Web 2.0 revealed

Ways in which Standardization will lead Social Computing to support Business Model Innovation

Peter Knol - #0052485

September 23, 2008

Master Thesis

Business Informatics – Information Science

Prof.dr. Wim Scheper

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ABSTRACT

The value of Social Computing and its application in business has largely remained unclear until now. However, this research reveals that Social Computing principles may have important business value, as they can help to lower transaction costs through standardization in the field. This makes the development here to stay, and not another hype. This paper describes Social Computing with nine principles, obtained by comparing both Internet and academic sources in this field. These principles are Open Platform, Lightweight Models, Enabling Services, Intuitive Usability, Long Tail, Unbounded Collaboration, Collective Intelligence, Network Effects, and User Generated Content. Through semi-structured interviews with thirteen experts the principles are validated and related to a generic business model. A hierarchical cluster analysis reveals three clusters of principles. The first cluster is labeled Open Collaboration and supports interaction with partners and customers. The second cluster is labeled Lean Configuration and supports a flexible and adaptive business setup. The third cluster is labeled Customer Value and supports enabling partners and customers in co-creating the Value Propositions of a business. This research shows through these clusters that Social Computing most support provides in those aspects of business, where connections with the environment exist; the relations with partners and customers.

This research contributes to the relatively new scientific field concerning Social Computing. Therefore this research contains many suggestions for further research. This

research might help those interested in the field of Social Computing, for it provides insight into what this concept is and how it should be valued. Next, management might be interested, since this research shows where opportunities exist for incorporating Social Computing in an organization, through business model innovation.

Keywords: standardization, transaction cost economics, Web 2.0, Social Computing, business model innovation

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This thesis document can be seen as the completion of my study. Over the past five years, my knowledge and interest in the field of business informatics have been increasing steadily. On one hand, the possibilities of ICT seem inexhaustible, making a profession in this field always surprising. On the other hand, age old economic wisdom about business appears to remain to be true, making the same profession timeless. During this research both aspects have reached a climax; in new fields such as Social Computing too, many old economic laws remain sustainable. The cutting edge of those two elements made this research both a pleasure as well as a quest, giving me the power to carry on in search of discoveries.

I could never have done this research on my own. Therefore I would take a moment to really thank those people that helped me in, and through, this research.

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Chapter 1

INTRODUCTION

This thesis document is the result of my master thesis research performed to complete the master Business Informatics at Utrecht University. This research has been performed in collaboration with Deloitte Consulting, a business consulting firm, to gain more knowledge in the field of Social Computing[1] and subsequently whether that might support business models.

This chapter first contains the motivation for this research. Next, an outline of the research goal is presented, together with the questions aimed to be answered within this research. Finally, a lay-out will be given on how this research is performed and which methods are used.

[1] Instead of using term 'Web 2.0' this research uses the term 'Social Computing', because Web 2.0 might be popular but is rather biased, the developments intended in this research are broader than just the Web, and the sentence 'recent developments on Internet' is rather vague. Why we chose Social Computing will be explained in Chapter 3.

1.1 Motivation

The second half of this decennium seems to drag us into a new Internet hype. Recent developments on the Internet are in the news almost every day and gain growing (commercial) attention. The new possibilities of the Internet are hot marketing topics. Many Internet startups are appearing out of nowhere, and are being taken over for seemingly stupendous amounts by established corporations; News Corporation bought MySpace.com for $580 million in 2005, Google bought YouTube for $1.65 billion in 2006, Microsoft bought a 1.6% share of Facebook for $240 million in 2007, and so forth. The stream of opportunities for websites and services like Flickr (which is a photo sharing service), Last.fm (which is a music taste sharing service), Facebook (which is a network relation service), Craigslist (which combines a classified service with an existing map service, Google Maps), or Wikipedia (which is a service that offers a new way to create an old product, being an encyclopedia) seems never ending. Corporations do not want to stay behind; more than half of the North American and European enterprises consider Web 2.0 to be a priority in 2008 (Forrester, 2008). These hype-like developments do automatically draw a comparison to the Internet hype, which appeared to be a bubble that popped around the millennium change, less than a decade ago. That time, too much value was attributed to the Internet, which resulted in overrating those companies that were doing business related to the Internet. This time the trend is popularized with the buzz-word 'Web 2.0', to which this work refers to as Social Computing. Are we in the midst of a similar hype? Or is the ecstasy we can hear around us in the media based on something fundamentally different, and are the new developments here to stay? **Are we in the midst of a hype or a revolution?** That is a question which is the subject of many discussions in the blogosphere, marketing circles, and, recently, also in scientific literature. The stakes are high: overrating the hype resulted in huge shake-out between companies around the millennium, but undervaluing the revolution puts you far behind the competition. Therefore at Deloitte Consulting several customers have shown interest in this field, which gives the first trigger for this research.

In history many technological revolutions can be found. The invention of muskets, screw thread, electricity, and many other inventions, may serve as an analogy for the Internet developments occurring in the second half of the first decade if this century. These inventions often changed the world, which resulted in new ways of building and leading an organization or society. Such historical revolutions are very interesting in the light of current developments on the Internet. Also, ICT inventions have changed the world. For instance, the first computer mainframes did, which were produced in the 1960s, and the first killer business applications (database and word processing) for purchasing a PC did too, which came around 1985. The rise of the Internet to home consumers in the beginning of the '90s changed the world even more. The world will never be the same as before. As of now, the Internet may be considered mature; it is common in households and daily business life. After its hype in the last decennium of the

previous century the bubble popped, but the Internet itself survived. In the same way technological revolutions in history changed the way we do business or run an organization, in the same way ICT and the Internet do, with growing societal impact. These analogies with historical revolutions might very well help valuing technological developments today. What are key principles in those technological revolutions? Are we at the moment on the threshold of a similar revolution? **Can we value recent developments on the Internet based on findings in historical technological revolutions?** These questions are other triggers for this research.

Aforementioned questions do not stand alone. If the so-called Social Computing is here to stay, what will its influence be on the way we do business? Should corporations anticipate on these developments, and if so, how? According to a research of McKinsey, companies investing in Internet technologies in the last five years are very satisfied with the results (McKinsey, 2007). Many corporations already are rethinking their business models and say they have 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 of IBM shows that outperformers in industry did place higher priority on business model innovation than underperformers did (IBM, 2006, p. 12). To make the influence of Social Computing more tangible, the concept of a business model is used to find supportive relations between the two. **Is Social Computing an added value in business, and if so, how can it be applied?** The effect of Social Computing on business models is the final trigger for this research.

1.2 Research Goal

The first reason for this research was the question whether Social Computing is a hype or a revolution. Therefore, this research first examines analogies in the history of technological revolutions to find key principles in these revolutions. When found, it is possible to value and explain the Social Computing developments on the Internet, which is the second reason for this research. Only then it is worth to find the main principles behind those developments. With this information it can be tried to find how these developments must be seen in the light of running a business. The aim is to find how a business model will be influenced, or supported, by the findings describing Social Computing. Since this research will not ground a theory, it will not pose hypotheses up front. Rather, it likes to ask a question which leads through the research. The research goal exists in answering this main research question:

In which ways will Standardization lead Social Computing to support Business Model Innovation?

Exhibit 1 – The research question.

The main research question is divided into several sub-questions. These will be answered in the different phases needed to approach the answer to the main question. The answer to each question is somehow needed to be able to answer the next question, which gives structure to this research. These sub-research-questions are:

1. What is the role of standards in technological revolutions and developments?
2. How do standards give value to the Social Computing developments?
3. What are the main principles underlying Social Computing?
4. Is Social Computing a hype or here to stay?
5. What is a business model and what is its role in a corporation?
6. Where in a business model can Social Computing support the business?

The scientific relevance of this research exists in several aspects. First, the research will give insight in the structure and steps of technological revolutions.

Second, it attempts to grasp the term Social Computing. It tries to find the principles behind it, and value the developments which underlay this trend. Since this term is at least a little controversial, this research will join the frontier discussion in finding the value of Social Computing, and contribute scientifically to this discussion.

Third, this research also attempts to apply the findings by putting a generic business model to a test, with the Social Computing principles which are found. Where most of the research on Social Computing very often still focuses on the Internet, this research tries to generalize the findings to a broader perspective by applying them to business model innovation. This way, it not only contributes to the discussion about Social Computing, and putting it to a scientific level. It also applies the findings to daily business use, which adds social relevance to this research. It makes this research interesting to both Internet adepts as well as corporate management. This research helps companies to adequately react on the current developments on the Internet. Furthermore, it helps corporations to understand the changing use of existing technologies in their business, to remain or become competitive advantage.

1.3 Research Lay-out and Methodology

This research will be very explorative. The field of Social Computing is relatively new, and not much scientific literature is available. In contributing to the exploration of the field, this research will contain many recommendations for further research, based on the careful steps taken in the swamp called Social Computing.

Figure 1 gives an overview of the research model through a *process deliverable diagram* (PDD). The concept of a PDD is developed by Van de Weerd, Versendaal, and Brinkkemper (2006). A PDD is a helpful method to clearly depict the research process with according deliverables. On the left of the model the research steps are depicted, on the right the accompanied deliverables. Each phase is captured in a rounded box, which may contain several research steps. The numbers in the model correspond with the chapters where the specific research step is described.

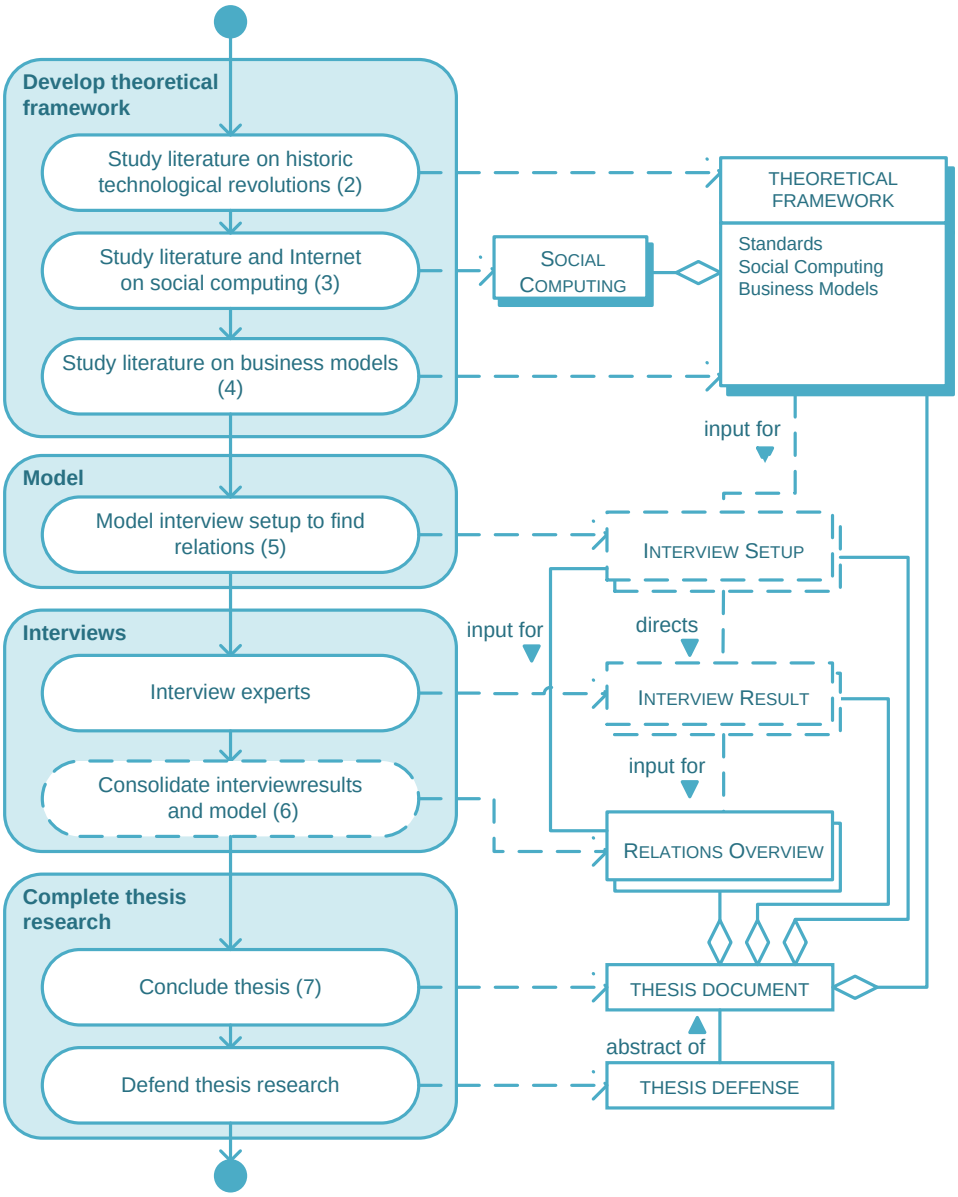

Figure 1 - Research model depicted in a process deliverable diagram.

Chapter 2 describes the role and relevance of standards in this subject. The findings in this chapter are based on a literature study on historical technological revolutions. A display of existing ideas in this field help to find generalizations applicable in today's technological developments on the Internet. Therefore this chapter will contain a qualitative literature research with a historical dimension.

Chapter 3 describes the research that has been done to be able to define Social Computing, its relevance and common use, and the abstraction level to look at it. This is a hard phase of the research, since the Social Computing phenomenon is new, and the opinions about, and definition of, the subject rather differ. This research is based on comparing the exposures

of trend watchers, Internet experts, and scientists in new media, the blogosphere, and scientific papers, to find reoccurring trends. Doorewaard & Verschuren call this a 'deductive comparison' (Doorewaard & Verschuren, 2000, p. 53). The collected data of this comparison will be analyzed according the tree steps mentioned by Miles & Huberman as depicted in Figure 2; data reduction includes selecting, abstracting, and transforming the data; data display includes an organized representation, both graphical as textual, of the data; and conclusions drawing and verification includes the decisions on what findings mean, noting regularities and explanations by inductive reasoning, and the reconsidering of findings (Miles & Huberman, 1994, pp. 11-12). As shown in the figure, this is an interactive, cyclical process.

This chapter contains mainly new research, since the subject is new, whereas the previous and next chapters are more or less a display of existing ideas and theories, relevant in the context of this research. The results of Chapter 3 form a main takeaway of this research. The Social Computing principles will be validated in Chapter 6 through semi-structured interviews with experts in the field of Social Computing.

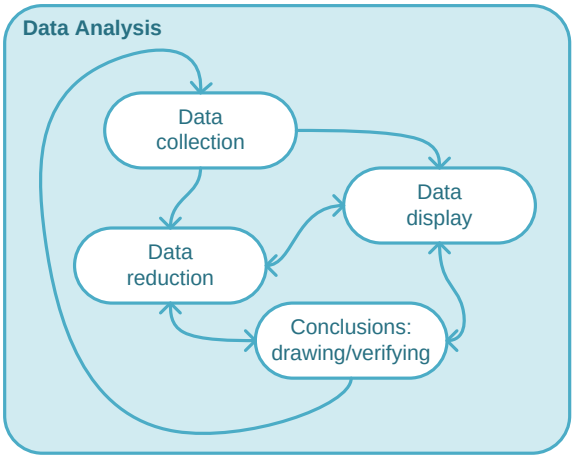

Figure 2 - Components of Data Analysis: Interactive Model (Miles & Huberman, 1994).

Next, Chapter 4 gives the definition and use of a business model. This subject had been extensively studied and described in scientific literature, of which this chapter will display main results. Besides the place and value of a business model for a corporation, it shows the building blocks of a business model, and how these are related to each other. This chapter will be theoretical in that it gives the results of most recent literature on business models.

Chapter 2, Chapter 3, and Chapter 4 form the theoretical framework which will be the input for developing a matrix which relates Social Computing principles to a business model. The aim is to look at how the different the Social Computing principles, found in Chapter 3, can support the business of a corporation. To make this tangible the generic business model, introduced in Chapter 4, will be used. The aim is to find how the principles support the actions

required in each business model building block. This is done through semi-structured interviews with experts in the field. Chapter 5 describes this process. The model constructed in Chapter 3 will be validated too in these interviews. Next, the experts are asked to fill in the matrix of Chapter 5, relating the Social Computing principles to a business model. An expert is considered someone familiar with Social Computing and business models, someone within an organization who is responsible for innovation of the business processes, or a scientist in this field. The freedom of a semi-structured interview gains the possibility to achieve a lot of insights from the experts. In the structured part of the interview data will be achieved from the filled matrices, which are input for the analysis. According to Miles & Huberman (1994, p. 27) a small sample size (n>=10) can be used to interview, since this research is not quantitative but qualitative. The samples will be specified during the process of research. The matrix constructed in Chapter 5 is needed for the application of the research in the next chapter.

Chapter 6 contains the results of the interviews. With the gathered information from the interviews, it is possible to "… *put flesh on the bones of general constructs and their relationships*" (Miles & Huberman, 1994, p. 27), or to give the models more body. When needed, the models will be changed according the validation results.

Finally, in Chapter 7 the research will be evaluated, conclusions will be drawn, and limitations will be given. It probably leaves a lot of further research suggestions, which is a result of explorative research.

Chapter 2

The Role of Standards in Technological Developments and Innovation Processes

To understand the value of recent developments on the Internet, technological revolutions from history can provide some important insights. Therefore, this research will look at some analogies in the history of revolutions in technological developments, by giving examples of muskets, screw thread, electricity, and the Internet in its early days. These examples each illustrate perfectly the essential steps in a revolution. Many more examples could be found though, like the railway gauges, telecommunication, computer industry, or financial services, to name but a few.

After these examples, this research will look at literature on revolutions and innovations, and see whether it confirms what is found in mentioned analogies. The ideas of disruptive innovations and paradigm shifts will be looked at, and their influences in an economic environment will be studied.

To make the link to the Internet, the concept of transaction cost economics will be introduced, which relates this chapter about standardization to the next chapter about Social Computing.

Finally, this chapter ends with a conclusion on the role of standards in innovation and development. This will be the basis for valuing Social Computing developments, which will be elaborated on in the next chapter.

At the end of this chapter the first two sub-research-questions are answered; 'What is the role of standards in technological revolutions and developments?' and 'How do standards give value to the Social Computing developments?'

2.1 Standards from a Historical Perspective

Muskets

The first example to look at is that of muskets. Until the eighteenth century it was common for a gunsmith to make fire-arms one by one, each fire-arm was unique. When a part of it was broken, the entire gun needed to go back to the gun shop to repair just this single broken part. Around 1778, Honoré Blanc, a French gunsmith and pioneer, claimed to be able to create 1 000 muskets a year, by unskilled labors, for Napoleon. He pioneered in being able to do so by developing these muskets from parts which were exactly the same for each musket; interchangeable parts. He demonstrated this process before a committee of scientists, politicians, and militaries of France by creating some muskets, disbanding them into separate bins, and then showed that he was able to reassemble the muskets from picking parts at random from each bin (Alder, 1997).

Ironically the government rejected this process. The reason: in such a situation it would be possible for anyone to manufacture parts and assemble muskets. This would diminish control by the government, a thought which will be seen later in this research again as a counter argument to Social Computing as well. The idea then was taken to the United States, where, about 18 years later, Eli Whitney performed the same show, although he faked it, before the Congress (Roe, 1916). It was known in armory practice as the American System of Manufacturing (Hounshell, 1984).

Screw thread

The next example is that of screw thread. The standardization of screw thread was one of the key inventions of the industrial revolution. Henry Maudsley (1771-1831) was well known for pioneering with interchangeable bolts and nuts with screw thread, around 1800. Since then this was a practical commodity (Roe, 1916). It was a major advance in workshop technology (Rolt, 1962), because not only it was an interchangeable part itself, but it also made it easier to interchange modules, since screws and bolts and nuts function as connectors and fasteners. It therefore boosted modularity in the industry.

