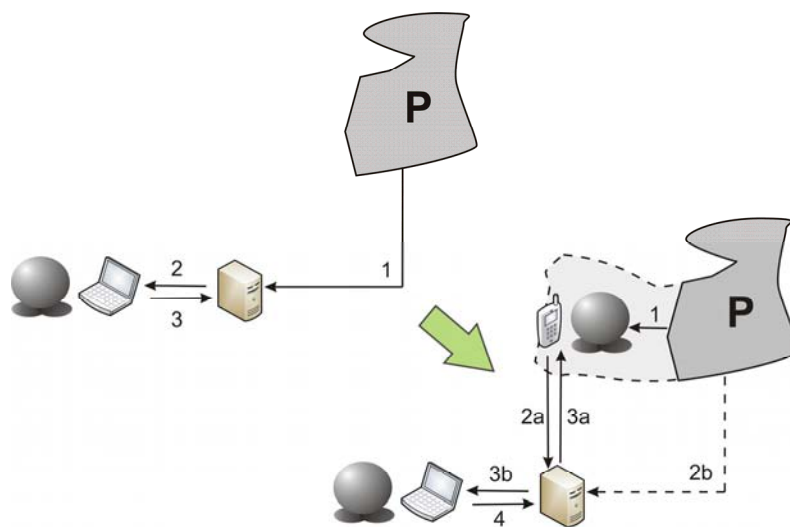


Figure 2. Amplifying the real-time and "real-space" interaction with mobile social media.

In the lower right corner of Figure 2 there is the opportunity which mobile social media can introduce. In particular, people who are eye witnesses of some phenomena (1) can directly capture them and upload to the Web (2a). At the same time, "official" stories of the same phenomena can be uploaded (2b). However, they are no longer every time necessary. Often regular citizens are in scenes-of-news sooner than reporters, and sometimes the phenomena do not make it to the mass media, but thanks to citizens can still be uploaded to the Web.

In addition to the stories finally reaching people surfing the Web at homes or offices (3b), they can also reach the mobile Web browsers (3a). In fact, sometimes the mobile Web applications with their push functionalities can act as triggers for people to direct their attention to some event taking place around or close to them. In other words, 3a can take place before 1. Finally, as in the traditional mode, also in this version people have the possibility of commenting or otherwise reacting to the stories (4). It is notable, however, that mobile Web users have this possibility sooner than the wireline Web users, either because they witness the event themselves, or are notified by it (push).

An interesting discussion can be initiated on if and how the millions of potential citizen journalists can influence the phenomena they are reporting about. In Figure 2, the mobile Web user in lower right corner is surrounded by a dashed line. This is to indicate that she is herself becoming part of the phenomenon (P). Business-wise, this opens up interesting possibilities. In addition to using people in taking photos of celebrities or scenes-of-accident, more sophisticated models can also be thought of. This, in essence, is the enhancement of real-time information and interaction with its “real-space” counterpart.

4.3 Dynamics between Individuals and Companies

An important aspect of the SCaSOm project was to find out the relationships and dynamics between individuals and companies³. The original idea was that the relationship would be mainly unidirectional, realizing as service or content annotating, for example by giving book or restaurant reviews. It turned out, however, that also the companies are utilizing user-generated content, for example by doing business intelligence of blog posts (see Figure 3).

Companies are starting to get very interested in what users write about them in various fora. The next step for companies is to not only passively follow what is going on, but rather take an active role and participate in these discussions. Word of mouth is very powerful mechanism nowadays for transmitting ideas and opinions among the crowds. It would be foolish for a company to not be interested in being aware of and utilizing it. A key thing for a company is to take part in this openly and honestly, so that the consumers are aware that the company is present among them. Once among the consumers, the company can try to guide the crowds for doing something useful for their businesses, such as evaluate and even develop products or services.

³ Note that the term ‘company’ in this context captures both commercial companies and public administration bodies; anything which has “official” status as content/service provider.

