UNDERSTANDING KNOWLEDGE SHARING IN WEB 2.0 ONLINE COMMUNITIES

UNDERSTANDING KNOWLEDGE SHARING IN WEB 2.0 ONLINE COMMUNITIES:

A SOCIO-TECHNICAL STUDY

By

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**ABSTRACT**

Knowledge sharing–the dissemination of knowledge from an individual/group to another–has been an interesting topic for knowledge management scholars. Previous studies on knowledge sharing in online communities have primarily focused on communities of practice (organizational/business communities) and the social factors of knowledge sharing behaviour. However, non-business-oriented online communities have not been rigorously examined in the academic literature as venues for facilitating knowledge sharing. In addition, the burst of new age Internet tools (artifacts) such as social bookmarking has changed the face of online social networking. Within the context of Web 2.0, this socio-technical research investigation introduces both social and technical factors affecting attitude towards knowledge sharing in communities of relationship and communities of interest, and proposes a relational model of knowledge sharing attitude in Web 2.0 online communities. Social Capital Theory provides the main theoretical backbone for the proposed model. Theory of Reasoned Action (TRA) and social constructionsim have also been used. Following the description of the proposed hypotheses and research methodology using a survey about three Web 2.0 websites (Facebook, LinkedIn, and Cnet), data analysis through Partial Least Squared (PLS) method is applied to examine the effect of social and technical antecedent of knowledge sharing attitude. The R2 value of 0.78 indicates the strong explanatory power of the research model.

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**LIST OF ACRONYMS AND SYMBOLS**

|  |  |
| --- | --- |
| AHP | Analytical Hierarchy Process |
| ANOVA | Analysis of Variance |
| AVE | Average Variance Extracted |
| CFI | Comparative Fit Index |
| CMV | Common Method Variance |
| CS | Computer Science |
| EAM | Extended Analysis Method |
| EFA | Exploratory Factor Analysis |
| FAHP | Fuzzy Analytical Hierarchy Process |
| IS | Information Systems |
| IT | Information Technology |
| GoF | Goodness of Fit |
| HTML | Hypertext Mark-up Language |
| KM | Knowledge Management |
| LLSM | Logarithmic Least Squares Method |
| MIS | Management Information Systems |
| MREB | McMaster Research Ethics Board |
| NFI | Normed Fit Index |
| PLS | Partial Least Squares |
| RSS | Really Simple Syndication |
| TAM | Technology Acceptance Model |
| UTAUT | Unified Theory of Acceptance and Use of Technology |
| VC | Virtual Community |
| VIF | Variance Inflation Factor |
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**LIST OF TERMS**