Electricity

An example from the late 1880s comes with the invention and standardization of electric current. The standardization of it took about 40 years, and was challenged in the so-called 'War of the Currents'. The dispute was between alternating current (AC), promoted by George Westinghouse and direct current (DC), promoted by Thomas Edison. It involved demonstrations including the electrocution of an elephant, and the invention of the electric chair (Reynolds & Bernstein, 1989). A standard was needed to be able to develop compatible electric equipment. Only since the widely acceptation of AC, mass usage of electricity was available and commoditizing ran off. The discovery of it changed the world, compared to the preceded steam era, in that it brought new ways of running an organization, and society.

Internet

The same as for the aforementioned examples holds for the Internet, namely that standardization leads to commoditization and massive use. One of the co-creators of the World Wide Web, Tim Berners-Lee, shares in a speech before the Congress on the future of the Web: "*The success of the World Wide Web, itself built on the open Internet, has depended on three critical factors: 1) unlimited links from any part of the Web to any other; 2) open technical standards as the basis for continued growth of innovation applications; and 3) separation of network layers, enabling independent innovation for network transport, routing and information applications*" (Berners-Lee, 2007, p. 2). Berners-Lee mentions three things: unlimited linking, open standards and interchangeability. These three aspects are closely related; the interchangeability of techniques of the Internet was only possible due to open standards and the open standards lead to unlimited contribution of links. The evolution of the Web was a fact.

Berners-Lee continues: "*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.* (…) *Applying the age old wisdom of*

design with interchangeable parts and separation of concerns, each component of the Internet and the applications that run on top of it are able to develop and improve independently. This separation of layers allows simultaneous but autonomous innovation to occur at many levels all at once" (Berners-Lee, 2007, p. 4). There, he summarizes some important lessons the examples above already showed; standards are bare essentials for creating a commodity, and interchangeable parts are the basis of the development of new technologies and innovations (Berners-Lee, 2007, p. 5).

The development of new standards accelerated due to the increased speed of communication. This first happened through the telegraph, which was not a commodity. It next happened through the telephone, which clearly is a commodity. And finally, through the Internet, which is a commodity too. This is why it would not take as many years today as it did in history for new standards to evolve.

Lessons from History

Interchangeability is the basis for highly increased production. Because of standardization in an industry, a massive opportunity to sell appears in that industry. The standardization of electric current, for example, made it possible to create electric products, without having to deal with power supply differences. No more adapters, convertors, or even special power plants. Next, the market in electricity itself took off, since electricity was necessary to many, which resulted in the commoditization of it. Standards enabled increase of efficiency in production, innovation and development in a broad market. In the next sections will be elaborated on this.

2.2 Disruptive Innovations and Paradigm Shifts

The aforementioned historical cases are all examples of disruptive innovations. Christensen[2] studied the influence of major technological developments or innovations to well established corporations (Christensen, 1997; 2003). He noticed that an innovation, like the ones mentioned in our examples, can disrupt established organizations or even society. Christensen distinguishes low-end and new-market disruptive innovations. Low-end disruption occurs when an innovation, which is lower in performance or quality than existing products or technologies, still satisfies the customers' need, because the existing product or technology did exceed the customers' need. Therefore, disruption can take place due to an overshoot of product value, or technology performance of existing products or technologies. A new-market disruption occurs

[2] Clayton Christensen is a professor of business administration at Harvard Business School.

[3] Thomas Kuhn was professor at Harvard University, at the University of California, Berkeley, at Princeton University,

when an innovation serves a totally new market. Therefore, the disruption can take place due to an undershoot of product value or technological performance, since there are no existing products or technologies (Christensen & Raynor, 2003).

A disruptive innovation results in a paradigm shift; with the discovery or invention of a new technology, a new theory, or a new view of reality, we have to change our perception of what we found normal to date. Kuhn[3] wrote an influential essay on the structure of scientific revolutions (Kuhn, 1996), where the term 'scientific revolution' later gained reputation as 'paradigm shift'. In the context of this research, the term 'paradigm' corresponds with the term 'standards', which is used in the previous section. Kuhn notices three steps in such a scientific revolution: First, the awareness or discovery of an anomaly of an established paradigm rises. Kuhn learns that such an awareness of an anomaly rises, when established paradigms are more and more refined, caused by competition amongst scientist. With the competition and development of a refined apparatus, anomalies of a theory become more and more visible (Kuhn, 1996, p. 65). Second, when an anomaly becomes recognized as such, the emergence of the observation, and the recognition of the anomaly, results in the urge to find a new proper theory, which also takes the anomaly into account. Finally, the anomaly will be adapted, and the paradigm will be changed, which leads to the invention of a new theory. (Kuhn, 1996, p. 62). The steps are presented in the first column of Figure 3 on page 18.

2.3 Standards and Economic Environments

North[4] did research on institutions and their role in political and economic environments (North, 1991). In the context of this research, he gives some interesting insights in the field of standards. Assume that institutions are a sort of established standards in political, economic and social interaction. Then, North claims that "*the central issue of economic history and of economic development is to account for the evolution of political and economic institutions that create an economic environment that induces increasing productivity*" (North, 1991, p. 98). *"At stake in this evolution is (…) whether organizations have the incentive to acquire knowledge and information that will induce them to evolve in more socially productive directions*" (North, 1991, p. 102). In other words, North suggests creating an environment or setting that allows your organization to participate in institutional evolutions, or the evolution

[3] Thomas Kuhn was professor at Harvard University, at the University of California, Berkeley, at Princeton University, and at the Massachusetts Institute of Technology (MIT), all in the field of history of science.

[4] Douglas North is Luce Professor of Law and Liberty and Director of the Center in Political Economy at Washington University.

of standards, and let this evolution lead you to directions of new opportunities. These steps are presented in the second column of Figure 3 on page 18.

A rather large historical case clarifying this idea comes from North in the same study. He claims that civilization and economic development in modern history of Western Europe, compared to other locations those days, can be attributed to innovations on institutional instruments, evolved from interplay between two fundamental economic forces: economies of scale and improved mechanisms to enforce institutions, or contracts (North, 1991, p. 107). In Western Europe an environment of severe competition amongst nations existed, there were investments that gradually and incrementally altered the basic institutional framework, and organizations followed opportunities provided by the institutional framework (North, 1991, pp. 108-109). According to North, Western Europe owes its civilization to political and economic institutions.

Christensen clarifies the link between standards and economic development in his law of conservation of attractive profits. He learns that "*when attractive profits disappear at one stage in the value chain because a product becomes modular and commoditized, the opportunity to earn attractive profits with proprietary products will usually emerge at an adjacent stage*" (Christensen & Raynor, 2003). The 'value chain' in the definition of Christensen is synonymous with the 'environment' in the idea of North, both being the context in which standards or institutions evolve. The focus at adjacent stages in the definition of Christensen is what North sees as to follow directions of new opportunities. This gives the next steps; modular and commoditized products lead to a decline of profits for such products. Therefore you need to look at adjacent stages to find new profitable products. The previous section already showed this could be in two directions, low-end, or new-market. The steps of Christensen are presented in the third column of Figure 3.

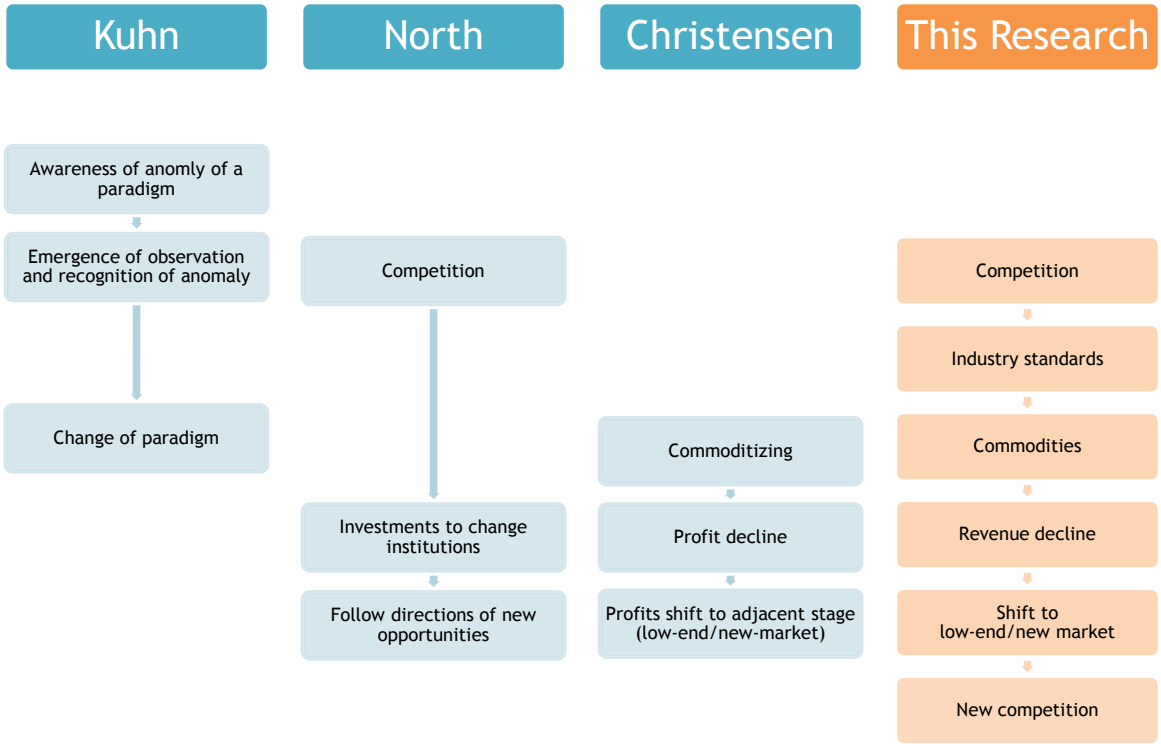

Figure 3 - Comparison of ideas on the evolution of innovation and the role of standards.

Let's look at a case to clarify the idea of Christensen. Around the '60s, IBM was successful with their mainframes, which in fact is a compilation of modular commodities of hardware. At the time the mainframes were commodities, according to the law of Christensen, IBM should have focused on adjacent stages, since there was hardly any margin left in mainframe revenues. The adjacent stages would be either the new market option of Christensen, like software, or the low-end option of Christensen, like their invention of the microchip for Personal Computers. Both options actually emerged; Value moved from hardware to software, which was a new market IBM could have focused on. And value moved from mainframes to PC's, which was a low-end market IBM could have focused on. Ironically, IBM had sold the software rights to Microsoft and started to work with Intel for PC's. The growth of Microsoft and Intel are history.

When taking this case one step further, one can ask in what stage we are at the moment. Software also largely becomes a commodity. Not every piece of software, but some important essentials like operating systems and text processing tools are more and more freely available through open source initiatives, and are compatible with that of competing vendors. Next to that, a shift from software on your desktop PC towards software services online can be noticed, which requires only a browser. In other words, to remain in the context of the case, what in turn does Microsoft need to do to sustain competitive when their products become commoditized? In which direction should they focus? An adjacent stage could very well be online

services. Are there competitors with better papers for such an adjacent stage? Could this be Google, for instance? This research will dig deeper into this in the next chapter.

The standardization loop reoccurs in each stage. So from one stage to the next, the standardization loop shifts focus and standardization goes up the stages. Figure 3 gives an overview of the mentioned ideas and puts the steps of mentioned sources at the same row as the ones it matches to in other columns. The last column represents the findings of this chapter and gives an overview of the lesson that can be learned. The column shows a loop containing consecutive steps, elaborated upon in the previous sections. First, it shows that competition leads to standards within an industry. Next, these standards lead to modules, or commodities in this industry. Commodities lead to revenue decline for that product (whether your profit will decline really depends on your business model, as will be seen in Chapter 4). When the attractiveness shifts to an adjacent stage, one needs to shift focus to these new profitable areas, whether this can be a low-end, or a new-market. Finally, when an adjacent profitable stage is found, new competition will arise in those areas, which is the start of a next loop.

2.4 Transaction Cost Economics

To understand why standards and commodities lead to lower margins, and therefore forces corporations to look for adjacent stages, the concept of transaction cost economics will be introduced. The idea of transaction costs first appeared in the influential work *The Nature of the Firm*, by Coase, even though he did not use this specific term, as "*… the costs of the price mechanism*" (Coase, 1937), which is sort of a market trading fee. Williamson has build upon Coase's work and explains the term as "*the economic equivalent of friction in physical systems*" (Williamson, 1985, p. 17), in other words, the costs of making an economic exchange.

Transaction costs can be divided into in different types: Search and information costs include costs referring to the gathering of information, or the search for partners or resources; bargaining costs include costs associated with negotiating an agreement; policing and enforcement costs include costs of monitoring agreements and sanctions when agreements are not obliged; and finally, costs of physical transaction of the product. The costs are determined by the frequency, specificity, uncertainty, limited rationality, and opportunistic behavior of a transaction, which is caused by the complexity and uncertainty of the economic system. This leads to an unequal distribution of information between the parties involved in the transaction. The value of the transaction cost economics lies in the increase of efficiently managing this uncertainty, leading to more equally distributed information (Cordella, 2001).

Lower transaction costs can be achieved with standards, since they lead to better interchangeability between products and services, or, in terms of ICT, higher compatibility. According to Liebowitz, the telegraph, for example, was an advance in communication, thus in

transmitting information. But the telegraph did not was a commodity, thus didn't massively lower transaction costs. The telephone, on the contrary, is a commodity, thus lowered transaction costs, and completely transformed communication (Liebowitz, 2002). Look again to the IBM example; because standards were used in hardware, hardware was a commodity. Further, hardware was compatible within almost any other computer system. It was easier to switch hardware around different PC's, which didn't make it necessary anymore to buy special hardware for each PC. This increased the ease of use of hardware and massively lowered costs (in this case time and money to search and buy hardware for another PC) of transaction (in this case the obtaining of proper hardware for a PC).

ICT played an important role in lowering transaction costs, over the last decades, and especially the Internet did. ICT systems, like the Internet, are able to manage high amounts of data and converting it into information. Next, this information can be stored, quickly retrieved, and communicated to the right places fast and efficiently. Therefore, ICT systems massively lower the transaction costs of information, which according to North is a big stake in the evolution of more productive directions, as seen in section 2.3. Next, ICT helps to equally distribute information between parties involved in a transaction. According to Liebowitz, that is exactly the value of the Internet: "*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 is because the Internet can store and retrieve information, something telephone and television couldn't do. Where lower transaction costs will occur on the Internet will be extensively elaborated upon in the next chapter.

Does this mean a new innovation always will become the new standard? Farell and Saloner explain that this is not the case. Complete information and identical preferences among firms are needed for new technologies to become a new standard (Farrell & Saloner, 1985). But even if those two are in place, the cost of switching to this new technology, which is a transactions cost, needs to be lower than the reward of doing so. Coordination is needed to put firms on the bandwagon of change. Coordination can be achieved by equally distributing the right information. ICT and the Internet lead to lower transaction costs, which do help overcoming the problems of proper standards mentioned by Farrell and Saloner.

More information supplied by ICT and the Internet is not a good thing per se. It can result in an information overload, which in turn will lead to higher, instead of lower transaction costs. Cordella describes two strategies to assure lower transaction costs by an ICT implementation. The implementation should result in an improvement of the information processing capabilities of the corporation, which makes the decision a trade-off between the costs of the ICT implementation and the lowering of the transaction costs. Or the implementation should reduce the need for coordination (Cordella, 2001). Both strategies were already mentioned above. These two strategies should be taken into account in the next chapter, when focusing more on where the lower transaction costs happen.

2.5 Conclusion and Application

This chapter showed how development and innovation take place, based on historical cases, and some influential ideas in this field. The research focused on standards and commodities, and how they lead, via interchangeability, to lower transaction costs. This is more visually depicted in Figure 4, which extends the last column of Figure 3.

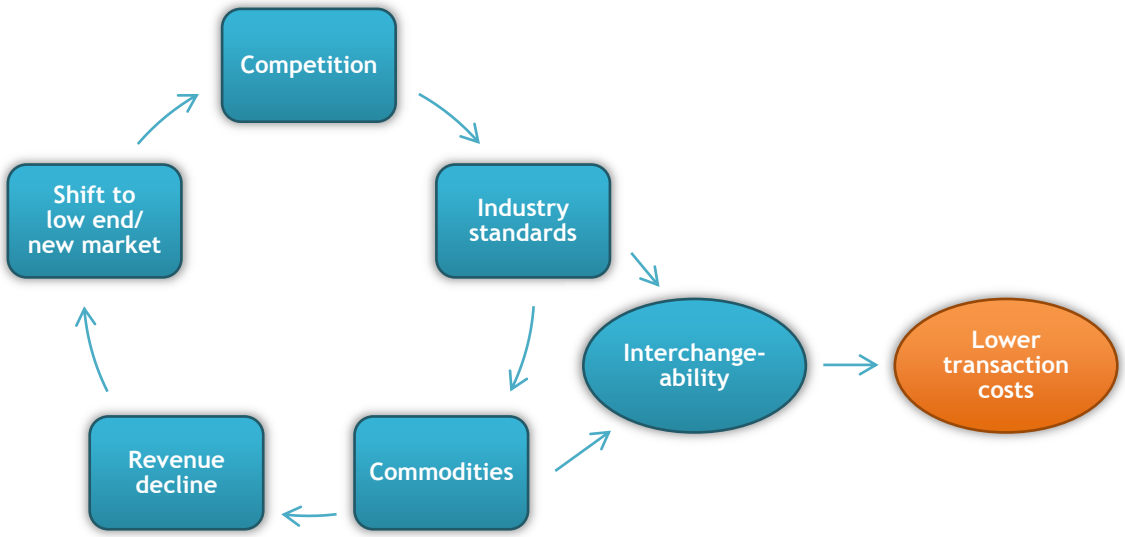

Figure 4 - Innovation development cycle leading to lower transaction costs.

These lessons explain the role of standards in technological revolutions and developments, and explain how standards give value to the Social Computing developments, which were sub-research-questions 1 and 2.

An attentive reader might see similarities between the innovation development cycle and the adopting phases of a new technology in the diffusion of innovations theory of Rogers, being innovators, early adopters, early majority, late majority, and laggards (Rogers, 1962). Rogers focuses more on the user side, though. In relation to Rogers and what has been explained in this chapter, it is also interesting to read the work of Moore (Moore, 1991), since he alters the model of Rogers slightly to better be able to apply it on technologies. Next, he focuses on how to make the step from early adopters to early majority, which might help making the step from competition to industry standards.

The innovation development cycle, together with the transaction cost economics, will be the canvas at which the Social Computing developments will be drawn in the next chapter. This research will show how standardization and interchangeability are the basis of the developments in Social Computing, and how Social Computing either leads to lower transaction costs, or is a result of lowering the transaction costs.