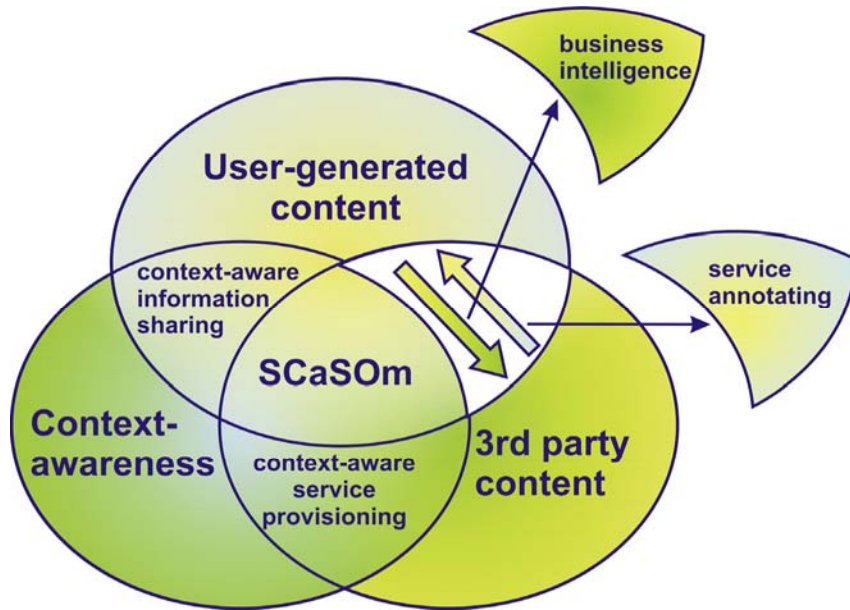


Figure 3. Bidirectional dynamics between individuals and companies.

In general, the traditional boundaries between individuals and companies, employees and employers, as well as subjects and objects were commented of going through a change. They are not going to go away completely, but rather form a sliding scale, as depicted by Figure 4, where actors can take multiple roles and hop between them as they feel appropriate.

Players in the new economy of social media are going to act in multiple roles. Anyone can be a content creator, distributor, or consumer, as well as a service provider. Some geographical restrictions naturally apply, and they are important to acknowledge especially with regard to mobile social media applications.

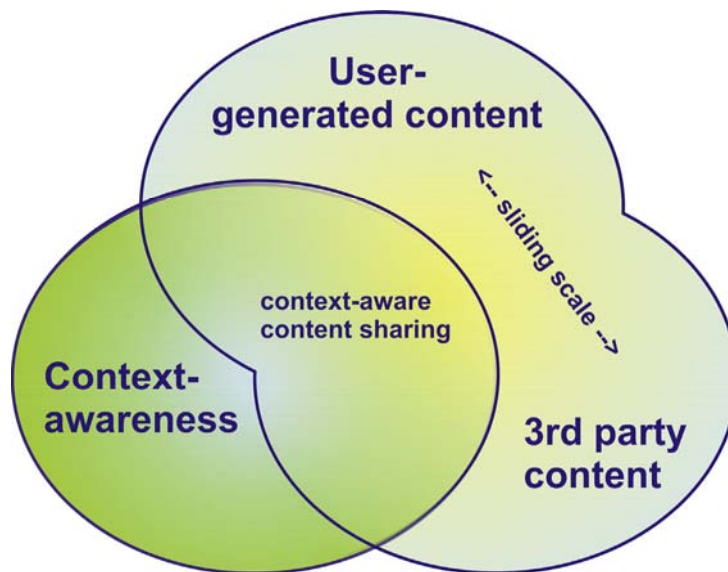


Figure 4. Sliding scale between individuals and companies.

4.4 Pros & Cons of Automatic Provision & Consumption

The question on automatic content consumption and provision provided results which can be divided into possibilities vs. threats on one hand, and consumption vs. provision issues on the other. These two categorizations are orthogonal, as Table 1 depicts. The terms “user” and “company” are in the leftmost column of Table 1 given in quotation marks. The reason for is explained in Section 4.2; it is envisaged that the borders between users/customers/individuals on one hand, and companies on the other, is going to blur in many cases. Therefore, also with regard to the automatic content, both individuals and companies can act as content consumers and providers.

