THE EMERGING VALUE OF SOCIAL COMPUTING IN BUSINESS MODEL INNOVATION

ABSTRACT

The value of social computing and its application in business has not received much attention in literature. However, this chapter reveals that social computing principles may have important business value, as they can help lower transaction costs. This makes the social computing development here to stay, instead of another hype. This chapter describes social computing with nine technological and social principles, obtained by comparing both Internet and academic sources in this field. Relating them to a business model reveals that social computing provides most support in those aspects of business where connections with the environment exist; the relations with partners and customers. This chapter will explain what social computing is, and how one can use it to increase business value.

Keywords: standardization, transaction costs economics, Web 2.0, social computing, business model innovation

INTRODUCTION: SOCIAL COMPUTING AND BUSINESS MODELS

A certain euphoria exists on seemingly unbounded possibilities coming with what has been labeled Web 2.0 or social computing[1]. From 2005 onwards, developments in social computing do sometimes reflect the Internet hype at the beginning of this century. The impact of social computing is not restricted to technology adepts, but also affects the business world. More than half of the North American and European corporations consider social computing to be a priority in 2008 (Forrester, 2008). Those investing in Internet technologies in the last five years are very satisfied with the results (McKinsey, 2007). Many corporation are rethinking their business models and intend to make fundamental changes in their businesses. "*Business model innovation matters. Competitive pressures have pushed business model innovation much higher than expected on CEOs' priority lists*" (IBM, 2006). The same research shows that outperformers in industry gave higher priority on business model innovation than underperformers did.

Are these developments just another hype? Or are we witnessing fundamental changes in the business landscape? Unfortunately, studies on the value of social computing are lacking. However, history provides interesting insights on technological developments, that might be applied to social computing. Using these insights we are able to assess the significance of the social computing developments.

This chapter will perform an explorative and qualitative search on social computing, since the field of social computing is new, and not much scientific literature is available yet. We will describe how social computing can be of value in business. The subsequent sections each describe a different topic related to this subject. Section 2 studies technological revolutions in recent history and describes the role of standards to provide analogies for the technologies under discussion in social computing. Section 3 defines social computing. Section 4 elaborates on business models and their role in organizations. Section 5 describes how social computing can be used in business by relating it to business models. Section 6 presents conclusions and discussion.

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[1] We use the term *social computing* in this paper, since it covers both the technological and social aspects of the developments under discussion. Web 2.0 is popular, but rather biased, and strictly speaking not accurate; the developments we are talking about occur on Internet as a whole, and are thus broader than just the Web.

STANDARDS AND TRANSACTION COSTS ECONOMICS

Standards play a key role in technological revolutions. History shows some illustrative examples explaining the role of standards in technological revolutions. For example, in 1788 the French gunsmith Honoré Blanc pioneered the development of muskets from standard or interchangeable parts. He disassembled several muskets, put the components in separate bins and then reassembled the muskets from picking parts at random from each bin. Around 1800, Henry Maudslay developed a standard for screw thread, which resulted in the large scale production of interchangeable bolts and nuts. It was a major advance in workshop technology, and it boosted modularity and productivity as it made possible the design and production of components constituting larger wholes. Another example of the role of standards is the so-called war of the currents. In the late 1880s, this war was triggered by the invention and standardization of electric current. The feud between alternating current (AC), promoted by George Westinghouse, and direct current (DC), promoted by Thomas Edison involved demonstrations including the electrocution of an elephant and the invention of the electric chair. It was only after the victory of the AC standard that mass usage of electricity, and its commoditizing, ran off. What we can learn from these cases is that standards in an industry support interchangeability, and interchangeability decreases complexity (Christensen & Raynor, 2003).

The aforementioned revolutions can be transposed to the Internet as well. The success of the World Wide Web arguably depends mainly on open standards and interchangeability (Berners-Lee, 2007). Therefore, "*the Internet creates value by reducing the costs of transmitting information. (…) [It] is a terrific advance in lowering the cost of information*" (Liebowitz, 2002, p. 9). This can be achieved, because standards lead to increased interchangeability between products and services, much like the historical cases described above. In terms of information technology, standards lead to higher compatibility.

Standards lower transaction costs. Transaction costs are the costs of making an economic exchange. Transaction costs are defined by Coase (1937) as "*the costs of the price mechanism*". In a similar vein, Williamson (1985) describes transaction costs as *the economic equivalent of friction in physical systems*". The standards that created the Internet and the Web, like TCP/IP and HTTP, lowered communication and search costs (Malone 2004), both being embodiments of transaction costs. How does this translate to social computing?

When the World Wide Web increasingly became more common during the '90s, its primary use by companies was to represent themselves online, and by consumers to find information about these companies, or other consumers. It is important to understand that instead of using the new technology for new purposes, it was used for existing purposes. The Web in its infant days was used as a replacement for existing pressed media. This is a commonly observed behavior with respect to new technologies (McLuhan, 1964). Another example can be found in the development of the automobile. The first cars looked just like stage coaches; wheels with spokes, its appearance, and so on. But instead of using horses they were equipped with engines. Some two decades later the basic shape of the modern car was invented. That is, it was only then that the new possibilities of this technology became apparent.