Chapter 3

DEFINING SOCIAL COMPUTING

The previous chapter showed how technological developments and innovations occur. It showed that the rules of the innovation game also apply to ICT and the Internet. What's more, ICT and the Internet amplify those rules, as has been seen. From that perspective, this research will take a closer look at the Internet as a whole, and its recent developments in particular, referred to with the term Social Computing. More and more is written and heard about Social Computing. It has become a marketing buzzword and without you or your product being marked 2.0, as in Web 2.0[5], you seem out to be of the market. Even though many of those using the term don't even know what it really is. "*It also has not helped that numerous folks have tried to co-opt the term for their own marketing and investment reasons, often without*

[5] Although this research refers to recent development on Internet with the term 'Social Computing', the term 'Web 2.0' might still be used when referring to other people's ideas, or when citing sources.

properly understanding what Web 2.0 is" (Hinchcliffe, 2006). The opinions on Web 2.0 rather differ from evangelists (O'Reilly, 2005; Hinchcliffe, 2006; Leadbeater, 2007) to antagonists (Boutin, 2006; Keen, 2007). This chapter will give the floor to both evangelists and antagonists. Also the definition varies from study to study and from blog to blog, which could explain the disputes among bloggers, trend watchers and scientists about a proper definition. It took a while to even find a common perspective since the first definition attempt of O'Reilly and Graham in 2004, varying from just graphical elements, technologies and design patterns, to more abstract attitudes and philosophies (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006; O'Reilly, 2005). Maybe a combination of one or more of these abstraction levels should be incorporated when defining Social Computing.

Figure 5 - Example of a tag cloud, which is an example of a rich user interface tool, in this case used to describe Web 2.0 (Angermeier, 2005).

All these aspects are due to the newness of the subject of Social Computing. Every opinion and study contributes to the crystallization of the concept. Therefore many of these opinions, writings, studies, and researches will be used to find some common ground in the Social Computing chaos. That will be the start of the description of Social Computing used in this research. It is not the aim to develop a firm definition of Social Computing, since the developments around the subject evolve too fast at the moment, and the pitfall of being out of date at the end of the research process is present. Also, it is more interesting to focus on what can be learned from current developments instead of trying to define them precisely. Therefore the quest 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 on the Internet. This chapter will use examples, mention technologies, services, and so on, to clarify the findings in this chapter. At the end of this chapter the answers to the next two sub-research-questions will be presented: 'Is Social Computing a hype or here to stay?' and 'What are the main principles underlying Social Computing?'

3.1 Social Computing in its Context

To find the origin of Social Computing, one cannot ignore the term 'Web 2.0'. The origination of the term is straightforward. It first showed up at a conference, where Tim O'Reilly (O'Reilly, 2005) and Paul Graham (Graham, 2005) talked with each other on this subject. 'Web' refers to the World Wide Web, as being part of the Internet. The digit '2.0' suggests a version number, like software version numbers. Web 2.0 thus indicates a new or second version of the Web. Now here the dispute already starts: What, then, was Web 1.0? Will there be a Web 3.0? Is the Web new since Web 1.0, or has it changed? Has the Web evolved since then? These and more questions will be enlightened in this section, aiming to place Social Computing in a broader environment.

What is or was Web 1.0?

The version numbering focuses on the different *uses* of the Web (O'Reilly, 2005). Web 1.0 is the first phase of the Internet era. The first era (approximately 1990-2000, ten years is an era on the Internet) characterizes itself by using the Internet in a way like pressed media, it was all about presentation (Tapscott & Williams, 2007). When the World Wide Web was common in households in the '90s, its first use by companies was to represent themselves online. Consumers used the Internet for finding information about companies, or other consumers. Instead of using the new technology as a new concept, with all of its new possibilities, it was used like an old concept; pressed media. This is a common seen behavior with new technologies (McLuhan, 1964). Compare it to the development of vehicles, from stage coaches to cars. The first cars looked just like stage coaches, but instead of horses they were driven by engines, see Figure 6. Later, human found there were better shapes for vehicles with an engine. Then, the use of the new technology adjusted to the new possibilities of this technology.

Figure 6 - The Concord Stage Coach from Louis Downing in 1825. One of the first engine driven cars from Daimler and Maybach in 1885. The T-Ford from Henry Ford in 1909.

The same holds for the Internet; a new technology (the World Wide 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).

Some suggest the first phase of the Internet was not really the Internet as it was designed to be. They say we are now getting to the Internet as it was intended, so only now we can speak of Web 1.0 (Berners-Lee, 2006). Graham calls Web 2.0 "… *using the web the way it's meant to be used*" (Graham, 2005). The idea is the same, but the difference is about when to start numbering the Web versions. But most sources agree that the current developments on the Internet do show differences in its use compared to its first era.

Will there be a Web 3.0?

When we start versioning the Web, it is attractive to hypothesize about the future and newer versions. It is of course commercially attractive to start using the term Web 3.0, suggesting you is already ahead of the crowd with an even newer version. Some suggest that there are Web 3.0 symptoms already, or that Web 3.0 will evolve rapidly after its predecessor (Shannon, 2006). Views on this version of the web vary widely, one coming from Berners-Lee, who describes in an interview with the Herald Tribune that the successor will be a semantic web with more artificial intelligence and connected databases (Shannon, 2006). Therefore, Web 3.0 also often is referred to as the 'Semantic Web'.

Does the Web evolve? What's new in newer versions?

That the Internet evolves needs no defense. The versioning is an attempt to describe the different stages and catch this evolution into significantly different uses of the Web. The answer to the second question is that the Web is not something totally new in the era of Web 2.0. The same as with software versions holds for the Web too; newer versions pretty much entail everything from older versions plus some new features and developments. So Web 2.0 does not suggest a totally new Web. It does suggest the Web entails all it already encapsulated from the first era, plus some new developments that is making it worth giving it a new version number.

Or as O'Reilly states: *"The 2.0-ness is not something new, but rather a fuller realization of the true potential of the web platform…"* (O'Reilly, 2005). This also means that something being labeled as Web 2.0 can, and most often will, use techniques or concepts that already exist for a long time, say in the Web 1.0 era.

The Web versus the Internet

The Web and the Internet is not the same (Berners-Lee, 2007). This is important to notice, since the remainder of this chapter will show that the developments do not limit themselves to the Web, but occur rather at the full breadth of the Internet. The Internet is the networking infrastructure connecting networks with networks and computers with computers. Therefore all connected computers can connect to each other and communicate through a variety of ways. The World Wide Web, or simply the Web, is just one of those ways to communicate over the Internet. The communication is in this context the information sharing by, for example, web pages over HTTP. Other ways to communicate over the Internet are, for instance, email over SMTP, file sharing over FTP, or telephoning over VoIP. Strictly speaking, the protocols used in these examples are not part of the Web. When talking about Web 2.0, one suggests focusing on the Web only. Strictly the term 'Web 2.0' therefore is too narrow, since Web 2.0, as will be shown, entails all the possibilities of the Internet instead of just the Web. This is one of the reasons for not using the term 'Web 2.0' when referring to recent developments on the Internet. According to Vossen & Hagemann, it actually should have been called 'Internet 2.0' (Vossen & Hagemann, 2007, p. xii).

Social Computing

The other reason for not using the term 'Web 2.0' is that the term is too burdened; it has been used massively, making it a buzz-word, used properly but more often improperly by people who did, but more often by people who did not know the meaning of the term. For this reason this research steps away from this biased term, and uses the term *Social Computing* instead. It not only covers the breadth of the developments better – not just the Web, but computing in general - it also mentions the direction of the trends in recent Internet developments – the socialization of the Internet, as will be shown in the continuation of this chapter. Social Computing refers to the same as what others refer to with Web 2.0. Social Computing is not a new term; others have used the term as well. For instance, a Forrester research defines it as "a *social structure in which technology puts power in communities, not institutions*" (Forrester, 2006).

3.2 Comparison of Social Computing Definitions

The previous section positioned Social Computing in a context. In this section some more focus will be placed on what Social Computing is. In search for defining elements many examples will be used to clarify this quest. Some different existing views will be posed as well. This way a common ground will be found out of all cited opinions on the subject and the discovered similarities point to the principles of Social Computing.

When exploring the field of Social Computing, several more or less founded definitions, descriptions, principles, and design patterns came by. All definitions or descriptions exist out of one or more elements. For comparison, these elements are put together in Table 1. The column header contains the author of the definition or description placed in that column. Each cell in that column contains elements of the author's definition or description. Elements that look similar between different definitions or descriptions are placed at the same row level. This way an extensive overview of different elements of Social Computing definitions and descriptions is presented, compared to each other as found in the study on the Internet and academic sources.

The last column presents the findings of this chapters' research. The cells in this column contain the labels of what the rows at each level describes. These rows contain elements of defining Social Computing of the researched sources. Therefore, the labels in this column are the principles considered by this research as underlying Social Computing. The remainder of this section will elaborate on all the principles mentioned in the last column of Table 1, describing how these Social Computing principles are found.

A running example will be used to clarify each principle. This running example will review the approach of Microsoft and that of Google to the principle at hand. These companies are of special interest, as you may remember from the chapter on standardization. The chapter showed that Microsoft's core business, software, is becoming more and more a commodity and revenues will, and focus needs to, shift to an adjacent stage. On the most probable adjacent stage, online services, Google is the company which holds the best papers for winning competition at that stage, at the moment. This chapter will show why.

Even though the first definitions of Web 2.0 included technologies like AJAX (Graham, 2005; O'Reilly, 2005), Web 2.0 is not only about technologies (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006, p. 12; Hinchcliffe, 2006). It is more about a way of architecting software and business (Hinchcliffe, 2006), or even as abstract as a philosophy (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006, p. 12). It is a set of related forces, design patterns and business models (Hinchcliffe, 2006). Technologies can be enablers.

O'Reilly principles, design patterns and core competences	Hinchcliffe key aspects	Hoegg et al. fundamentals	McAfee ground rules	Vossen & Hagemann essences	This Research
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	User Generated Content
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	Network Effects
Harnessing collective intelligence			Support emerging of knowledge		Collective Intelligence
Cooperate with users as co-developers		Creating and sharing of information			Unbounded Collaboration
Leverage the long tail					Long Tail Focus
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	Intuitive Usability
Cost-effective scalable services in stead of software		Dynamic services	Technologies that let users build structure over time can coexist peacefully with those that define it up front		Enabling Services
Perpetual beta	Continuous and seamless update of software and data, often very rapidly				Lightweight Models
Lightweight programming models and business models					
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		Open Platform
Web as platform					

Table 1 - Comparison of Social Computing definition elements, for structural reasons listed with technological elements at the bottom, who serve as a fundament on which the social elements towards the top are build.

Open Platform

O'Reilly (O'Reilly, 2005) is an often cited source when talking about Web 2.0, which is why this research cannot ignore his views on the subject. 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 should be 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, according to O'Reilly. 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).

Andrew McAfee puts it a little bit different, noting 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, 2006). 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, 2006). At this moment the Internet is an example of such a platform. 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*

Microsoft vs. Google

Microsoft focuses at a local desktop PC with an operating system and some office processing software. The flagship of Microsoft still is their operating system Windows. This is a closed and highly protected piece of software, which needs to be purchased, and can hardly be changed or personalized once obtained. Microsoft puts high stakes on authoring and security, which forces them to have such a local and closed platform. Google, on the other hand, does not offers an operating system, but the tools and services they offer, such as Google Docs, all run on Internet. The Internet is their platform, for working with the tools of Google, combining them and store the outcome of the usage, such as a document out of Google Docs. Security and authoring are approached different by Google, as we will see in the section on User Generated Content.

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 mentions 'being open' or 'transparency' as a new idea in the current Internet era, in his book *Wikinomics* (2007). Being open also increases trust, according to Tapscott. Next, a global platform for collaboration will open many new possibilities in many fields (Tapscott & Williams, 2007).

On the other hand, McAfee does not promote one platform like the Internet, but suggests building and adding upon existing platforms, an opinion in which he shares the side of Microsoft, as we can see in the example in the sidebar. He gives as ground rule to create an "… o*nline platform with a constantly changing structure build by distributed, autonomous and largely self-interested peers*" (McAfee, 2006, 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, 2006; McAfee, 2006). These remarks already entails many elements considered in the next subsections, but again an open, simple, and even free platform is mentioned.

Trend watcher Dion Hinchcliffe says about the platform: "*The Web and all its connected devices as one global platform of reusable services and data*" (Hinchcliffe, 2006). He, in a way, extends on what McAfee said, by noting that the platform is not just the Internet, but all connected devices, like the Internet, but more. That is why this element is called *Open* Platform, leaving it open which system this platform should contain. One could for instance think of the increasing developments in the field of mobile telephony and its synergy with the Internet. O'Reilly too, mentions different devices as an element of Web 2.0, but in relation to software (O'Reilly, 2005). 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 organization computer systems, should be replaced by the Internet straight away. Why let go the advantages of a well built history and switch solely to the Internet? 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. They don't have to be purchased, since open software platforms like the LAMP (Linux for operating systems, Apache for web servers, MySQL for databases, and PHP as programming language) stack and a Firefox browser gains market share increasingly (Tapscott & Williams, 2007, pp. 21, 22).

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; when an open, accessible, maybe free, platform exists to build your information systems upon, users are easily able to switch services, or edit them. They do not have to worry about local hardware as much as they used to do, since only a desktop PC with a browser will be necessary. The users 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

Both McAfee and Hinchcliffe already mentioned something about models and services in the previous subsection. Services will be elaborated upon in the next subsection, now some more focus will be on Lightweight Models.

O'Reilly calls lightweight programming models and business models one of the core competences of Web 2.0. With this he means to aim at several strategies. First, the programming and business models should allow for loosely coupled systems. Next, syndication is more important than coordination of information. Finally, one should design for hackability and remixability (O'Reilly, 2005). These strategies should 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. See the side bar example. A combination of services like this is called a mash-up.

The idea of Lightweight Models is very superficially shown sometimes by sites, like Google's

Microsoft vs. Google

An example of a mash-up is Funda.nl. Google created Google Maps to deliver data, maps in this example. Third parties, what's more, individuals, could create upon this product. This way a real estate agent combines his housing data with Google Maps and created Funda.nl. This way they could show the offered houses on a map. The hackability of Google Maps and therefore the remixabilty possibilities for services like Funda.nl make both Google Maps and the mash-ups successful.

Microsoft is known for not wanting to open up their source code to let others develop upon Microsoft products, for example Internet Explorer. They also are strict in the products they offer; structures are hard baked in the software and are hardly changeable by its users. Live Maps is compatible with KML only since this year.

Gmail, containing the term 'beta' in their logo or header. The reasoning is to suggest that the service is still in development, while, in the mean time, it is already in use. By suggesting that the service is not yet complete, Google suggests to improve the service soon, just like one would do after releasing beta versions of a software packet. But the term beta remains in the logo, which suggests Google will always be working on improving the service. This phenomenon is called 'perpetual beta'. Updating with such fast subsequences requires an agile business model which can handle such a fast update rate. Instead of revising every year or month, like traditional software companies do with their products, web services implement new versions up to a few times a day. The required agility to be able to do so is the basis for an enabling service, the subject of next subsection.

Agility also has to do with not creating structures and limits to a service up front. McAfee mentions "*Technologies that let users build structure over time can coexist peacefully with those that define it up front*" (McAfee, 2006). He suggests letting structures emerge over time, by the use of a tool or service, see the subsection on Network Effects. This is something a development model should take into account and extends the openness of the platform of the previous subsection. Again, compatibility is an important issue. Tapscott calls 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 anticipating on a changing environment take less effort.

Enabling Services

Services were already mentioned in the previous subsection. This subsection wants to compare services with regular software. Online services, or software brought to you as a service, are often promoted with the term 'SaaS'[6]. Examples of online services 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

Microsoft vs. Google

Compare the flexibility of iGoogle which even enables a Microsoft Live Mail gadget, to the webmail version of Microsoft Exchange, where only users with Microsoft's Internet Explorer can use the full possibilities of Exchange, but users with other browsers, like Mozilla's Firefox, are offered only some basic elements of the service.

[6] Software as a service, where 'DaaS' refers to data as a service (for example salary.com), and 'HaaS' refers to hardware as a service (for example Amazon S3).

software packages like Outlook for mail and SAP for CRM.

There are many advantages of online services above local software. First, there is the advantage of the maintenance of the package, which becomes part of the service provider, instead of the user. Next, updates can be implemented right away, since every user is using the online product, which discards the need for users to achieve 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 deliverer's server, the delivering company has the possibility to update whenever they feel to, immediately assuring every user uses this updated version. Next, there is a logistic advantage; 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 resulting from 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. This means, it should be easy to interact between services. Services, or parts of them, should ask to be interchanged with other services, to create 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). Elements of this refer already to the next subsection, Intuitive Usability, but they also mention mash-ups and remixability when they mention the aim to build new applications as a composition of others. 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). The last part of this citation refers back to the previous subsection.

One condition is that the service 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 scaled with 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 and with some creativity supports innovation. There is less need for distribution, so efficiency increases. Storing the results of online services make those results better distributable to or accessible for colleagues for instance.

Intuitive Usability

Many of the researched resources mention something about usability or functionality. 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, 2006). 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 Jakob 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. This is one of the preconditions for the Long Tail principle, further elaborated upon in the next subsection.

Microsoft vs. Google

Usability is not Microsoft strongest ability. The Blue Screen of Death (BSoD), it's incompatibility with other vendors offering similar products, and its quest for validating their product by users are a few examples. Microsoft took over WIMPs from Apple, which in turn took it from Xerox PARC. Google is more focused on SLATES at the moment, and has a proven ability in especially search and links.

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, 2006):

- 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.

Many of the underlying ideas of these components come back in the subsections about Collective Intelligence and Network Effects, but the goal 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. Instead, advance the user with offerings or help with information gathered in the background.

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 [7] 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, from David Heinemeier Hansson, is another language in development and often used in recent designs. In their Web 2.0 discussion, Hinchcliffe and others called aforementioned technologies and languages, a lightweight version of SOA (Service Oriented Applications), or WOA (Web based Oriented Applications). It needs to be expressed 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 straight forward. 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

The Long Tail is the only principle mentioned by just one source as a core element in Web 2.0. Still, it is included in the model. This is been done, first, because also the other sources mentioned long tail, though not in their definition (Hinchcliffe, 2005; Vossen & Hagemann, 2007). Next, this is been done because also not listed sources have mentioned it (Forrester, 2008). The long tail is an old concept, but in relation to the Internet developments popularized by Chris Anderson in his book *The Long Tail* (Anderson, 2007). Take a power law distribution, or a Pareto distribution, as in Figure 7. 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 specific clients. As we see in the figure, there is a small amount of clients

[7] AJAX combines several existing technologies and languages like XHTML and CSS for presentation, the Document Object Model (DOM) for dynamic display and interaction, XML and XSLT for data interchange and manipulation, XMLHttpRequest for asynchronous data retrieval and JavaScript binding it all together (Garrett, 2005).

who each generate a large amount of profit, called the short neck, often about 20% of the Pareto principle. Next, we see there is a large amount of clients who each generates a small amount of profit, called the long tail, often 80% of the Pareto principle. Obviously is seems most interesting to target those clients who generate high profits. But the idea of the Long Tail is that a large amount of clients, who generate only a small profit, total for a high amount of profit as well.

The focus on the Long Tail is made possible since a decrease of, for instance, stocking and distribution costs make it more attractive to also serve niche clients. Another trend is that lower transaction costs for clients, make it more attractive for them to find other providers, which makes self-service possible (see sidebar). In that case it is not a provider who actively searches for clients, but a client searching for a provider, with the provider just enabling and facilitating these searching clients.

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.

Google vs. DoubleClick

DoubleClick, a first Internet era advertizing company, really focused on the short neck of advertisement space, targeting large websites seeking large profits. Google on the other hand, noticed that the Internet was made out of many small sites, and focused on these with offering their AdSense program. Clients themselves could mark a space on their site as available for advertisement, and AdSense would place an advertisement, fitting the content of the site, in to that space. This advertisement approach, largely through client self service, was the core of Google's very successful business model.