Table 1. Possibilities and threats with regard to content provision and consumption.

	Possibilities and drivers	Threats and obstacles
“User”; Content provider	<ul style="list-style-type: none"> - Better service - Targeted information - Payments and other incentives 	<ul style="list-style-type: none"> - Lose of control - Preserving privacy - Cost
“Company”; Content consumer	<ul style="list-style-type: none"> - Streamlining business processes - Gaining knowledge of customer behavior 	<ul style="list-style-type: none"> - Accountability of content providers - Trusting content providers - Cost

Provision of content needs to be tempting. The provider has to acknowledge that by automatically disclosing content there are some incentives for doing so. In addition to payments or reimbursements (for example discounts in telephone bills), personalized services can work. In the content consumption side, many opportunities can be thought of. Knowing the presence information of mobile workers, for example, can be used in streamlining business processes by dynamically rerouting the workers’ paths. In the business/consumer interface, having access to customer behavior information is naturally of great importance to companies when redesigning their products and services.

Obstacles for the automatic scenarios arise to a large extent from the issues related to privacy, trust, accountability, and so on. Being unaware of where the disclosed information ends up is causing the sense of losing control and privacy. A mobile employee, who is continuously monitored by his employer, might feel uneasy unless the system is implemented well. For example, the system should be transparent so that the employee knows whether or not he is currently being monitored, by whom, and to what extent. Also a customer disclosing information to the company whose services she uses, benefits from knowing where the information ends up and how large is the network having access to it. Also anonymization should be applied in many cases. Content consumer, on the other hand, is worried about the quality of the content. The accountability of the providers should be guaranteed, and trust between the consumer and provider established. As was noted by some interviewees, good behavior from the

provider’s part can be enforced by paying afterwards, if the results are meeting the requirements. However, in some critical applications such as in the area of healthcare, this is not necessarily enough.

4.5 Benefits of Being Aware of User Characteristics

Depending on the user and/or the application area, different levels can be applied in demarcating the social media’s domain of interest. Figure 5 depicts one such classification scheme, related to applications utilizing recommendations or opinions. The topmost concept captures all users. First, a distinction is made on whether the user is more interested in authoritative opinions such as official certificates or reviews given by restaurant critics, or if she prefers user opinions. If she prefers user opinions, it can be acknowledged whether or not she knows the user giving the opinion. Additionally, for the known users reputation information can be given, even specifically in the current context.

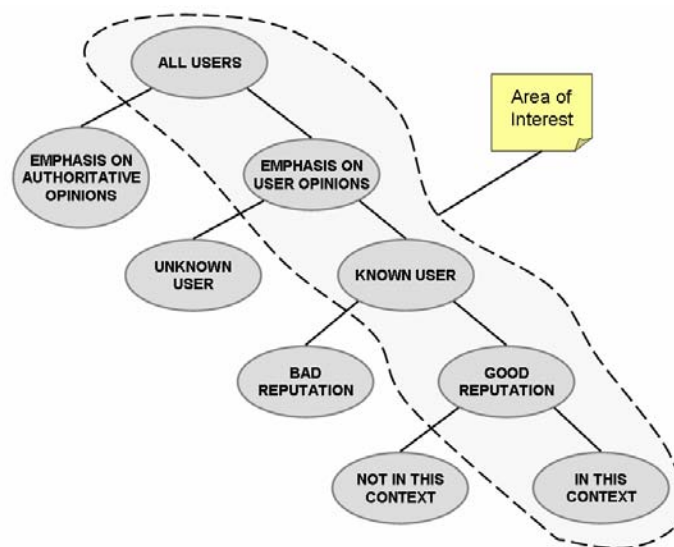


Figure 5. Various levels for demarcating the area of interest.

The deeper Figure 5’s taxonomy is navigated, the more exact information can be given. Suppose that Kelly the user is provided with an opinion about a restaurant stating “4 stars”, with nothing more. This is not necessarily very useful to Kelly. In contrast, if the opinion “4 stars” is accompanied with information that it originates from Shelly, another regular user of the system (as opposed to a professional restaurant critic), who Kelly knows personally, is known by her to behave well and give truthful opinions, and of being especially knowledgeable in this domain, there is potentially a lot more for Kelly to reason about. At the same time, naturally, this poses further demands to the application logic and functionalities.

