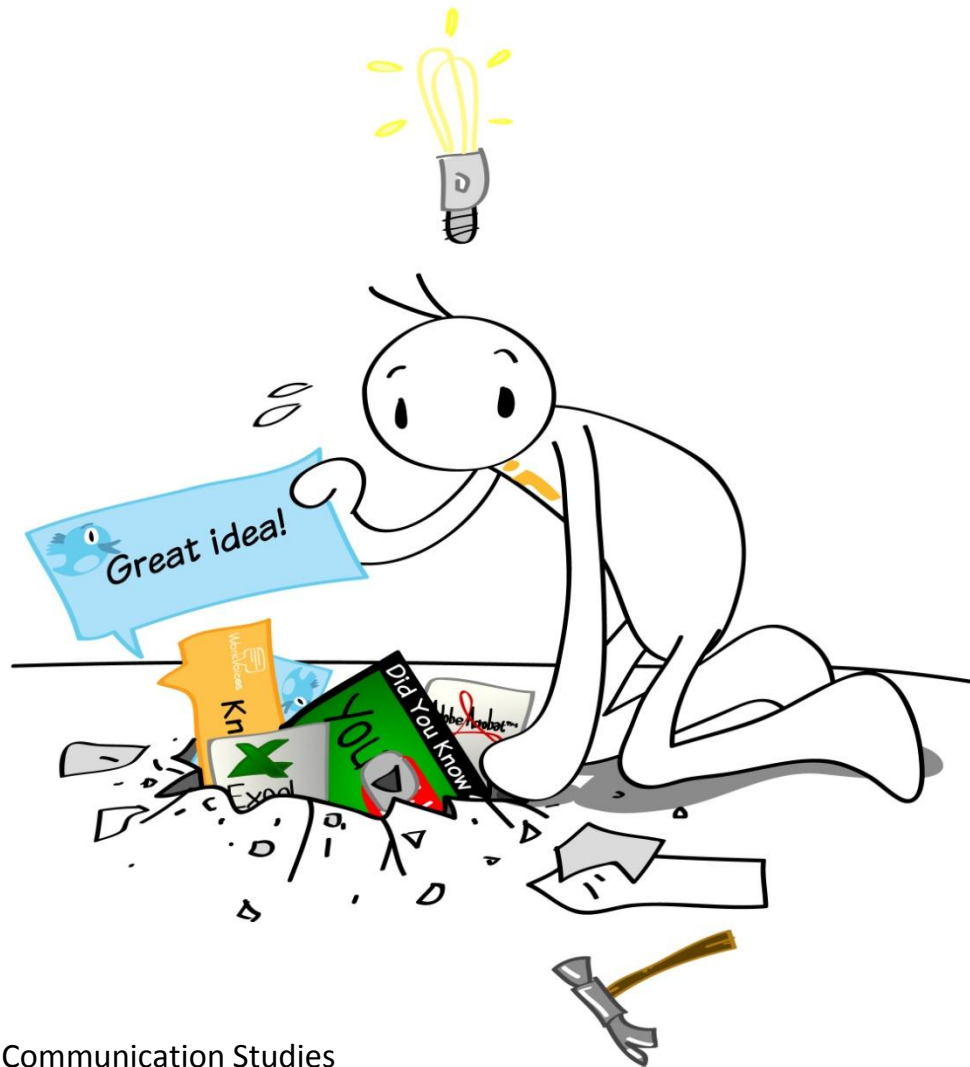


Stumble upon hidden Knowledge: Microblogging in Organizations



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 **SOMERE**
Social Media Research
2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019-2020-2021-2022-2023-2024-2025-2026-2027-2028-2029-2030-2031-2032-2033-2034-2035-2036-2037-2038-2039-2040-2041-2042-2043-2044-2045-2046-2047-2048-2049-2050-2051-2052-2053-2054-2055-2056-2057-2058-2059-2060-2061-2062-2063-2064-2065-2066-2067-2068-2069-2070-2071-2072-2073-2074-2075-2076-2077-2078-2079-2080-2081-2082-2083-2084-2085-2086-2087-2088-2089-2090-2091-2092-2093-2094-2095-2096-2097-2098-2099-2100-2101-2102-2103-2104-2105-2106-2107-2108-2109-2110-2111-2112-2113-2114-2115-2116-2117-2118-2119-2120-2121-2122-2123-2124-2125-2126-2127-2128-2129-2130-2131-2132-2133-2134-2135-2136-2137-2138-2139-2140-2141-2142-2143-2144-2145-2146-2147-2148-2149-2150-2151-2152-2153-2154-2155-2156-2157-2158-2159-2160-2161-2162-2163-2164-2165-2166-2167-2168-2169-2170-2171-2172-2173-2174-2175-2176-2177-2178-2179-2180-2181-2182-2183-2184-2185-2186-2187-2188-2189-2190-2191-2192-2193-2194-2195-2196-2197-2198-2199-2200-2201-2202-2203-2204-2205-2206-2207-2208-2209-2210-2211-2212-2213-2214-2215-2216-2217-2218-2219-2220-2221-2222-2223-2224-2225-2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2332-2333-2334-2335-2336-2337-2338-2339-2340-2341-2342-2343-2344-2345-2346-2347-2348-2349-2350-2351-2352-2353-2354-2355-2356-2357-2358-2359-2360-2361-2362-2363-2364-2365-2366-2367-2368-2369-2370-2371-2372-2373-2374-2375-2376-2377-2378-2379-2380-2381-2382-2383-2384-2385-2386-2387-2388-2389-2390-2391-2392-2393-2394-2395-2396-2397-2398-2399-2400-2401-2402-2403-2404-2405-2406-2407-2408-2409-2410-2411-2412-2413-2414-2415-2416-2417-2418-2419-2420-2421-2422-2423-2424-2425-2426-2427-2428-2429-2430-2431-2432-2433-2434-2435-2436-2437-2438-2439-2440-2441-2442-2443-2444-2445-2446-2447-2448-2449-2450-2451-2452-2453-2454-2455-2456-2457-2458-2459-2460-2461-2462-2463-2464-2465-2466-2467-2468-2469-2470-2471-2472-2473-2474-2475-2476-2477-2478-2479-2480-2481-2482-2483-2484-2485-2486-2487-2488-2489-2490-2491-2492-2493-2494-2495-2496-2497-2498-2499-2500-2501-2502-2503-2504-2505-2506-2507-2508-2509-2510-2511-2512-2513-2514-2515-2516-2517-2518-2519-2520-2521-2522-2523-2524-2525-2526-2527-2528-2529-2530-2531-2532-2533-2534-2535-2536-2537-2538-2539-2540-2541-2542-2543-2544-2545-2546-2547-2548-2549-2550-2551-2552-2553-2554-2555-2556-2557-2558-2559-2560-2561-2562-2563-2564-2565-2566-2567-2568-2569-2570-2571-2572-2573-2574-2575-2576-2577-2578-2579-2580-2581-2582-2583-2584-2585-2586-2587-2588-2589-2590-2591-2592-2593-2594-2595-2596-2597-2598-2599-2600-2601-2602-2603-2604-2605-2606-2607-2608-2609-2610-2611-2612-2613-2614-2615-2616-2617-2618-2619-2620-2621-2622-2623-2624-2625-2626-2627-2628-2629-2630-2631-2632-2633-2634-2635-2636-2637-2638-2639-2640-2641-2642-2643-2644-2645-2646-2647-2648-2649-2650-2651-2652-2653-2654-2655-2656-2657-2658-2659-2660-2661-2662-2663-2664-2665-2666-2667-2668-2669-2670-2671-2672-2673-2674-2675-2676-2677-2678-2679-2680-2681-2682-2683-2684-2685-2686-2687-2688-2689-2690-2691-2692-2693-2694-2695-2696-2697-2698-2699-2700-2701-2702-2703-2704-2705-2706-2707-2708-2709-2710-2711-2712-2713-2714-2715-2716-2717-2718-2719-2720-2721-2722-2723-2724-2725-2726-2727-2728-2729-2730-2731-2732-2733-2734-2735-2736-2737-2738-2739-2740-2741-2742-2743-2744-2745-2746-2747-2748-2749-2750-2751-2752-2753-2754-2755-2756-2757-2758-2759-2760-2761-2762-2763-2764-2765-2766-2767-2768-2769-2770-2771-2772-2773-2774-2775-2776-2777-2778-2779-2780-2781-2782-2783-2784-2785-2786-2787-2788-2789-2790-2791-2792-2793-2794-2795-2796-2797-2798-2799-2800-2801-2802-2803-2804-2805-2806-2807-2808-2809-2810-2811-2812-2813-2814-2815-2816-2817-2818-2819-2820-2821-2822-2823-2824-2825-2826-2827-2828-2829-2830-2831-2832-2833-2834-2835-2836-2837-2838-2839-2840-2841-2842-2843-2844-2845-2846-2847-2848-2849-2850-2851-2852-2853-2854-2855-2856-2857-2858-2859-2860-2861-2862-2863-2864-2865-2866-2867-2868-2869-2870-2871-2872-2873-2874-2875-2876-2877-2878-2879-2880-2881-2882-2883-2884-2885-2886-2887-2888-2889-2890-2891-2892-2893-2894-2895-2896-2897-2898-2899-2900-2901-2902-2903-2904-2905-2906-2907-2908-2909-2910-2911-2912-2913-2914-2915-2916-2917-2918-2919-2920-2921-2922-2923-2924-2925-2926-2927-2928-2929-2930-2931-2932-2933-2934-2935-2936-2937-2938-2939-2940-2941-2942-2943-2944-2945-2946-2947-2948-2949-2950-2951-2952-2953-2954-2955-2956-2957-2958-2959-2960-2961-2962-2963-2964-2965-2966-2967-2968-2969-2970-2971-2972-2973-2974-2975-2976-2977-2978-2979-2980-2981-2982-2983-2984-2985-2986-2987-2988-2989-2990-2991-2992-2993-2994-2995-2996-2997-2998-2999-3000-3001-3002-3003-3004-3005-3006-3007-3008-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Summary

In this research, effects on knowledge sharing by the social medium microblogging have been explored. Using pilots with the microblogging platform WorkVoices and a study of the microblogging platform Yammer, the research question *“What effect does the use of organizational microblogging have on knowledge sharing?”* has been answered. The research showed a significant increase in the availability and the intention of participants to share knowledge. Knowledge sharing using microblogging scored high on potential and was valued positive, though the scores for the applications, WorkVoices and Yammer, were lower. This research showed that organizational microblogging has the competence to reveal hidden knowledge and information by a simple post, while using an accessible method.

Management summary

This research explored effects on knowledge sharing by the social medium microblogging. Social media have the features to be able to gather, store and spread all sorts of knowledge. These media have been researched by scientists to explore its knowledge management potential (Bughin & Manyika, 2007; Hildreth, Kimble & Wright, 2000; Sharratt & Usoro, 2003). In addition, organizations are always looking for effective knowledge management solutions that they might find within a social medium. This research brings more attention to organizational microblogging as a research subject and application.

The main research question for this research has been *“What effect does the use of organizational microblogging have on knowledge sharing?”*. Important factors have been: conditions for knowledge sharing and the knowledge sharing intention and behaviour, characteristics that are important when using organizational microblogging, and the value of organizational microblogging. As a method of research, pilots with the microblogging platform WorkVoices have been organized. Three organizations cooperated in a pilot. Surveys and focusgroups have been used to answer the research question. In addition, a study of the microblogging platform Yammer has been performed.

During the pilot period, the availability and the intention of participants to share knowledge have significantly grown. A high score on potential for knowledge sharing using microblogging was given, though the scores for the applications, WorkVoices and Yammer, were lower. Positive aspects of microblogging were that hidden knowledge is being revealed. Characteristics important to the use of microblogging are collecting the diversity of media in one portal or tool, the search engine and the activity of other users. Also, a medium should be company driven to enhance relevancy.

This research showed that organizational microblogging has the competence to reveal hidden knowledge and information by a simple post, while using an accessible method. Microblogging with knowledge sharing as intention is regarded as a development with much potential and valued positive. This has been an exploratory research; more studies focusing on this topic should be performed. Recommendations for using organizational microblogging more effectively, were:

- *Focus on knowledge sharing* and make users aware of this.
- *Integrate microblogging into the workflow* of all employees.
- *Make microblogging indispensable* to harvest its benefits. A larger group of users that wish to share and interact using the medium is required.
- *Pick the right tool*, the effort needed and the performance gain also depends on the tool used.
- *Draw people towards the medium* instead of obliging use.
- *Guard to implement microblogging too quick*; start with a small number of users.
- *Repay the user for their effort*. Add information relevant to the user's interest.
- *Guard the signal to noise ratio* to utilize the goal of knowledge sharing

Preface

My years of being a student have drawn to an end. A time that I have enjoyed. The freedom and the possibilities to learn things relevant to my interest were great. Going on a six-month internship abroad, organizing information days for Communication Studies, doing work for my student association. All are activities I enjoyed to the maximum. However, I also had my negative encounters with being a student, for instance having to follow courses that I could not care less about and making a huge amount of exams. Luckily, I can end my education on a positive note.

I have really enjoyed graduating on knowledge sharing and microblogging, even though it was not always easy. Setting up microblogging pilots was a challenge. Creating a solid theoretical foundation and modeling the different constructs were activities that required a lot of time and attention. Fortunately, I was not always alone on these tasks.

In the first place, I would like to thank Sjoerd de Vries and Henny Leemkuil for mentoring me during this graduation process. With smart remarks and helpful alterations, you have helped me finishing this thesis.

Furthermore, I would like to thank Christian van den Berge and Mark Geljon of GriDD consultancy. Thank you for providing a very pleasant working environment and helping me in every way you could think of. In addition, I would like to thank WorkVoices for helping me set up research pilots using their product and the pilot companies TriMM, 1% Club and Webclusive for cooperating. On top, I would like to thank the people at Novay for helping me on certain subjects.

Last, but certainly not least, I would like to thank my father and mother for supporting me during my study period and my girlfriend for being there when needed. The support of my family has helped me stay motivated and bring this thesis to a positive end.

Jeroen Grit,

Enschede, October 2009

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1. Research introduction

The World Wide Web user has shifted to creating content from consuming content, while conversing socially about it. The media which meet these social requirements have been christened Social Media. Some examples are the sites YouTube, Facebook, Wikipedia and Twitter.

Social media are regarded as having an important role in the future of knowledge management. A great benefit that many of social media have is the aspect to gather, store and spread all sorts of knowledge. This benefit is being put to use in organizations and has the potential of becoming a very interesting communication channel. This channel can be used for the benefit of knowledge management. Knowledge management is a specialism that is being employed in countless shapes and is in a constant evolving process. Utilizing social media is already done by many organizations and has become a very interesting research object.

The potential of social media in organizations has caught the attention of scientists (Bughin & Manyika, 2007; Hildreth, Kimble & Wright, 2000; Sharratt & Usoro, 2003) who are very interested to see which possibilities it has. Besides, organizations are looking for effective knowledge management solutions that they might find within a social medium. To advance on this subject, a research will be conducted to discover effects of using social media on knowledge management. The research will focus on a social medium, microblogging, which is believed to have the quality to bring hidden knowledge into view. Microblogging is believed to have an effect on knowledge sharing. This chapter will give a detailed explanation of important elements of this research and further clarify the communal and scientific context of this research.

1.1 Knowledge management

Knowledge is thought to help make judgments or help improve the structure of workflows (Smith & McKeen, 2003). The feature of knowledge to be an important component of an organization's capital, makes it crucial to manage knowledge. Knowledge is of such high importance because it has to be present in company processes to improve efficiency, effectiveness, productivity and quality. According to Smith and McKeen (2003), knowledge management in short, is the extraction of knowledge from the agent holding it and making it available to others. They claim knowledge to be crucial; an organization without knowledge cannot exist.

According to Tiwana (2003), the management of knowledge is divided into three basic stages. The first stage is the acquisition of knowledge. This includes the development and creation of insights, skills and relationships. Sharing knowledge is the second stage identified by Tiwana (2003). This is broadcasting what is already known. The third and last stage, is the utilization of knowledge; learning from the acquired and broadcasted knowledge is integrated into the organization (Tiwana, 2003).

Knowledge management has been recognized as a special part of business around the 1950s. Knowledge management itself is much older, even the Romans already made use of knowledge management by using maps, and in the Middle Ages the teaching from master to apprentice was a normal way to distribute and share knowledge. There has been a lot of research into knowledge

management and its disciplines. This research is the basis for further research into knowledge sharing using microblogging.

1.2 Social media

Online media on which the user forms and uses the content are considered to be social media. Within social media, a lot of different applications can be identified. Text, images, audio, and video are being used by social media. Technologies used are for instance: (micro)blogs, message boards, podcasts, wikis, and social bookmarking. A few examples of social media applications are Wikipedia (referencing), MySpace (social networking), YouTube (video sharing), Second Life (virtual reality), Twitter (microblogging), Del.icio.us (social bookmarking) and Flickr (photo sharing).

The popularity of certain social media is huge. A few numbers are that every minute 13 hours of video material are uploaded to video-sharing site YouTube, 13 million articles are available on referencing site Wikipedia and 3.6 billion photos are available on the photo-sharing site Flickr. All these platforms have in common that in one way or the other you can get in touch with other users. You can comment on YouTube videos and Flickr photos, and you can discuss the alterations of Wikipedia articles. Next to that, all content is created by the user. Users create, react and collaborate.

There is no real consensus on what the true definition of social media is. A definition that is applicable and nearly complete is the definition presented on the Wikipedia page on social media.

Social media are media with content that is designed to be disseminated through social interaction, created using highly accessible and scalable publishing techniques. Social media supports the human need for social interaction, using Internet- and web-based technologies to transform broadcast media monologues (one to many) into social media dialogues (many to many). It supports the democratization of knowledge and information, transforming people from content consumers into content producers ("Social Media," 2009).

An additional feature is the capability of social media to be used within organizations. Examples are company blogs, podcasts from the CEO or department wikis. Possibilities like tagging, microblogging, blogging, wikis and social bookmarking can make knowledge within an organization more insightful.

Making knowledge more insightful is an interesting activity because a lot of knowledge is impossible to manage. Knowledge you only stumble upon in the coffee corner when a colleague surprises you with expertise you never thought he or she had. Identifying these abilities would be very attractive for organizations. From a scientific point of view, bringing hidden knowledge into view is very interesting. Some knowledge is difficult to grasp, and social media might be able to influence this. This research will have a scientific and communal focus on effects of microblogging on knowledge sharing. In the next paragraph, features of microblogging will be described.

1.3 Microblogging

As stated earlier, the research will focus on microblogging, a social medium that is believed to have the quality to bring hidden knowledge into view. Microblogging is one of social media's latest trends and is believed to have much potential on this subject.