|  |  |
| --- | --- |
| Aggregator | A website that provides user-generated content on the Web which can be voted ‘up’ or ‘down’. |
| Blog | A personal [journal](http://en.wikipedia.org/wiki/Journal) published on the [Web](http://en.wikipedia.org/wiki/World_Wide_Web) consisting of discrete entries (posts) typically displayed in reverse chronological order so the most recent post appears first. |
| Comment | A comment is a verbal or written remark often related to an observation or statement. |
| Community of interest | A community that brings together users to interact on specific topics. |
| Community of practice | A Community–mainly organizational/business-oriented–which centres on solving specific problems. |
| Community of relationship | A community which centres on building social supports. |
| Community type\* | A classification used to categorize Web 2.0 online communities. |
| Engagement | The degree to which users experience perception of involvement. |
| Enjoyment in helping others | The degree to which users enjoy helping others through knowledge sharing beyond personal gains. |
| Hashtag (#) | A form of metadata tag used in social networking services. |
| HTML | A markup language used to create web pages. |
| Identification | The degree to which users feel they belong to the community. |
| Information | Processed data in specific contexts which answer ‘what?’, ‘when?’ and ‘who?’ |
| Knowledge\*\* | Actionable information which answers ‘how?’ and ‘why?’ |
| Knowledge sharing | The dissemination of knowledge from one individual/group to another. |
| Knowledge sharing attitude | The degree to which users possess positive or negative feeling about knowledge sharing. |
| Knowledge transfer | Incorporates both knowledge sharing and use. Goes beyond knowledge sharing in that it infers the ability of the knowledge recipient to apply the shared knowledge in a new context or situation. |
| Mashup | A Web application that uses content from various sources to create a single graphical interface. |
| Metadata | Data about data. For example, the date of creation of a piece of data, or the name of the author who created a data item. |
| Online Community | A social network consisting of a group of geographically and temporally dispersed individuals with similar interests. |
| Publicator | A venue for users to share personal thoughts (i.e., via a blog) or facts (i.e., via a wiki). |
| Reciprocity | The degree to which users believe that their relationships in an online community is fair with mutual benefits. |
| Reputation | The degree to which users believe that sharing knowledge would enhance their status. |
| RSS | A family of [web feed](http://en.wikipedia.org/wiki/Web_feed) formats used to publish frequently updated works such as [blog](http://en.wikipedia.org/wiki/Blog) entries. |
| Social bookmarking | A method for Internet users to organize, store, manage and search for [bookmarks](http://en.wikipedia.org/wiki/Internet_bookmark) of resources online. |
| Social network | A website that allows people to connect with others. |
| Tag | An index (metadata) assigned to a piece of information. |
| User Anonymity | The degree to which a user in a Web 2.0 online community believes he/she is anonymous. |
| Web 2.0 | A set of online technologies, ideas, and services to enhance participation and collaboration in online environments. |
| Web 2.0 artifact usefulness | The degree to which users believe using a Web 2.0 artifact would enhance their performance of social interaction and information sharing. |
| Wiki | A [website](http://en.wikipedia.org/wiki/Website) that allows users to add, modify, or delete content via a [web browser](http://en.wikipedia.org/wiki/Web_browser) using a simplified [markup language](http://en.wikipedia.org/wiki/Markup_language) or a [rich-text editor](http://en.wikipedia.org/wiki/Online_rich-text_editor). |
| XML | An encoded markup language which is both human- and machine-readable. |

**\*** There are various classifications for Web 2.0 online communities (page 32).

**\*\*** Although there is an extant literature on ‘information’ and ‘knowledge’ and their utilization in different disciplines, no clear differentiation can be established between the two concepts, as such they have many characteristics in common.

**Chapter 1: Introduction**

* 1. **Research Motivation**

By the end of 2014, 30% of the world’s population will have access to the internet (see: www.un.org/apps/news). In North America, Internet usage penetration reached 78.6% (see: [www.internetworldstats.com](http://www.internetworldstats.com)). With more than one billion users in May 2013, Facebook–a friendship–oriented social network–alone stands for 40% of total Internet users (see: [www.facebook.com/stats](http://www.facebook.com/stats)). In Canada, over 18.5 million people have a Facebook profile which accounts for 55% of the country’s population. More than 44% of Canadians are Facebook monthly active users, while 26% of Canadians (over 9 million) are Facebook daily active users (see: newsroom.fb.com). In 2013, Canadians spend a monthly average of 400 minutes on Facebook (Briekss, 2013). LinkedIn–the largest social network for professionals–had about 92 million members in North America as of May 2013 of which 40% were daily users (see: press.linkedin.com). Forty–seven percent of LinkedIn members spend two hours on the LinkedIn website per week. Nine point two million North Americans (10% of members) spend more than eight hours on LinkedIn per week. From 2011 to 2013 the numbers of LinkedIn users grew by 24% (see press.linkedin.com). Cnet, Engadget, and Gizmodo are among the top websites that cover technology–related news and reviews. Cnet is the largest tech-savvy website ranked 47 out 500 on the most visiting websites list in 2013 (Alexa, 2013). Cnet allows millions of members to share information on a broad range of technology-related forums.

The above statistics indicate the popularity of social networks on the Internet. In fact, by March 2013, 72% of online adults used social networking websites (Pewinternet, 2013). More than 58% of Internet users of all ages have used or have a profile on at least one online social network (Statistic Brian, 2014).

The amount of information being shared on popular social networks is immense. Most social network websites offer users a feature to post links from other websites (called the source website) to the shared page (normally called a member’s homepage) on the social network (call the target website). This process–also called bookmarking or social bookmarking–happens in two ways: i) either the source website (a news website, for instance) is integrated with the social network through a button designed to link the pages, or, ii) users manually copy and paste the Internet address from the source website to the their social network page. For example, a recent study shows approximately 25% of the total 10,000 most visited websites have a direct Facebook button on their pages.