In addition to the technological implications described above, the abovementioned phenomenon has impact on how the business is made. The more a company can know about its customers, such as whether they prefer authoritative or peer opinions, and in which areas/contexts, the more it can adapt its way of operating to fit the users and the communities formed by them. Respecting the communities' specific characteristics and conventions is of great importance for the future companies to gain respect and appear sticky enough for the users to stay loyal.

4.6 Work vs. Leisure ≠ Efficient vs. Lazy ≠ Boring vs. Fun

It is a known fact that in many professions it is no longer straightforward to draw a line between working and spare time. People telecommute, work during weekends, take time off in the middle of working day, and so on. The subsequent time intervals devoted either to work or leisure are getting ever shorter. In addition to this, there are activities, of which one cannot say in retrospective, whether they were work or leisure.

In addition to the above phenomenon, ways people spend their spare time are changing. Partly due to longer working hours in many professions, people are becoming more aware of how they spend their spare time. Instead of lying on the couch passively watching TV, more attention is put on how to make most of the ever-shortening free time. Furthermore, also working culture is changing with regard to these phenomena. An employer can gain competitive advantage by allowing people to devote some time during their working hours to fun stuff outside the main projects. In fact, some employers demand that a certain percentage is spent on free exploration and self-improvement. These jobs are typically in fields calling for high creative capabilities from their employees, and they want to nurture these creative habits in order to generate out-of-the-box innovations.

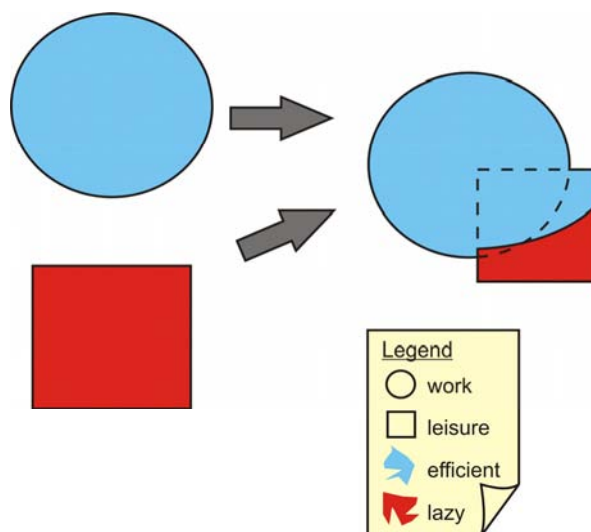


Figure 6. From distinct work and spare time to a mix with more emphasis on efficiency than laziness.

Figure 6 depicts the shift from distinct work and leisure to an overlap, as well as the notion that efficiency is becoming more common even in the ever-shrinking spare time. Utility applications such as calendars, reminders, and recommendation services are of interest to consumers trying to optimize their free time. As was noted by the interviewees, utility applications aimed at consumers are a good intermediary step in shifting from entertainment sector towards full-blown professional applications.

Mashups and widgets are examples of technological innovations, which support well the mixture of leisure time and work. A person engaged in a work assignment might spot something fun, and an application with readiness to react to it would be of use to her. This is of special interest to mobile social media, since often this “fun” originates from the mobile worker’s surroundings. For example, when entering to a construction site, a worker currently performing strength calculations might spot a funny incident from the window of a bus, and wish to share this scene with others. At this point it would be appropriate, if he did not have to interrupt the calculations and open another application for this image sharing. A good user experience would be achieved, if he could take the picture and share it from the same interface by using a widget embedded on the application. This enables all sorts of new businesses to surface. Mashups and widgets with semantics attached to their interfaces enable combining content from various sources in new and serendipitous ways.

4.7 Assisting Discontinuous Cognitive Processes

It makes no sense to take everything there is on the wireline Web and try to duplicate on the mobile Web. This rule of thumb applies also for the mobile social media. People do not want to spend significant amounts of time surfing on different MySpace pages when they are on the move and have to reserve their cognitive capabilities for coping with phenomena surrounding them. Instead, mobile social media applications should be designed so that they respect that the attention span of mobile users is short, and cognitive processes tend to be interrupted and later on restarted.