Microblogging is a variant of blogging that allows users to post quick, short messages on the web for others to access. These messages can be restricted to a certain number of individuals, sent exclusively to a specific contact, or be made available to the World Wide Web. Twitter is probably the most well known microblogging platform currently available on the web.

The focus of recent scientific literature on microblogging has been on subjects matched to learning and education (Costa, Beham, Reinhard et al., 2008; Java, Finin, Song & Tseng, 2007). Zhao and Rosson (2008) have researched why people use Twitter. According to their research, people use Twitter at work to keep up with what is new and what is happening with other people. Furthermore, they claim the sharing and exchanging of information to be an important activity. Microblogging provides an informal communication channel complementary to other media (e.g., IM, email, phone, weblog, or face-to-face).

Currently, a niche is present in scientific literature on organizational microblogging with the intention of knowledge sharing. This research brings more attention to microblogging and knowledge sharing as a research subject.

1.4 Stakeholders

This research is assigned and mentored by GriDD consultancy. GriDD is a consultancy agency that provides guidance, consultancy and support, to improve processes by optimizing effectiveness of information in knowledge intensive organizations. For this purpose, they are always on top of new developments. This research is relevant to their interests because the visualization of knowledge is an important topic in their daily work. Researching the aspects of a medium like microblogging can create valuable knowledge to use in future cases.

Besides GriDD, this research is supervised by the University of Twente. This is done by Somere, the Social Media Research center. Somere is involved in the research on effects of microblogging on knowledge sharing because they think microblogging to be an interesting research subject.

The research conclusions will be of assistance in future cases of GriDD and will be used as a starting point for further research on this subject by Somere. The research center Somere will be publishing a book on social media research; this research should provide input for one of its chapters. GriDD is willing to use the gathered knowledge and recommendations to optimize their ideas and work with social media and knowledge sharing.

1.5 The research question

The focus of this research will be the exploration of effects of organizational microblogging on knowledge sharing. The main research question is:

“What effect does the use of organizational microblogging have on knowledge sharing?”

Important factors will be conditions, intention and behaviour for knowledge sharing, characteristics important when using organizational microblogging, and the value of organizational microblogging. The research results will provide input for further research and help organizations use organizational microblogging more effectively.

The research starts by studying the relevant scientific literature and creating a scientific framework. Based on this framework, sub research questions are formulated and a research model is drawn. This is presented in the next chapter. In the third chapter, the method of research is described. All gathered data is analyzed and presented in chapter 4. Based on chapter 4, answers to the research questions are formulated and a number of recommendations is given to GriDD consultancy. In the last chapter, the whole research cycle is discussed and reflected upon. This reflection brings forth recommendations on future research regarding this topic.

2. Scientific framework of knowledge sharing using microblogging

In this chapter the scientific literature surrounding knowledge sharing and microblogging is explored. Based on previous research, a theoretical framework is build that is used as the foundation of this research. First, knowledge management is introduced and defined. Next, knowledge sharing is identified as a major focus area for knowledge management. Subsequently, conditions that have an effect on the knowledge sharing intention and knowledge sharing behaviour are described. Furthermore, the functions and possibilities of social media will be explained more elaborately. Consequently, microblogging will be defined as a research subject. In addition, characteristics that are important to the use of social media are presented. In conclusion, a research model and research questions are presented.

2.1 Knowledge management

Management of knowledge is an important activity for knowledge-intensive organizations. The managing and sharing of knowledge is essential for organizations because knowledge is their main building block.

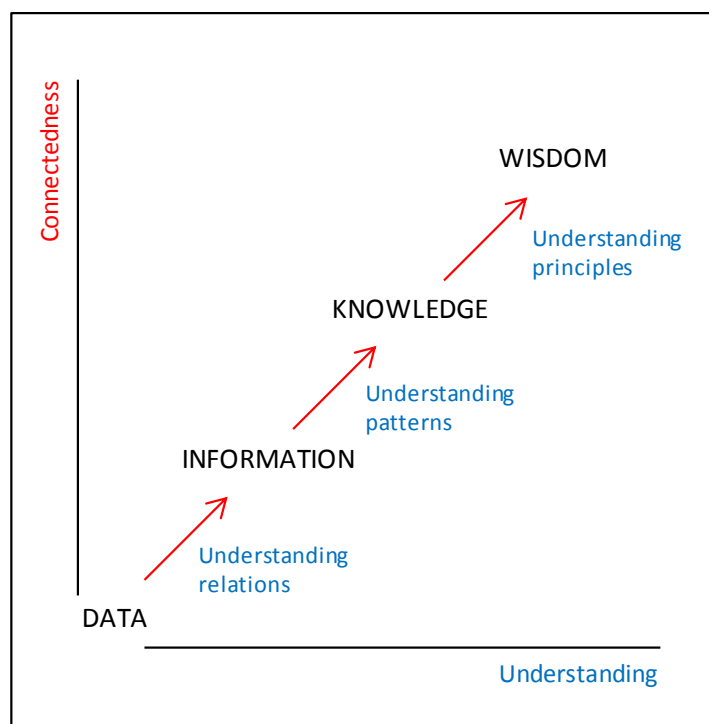


Figure 1: Sequence from data to wisdom (Bellinger, Castro & Mills, 2004).

First, it is important to describe what knowledge is and note that there is a difference between knowledge and information. Knowledge is a part of the four steps from data to wisdom (Bellinger, Castro & Mills, 2004; Davenport & Prusak, 2000). The sequence from data to wisdom is described in figure 1. Data is raw and does not need to have meaning or be usable. It simply exists and has no significance beyond its existence. Information is data that has been given meaning by way of relational connection. This meaning can be useful, but does not have to be useful. Knowledge is the appropriate

collection of information, such that its intent is to be useful. Knowledge has useful meaning, but it does not provide for, in and of itself, an integration such as would infer further knowledge. Wisdom embodies an understanding of fundamental principles embodied within the knowledge that are essentially the basis for the knowledge being what it is. Wisdom helps to give us understanding on matter where previously has been no understanding, and in doing so, goes far beyond understanding itself. When discerning or judging between right and wrong, good and bad the outcome is influenced by wisdom. Understanding makes data, information and knowledge insightful and is therefore an important part of the process. Knowledge is worth nothing to a person when this person is not able to understand the knowledge (Bellinger, Castro & Mills, 2004).

According to Davenport, De Long and Beers (1998) knowledge is information combined with experience, context, interpretation and reflection. It is an important factor when making decisions or deciding on actions. Given the importance of such an asset, it is not surprising that organizations everywhere are paying attention to knowledge; exploring what it is and how to create, transfer, and use it more effectively.

Soekijad and Andriessen (2003) explain that knowledge sharing can often be considered as a first and necessary step in a learning process. People can share knowledge and experiences, which they can apply later in their own situation. Knowledge can be transferred, distributed or newly created. According to Nonaka (1994) interaction plays a critical role in developing ideas, although ideas are formed in the minds of individuals. Interaction contributes to the amplification and development of new knowledge. It defines a further dimension to organizational knowledge creation, even when the actors interacting span departmental or organizational boundaries.

The unique properties of knowledge make it very valuable for organizations. Prusak (2001) states for instance that economists, strategy academics and commentators agree that a firm can best be seen as a coordinated collection of capabilities, somewhat bound by its own history, and limited in its effectiveness by its current cognitive and social skills. The main building block of these capabilities is knowledge, especially the knowledge that is mostly tacit and specific to the firm. This knowledge needs to be managed.

Na Ubon and Kimble (2002) gave a definition of knowledge management that will be used in this research. According to them knowledge management is not a single discipline; it is rather an integration of numerous endeavours and fields of study.

Knowledge management is the management of processes that govern the creation, dissemination, and utilization of knowledge by merging technologies, organizational structures and people, to create the most effective learning, problem solving and decision-making in an organization (Na Ubon & Kimble, 2002).

The actions this definition describes, creation, dissemination and utilization, and the actors it describes, merging technologies, organizational structures and people, make it an appropriate and complete definition. Davenport, Long and Beers (1998) researched which factors determine the success of a knowledge management project. The link of the project to the economic performance or industry value

of the company, the standard knowledge structure, the multiple channels for knowledge transfer and a knowledge-friendly culture were factors they named.

2.1.1 Knowledge sharing

Knowledge sharing has been identified as a major focus area for knowledge management. The relevance of this theme particularly derives from the fact that it provides a link between the level of individual knowledge workers, where knowledge resides, and the level of the organization, where knowledge attains its (economic, competitive) value (Hendriks, 1999). In practice, knowledge sharing proves to be a significant barrier for effective knowledge management. Inadequate organizational structures, cultures that are not friendly to knowledge sharing and special separation have been identified as impediments to knowledge sharing (Davenport & Prusak, 2000). Critical concern goes to whether knowledge workers have the intention to share knowledge. According to Hendriks (1999) the common intention of empowering the individual knowledge worker to use his knowledge sharing skills will only work out if the worker is motivated to share knowledge. The use of the introduction of information systems such as intranets and document management systems depends on this. Hendriks (1999) explains knowledge is not like a commodity that can be passed around freely, it is tied to a knowing subject. To have someone else share his or her knowledge, an act of reconstruction is needed. It takes knowledge to acquire knowledge, and therefore, to share knowledge. One party should communicate its knowledge. The other party should be able to perceive these expressions of knowledge and make sense of them.

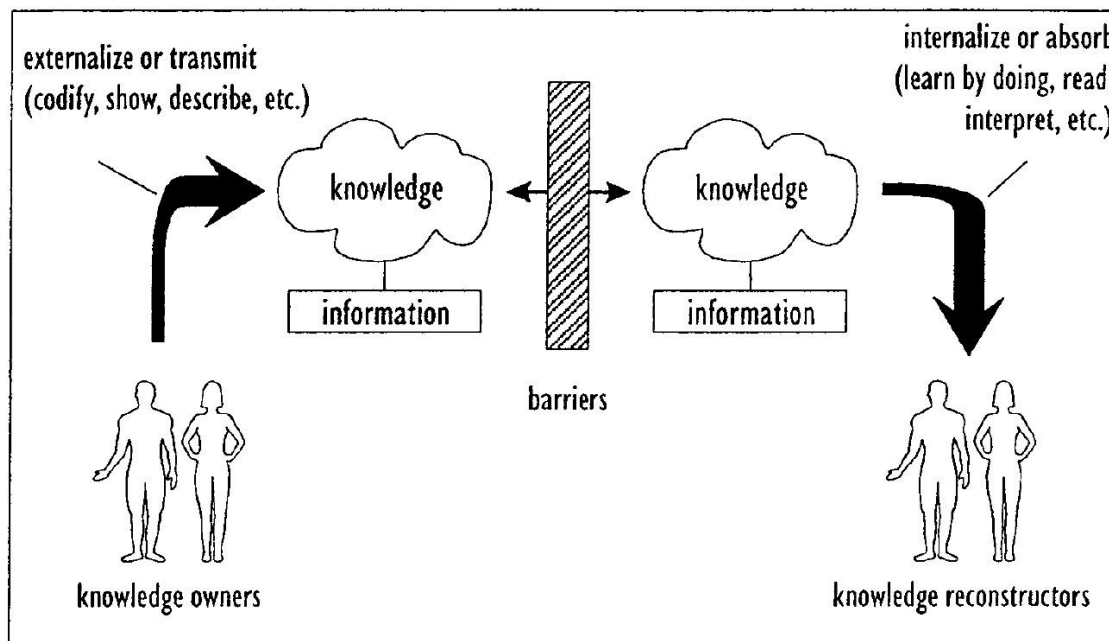


Figure 2: Model of knowledge sharing (Hendriks, 1999)

In figure 2, a simplified model of knowledge sharing is visualized. In this figure of Hendriks (1999), two sub-processes make up the process of knowledge sharing. The first act is the transmission of knowledge by the knowledge owners, those who have knowledge. This transmission can take many forms and does not have to be a conscious act. The form is best when it is suitable for reconstruction by others. The second act is absorption of knowledge by the people seeking to acquire it. The act of absorption occurs

in many different forms as well, including learning by doing, reading books or trying to understand the codified knowledge in a knowledge base. The absorption of (previously or simultaneously) transmitted knowledge may be blocked by barriers. These barriers can be barriers of space or time, but can also be more fundamental like barriers of social distance, culture, language, and differences in mental or research frames (Hendriks, 1999).

Several scientists (Brink, van den, 2001; Borgatti & Cross, 2003; Cross, Parker, Prusak & Borgatti, 2001; Soekijad & Andriessen, 2003.) have identified positive and negative barriers, or conditions, that have an effect on knowledge sharing. These conditions are relevant to this research because the use of organizational microblogging is hypothesized to have an effect on these conditions. In the following paragraphs, these conditions will be described more explicitly.

2.2 Conditions that have an effect on knowledge sharing

The conditions that have an effect on knowledge sharing are important. When these conditions are identified, the possibility exists that they can be influenced. In this paragraph, several conditions will be described. These conditions will be important in this research setting because it is assumed microblogging has an effect on them.

Van den Brink (2001) considers knowledge sharing interaction between people. In addition, he states that organizational issues have a major impact on knowledge sharing. Furthermore, information and communication technology is an important facilitator of knowledge sharing. He proposes three entities as key factors in knowledge sharing: people, organization and technology. In figure 3 the social, organizational and technological conditions which van den Brink (2001) recognizes are shown. The social conditions are the human factor in knowledge sharing. It focuses on the drivers that trigger people to do what they do, on the possible skill levels of a person, and on the roles an individual can play in an organization. For the organizational conditions van den Brink (2001) has used the 7S framework of McKinsey to distinguish which organization related conditions facilitate knowledge sharing. The 7S framework by McKinsey consists of seven organizational factors: strategy, structure, systems, staff, style, skills, and shared values (The McKinsey 7S Framework, n.d.). The technological conditions are reflecting on information and communication technology. A major objective of ICT in facilitating knowledge sharing is to connect people with other people or with explicit knowledge. Three dimensions have been distinguished: the sharing of explicit knowledge, the sharing of tacit knowledge and the sharing of both explicit and tacit knowledge.

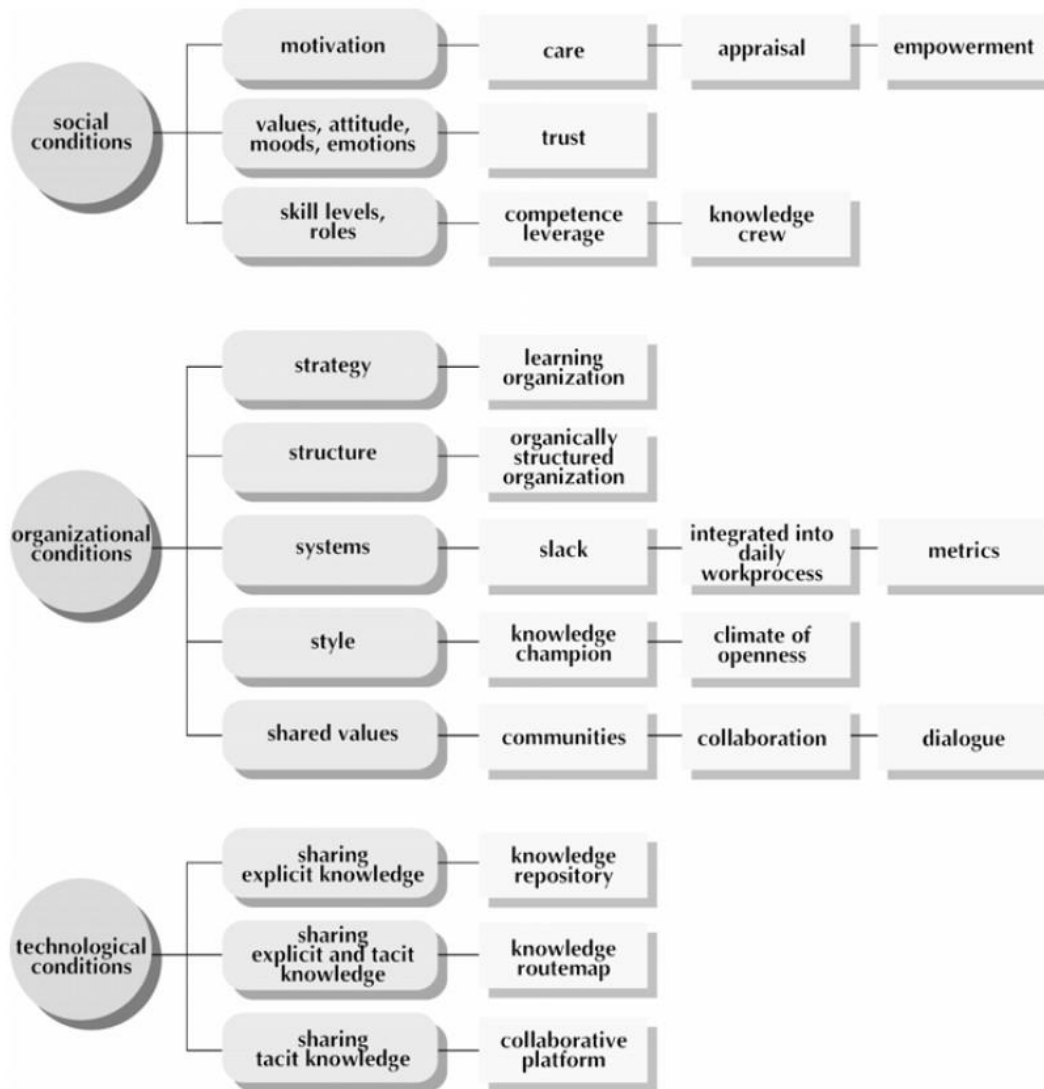


Figure 3: Knowledge sharing enabling conditions (Brink, van den, 2001).

Soekijad and Andriessen (2003) have identified factors that are important for successful knowledge sharing as well. They specifically paid attention to knowledge sharing in alliances of competing organizations. Based on scientific literature they have clustered conditions for learning and knowledge sharing in alliances. The first range of conditions is described as organizational characteristics. An organization must expect to receive a certain added value from knowledge sharing and in general must be willing and able to share knowledge. In this view, an organization must be motivated and have a high intent towards co-operation and learning. The organization must be able to communicate and it needs to be highly transparent and receptive. The last characteristic is an organizations ability to have access to knowledge. Access can be gained through ties and networks. The second cluster of conditions consists of the (mutual) relationship between the organizations involved. They include the strength of the relation and the recognition and trust between the organizations. Other conditions include positive former experiences and a favourable climate. The final cluster of conditions can be found in the characteristics of the knowledge shared. The more codifiable and teachable knowledge is, the easier it is

to transfer it. Tacit knowledge is less easy to exchange because it is less codifiable. Soekijad and Andriessen (2003) found other success conditions that addressed the inter-personal level, rather than the inter-organizational level. Conditions as personal reputation, degree of power of decision and the language and skills of a person can be related to characteristics of an individual. Other conditions refer more to the inter-personal relations in a group. These are inter-personal trust and group cohesion, active interaction or learning by doing, comparable knowledge levels (as peers), and diversity in skills and expertise. Soekijad and Andriessen (2003) affirm that in order to enable learning, group members need to be aware of what the others do and expect, and how others can be of value to them.