The same holds for the Internet; a new technology (the Web) was used for old concepts (brochures, newspapers, catalogs, business cards, etc.). In the second era (which started approximately in 2001), the Internet is used in a different way, more adjusted to the possibilities of the Internet (Tapscott & Williams, 2007). The possibilities that have been

created during this time span significantly reduce transaction costs. Time to take a closer look to what social computing actually is.

DEFINING SOCIAL COMPUTING

Social computing has become a marketing buzzword. The suffix '2.0', as in Web 2.0, has become iconic. Many different definitions exist. This is due to the newness of the subject of social computing. For the purpose of clarifying the concept, various opinions, writings, studies, and researches will be presented to find some common ground to define social computing. It is interesting to focus on what can be learned from current developments. Therefore, we will reach out to principles underlying social computing, at a higher level of abstraction then just bare examples or cases. A principle is an initial concept, a fundamental idea, a basic rule. The principles should be applicable in other situations.

Nine social computing principles

In order to define social computing, we draw upon literature as well as Internet sources. The latter presents a unorthodox but valuable alternative, since it is the platform presenting the newest opinions and discussions in this field. All the sources that we used, do attempt to define social computing in a way. O'Reilly is looking for principles (O'Reilly, 2005), Hinchcliffe goes for key aspects (Hinchcliffe, 2005), Hoegg et al. use fundamentals (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006), McAfee finds ground rules (McAfee, 2006a), and Vossen and Hagemann stick to essences (Vossen & Hagemann, 2007). All the definitions or descriptions that we used consist of one or more elements. For comparison reasons, these elements are put together in Table 1. The column header contains the author's name. Each cell in that column describes elements of the author's definition or description. The first column presents the defined principles based on the definitions from the other columns at that row level. The cells in the first column therefore contain elements of defining social computing of the researched sources. The remainder of this section will elaborate on these principles as mentioned in the first column of Table 1.

social computing principles	O'Reilly (2005) principles	Hinchcliffe (2005) key aspects	Hoegg et al. (2006) fundamentals	McAfee (2006a) ground rules	Vossen and Hagemann (2007) essences
User generated content	Data is the core	Data consumption and remixing from all sources, particularly user generated data	Information enrichment		Ways to utilize and combine data and data streams
Network effects	Network effects as more people participate	Architecture of participation that encourages user contribution	Mutually maximize collective intelligence	Network effects	A socialization of the Web, where a user makes personal entries available to the general public, and where this often leads to an improvement of the underlying platform
Collective intelligence	Harnessing collective intelligence		Creating and sharing of information	Support emerging of knowledge	
Unbounded collaboration	Cooperate with users as co-developers				
Leverage the long tail	Leverage the long tail				
Intuitive usability	Lightweight and rich user interfaces	Rich and interactive user interfaces		Easy to use offerings	Functionality- as well as service-oriented approaches to build new applications as a composition of other, and in order to enrich user experiences
Enabling services	Cost-effective scalable services instead of software	Continuous and seamless update of software and data, often very rapidly	Dynamic services	Technologies that let users build structure over time can coexist peacefully with those that define it up front	
Lightweight models	Perpetual beta				
	Lightweight programming models and business models				
Open platform	Software above the level of a single device	The Web and all its connected devices as one global platform of reusable services and data	Formalized interaction	Online platform with a constantly changing structure build by distributed, autonomous and largely self-interested peers	
	Web as platform				

Table 1 - Comparison of social computing definition elements.

Open Platform

O'Reilly (O'Reilly, 2005) might be the most cited source on the Internet when talking about Web 2.0. O'Reilly shortly defines Web 2.0 as "*the business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform*" (O'Reilly, 2006). The key element in this definition is the Internet as a platform, which means that the Internet is the computer and the operating system on which services are offered, instead of a desktop computer running software. Although the Internet is already often used to ship new software versions to customers, the idea of the Internet as a platform goes one step further. It means that the browser is your only local tool, which gives you access to everything else you want to do, since everything you do happens on the Internet (O'Reilly, 2005).

McAfee notes that "*most current platforms, such as knowledge management systems, information portals, intranets and workflow applications, are highly structured from the start, and users have little opportunity to influence this structure*" (McAfee, 2006a). It is not that the Internet should be the platform per se, but that most current platforms, like desktops, are too structured, preconceived, or imposed. The platform should be open, blank, in a way unstructured but able to emerge: "*Instead, they* [should be] *building tools that let these aspects of knowledge work emerge*" (McAfee, 2006a). This idea corresponds with that of Berners-Lee, which we saw in the chapter on standardization: "*The lesson from the proliferation of new applications and services on top of the Web infrastructure is that innovation will happen provided it has a platform of open technical standards, a flexible, scalable architecture, and access to these standards on royalty-free ($0 fee patent licenses) terms*" (Berners-Lee, 2007, p. 4). Tapscott & Williams (2007) mention 'being open' or 'transparency' as a new idea in the current Internet era. Being open also increases trust. Next, a global platform for collaboration will open many new possibilities in many fields.

On the other hand, McAfee does not promote one platform like the Internet, but suggests building and adding upon existing platforms. He gives as a ground rule to create an "… o*nline platform with a constantly changing structure build by distributed, autonomous and largely self-interested peers*" (McAfee, 2006a, p. 26). McAfee describes how these platforms should be used in a business environment: "*Simple, Free Platforms for Self-Expression; Emergent Structures, Rather than Imposed Ones; Order from Chaos*. (…) *They're meant instead to illustrate how technologists have done a brilliant job at three tasks: building platforms to let lots of users express themselves, letting the structure of these platforms emerge over time instead of imposing it up front, and helping users deal with the resulting flood of content*" (McAfee, 2006a; McAfee, 2006b).