The aforementioned issue can be turned into an advantage. The first thing to do would be to design the mobile social media applications so that they can be initiated, executed, and completed within a short period of time. A more advantaged approach, however, would be to design the applications so that they allow people to interrupt the usage and continue it later on. Furthermore, the applications should not only allow doing so, but actually provide support for it.

Figure 7 depicts a high level approach for supporting discontinuous cognitive processes. More specifically, 7a shows a scenario where a user arrives in a context, where the

environment provides suitable grounds for distributing relevant material for carrying out some subprocess. The user is currently executing a process consisting of three subprocesses, denoted by the symbols “drop”, “parallelogram”, and “circle”, respectively. Real world counterpart for the entire process might be “book a flight ticket”, and the subprocesses “enter name”, “enter frequent flyer code”, and “enter email address”. The middle-one of these subprocesses, namely “parallelogram”, could be distributed to the surroundings. Frequent flyer numbers are such information that the users generally do not need to be aware of them all the time, but only in specific situations.

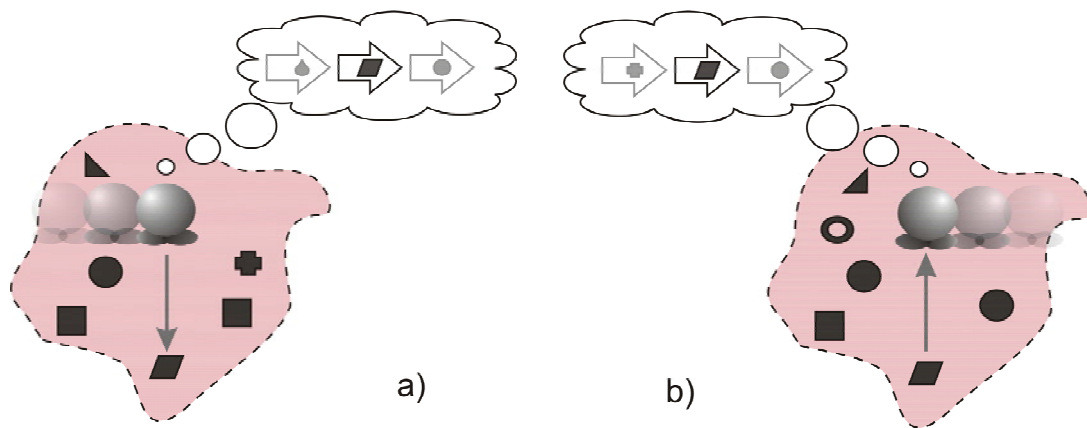


Figure 7a and b. Externalizing material assisting cognitive processes to surroundings (a) and internalizing it later on for assisting current processes (b).

Figure 7b depicts another case, taking place later on when the information. In this case the frequent flyer code (earlier distributed in Figure 7a) is retrieved for usage. The entire process of 7b differs a little bit from the case of 7a. It can for example denote a process of “pay for a flight ticket”, which executes when the user arrives in appropriate context, say one week before the flight is to take place. The subprocesses are “select a flight” (“cross”), “enter frequent flyer code” (“parallelogram”), and “enter email address” (“circle”), respectively. Some relevant information for purchasing the flight ticket, here the frequent flyer code, can be retrieved from the surroundings in appropriate time, and thereby the user does not have to be aware of it in other times. This assists the user in directing the cognitive capabilities for appropriate processes and discarding the contextually irrelevant/redundant information.

There are some business aspects that can be taken into account when designing an application supporting the abovementioned scenarios. For example, choose the application area and design the functionalities so that the short and discontinuous processes are supported. Leave out applications which demand continuous monitoring by the user. Instead of forcing the user to follow stock price development, allow her to

set a threshold and once the price passes the threshold, either notify her or even perform a transaction on behalf of her should she have given permission.