Cross et al. (2001) developed empirical support for relational conditions that facilitate knowledge creation and sharing in social networks, as well as insight into social and technical interventions that facilitate knowledge flows in these networks. The first phase of their research was the interviewing of 40 managers. Four features emerged distinguishing effective from ineffective relationships. The first is knowing what another person knows and thus when to turn to him or her. The second is being able to gain timely access to that person. The third is the willingness of the person sought out to engage in problem solving rather than dump information. The fourth and last is a degree of safety in the relationship that promotes learning and creativity. The managers that were interviewed indicated that these four conditions were key characteristics of relationships that were effective for acquiring information, solving problems or learning. They recounted that when knowledge sharing or learning did not happen, one of these conditions was absent in the relationship. In table 2.1, the impact of the four conditions on knowledge sharing is described.

Table 2.1: Knowledge sharing conditions that promote effective knowledge sharing (Cross et al., 2001)

Knowledge sharing conditions	Impact on knowledge seeking
Knowledge	Knowing what someone else knows (even if we are initially inaccurate and calibrate over time) is a precursor to seeking a specific person out when we are faced with a problem or opportunity. For other people to be options, we must have at least some perception of their expertise.
Access	However, knowing what someone else knows is only useful if you can get access to their thinking in a sufficiently timely fashion. Access is heavily influenced by the closeness of one's relationship as well as physical proximity, organizational design and collaborative technology.
Engagement	People are helpful in learning interactions when they actively think along with the seeker and engage in problem solving. Rather than dump information, these people first understand the problem as experienced by the seeker and then shape their knowledge to the problem at hand.
Safety	Finally, relationships that are safe are often most effective for learning purposes. Being able to admit a lack of knowledge and diverge in a conversation often results in creativity and learning.

One of the interesting findings from their interviews with the forty managers in the first phase of their research was how important the willingness of the person sought out for information to engage with the information seeker was. People who were willing to cognitively engage in problem solving helped seekers to gain knowledge with sufficient understanding and clarity. The simple reaction of the one

sought out to understand the seekers query and teach instead of dump information was enough, no significant time investment was needed.

The safety of the relationship was indicated by Cross et al. (2001) being important as well. Asking someone for help often requires that the seeker has some degree of trust in the person sought out for information. Such trust often shapes the extent to which people will be forthcoming about their lack of knowledge, as defensive behaviour can knowingly and unknowingly block learning in critical interaction. Several managers indicated that creativity was increased when they were in a more safe relationship. Ideas that were out of the ordinary were more easily shared and this often resulted in solutions that were more creative. The four conditions were validated by a separate quantitative study (Cross et al., 2001).

Borgatti and Cross (2003) propose that the intentional search for information in an organizational setting can be seen as a dynamic choice process. According to Borgatti and Cross (2003), the intention to seek information from a specific other is determined by characteristics of the relationship between the seeker and a set of other people he or she might turn to. In turn, actual information seeking episodes (as well as third-party interaction) update the seekers' perception of another person with respect to these characteristics. Borgatti and Cross (2003) hypothesize that information seeking is a function of the extent to which a person knows and values the expertise of another, the accessibility of this person, and the potential costs incurred when seeking information. They claim that individuals are more likely to seek information from those whose areas of expertise are known to them (knowing). They also propose it to be important that a knowledge seeker positively evaluates the knowledge and skills of the person sought out in relation to the problem the seeker is attempting to solve (value). Furthermore, they hypothesized that knowing that someone else has valuable expertise is important, but his or her knowledge is only helpful if they are accessible (access). Lastly, they assume that a potentially significant cost of seeking information from others in organizational settings lies with the interpersonal risks an individual takes by admitting ignorance on the given subject. When seeking help, esteem and reputation come into play as we are motivated to maintain positive self-images (cost). Borgatti and Cross (2003) suggest that knowing, access and cost mediate the relationship between physical proximity and information seeking. Proximity leads to chance meetings in which people gradually come to learn about each other, get more comfortable, and develop bonds that enable future access.

The study of Borgatti and Cross (2003) offers support on relational conditions that facilitate information seeking. Knowing what another person knows, valuing what that other person knows in relation to one's work, and being able to gain timely access to that person's thinking have been proven as conditions that are predictive of the behaviour of information seeking. Although cost emerged as an important factor in prior work, it did not to have a significant influence in the research of Borgatti and Cross (2003). Based on earlier research, Borgatti and Cross (2003) created a model that explains the dynamic learning when searching intentional. Figure 4 shows the dynamic model of learning in intentional search.

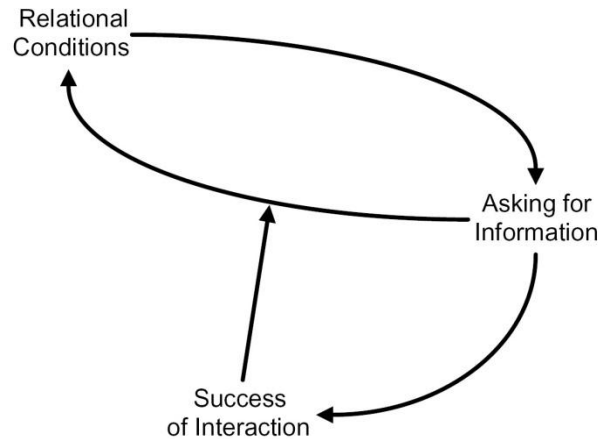


Figure 4: Dynamic feedback system (Borgatti & Cross, 2003).

Knowing, valuing, access and cost relations enable information seeking, however when we engage with others we recalibrate our understanding of their skills and knowledge, as well as how to gain access to them most effectively and what potential costs might be of interacting with them. As the understanding of others is being revisioned, the probability of interacting with them in the future is affected, creating a dynamic system.

The findings in this paragraph give information on how the knowledge sharing intention and knowledge sharing behaviour is influenced by conditions. These conditions can drive or slow down knowledge sharing. According to Cross et al. (2001) and Borgatti and Cross (2003), the conditions they describe have an effect on knowledge sharing intention and knowledge sharing behaviour. It is assumed that the use of organizational microblogging has an effect on the knowledge sharing conditions by Cross et al. (2001), the knowledge sharing intention and the knowledge sharing behaviour. As of yet, the use of organizational microblogging has not been described. Therefore, the next paragraphs will further explain and recite scientific literature on social media, microblogging and microblogging within organizations.

2.3 Social media

Social media is the term chosen for a large collection of internet-based media. These media have in common that they are social, as the name already hints. Content is created by the users, and discussed with other users. Creating content can be a collaborative task. Examples of social media are the opportunity to game together in a virtual world and the possibility to review and discuss products on review sites and forums. Furthermore, you can work together on multimedia like movies, photos and music. It is also possible to share your bookmarks and news articles and have them gain more popularity. You can create a network online with people you know, both on social and professional ground, and there are countless ways to start your own weblog. You can post your questions online and microblog about what you are doing or what interests you. Social media is a large umbrella term, which catches a lot of the present World Wide Web.

An in chapter 1 presented definition on social media is from the Wikipedia page on social media. A special aspect of this definition is that it is from a social medium. The wiki page has been started in 2006, and has been edited and extended over a 1000 times since.

Social media are media with content that is designed to be disseminated through social interaction, created using highly accessible and scalable publishing techniques. Social media supports the human need for social interaction, using Internet- and web-based technologies to transform broadcast media monologues (one to many) into social media dialogues (many to many). It supports the democratization of knowledge and information, transforming people from content consumers into content producers ("Social Media," 2009).

Important properties of this definition are the mentioning of the accessibility of the techniques to update media. For many users the ease of use of configuring and updating a medium are very important. Next to that, it is important to name the transformation broadcast media monologues (one to many) into social media dialogues (many to many). The power of broadcasting has shifted.

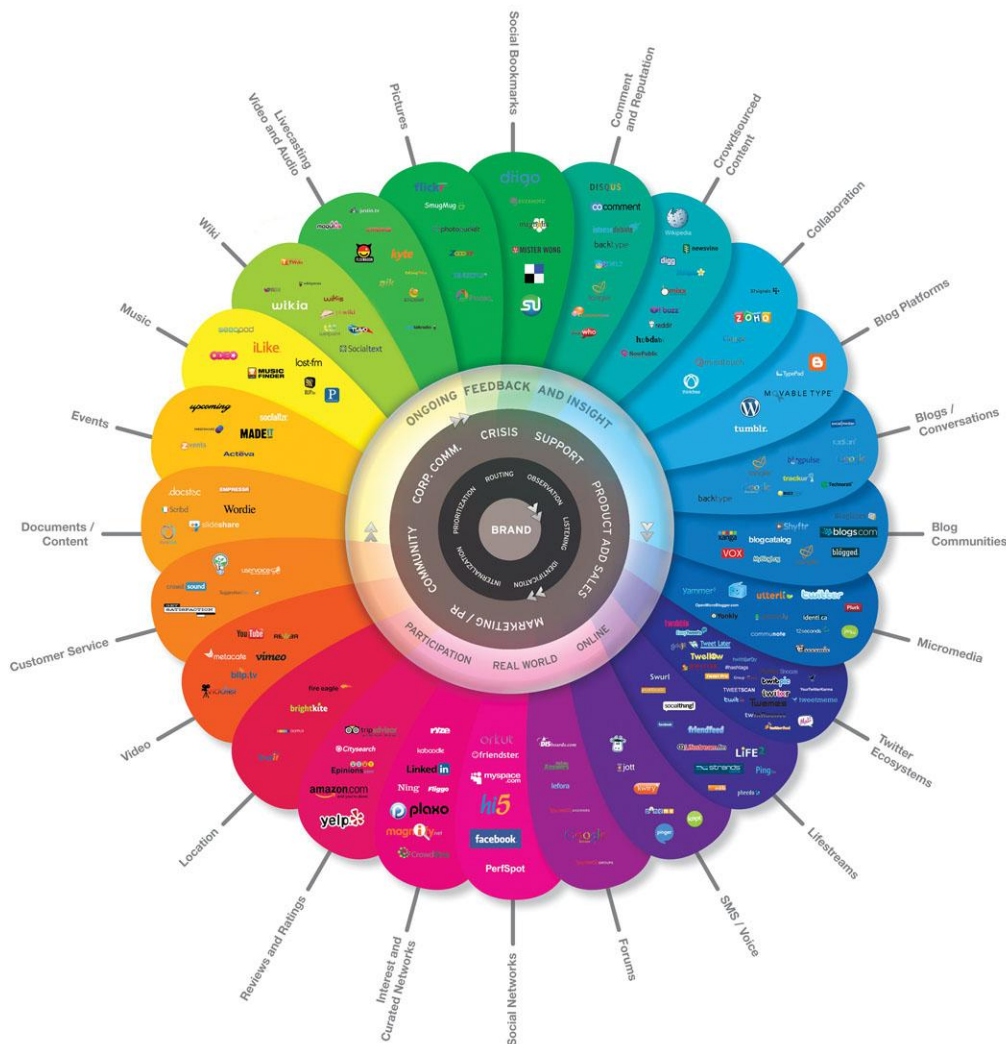


Figure 5: Conversation prism (Solis & Thomas, 2005).

When analyzing this definition, it is noticed that the soft border of social media is not mentioned. Just as with Web 2.0 (O'Reilly, 2005), there are no conditions that assess whether a medium is social, or not. This soft border is an important aspect of social media. It shows that social media are not limited by

their own identity. Another missing aspect in the definition is the diversity of social media. Social media come in many different flavours. In figure 5 you can find the conversation prism by Solis and Thomas (2005). They have tried to group social media. They made a map of the various social media grouped on application. The media are arranged in a spectrum around the heart of the prism, the brand. This heart is circled by terms like crisis, support, product and sales, marketing / PR, community and corporate communication.

Social media is a part of Web 2.0, a collection of modern web applications with a strong focus on spreading and managing information. Web 2.0 is a set of applications on the internet that have been collected together under one name. These applications are not per se on the World Wide Web but can also be applications that make use of the internet. Components of web 2.0 are for example blogging, bookmarking and tagging, RSS, cost per click adverts and search engine optimization. Web 2.0 has a soft border, just like social media. O'Reilly (2005) has set a number of properties to the core of Web 2.0. The strategic positioning of Web 2.0 is that the web is being used as a platform; the user is positioned within control of its own data. A visualization of this core and its arms is shown under figure 6. It shows the many ideas that radiate out from the Web 2.0 core.

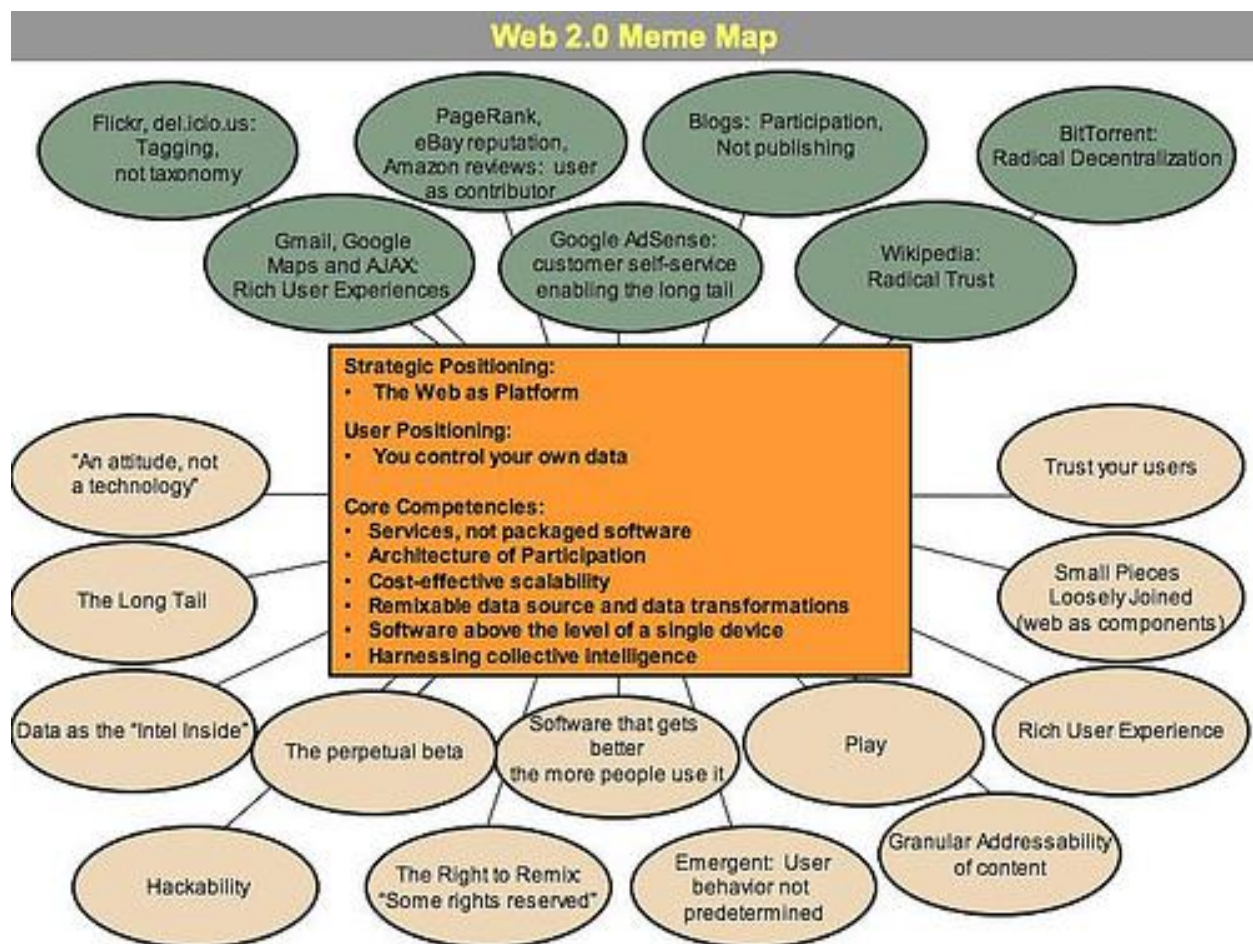


Figure 6: Web 2.0 Meme map (O'Reilly, 2005).

Results of the McKinsey Quarterly survey on Web 2.0 (McKinsey, 2008) were that Web 2.0 is used by 94% of the respondents internally, 83% of the respondents is using Web 2.0 to manage knowledge, 78% is fostering collaboration across the company. Looking ahead McKinsey (2008) predicts a growth in Web 2.0 technologies by organizations. Companies will invest more money for new technologies and innovate their use of Web 2.0. McKinsey (2008) predicts that in the near future Web 2.0 will become a driver of competitive advantage.

When Web 2.0 or social media technology is used within organizations, this technology allows enterprises to reap the benefits of scope from knowledge management. According to Bughin & Manyika (2007) the competitive advantage will not come from technology; it will come through execution of a new paradigm that requires more edge competencies, more trust and loose control. It is a better way to harness the contribution of the cluster of social networks the corporation is trying to emulate. According to Ullrich, Borau, Luo, Tan, Shen and Shen (2008) Web 2.0 is good for learning and for research. It enables the active participation of each user and due to recent techniques, there is a great usability of the applications used. With many users contributing, the power of the crowd is being harnessed.

Web 2.0 is so great for learning and research because of its characteristic to enable access to data on an unprecedented scale, such as pictures, bookmarks, mapping data, indexed data etc. This data is available, well annotated and centralized. The ways of exploitation of this content are plentiful. The Web 2.0 approach is characterized by pragmatic solutions and lightweight formats. The data can be accessed by the web but also via APIs. The lightweight property gives the opportunity to access your content from a wider range of clients than the PC browser. For instance via mobile phones, PDA's and game consoles. This way, users can participate from wherever they are. No barriers hinder the growth of content; community building can be facilitated enabling matchmaking between peers with common interests. These options enable a completely different way of working with content than before (Ullrich et al., 2008).