Hinchcliffe (2006) says about the platform: "*The Web and all its connected devices as one global platform of reusable services and data*". He, in a way, extends on what McAfee said, by noting that the platform is not just the Web, but all connected devices. That is why this element is called *Open* Platform, leaving it open which system this platform contains. O'Reilly too (2005), mentions different devices as an element of Web 2.0, but in relation to software. An example of the synergy between different devices is the combination of iTunes, which makes use of the Internet as music database, iTunes as local software client to play and buy music, and the possibility to copy music to an iPod to listen to the music.

This does not mean that existing platforms, like local desktop PC's, or corporate information systems, should immediately be replaced by the Internet. Why let go the advantages of a well built history and switch solely to the Internet? That is not what is suggested. Instead, try to use

the good of the two worlds and integrate openness onto your existing platform. Compatibility is a keyword in such an approach, and everyone should be able to add, edit and build upon this platform. Authoring doesn't have to be as big a problem as will be discussed in the subsection about user generated content.

Why an open platform lowers transaction costs is not difficult to understand. The existence of an open, accessible, and even maybe free, platform invites people to build information systems upon, to switch services, or to personalize them. Users do not have to worry about local hardware as much as they used to do, and they save costs.
The open platform is the fundament on which many of the next principles are building, as we will see in the next subsections, which is why this principle is handled first.

Lightweight Models

O'Reilly calls lightweight programming models and business models one of the defining characteristics of Web 2.0. This means that the programming and business models should allow for loosely coupled systems. Also, syndication is more important than coordination of information. Finally, one should design for hackability and remixability (O'Reilly, 2005). These three strategies assure flexible businesses that can easily anticipate on a changing environment. Since the environment in which we do business today is changing faster and faster, these strategies help making an organization, or web service, lean and agile. In the development of a product one should already take into account the possibilities for re-use by third parties, or possibilities to easily extend on that product.

Agility also has to do with not creating structures and limits to a service up front. McAfee mentions that "*Technologies that let users build structure over time can coexist peacefully with those that define it up front*" (McAfee, 2006a). He suggests letting structures emerge over time, by the use of a tool or service. This is something a development model should take into account and it extends the openness of the platform. Again, compatibility is an important issue. Tapscott & Williams call for removing insulation to open the way for 'acting globally' (Tapscott & Williams, 2007, p. 30).

Aiming for lightweight models also lowers transaction costs. Changing an organization costs a lot in terms of energy and investments. But developing a business in an agile and lean way from the start, makes changing the organization less costly.

Enabling Services

Another defining property of social computing is formed by online services. Examples are Gmail, an email service, salesforce.com or SugarCRM, both CRM services, or osCommerce, a web shop service. These are online offered services, with or without paid membership, sometimes open source, otherwise offered by a commercial company. These services compete with software packages like Outlook for mail and SAP or Oracle for CRM.

Many advantages of online services exist when compared to local software. First, there is the advantage of the maintenance of the package, which is carried out by the service provider, instead of by the user. Next, updates can be implemented without having users to wait and buy updates, which saves costs. Updating is far easier on an open platform with lightweight development and business models since every user uses the online version. Furthermore, since the services run on the provider's server, the service provider has the possibility to update whenever it sees fit, immediately assuring every user uses this updated version. Next, a logistic advantage can be distinguished, i.e., products delivered as a service through the Internet don't

need shipping and will therefore be delivered faster and cheaper. Next, data storage is managed online. In relation to this, the content related to services, for example, a document from Google Documents, is easier to share through the Internet, since the results already are stored online. This holds for backups too.

These services should not only be flexible, but enabling as well. This means, it should be easy to connect services in order to create composites or mash-ups. Vossen & Hagemann mention "*functionality- as well as service-oriented approaches to build new applications as a composition of other, and in order to enrich user experiences*" as a core aspect of social computing (Vossen & Hagemann, 2007, p. 67). Also Hoegg et al. assure that "*Web 2.0 services are highly dynamic, which is why this context has to be understood as an interactive development process*" (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006, p. 13).

Enabling services must be scalable, preferably cost effective (O'Reilly, 2005). Since every software or service is a tool to manage content, or data, may it be documents, music, movies, financial administration, or whatever, the service must be scalable depending on the amount of data it handles, often related to the amount of users.

Enabling services too lower transaction costs; one does not need local resources as much as with local software. Interchangeability enables the re-use of pieces of services. There is less need for distribution, so efficiency increases. Storing the results of online services make those results better distributable to or accessible for others.

Intuitive Usability

Many of the researched resources mention usability or functionality as a defining property of social computing. According to O'Reilly, user experiences should be rich (O'Reilly, 2005). To Hinchcliffe, user interfaces should be rich and interactive (Hinchcliffe, 2005). To McAfee, offerings should be easy to use (McAfee, 2006a). And to Vossen & Hageman functionality should enrich user experiences (Vossen & Hagemann, 2007). Usability is about the ease of use of a user interface, usability guru Nielsen explains. This breaks down to five elements; learnability, how easy is it to accomplish tasks; efficiency, how quickly can tasks be performed when learned; memorability, ease of reestablished proficiency; errors, how severe and recoverable when made; and satisfaction, how pleasant to use the design (Nielsen, 1993).