Social networks such as Facebook and LinkedIn are online communities where identified or anonymous members can build friendship/professional networks. In other words, social networks are online communities in which socialization facilitates information and knowledge sharing. Such websites offer a series of technologies/tools (such as social bookmarking and commenting) known as Web 2.0. Technologies and ideas such as social bookmarking, mashups, Really Simple Syndication (RSS) have emerged from the traditional World Wide Web, which primarily consisted of elementary static HTML pages, and formed what is now known as Web 2.0. Although there are numerous facets that have played a role in Internet usage (and specifically social networks) expansion, an important driver of this development is the introduction of Web 2.0 technologies/tools and websites. Web 2.0 has been defined as a set of online technologies, ideas, and services to enhance participation and collaboration in online environments (O’Reilly, 2005). Because of the high potential for user collaboration, Web 2.0 is often referred to as the ‘social web’. Websites such as Facebook, LinkedIn, Cnet, Reddit, Delicious, Google+, and Pinterest are all based on user collaboration. While early critics argued that Web 2.0 was largely marketing hype (for example, Zajicek, 2007), it has been proven to have valuable applications in diverse contexts such as education, healthcare, and government (Antoni, García, Mildred and Mendoza, 2010; Wilshusen, 2010; Boulos and Wheeler, 2007; Tredinnick, 2006).

Knowledge sharing is identified as a major research theme in knowledge management (Alavi and Leidner, 2001). One of the biggest challenges confronting knowledge sharing in virtual communities (Hsu et al., 2007) is that individuals have a natural tendency to hoard knowledge and not share (Davenport and Prusak, 1998). The ultimate goal of Web 2.0 is facilitating the sharing of knowledge. Gruber (2007) argues that collective intelligence through knowledge sharing is the tenet of Web 2.0. Knowledge sharing–the dissemination of knowledge from one individual/group to another–is proposed to be an influential foundation of Web 2.0 (Allen, 2010). Despite the importance of Web 2.0 in facilitating a knowledge share revolution, very little empirical research has been conducted to understand how and why knowledge is shared in online communities.

**1.2 Research Objectives**

Most prior research on knowledge sharing has been conducted in organizational contexts (Szulanski, 1996; Bock, Zmud, Kim and Lee, 2005; Ko, Kirsch and King, 2005; Wasko and Faraj, 2005; Kankanhalli et al., 2005). Even the definition of knowledge sharing (or knowledge transfer) offered by knowledge management scholars is focused on organizational groups/teams (e.g., Argote and Ingram, 2000). Since there is a vast amount of Web 2.0 enabled user interaction on the World Wide Web today, conducting research to understand the nature of knowledge sharing within non-organizational online social networks seems to be paramount.

The overarching question of this research is “what are the factors that motivate people to share knowledge in Web 2.0 online communities?” Knowledge sharing is a social occurrence between individuals and groups (Alavi and Leidner, 2001). When technology is a major enabler for this social occurrence, researchers advise studying both social and technical aspects (Bostrom and Heinen, 1977; Mumford, 1979). As such, when studying the knowledge sharing phenomenon in the context of the Internet, the technical elements that facilitate the sharing should also be studied. This research proposes a socio-technical model of knowledge sharing in Web 2.0 online communities.

More specifically, the objectives of this research are as follows:

1- To study the impact of the social antecedents on knowledge sharing attitude in Web 2.0 online communities.

2- To identify the impact of the technical antecedents on knowledge sharing attitude in Web 2.0 online communities.

3- To investigate the effect of the contextual factors on the antecedents of knowledge sharing attitude in Web 2.0 online communities.

This investigation will have multiple contributions to information systems research. First, by developing a new socio-technical knowledge sharing model specific to Web 2.0 online communities, information systems scholars will be able to probe more deeply into the motivators and barriers of knowledge sharing beyond traditional organizational contexts. Second, previous studies on knowledge sharing centre on organizations. Also, despite the fact that the Internet has been studied in the context of knowledge sharing, understanding of how Internet technologies facilitate knowledge sharing in non-organizational contexts has been overlooked. This study intends to bridge the gap between Internet frontline technologies (through which global knowledge creation and sharing is facilitated) and conventional knowledge sharing research. This can be done through investigating the utilization of technologies such as social bookmarking for knowledge sharing (further elaborated in section 2.4).