The community of practice is one of the social media types that are frequently used for knowledge sharing. Hildreth, Kimble and Wright (2000) researched how well these communities would hold in a distributed learning environment. Communities of practice have been recognized as being groups of soft knowledge wherein the sharing of knowledge takes place. The research demonstrated that communities of practice can function within a distributed environment. An interesting finding was that a face-to-face element is necessary to take the evolution of the community further more quickly. Sharratt and Usoro (2003) executed an exploratory research towards the possibility of knowledge sharing within communities of practice. They identified several hypothetical factors that should have an influence on knowledge sharing in communities of practice. These factors are the contribution of knowledge sharing; the hierarchical organizational structure; the ease of use and the perceived usefulness of the information system; trust based on integrity, benevolence and competence; and lastly the recognition of career advancement, sense of community and the value of congruence.

In this research, the focus will be on the social medium microblogging. The next paragraph describes what microblogging is, what its main functions are and how it can have a positive effect on knowledge sharing.

2.3.1 Microblogging

Microblogging is about posting updates, ideas or simply quick notifications (McFedries, 2007). It is the micro equivalent of blogging, one of the most used social media. Updates or posts are made by describing a topic in a small amount of characters. Microblogging tools facilitate the easy sharing of status messages either publicly or within a social network. Microblogging has the functionality of being able to follow other microbloggers. All their updates will be collected on one timeline for you. Others can follow you as well. Between users, interaction is possible by replying to each other. Your messages can be sent to a certain number of individuals, sent exclusively to a specific contact, or made available to the World Wide Web (Costa, Beham, Reinhardt & Sillaots, 2008). Microblogging tools as Twitter and Jaiku provide a light-weight, easy form of communication that enables users to broadcast and share information about their activities, opinions and status.

According to Java et al. (2007) microblogging fulfils a need for an even faster mode of communication. By encouraging shorter posts, it lowers users' requirement of time and thought investment for content generation. This is also one of its main differentiating factors from blogging in general. The second important difference is the frequency of the update. On average a prolific blogger may update her blog once every few days; on the other hand a microblogger may post several updates in a single day (Java et al., 2007). Figure 7 represents the profile page of Evan Williams, founder and CEO of Twitter.com. He twitters about his daily life and interacts with users of Twitter.



Figure 7: Twitter profile page of Evan Williams, founder and CEO of Twitter.com (<http://twitter.com/ev>, 18-5-2009)

According to Grosseck and Holotescu (2008) the main functions of microblogging are the publishing of online brief text updates, in less than 140-200 characters. Most microblogging tools can be used multi-medial. Updates can be send and read on your computer using a web browser or a desktop application. On your mobile phone, microblogging is possible by using SMS and via mobile internet. Microblogging is a convenient way for quick updates on your interests, activities and findings. According to Java et al. (2007) the main types of user intentions are daily chatter, conversations, sharing information and URLs and reporting news. Furthermore, Java et al. (2007) claim users play different roles in different communities, like information sharing, friendship-wise relationship or information seeking. Ebner & Schiefner (2008) extended these types of microblogging by emphasizing the communication aspect. Especially learning is an active process on the part of the learner. Microblogging enables a real-time interaction between users, using different devices, technologies and applications (Grosseck & Holotescu, 2008).

Microblogging within an organization is often difficult. Many microblogging tools are public to everyone. Some hesitation to discuss project- or client-specific information on a public webpage is present because of company secrecy concerns. People use, for example, Twitter at work to keep up with what is new and what is happening with one another, and to share and exchange information needed. It provides a new informal communication channel complementary to other media. Work-related content is often personal or trivial to some extent and therefore people won't bother to share with others through instant messaging, email, or discussion forum. However, small informal exchanges are crucial for facilitating collaboration among co-workers (Zhao & Rosson, 2008). Microblogging has the characteristic of not interrupting your followers like an email or instant message does.

Different scientists (Costa et al., 2008; Ebner & Schiefner, 2008; Holotescu & Grosseck, 2009) have researched the capabilities of learning and knowledge sharing by using microblogging. They judged microblogging to be an extension of the possibilities to share knowledge. Holotescu and Grosseck (2009) have researched these possibilities by creating a microblogging platform especially for educational purposes. Their platform, Cirip.ro, has many educational uses, for information and knowledge management, for courses enhancement, for delivering entire online courses, for collaborative projects in universities, for communities of practice, or for e-portfolios. Users were able to specify their subject domain, user groups could be created, and there was a possibility to embed images, audio, (live) video or other files. Cirip.ro proved to be an effective tool for professional development and for collaboration with students. It provided valuable interactions in educational context acting as a social factor in a course management system. Courses using microblogging promoted an ambient awareness for communication, connections, and immediacy in 140 characters at a time.

Costa et al. (2008) found in their research among summer school participants that Twitter was regarded as a useful tool for spontaneous and immediate communication. It helped capture the spirit of the moment in a very easy way, promoting the sharing of ideas and prompting unplanned discussion about relevant topics.

Ebner and Schiefner (2008) concluded after two months of testing microblogging in an office environment that exchanging small information chunks is the strength of microblogging in the same way as discussion with a community about current news and interests is. They express that these forms of

information can be used in various settings and enhance our daily working routine or learning behaviour. Even though Ebner and Schiefner (2008) state that learning is an active cognitive process on the part of the learner, they believe it also to be a social process that develops through conversation.

Based on scientific research, microblogging can be called a medium fit for knowledge sharing. Microblogging has received various attention in research, the articles that have been published show promising results. These results will be used in designing a research method to identify the effect microblogging has on knowledge sharing. The low effort method of microblogging seems to be able to meet the knowledge sharing conditions by Cross et al. (2001). Microblogging post are expected to create a better understanding of who knows what and how these people can be reached. Another aspect that will be studied in this research is which characteristics are important when using organizational microblogging. Research on these characteristics will be described in the next paragraph.

2.4 Important characteristics for the use of microblogging

When introducing a new technology, the adoption of this technology by the organization is not an immediate given. Several characteristics influence the successful adoption of a technology. This is assumed to be the case with microblogging as well. The adoption of technology has been a research subject for many years resulting in a large amount of models predicting the use of technology. Examples of models are the Theory of Reasoned Action, the Theory of Planned Behavior, the Technology Acceptance Model and the Diffusion Theory. Kukafka, Johnson, Linfante and Allegrante (2003) used these models to create a framework. They drew two conclusions. The first is that IT use is complex, multi-dimensional, and influenced by a variety of factors at individual and organizational levels. The second is that success in achieving change is enhanced by the active participation of members from the target user groups.

Another research that combines models to have a better understanding of the adoption of technology is the Unified Theory of Acceptance and Use of Technology model, in short UTAUT, by Venkatesh, Morris, Davis and Davis (2003). This model identifies several characteristics influencing the adoption of technology. These characteristics are claimed to be able to predict the adoption of a technology by 70% (Venkatesh et al., 2003). The UTAUT model is largely based on the TAM model by Davis, Bagozzi and Warshaw (1989). This model theorizes that the external influences on the user intention are moderated by the perceived usefulness of the technology and the perceived ease of use. Venkatesh et al. (2003) used this knowledge to create the UTAUT model. In the model, the expected performance of the technology, the expected effort needed to use the technology, the attitude towards the technology and the conditions facilitating the use of the technology are predicting the intention of use and the actual use behaviour.

The UTAUT model has been modified and extended by Günther, Krasnova, Riehle and Schöndienst (2009) to predict the adoption of microblogging. In several focusgroups, they used a set of questions to understand participants' attitude towards the use of microblogging in the workplace. They found several different constructs to be of influence in the adoption of microblogging, next to the normal constructs in the UTAUT model. They believed privacy concerns, reputation, expected relationships and collaborative norms to be of influence on the behavioural intention. Furthermore, they believed reputation,

communication benefits, signal to noise ratio, codification effort and the expected relationships to be of influence on the performance expectancy. Günther et al. (2009) expected this adapted version of the UTAUT model to perform well in explaining social software adoption in general, as similar issues arising from self-disclosure and social interaction are involved. The revised UTAUT model can be found under figure 8.

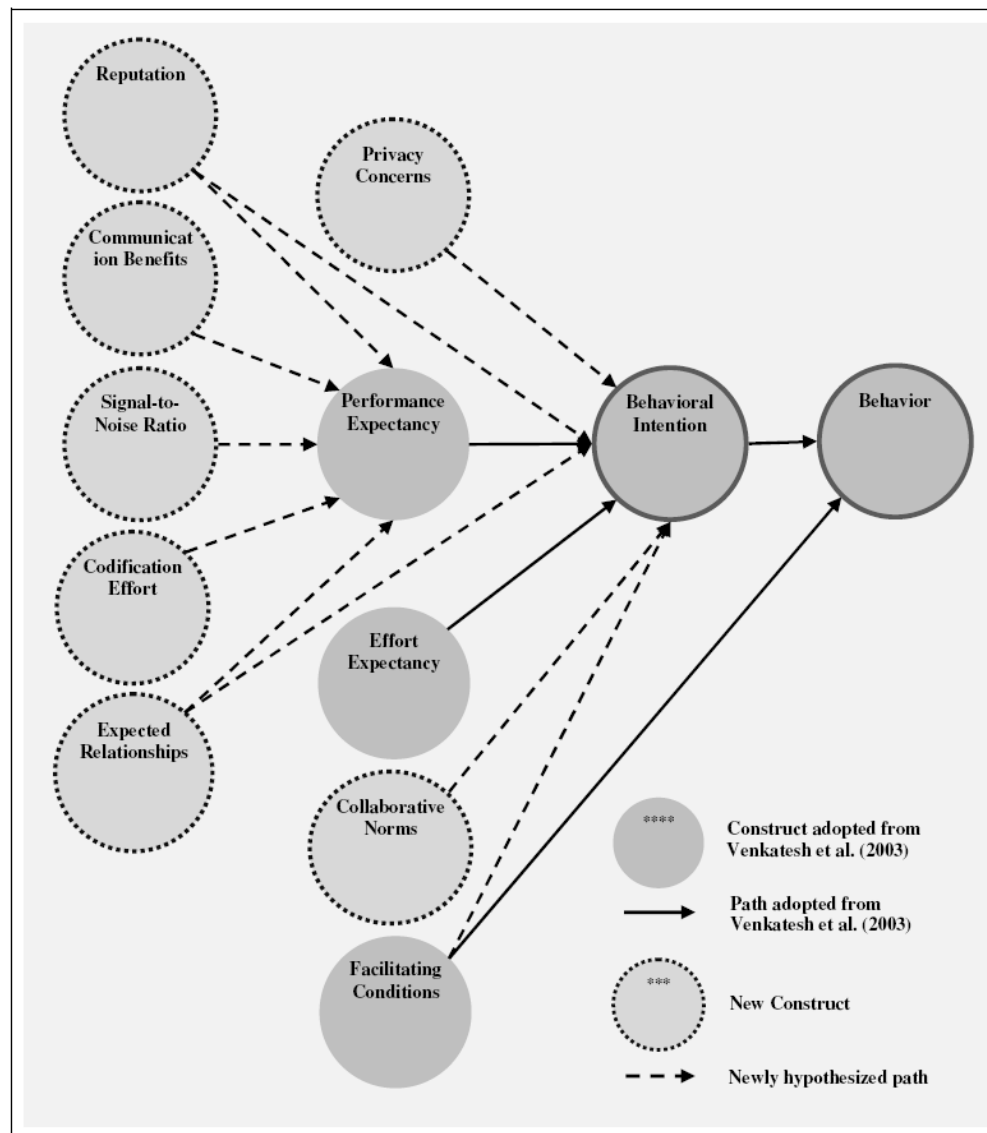


Figure 8: Modified and Extended Version of UTAUT (Günther et al., 2009)

The characteristics described in this modified and extended version of UTAUT by Günther et al. (2009) are expected to be important in the use of microblogging. Using these characteristics the adoption of microblogging in an organization can be better tailored. In this research the characteristics will be grouped under tool, user and organization. This is done to evaluate the use of the specific microblogging tool, assess which user characteristics are important to the use of microblogging, and study whether the organizations features make a difference. The characteristics by Günther et al. (2009) will be a source to these three groups.

Next to that, the personality of the user will be researched using a NEO-Five Factor Inventory (NEO-FFI) to explore the importance of the personality factors when using microblogging. The NEO-FFI is a personality test developed to provide measurement of the five basic personality factors, neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (Aluja, García, Rossier & García, 2004). It is expected that people that are less conscientious, will have a more positive attitude to working with new media because they do not need the fine distinction most new media lack.

Using the different topics described in this chapter, a research model and research questions have been created. The model and questions are presented in the next paragraph.

2.5 Research model and research questions

Based on the scientific literature presented in this chapter a research model has been created. You can find this model under figure 9. In this model, the relations between the different factors in this research have been visualized.

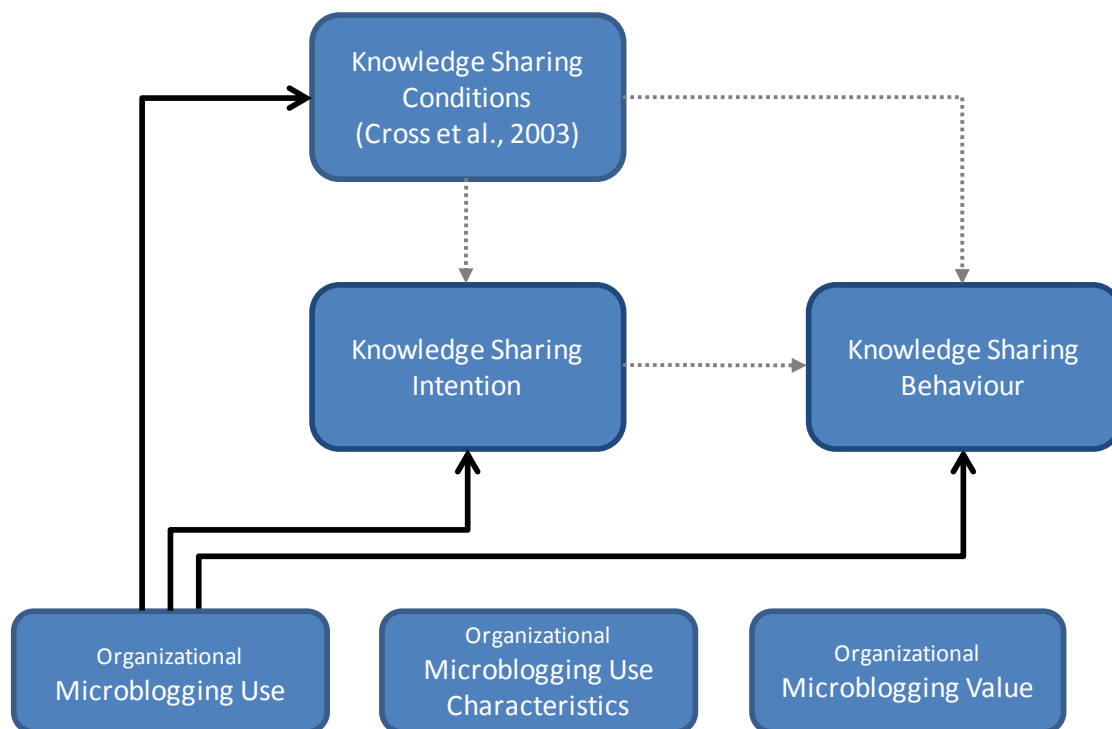


Figure 9: Research model

The knowledge sharing conditions by Cross et al. (2001) and Borgatti and Cross (2003), that were presented in paragraph 2.2, seem to fit with social media. Knowledge, access, engagement and safety are all conditions that can be influenced by communication. This is why it is hypothesized that the use of organizational microblogging has an effect on the knowledge sharing conditions. The aspect of microblogging to easily share status messages would have a positive effect on knowing what someone else knows. In addition, the low threshold method of conversing with colleagues can make people more accessible to others and give people a higher feeling of safety when seeking knowledge. Creating a good atmosphere is also believed to be of a positive effect on the way people engage with each other when

sharing knowledge. It is also assumed that the use of organizational microblogging has an effect on the knowledge sharing intention and the knowledge sharing behaviour. This is assumed because by posting updates, ideas or quick notifications, knowledge sharing is believed to cost less effort than without microblogging.

Based on scientific literature (Borgatti & Cross, 2003; Cross et al., 2001), the knowledge sharing conditions are believed to have an effect on the knowledge sharing intention and knowledge sharing behaviour. These relations will not be validated in this research, as they are not a primary focus. However, leaving out these relations in the model impairs comprehending the importance of the knowledge sharing conditions. Therefore, these relations are present in the model, but have been drawn with a dashed arrow.

The characteristics that are considered important for the use of organizational microblogging are in the model under organizational microblogging use characteristics. They represent a more broad range of characteristics that surround the context of an organization, like the choice for a tool, the personality of the user and the features of an organization. The value of microblogging is in the model as well. Microblogging is a quite new medium and not yet broadly adopted. Researching what the value of microblogging within an organization is, is therefore interesting.

The research model has lead to a main research question and three sub research questions. The main research question will be:

“What effect does the use of organizational microblogging have on knowledge sharing?”

In this question, the term knowledge sharing refers to the three knowledge sharing factors: knowledge sharing conditions, knowledge sharing intention and knowledge sharing behaviour. To gain input on these factors and be able to answer the main research question the following sub research question has been made:

1. *“What effect does the use of organizational microblogging have on conditions, intention and behaviour for knowledge sharing?”*

To research this question, users need to use microblogging for a longer period. The second research question will regard the characteristics important for the use of microblogging. A special focus will be kept on the tool, the user and the organization. The second question is:

2. *“What characteristics are important when using organizational microblogging?”*

The third and last question is based on the value of organizational microblogging. The third question is:

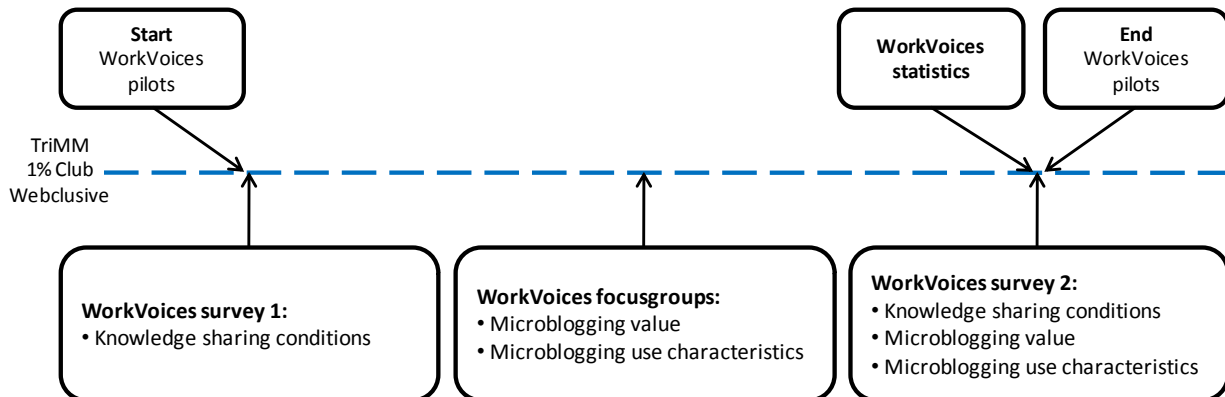
3. *“What is the value of organizational microblogging?”*

By hosting microblogging pilots within three organizations, the research questions will be researched. Next to the pilots, a study of microblogging at another organization will carried out. In the next chapter, the method of research will be described.