Intuitive in the current context means that the user should not have any concern about how to use a service. The *walk up 'n' use* idea in usability jargon explains the idea. It goes one step further then the ease of learning aspect of usability. The intuitivity should ensure both experienced and non-experienced users are able to use a service. This needs a design for experienced users, who want to find enough features or personalization options in the service, to remain being of interest. On the other hand, it needs a design for non-experienced users, who want to be able to immediately know how to use the service without being discouraged by the amount of features.

McAfee suggest replacing the WIMP components (windows, icons, menus and pointers), often used for interface design up to date, with SLATES (search, links, authoring, tags, extensions and signals) (McAfee, 2006a):

- Search; let users search themselves instead of preconceived notions brought up through page layout and navigation structures by editors or professional staff.
- Links; let (intra)nets be built by large groups so a dense link network can evolve containing information on relevance and interest.

- Authoring; many people can add value to a service, authoring should support the elicitation of these contributions. Wikipedia proofs that these contribution emerge to convergent, high quality content (Giles, 2005).
- Tags; a categorization system that emerges over time due to users' actions. This is called a folksonomy, versus a taxonomy which imposes a categorization up front.
- Extensions; recommendation systems or algorithms that reason by extension to offer users things they might be interested in.
- Signals; when new content of interest appears, users are notified, compare syndication or RSS feeds.

The purpose of intuitive usability is clear; make the use of a service as easy as possible, and don't concern the user with difficulties the service can do smartly by itself. Programming languages have been developed to realize this purpose. Macromedia coined the term Rich Internet Applications (RIA) to focus more on the GUI style applications that could be build with Flash. But when Google introduced AJAX technologies to create their services like Gmail, the web-based applications really got the look and feel of PC-based applications without losing their web advantages (O'Reilly, 2005). Ruby on Rails is another contemporary programming language that is often used.
In their Web 2.0 discussion, Hinchcliffe and others call these technologies and languages, a lightweight version of SOA (Service Oriented Applications), or WOA (Web based Oriented Applications). It needs to be emphasized that the specific mentioned languages are not social computing in itself, but programming languages in their broadest form do enable intuitive design and therefore usability. Mentioned languages are examples of enabling technologies.

That intuitive usability lowers transaction costs is easily demonstrated. Ease of use increases efficiency, lowers search costs, and lowers the costs of learning a tool or service.
The four principles mentioned so far are the basis for the remaining principles. They are more technological, and closely related to each other. These principles trigger lower transaction costs. The following principles tend to be more social. Those principles are a result of lower transaction costs.

Long Tail Focus

Although the long tail is only mentioned by just one source as a core element in social computing, it is nevertheless included in the model. This has been done, because also other sources mention the long tail, though not in their definition (Hinchcliffe, 2005; Vossen & Hagemann, 2007).
The long tail is an old concept, but that has been popularized by Anderson in his book *The Long Tail* (Anderson, 2007). Take a power law distribution, or a Pareto distribution, as in Figure 1. The horizontal axis depicts for instance an amount of clients, the vertical axis depicts for instance an amount of profit. The curve depicts the profit gained from those clients. As we see in the figure, there is a small amount of clients who each generate a large amount of profit, called the short neck (20% of the total). Furthermore, many clients exist, each of which generates a small amount of profit, called the long tail. The natural inclination is to target the 20% of the clients who generate high profits. However, the long tail on the Internet is also very profitable, since the stocking and distribution costs are near zero.

The idea of the long tail is applicable in many fields. For instance, auction sites and market places on the Internet. Or online book stores like Amazon as described by Brynjolfsson et al. (Brynjolfsson, Hu, & Simester, 2007), where they describe how a large proportion of the sales of Amazon comes from niche products often not available in normal book stores. In another

article they describe how lower search costs can increase the distribution of sales (Brynjolfsson, Hu, & Smith, 2003). This shows how the decrease of transaction costs makes it possible to leverage the Long Tail.

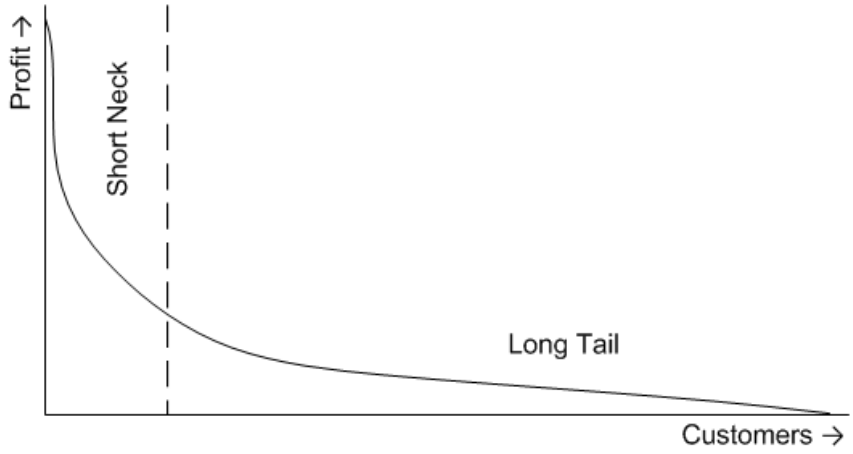

Figure 1 - A power law distribution.