In addition to allowing users to externalize and store relevant information in their surroundings, provide explicit support for that. In the case of frequent flyer code (Figure 7), suggest using it in appropriate situations, such as when registering to a hotel or car rental affiliated with the airline/alliance in question. Besides better usability and user satisfaction, this opens up new business opportunities for companies. Say the consumer is in a busy downtown and selecting a hotel among many to choose from. Here, making him aware of the possibility of earning mileage points or receiving discounts might make a difference and create a competitive advantage for the particular hotel.

Around the context-aware notification mechanisms and distribution of information, various flexible and extensible value networks can be built. Some companies can provide the platform for distributing information, others the notification mechanisms, and yet others the user interfaces. Revenues between these players should be shared. Note that the users themselves can be part of these value networks also as content/service providers. Individuals and communities can host applications and provide service compositions, and share these with others either for free or in exchange to something. It is therefore important to allow the users of the system to personalize “to the extreme” the ways they wish to distribute their cognitive processes, and in this sense let them extend and modify the system as they please.

4.8 Design Principles for Mobile Social Media

This final section outlines some very general level design principles and best practices for social media, especially from the point of view of mobile scenarios and usages. The items on the list are aggregates of the interview findings. However, they are not based on any quantifications of the most frequent answers.

1. Design mobile social media applications so that they truly acknowledge mobility. First, the users have to distribute their attention span to multiple phenomena. Secondly, the users can be reached anytime/anywhere due to mobile Web’s always-on and push nature. In addition to consumer applications, these remarks have impact on the professional sector. Professions, where at least some individual tasks and subprocesses are short in nature, and/or employees are mobile, fit mobile social media.
2. It is extremely important for companies engaged in social media to respect the specific features of the community/communities they are operating with. The

companies should steer their services so that communities' demands are fulfilled. In this way, the customer relationship is deepened. In case of mobile social media, this requirement is even amplified. Mobility and changing contextual details characterize the communities in ways that – if taken seriously – can have a positive twist to the business.

3. Mobile social media is spanning specific business branches and industry sectors. Instead of focusing on traditional “yellow page” like categories in the search of breakthroughs, it is better to approach the phenomenon via the specific opportunities enabled by mobility on one hand, and social media on the other.
4. Instead of separating clearly between virtual and physical environments, consider them as complements of each other. People can choose to perform some task in the physical world, in virtual, or both. Good business models for mobile social media acknowledge this, and applications respecting it encourage people to act via the most appropriate channels.
5. Respect the intertvideness of leisure time and work. Design businesses so that they support people shifting roles from a worker to a consumer and back, and even being simultaneously engaged in both activities. This calls for technological innovations, such as mashups and widgets, but also flexible and modular business networks spanning industry sectors.
6. Design applications so that the trust building originates “from inside”, and privacy issues for all parties are by default ensured. In other words, instead of giving the impression of restricting and monitoring, companies should lay out clear rules and conventions in the beginning of interacting with individuals, and themselves act so that their reputation is maintained. This creates a virtuous circle of better cooperation between companies and individuals/communities.
7. Consider “servicizing” things with users' help. In addition to sharing content, the users can individually or as communities assist companies in performing various tasks. This can be amplified at least by doing one or both of the following: i) Support automatic content creation, enrichment, sharing, and consumption, because it requires less work from the users' side, but can still provide valuable information to the company; ii) Open interfaces for the users to personalize and extend the service provision interfaces and in that sense nurture their “inner nerds”.

Acknowledgements

Thanks to VTT's Industrial Innovation Management program, which enabled conducting this research in terms of the project SCaSOm⁴. Thanks also to all the interviewees (see Annex B for listing), as well as to the people who were not interviewed themselves but had good recommendations, namely Tomi Ahonen, Grit Denker, Jyri Engeström, Heikki Helin, Mari Isbom, Mårten Mickos, Yrjö Neuvo, Matti Penttilä, and Hansen Yip.

Mari Isbom from Tekes and Hansen Yip from Finpro are also to thank for their willingness to coordinate the mobile social media research in Finland. Together VTT, Tekes, and Finpro form a strong Finnish coalition for tackling the issue.