3. Method of research

This chapter provides an overview of how this research has been executed. The research questions have been answered by studying two different microblogging platforms, WorkVoices and Yammer. In figure 10, the different methods of research are illustrated. Every method has been pictured on a time line including information on which construct has been researched using the method.

WorkVoices pilots



Yammer study

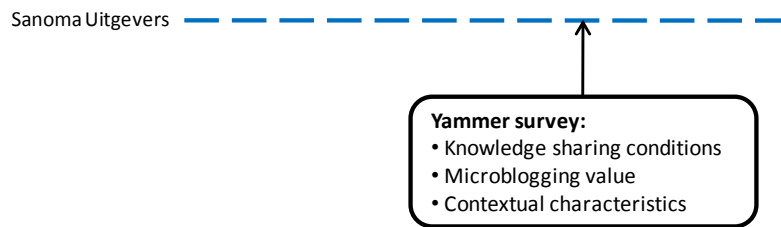


Figure 10: Research method overview

First, the WorkVoices pilots are described including the participating organizations and the pilot design. Next, the design, the participants, the apparatus and the procedure of the two WorkVoices surveys is explained. After that, the same information will be provided on the WorkVoices focusgroups including the method of analysis. Furthermore, statistics are given on the usage of WorkVoices during the pilot period. Alongside the WorkVoices pilots, a study has been executed at Sanoma Uitgevers, researching their use of Yammer. This study is described first. Next, the design, the participants, the apparatus and the procedure of the Yammer survey is explained.

3.1 WorkVoices pilot

To research which conditions have an effect on knowledge sharing when using organizational microblogging, pilots with microblogging have been organized. In these pilots with three organizations,

the focus has been on the effects of microblogging on knowledge sharing, which characteristics are important to the use of microblogging, and what the value of organizational microblogging is.

WorkVoices is the microblogging platform that has been selected to use during the microblogging pilots. WorkVoices is a password-protected environment, specially designed for knowledge sharing within organizations, or as the founders call it, microsharing. Microblogging in WorkVoices is not very different from for instance Twitter. It does have some extra options, like the adding of attachments, specifying your location, adding tags to a message and the creating of threads when replying to an update. Every user is able to follow and be followed. Next to that, users are able to create topic specific tribes and close this tribe to all but the users with access granted. A large downside of the use of WorkVoices has been the beta phase WorkVoices was still in during the pilots. Some functions of WorkVoices were not working yet or were not working correctly. This made the usability of WorkVoices lower than expected. WorkVoices could only be used via a web application.

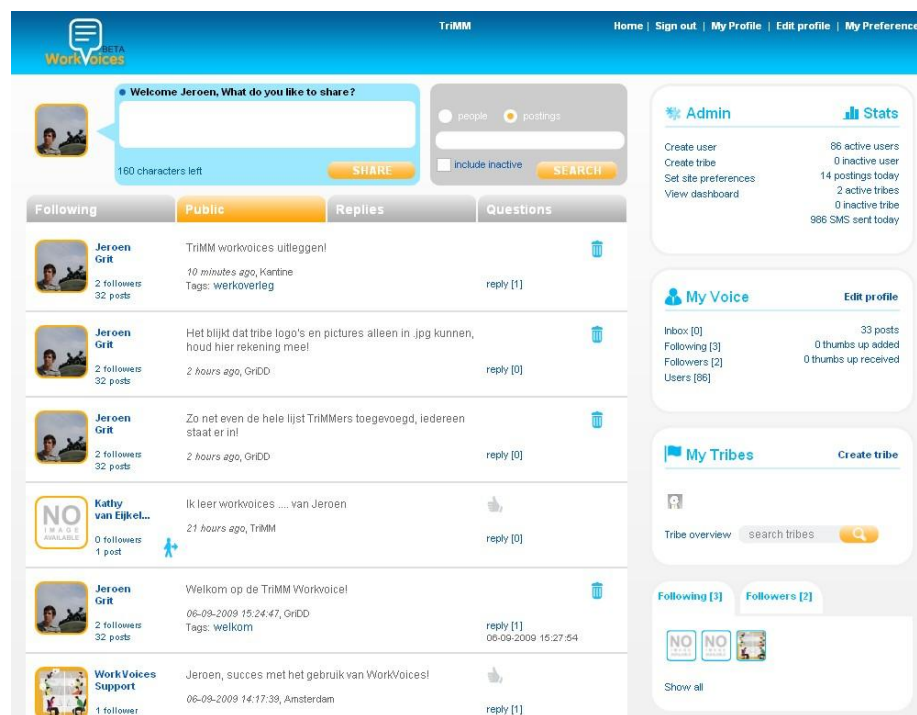


Figure 11: A screenshot of the WorkVoices Public page

The organizations TriMM interactive media, the 1% Club and Webclusive were pilot participants. TriMM interactive media is a company that can provide clients with all sorts of multimedia and everything around that product. These products are internet sites and web applications. Their goal is the best result in the area of internal and external communication, training, exchange of knowledge and the driving of processes. The 1% Club is a marketplace for small-scale development projects. Individuals can decide themselves how much money they contribute. All projects are advertised on a website and people can easily contribute to a project they like. Webclusive is a technical internet company that realizes large internet projects. They have the expertise for the development and implementation of high quality and high traffic websites. One important property of all pilot organizations is that they are all working with or via the World Wide Web.

Design

Every pilot has been setup in an identical fashion. To begin with, the pilot participants had a briefing on the use and options of WorkVoices. They were encouraged to start using WorkVoices in all its aspects and explore how they could use this medium to their liking. They were informed on the microsharing concept of WorkVoices and its mission of simplifying and enhancing effective knowledge sharing within organizations. After the briefing, all participants were given the login credentials and were asked to give it a go. TriMM and Webclusive started their pilot in July 2009, the 1% Club started in May 2009. All pilots ended in September 2009.

3.1.1 WorkVoices survey 1 & 2

To research effects of microblogging on knowledge sharing, which characteristics are important to the use of microblogging, and what the value of organizational microblogging is, all participants of the WorkVoices pilots were asked to complete two surveys. One at the start of the pilot and one at the end of the pilot. The surveys were published online and spread using an email invitation.

Design

The first and second survey have been designed as an effect measurement. Both surveys had identical items that were compared during the statistical analysis. The surveys were an exact match with the only difference that the people who had read posts on WorkVoices got a few questions on the use of the medium. The surveys focused first on the internet expertise and the social media competence of the respondent. Based on a scale by Nysveen & Pedersen (2002) the respondents were asked to rate their internet expertise. The scale used was a 7-point Likert scale, ranging from very low to very high.

Subsequently, the social media competence of the user was measured. A large diversity of social media categories were provided, including blogging, communities of practice, microblogging, photo sharing, referencing, social bookmarking, social networking, taxonomies, video sharing and virtual reality. For each of these categories they had to decide which role they fulfilled. A scale provided by Forrester (2006) was employed. People had to choose from being an inactive, a spectator, a joiner, a critic or a creator. The collector category (collecting information using RSS and tagging) was left out of this scale because the category did not seem a logical next step in the scale. This was also a conclusion after pretesting the surveys.

In the survey the knowledge sharing conditions based on Cross et al. (2001) and Borgatti and Cross (2003) were measured using questions and statements. The condition knowledge was measured by asking the respondents to rate how good they were informed on four different topics. They could answer on a 7-point Likert scale ranging from very poor to very good. Every topic had a version to rate the topic on department level and a version to rate the topic for the whole organization. The construct knowledge had a Cronbach's alpha (α) of .88 in the first survey and .91 in the second survey. Cronbach's alpha determines the internal consistency of items in a survey instrument to measure its reliability. Checking reliability is desired when using an assembly of interrelated items designed to measure underlying constructs. It measures how well a set of items measures a single construct (Santos, 1999). Cronbach's alpha has a minimum of 0 and a maximum of 1.0 ranging from unreliable to reliable. .88 is a

reliable Cronbach's alpha. The condition access had six topics that had to be rated on a 7-point Likert scale ranging from very poor to very good. The condition engagement had six different topics; the condition safety had four topics. These topics were rated on different statements on a 7-point Likert scale ranging from strongly disagree to strongly agree. All topics were measured on department level and whole organization level. The construct access had $\alpha = .95$ in the first survey and $\alpha = .94$ in the second survey. The construct engagement scored $\alpha = .87$ in the first survey and $\alpha = .91$ in the second survey. Moreover, the construct safety had $\alpha = .85$ in the first survey and second survey.

Next to the knowledge sharing conditions, indicators were used to measure the knowledge sharing behaviour and the knowledge sharing intention. For both, four statements were used in the surveys. These statements were rated on a 7-point Likert scale ranging from strongly disagree to strongly agree. The construct knowledge sharing behaviour scored $\alpha = .85$ in the first and second survey, the construct knowledge sharing intention had $\alpha = .81$ in the first and second survey. The last questions in the survey were questions on age, gender and educational level. The whole survey setup can be found in the appendix.

The second survey was almost identical to the first survey. The only difference was that a few questions on WorkVoices and microblogging were used. These questions included the use in reading and posting, and rating the communication using WorkVoices. Respondents were rating their activity on a 5-point Likert scale ranging from never to a few times a day. When the respondent had never read WorkVoices, the survey software would forward him or her to the knowledge sharing conditions part of the survey to keep him or her from assessing a medium never used. WorkVoices was rated on 7-point Likert scale ranging from very low to very high. Next to these questions, two statements were given measuring the suitability of communicating via microblogging in general and via WorkVoices. These statements were answered on a 7-point Likert scale ranging from strongly disagree to strongly agree. Lastly, an open question was given, asking for any remarks on pros and cons of communicating via WorkVoices in their organization. The complete survey setup can be found in the appendix.

Participants

The first survey was sent out to map the current values of the pilot organizations. All respondents were employees of the pilot organizations. TriMM had a response of 52 out of 74 invitations, a response of 70%. At the 1% Club, 11 people completed the survey, having 12 people invited. This is a response of 92%. Webclusive had 8 out of 11 invitations answered (67%). Of the whole dataset, 74.2% of the respondents was male and 25.8% female. The average age was 32.6 ($SD=9.1$). The largest part of the respondents, 41.9%, had HBO/HTS as their highest educational level. More than one third (35.5%) had WO as their highest educational level.

The respondents of the first survey scored an average of 5.58 ($SD=1.1$) at the internet expertise level with a minimum of 3 and a maximum of 7 on a 7-point Likert scale ranging from very low to very high. On the social media competence the respondents scored an average of 2.1 ($SD=0.66$) on a 5-point scale. The scale options were 1. An inactive, 2. A spectator, 3. A joiner, 4. A critic or 5. A creator. The average of 2.1 matches being a spectator. The maximum average score was 4, the minimum was 1.

The main goal for the second survey was to measure any differences with the first survey. Next to that, it was used to assess WorkVoices. TriMM responded to the survey invitation with 42 out of 75 people completing the survey. This is a response of 56%. At the 1% Club 8 out of 12 people responded to their invitation to participate in the survey. A response of 67%. Webclusive responded in a low fashion compared to the first survey. Only 4 people responded to the invitation where 11 people were invited. This is a response of 36%. The second survey had the gender differentiation of 70.8% male and 29.2% female. The average age was 34.2 ($SD=9.5$). Almost half of the participants (43.8%) had an educational level of WO. 37.5% had HBO/HTS as their highest educational level.

The respondents of the second survey scored a lower average on the internet expertise level than on the first survey. The average was 5.33 ($SD=1.0$). The minimum score was 4 and the maximum 7. On social media competence the average score was 2.1 ($SD=0.7$) with a minimum of 1 and a maximum of 3.7. The role of spectator is fitting for this score.

With an average score on reading of 2.4 ($SD=1.4$) the amount of reading was between less than once a month to a few times a month. More than one third (35.2%) never read WorkVoices, 13% read WorkVoices a few times a day. Only 3.7% posted a few times a day on WorkVoices. Half of the participants (52%) never posted on WorkVoices.

Apparatus

The surveys were made using the SurveyMonkey.com web editor. Using this editor, email invitations were created and sent. Every participant was invited to fill in the survey, even if they did not have the chance to work with WorkVoices yet. The TriMM invitees had a chance on winning a robot by completing the survey. Using a web browser the survey could be filled in and completed.

Procedure

SurveyMonkey.com was used to create, spread and store the surveys as well. Every single topic was presented on a single page helping people focus on the topic at hand and not on the topics to come. This might have helped respondents review every topic better and improve the reliability of the respondents' answers. According to the research of Andrews, Nonnecke and Preece (2003) the design of a survey should be presented in a logical style. This method of only a single topic per page keeps the respondents attention on the topic of that page instead of browsing down a long list. The survey was pretested with three different people using a walkthrough analysis method. Spencer (2000) presents a method for a streamlined cognitive walkthrough method. This description has been used to pretest the survey and increase its quality. The walkthrough participants were asked to complete the online survey as they would normally. Meanwhile questions were asked about how they made their choices and what their opinion was on certain items. They were asked to name any observed irregularities or remarks they had. Using this input the survey was adjusted and retested with colleagues at GriDD. Using these last remarks the survey was sent out using an email invitation. For TriMM and the 1% Club the first survey invitation was sent out in July 2009, for Webclusive in August 2009. The invitation for the second survey was sent out in September 2009. All survey collectors were kept open for a period of two weeks. After one week, a reminder was sent to the people who had not yet reacted on their invitation. The surveys as used online can be found in the appendix.

3.1.2 WorkVoices focusgroups

Three focusgroups, each with a group of four people, have been organized within the pilot organization TriMM. Focusgroups were used to gain more insight on the microblogging use characteristics and the microblogging value. The people were selected on their activities within WorkVoices, their affinity to new media and the way they worked with these new media. Focusgroup 1 was characterized as the early adopter group. Focusgroup 2 and 3 consisted of people who were more skeptical towards new media than the first group. They were all employees of TriMM.

Design

The choice to use a focusgroup has been based on the many positive attributes focusgroups have compared to other qualitative research methods. For instance, a focusgroup combines individual interviews with observation (Morgan, 1988). Because several people get a chance to speak, the possibility exists a discussion between the participants is started without this being a goal. Extra data can be gathered this way. The researcher is in the position to observe the conversation and join in to enquire some extra information when triggered. The interaction between the participants is the most important. Their points of view and experiences make focusgroups more valuable than individual interviews (Morgan, 1996).

The focusgroups were started with a small explanation of what microblogging is and what variations there are. After the introduction of Twitter, Yammer and WorkVoices, their opinion and use of WorkVoices was set as the first topic of discussion. After evaluating WorkVoices, the knowledge sharing situation of the respondents was a very important topic. They were asked how they filled in the knowledge sharing conditions, Knowledge, Access, Engagement and Safety. Another important topic was the use of microblogging and social media in general. They were asked for missing options within social media, potential social media that could be used within organizations, and what sort of medium would be ideal for knowledge sharing within organizations. To wrap up the hour used for the focus groups, all participants were asked to name conditions necessary when trying to create a successful knowledge sharing environment within an organization. The operating schedule and the full transcripts for the focusgroups can be found in the appendix.

Participants

The people that were invited to the focusgroups were all employees of TriMM. As employees of a company creating online solutions, they all had an affinity with online media. The first focusgroup had four male participants. These were an illustrator aged 34, an interaction designer aged 33, a creative producer aged 27 and a project manager aged 38. The second group had two male and two female participants. A project manager aged 36, a project manager aged 43, a webmaster aged 45 and an interaction designer aged 35. The third group had four male participants. A software engineer aged 29, a software engineer aged 37, a web developer aged 38, and a graphic designer aged 24.

To investigate the personality of the participants and see whether this is an important characteristic when using organizational microblogging, the completion of a personality test was one of the activities. The NEO-Five Factor Inventory (NEO-FFI) test was used for this purpose. The NEO-FFI is a psychological

personality inventory; 60 items with 12 per domain measure the five factors Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness. The test was performed to see whether specific groups had specific personalities. The NEO-FFI test scores are measured on a standard nine (Stanine) scale from 1 to 9 with a normal distribution. The outcome of the test is a score on five personality dimensions. These dimensions are measured using questions on different aspects attached to the personality dimension. The personality dimensions and every aspect attached to that dimension can be found in table 3.1.

Table 3.1 Focusgroup NEO-FFI personality dimensions

Personality dimension	Aspects
▪ Neuroticism	Anxiety, hostility, depression, self-consciousness, impulsiveness and vulnerability to stress
▪ Extraversion	Warmth, gregariousness, assertiveness, activity, excitement seeking and positive emotion
▪ Openness to experience	Fantasy, aesthetics, feelings, actions, ideas and values
▪ Agreeableness	Competence, order, dutifulness, achievement striving, self-discipline, deliberation
▪ Conscientiousness	Trust, straightforwardness, altruism, compliance, modesty and tendermindedness

Apparatus

All groups could be organized on the same day in the creative room at TriMM. The focusgroups were recorded with a video camera to be able to transcribe the input given. A Powerpoint presentation was used to introduce microblogging and a NEO-FFI test was used to measure the different personalities.

Procedure

All participants of the focusgroups have been invited by sending them an email. The time taken for one focusgroup was one hour including the introduction. Starting the meeting, all participants were asked to complete a NEO FFI personality test. After that, the researcher started with the introduction of the focusgroup. This included a short movie about the use of Twitter and some information on the different microblogging platforms. The researcher gave special attention to letting people finish their sentence and have all people take the possibility to broadcast their opinion.

Analysis

To analyze the data gathered in the focusgroups, the recordings made have been literally transcribed. The discussions from the focusgroups have been analyzed and relevant phrases and conclusions have been pasted in a spreadsheet. Using this spreadsheet, the different findings have been categorized on the relevancy they carried for the different research questions. The findings have been translated from Dutch to English. Using guidelines of Miles and Huberman (1994) the findings have been grouped and sorted in separate tables.

3.1.3 WorkVoices statistics

To interpret the usage of WorkVoices the site statistics have been used to gain insight on that topic. To see how active the pilot participants have been, the amount of posts and the amount of logins have been used. These numbers should be interpreted with the amount of days the different pilots ran in mind. The pilot at TriMM ran 78 days, the pilot at the 1% Club ran 115 days and the pilot at Webclusive ran 48 days.