Unbounded Collaboration

O'Reilly (2005) mentions that respecting users as co-developers is one of the core competencies of Web 2.0 companies. Hoegg et al. (2006) mention the need for creating and sharing information. Vossen & Hageman make similar statements, but generalize by saying that personal contributions are made available to the general public (Vossen & Hagemann, 2007, p. 67). The idea of these authors is clear: users add value. Or as McAfee puts it, "… *most people have something to contribute, whether it's knowledge, insight, experience, a comment, a fact, an edit, a link, and so on, and authorship is a way to elicit these contributions*" (McAfee, 2006a).

With collaboration that is unbounded, we mean that collaboration is less and less dependent of place and time. When the Internet is used as a platform, offering intuitively usable enabling services, collaboration around the globe becomes much more easy. This new form of organization is called *peering* and refers to a more horizontal organization (Tapscott & Williams, 2007, p. 23).

Users often meet in communities, dealing with a certain subject, task, or interest. When collaboration is a goal enabled by the Internet, then communities could be seen as the socialization of the Internet, or, broader, the socialization of computing. User contributions, in their broadest form, are often valuable to other users or to organizations. Those contributions lead to content enrichment and the improvement of the services dealing with this content. This enrichment and improvement will emerge over time. This is the relation between the last four subsections.

Just as leveraging the long tail is becoming attractive because of lower transaction costs, also unbounded collaboration is made possible due to lower transaction costs of working together. The open platform provides a perfect basis for collaboration, using the services, usability, and resources of this platform.

Collective Intelligence

According to Hoegg et al. (2006) Web 2.0 is "*the philosophy of mutually maximizing collective intelligence and added value for each participant by formalized and dynamic information sharing and creation*". Collective Intelligence is also a core competence distinguished by O'Reilly (2005). The term refers to the process of eliciting intelligence from a lot of individuals. Collective Intelligence is the knowledge of the mass, the knowledge and competences of the total of a collection of users, on the Internet or in a community. This is also called 'the wisdom of crowds'. As Surowiecki (2004) explains: "*Large groups of people are smarter than an elite few, no matter how brilliant the elite few may be. The wisdom of crowds is better at solving problems, fostering innovation, coming to wise decisions, and even predicting the future*" (Surowiecki, 2004). This has been researched in the case of Wikipedia, the online encyclopedia created by Internet users. The results show that Wikipedia is almost as accurate in scientific articles as the Encyclopedia Britannica (Giles, 2005). But users do need to share their intelligence, whatever it may be, to be able to make use of it. Therefore Tapscott & Williams 2007, p.26) calls *sharing* as a new idea in the Internet era.

Attention should be given to the 'one percent rule'. This rule states that in a community, just one percent of the visitors will contribute to the community, only ten percent will react in some way, but the majority of 90% just lurks, which means, read, consumes, uses, but does not add anything of value to the community. This is a common habit in newsgroups, for example, but also on social network sites like Facebook or Flickr.

The driving force behind collective intelligence is, again, the reduction of transaction costs. By opening up the platform, transaction costs are lowered resulting in lower thresholds to participation and sharing of knowledge. The result is a common pool of knowledge.

Network Effects

Instead of unbounded collaboration, or collective intelligence, which imply purposeful interaction, users also can be unaware of their contributions, when just using a service. An example of this phenomenon is the Amazon suggestions: "*If you like this book, you'll probably also like this one."* Amazon can do these suggestions based on browsing and buying information of other users. This is called a network effect. Metcalfe (1980) introduced the term based on the use of the Ethernet card. He relates the value of an Ethernet network to the number of cards in that network. The value of one card increases exponentially when more users with a card join the network. Another example is that of a telephone: the more people obtain a telephone, the more people can be connected, the more valuable the telephone becomes. The same holds for services on the Internet. Network effects are also known as network externalities (Katz & Shapiro, 1985).

Hincliffe (2006) calls network effects "*the real secret sauce of Web 2.0*". Examples are many, like Wikipedia, Del.ici.ous, Digg or Flickr. To initiate network effects, a certain number of users, contributors, editors, and so on is needed. This number is called the critical mass. Graphically the critical mass can be depicted as the turning point after which the curve rises or falls steeply (Gladwell, 2000).

The one percent rule is a major obstacle for generating network effects. To overcome this problem, network effects should happen automatically. "*Only a small percentage of users will go through the trouble of adding value to your application. Therefore: Set inclusive defaults for aggregating user data as a side-effect of their use of the application*" (O'Reilly, 2005). In this way, users contribute to building applications getting better the more it's been used. One of the first success stories relying on this phenomenon was Napster, since Napster was configured

to share downloaded music by default, which automatically increased the size of the music database.

McAfee (2006a) calls this phenomenon 'extensions', meaning "… *automating some of the work of categorization and pattern matching*". Vossen & Hagemann mention that the socialization of the web often leads to improvement of the underlying platform (Vossen & Hagemann, 2007, p. 67).

Because of the network effects and the resulting increasing returns, some argued that being first to a market will result in first-mover-wins, or winner-take-all principles. Accordingly, lock-in should guarantee corporations to make sustainable profits. But, as Liebowitz explains, the opposite is true on the Internet. Because of lower transaction costs, it will be easier for users to switch from providers, so lock-in will not hold (Liebowitz, 2002, pp. 20ff.). Section 2 already showed how lower transaction costs help to lower switching barriers.