From a practitioner perspective, the results could impact Web 2.0 online communities both for organizations and social network companies (like LinkedIn), as well as users. From an organizational viewpoint, businesses could better leverage Web 2.0 artifacts (technologies or features) such as bookmarking (posting links from a source website to a target website) on their own websites or social press rooms as a reliable gateway to introduce themselves and their market products. Through the deployment of such an artifact, members of various social networks would be able to bookmark news or a corporate statement to different online communities. The more users share bookmark information and the more they discuss them through comments on the target online communities, there is a higher chance for businesses to find feedback on the products, services, news, and statements. For example, consider a camera manufacturing business; when a new camera model is launched, users will likely share a vast number of bookmarks and comments about their perspectives and experiences. This can drive traffic to the source page of the company/product. This ongoing cycle brings about opportunities for companies to analyze data from comments via text mining or similar technologies. From a social network companies’ standpoint (such as Facebook or LinkedIn), when better information is conveyed and added from source websites to social networks, their users are more satisfied and their reputations are strengthened. Stronger reputations and more satisfied users can ultimately result in greater advertising power (advertising is the main income source of revenue for Facebook–the leading social network). More satisfied users could result in high number of visits, and thus, better online advertising potential.

**1.3 Research Outline**

The remainder of this manuscript is organized as followings.

Chapter 2 provides a literature review on knowledge, knowledge sharing, and outlines the extant research on knowledge sharing in online communities. Additionally, an introduction to Web 2.0 and what differentiates it from the traditional World Wide Web is provided.

Chapter 3 provides a comprehensive discussion of the background theories on which this research is built and the proposed research model. Social Capital Theory, Theory of Reasoned Action (TRA), and Social Constructionism are three main foundational theories to be discussed. Furthermore, the Web 2.0 artifacts chosen for this current research are outlined with appropriate justification. This chapter also proposes a research model of antecedents of knowledge sharing attitude. Accordingly, relevant hypotheses are suggested.

In Chapter 4, the research design, data analysis method, constructs operationalization, and the results of the pilot test are provided.

Chapter 5 describes the data analysis and research results. This chapter provides the demographics of the respondents and the data screening process. In addition, the measurement model, the structural model, and post-hoc analysis are explained.

Lastly, Chapter 6 presents a discussion on the answers to the proposed research questions. Additionally, contributions of the findings, research limitations, future research suggestions, and a conclusion are outlined.

**Chapter 2: Literature Review**

This chapter outlines concepts such as knowledge, knowledge sharing in online communities, and Web 2.0 artifacts. A literature review of knowledge sharing in online communities and Web 2.0 artifacts is presented.

* 1. **Data, Information, and Knowledge**

‘Information overload’ is a common term among many scholars, especially since the dawn of the World Wide Web (O’Reilly, 1980; Breghel, 1997; Nelson, 2001). Edmunds and Morris (2000) defines information overload as “having more information than one can assimilate or it might mean being burdened with a large supply of unsolicited information, some of which may be relevant” (p. 19). Being bombarded in an ‘information society’, the growing numbers of information channels and technological advancements cause information overload. Eppler & Mengis (2004), in their comprehensive literature review, argue that information overload is not solely a business phenomenon, but emphasize its interdisciplinary nature. Considering the amount of information being shared on the Internet (in the case of this research, online social networks), the question arises as to what is considered to be information and what is contemplated to be knowledge?

Data, information, and knowledge and their relationships in between have been extensively discussed (for example, Dretske, 1981; Ackoff, 1989; Detlor, 2002). Studies on the aforementioned three notions consensually imply that data are raw facts, information is processed data, and knowledge is apprehended, justified, and expressed information (Zins, 2007; Buckland, 1991; Machlup, 1980). Although there is no clear distinguishable factor that differentiates information and knowledge (Alavi and Leidner, 2001), there are various perspectives on these two concepts. Table 2.1 presents a summary of viewpoints on information and knowledge.