At TriMM the usage activity was quite low. Of the 75 users, 48 users logged in 381 times. One user took the lion's share of this number with 97 logins. On average 4.88 users per day logged in. 26 users made a post or a reply with a total of 339 posts and replies. This is an average of 4.35 posts per day. The 1% Club was a lot more active than TriMM. 18 users logged in 708 times, 14 of these 18 users made 730 posts and replies. On average 6.16 users logged in every day and 6.35 posts were made. Webclusive had a quite high activity. 17 users logged in 304 times. 14 users were responsible for 177 posts and replies. On average 6.33 users logged in every day. Their average post count per day was 3.69, which is lower than the other organizations.

3.2 Yammer study

A study researching the effects of microblogging on knowledge sharing, which characteristics are important to the use of microblogging, and what the value of organizational microblogging is, has taken place at Sanoma Uitgevers. This has been done to use another microblogging platform next to WorkVoices. Sanoma is a large multimedia publisher. The department Sales Support and Development had been using Yammer for a certain amount of time and was willing to fill in a survey on their use of Yammer.

Yammer is, just like WorkVoices, a microblogging platform specialized for the use in organizations. Based on the domain name in an email address anyone is able to set up a company Yammer. Everyone with the same domain name in their address is able to join the company Yammer. Yammer has the options to create public and closed groups, to tag messages and to attach files. Yammer's main question is "What are you working on?".

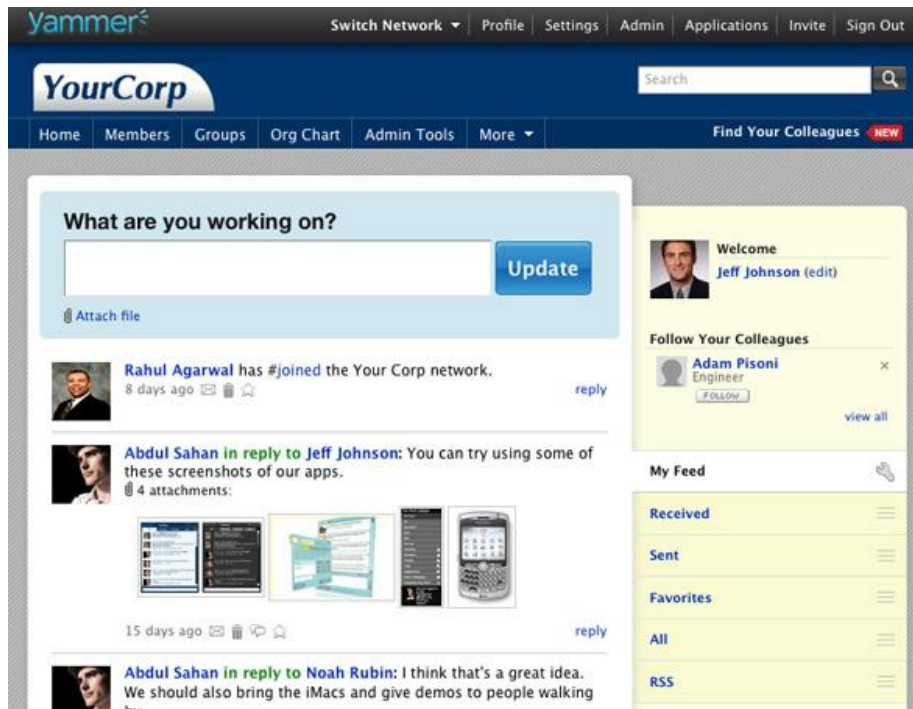


Figure 12: A screenshot of the Yammer homepage

Yammer was introduced at Sanoma in October 2008 and after an initial good start with about 75 users. The use of Yammer declined due to some difficulties with the posting of Out of Office replies on the Yammer timeline. When spreading the survey, the use of Yammer had stopped.

3.2.1 Yammer survey

To research the effect of Yammer on knowledge sharing, which characteristics are important to the use of microblogging, and what the value of organizational microblogging is, a survey has been distributed. The survey was spread within the department Sales Support and Development of Sanoma Uitgevers.

Design

The survey had the knowledge sharing conditions knowledge and engagement, and knowledge sharing within organizations as main subjects. Like the other two surveys, the respondents were asked to rate their internet expertise. The scale used was a 7-point Likert scale ranging from very low to very high. The social media competence was rated using a large diversity of social media categories; people had to choose from being an inactive, a spectator, a joiner, a critic or a creator.

To research Yammer, the respondents were first asked to rate their activity on Yammer. Respondents were rating their activity on a 5-point Likert scale ranging from never to a few times a day. When they answered to have never read or posted on Yammer, they were taken to the last page of the survey to fill in their age, gender and educational level. This was done to prevent participants answering on topics about a medium they had never used. Furthermore, they were asked to rate the communication via Yammer. This was done using a 7-point Likert scale ranging from very low to very high. Two statements were given measuring the suitability of communicating via microblogging in general and by using

Yammer. These statements were answered on a 7-point Likert scale ranging from strongly disagree to strongly agree. Three open questions on communicating using Yammer, other potential media for knowledge sharing and other characteristics a medium should have for knowledge sharing were asked to fill in.

Two of the knowledge sharing conditions were used in this survey. Knowledge and engagement were measured with twenty statements. The conditions access and safety were left out of the survey because these could not be phrased to have a direct influence of Yammer. Every statement measuring knowledge and engagement was phrased in a fashion that Yammer had an effect on the subject discussed. The statements were rated on a 7-point Likert scale ranging from strongly disagree to strongly agree. The reliability of both constructs was very good. The reliability of knowledge was $\alpha = .94$ and on engagement $\alpha = .97$. These are scores confirming large reliability, though these numbers should be interpreted with the low response in mind. On the last page of the survey, the respondents were asked to supply their age, gender and educational level. The complete survey setup can be found in the appendix.

Participants

The survey was distributed by the contact at Sanoma via an email invitation, including the hyperlink to the survey. In total 16 people were invited to participate in the survey. Fourteen out of this number filled in this survey. This is a response of 87.5%. Of the participants in this survey, 61.5% was male and 38.5% female. The average age was 36.7 ($SD=4.3$). The largest part of the participants, 61.5%, had HBO/HTS as their highest educational level. On third (30.8%) had WO as their highest educational level.

The internet expertise level of the respondents had an average of 5.2 ($SD=1.0$) with a minimum of 4 and a maximum of 7 on a 7-point Likert scale ranging from very low to very high. The average score on the social media competence was 2.4 ($SD=0.9$). The scale options were 1. an inactive, 2. a spectator, 3. a joiner, 4. a critic or 5. a creator. The survey respondents scored between a spectator and a joiner.

Yammer was read between a few times a month and a few times a week with an average of 3.5 ($SD=0.7$). More than half of the participants (57.1%) read Yammer a few times a week. Posts were made between less than once a month and a few times a month with an average of 2.3 ($SD=1.0$). Only 14.3% posted a few times a week.

Apparatus

The survey was made using the SurveyMonkey.com web editor. The hyperlink to the survey was spread by the contact at Sanoma. Using a web browser the survey could be filled in and completed.

Procedure

SurveyMonkey.com was used to create, spread and store the surveys as well. Like with the other surveys, every set of subjects or statements were presented on a different page helping people focus on the statement at hand and not on the statements to come. The survey collector hyperlink was kept open for a period of two and a half week. The contact at Sanoma reminded several people face-to-face of the survey during the time the survey was online. The survey as used online can be found in the appendix.

4. Results

The data gathered using the studies described in chapter 3 is presented in this chapter. Every sub research question is matched to the data providing answers to this question. The first paragraph is on the effects organizational microblogging has on the knowledge sharing conditions, the knowledge sharing intention and the knowledge sharing behaviour. The second paragraph categorizes the different characteristics important to the use of organizational microblogging. The third paragraph explains the value of organizational microblogging. In the last paragraph, the relations in the research model, presented in chapter 2, are reviewed.

4.1 Effects of microblogging on knowledge sharing conditions, intention and behaviour

In the first and second WorkVoices survey, statements were made without referring to WorkVoices. In the Yammer evaluation the direct effect of Yammer was taken up into the statement and people were asked to rate the effect of Yammer on the subjects presented. All average numbers, measured on a 7-point Likert scale, for survey 1 and 2 on the knowledge sharing conditions and the knowledge sharing behavior indicators are above the neutral score of four. Especially the constructs Engagement and Safety score high. The tendency to share knowledge is high, as is feeling safe to share knowledge and seek for it. To see whether any significant changes occurred during the pilot period, a paired samples t-test has been executed. This gave a significant difference on Access ($t(37)=-2.11, p = .042$) and the Knowledge sharing intention ($t(35)=2.12, p = .041$). We can draw the conclusion that during the pilot period the availability and the accessibility of colleagues to share knowledge have significantly increased. Next to that, the intention to share knowledge has significantly increased as well. In table 4.1, the average scores and accompanying standard deviations on the knowledge sharing conditions and knowledge sharing intention and behaviour indicators are shown.

A result of the Yammer evaluation is that people did not believe that the use of Yammer gave them more information on who has which knowledge, with an average of 3.48 ($SD=1.38$). For instance, the expertise and professional interests of colleagues. Next to that, the use of Yammer did not have the effect that people were more open and available for the sharing of knowledge, shown by the average score of 2.77 ($SD=1.31$) on Engagement.

Table 4.1 Construct Knowledge sharing conditions

Construct	Average (and standard deviation)					
	WorkVoices survey 1	n	WorkVoices survey 2	n	Yammer evaluation	n
Knowledge	4.96 (0.84)	69	5.06 (0.83)	52	3.48 (1.38)	13
Access	4.81 (1.00)	69	5.12 (0.88)*	51		
Engagement	5.74 (0.62)	65	5.85 (0.66)	48	2.77 (1.31)	13
Safety	5.70 (0.68)	63	5.81 (0.68)	48		
Knowledge sharing intention	5.21 (0.93)	61	5.32 (0.88)*	48		
Knowledge sharing behaviour	5.33 (1.03)	62	5.43 (1.00)	48		

*Significant difference with $p < .05$

In the WorkVoices focusgroups, the knowledge sharing conditions came up as well. In table 4.2, the results of this discussion have been reported. Plus and minus signs have been used to indicate whether a topic is positive or negative. The focusgroup participants discussed that they did not always know how to find the right people for the job. Especially when extraordinary projects came in, people had problems to find out exactly who did what. Too much knowledge is only stored in the head and is not made easy accessible. Who knows what is not always easy to find out. People do claim to work in a safe enough environment to ask around until they have their questions answered.

Table 4.2 Focusgroup answers regarding the Knowledge sharing conditions

Focusgroup input	+ / –
▪ Knowledge is too much stored in the head.	–
▪ When searching people for the extraordinary projects, I have no idea who does exactly what.	–
▪ I do not always know how to find the right people for the job. Keep asking around till you find the one.	–

In this paragraph effects of organizational microblogging on knowledge sharing conditions, knowledge sharing intention and knowledge sharing behaviour, have been evaluated. Using the knowledge sharing conditions the direct effect of Yammer has been measured; these effects were not present. The knowledge sharing conditions were used as well to see whether a significant effect could be identified between the start and end of the pilot periods. The conclusion can be drawn that on Access and the Knowledge sharing intention a significant positive difference can be identified. During the pilot period, the availability and the accessibility of colleagues to share knowledge and the intention to share knowledge have significantly increased. Using the data gathered during the focusgroups, the conclusion can be drawn that who knows what is not always clear, as is the way to access this knowledge. The environment in which people operate is safe enough to chase this knowledge until it is found.

4.2 Characteristics important when using microblogging

A successful implementation of microblogging with knowledge sharing as intention does not only depend on which effects microblogging has; it also depends on certain characteristics regarding the microblogging tool, the user and the organization. In this paragraph, the input from the surveys and the focusgroups regarding this subject is reported.

From the quantitative data, only one clear characteristic could be identified. A user characteristic is that being experienced with microblogging helps users rate microblogging higher than when users have no experience with microblogging. As reported before, people with experience significantly rated communicating using microblogging (WorkVoices) higher than people without experience ($F(1,33) = 4.54, p = .041$).

In the focusgroups user characteristics have been researched using a NEO-FFI personality test. Focusgroup 1 was characterized as the early adopter group. Focusgroup 2 and 3 consisted of people who were more skeptical towards new media than the first group. The data have been matched to the internet expertise and the social media competence and is presented in table 4.3.

Table 4.3 Focusgroup NEO-FFI scores

	Neuroticism	Extraversion	Openness to experience	Agree ableness	Conscientious ness	Internet expertise	Social media competence
Focus group 1	3.75	6.5	7.5	6.25	3.5	5.25	2.26
Focus group 2	4.25	6.25	7.25	6.75	4.5	5.38	2.21
Focus group 3	4.5	4.5	7.5	3.5	4.75	5.67	2.73

All groups had an average of around 4 on neuroticism. This is a score below the Stanine average score of 5, but not low enough to be out of the ordinary. Scores that are out of the ordinary are 1, 2, 8 and 9. Scores of 3 and 7 are exceptional, though not very special. Focusgroup 1 and 2 scored on the higher side of the three middle bars (4, 5, and 6) of the Stanine on extraversion, with an average of 6.5 and 6.25. Focusgroup 3 scored quite lower with 4.5. The participants are probably less extravert than the participants of the first two groups. All groups scored high on openness to experience with averages above 7. Apparently, all focusgroup participants are quite open to experience. Focusgroup 3 scored quite low on agreeableness with 3.5. The other two groups scored higher (6.25 and 6.75) and their participants are likely to have a personality that is more agreeable than the participants of focusgroup 3. All groups scored below average on conscientiousness (3.5, 4.5 and 4.75). Focusgroup 1 scored a full point lower than 2 and 3 and the participants of this group can be expected to be less conscientious than the participants of focusgroup 2 and 3. The scores of focusgroup 1 and 2 on Internet expertise and social media competence did not differ much; focusgroup 3 scored quite high and rated themselves more experienced with internet and more active on social media. When comparing the early adopter group, focusgroup 1, to group 2 and 3 that were more skeptical towards new media, an observation can be made. Apparently, participants that are more conscientious have more difficulty using a medium that is still lacking fine distinction, as new media often do.

From the open questions in the surveys evaluating the WorkVoices pilots and the use of Yammer, certain topics have been consolidated. In table 4.4, the answers given by the survey respondents have been reported.

Regarding the tool used, bugs were said to be something that is important to be absent. One user quit using Yammer after experiencing a bug of Out of Office replies being posted to Yammer. Next to that, a desktop application is very important so new posts spring into the eye easily and you do not need to open your browser for an update. Alerts for posts on your interests have been named as well.

User characteristics are that the overload of information should be managed without adding extra user accounts. The integration of the different media is an important subject. Next to that, it has been said that the use of microblogging is more fun when more people were active. The small amount of active users takes away the positive aspects that for instance Twitter has. Active users get de-motivated when only a small amount of users is active.

On organizational level, a suggestion was made to group the microblogging application like the organizations structure. Next to that, it was important to guard that serious and less serious messages do not cross each other's path and harm their individual effectiveness.

Table 4.4 Survey answers characteristics important to the use of microblogging

Survey input	Characteristic
▪ The bug with Out of Office replies being posted made me quit	Tool
▪ It should have a desktop application so you don't need to open your browser to check up on new posts.	Tool
▪ An alert when messages matching your interests are being posted	Tool
▪ We are getting an overload of information. This should be more integrated without extra accounts	User
▪ It would be more fun if more people were active	User
▪ A small amount of active members give it not the pro's Twitter has.	User
▪ Active users are getting de-motivated by the small amount of active users	User
▪ Group categories for every department	Organization
▪ There is a chance that serious and less serious messages are crossing each other which harms the effectiveness of the microblogging	Organization

Based on the focusgroup results, a large list of characteristics important to the use of microblogging could be created. Table 4.5 gives the conclusions from the focusgroups.

From the tool perspective, it is very important to integrate the different communication media in one portal or application. Search and the ability to find things you look for is very important. There is no consensus if the medium should be a desktop application or a web application. Best is not to limit it to a browser, but not oblige an installation. The speed and user interface of a medium are very important for successful use as well. Low effort options like a weekly brief update are ideas to draw other users in to the tool as well.

From the user point of view, it is very important a large user commitment is present. Putting energy into a medium should pay the user with something in return. Others should use it and it should be integrated as an activity into your working day. The content on the medium is very important for the user as well. A filter for relevance is pitched, as is an option to remove less interesting messages. Next to that, the content on a medium should be a trigger for others to use it.

Organizational characteristics are much about the company culture and the influence from above on using a medium. Management should oblige certain things more. The use of a medium should be part of the company culture. An idea to reach such goals is to move company announcements to different media. Lastly, it was mentioned that when a choice is made for a medium, the company should stick by it and drive the use.

Table 4.5 Focusgroup answers on characteristics important to the use of microblogging

Focusgroup input	Characteristic
▪ Use a desktop appliance that gives a popup	Tool
▪ A medium I can decorate to my own relevance liking	Tool
▪ Control should be yours	Tool
▪ All communication media in one	Tool
▪ A portal or environment where all media can meet	Tool
▪ Use RSS and a good search for an intranet	Tool
▪ There are a lot of media, but not all are used to their full possibility	Tool
▪ Search is very important	Tool
▪ Usability and effort needed is very important	Tool
▪ An activity update could be interesting	Tool
▪ A medium should be up to date and it should be in one place	Tool
▪ One portal with a good search	Tool
▪ Create a secure medium	Tool
▪ Make sure it works fast	Tool
▪ Keep the application lean and mean	Tool
▪ Create a good user interface	Tool
▪ Use it via the web	Tool
▪ Don't limit it to just a browser	Tool
▪ Large user commitment is needed	User
▪ External knowledge is much more interesting	User
▪ Information that is important for all can be a trigger for the use of the medium	User
▪ A more clarifying picture with a filter for relevance	User
▪ If putting energy into using a medium gives me back something, I'm in	User
▪ Integrate it into your working day and make sure others use it	User
▪ It is a time needy medium which doesn't give enough back	User
▪ Oblige using by putting company announcements on the microblogging platform	Organization
▪ To enhance use, it should be more company and management driven	Organization
▪ Part of the company culture	Organization
▪ When a choice has been made for a medium it should be company driven and an obligation to use it	Organization

In this paragraph, the characteristics that are important to the use of organizational microblogging have been identified. These characteristics include features on the tool, the user and the organization. Important topics named by respondents are collecting the diversity of media in one portal or tool, the importance of search and that the activity of other users is driving a medium. Lastly, the role of an organization when implementing a new medium, as microblogging, should not be underestimated. A medium should be company driven and all users should be requested to join, to repay users for their input.