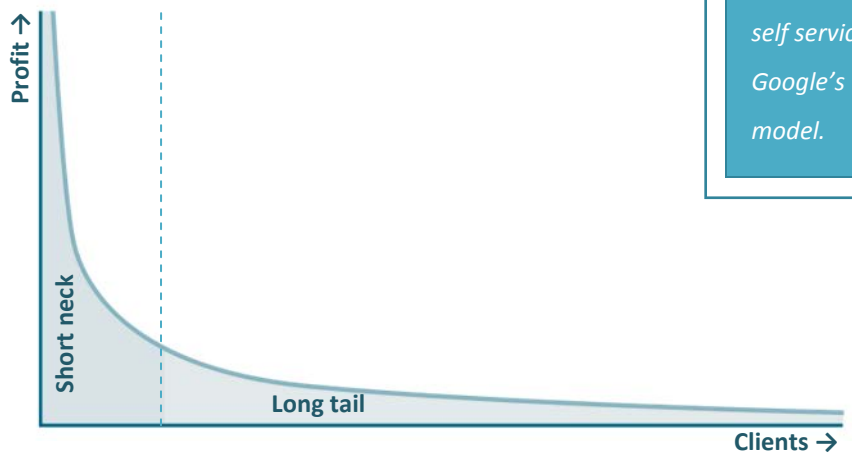

Figure 7 - A power law distribution.

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.

Unbounded Collaboration

Collaboration might be the main goal where the enabling role of the Internet becomes apparent. The recent Social Computing developments really add to this goal. Services and programs can cooperate, like shown in the subsection of Enabling Services. In this subsection will be focused on collaboration between people, organizations, or both.

Collaboration can occur in different ways. For example users can collaborate on creating documents, using Google Docs. Or people can work together in developing software, like the way open source software is created. Or people can work together with organizations to help them with ideas for new or revised products. And of course organizations work together in performing their tasks and reaching their goals.

O'Reilly mentions that respecting users as co-developers is one of the core competencies of Web 2.0 companies and acknowledges there is need for trust do to so (O'Reilly, 2005). Hoegg et al. mention the need for creating and sharing information (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006), which also points already to the next subsections. Vossen & Hageman also make statements in this direction, but generalize by saying that personal contributions are made available to the general public (Vossen & Hagemann, 2007, p. 67). The idea of them all 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, 2006). This is something Confucius already learned in 450BC: "*Tell me and I forget; show me and I may remember; involve me and I will understand.*"

> ***Microsoft vs. Google***
>
> *Compare Microsoft Word with Google Documents. The difference is not only local vs. online, or paid vs. free, but mainly that Google Documents supports collaboration. It is possible to work at the same time on the same document. The first precondition to achieve this are that Google Docs runs online, on the open accessible platform. Docs might be more basic then Word is, but it's enough for many users.*

With collaboration that is unbounded, is meant that collaboration is less and less dependent of place and time (see sidebar). When the Internet is used as a platform, offering intuitively usable enabling services, collaboration around the globe becomes very easy. Not only involving customers in the development of a new product, which is more the area of the next

subsection on Collective Intelligence, but really collaboration initiated from both, or more, sides, like in the development of open source software. This new form of organization is called *peering* by Tapscott, and, according to him, also 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 forms a perfect basis to collaborate on, using the services, usability, and resources of this platform.

Collective Intelligence

Unbounded Collaboration focused on collaboration of different parties, initiated from different sides, with the goal to together develop something. Collective Intelligence is more about individuals who do not per se have the goal to develop something collectively, but who individually work on the Open Platform, and, as a result, are developing something of value. Therefore this is also called co-creation (Prahalad & Ramaswamy, 2004).

According to Hoegg et al. 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*" (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva, 2006). This definition includes different elements. Dynamic services are mentioned again, as in the subsection about Enabling Services. Another element is to mutually maximize collective intelligence. Collective Intelligence is also a core competence according to O'Reilly (O'Reilly, 2005). Users can add value in different ways, we already saw in the previous subsection, and will do so if you harness it.

Google's PageRank

Google started as a search engine, returning better results than the existing search engines. Google's results were also based on the links referring to a certain page, assuming an interest of someone in that page. This link analysis algorithm is called PageRank, and is a key indicator in Google's search results. It actually is based on the intelligence of a collective; the individuals providing links, a link refers to a qualitative website.

The term 'collective intelligence' is actually a fallacy of wrong level, since a collective cannot have intelligence. The term refers more to the process of eliciting intelligence of 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, in a community, and so on. This is also called 'the wisdom of crowds', a subject James Surowiecki wrote a book about; he 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 also 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 calls *sharing* as a new idea in the Internet era (Tapscott & Williams, 2007, p. 26).

The crowd is an emergent entity. This means that the more people act in some way, the more people will copy that behavior. For example, when someone is about to drown in a pond, witnesses often do not react, while everybody sees the accident happening. In such a case people are like a colony of ants, a herd of sheep, or a school of fishes. These are also called boids. Central decision making is very difficult in such a situation, since there is no common point to address, no one you can speak to in particular to reach the entire group. This phenomenon is extensively elaborated upon by Rod Beckström, in his book *The Starfish and the Spider* (Beckstrom & Brafman, 2006). He describes the decentralization of the Internet and explains the need for trust, as O'Reilly did in the previous subsection, since decentralization lacks control. One can create a social environment, like a community, not per se restricted to the Internet, with some structures, or facilities, where a community can and may emerge. This emerging is an organic process, which can be steered by the service providers through the identity, visibility, conversation, relation, sharing, reputation, authoring, and so on, of users. The theory of bounded rationality gives more insights in these issues (Simon, 1991).

A remark that needs to be placed is the phenomenon of the 'one percent rule'. This rule explains 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 initiatives like SecondLife. A possible solution for this is presented in the next subsection.

The increased possibilities for knowledge elicitation from many individuals are also made possible by lower transaction costs for those individuals to share their intelligence.

Network Effects

Instead of Unbounded collaboration, or Collective Intelligence, which implies 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'. Robert Metcalfe introduced the term around his network law, based on the use of the Ethernet card in the 1980s (Metcalfe, 1980). This law relates the value of a network to the amount 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; when you are the only one in possession of a telephone, it would be useless. But the more people obtain a telephone, the more people you can connect to, the more valuable you telephone will become. The same idea holds for services on the Internet where Network Effects are used. Network Effects are also known as network externalities (Katz & Shapiro, 1985).

Google's PageRank

Google's PageRank illustrates the value of network effects provided in an unconscious way. The more people use links to other sites, the better Google can calculate the assumed value given to a linked-to website, relative to other less linked-to websites. This information is provided unconsciously by website users, but it gives increased value when using the Google search engine.

Hincliffe calls Network Effects "*the real secret sauce of Web 2.0*", emphasizing this phenomenon really appears just now, because the appliance to a service has been made easy through other developments, like sharing and feedback loops (Hinchcliffe, 2006). The more users use a service, the more valuable the service becomes. Examples are countless: Wikipedia; the more users contribute and edit articles, the more accurate information on it will become, and the more users will come to use Wikipedia. Del.ici.ous; the more users add tags to their bookmarks, the better these tags describe the content behind the bookmark, the more findable they become. Flickr; the more users add tags to a picture, the better the content on this picture is described, the better findable it becomes.

To leverage the value of Network Effects, a certain amount of users, contributors, editors, and so on is needed. This amount is called the critical mass. Depicted in a usage curve, when the critical mass is reached, the usage of the service will increase steep at once, whereas before that point the usage did increase slowly. This point in the curve is called the 'tipping point' (Gladwell, 2000). How to reach this point has been described by Moore in his book *Crossing the Chasm* (Moore, 1991). This, again, has relations to the adoption phases in the diffusion of innovations theory of Rogers (Rogers, 1962).

To make use of the Network Effects, and to overcome the problem of the one percent rule of the previous subsection, the aim is to let the Network Effects 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). 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. This architectural trick uses the 'selfish' pursue of users to collectively build value as an automatically byproduct, explains O'Reilly.

McAfee calls this phenomenon 'extensions', meaning "… *automating some of the work of categorization and pattern matching*", as we already saw in the subsection on Intuitive Usability (McAfee, 2006). Vossen & Hagemann mention that the socialization of the web often leads to improvement of the underlying platform (Vossen & Hagemann, 2007, p. 67). Again, this is something reached with a service developed to make use of those improvements.

In relation to the Network Effects stands the phenomenon of cumulative advantage, or the Matthew-effect, from the parable of the talents in the Bible in the book of Matthew. Robert K. Merton described this effect already in 1968 (Merton, 1968). The theory learns that the rich get richer, or he that has much, will get more, and he that has few, even what he has will be taken. Take again the tipping point in the usage of a service from the previous subsection. When a service reaches the tipping point in usage, its usage will highly increase. Therefore the Network Effects become more usable to the service, resulting in even more value. Also called a waterfall effect or increasing returns. Because of these increasing returns, some argued that being first to a market will result in first-mover-wins, or winner-take-all principles. According to them, lock-in should guarantee corporations to ultimately make profit from the Network Effects. But, as Liebowitz explains, the opposite is true on the Internet, whereas the Social Computing developments even more undermine these thoughts. Because of lower transaction costs, it will be easier for users to switch from providers, so lock-in will not hold (Liebowitz, 2002, pp. 20, 21). Chapter 2 already showed how lower transaction costs help coordination barriers from switching to other providers. Social Computing highly extends to lower transaction costs and coordination, thus decreasing lock-in possibilities even more.

This does not mean the Network Effects will decrease in the Internet era, they will not. But using Network Effects for first-mover-wins, or winner-takes-all principles, thus aiming at lock-in is not truer on the Internet then it is in the off-line world. Social Computing doesn't change that, or undermines it. A research from McAfee and Brynjolfsson revealed that winners might win big and fast, but not necessarily very long (McAfee & Brynjolfsson, 2008). Remember how quick Yahoo! replaced AltaVista, and how quick Google replaced Yahoo!. They conclude, therefore, that competition gets nastier.

User Generated Content

All the previous subsections were about how to approach a platform, build services, deal with users and their contributions. But O'Reilly is right, when he says, in the end it's actually all about data (O'Reilly, 2005). Hinchcliffe calls data consumption and remixing a key aspect of Web 2.0 (Hinchcliffe, 2006). 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*" as one trend (Berners-Lee, 2007, p. 5).

O'Reilly stimulates to seek for hard to recreate data for competitive advantage. Good examples of valuable data owning companies are NavTeq and TeleAtlas, who create geographical maps. Both companies were bought last year for more than ten times the turnover they made in 2006, NavTeq by Nokia and TeleAtlas by TomTom. What's more, TeleAtlas did not even had one year of profit in its existence. Many companies rely on their data, as do some organizations on the Internet as well; MapQuest, Yahoo Maps, MSN Maps, Google Maps and Google Earth.

The same value of data holds for 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 in reusing and smartly enriching data, or offering tools to do so. A key aspect is who owns this data? Ownership is important, but also in this area things are changing. For example the authorship rights on the Internet are very difficult to restrain. On the Internet, especially in recent developments, combining, sharing, enriching content is of value, as we have seen so far. So by claiming too much rights and protecting data, one blocks the value adding possibilities. This not only is a missed chance for the community, but also puts the author out of the picture, since it is hard to use content which is not accessible. A corporation doesn't make money with content, but because of content (see sidebar).

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*

Google Maps, Google Earth

Google uses NavTeq data for their Google Maps and Google Earth. Google provides the data for free in their services, and lets anyone develop mash-ups, based on these data. Numerous websites and services are build this way, enriching Google's data, from showing crime activity in cities, noise pollution around airports, classifieds in your neighborhood, and so on. This way Google assures that users go to Google for the tools, while they give away the data.

conversation" (Graham, 2005). Therefore some new initiatives rise around this subject, like the Creative Commons, which is a method for describing the authority of created content.

Content may be the core in Social Computing, there are also drawbacks to opening up content, and working and storing your work online. First, there is the concern of often heard suspicion on privacy issues. When using Gmail as your email service, its contact list as your address book, Google Docs to create and share your work, and Google Blogger to write about your personal interest, imagine the amount of personal and professional information Google gathers about you. Another, relating issue is that of authoring; what about security of what you create online? Microsoft assures that a platform like Windows on a local desktop PC is necessary to guarantee the right application of these issues.

This is not necessarily the case. Again, it is about trust. If Google would be transparent enough to its users, by showing how they deal with these issues, it is possible for the user to decide whether that is sufficient. Then, the user will remain using the services of Google. Or whether that is not sufficient enough. Then, the user than can switch to an organization that offers privacy and security according his or her wishes. It therefore is the user who decides who to trust and who not. This aspect is in such a situation just a part of the business model of the organization, an added value of an online corporation. As for privacy issues, the discussion will presumably change from protection by authorities, to self protection, or openness, from users. So these aspects do, in fact, have nothing to do with the platform. But now I am already too much into the next chapters, where business models make their entry.

3.3 Conclusion

Nine different Social Computing principles, found in Internet and academic sources have now been identified and elaborated upon. In Figure 8 they are all depicted once again, but now in a more visual, flower-like, model. The bottom ones are the technological principles, causing lower transaction costs, while the top ones are the social principles, catalyzed because of lower transaction costs. As in the model is depicted, the different principles overlap each other a little bit, making them not fully mutual exclusive. This model also nicely visualizes the term Social Computing, containing the same distinction between more technological and more social issues. This model gives an answer to the third sub-research-question, 'What are the main principles of Social Computing?'

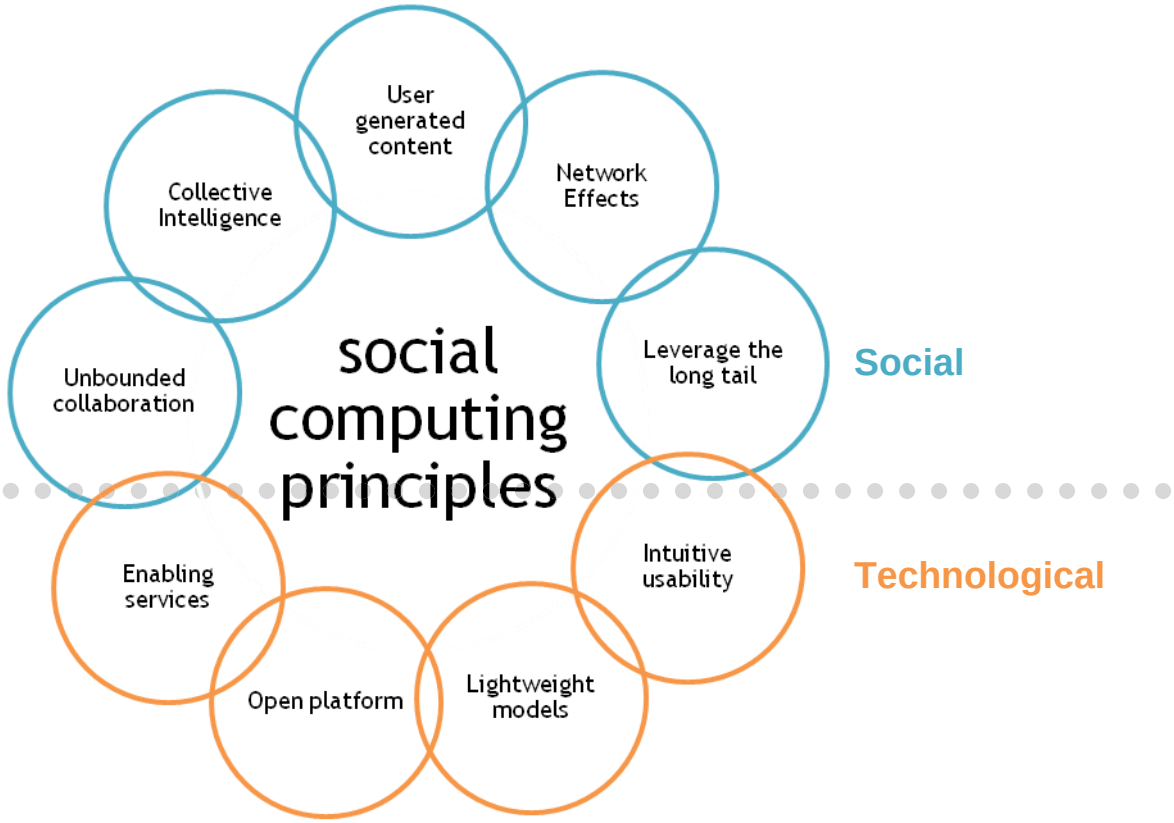

Figure 8 - The nine principles of Social Computing, from technological enabling principles at the bottom to social resulting principles at the top.

Although it was not the explicit aim to find a firm definition of Social Computing, an attempt will be made to do so to add to the emerging discussion in this field. A core value of the Internet technologies, as showed, is that lower transaction costs enable a more equal distributed access to information. Hence probably the well-known term Information and Communication Technology in the first place, or Social Computing as mentioned in this research. But in Social Computing it is not only about access anymore, but it is also about contributing as individual, or as a community. Three things appear to be of importance; content (information), technologies (as enablers), and socialization (usage more conform daily life). This would result in a development where enabling technologies empower individuals, also grouped in communities. Those individuals are empowered to express themselves in a daily-life way. This expression is visualized in the creation, enriching, or just finding of content. Therefore this research defines Social Computing as shown in Exhibit 2.

Social Computing refers to 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, and finding of content.

Exhibit 2 - Social Computing definition.

The fourth sub-research-question was 'Is Social Computing a hype or here to stay?' By elaborating on the transaction cost economics at each principle, this research hopefully has been convincing: The first four principles cause lower transaction costs. These principles in return enable lower transaction costs for the other five principles. In the chapter on standardization we saw that transaction costs decrease, trough standardization and interchangeability. Social Computing catalyzes this. The storing, searching, retrieving, sharing, editing, enriching, and managing of data becomes more efficient. This already happened a little bit in the first era of the Internet, but takes off enormously in the second era. Social Computing increases value. Therefore this research assumes Social Computing is here to stay. McAfee and Brynjolfsson show "*… that competition in the US has become significantly nastier, or more 'Schumpeterian,' since the mid 1990s, and that the increase in competitive intensity is the biggest in the industries that spend the most on IT*" (McAfee & Brynjolfsson, 2008). They conclude, it is worth investing in IT, and so it is in Social Computing.

Both Microsoft's and Google's, and sometimes someone else's, approach to the principles at hand are mentioned as a running example. Obviously, at the moment this research is more confident by the approach of Google, since they incorporate more of the principles, which makes them better prepared for the future and its competition. Although, according to O'Reilly, Microsoft has an enormous proven ability to learn and take over competition, "*there's no question that this time, the competition will require Microsoft (and by extension, every other existing software company) to become a deeply different kind of company*" (O'Reilly, 2005). For new companies this will be easier then for Microsoft, since they live with the legacy and culture of the past.

It would be possible now, to focus on one of the principles, elaborate deeply on it, and extensively describe it's relation with and effects on business models. But, the remainder of this research will not focus on just one of the many principles that enclose Social Computing. There are two reasons for that: The first is that because there has been done quite some research to one aspect of Social Computing. For example there are books on wiki's (Tapscott & Williams, 2007), on the Long Tail (Anderson, 2007), on decentralization (Beckstrom & Brafman, 2006), on crowd sourcing (Surowiecki, 2004), on open innovation (Chesbrough H. , 2003), the tipping point (Gladwell, 2000), and so on. It is highly recommended to read those books when having interest in the according field. Most of them are mentioned in this chapter to provide references and

further reading. The second reason is that in this research it is the aim to find how Social Computing, as a whole, influences business models. It therefore will be less thorough then when focusing on one of the principles, but it does give a better overview of Social Computing in relation to business models.

This research has tried not to join the euphoria of everything around Social Computing. But that the developments around Social Computing are more than just another hype or bubble can be concluded. It has also been confirmed from the scientific field, where is been minded that the increasing impact of Web 2.0 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, Martignoni, Meckel, & Stanoevska-Slabeva, 2006). How these business models will be affected will be the subject of next chapters.