Table 2.1 suggests that a practical separation of information and knowledge has not been discussed clearly. Nonetheless, it can be concluded from different viewpoints in Table 2.1 that information can be viewed as meaningful data that describes a situation/phenomenon and gives answers to the questions ‘what?’, ‘when?’, and ‘who?’. Information is data that is processed in a specific context and can potentially alter the perception of individuals involved in information processing. This alteration is the preliminary stage of knowledge. Knowledge can be viewed as actionable information and answers the questions ‘why?’ and ‘how?’ The role of experience in knowledge is also highlighted by different scholars (for example, Leonard and Sensiper, 1998). Knowledge is argued to be justified beliefs based on individual and collective experience (Ehrlich and Cash, 1994; Choo, Detlor, and Turnbull, 2000). Although there is extant literature on information and knowledge and their utilization in different disciplines, no clear differentiation can be established between the two concepts, as they have many characteristics in common. For instance, both information and knowledge can be tangible or intangible (Buckland, 1991) and have to be contextualized to possess meaning (Davenport and Prusak, 1997). Moreover, both information and knowledge can be shared through messages from a sender to a receiver. This study defines information as meaningful data (Davenport and Prusak, 1997) and knowledge as actionable practical information (Leonard and Sensiper, 1998).

**Table 2.1: Viewpoints on Information and Knowledge**

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **Context** | **Concept Description** | |
| **Information** | **Knowledge** |
| Maturana (1980) | Biology and cognition | - | Experience that cannot be transferred. Only Objective knowledge is believed to be transferable |
| Buckland (1991) | Information Systems | Information consists of tangible and intangible data, objects, and events | Communicated information as intangible ideas |
| Wiig (1993) | Knowledge Management | Facts to describe a situation or a condition | Methodologies, concepts, judgments, perspectives |
| Ehrlich and Cash (1994) | Digital Libraries | Data that have been put into explicated, experimented, and confirmed context | Grounded in collective as well as individual experience |
| Nonaka and Takeuchi (1995) | Knowledge Management | Meaningful messages | Beliefs created by messages |
| Spek and Spijkervet (1997) | Knowledge Management | Meaningful data | The ability to assign meaning |
| Davenport and Prusak (1997) | Knowledge Management | A message meant to change the receiver’s perception | Contextual information, values, insights. |
| Leonard and Sensiper (1998) | Group innovation | - | Relevant actionable information based on experience |
| Quigley and Debons (1999) | Information Theory | Who, when, what, or where answers | Why and how answers |
| Choo et al. (2000) | Knowledge Management | Meaningful data | Justified true beliefs |
| Lueg (2007) | Knowledge Management | Preliminary stage to knowledge | Information with specific properties |

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* 1. **Knowledge Sharing**

Through the centuries, knowledge sharing has been of benefit to both individuals and groups (Reid, 2003). Knowledge sharing is the dissemination of knowledge from an individual/group to another and is identified as a major theme in Knowledge Management (Alavi and Leidner, 2001). In the context of Information Systems, knowledge sharing has roots in organizational/business settings. Cummings (2004) suggests that knowledge sharing is the provision of information to collaborate with others in order to solve problems and develop ideas. Knowledge sharing occurs via communication through networking with others or documenting, organizing, and capturing knowledge for others (Pulakos, Dorsey, & Borman, 2003). Albeit knowledge sharing has been mostly studied in organizations, virtual communities, communities of practice (networks of practice) in which organizational problem solving and transferring expertise are the main focus (Argote & Ingram, 2000; Wasko & Faraj, 2005), the fact that knowledge sharing also transpires in non-business-oriented communities is affirmed (for example, Jarvenpaa & Staples, 2000). Knowledge sharing is dependent upon individuals’ willingness to share their knowledge with others (Nonaka & Konno, 2000). Gupta and Govindarajan (2000) states that motivational deposition of the source (willingness to share knowledge), is one element of knowledge sharing concept. Thus, many scholars have investigated the motivational triggers of knowledge sharing such as trust, attitude, organizational rewards, reputation, personality, etc (Bock and Kim, 2001; Cabrera et al., 2006; Chiu and Wang, 2007; Hsu, Ju, Yen, and Chang, 2007; Kankanhalli, Tan, and Wei, 2005).