4.3 The value of microblogging

The value the respondents attribute to organizational microblogging has been researched by means of the second WorkVoices survey, the Yammer survey and the focusgroups. In this paragraph, the results of these studies will be presented.

In table 4.6, the results of the items regarding the value of microblogging are reported. On a 7-point scale, microblogging using WorkVoices was rated 3.83 ($SD=1.60$) which is a near neutral rating. WorkVoices was not rated as a positive addition to the work of the respondents. With an average of 3.66 ($SD=2.00$) it scored below the neutral 4. The high standard deviation of 2.00 is an indication the respondents were not united in their answer. Knowledge sharing using microblogging is regarded as a development with much potential and had an average outcome of 4.80 ($SD=1.80$). To see whether the experience of respondents with microblogging had an influence on the awarded value on microblogging, the dataset was divided in people without and with experience in microblogging. In the third and fourth column of table 4.6, these results have been reported. It is apparent that the people with experience with microblogging rated microblogging higher than the people without experience of microblogging. Especially the potential that is awarded to knowledge sharing using microblogging, showed a large difference. People without experience with microblogging had an average of 4.43 ($SD=1.81$), people with experience had an average of 5.36 ($SD=1.69$). The results reported have been tested for significant differences using a statistical ANOVA test. People with experience with microblogging significantly rated communicating using microblogging (WorkVoices) higher than people without experience with microblogging ($F(1,33) = 4.54, p = .041$). If a person already has experience with microblogging, they would have a more positive attitude to use organizational microblogging.

Table 4.6 Items regarding the value of microblogging (WorkVoices)

Items	Average (and standard deviation)		
	(N=35)	Without MB experience (n=21)	With MB experience (n=14)
How would you rate communicating using microblogging (WorkVoices)?	3.83 (1.60)	3.38 (1.53)	4.50 (1.51)*
Microblogging using WorkVoices was a positive addition to my work	3.66 (2.00)	3.14 (1.85)	4.43 (2.00)
Knowledge sharing using microblogging is a development with much potential	4.80 (1.80)	4.43 (1.81)	5.36 (1.69)

Data is reported for the whole population and for the population without and with experience with microblogging

*Significant difference with $p < .05$

Using the same items, data has been gathered to evaluate Yammer. In table 4.7, all results are reported. Communicating using microblogging (Yammer) is being rated below average with an average of 3.43 ($SD=1.28$). Like WorkVoices, Yammer is not regarded a positive addition to the respondents work with an average of 3.71 ($SD=1.49$). Knowledge sharing using microblogging is regarded as a development with potential. With an average of 4.92 ($SD=1.26$) people agree more or less with the statement. The average

score of people having experience or no experience with microblogging are only different from each other at the statement claiming knowledge sharing using microblogging is a development with much potential. People without any experience with microblogging answer with an average of 4.50 ($SD=1.31$) where people with experience with microblogging answer with an average of 5.60 ($SD=0.80$). This is quite a large difference and another indication that people with experience with microblogging value knowledge sharing using microblogging better. This difference was not significant.

Table 4.7 Items regarding the value of microblogging (Yammer)

Items	Average (and standard deviation)		
	(N=14)	Without MB experience (n=8)	With MB experience (n=6)
How would you rate communicating using microblogging (Yammer)?	3.43 (1.28)	3.12 (1.36)	3.83 (1.17)
Microblogging using Yammer was a positive addition to my work	3.71 (1.49)	3.62 (1.41)	3.83 (1.73)
Knowledge sharing using microblogging is a development with much potential	4.92 (1.26)	4.50 (1.31)	5.60 (0.80)

Data is reported for the whole population and for the population without and with experience with microblogging

Next to the numbers determining the value of microblogging with knowledge sharing as intention, the surveys had some open questions as well, which provided answers from the respondents. These answers can be found in table 4.8. The answers are arranged on being a positive or negative aspect towards microblogging in general, WorkVoices or Yammer. This has been clarified using a plus or minus sign. An extra characteristic, grouping every answer, has been added as well. The characteristics are performance, use and technology

Positive aspects of microblogging that have been noted are the ability to reveal otherwise hidden information by a simple short post while using an easy accessible method. Another respondent noted that, although WorkVoices might not have fitted nicely in their organization due to unnamed obstacles, microblogging is able to have a large added value when implemented in a workflow fit for such a medium. Microblogging could let you easily know what everybody is up to, create a good atmosphere and be very informative as well, when used optimally.

Other respondents were less positive and declared not to understand the benefit of microblogging over other media, like email and intranets. Another point made, was that as a gatherer of information on the web, the information served via Yammer is nothing new and duplicate. WorkVoices was noted as a product that is still too much a beta product to use as a mature medium. Lastly, it was said that a microblogging implementation will only work when a certain number of people is active and it is seen as an indispensable product.

Table 4.8 Survey answers regarding the value of microblogging

Survey input	Characteristic	+ / –
▪ When used optimally it informs you of what everybody is doing, creates a good atmosphere and it is very informative	Performance	+
▪ Hidden knowledge is being revealed in an easy accessible way	Performance	+
▪ Although the WorkVoices pilot was not functioning well due to the many obstacles, microblogging can have a large added value when used in an organization where it fits their workflow	Use	+
▪ I use so many sources I don't take the time to use Yammer	Use	–
▪ Yammer has too much irrelevant information that is being duplicated by sites I am already reading	Use	–
▪ It will only work when an x% is active and it is seen as indispensable	Use	–
▪ I don't see the added value over mail and the intranet	Technology	–
▪ It is a disadvantage that you can only post a small amount of text	Technology	–
▪ WorkVoices is still too much a beta product that is not finished	Technology	–
▪ It doesn't have a large added value over other communication media	Technology	–

Like the survey, the value of microblogging came up in the focusgroups as well. In table 4.9, the topics that were discussed and the conclusions that were drawn are reported. Like in table 4.8, plus and minus signs have been used to indicate whether a topic is positive or negative to the value of microblogging. Next to that, the answers have been grouped on characteristics as well.

Positive aspects that were identified were the possibilities to follow a selection of users instead of the whole bunch. This possibility was not always completely understood by the users. A great aspect of microblogging could be that it has the potential to take a lot of traffic out of the email messages. Certain announcements and lists would do great in a microblogging client according to the participants. The FYI, For Your Information, email is polluting many mailboxes and people note that losing some email would be nice. The aspect of microblogging that all posts made can be found back on content and tagging was seen as a positive feature as well.

A part of the participants was not positive towards the use of microblogging. When people only post what they are working on, it is not interesting. The need for extra information is not always imminent. Other meetings that are in person meet the interest sufficiently and let people know what is going on. People do note that microblogging could serve very easy to communicate with a large group. The user-friendliness of WorkVoices was a trending topic. The time to investigate how it works and how to make use of it was for most too much to make a good start. That WorkVoices is only accessible using a browser was another negative point that held back users. It was agreed on as well, that for a sound working pilot, starting in an empty framework is not motivating. Having a medium a bit more filled up could help. Next to that, participants agreed that the use was too informal. When WorkVoices had a better usability and the pilot had a higher relevance, the use could have been enhanced.

Table 4.9 Focusgroup answers regarding the value of microblogging

Focusgroup input	Characteristic	+ / –
▪ The For Your Information email could be easily moved to microblogging from email	Performance	+
▪ That all messages are saved and searchable is a large advantage over instant messaging	Performance	+
▪ Moving some mail activity to microblogging is a good idea	Performance	+
▪ Microblogging is easy to communicate with a larger group	Performance	+
▪ Following only a selection of the users is a good option and has not been understood by the pilot users.	Use	+
▪ It is not interesting when it is only "What are you working on"	Use	–
▪ The use is too informal. Better usability and higher relevance would enhance use	Use	–
▪ Other face to face meetings are sufficient to know what is going on	Use	–
▪ Starting and using WorkVoices is not a logical first step in the day	Use	–
▪ I don't see the use of using WorkVoices	Technology	–
▪ Only browser accessibility is a disadvantage	Technology	–
▪ WorkVoices is not user-friendly	Technology	–
▪ The start with an empty framework doesn't motivate to start using microblogging	Technology	–
▪ I don't see the immediate use of microblogging	Technology	–
▪ I am not investing time to find out how to use it, I want to know how it works straight out	Technology	–

In this paragraph, the value of microblogging was reported. A high score on potential for knowledge sharing using microblogging was noted, but lower scores for the applications, WorkVoices and Yammer. In qualitative research, the real use of microblogging was questioned. Aspects that were more positive, were that hidden knowledge is being revealed and it can take unneeded traffic out of your email.

4.4 Reviewing the research model

In chapter 2, a research model has been presented. In this model, all factors thought to have an effect on knowledge sharing have been related. Next to that, factors hypothesized to be important to the use of organizational microblogging have been taken up in the model. In this paragraph, all connections in the research model will be reviewed.

Based on the results presented in this chapter, the connection between the use of organizational microblogging and knowledge sharing behaviour has been removed. This research did not show a significant effect during the WorkVoices pilot. The use of organizational microblogging in the WorkVoices pilot did show a significant positive increase on knowledge sharing intention. Furthermore, a positive significant increase on the knowledge sharing condition Access was observed. The other conditions increased over the pilot period, but this increase was not significant. Based on indications from scientific literature presented in chapter 2 (Borgatti & Cross, 2003; Cross et al., 2001), the knowledge sharing conditions are believed to have an effect on knowledge sharing intention and knowledge sharing behaviour. These relations have not been proven in this research and have therefore been drawn with a dashed arrow.

Next to reviewing the relations that were hypothesized in chapter 2, some new relations have been added as well. Based on this research it is believed that the characteristics important to the use of organizational microblogging have an effect on the use of organizational microblogging. In addition, it is believed that the value of organizational microblogging has an effect on the use of organizational microblogging as well. These relations are hypothesized and are not significant. In future research, these relations can be researched in more detail. The reviewed research model can be found under figure 13.

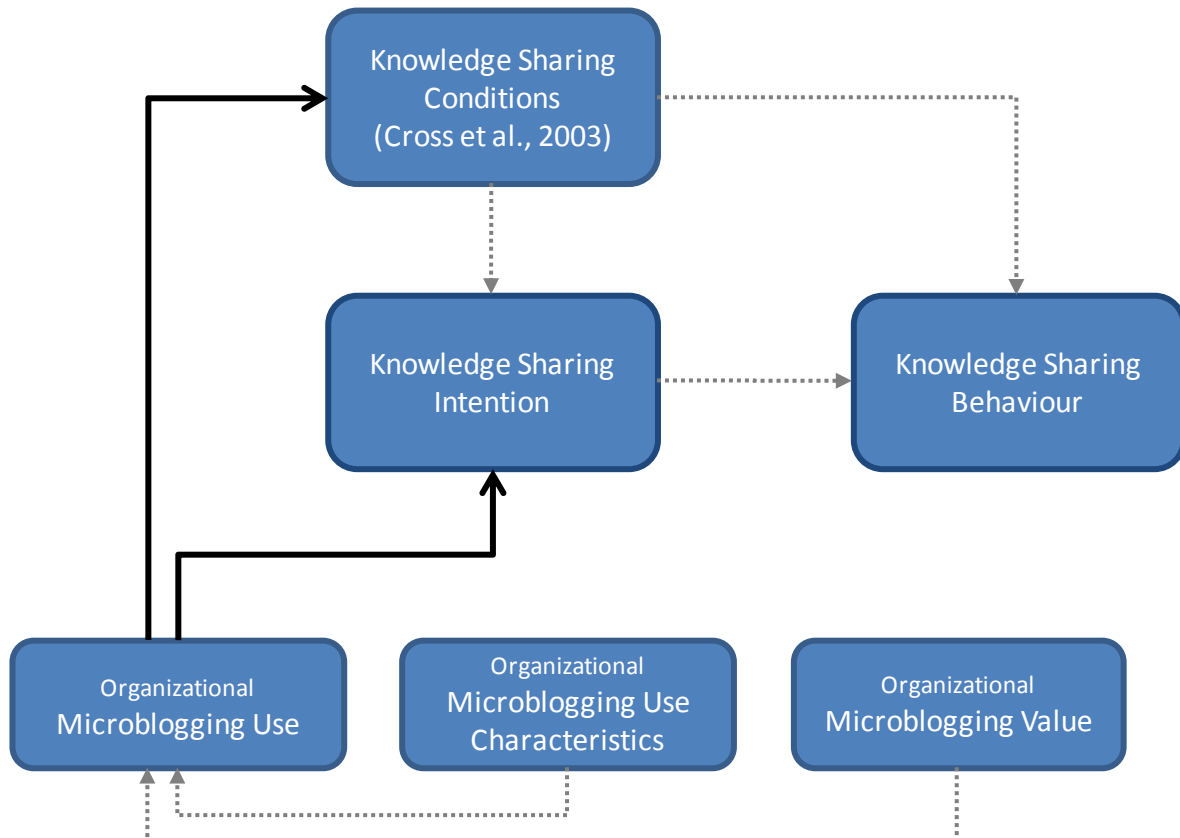


Figure 13: Reviewed research model

5. Conclusions and recommendations

In the first chapter of this thesis, the research question: *“What effect does the use of organizational microblogging have on knowledge sharing?”* has been formulated. To answer this question three sub research questions have been formulated in chapter 2. In this chapter, every sub research question is answered and using these answers, a main conclusion is drawn answering the main research question. On top of this, recommendations are given to be able to utilize the conclusions of this research in a practical setting.

5.1 Effects of microblogging on knowledge sharing conditions, intention and behaviour

The research question *“What effect does the use of organizational microblogging have on conditions, intention and behaviour for knowledge sharing?”* has been researched by an effect measurement on the knowledge sharing conditions by Cross et al. (2001) and Borgatti and Cross (2003) and indicators of knowledge sharing intention and knowledge sharing behaviour. The scores on all conditions have increased during the pilot period, although only the access to knowledge and the intention to share knowledge showed a positive significant increase.

The knowledge sharing conditions were all rated quite high, showing that the pilot organizations had an open and friendly knowledge sharing environment. All knowledge sharing conditions, the knowledge sharing intention, and the knowledge sharing behaviour showed an increase during the pilot period. Even though all other constructs did show an increase over the pilot period, only two constructs were significantly different. The increase in the access to knowledge, and the intention to share knowledge, proved significantly different. A reason for the absence of other significant effects could be the length of the pilot period or the way it was organized. The fact that participants value microblogging as a development with much potential, is a strong indicator of the effect microblogging could have on knowledge sharing.

From the focusgroup data, some extra information was provided on which state the knowledge sharing conditions were in. The conditions knowledge, who knows what, and the access to this knowledge can be improved. Too much information is stored in the head and people sometimes have difficulty finding the right person for a job. Organizational microblogging could help visualize this tacit knowledge.

5.2 Characteristics important when using microblogging

The second sub research was *“What characteristics are important when using organizational microblogging?”*. To identify the characteristics important to the use of microblogging, the data from the surveys and focusgroups has been analyzed. This data has been grouped in characteristics regarding the tool, the user and the organization. The tool used should be a stable and searchable application, integrated with other media and preferably both accessible using your desktop and your browser. The usability should be very high. User characteristics are that it is important that some users are already familiar with microblogging. Next to that, a large user commitment should be present, creating content that is a trigger for other colleagues to use the medium. Organizational characteristics are that the choice for a medium should be driven by the organization, a request should be made to join in the medium by the management. The use of the medium should become integrated in the company culture.

A characteristic that has been discovered regarding the tool used is the stability of the application. This was concluded to be very important, no bugs should be present. Next to that, it is essential to have an application with a high usability. People should be able to work with a tool on intuition and not be obliged to go through a large learning curve. The tool should work fast and have a high quality search. The option to have the tool accessible using both a desktop and a browser has a preference.

A user characteristic important to the use of organizational microblogging, is the experience of some participants with microblogging. When some are already experienced, this has a significant positive effect on the rating of microblogging. To prevent an overflow of different media, it would be best if the application used is integrated with the other communication media present. A large user commitment is very important to enhance use, the activity of users is driving the success of a medium. Next to that, the content on the medium should be relevant and a trigger for other users to make use of the medium.

Conclusions on the organizational characteristics are that a medium should be company driven. When using a medium, this medium should be fitted in to the workflow and be part of the company culture. All users should be requested to join in using the medium. An organization should guard the right balance between serious and less serious messages. This way, active users are repaid for their input and a healthy community can be created.

5.3 The value of microblogging

The third research question was *“What is the value of organizational microblogging?”*. Using surveys and focusgroups it can be concluded that microblogging is valued high as a development with much potential. Having some people present in your organization with microblogging experience would create a more positive value of microblogging. When implemented into the workflow and being indispensable, the key competence of microblogging is being able to reveal hidden information by a simple post.

From the survey data, the conclusion can be drawn that microblogging is valued as a development with much potential, even though the microblogging application used was not given a high rating. Next to that, microblogging was not seen as a positive addition to the participants work. It is important to note that people with microblogging experience rated communicating using microblogging significantly higher than people without microblogging experience. Furthermore, people with microblogging experience, valued microblogging more as a development with much potential than people without any experience. To create a positive value of microblogging with knowledge sharing as intention, some people within the organization should already have experience with microblogging.

Out of the qualitative data, the following conclusions could be drawn regarding the value of microblogging. Some people did not understand the added value of microblogging, and included the commentary that the application used was too much of a beta product. When the application would have had a higher usability, and the use of microblogging would have had a higher relevance, a more positive use could have been gained. Great aspects of microblogging were said to be the ability to easily find posts and the option to communicate with a large group. A certain number of users have to be active and the use should be regarded as indispensable. It has to be implemented into the workflow. When used with these aspects present, microblogging can make it easy to know what everybody is up to, create a good atmosphere and be very informative.

5.4 The effect of organizational microblogging on knowledge sharing

The goal of this research was to identify whether organizational microblogging has an effect on knowledge sharing. Using the conclusions presented earlier in this chapter a main conclusion to this research is phrased answering the main research question *“What effect does the use of organizational microblogging have on knowledge sharing?”*.

While making use of organizational microblogging, a positive significant increase on the knowledge sharing intention and the knowledge sharing condition Access could be observed. Next to that, microblogging with knowledge sharing as intention is seen as a development with much potential. Users valued microblogging with knowledge sharing as intention positive. Indications are that organizational microblogging has an effect on knowledge sharing within an organization, even though no solid statistical evidence has been found. To draw more solid conclusions, studies of a less exploratory nature should be used. In this research, a number of characteristics have been discovered important to the use of organizational microblogging. When meeting these characteristics as an organization, implementing organizational microblogging would be a great method to increase knowledge sharing in your organization and reveal knowledge that otherwise would stay hidden. Organizational microblogging has the key competence to reveal hidden knowledge and information by a simple post, while using an accessible method.