Chapter 4

BUSINESS MODELS

Now that the elements of recent developments on the Internet – Social Computing - are described, this chapter describes the final step of theory. To find a relation between Social Computing and doing business, something tangible needs to be found, to which Social Computing can be related to. Business models describe a corporation in all of its aspects. That is why this research chose to relate Social Computing to a business model. This chapter describes business models, their role or function in running a business, and the generic elements they contain. This needs to be done in order to be able to determine the relations and influences of Social Computing to business models, or elements of it. The description of these relations can be found in the next chapter, Chapter 5. Two studies on business models are introduced; that of Henry Chesbrough[8] (Chesbrough H. , 2003) and that of Alexander Osterwalder[9] (Osterwalder,

[8] Chesbrough is adjunct professor at the Haas School of Business at the University of California.

Pigneur, & Tucci, 2005). Both studies assembled much of the available literature on this subject to base their findings on. Therefore their work is considered as a sufficient overview on the role, use, and elements of business models. The business model wheel doesn't need to be reinvented. This research is not about reviewing the idea of business models, but on how Social Computing might support them.

Chesbrough studied business models in the context of reviewing the idea of innovation, which supports the context of this research in that it also looked at innovation in the field of Social Computing. Osterwalder studied business models and its ontologies, and continued researching business model innovation, which supports this research in how business models can be innovated in a changing and innovative environment. This is exactly the case in the Social Computing developments.

4.1 What is a Business Model

Although the term 'business model' gained growing reputation in last two decades (Osterwalder, Pigneur, & Tucci, 2005, p. 3), the basis of its definition comes from Andrews' classic definition of the strategy of a business (Chesbrough & Rosenbloom, 2002, p. 7). This definition states business strategy as "*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 strategy of a corporation is at several points somewhat else than a business model; first, a business model focuses on value creation, while a business strategy focuses on how value will be captured; next a business model seeks to create value for the organization, while a business strategy seeks to create value for an organization's shareholders; and finally, a business model needs less environmental knowledge, whereas a business strategy needs more complex information, also about the environment (Chesbrough & Rosenbloom, 2002, p. 535).

In his book *Open Innovation*, Chesbrough elaborates on business models in the context of innovation within a corporation, based on both scientific and business cases. He defines a business model as a method to convert a new technology into economic value (Chesbrough H. , 2003, p. 63). That places a business model in a bigger picture, as depicted in Figure 9. The figure shows how a business model relates a (new) technology as input to an economic output. Technological inputs and economic outputs are not in the focus of this research, but the business model itself is.

Chesbrough stresses the need of a business model by explaining that a good technology with a bad business model will not create value. On the other hand, a minor technology with a

[9] Osterwalder did post-doctoral research on business models and business model innovation and is currently founder and partner at a consulting firm in this field.

good business model may still create value. This means that the commercializing of an innovation does not exist in the product or service using the new technology, but in the business model which underlies that product or service. Since organizations can become too complex for one man to oversee, a business model is needed to relate the organizational domains to each other. The complexity of organizational domains should be connected with the business model.

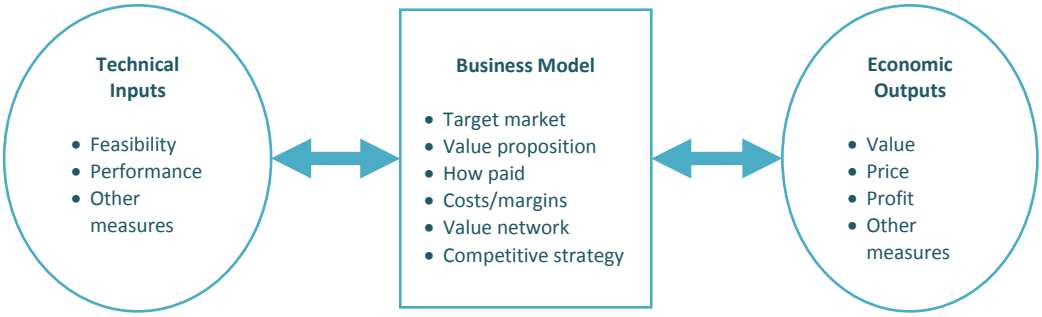

Figure 9 - The business model position (Chesbrough H. , 2003, p. 69).

Osterwalder did research on business models too, and focused on their role in an Internet environment (Osterwalder, Pigneur, & Tucci, 2005). He positions a business model slightly different than Chesbrough, but Osterwalder did not only have innovation in mind when drawing the bigger picture. Figure 10 shows a business model in between three elements: The business strategy stands above the business model, since a business model aims at translating the strategy of a corporation into a model to follow and achieve the strategy. The business structures and processes are the environmental aspects within the corporation in which a business model has to be implemented. The technology is an enabling factor which has a mutual relation with the business model in that technology should support or improve the business model one way and the business model should ask for the right technology vice versa. These three elements have been known longer as of importance to be linked in an appropriate way (Schroeder, Congden, & Gopinath, 1995). Of course there are more factors of influence on a corporation and its business model. One can think of competitive forces, customer demand, social environment, and legal environment. But it goes beyond the goal of this research to elaborate on those variables.

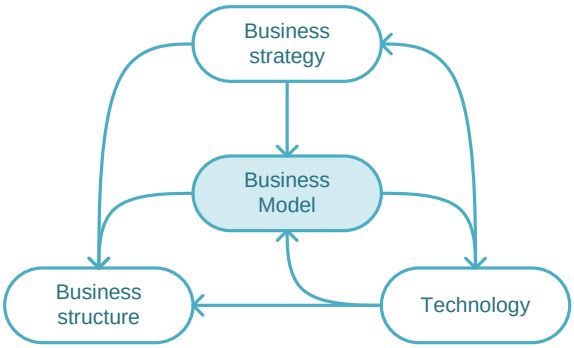

Figure 10 - The business model position (Osterwalder A. , 2005).

Osterwalder defines 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. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams*" (Osterwalder, Pigneur, & Tucci, 2005, p. 10). In the next section this definition will be analyzed.

4.2 Business Model Building Blocks

With the role and position of a business model in mind, this section will now elaborate on the business model itself. Chesbrough distinguishes six elements as part of a business model (Chesbrough H. , 2003). Osterwalder finds nine elements, or *building blocks* (Osterwalder, Pigneur, & Tucci, 2005). Both lists are shown in Table 2.

	Chesbrough	Osterwalder
Product	Value Proposition	Value Proposition
Customer Interface	Market Segment	Customer Segments
	Value Chain	Communication and Distribution Channels
	Value Chain	Customer Relationships
Asset Management	Competitive Strategy	Key Resources and Competencies
	Competitive Strategy	Configuration of Key Activities
	Value Network	Partner Network
Financial Aspects	Costs/Margins	Revenue Streams
	Costs/Margins	Cost Structure

Table 2 - Comparison of business model elements.

When depicted next to each other, the lists look similar. The authors use slightly different labels, but often do refer to the same idea. This research will continue building on the work of Osterwalder, since his building blocks are more precise and exclusive. Osterwalder also shows how the items are related to each other, which is depicted in Figure 11. Each element will be described in subsequent sections. The lines represent either flows of products, information, or money.

Each building block will be clarified with a very basic running example out of the music industry, which has been in great turmoil recently. It is not a the first time the music industry is analyzed (O'Hear, 2007; Masnick, 2006; Koster, 2007), but the case does clarify the building blocks of the business model very well, and is applicable in a situation guided with and without Social Computing. Not everyone might have heard of this case, since not everyone is so well informed into this field. This chapter will follow Sony BMG and its business model without a Social Computing approach. The next chapter will use the music industry case again, but explain how business models in that industry changed due to Social Computing.

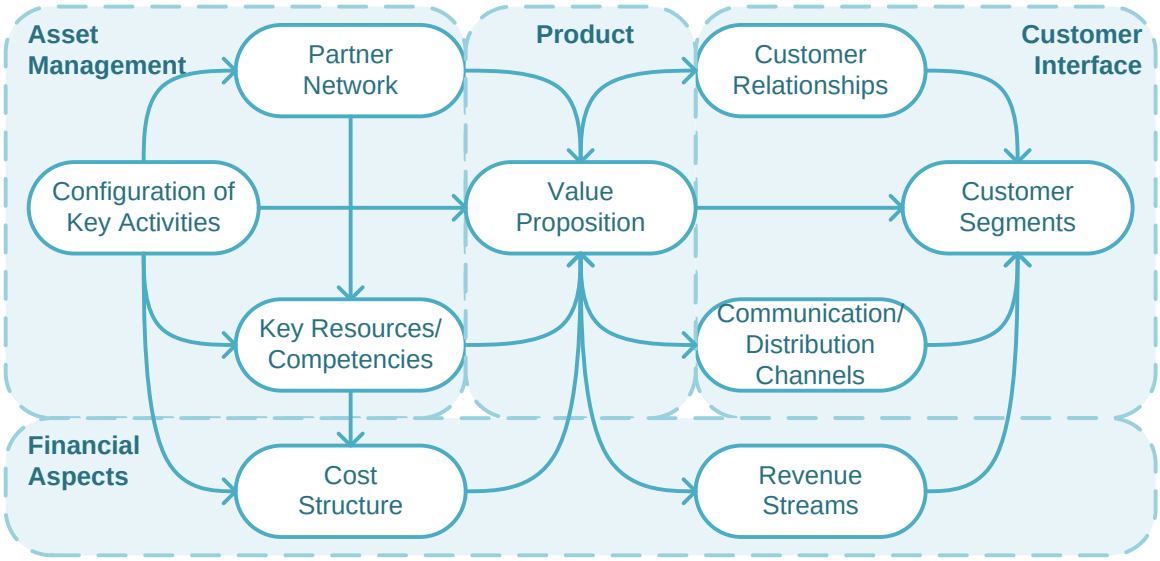

Figure 11 - A business model and its building blocks (Osterwalder A. , 2005).

Value Proposition

From the point of view of Chesbrough, a new innovation, the Value Proposition is held in the new technology. More abstract, the Value Proposition is what you as corporation offer to a market or a customer (which also might be the next link in the value chain), that satisfies in a specific need of that market or customer. It might be the solution to a problem which that customer has. The value of your offered solution is determined by a few aspects, including how big the problem is to your customer, the acuteness of the need for a solution, and the benefit of

the solution to the customer. These all add to the perceived value of your offer to the customer.

The customer, obviously, is of importance in the determination of your Value Proposition. Therefore the next step in business modeling is to determine your customers, how you communicate with them and distribute your Value Proposition to them and what kind of relationships you maintain with them. But the Value Proposition is composed by other elements; your Partner Network, the configuration of you key activities, your key Resources and Competencies, and of course the costs you have to make to achieve aforementioned three elements. Those will be the last steps of the business model design.

> ***Music Industry***
>
> *The Value Proposition of Sony BMG is to offer music to the customer. This music comes from talented musicians. Sony picks those of whom they think the majority of the customers will like.*

This building block is closely related to the value discipline 'Product Leadership' of Treacy & Wiersema in that it focuses on an innovative, excellent product (Treacy & Wiersema, 1995). Porter defines competing on 'differentiation' as one way of sustaining competitive advantage against your competitors (Porter, 1985).

Customer Segments

As mentioned in the previous section, the Value Proposition and the customer, or market, segments are closely related. A segment is a group of customers with the same characteristics. The Value Proposition is determined for each Customer Segment, or the other way around, the Customer Segments are determined for the different Value Propositions of an organization. Sometimes it might be better first to determine the Customer Segments and next find proper Value Propositions for each segment.

The satisfaction of a customer's need should be turned in to a Revenue Stream. You need to know the customer in order to know what value you should create for him or her and where you should focus your activities in order to create or capture these values. Therefore it might be that, with the same technology but a different customer, a different value should be created. Famous is the case of Canon entering the printing market, which up till then was dominated by Xerox. Canon targeted the small businesses and home consumers, and took a fair bit of the market share

> ***Music Industry***
>
> *Sony BMG focuses at Customer Segments that will buy CD's. The best Customer Segment would be a large group with a similar music taste, the short neck of the music taste distribution. In that way, one musician will satisfy many customers.*

from Xerox, which in turn had always targeted the big corporations (Chesbrough H. , 2003, p. 74). A smart business model made the low-end focus of Canon successful, in this seemingly impenetrable industry.

Communication and Distribution Channels

Once the Customer Segments are mapped, you need to determine how you are going to communicate with your customers. This can be by advertising, promotion teams, websites, phone inquiries, and so on. Of course also the Internet plays a growing role since its commoditizing from around 1995. Communication not only includes sending your message to the customers, but also to hear from the customers their reaction on your Value Proposition. In addition you need to know how well your channels work, and by which means you reach which Customer Segments.

> ***Music Industry***
>
> *Sony BMG distributes most of their music on CD's, through music retail shops. But music also is send to radio stations. Promotion often is more varied, including magazines, radio, and TV advertisements.*

Channels not only include the flow of communication between you and the customers, channels also include how you offer your Value Proposition to them. You should determine the best distribution channel for each of your offerings. This, of course, heavily depends on what this Value Proposition is. Be it an online service, then the Internet will be your channel, which results in low costs. Be it a tangible product, then it might be delivered through a retail shop with additional transport aspects. Or you might use both channels for the deliverance of your tangible product and for the after sale services.

Customer Relationships

Customer Relationships include the type of relation you maintain with each Customer Segment for each Value Proposition. Important is the expectation you create with your customer. Different customers expect different relationships, for example customers paying more expect more.

Customer Relationships has great overlap with Customer Relationship Management (CRM), which also is about how you create an appealing environment in which the customer wants to identify himself and what a customer is willing to pay for that. Closely

> ***Music Industry***
>
> *The relation Sony BMG creates is per Value Proposition (commercialized artist). They aim to create an appealing bond with the customers to an artist. This is their institutional branding to the customers.*

related to the Customer Interface of the business model is the value discipline 'Customer Intimacy' of Treacy & Wiersema (Treacy & Wiersema, 1995).

Revenue Streams

The Customer Interface for a certain Value Proposition is now described. But for the Value Proposition you offer to the customer, you want something in return. That is called the Revenue Stream. The Customer Interface of the business model needs to convert your offered Value Proposition into revenue. Those Revenue Streams might be the profits of selling products, renting products, transaction fees, advertising fees, subscription models, or even giving away a Value Proposition.

> ***Music Industry***
>
> *The Value Propositions of Sony BMG to each of the Customer Segments generate the Revenue Stream. Mostly sold music.*

The overview of the Revenue Stream for each Customer Segment and each Value Proposition gives insight in the contribution of the different Customer Segments to the total Revenue Stream. This might help in determining the effort you want to put into the value creation or capturing for each Customer Segment.

Key Resources and Competencies

On the Asset Management side of the business model, first the Key Resources and Competencies block shows up. Here you need to describe which resource your corporation has internally, like human resources, building materials, and capital. They also might be your competences, like knowledge, data, or IT infrastructure.

> ***Music Industry***
>
> *The key Resources and Competencies of Sony BMG are their ability for talent detection, their music labels, and their distribution network.*

Some of these core capabilities might be increasingly difficult to measure, like your brand equity or expertise. You should ask yourself whether each resource is needed to create the Value Proposition you deliver. Your Key Resources and Competencies are highly accountable for how your corporation will sustain competitive advantage in how you gain differential access to these resources (Wernerfelt, 1984).

Configuration of Key Activities

The Configuration of Key Activities is a highly accountable building block for sustaining competitive advantage in how you design your internal processes to create value for the customer, when they are difficult to imitate (Wernerfelt, 1984). This block determines the

configuration of your Key Resources and Competencies mentioned in the previous building block. Having the right resources and competencies is one thing, but how to apply them to create a Value Proposition is another one.

> ***Music Industry***
>
> *Sony BMG has a limited shelf space. Therefore, they need to focus their operations in the short neck of music distribution. Their main activities are talent detection and talent marketing.*

Partner Network

Your Partner Network is the last building block on the infrastructure management side of the business model. This block determines who the partners and suppliers are that you work with to create your offered value. Therefore this block sometimes is called value network. This block gains importance since networks are increasingly important in today's economy, a network economy. Also, the value chain is more and more becoming a value network, where the customer also might be someone helping on new product design. This block also determines which activities the corporation does by itself, and which activities should be in-sourced, or out-sourced to obtain the required resources for your Value Proposition. Finally the relation of your Value Proposition and that of other corporations is determined here, for example by finding complementary products that increase the value of your proposition.

> ***Music Industry***
>
> *The partners of Sony BMG are of course first the talented musicians. But also producers, and the ones responsible for distributing the music, and those accounting for the marketing aspects.*

The Asset Management side of the business model is closely related with the value discipline 'Operational Excellence' of Treacy & Wiersema (Treacy & Wiersema, 1995). Not the partners themselves are part of the operations, but the ability to incorporate the necessary input of partners into your operations.

Cost Structure

The costs of the running a business according to your business model is determined in the Cost Structure building block. Here, you can specialize the costs by sorting them in high to low order, and by referring them to other building blocks, like resources or Customer Segments. This way the profitability of a value offering can be determined. The Cost Structure also gives insight in the demanded prices of your offerings and the justification of target

> ***Music Industry***
>
> *Most costs of Sony BMG are in marketing and the distribution of music.*

margins. Competing on 'costs' is another way defined by Porter in sustaining competitive advantage against your competitors (Porter, 1985).

Notice that the financial result of your business is determined by the results of the Revenue Streams minus the results of the Cost Structure.

4.3 Business Model Design

Both Chesbrough and Osterwalder stress the complexity of designing a business model. In this process, actors out of all places of the organization should be involved, to ensure that each part of your organization is included in the business model. As mentioned at the beginning of this chapter, a business model is needed because the complexity of the interaction of all business units cannot be overseen by one person.

Business models have been grown in many kinds, all referring to a certain realization of the generic business model as presented. For instance, a razor-and-blade's model suggests giving away, or charging low for, some of your Value Proposition (a razor), while generating revenues on other Value Proposition's (the blades). A subscription-based business model is often seen with news papers, telephone and Internet providers, or sport schools, and suggests paying a temporary fee to get unlimited access to some Value Proposition for the time being. Further, there is the auction business model, the monopolistic business model, the low-cost-carrier business model, and so on. Finally hybrid forms also do exist.

This chapter answered the fifth sub-research-question, 'What are business models and what is their role in running a business?' This was needed to be able to relate Social Computing to the way we do business. That business models will change, or are changing, is something we can see in everyday business life. But how they will change, for instance due to Social Computing developments, is something that will be shown in the next chapters. Tapscott & Williams for now suggest new business strategies as "… *models where masses of consumers, employees, suppliers, business partners, and even competitors co-create value in the absence of direct managerial control*". (Tapscott & Williams, 2007, p. 55)

Chapter 5

Social Computing Support for Business Models – the Method

Up till now, mostly existing concepts, theories, and ideas are described. This chapter will now extend upon the theoretical framework built in the past chapters. The idea is to look again to business models, only now with the Social Computing principles in mind. The aim of this chapter is to create a method for examining how Social Computing supports the different business model building blocks. The next chapter will apply this method and will look at the results of this application.

Although the application of Social Computing in an organization often is referred to as Enterprise 2.0, according to McAfee (McAfee, 2006), the school of Enterprise 2.0 limits itself to the intranet of the company. This research strictly does not want to focus on an organization internally only, but also wants to look outside the company and to the Internet. This research

therefore promotes to broaden the term Enterprise 2.0 accordingly. If so, this research would fit in perfectly.