This does not mean the network effects will vanish in the Internet era, they will not. But long term lock-in is not easier on the Internet than it is in the off-line world. Social computing doesn't change that, or undermines it. A study from McAfee and Brynjolfsson (2008) reveals that winners might win big and fast, but not necessarily very long. Remember how quickly Yahoo! replaced AltaVista, only to be replaced not many years later by Google as the main search engine. McAfee and Brynjolfsson conclude, therefore, that competition gets nastier.

User Generated Content

Data is key to social computing. O'Reilly (2005) remarks that in the end it's all about data. Hinchcliffe (2006) calls data consumption and remixing a key aspect of Web 2.0. Also McAfee and Vossen & Hagemann mention the central role of data or information and its enrichment and utilization. In sketching the trends of the Web for the future, Berners-Lee sees that "… *the Web will become one big database*" (Berners-Lee, 2007, p. 5).

This data can be news, information on books, events, weather, market places, stock and market prices, and so on. Many websites rely on only a few data sources. Advantages are sought for by reusing and smartly enriching data, or offering tools to do so. Graham puts it this way: "*Experts have given Wikipedia middling reviews, but they miss the critical point: it's good enough. And it's free, which means people actually read it. On the web, articles you have to pay for might as well not exist. Even if you were willing to pay to read them yourself, you can't link to them. They're not part of the conversation*" (Graham, 2005).

The property of being good enough resembles what is called satisficing behavior (Simon 1976), which is a key characteristic of human decision making. The alternative that satisfies certain criteria will be chosen. This will not necessarily be the best solution. By enriching data through online collaboration, users generate content that is more valuable. By tagging the data, content becomes easier to find. In this way user generated content supports satisficing behavior; the good enough alternative is easier determined, which means that transaction costs are lowered.

The nine social computing principles

We have distinguished nine social computing principles. The first four principles are technological and lower transaction costs, since searching, editing, and reaching of content and services becomes more easy, more accessible, increasingly efficient, or cheaper. The last five principles are social and emerge due to lower transaction costs. Therefore we refer to social computing as a development where technologies enable empowerment of individuals, or

groups of individuals, to express themselves in a more natural way, leading to easier creation, enriching, sharing, and finding of content. The principles are depicted in Figure 2 (cf. Knol, Spruit, & Scheper, 2008).

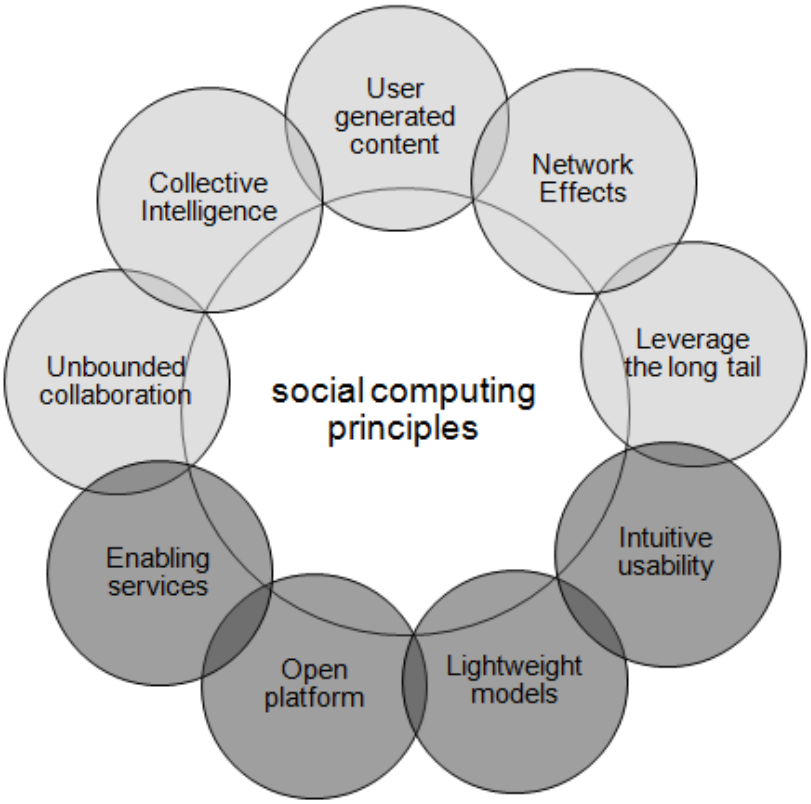

Figure 2 – The nine principles of social computing, of which the bottom darker four are technology oriented and the upper lighter five are socially oriented (Knol, Spruit, & Scheper, 2008).

After having discussed the key principles of social computing, we will now address the question in what way social computing might affect companies.

BUSINESS MODELS

The increasing impact of social computing on business "*should (…) not be neglected from an academic perspective. New business models arise and existing business models are highly affected by Web 2.0 communities*" (Hoegg et al., 2006). To understand how social computing impacts business, the concept of a business model is helpful.

According to Chesbrough and Rosenbloom (2002, p.7), the origin of the concept of a business model can be traced back to Andrews' classic definition of the business strategy: "*the determination of how a company will compete in a given business and position itself among its competitors*" (Andrews, 1971, p. 12). Chesbrough, stresses that the business strategy differs from the business model. Firstly, a business model focuses on value creation, while a business strategy focuses on how value will be captured. Secondly, a business model emphasizes the creation of value for the organization, while a business strategy centers around the creation of value for an organization's shareholders. Finally, the information needed to craft a business model differs from the information needed to design a valid business strategy, especially with regard to environmental information (Chesbrough & Rosenbloom, 2002, p. 535).