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⁴ SCaSOm = Sharing Content and Services in Open environments.

⁵ Resome = Revenue from social media.

Annex A: Questions Asked

Annex A presents the asked questions. Note that during the interviews the questions were for indicative purposes only and not followed to the letter. Depending on the interviewee's profile and interests, emphasis was put on different questions. In over 90% of the cases, however, all the main questions (denoted with numbers 1., 2., ...) were discussed at least to some detail. The subquestions, denoted by small letters (a., b., ...), as well as the subsubquestions (i., j., ...), were considered depending on the interviewee. If the interviewee had a lot to say without the need of going to subquestions, they were discarded.

1. Short description of the interviewee. (Possible to attach or provide a link to CV.)
2. Comments on megatrends on the Web now and/or in the future (not only wrt. Mobile; not only wrt. Web 2.0)?
 - a. Individuals vs. companies vs. communities as content creators? Legal etc. implications? Motivation of various entities?
 - b. Environment is open and creating content/services is basically free → impact on business models?
 - c. Will the entities form distinct categories (content creator vs. content provider vs. content consumer vs. content proxy) or rather a sliding scale / belonging in many categories?

Show the SCaSOm general picture:

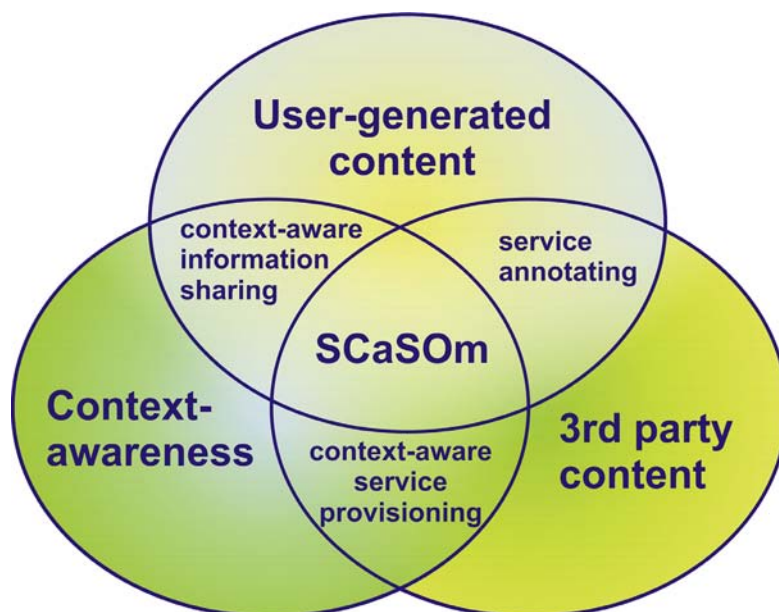


Figure A1. The research focus.

3. General comments on Web 2.0 / social media in mobile/wireless environments?
 - a. Web 2.0 in wireless vs. wireline? (PC vs. mobile devices; stationary vs. on-the-move situations of users?)
 - b. What new can Web 2.0 bring to mobile applications and devices and vice versa?
 - c. Multimodalities and multimedia (e.g., the impact of camera-equipped phones?)
4. Community aspects for mobile Web 2.0?
 - a. What new will mobility bring to communities? E.g., context-based communities (created in certain geographical location or proximity between individuals)
5. Content vs. service provision?
 - a. Cf. product (typically “long-lasting”) vs. service (typically temporary)
 - b. Could individuals provide services as easily as content and participate in 3rd party service processes?
 - c. Impact on business models
 - d. Impact on annotation (content is more enduring/unchangeable than service)
 - i. psychological, sociological, societal, and economical impact
6. Automatic vs. manual content consuming and provision
 - a. Accountability differences between intentional (manual) and automatic content provision
 - b. Usage of context in content consuming and provision
 - i. esp. in automatic consuming and provision (using various “sensors”; e.g. people as weather stations)
7. End-user applications vs. professional applications
 - a. How do requirements on security/trust/accountability vary
 - b. How does the degree of openness vary
 - c. Entertainment vs. utility and professional applications; which will come first; which will have more far-reaching implications on society and business?
8. Differences wrt. application domain
 - a. Travel, cars, maintenance, wholesale, TV, fitness, etc.
 - b. Which domain has the most potential?
9. Suggestions for other potential interviewees?