5.1 Method

There are different ways to find supportive relations between the Social Computing principles and a business model. The aim is to find relations which support the business model, or elements thereof. How, or whether, a Social Computing principle supports a building block. Therefore, a matrix is used as starting point, with on one axis the business model building blocks and on the other axis the Social Computing principles, as depicted in Figure 12. This probably is the most simple and straight forward method, but it gives a good starting point. In this matrix it is possible to mark those fields where a principle supports a building block.

Another method is to map the Social Computing principles on a business model, like depicted in Figure 13. In this figure, which is an example, the Social Computing principles (being SCP1, SCP2, and SCP3) are plotted on parts of the business model where they provide most support. This appears to be more complicated, since the principles are not listed but need to be thought of, and the business model shows more information then might be needed to find direct supportive relations.

		Business Model Building Blocks								
		Value proposition	Customer segments	Communication and Distribution channels	Customer relationship	Revenue streams	Key resources	Key activities	Partner network	Cost structure
Social Computing principles	User Generated Content									
	Network Effects									
	Collective Intelligence									
	Unbounded Collaboration									
	Long Tail Focus									
	Intuitive Usability									
	Enabling Services									
	Lightweight Models									
	Open Platform									

Figure 12 - The empty matrix model.

The first two methods are both model-driven; start with a model, which afterwards can be applied to business. The other way around would be data-driven; start with business, say business cases, and find information from it to create a model. It would be possible to first look at case studies and next extrapolate the lessons learned and apply those to the matrix model.

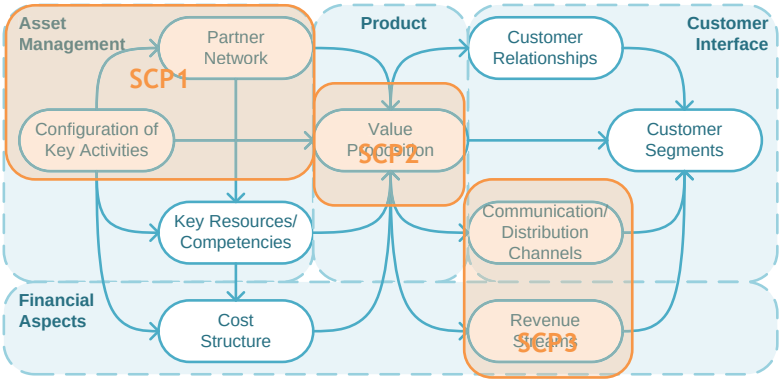

Figure 13 - The mapping model, an example.

But case studies could also be used to support a model driven approach: First, create the matrix model, and next, find case studies to found the findings with. This approach probably will be better, since it seems the simplest approach. Therefore this chapter will start with the matrix model of the first method, and look at the individual cells, indicating supportive relations. That way it is possible to observe whether there are multiple effects of one Social Computing principle on a business model building block. Next, these effects can nicely be plotted on the business model by using the mapping model of the second method. At that moment cases from the music industry seem suitable to clarify the relations at hand.

Experts in the field of Social Computing and/or business models will be asked to fill in the matrix, to obtain more objective data. This will be done through semi-structured interviews. This approach is similar to the Delphi method. It is a method to structure a process of allowing a group of experts, to deal with a complex problem in order to find consensus (Linstone & Turoff, 1975, p. 3). The Delphi method is often used in forecasting difficult situations. Therefore it seems suitable to this situation, since this research has been highly explorative with emerging developments in the field, at the time the research has been conducted. The subject is evolving at the moment, so there are not many references to compare the research with. This makes validation difficult, but the Delphi method enables to do this qualitatively.

5.2 Interviews

The interviews are used for several goals in this research. First, they are used to show the principles describing Social Computing to the interviewed experts. Although that part of

research was based on literature research to complete our theoretical framework, it will be very interesting to see whether the experts agree with our model. This may confirm the findings, although the interviews are not in the first place to validate the Social Computing principles.

Next, which is the main reason for the interviews, the interviewed experts are asked to mark supportive relations between the Social Computing principles and the business model building blocks. This data is the core of the interview and gives the opportunity to find these relations based on different opinions.

The interviews will be semi-structured. Parts of the interview will be equal to each expert, like the discussion about the Social Computing principles model, and the filling of the matrix, to be able to compare their answers. But the floor will definitely be given to the interviewed expert as well, to enable him to share his ideas, opinions, and thoughts about the subjects, and their relations. This will give a lot of additional data to use in the analysis, validation, and conclusion drawing in the next chapters.

Experts

Since from the start this research is an explorative one, the aim is not to find hundreds of respondents, because this research will not proceed with a deep statistical analysis of the data. For that, the field is too new, and the knowledge about this field too shallow. This research is more about finding rough relations and directions for further, maybe more statistical, research. Therefore 10 – 15 experts should be sufficient, according to Miles & Huberman (1994, p. 27).

These experts should be familiar with Social Computing. Only a good understanding of this topic will result in objective contribution the model and valid filled matrices. The vision on Social Computing of this research will be explained by showing the found principles. This will be discussed with them, but only after they mentioned their description of Social Computing. When only this research' presentation of Social Computing would be their input for filling in the matrix, their answers would be biased towards what is presented.

They also should have little notion about business models. But the concept of business models is very well explainable and leaves not as much room for interpretation as the concept of Social Computing does.

Questions

The interview exists out of three phases. Phase one is sort of a warming up, getting to know each other, and getting the level of the discussion. In this phase, the findings of Chapter 2, on the innovation development cycle and the role of standardization in it, will be presented, and discussed.

Phase two is about the Social Computing principles model. Before showing this research' model, the expert will be asked to gives his ideas, examples, website, organization, or whatever he might think of, when thinking of Social Computing. Although the expert will also be asked

whether he considers himself a Social Computing expert, this part of the interview will show whether he does have an opinion about it, and how broad and founded his opinion is. All he sums up will be written down, with the goal to compare and match his ideas with the one in this research' model; do the concepts he mentions fit somewhere in the model? That is the validation part. After his waterfall of ideas, the model of this research will be shown. Each principle will be explained and discussed to see whether he did or did not mention it, or agrees with it.

Finally, phase three is about the business models. First, the expert will be asked whether he is familiar with business models. If needed, the business model as described in Chapter 4 will be explained. Next, the expert will be explained how and why relations need to be found. It is stressed that the business model is the goal, and Social Computing should function as an enabler, which make the relations supportive. It is also stressed to look for direct relations. In the end, everything in the business model aims to create a Value Proposition, but this doesn't mean every principle related to one building block, always relates to the Value Proposition as well. Thinking of cases might help the expert to find relations.

Long has been thought about whether any restrictions should be given to the marking of cells. One could ask, for instance, to fill in only one cell per row, or per column, which will force the expert to find prioritized relations. But that is not what this research is looking for. One could also ask to distribute, say, 20 marks over all cells in the matrix. Or one could ask to share three marks in the cells of one row or column. But these restrictions all assume there would be such an optimal amount of marks, or only one or two marks per building block or principle. This assumption will not be made, simply because there is nothing to found such an assumption upon. Therefore it is left to the expert to decide how many cells he wants to mark. This might result in many marks, or a row or column with all cells marked. So be it, if that is how the experts sees the relation, it very well could be right. That is why experts are involved in the first place.

Although some ideas about how to fill in the matrix can be thought of, it seems not necessary to share them, since this research doesn't test a hypothesis, and the interview should be as objective as possible. Exhibit 3 shows an overview of the structure and questions of the interview. An interview should take between 60 and 120 minutes.

Phase 1 - Standardization

This phase is used as warming up; explanation of the innovation development cycle, the expert reacts in a discussion. The model is not presented for validation.

1. Do you recognize the role of standards in technological innovations?

Phase 2 - Social Computing

The goal of this phase is to examine whether the principles mentioned in this research' model are recognized principles that underlie Social Computing.

2. Do you consider yourself a Social Computing expert?
3. How would you describe Social Computing (Web 2.0)?

The mentioned keywords are written down. The Social Computing principles model will be shown.

4. What do you think of these principles?
5. Do the principles in the model correspond with the ones you mentioned?
6. Can we clarify the differences?
7. Are there principles missing, or is the overlap too big?

Phase 3 - Business Models

The goal of this phase is to examine whether Social Computing can be related to business models in a supporting way. Explanation of the business model.

8. Do you consider yourself a business model expert?

Show the empty matrix.

9. Can you relate Social Computing to the business model?
10. How would you structure the Social Computing Principles and the business model?

Exhibit 3 - Interview structure and questions.

5.3 Processing

The interviews will generate a lot of information and some data. As said, the phase on Social Computing principles will generate information on whether the model is complete, too broad, or too narrow. It might deepen the views on the principles.

The matrices will yield interesting data. Although the amount of cases will not be enough to do a thorough statistical analysis, the data gives a good starting point in relating Social Computing to a business model. First, it is possible to see whether the experts were able to fill in the matrix at all, indicating whether a good approach is chosen. Next, when the matrices are filled in, it is possible to see whether there exists coherence between the experts. Third, since the result will be represented in a burn chart with often marked cells colored dark, and rarely or not marked cells colored light, it will give a quick overview of where the stronger relations exist, where the weaker ones exist, and where no relations exist. Finally, with this data it will be possible to do some careful statistical analysis. This analysis includes a clustering of the

principles per business model part. But it is necessary to remain very modest with those results, since the amount of data is too less to perform firm statistical analysis. First, the next chapter will show the results of the in next chapter.

Chapter 6

Social Computing Support for Business Models – the Results and Validation

This chapter will first focus on the results of the interviews. With these results it is possible to validate the Social Computing principles. With the results of the validation process the findings can be remodeled and the model can be updated with the experts their input. This will be done in the second section. Next, it is needed to examine whether these principles indeed support a business model, and if so, how. Relations between the principles and a business model will be shown in the third section, which will elaborate on the data, the value that can be attached to it, how it should interpreted, and how to find relations and directions for further

research. The approach needs to be very descriptive in this section, considering the low amount of cases. Any statistical approach should be done very carefully, and with the proper value attached to it.

6.1 Experts

Fifteen experts out of a list of 25 were approached. One didn't react, probably because he was a little bit too much out of reach (a professor in the field of Enterprise 2.0 at a university in the United States). Another one did want to meet up, but couldn't because of a lack of time. The remaining thirteen presented themselves available for an interview. This amount can be considered enough for this research (Miles & Huberman, 1994, p. 27). We met at locations suggested by the expert. All the experts fulfilled the criteria of being familiar with Web 2.0 or Social Computing. Some of them were also very familiar with business models, since they are co-founders of firms in the field of social media, or related. Table 3 gives an overview of the interviewed experts. Their names are blinded for privacy reasons, but a short description of their background and current activities is recorded, to be able to take this information into account when analyzing the results. An outline of each of the interviews can be found in the appendices.

ID	Description
01	Completed his PhD in the field of business models in Switzerland. He currently works as a business consultant and is managing partner of that firm. He speaks on the subject of business model innovation.
02	Works as a managing business consultant in the field of SOA and Business Intelligence, and speaks on the topic of Enterprise 2.0.
03	Is project manager at a website bureau and works on initiatives in new media fields.
04	Works as business consultant at a firm specialized in enterprise social networking and knowledge sharing.
05	Is a business consultant and director of the innovation initiative at a large business consulting firm.
06	Works at a marketing business innovation company.
07	Is performing his PhD in software development and is consultant at a firm specialized in online content management systems.
08	Is an information manager of one of the divisions of a large international industrial corporation based in the Netherlands.
09	Works as a business consultant at a firm specialized in creating innovation communities within organizations.
10	Has a background in journalism and the Internet. Is a freelancer in the field of social media.
11	Is an interactive media resultant and managing partner of several start-ups in new media.
12	Is a freelance specialist in the field of online and mobile marketing and sales and co-founder of some mobile oriented start-ups.

13	Holds a PhD in chain-informatization, is professor at a university in that field, and is strategic advisor at the ministry of justice in the Netherlands.

Table 3 - Overview of interviewed experts.

It often gives some difficulty to find respondents for a research. But finding experts willing to cooperate in these interviews was not difficult. Therefore it can be concluded that the field of Social Computing is new indeed, and many people are interested in any research arising in this field.

6.2 Validation of Social Computing Principles

The first goal of the interviews was to validate the Social Computing model. The experts were asked for their description of Social Computing after which this research' description was shown, to compare both. This section will now look at what the experts thought and, when necessary, make changes to the model of Chapter 3.

When looking at the ideas the experts have by Social Computing, it seems reasonable to conclude that most keywords they mentioned, do match one of the principles of the model. It could be that they mentioned things a little bit different, but intend the same. Or that they gave examples of companies, websites, or services which apply a certain principle. This confirms that the chosen principles do underlie Social Computing.

One, or a few experts mentioned an idea which none of the other experts mentioned. Such appearances were not taken into consideration for changing our model. Such an idea, for example, was innovation, or innovation by individuals, or the stimulation of innovation (Expert01, Expert02, and Expert05). It is considered that innovation is not a Social Computing principle itself, but surely that Social Computing may help enable innovation, because of more easy interaction, communication, and collaboration. These enabling aspects of innovation are covered enough in Enabling Services, Intuitive Usability, and Unbounded Collaboration. Another thing mentioned as missing too much is mobile telephony. Quite a few experts (Expert02, Expert03, Expert04, Expert11, and Expert12) mentioned something about mobile telephony. Out of these, two (Experts 02 and 12) found it was undervalued in the model. I do actually believe this is not the case, since it is covered in Open Platform, by stressing that the platform doesn't have to be the Internet alone. It is even one of the reasons to call Open Platform that way, and not, for instance, the Internet as a platform. Finally, personalization, or personalized services, was mentioned by several experts as missing (Experts03, Expert10, and Expert11). This aspect has been long thought about, but this idea too is more of a result of Social Computing enabling principles. In this case the principles Enabling Services and Intuitive Usability.

The experts did forced this research change the model a little. Changes are made in the labels of the principles, to make them better cover the idea I have in mind with a principle. All the experts did follow me on the principles, but some helped to find a more suitable label. Flexible Services has been changed into Enabling Services and Cooperation has been changed into Unbounded Collaboration. The content of these principles didn't change.

Several of the experts (Expert01, Expert02, Expert06, and Expert13) noted that the principles are not on the same abstraction level, are different concepts sometimes being technologies, sometimes being models, sometimes social trends. This has to be admitted. The principles are somewhat different, making it harder to compare them, or relate them to something else as will be done in the next step. But the first goal was to find Social Computing principles. That those principles subsequently happen to be different of a kind doesn't make them less of a principle. For me, it emphasizes again that Social Computing is a broad topic covering different abstraction levels, like both technological as well as social trends.

6.3 Relations between Social Computing and Business Models

After discussing the Social Computing principles model with the experts, the next phase of the interviews was introduced; the relation between Social Computing and business model innovation. Each expert filled in the matrix, although some found it hard because of the differences in the principles as mentioned in previous section. The resulting individual marks are counted and placed in a burn chart matrix, which is depicted in Figure 14.

Social Computing principles	Business Model Building Blocks								
	Customer segments	Value proposition	Com and distr channels	Customer relationship	Revenue streams	Key resources	Key activities	Partner network	Cost structure
Long Tail Focus	9	5	7	5	5	3	3	4	6
User Generated Content	4	10	4	9	6	4	4	4	5
Open Platform	3	5	6	5	4	6	6	9	6
Intuitive Usability	6	5	4	9	2	2	4	1	1
Collective Intelligence	3	7	4	9	4	6	7	9	6
Network Effects	3	7	9	6	4	2	4	4	6
Lightweight Models	5	6	5	5	5	6	8	6	10
Enabling Services	5	4	7	8	5	4	7	7	6
Unbounded Collaboration	5	6	8	9	5	5	6	12	6

Figure 14 - Burn chart matrix of the results of the expert interviews.

Per field, the matrix shows numbers, referring to the amount of which according field is marked. The color of each field corresponds with this number; the higher the number, the darker the color, the more often a relation has been found, the stronger the relation can be considered. And the other way around; the lower a number, the lighter the color, and the weaker the relation can be considered.

6.4 Matrix Description

First, this data will be approached in a descriptive way. Since a qualitative explorative research is performed, it is necessary to look carefully to what can be seen in the few cases. With thirteen cases, the amount of marks for a relation could be thirteen at most. But there is no field marked thirteen times. There is no relation that all the experts agree on.

The most often marked relation appears to be between Unbounded Collaboration and Partner Network. Twelve out of thirteen experts are agreed that the

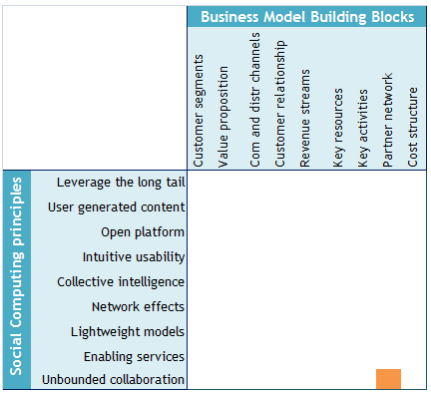

Figure 15 - Twelve or more marks.

principle of Unbounded Collaboration can support creating a Partner Network, see Figure 15. This is not a surprise. First, some experts noted that the principle and the building block are almost the same. This is not the case, but they do really are very similar, especially when you consider that organizations more and more become network organizations with collaborating entities. Also users are more and more involved in product development, making them sort of partners for that organization. This probably also is why any relations between Unbounded Collaboration and customers show up after a few more steps down.

When going one step down, looking at fields marked eleven or more times, there are none. One more step down shows all fields marked ten or more times, see Figure 16. Two new fields appear, being User Generated Content supporting Value Proposition and Lightweight Models supporting Cost Structure. The first relation can be explained by the apparent awareness of the experts of the fact that users are able to share and enrich content more and more, instead of getting content provided by an organization. If content is the Value Proposition for an organization, the relation is even more understandable. The second relation is a little harder to explain. But when looking closely to Lightweight Models, it covers agility, scalability, and leanness of an organization, which is important because the environment is changing faster and faster. In such a situation, having a flexible business model helps keeping costs low when you have to change your organization setup again.

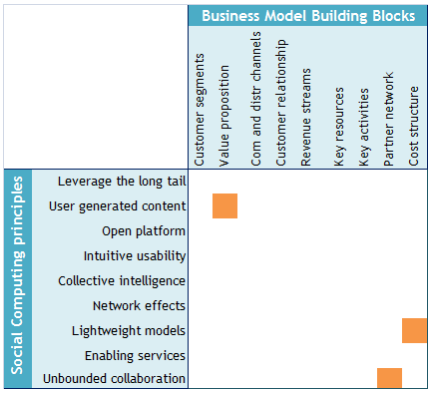

Figure 16 - Ten or more marks.

One more step down, facing nine or more marked fields, a sudden increase to eleven relations appears, see Figure 17. Especially the relations with Customer Relationship draw attention since there are four of them in this view. Accordingly, the experts do agree that many of the Social Computing principles can support the relation with customers of an organization. They marked User Generated Content, Intuitive Usability, Collective Intelligence, and Unbounded Collaboration. An increase of two relations in the Partner Network column, with Open Platform and Collective Intelligence, can be seen as well. The Partner Network remains important according to the experts, extending on the findings with the strongest relation. Interestingly to notice, the two building blocks Customer Relations and Partner Network are the most important connections of an organization to its environment. Exactly in those parts of the business Social Computing can be supportive, according to the experts. Those are the places

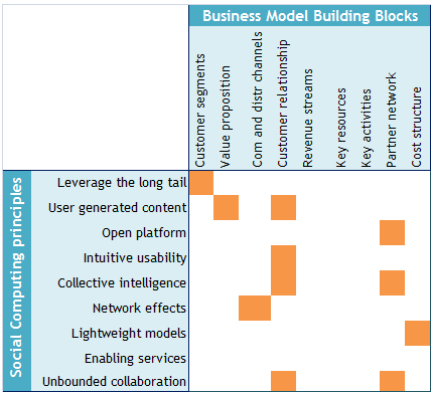

Figure 17 - Nine or more marks.

with probably the densest information transferring, to suppliers and to customers. Or between input and throughput, and throughput and output, in a model found in many standard organizational works (Daft, 1991). Finally two more relations appear in this view. One between the Long Tail and Customer Segments, which shows experts see possibilities for new or other Customer Segments when taking the Long Tail in mind. And one between Network Effects and Communication and Distribution Channels, which is harder to explain, but which indicates that experts apparently see that the increasing value of a good or service, because of increased usage, supports the channels for communication and distribution.