In the context of corporate innovation, Chesbrough (2003) defines a business model as a method to convert a new technology into economic value (Chesbrough, 2003, p. 63). In this regard, Chesbrough stresses the need for a business model by explaining that the commercializing of an innovation does not exists in the product or service using the new technology, but in the business model which underlies that product or service.

In their study on the origins and applications of business models, Osterwalder et al. define a business model as: "*... a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm*" (Osterwalder, Pigneur, & Tucci, 2005). Their generic business model is depicted in Figure 3.

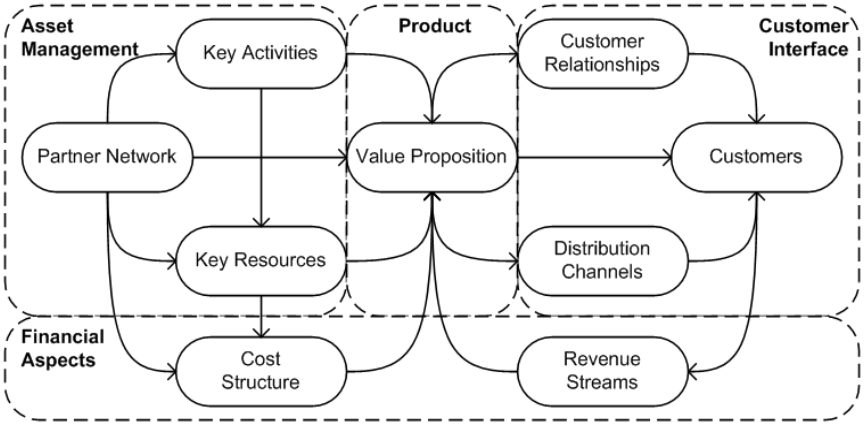

Figure 3 – The business model and its building blocks (Osterwalder et al 2005).

Business Model Building Blocks

Central to Osterwalder's business model is the value proposition. It is the offer that is proposed to the customers. The value of proposition is determined by a.o. the urgency of the customer's need and the perceived benefits. Satisfying customer's need yield a revenue stream.

In order to realize revenues from customers, the customers have to be reached, which means that communication has to take place. This can be through advertising, websites, phone inquiries, etc. Subsequently, the value proposition has to be distributed to the customer, either over the Internet or via more traditional channels like retail shops or mail. The final building block of the customer interface is the customer relationship. Customer relationships specify the type of relation that are maintained with each customer segment. Different customers expect different relationships.

On the asset management side of the business model, the key resources are the resources that are crucial for producing the value proposition. Examples are specialized skills, knowledge, capital, machinery or IT infrastructure. Key resources affect the firm's competitive advantage (Wernerfelt, 1984).

Having the right resources is one thing, but how to apply them to create a value proposition is another one. For this reason key activities are included in the model. The partner network building block stresses the importance of the firm's supply side eco-system. By defining what the partners and suppliers will be, the firm also determines which activities it will do itself, and which activities will be in- or out-sourced to obtain the required resources for the value proposition. As running a business means that costs will be made, the cost structure is added as a final component to the business model.

RELATING SOCIAL COMPUTING TO BUSINESS MODELS

We can now turn the our attention to the question how social computing supports the different business model building blocks. Although the application of social computing in an organization often is referred to as Enterprise 2.0, the school of Enterprise 2.0 limits itself to the intranet of the company (McAfee 2006a). This chapter takes a broader perspective and examines both the internal and external environment of an organization, including both intranet and the Internet.

Knol, Spruit and Scheper (2008) asked experts to mark relations between social computing principles and business model building blocks. Next, they analyzed these relations, clustered them in three groups and labeled those groups open collaboration, lean configuration, and user value. Open collaboration contains the social computing principles covering openness, accessibility, remixability, and interchangeability. Lean configuration contains social computing principles relating to flexibility and scalability. Finally, user value contains social computing principles focusing on the users and how and what they contribute.
Open collaboration highly supports both customer relationships and partner network. Lean configuration supports customer segments, communication and distribution channels, as well as the key activities. User value concerns primarily value proposition, customer relationships, and partner network, considering the user might also be a partner. The three clusters reveal where the social computing principles most support the business model (see Figure 4). It is in these building blocks that the most possibilities exist for business model innovation supported by social computing principles.

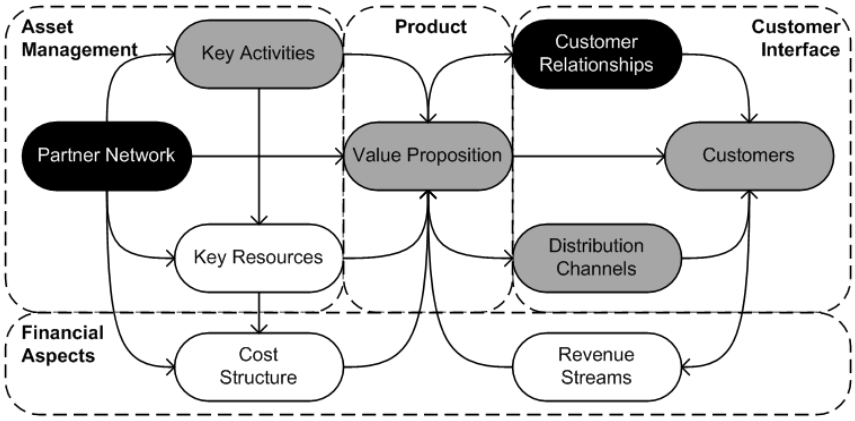

Figure 4 - social computing support for an organization mapped on a business model.