The concepts of knowledge sharing, knowledge transfer, and knowledge exchange has been applied interchangeably in the literature. We define knowledge sharing as the dissemination of knowledge from an individual/group to another. We believe that knowledge transfer goes beyond knowledge sharing and occurs when the shared knowledge has actually been applied by the knowledge receiver in a new context/situation. This is consistent with the work of Argote and Ingram (2000) in which knowledge transfer is accentuated as a basis for competitive advantage in firms. Other studies assert the essential relationship between knowledge transfer and absorptive capacity, firm productivity, and learning (Robert et al., 2012; Chang & Gurbaxani, 2012; Goh, 2002). Knowledge transfer involves both the sharing of knowledge by the source and application of knowledge by the recipient (Wang and Noe, 2010). Knowledge transfer is a complex and a difficult to measure process beyond the scope of this study. Knowledge exchange involves both knowledge sharing (knowledge contribution) by the source and knowledge seeking by the individuals/groups searching for knowledge (Wang and Noe, 2010). Both knowledge seeking and knowledge contribution have been the focal point of previous studies either independently (Wasko and Faraj, 2000; King and Marks, 2008; Bock, Zmud, Kim, and Lee, 2005; Bock, Kankanhalli, and Sharma, 2006; Grey and Dorcikova, 2005) or collectively (Quigley, Tesluk, Lockes, and Bartol, 2007; Watson and Hewett, 2006; He and Wei, 2008). This research is focused on knowledge sharing and not knowledge seeking.

* 1. **Knowledge Sharing in Online Communities**

Wang & Noe (2010) advocate that the concept of ‘social networks’ is a main area of emphasis and a future research venue in knowledge sharing. A social network is a social structure including social nodes (such as individuals) and a set of dyadic ties between the nodes (Wasserman, 1994). Online communities are technically a subset of social networks. The term online community can have multiple definitions based on the context of study. Terminologies such as online community, virtual community, online community of practice, network of practice, and knowledge networkhave been used interchangeably to some extent (Wasko & Faraj, 2005; Chiu & Wang, 2007; Ardichvili et al., 2003; Chiu et al., 2006). We follow the network model of knowledge management, also known as the interactive model (Alavi, 2000) and define an online community as a social network consisting of a group of geographically and temporally dispersed individuals with similar interests, in which knowledge sharing is facilitated through the Internet technologies. The previous description is consistent with Preece’s (2000) definition of online community which is a social gathering of individuals with shared interests mainly in the Internet environment. We define a Web 2.0 online community as an online community in which Web 2.0 artifacts such as social bookmarking, commenting, and Really Simple Syndication (RSS) are utilized.

Individuals have a natural tendency to hoard knowledge (Davenport and Prusak, 1998) and this is not an exception when it comes to online communities. Knowledge sharing has one of the biggest challenges in fostering virtual communities (Hsu et al., 2007). Previous studies on motivating factors of knowledge sharing in online communities can be summarized in four categories: environmental factors, individual characteristics, cultural factors, and technological factors.

Organizational contextual factors such as culture, structure and interpersonal characteristics are major environmental factors affecting knowledge sharing (Wang and Noe, 2010). Higher trust–as a cultural dimension–tends to lessen the effect of perceived costs on knowledge sharing and expands firm capability for knowledge sharing (Kankanhalli et al, 2005; Collins and Smith, 2006; Chiu, Hsu, and Wang, 2006). Learning emphasizing climates expedite knowledge sharing in organizations (Taylor and Wright, 2004; Hsu, 2006). Innovation emphasizing cultures facilitate knowledge sharing (Ruppel and Harrington, 2001). Fairness of knowledge sharing (norm of reciprocity) has been proven to positively affect knowledge sharing (Chiu et al., 2006). Wasko and Faraj (2005) found a negative impact of reciprocity on knowledge sharing. Pro-sharing norms, management support, and rewards and incentives are other subjects that have been investigated in regard to individuals’ willingness to share knowledge (Kankanhalli et al., 2005; Chang, Yeh, and Yeh, 2007, Connelly and Kelloway, 2003; Cabrera, Collins, and Salgado, 2006; Quigley et al., 2007; Weiss, 1999; Bock et al., 2005). Less centralized organizational structures promote knowledge sharing (Kim and Lee, 2006). Interpersonal and team characteristics such as team communication styles, stronger ties between individuals in a social network, and diversity of team-members also affect knowledge sharing (Srivastava et al., 2006; Sawng, Kim, and Hun, 2006; Wasko & Faraj, 2005; Chen, 2007). Individual characteristics including attitudes, expectations, personality, and level of expertise have been advocated to have strong relationship with knowledge sharing (Hsu et al., 2007; Bock and Kim, 2002; Cabrera et al., 2006; Constant, Sproull, and Kiesler, 1996; Wasko and Faraj, 2005). Cultural factors such as national culture and language have been examined as antecedents of knowledge sharing (Minbaeva, 2007; Voelpel, Dous, and Davenport, 2005). For instance, individuals from cultures with a collectivistic character are expected to be more participant in sharing knowledge (Hwang and Kim, 2007). Technological factors such as level of IT usage, technical infrastructure capability have great impact on knowledge sharing in communities (Bock & Kim, 2002; Sharratt and Usoro, 2003; Pan and Leidner, 2003; Kim and Lee, 2006; Hsu and Lin, 2008). Despite the aforementioned studies, technological aspects are perhaps the most neglected factors in the literature of knowledge sharing. A list of studies relating to the antecedents of knowledge sharing perceptions (attitude and intention) is presented in Table 2.2a. Similarly, those related to the antecedents of knowledge sharing behavior is presented in Table 2.2b.