Going down one more step, facing eight or more marked fields, we see an increase of only three relations, see Figure 18. Again, one relation appears in the Customer Relationships column, in relation with Enabling Services, which indicates that the experts agree that the interchangeability of services is supportive for the relation with the customers of an organization. Next, the relation between Lightweight Models and Key Activities indicates that the experts are agreed that, when taking a lean and agile approach of your business, this will affect the essential activities you have to do to create the proper Value Proposition. Finally, Unbounded Collaboration supports the Communication and Distribution Channels, which again is an extension of interaction with the environment of an organization which has been seen previously. In this view, Unbounded Collaboration is the most important principle, with three relations. This, too, extends on what previously has been noticed about collaboration.

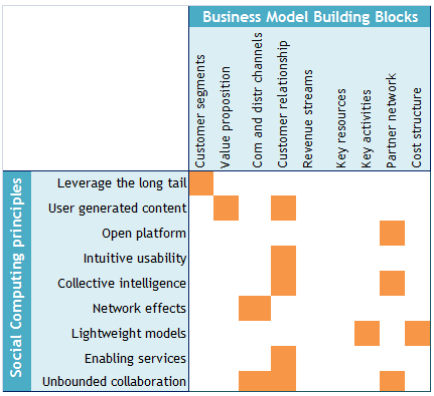

Figure 18 - Eight or more marks.

Another step down increases the amount of relations with quite a few again, seven to be precisely, see Figure 19. But most remarkable in this view are the columns with no marks at all, being Revenue Streams and Key Resources and Competencies. Customer Segments and Cost Structure do only have one mark. Experts might have seen the building blocks representing the Financial Aspects more as results, or as derivates, of the business model parts they represent. Asset Management for Cost Structure and Customer Interface for Revenue Streams. Therefore most of the principles don't offer immediate support for these building blocks. But the other two rather empty columns, Customer Segments and Key Resources and Activities, are unclear, leaving the remark that the

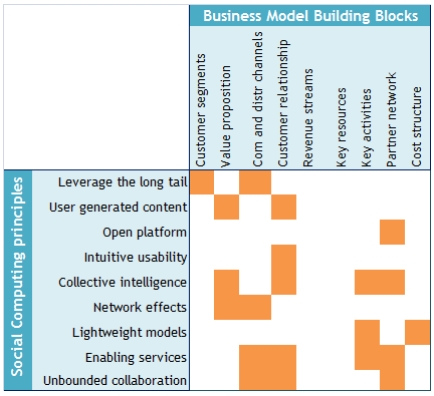

Figure 19 - Seven or more marks.

experts as of now are agreed that not many opportunities exist for those building blocks in relation to Social Computing.

Going more steps down doesn't give clear new insights. The matrix becomes filled more and more, with an increasing amount of relations appearing, about fifteen per step.

When going further down, it is more interesting to look at the fields remaining empty. Down to three or more relations, there are five of such fields, see Figure 20. Four of them relate to Intuitive Usability, one to Network Effects. Apparently the experts didn't find that Intuitive Usability directly supports doing business. Especially not in relation to the Financial Aspects, again probably because of its derivate status, and in Key Resources and Partner Network. Also Network Effects and Key Resources don't appear have a direct relation. Notice that Key Resources is the building block with most fields remaining empty at a very low amount of required marks.

Finally, the two fields that remain empty, even at only two or more required marks, are Intuitive Usability in relation with both Partner Network and Cost Structure, see Figure 21. Viewing one or more relations makes all fields marked, indicating every field has been marked at least one time by one of the experts.

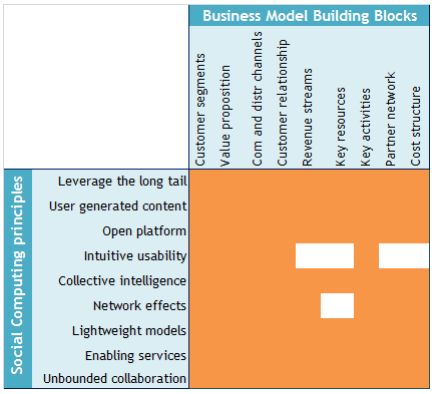

Figure 20 - Three or more marks.

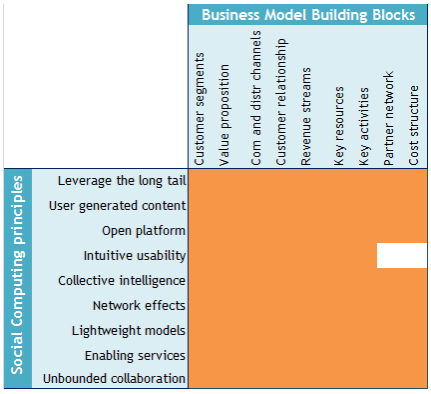

Figure 21 - Two or more marks.

6.5 Frequencies Analysis

Next, let's take a look at the frequencies of both the principles and the building blocks. In both Figure 22 and Figure 23 no principles or building blocks appear that are not covered, nor do they vary much in amount compared to the other principles or building blocks. Of the principles Intuitive Usability is marked the least, which was already noticed, since this principle contains fields remaining empty at even only two or more required marks. Already noticed too, is that Unbounded Collaboration is marked most often with one of the principles.

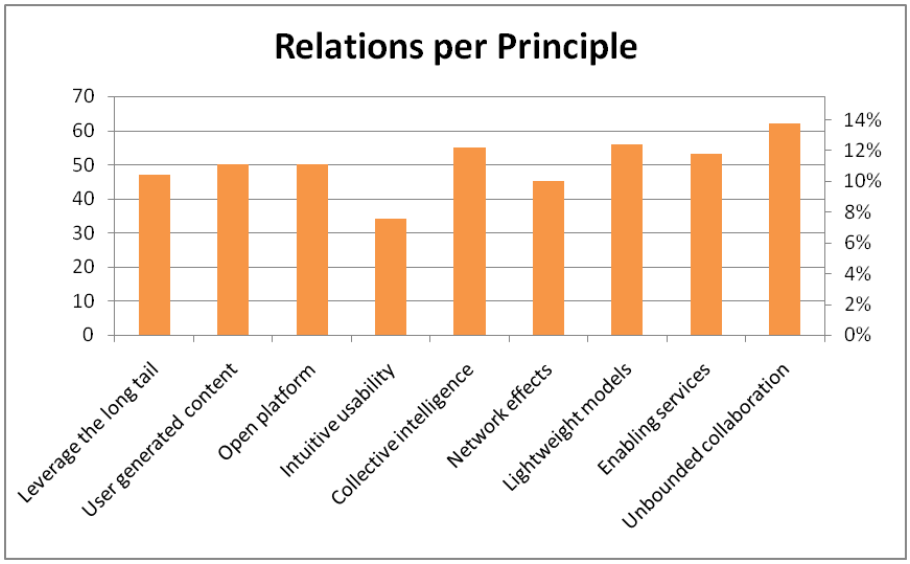

Figure 22 - Amount of relations per Social Computing principle.

Also on the building blocks no new insights; Key Resources is marked the least and Customer Relationship the most, but the differences are not very high.

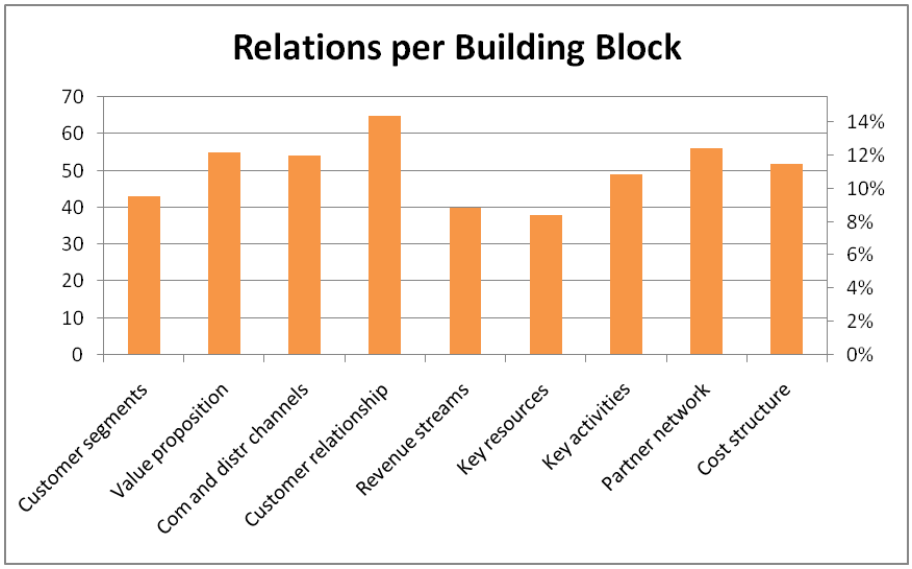

Figure 23 - Amount of relation per business model building block.

6.6 Experts Coherence Analysis

After analyzing the matrix, the experts will be analyzed. In Table 4 an overview is depicted of some basic data of how the experts filled in the matrix.

ExpertID	Count	0	1	2	3	Total	Index	Value Discipline
01	51	1	1	3	10	15	0,29	Customer Intimacy
02	72	0	2	4	15	21	0,29	Customer Intimacy
03	33	0	1	1	2	4	0,12	Customer Intimacy
04	43	0	1	1	5	7	0,16	Customer Intimacy
05	37	0	0	0	5	5	0,14	Customer Intimacy
06	15	0	0	0	2	2	0,13	Customer Intimacy
07	41	0	0	2	6	8	0,2	Product Leadership
08	20	0	0	0	1	1	0,05	Operational Excellence
09	29	0	1	3	8	12	0,41	Customer Intimacy
10	21	0	0	0	0	0	0	Customer Intimacy
11	30	0	0	0	2	2	0,07	Customer Intimacy
12	43	0	0	1	6	7	0,16	Customer Intimacy
13	17	1	0	0	2	3	0,18	Operational Excellence

Table 4 - Overview of the amount of marks for each expert.

The first column shows the experts' ID. The second column shows how many marks an expert placed in his matrix. The matrix contained 81 fields. The amount of marks placed by the experts differs from 15 up to 72. As mentioned, different amounts make it more difficult to compare the cases, but this research didn't want to load the experts with presumptions. Some sort of an index would be helpful, to be able to better compare the cases. The creation of it goes in steps: The third column shows the amount of fields an expert marked, that no other expert marked. For instance, Expert01 marked one field that no other expert marked, Expert02 marked no fields that are not marked by someone else too. The fourth column shows the amount of fields an expert marked that only one other expert has marked. The fifth column shows the amount of fields an expert marked that only two other experts marked. And the sixth column shows the amount of fields an expert marked that only three other experts marked. The seventh column shows the total amount of these fields per expert. The reasoning is that, when the total is high, the expert marked many fields that no, or few, other experts marked. But, when an expert marked many fields whatsoever, this total value will obviously be higher. Therefore the total amount of rarely marked fields is divided by the total amount an expert marked. This is the index. Now it is possible to compare the experts, and find, for instance that, although Expert04 and Expert12 marked 43 fields, they have a rather low index of 0,16. On the other hand, Expert09 marked only 29 fields, but has an index of 0,41, which is the highest. He is therefore some sort of an outlier, the least coherent with the other experts. But since there were no pre-assumption made about an amount of fields to be marked, he will not be

abandoned as an outlier. The expert most coherent with the others is Expert10, with no fields marked that none or few others marked as well.

The value discipline of Treacy & Wiersema (Treacy & Wiersema, 1995) is printed in the last column. This has been done afterwards. The interviewed experts are studied to find which value discipline bests suits the background of each expert. This is done out of curiosity, trying to find whether it was possible to make a differentiation afterwards. But most experts fit in one discipline, being Customer Intimacy. This is not a big surprise, since Social Computing is most often related to the Internet. Firms and freelancers active in that field often are consulting firms, or service providers, who obviously have to focus most on Customer Intimacy. Omitting the three experts fitting another value discipline didn't change the results very much. Therefore, three experts are either not enough to create differences, or such a differentiation doesn't yield any interesting results at all.

6.7 Statistical Analysis

After interpreting the burn chart matrix, this section will now, very carefully, take some steps into a statistical analysis. Table 5 gives some simple data information. In the first column some information about the amount of marks per relation is printed. The standard deviation is rather high, indicating the strength of relations varied. This is conform previous observations. For instance, the matrix shows a relation marked once, up to relations marked twelve times. The second column shows the amount of marks placed by our experts. Again, a high standard deviation is shown, which correspond earlier notion about a range from 15 to 72 marks placed by experts.

Strength of a relation		Amounts of marks	
Total cases	13	Total marks	452
Mean of cases	5,6	Mean of marks	35
Median of cases	5	Median of marks	33
Modus of cases	6	Modus of marks	43
Standard deviation of cases	2,1	Standard deviation of marks	16

Table 5 - Some simple data information.

In Figure 24 an overview of how often each amount of marks appears is printed. There are no fields with no marks, there are two fields marked once, three fields marked twice, and so on. As can be seen, this frequency distribution tends towards normal.

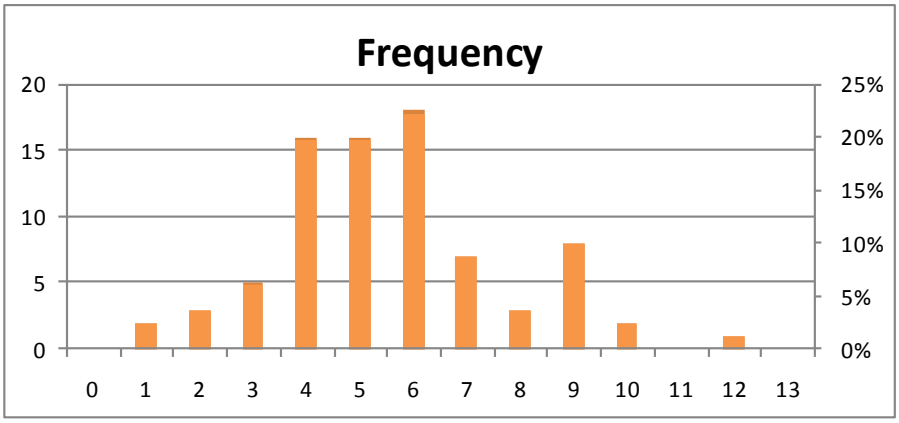

Figure 24 - Frequency distribution per amount of marks.

Next, a cumulative frequency of the amount of marks is depicted in Figure 25. Notice here that, when the amount of marks from one to nine in the fields is summed, almost 100% of the marks are covered. 78 out of 81 to be precise. Only three marked fields are not covered. Since this is the closest to our standard deviation of 2,1 or 2,5% (3 out of 81 is 3,7%), and one time the standard deviation is an indication of significance in a normal distribution, we could take this as a threshold indicating the strong relations. Putting the threshold at nine or more marks results in a view of the matrix as depicted in Figure 17.

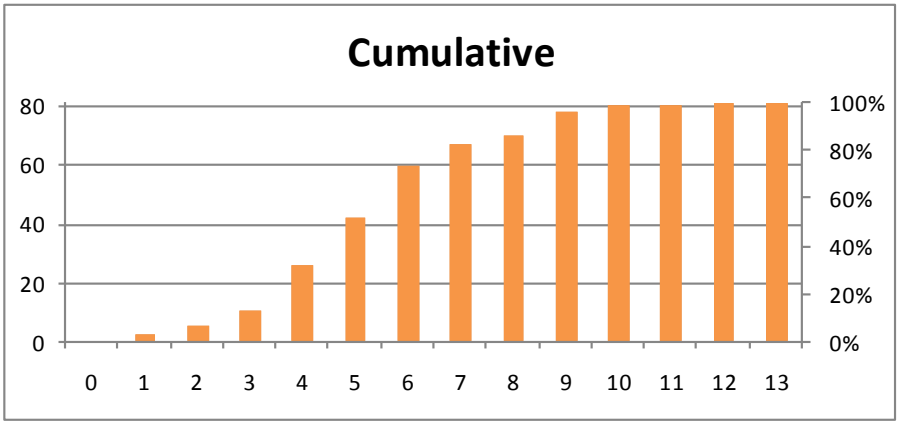

Figure 25 - Cumulative frequency per amount of marks.

6.8 Clusters Analysis

Next, this section describes whether it is possible to make clusters out of the nine principles. It needs to be mentioned again that there are just a few cases, which makes statistical analysis hard, or not as reliable as when more cases were used. But since it is the best

way of finding clusters, an attempt will be made with a cluster analysis and a dendogram. Since there is more than one case and no assumption about the amount of clusters, a hierarchical cluster analysis will be done. Since the clusters need to be created from actually distinct groups, a complete linkage method will be taken. The most common measure is the squared Euclidean distance metric, which will be used. The result is depicted in Figure 26.

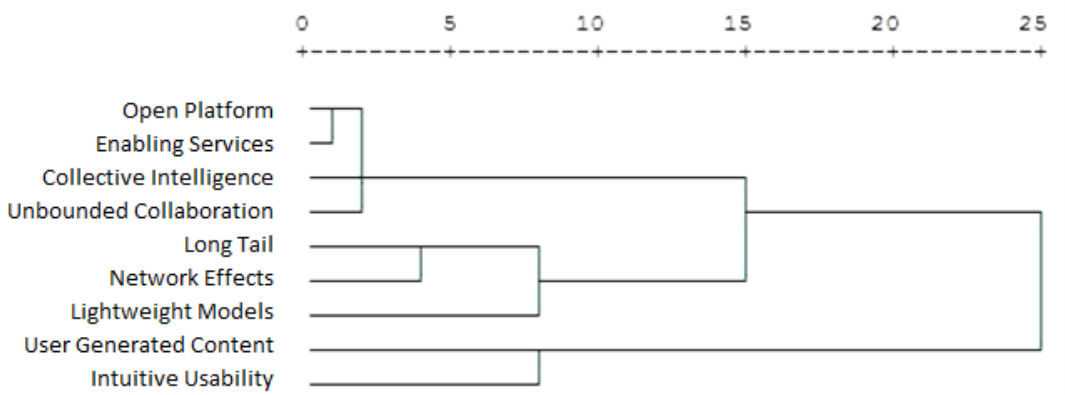

Figure 26 - Dendogram of the cluster analysis of the principles.

On the left, the principles are printed. On the right, the lines refer to the distance metric before two principles assemble to form a group. The distance is depicted above the dendogram. At a distance of one, for example, Open Platform and Enabling Services form a cluster, at a distance of two, both Collective Intelligence and Unbounded Collaboration join the cluster. At a distance of four, a less staunch cluster is formed between Long Tail and Network Effects. This cluster is joined by Lightweight Models, at a distance of seven. In the meantime, at the same distance, User Generated Content and Intuitive Usability form a cluster. At the distance of fifteen the first two clusters come together to form a bigger, less staunch, cluster. Finally, at a distance of 25, the third cluster joins the big cluster. All principles are now joined together into one cluster. Such a cluster would not be of very much use, nor would nine or seven small clusters be. Therefore, a reasonable amount of clusters needs to be found. Between thirteen and fifteen, all principles are joined into three clusters. The distance at which these clusters are formed is less than half of 25. The distance before the three clusters are formed into two clusters is seven, indicating some stability. Both reasons make it reasonable to form these three clusters. Table 6 presents them.