5.5 Recommendations

To be able to utilize the conclusions of this research, some practical recommendations will be given. These recommendations can be used by GriDD consultancy to further optimize their work of consulting on the implementation of social media solutions for knowledge sharing purposes.

Implementation of organizational microblogging

Focus on knowledge sharing - Microblogging can be used with many different goals in mind. When implementing microblogging into an organization with knowledge sharing as a goal, the primarily focus must be on knowledge sharing. GriDD should make users conscious of why they are using microblogging. The knowledge sharing conditions by Cross et al. (2001) and Borgatti and Cross (2003) should be taken into account by GriDD, and tried to tweak. An example is the adding of profile pages to the microblogging tool, listing every user's key competences. When these competences are being indexed and searchable, the knowledge sharing condition knowledge, who knows what, can be improved.

Make microblogging indispensable - When implementing a new medium, it should be company driven and be company used. The benefit of microblogging requires the activity of a larger group of users that wish to share and interact using the medium. To succeed, microblogging should be an activity that is integrated into the working day of all employees. Changing a company culture is a difficult task, which needs the full attention of opinion leaders in an organization. When setting the right example, others will follow and the right benefits can be harvested.

Implement microblogging into the workflow - When choosing to implement microblogging into an organization, it is very important to draw people towards the medium instead of obliging use. When a new medium is introduced, a change in communicating is required by the users. Easy incentives GriDD can use to bring on this change, are moving the For Your Information emails to the microblogging platform and starting discussions on topics specifically interesting to the users. Microblogging has the aspect of easy communication with large groups; this feature can be used by posting company announcements on the microblogging platform used. Every user will expect some sort of extra performance out of using a medium. The positive aspects of microblogging should help the users enhance their working performance.

Start an implementation small - Guard to implement microblogging too quickly into an organization. It is best to start using the medium with a small number of users and test the application thoroughly. During this initial test phase, the medium should be filled with content. This way, users do not start in an empty environment, when launching organization wide. Examples of use have been set, and the first interesting topics have been posted. This makes it is easier for people to join in.

Tooling for organizational microblogging

Pick the right tool - The tool you use for your microblogging activities is very important. The effort and performance a user gains out of using microblogging is not only depending on the other users, but also on the tool used. There are a number of characteristics GriDD should pay attention to, when picking a tool. First, a tool should be stable. Bugs in a tool make users quit easily. Subsequently, the speed of a tool is very important. Microblogging is a medium that can be used quickly, and the tool used should not impede this aspect. Next to that, the user experience should be in good order. Both the interface and interaction of a tool should have a high-quality design. The integration into the working day greatly depends on the options a tool has. Features like a browser and a desktop client are important. A tool should feature tagging and advanced searching. An effective search engine is very important. Additionally, a filter for relevance, for instance a tag cloud, is a feature that helps people use a tool according to their liking.

Use of organizational microblogging

Repay users for their effort - Users are putting effort into a medium and wish to be repaid for this effort. Using microblogging should be worth your while. It is worth one's while when a large group of users is actively adding information relevant to the user's interest. Using microblogging should help users enhance their working performance. What the benefit of using microblogging for the users is, should be investigated by GriDD to keep users satisfied.

Moderate the signal to noise ratio - It is easy for an active user group to get carried away in their enthusiasm and use microblogging more for the fun than the useful aspects. To perfectly utilize the goal of microblogging, the improvement of knowledge sharing, an organization should guard the signal to noise ratio. If the ratio of fun and work related posts is not in the right balance, microblogging will become a useless medium to many users. The effort to gain something from using microblogging will turn too large. A good way to divert fun posts from the main stream of posts is by creating special topic related groups.

6. Discussion

This research had the goal to research whether organizational microblogging had an effect on knowledge sharing. The foundation of this research has been a scientific framework. Using this framework, quantitative and qualitative research has been performed. The results have been used to draw conclusions and answer the research questions. In this chapter, the whole research cycle is reflected upon, starting with the data assembled, and ending with recommendations for future research.

6.1 The assembled data

The surveys that were used in the WorkVoices pilot had the large disadvantage, that the group of participants was relatively small for quantitative research. Unfortunately, more people than the used 98 people invited to participate were not available. The first survey had a good response; the second survey had a lower response. This lower response harmed the evaluation of microblogging; especially at the two smaller pilot organizations, a higher response would have been better. This would have created a stronger dataset. A negative aspect of the first WorkVoices survey was the different date of spreading the surveys. Between the spreading of the first survey within TriMM and the 1% Club and Webclusive was a time difference of almost a full month. This could have given a distorted view of the data, where TriMM and the 1% Club have had more experience with the positive and negative effects of microblogging. Another difficulty was that a large bit of the pilots took place during the summer holidays. With people coming and going on vacation, a normal working environment could not be simulated.

A downside of the WorkVoices focusgroup data was the enthusiasm within the three surveys groups. Topics were discussed quite intense, driving the focusgroup into the direction of the topic at hand. Even though the researcher present steered the focusgroup into the wanted direction, too much interference was not desired as well. These different discussions between the groups made the analysis of the data more difficult.

The Yammer survey had the weakness to have a small number of respondents, offering only a small bit of data. The qualitative questions were answered by a large number, ensuring good information of Yammer. A larger group of former Yammer users would have extended the influence of the Yammer evaluation in this research.

6.2 The method of research

The WorkVoices pilots including two surveys and three focusgroups and the Yammer study including a survey have been the methods of research to gather data. The WorkVoices pilots had as a largest downside the maturity of WorkVoices as a tool. It was still much in development and the bugs attached to this phase held back the use and scared some users from using WorkVoices. This was named as one of the larger downsides of WorkVoices in the focusgroups. Next to that, the amount of active users on WorkVoices at TriMM was really low. Only a small amount of users made use of WorkVoices, but only for a short period. Most people have taken a look at WorkVoices, but decided not to return to using it. A more successful pilot would have been necessary to research microblogging on a higher level. Another

negative aspect of the WorkVoices pilots was that the pilot period was quite short. Two months is not enough time to observe any effects that can be allocated to microblogging. A longer period, with a third moment of measurement after a year, would have created a stronger research. Due to time restrictions, this was not possible.

The surveys used in the WorkVoices pilot had a strong focus on the knowledge sharing conditions. A large amount of items was used to measure value of these conditions. Chance exist that this amount of items has taken away the focus on the questions at hand, and might have lead to more random answering than judging every items with full attention. An indication this might have happened, are the high scores on Cronbach's alpha on every construct. This is only an indication; a high Cronbach's alpha can also be assigned to a good quality survey design.

The focusgroups that were used to gather extra data on the research subjects were only organized within TriMM. Three groups of four people from the same organization have been used. This was very helpful, because all the different groups were easily compared to each other. Adding employees from different pilot organizations would have been better to create a more diverse dataset. In this design, the diversity was gained by inviting people with different inclinations towards social media.

The use of Yammer at Sanoma diminished a few months before the survey on the use was sent out. This was a weakness because the attitude people had when using Yammer, was affected by the Out of Office bug, that made most users to quit. Most probably, Yammer and its effects would have been evaluated more positively when the survey was spread during the peak time of its use.

6.3 The research model

The research model presented in the second chapter and reviewed in the fourth chapter is a summary of the different constructs in this research and visualizes the relationships that have been researched. Relations that have not been researched, were the relations between the knowledge sharing conditions and the knowledge sharing intention and knowledge sharing behaviour. It would have been an added value to this research if these relations would have been researched as well, proving the significance of the knowledge sharing conditions by Cross et al. (2003).

Next to that, the characteristics important to the use of organizational microblogging and the value of organizational microblogging are believed to have an effect on the use of organizational microblogging based on this research. The relations should be studied in future research to further clarify the factors influencing the use of organizational microblogging.

6.4 The scientific framework

In chapter 2, a scientific framework supporting this research has been presented. Two aspects were considered very important, the knowledge sharing conditions by Cross et al. (2001) and Borgatti and Cross (2003) and the characteristics important to the use of organizational microblogging (Venkatesh et al., 2003, Günther et al., 2009, Sharratt & Usoro, 2003).

The knowledge sharing conditions by Cross et al. (2001) and Borgatti and Cross (2003) have been used in the design of the WorkVoices and Yammer surveys and the focusgroups. The conditions knowledge,

access, engagement and safety promote effective knowledge sharing according to Cross et al. (2001). Based on this research, these conditions can be believed to have an effect on knowledge sharing. The surveys were not researching the truthfulness of the promoting features of the knowledge sharing conditions, but the effect of these conditions on knowledge sharing within a microblogging pilot. These effects could be identified partly. Next to that, indications were recognized of the importance of the knowledge sharing conditions in the focusgroups. In future research, using qualitative research to reconfirm the importance of these conditions is important.

The modified and extended UTAUT model by Günther et al. (2009) could be confirmed by the results of this research. Using the qualitative data a match could be made with the model constructs: signal to noise ratio, codification effort, performance expectancy, effort expectancy and facilitating conditions. This conclusion confirms the strength of the original model by Venkatesh et al. (2003) and the extensions by Günther et al. (2009). They discovered their extensions to the UTAUT model by organizing several interviews. As a result of the three focusgroups that were organized during this research, characteristics were identified that can be matched to the extensions by Günther et al. and the original constructs by Venkatesh et al. (2003). This modified and extended UTAUT model is a very interesting model to help research the prediction of use of social media. It is recommended to use this model in future research and validate the extensions.

Additionally, some of the factors influencing the possibility of knowledge sharing within communities of practice identified by Sharratt and Usoro (2003), have a match with the results of this research. Sharratt and Usoro (2003) identified in their exploratory research the ease of use, the perceived usefulness of the information system and the sense of community. These factors were identified in the results of this research as well.

6.5 Future research on organizational microblogging and knowledge sharing

The findings of this research have explored the realm of knowledge sharing using microblogging. Microblogging is still quite a new technology and has not received much research attention as of yet. The expectation that microblogging would have the possibilities to reveal tacit knowledge and have an effect on knowledge sharing has been explored and are concluded to be promising, taking certain factors important to the use of microblogging into account. Microblogging has proven itself a valuable research object showing features interesting for future research. More research on the combination of microblogging and knowledge sharing is encouraged to argument the findings on the added value of organizational microblogging. Special attention should be given to the features microblogging has visualizing otherwise hidden knowledge.

References

- Aluja, A., Garcíab, O., Rossierc, J. and Garcíaa, L.F. (2004). Comparison of the NEO-FFI, the NEO-FFI-R and an alternative short version of the NEO-PI-R (NEO-60) in Swiss and Spanish samples. *Personality and Individual Differences*, 38(2005), 591–604.
- Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic Survey Methodology: A Case Study in Reaching Hard-to-Involve Internet Users. *International journal of human–computer interaction*, 16(2), 185-210.
- Bellinger, G. Castro, D., & Mills, A. (2004). *Data, Information, Knowledge, and Wisdom*. Retrieved May 15, 2009, from <http://www.systems-thinking.org/dikw/dikw.htm>.
- Borgatti, S.P., & Cross, R. (2003). A Relational View of Information Seeking and Learning in Social Networks. *Management Science*, 49(4), 432-445.
- Brink, P., van den. (2001). *Measurement of conditions for knowledge sharing*. Retrieved April 27, 2009, from http://www.onthebrink.nl/documenten/measurement_conditions_ks.pdf.
- Bughin, J., & Manyika, J. (2007). Leveraging Enterprise 2.0 for competitive advantage. Retrieved March 20, 2009, from http://www.iadis.net/dl/final_uploads/200712L031.pdf.
- Building the Web 2.0 Enterprise: McKinsey Global Survey Results* (2008). Retrieved September 30, 2009, from http://www.mckinseyquarterly.com/High_Tech/Building_the_Web_20_Enterprise_McKinsey_Global_Survey_2174.
- Costa, C., Beham, G., Reinhardt, W., & Sillaots, M. (2008). *Microblogging In Technology Enhanced Learning: A Use-Case Inspection of PPE Summer School 2008*. Retrieved March 5, 2009, from http://together.eu/bitstream/123456789/365/4/ectel_2008_sirtel_twitter_final.pdf.
- Cross, R., Parker, A., Prusak, L., & Borgatti, S.P. (2001). Knowing What We Know: Supporting Knowledge Creation and Sharing in Social Networks. *Organizational Dynamics*, 30(2), 100-120.
- Davenport, T.H., De Long, D.W., & Beers, M.C. (1998). Successful Knowledge Management Projects. *Sloan Management Review*, 4, 43-57.
- Davenport, T.H., & Prusak, L. (2000). *Working Knowledge: how organizations manage what they know*. Boston, MA: Harvard Business Press.
- Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 38(8), 982-1003.
- Ebner, M., & Schiefner, M. (2008). Microblogging - more than fun? Originally published in: *Proceeding of IADIS Mobile Learning Conference 2008*, Inmaculada Arnedillo Sánchez and Pedro Isaías ed., Algarve, Portugal, 2008, p. 155-159.
- Forrester (2006). *Forrester's new Social Technographics report*. Retrieved June 29, 2009, from http://blogs.forrester.com/groundswell/2007/04/forresters_new_.html.

- Grosseck, G., & Holotescu, C. (2008). Can we use Twitter for educational activities? *The 4th International Scientific Conference eLearning and Software for Education Bucharest*, April 17-18, 2008.
- Günther, O., Krasnova, H., Riehle, D., & Schöndienst, V. (2009). Modeling Microblogging Adoption in the Enterprise. *Proceedings of the Fifteenth Americas Conference on Information Systems*, San Francisco, California, August 6-9, 2009.
- Hendriks, P. (1999). Why share Knowledge? The Influence of ICT on the Motivation for Knowledge Sharing. *Knowledge and Process Management*, 6(2), 91-100.
- Hildreth, P., Kimble, C., & Wright, P. (1998). *Computer mediated communications and international communities of practice*. Retrieved April 14, 2009 from <http://129.3.20.41/eps/io/papers/0504/0504005.pdf>.
- Holotescu, C., & Grosseck, G. (2009). *Using microblogging in education. Case study: Cirip.ro*. Retrieved April 16, 2009, from http://www.eden-online.org/contents/publications/LOGOS_D12_Proceedings.pdf.
- Java, A., Song, X., Finin, T., & Tseng, B. (2007). *Why We Twitter: Understanding Microblogging Usage and Communities*. Retrieved March 5, 2009, from <http://aisl.umbc.edu/get/softcopy/id/1073/1073.pdf>.
- Kukafka, R., Johnson, S.B., Linfante, A., & Allegrante, J.P. (2003) Grounding a new information technology implementation framework in behavioral science: a systematic analysis of the literature on IT use. *Journal of biomedical informatics*, 36(3), 218-227.
- McFedries, P. (2007). All A-Twitter. *IEEE Spectrum*, October 2007, 84.
- The McKinsey 7S Framework* (n.d.). Retrieved September 30, 2009, from http://www.mindtools.com/pages/article/newSTR_91.htm.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: an expanded sourcebook*. London: Sage Publications.
- Morgan, D. L. (1988). *Focus groups as qualitative research*. Newbury Park, CA: Sage Publications.
- Morgan, D. L. (1996). Focus Groups. *Annual review of sociology*, 22(1), 129.
- Na Ubon, A., & Kimble, C. (2002) Knowledge Management in Online Distance Education. *Proceedings of the 3rd International Conference Networked Learning*, Sheffield, UK, 465-473.
- Nonaka, I. (1994). *A dynamic theory of organizational knowledge creation*. *Organization Science*, 5(1), 14-37.
- Nysveen, H. & Pedersen, P.E. (2002). An exploratory study of customers' perception of company web sites offering various interactive applications: moderating effects of customers' Internet experience. *Decision Support Systems*, 37, 137-150.

- O'Reilly, T. (2005). What is Web 2.0 Design Patterns and Business Models for the Next Generation of Software. Retrieved January 22, 2009 from <http://www.oreillynnet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>.
- Prusak, L. (2001). Where did knowledge management come from? *IBM Systems Journal*, 40(4), 1002-1007.
- Santos, J.R.A. (1999). Cronbach's Alpha: A Tool for Assessing the Reliability of Scales. *Journal of extension*, 37(2), 1-4.
- Sharratt, M., & Usoro, A. (2003). Understanding Knowledge-Sharing in Online Communities of Practice. *Electronical Journal on Knowledge Management*, 1(2), 187-196.
- Smith, H.A., & McKeen, J.D. (2003). Knowledge Management in Organizations: The State of Current Practice. In C.W. Holsapple, *Handbook on Knowledge Management: Knowledge directions* (pp 394-410). Heidelberg, Germany: Springer.
- Social Media. (2009, September 23). In *Wikipedia, the free encyclopedia*. Retrieved March 12, 2009, from http://en.wikipedia.org/wiki/Social_media.
- Soekijad, M., & Andriessen, E. (2003). Conditions for knowledge sharing in competitive alliances. *European Management Journal*, 21(5), 578-587.
- Solis, B. & Thomas, J. (2005). *The conversation prism*. Retrieved May 19, 2009, from <http://theconversationprism.com/>.
- Spencer, R. (2000). The Streamlined Cognitive Walkthrough Method, Working Around Social Constraints Encountered in a Software Development Company. *CHI Letters*, 2(1), 353-359.
- Tiwana, A. (2003). *The Knowledge Management Toolkit*. Upper Saddle River, NJ: Pearson Education.
- Ullrich, C., Borau, K., Luo, H., Tan, X., Shen, L., & Shen, R. (2008). *Why Web 2.0 is Good for Learning and for Research: Principles and Prototypes*. Retrieved March 5, 2009, from <http://www2008.org/papers/pdf/p705-ullrichA.pdf>.
- Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Zhao, D., & Rosson, M.B. (2008). *How Might Microblogs Support Collaborative Work?* Retrieved March 5, 2009, from http://research.ihost.com/cscw08-socialnetworkinginorgs/papers/zhao_cscw08_workshop.pdf.

Appendix

All appendix files have been stored on the cd-rom you can find in the back of this thesis. All files are the original research files and are therefore in Dutch. On this cd-rom the following files can be found:

WorkVoices pilot

1. Setup WorkVoices survey 1
2. Web version WorkVoices survey 1
3. Setup WorkVoices survey 2
4. Web version WorkVoices survey 2
5. SPSS Datafile WorkVoices survey
6. Focusgroup operating schedule
7. Transcriptions focusgroup 1
8. Transcriptions focusgroup 2
9. Transcriptions focusgroup 3

Yammer study

10. Setup pilot Yammer survey
11. Web version Yammer survey
12. SPSS Datafile Yammer survey