**Table 2.2a Previous Studies on the Antecedents of Knowledge Sharing Perception**

| **Factor** | **Antecedent (impact)** | **Reference** |
| --- | --- | --- |
| Organizational contextual | Context (online/face-to-face)  Perceived benefits and costs  Team diversity  Trust | Wang and Noe (2010) |
| Cooperation (+)  Shared code and language (+)  Trust (+) | Collins and Smith (2006) |
| Social interaction ties (+)  Trust (+)  Shared language (+)  Shared vision (+)  Norms of reciprocity (+)  Identification (+) | Chiu et al. (2006) |
| Open leadership climate (+)  Learning from failure (+) | Taylor and Wright (2004) |
| Joint reward system (+) | Chang et al. (2007) |
| Extrinsic rewards (+)  Job autonomy (+)  Perceived support (+)  Organizational commitment (+) | Cabrera et al. (2006) |
| Expectation of reciprocity  Extrinsic incentives | Weiss (1999) |
| Anticipated extrinsic rewards (-)  Anticipated reciprocal relationships (+) | Bock et al. (2005) |
| Empowering leadership (+) | Srivastava et al. (2006) |
| Centralization (-)  Formalization (-)  Performance-based rewards system (+)  Vision and goals (+)  Trust among employees (+) | Kim and Lee (2006) |
| Task characteristics (+)  Task independence (+)  Group cohesiveness (+) | Sawng et al. (2006) |
| Identification-based trust (+)  Community outcome expectations (-) | Hsu et al. (2007) |
| Expected rewards (-)  Expected associations (+)  Expected contribution (+) | Bock and Kim (2002) |
| Transparency (+)  Incentive systems (+) | Voelpel et al. (2007) |
| Internalization (+)  Identification (+) | Hwang and Kim (2007) |
| Trust (+)  Organizational structure (+)  Sense of community (+)  Value congruence (+) | Sharratt and Usoro (200) |
| Reputation (+)  Trust (+)  Expected reciprocal benefits (+) | Hsu and Lin (2008) |
| Individual characteristics | Personality  Self-efficacy | Wang and Noe (2010) |
| Agreeableness (-)  Conscientiousness (+)  Open to experience (+)  Self-efficacy (+) | Cabrera et al. (2006) |
| Sense of self-worth | Bock et al. (2005) |
| Personal outcome expectations (+)  Knowledge sharing self-efficacy (+) | Hsu et al. (2007) |
| Altruism (+) | Hsu and Lin (2008) |
| Cultural | Collectivism | Wang and Noe (2010) |
| Culture | Voelpel et al. (2007) |
| Collectivism (+)  Social norms (+) | Hwang and Kim (2007) |
| Technological | Information quality (+) | Taylor and Wright (2004) |
| System availability (+)  System quality (+) | Cabrera et al. (2006) |
| IT application usage (+) | Kim and Lee (2006) |
| Ease of use (+)  Usefulness (+) | Sharratt and Usoro (2003) |
| Perceived usefulness (+)  Perceived ease of use (+)  Perceived enjoyments (+) | Hsu and Lin (2008) |