Principles	Open Platform Enabling Services Collective Intelligence Unbounded Collaboration	Long Tail Network Effects Lightweight Models	User Generated Content Intuitive Usability
Cluster label	Open Collaboration	Lean Configuration	User Value
Affecting	Customer Relationships Partner Network	Customer Segments Comm. and Distr. Channels Configuration of Key Activities	Value Proposition Customer Relationships Partner Network

Table 6 - Clusters

Now the clusters are found, a proper label should describe these clusters. The first cluster contains principles covering openness, accessibility, remixability, and interchangeability as basis for collaboration without boundaries. The label 'Open Collaboration' seems suitable. The second cluster contains some flexibility, scalability and focus on all users. The label 'Lean Configuration' has been chosen. Finally, the third cluster contains principles focusing on the user and how and what he contributes. The label 'User Value' covers the haul.

Finally, the clusters can be layered over the business model building blocks which they support most. Therefore the matrix will be of help, indicating which building blocks are most strongly related to the principles in each cluster. For the first cluster, all three principles highly support both Customer Relationships and Partner Network, so the layer covers those building blocks, as shown in Figure 27. For the next cluster, the principles support mostly Customer Segments, Communication and Distribution Channels, and Configuration of Key Activities. This is shown in Figure 28. For the third, the user might also be a partner, so the principles mostly support Value Proposition, Customer Relationships, and Partner Network. This is shown in Figure 29.

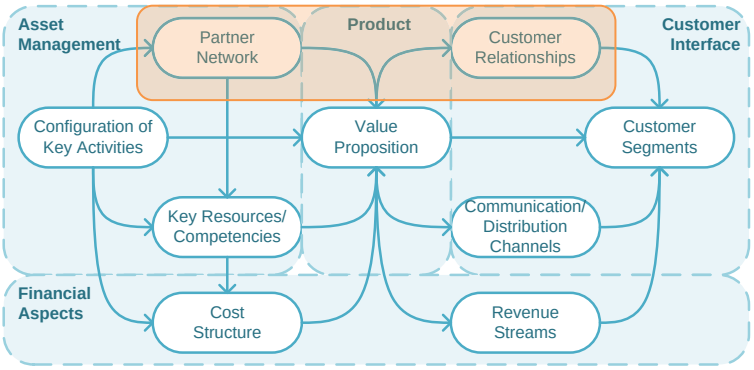

Figure 27 - Open Collaboration in the Business Model.

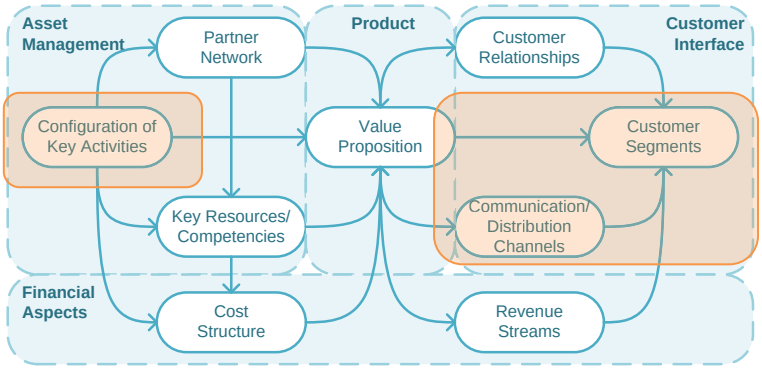

Figure 28 - Lean Configuration in the Business Model.

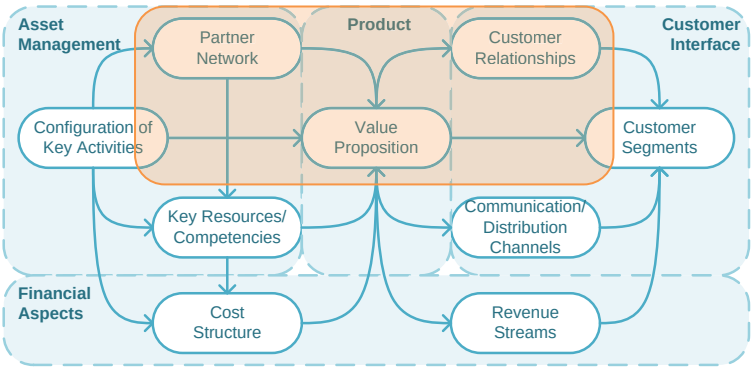

Figure 29 - User Value in the Business Model.

With this layering it is clearly visible where the Social Computing principles, joined into three clusters, mostly support the business model. At these places most opportunities exist for business model innovation. With that result, an answer has been found on the fifth sub-research-question, 'How can business models be innovated based on the found Social Computing principles?'

A few building blocks are not covered one of the clusters. First, the cluster layers present those aspects in a business mode that can most strongly be supported by Social Computing, according to the experts. As mentioned before, the experts probably see the Financial Aspects as derivates of both Asset Management and Customer Interface. Key Resources apparently is decreasing in importance when innovating business, according the experts.

6.9 Application

In this section the example of the music industry from previous chapter will be looked at again. But now with the supporting possibilities of Social Computing found in this chapter in mind.

The Value Proposition in the music industry can very well be created by the customer. When thinking of User Generated Content, it is the user himself who is enabled to create and share music. He is enabled to express himself online and share those expressions on open accessible platforms like MySpace, YouTube, and AmieStreet. The Intuitive Usability of these services makes them highly used. More Value Proposition will be invented, because of the ease of combining them; creating mash-ups. Since the music can be copied in a wink at hardly any costs, value goes to more one-of-a-kind experiences, which cannot be copied.

Next, it is also the user who selects the music he wants to hear. This can be very niche, since there are enough sources and access is easy. Customers are to be found in the Long Tail, small groups, or even individuals, with very diverse music tastes. Size is no restriction, there is enough supply.

The musician can link to his work, his Value Proposition, share it, give it away, and so on. Many bands already did this: Radiohead puts their newest album online for free and just asks for a tip. Prince gave its new album away through a magazine. And there are more examples. 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.

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 needs to be found on other aspects, adjacent stages of a music song. These stages probably will be more focused on experience, live concerts, merchandising, and other aspects of music which remain scarce. Music itself 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 other Key Resources to create his music. Not only his talent, but also his ability to use someone else's input becomes important. Other musicians and 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 him 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? They have to look at adjacent stages. 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, and so on. Everything an artist needs should be covered by one company. This can be seen as the low-end option, leaving the overshoot, and becoming available to the mass. Another option would be to seek new-markets. Most likely those markets will concern some experience, wanted by customers, and that cannot be copied.

Chapter 7

CONCLUSIONS AND DISCUSSION

In this last chapter, the research will be evaluated in the first section, with respect to reliability and validity. In the next section, the different findings and insights from this research will be summarized in the conclusions. Finally, a discussion about the findings and conclusions will be started, and directions for further research will be mentioned.

7.1 Evaluation

Miles & Huberman give a few standards for qualifying a research in their book on qualitative data analysis (Miles & Huberman, 1994, pp. 277-280). These are a little different from standards in quantitative data analysis, or statistical analysis. Qualitative data analysis needs its own terms. Those of Miles & Huberman will be used as directions for evaluating this research.

Reliability

First, let's look at objectivity and reliability. In the introduction a detailed description of the research method and approach was given. The main research question was divided into six sub-research-questions to make the research more tangible. The sub-research-questions were answered in different chapters and will be summarized in the conclusion. Three chapters contained mostly literature research, with chapter 3, about Social Computing, containing an interpretation of the studied sources as well. Therefore the model developed in that chapter was validated by experts, who agreed mostly upon the model. Minor changes were made. Almost all of the interviewed persons were Social Computing experts, making them probably more enthusiastic, sometimes euphoric, about the subject as, for instance, another IT expert, or even a random businessman. But these experts were chosen since they are familiar with the subject and therefore are the best able to see where the possibilities of Social Computing may support business. With all the experts the same interview was performed, and each time the necessary paradigms and theories needed for a next step were explained. The interview outline was made up such that the interviewed experts first had to give their ideas about Social Computing before the model of this research was shown and discussed. Next, the experts filled in the matrix, only guided with some remarks explaining the process, after which their ideas were discussed. Some experts found it difficult to relate the principles to the building blocks, though. But, the interviews yielded similar results about the Social Computing model. Concerning the matrix, the results were coherent enough to assume the experts understood the problem case brought forward with the matrix. The chapter relating both Social Computing and business models covers mostly new ideas. Therefore, it was explained step by step how and why decisions were made, leading to the subsequently step and the conclusions. Data, figures, and tables were presented when it supported a decision or conclusion. Also was mentioned where extra caution was needed, for instance when approaching the few cases statistically. Reviewers, supervisors and others reviewed the research on personal assumptions, values, and biases, and sometimes forced to step down a little bit, for instance in the growing enthusiasm about the subjects at hand as research continued. Data is available in the Appendices, where, from the interviews, dense outlines are created.

Validity

Validity is maybe the most important issue concerning truth value of the research. Do the findings make sense? Are the credible? As said, the Social Computing principles model could mostly be agreed on by the experts. Next, the matrix yielded results which corresponds with what the experts mentioned in describing Social Computing. For instance, most ideas and concepts they mentioned considered collaboration and user involvement, which, in the end, also are the business model building blocks mostly covered by the three clusters. Those building

blocks are Partner Network and Customer Relationships. Therefore, the filled matrices correspond with what the experts mentioned in the discussions about both Social Computing and business model innovation. The experts are described by their background, current positions, and value discipline they focus on most. At some moments during the research, links to existing theories were made, mostly covered already in the introduction and theoretical framework. This research also linked to many sources of emerging theories in the field of Web 2.0, Social Computing and Enterprise 2.0. Areas of uncertainty are identified when appropriate, for instance some harder to explain relations that were found, and the statistical approach of such few cases. Overall, the research has been rather low scale, focusing mostly on the principles, and relating them to a generic business model only. This can make it hard to apply the findings to a specific company, because there are many industries with even more business models. But examples were given, as well as directions for further research, to support application.

7.2 Conclusions

This research walked through a few steps. First, the role of standards and commodities showed that the innovation development cycle is reoccurring in new innovations. The cycle showed that competition needs companies to look for industry standards since standards increase efficiency and interchangeability. Once standards are set, it will become easier to enter and serve a market, resulting in more suppliers and competition. An increasing competition will support the commoditizing of the new technology. Commodities do not deliver as much revenue per product, so companies will shift focus to either increasing scales on the low-end, or new products in new-markets. This will result in new value properties, attracting new competition. The standards and commodities lead to increased interchangeability. Because of this efficiency, transaction costs, like searching and negotiating, will become 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.

Next, based on literature the main principles that underlie Social Computing were found. These principles first exist of technologically oriented ones, being Open Platform, Lightweight Models, Enabling Services, and Intuitive Usability. Next, social or user oriented principles are the Long Tail, Unbounded Collaboration, Collective Intelligence, Network Effects, and User Generated Content. These principles were validated in the interviews with Social Computing experts. 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 more natural way, leading to easier creation, enriching, or finding of content.

Third, a business model was shortly described, based on recent literature, as a conceptual tool that contains a set of elements and relationships, and allows expressing the business logic of a specific firm. The different building blocks gave insight in how a business model can be designed and applied, with respect to a Value Proposition, the Customer Interface, the Asset Management, and the Financial Aspects. The business model was introduced to find a way to relate the found Social Computing principles to a tangible model representing the way of doing business.

The interviewed experts gave their ideas of how they would make such supportive relations. Their ideas were combined in a burn chart matrix, showing either strong, or weak, or no relations between Social Computing and business model building blocks.

Again, the matrix was used to group the principles in more manageable clusters, which were labeled Open Collaboration, Lean Configuration, and User Value. The three cluster each covered different building blocks of the business model, although not exclusively. The building blocks which are best supported by Social Computing are Customer Relationships and Partner Network. But also Value Proposition, Communication and Distribution Channels, and Configuration of Key Activities can be supported by Social Computing. Those building blocks with a stronger relation to Social Computing connect a business to its environment, which is assumed to be the main reason why actually these building blocks can be supported with Social Computing, see Figure 30. When recent developments show standardization and commoditizing of ICT and its tools, this will lead to lower transaction costs in the area of information transactions. 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.

Next, partners, including customers, also can be of high value in creating a Value Proposition. This is because standardization and commoditizing make information sharing, finding, and enriching more accessible to individuals. This does need an adjustment of the key activities of a company, and an adjustment of the channels to reach the customers, which is assumed as being the main reason that those building blocks are affected as well by Social Computing, see Figure 30. These building blocks especially do need thorough consideration of Social Computing support in a business model innovation process.

These conclusions answer the main research question, by giving insight in the ways in which standardization leads Social Computing to support business model innovation.

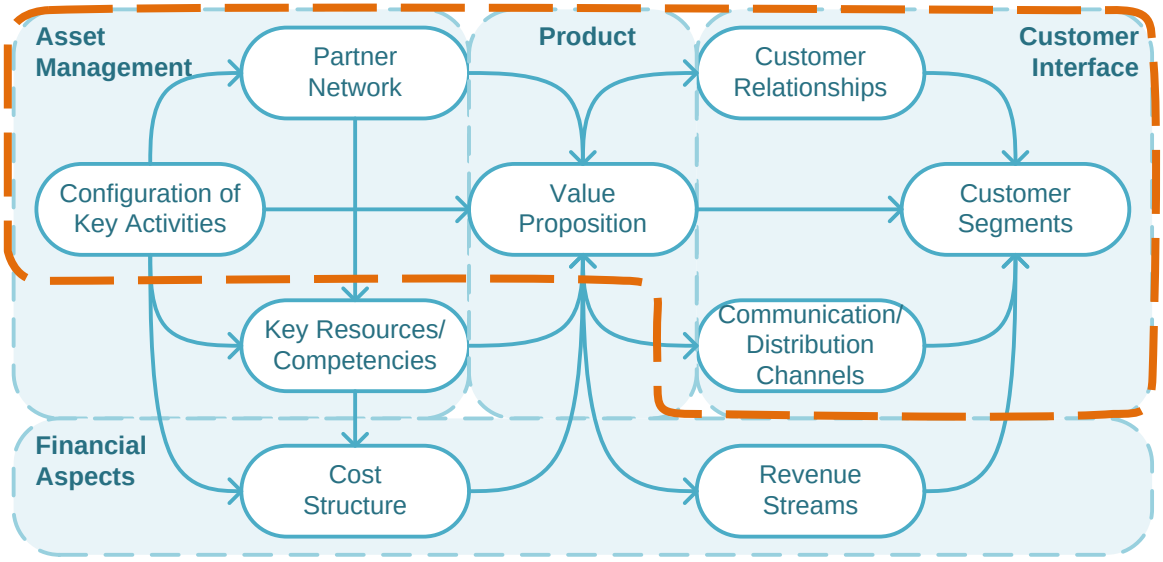

Figure 30 - Social Computing support to a company mapped on a business model.

7.3 Discussion and Further Research

This section will bring forward some rather interesting, unclear, or unsolved issues which came forward during the research. Also, some issues that did not fit the scope of this research, but are worth to give attention to in further research, are mentioned.

First, during this research, it has been noticed several times how much interest exists in the fields of Web 2.0, Social Computing, Enterprise 2.0, and business model innovation. For instance, the approached experts seemed very interested in discussing the subject and the findings of this research. It was not hard to find thirteen experts that were interviewed. This presumably is because these fields are still new, in that they are hardly researched. Many questions and uncertainties still exist in these fields. Anyone having ideas in solving issues in these fields are of interest to those active there. This may encourage any research emerging in these fields.

As mentioned, some experts found it difficult to mark relations in the matrix. They said there was somehow missing a step. Some mentioned this happens to be the user. For instance, with what background is an expert filling in the matrix? As an entrepreneur, as an IT-manager, as a web service developer, and so on. It has been suggested to create a user axis in the matrix, to make differentiation between different users. For instance a differentiation between users in a company focusing on either one of the value disciplines of Treacy & Wiersema. Though it would disturb the interview process too much to implement those advices right away, it has been tried to make a differentiation on these value disciplines afterwards. This did not give any

new insights, though. The only remark would be that because most of the experts fitted the Customer Intimacy discipline, this might have tended the results in a certain direction. This can't be said with certainty, since the first aim was to find Social Computing experts. These happened to be mostly Customer Intimacy oriented people. It would be very interesting, though, to make a user differentiation in a further research.

Next, the experts marked the strongest relations between building blocks connecting the business to its environment, as seen in Chapter 6. But how about the sharing, finding, enriching, and eliciting of information within a company? Did the experts really agree on that Key Resources and Competencies would become less important? How come, then, there is already a school of thought emerging in this field, called Enterprise 2.0, dealing exactly with Social Computing within an organization? Did the experts overlook something, and are there opportunities for giving new input to the field of knowledge management or the theory of organizational learning (Senge, 1992; Nonaka & Takeuchi, 1995)? On the principles side, Intuitive Usability appears to be the least important, according to the experts. Here, again, the question arises whether the experts were confident, or whether opportunities exist here as well for improvement. To my opinion, Intuitive Usability can very well lead to lower transaction costs for sharing, finding, eliciting, and enriching content.

Furthermore, it would be interesting to make this qualitative research more quantitative, to provide better foundation for the findings in this research. Especially for the statistically based findings, such as the clusters found with the cluster analysis. More focus would be needed in such a research. For instance, select one cluster and interview people active in the areas of business considered to be supported most by that cluster. Or make a specific differentiation between experts, by adding a user axis to the matrix. A quantitative research would make a statistical analysis more reliable.

Next, since now Social Computing principles have been found, it would be very interesting to analyze many assumed Web 2.0, or Social Computing, services and see whether they are based on one or more of these principles. An easy approach would be to take a matrix with the principles listed, and for each services mark whether a principle is applied. A more advanced way, and very interesting too, would be to develop a maturity model, with quick scans rating the maturity of the application of a principle within a service. Of course, first research needs to be done on the criteria that make a service mature with respect to the principles.

The concept of business models was just shortly explained, for being able to relate the principles to something tangible. A generic business model as presented was sufficient for this research. But a more extensive look into different business models, especially e-business models as mentioned by Weill & Vitale (Weill & Vitale, 2001) could give more insight in the coherence of findings between researches in the field of new business models. Do findings in this research support that of Weill & Vitale, for instance, in instances of business models they mention? At a first glance they do, since their eight atomic business models (direct-to-customer, full-service

provider, whole-of-enterprise/government, intermediary, shared infrastructure, virtual community, value net integrator, and content provider) also seem to value the increasing importance of partners, customers, outsourcing of value creation, and adjustment of key activities and infrastructure of a company. But a more thorough comparison should give certainty.

Other research closely linked to this research is the theory of bounded rationality (Simon, 1991), the garbage can model (Cohen, March, & Olson, 1972), and chain informatization (Grijpink, 1997). These theories all elaborate on supporting an individual, or a group of individuals, in their decision making processes, where distributed information is of importance. Lower transaction costs may overcome difficulties relating to such processes.

This research shows how Social Computing can support doing business, but it didn't elaborate onto which extend. For instance, what is the tipping point of the number of partners and customers needed to effectively increase value with them? How strong will Network Effects be? What actually does attract individuals to contribute to a company's Value Proposition? When are customers willing to pay for a service, and to what extend does it needs to be free to attract them? For that, the research has been too explorative, but these questions too are interesting when innovating business models.

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