Annex B: List of the Interviewees

The following people were interviewed for the research:

- Jyrki Alkio, Helsingin Sanomat
- Iñaki Amate, Fjord
- Timo Argillander, Digital Media Finland
- Yale Braunstein, UC Berkeley
- Adam Cheyer, SRI International
- Marc Davis, Yahoo!
- Christian Del Rosso, Nokia Oyj
- Dan Gillmor, Center for Citizen Media
- Annakaisa Häyrynen, Elisa Oyj
- Esko Kilpi, Esko Kilpi Oy
- Risto Kinnunen, Nokia Oyj
- Ossi Kuittinen, TeliaSonera Oyj
- Seppo Laine, Finpro
- Giuseppe Lugano, TeliaSonera Oyj / University of Jyväskylä
- Ronan Maclaverty, GE Healthcare
- Tony Mak, UC Berkeley / Haas School of Business
- David Martin, SRI International
- Roope Mokka, Demos Helsinki
- Riku Mäkelä, Tekes
- Antti Oulasvirta, HIIT
- Timo Pakkala, Nokia
- Alex Pang, Institute for the Future
- Pekka Pekkala, Helsingin Sanomat
- Mika Raento, Jaiku
- Timo Rapakko, Rapakko Associates Inc.
- Petteri Repo, National Consumer Research Centre
- Virpi Roto, Nokia Oyj
- Tero Sarkkinen, Futuremark
- Peter Vesterbacka, Some Bazaar

Author(s) Toivonen, Santtu		
Title Web on the Move Landscapes of Mobile Social Media		
Abstract Social media is at its finest in the middle of the first decade of the third millennium. In particular, a steadily increasing amount of social media content is created with mobile devices such as digital cameras and camcorders. More and more content captured with these mobile devices is being uploaded on the Web, and the uploaded content receives ever more people downloading it in return, as well as tagging it, recommending it to friends, refining it for own purposes, and so on. Killer applications such as MySpace, and especially the likes of YouTube and Flickr, enjoy and benefit from content created by mobile devices. It is crucial to note, however, that for the vast majority, the advantages of mobility have only been utilized in the content creation part, rather than the content consumption part. Mobile content consumption has until now been neglected in social media application design and provisioning. This report aims at providing a glance on how mobility, and along with it the important notion of context-awareness, has impact on social media. Moreover, the report seeks to analyze the potential business opportunities for mobile social media. The research was conducted in the form of expert interviews.		
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Series title and ISSN VTT Tiedotteita – Research Notes 1235-0605 (soft back edition) 1455-0865 (URL: http://www.vtt.fi/publications/index.jsp)		Project number 10946
Date August 2007	Language English	Pages 56 p. + app. 3 p.
Name of project SCaSOm		Commissioned by
Keywords mobility, context-awareness, Web 2.0, social media, business models		Publisher VTT Technical Research Centre of Finland P.O. Box 1000, FI-02044 VTT, Finland Phone internat. +358 20 722 4404 Fax +358 20 722 4374

In addition to textual content, many popular social media services enjoy rich multimedia, which is often originally captured with mobile devices such as camera phones. The relationship between mobility and social media is typically just this: The mobile device is used only as an input device. In contrast, utilizing the social media content later on is mainly performed with a PC. Browsing pictures and downloading movie clips is more convenient with large displays and better bandwidth than in restricted mobile environments.

There are some possibilities also for mobile usage of social media, and the report aims at investigating that. The most important point of view is business models and opportunities, but also some technological, usability, and trust/privacy issues are included. This is justified, since often these concepts are intertwined. Technological choices have impact on the possible business models and value networks, good usability of a service sometimes results in poor privacy, and so on.

The report is solely based on expert interviews. Twenty nine experts, the names of which are listed in Annex B, gave their opinions in various areas related to mobile social media. The discussions covered for example community aspects, automatic content creation, content vs. service provision, and professional vs. leisure applications.

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