Application

Following Osterwalder et al. (2005) we will use the music industry as a case to show how social computing principles can be applied in business. Nowadays, it is not uncommon that the value proposition in the music industry is created by the customer. When thinking of user generated content, it is the user himself who is enabled to create and share music. The user is can express herself online and share those expressions on open accessible platforms like MySpace, YouTube, and AmieStreet. The intuitive usability of these services makes them highly accessible and easy to use. More value propositions will be invented, because of the ease of combining them, resulting in music mash-ups based on sampling.

Contrary to the traditional broadcast model, the contemporary music lover determines what she wants to hear at what time. As many sources are available on the Internet and access is easy, there are virtually no limits to the songs the user wants to hear. This means that customers are to be found in the long tail as well as in the short neck. The musician can link to his work, his

value proposition, share it, give it away, or propose altogether different offers. Radiohead e.g. put their newest album online for free and just asks for a tip. This also means that the communication and distribution channels change from pushed distribution, to pulled discovery channels. Searching and finding is important. The availability of accessible work makes an artist better known, yielding more demand, so network effects appear. Distribution costs almost nothing.

Furthermore, the relationship between a musician and a customer becomes more individual. Customers become ambassadors of their favorite artist. Relationships occur in social networks. Because user generated content supports customer relationships, customers are involved in the music creation. The collective intelligence of customers is input for the artist. These sources can be approached since it becomes easy to contribute. Intuitive usability is the basis for reaching those inputs. The revenue streams per song go down fast. Profit are found in other aspects, adjacent stages of the song, like live concerts and merchandising. Music itself increasingly tends to be free, the transaction costs for it are too low to charge for it: Music becomes a commodity, because of an infinite supply and an infinite demand, and since barriers in transaction are taken away.

The artist will use key resources to create his music. Not only his talent, but also his ability to use someone else's input becomes important. Other musicians as well as customers become important resources. An artist doesn't need a label anymore. He himself can aim on discovery by being active in proper networks. This becomes a key activity for an artist. Customers like personal experience. So the artist needs to be active in open platforms ensuring discovery. On these platforms the partner network can be found too, often being customers. They together have collective intelligence to help an artist create the proper value propositions. These platforms are the places where the unbounded collaboration occurs.

Because of his highly lightweight models, the artist isn't left behind with high costs. The needed infrastructural assets are easily achieved by subscription. For instance, Amazon S3 supplies the artist with hardware needed to store his musical works, online, easily accessible, easy to share, maintained by the provider. When not needed anymore, he just stops the subscription and doesn't stay with the hardware. Most of his costs become variable, making his business scalable.

Where does that leave the music labels? Some think new opportunities exist in full-servicing musicians. Not only finding talent and commercialize their work on CD's. But also taking care of the concerts, the merchandizing, the promotion, video's, producing, recording, etc. Another option would be to seek new-markets. Most likely those markets will concern some experiences that are highly valued by customers, and that cannot be copied.

CONCLUSION AND DISCUSSION

In the foregoing, we showed that standards increase efficiency and interchangeability. Because of this efficiency, transaction costs will lower, making it easier to share, create, and locate transactions containing a certain value proposition. Lower transaction costs, therefore, are a main driver in the value of the Internet as a whole and social computing in particular.

In a subsequent step, the main principles that underlie social computing were distinguished. Some of these principles concern technology, such as open platform, lightweight models, enabling services, and intuitive usability. Other principles concern social or user oriented principles, i.e. the long tail, unbounded collaboration, collective intelligence, network effects,

and user generated content. These principles have been validated in interviews with social computing experts as reported in Knol et al. (2008). Based on these findings social computing has been defined by this research as referring to a development where technologies enable empowerment of individuals, or groups of individuals, to express themselves in a way that leads to easier creation, enriching, or finding of content.

In a third step, a business model was described as a conceptual tool that expresses the business logic of a firm. The different building blocks give insight in how a business model can be designed and applied, with respect to the value proposition, the customer interface, the asset management, and the financial aspects. The business model was introduced to find a way to relate the social computing principles to ways of doing business.

Finally, we showed that the parts which are best supported by social computing are customer relationship and partner network. But also the value proposition, communication and distribution channels, and configuration of key activities are supported by social computing. Interestingly, these building blocks concern the link between the business and its environment. Recent developments show a standardization and commoditizing of ICT and its tools. This will lead to lower transaction costs. Most of these transactions take place between a company and its partners and customers, in the transformation from input to throughput, and from throughput and output of an organization.

Also, partners, including customers, can be of high value in co-creating a value proposition. This is because standardization and commoditizing make information sharing, finding, and enriching more accessible to individuals. Therefore, organizations should focus on those areas, for as social computing is most supportive there. It does need an adjustment of the key activities of a company, and an adjustment of the channels to reach the customers. These building blocks especially need thorough consideration for social computing support in a business model innovation process.

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