**Table 2.2b Previous Studies on the Antecedents of Knowledge Sharing Behaviour**

|  |  |  |
| --- | --- | --- |
| **Factor** | **Antecedent (impact)** | **Reference** |
| Organizational contextual | Organizational reward (+) | Kankanhalli et al. (2005) |
| Social interaction ties (+)  Trust (+)  Shared language (+)  Shared vision (+)  Norms of reciprocity (+)  Identification (+) | Chiu et al. (2006) |
| Reward systems | Hsu (2006) |
| Commitment (+)  Reciprocity (-)  Tenure in the field (+)  Self-rated expertise (+)  Centrality (+) | Wasko and Faraj (2005) |
| Incentive condition (-)  Dyadic norms (+) | Quigley et al. (2007) |
| Organizational climate (+) | Bock et al. (2005) |
| Diversity of ties (+)  Weak ties (+) | Constant et al. (1996) |
| Individual characteristics | Enjoyment in helping others (+)  Knowledge self-efficacy (+) | Kankanhalli et al. (2005) |
| Commitment to helping others (+) | Hsu (2006) |
| Enjoyment of helping others (+)  Reputation (+) | Wasko and Faraj (2005) |
| Characteristics of sender (+)  Characteristics of receiver (+) | Minbaeva (2007) |
| Cultural | Collectivism | Hsu (2006) |
| Technological | Providing multiple channels (+) | Pan and Leidner (2003) |
| Characteristics of knowledge (+) | Minbaeva (2007) |

While antecedents and barriers of knowledge sharing have been investigated in online communities and virtual communities of practice (Ardichvili, Page, and Wentling, 2003; Hsu et. al, 2007; Chiu et al, 2006), the main focus has been on enhancing knowledge flow to solve organizational problems. Considering the amount of knowledge being shared on social network websites such as LinkedIn, the role of non-organizational social online communities has been significantly overlooked in the literature. Online environments have been proposed to be a powerful groundwork to mine data, discover knowledge, and ultimately create marketing intelligence for competitive advantage of firms (Berry and Linoff, 1997; Fayyad and Smith, 1996). For example, data mining customers’ feedback or public opinions in online discussions can generate marketing intelligence (Glane, Hurst, Nigam, Siegler, Stockton, and Tomokiyo, 2005). Thus studying online social communities can profit organizations as well as individuals who contribute on such websites.

Among the types of online communities which include practice-based/organizational communities (e.g., online communities of practice), information exchange communities (such as LinkedIn), communities of relationship (such as Facebook), and fun communities (such as secondlife.com), practice-based organizational communities tend to be the focus of academic investigation (Ma and Agarwal, 2007; Yang and Lai, 2011; Lu and Hsiao, 2007; Chai and Kim, 2010). Studying the impact of online community type on knowledge sharing behaviour could help to fill this research gap and contribute to the literature on Knowledge Management. Knowledge sharing has been studied mostly in the context of organizations. Those very few studies which investigate knowledge sharing non-organizational online social networks, take limited perspective by examining select social constructs and overlooking technical facilitators and contextual such as community characteristics. The primary focus of this research is not practice-based communities (communities of practice) such as intra-organizational communities, but non-business-oriented Web 2.0 online communities (communities of relationship and information exchange communities) with a wider range of members.

* 1. **Web 2.0**

Soon after the dot-com bubble in 2002, new ideas of exchanging information/content, such as social bookmarking, gained acceptance on the Web. The new information exchange model features do-it-yourself user-edited generated websites. The transition from HTML pages to dynamic user-centric applications (gadgets) brought what is known as Web 2.0. One of the most important characteristics of these applications is being separable, in a sense that application logic and data is separate from user-created interface. In other words, users do not require coding or technical expertise to share content; the content and process to update or share it is accessible through an easy-to-use application interface. Web 2.0 is defined as a set of online technologies, ideas, and services to enhance participation and collaboration in online environments (O’Reilly, 2005). Raman (2009) argues that the Web 2.0 phase on the Internet was the creation of user-centric Web artifacts, including but not limited to social bookmarking, commenting, blogging, Really Simple Syndicating (RSS), wikis, etc. While there are controversial discussions that Web 2.0 is only a marketing hype (for example, Zajicek, 2007), Web 2.0 advantages, applications, and challenges have already been noted and addressed in diverse contexts such as education, healthcare, and government (Antoni, García, Mildred and Mendoza, 2010; Wilshusen, 2010; Boulos and Wheeler, 2007; Tredinnick, 2006).

The ultimate goal of Web 2.0 is facilitating sharing of information/knowledge. The first generation of the Web was limited in terms of user participation in creating and sharing content on the Web. Content sharing and update mostly required programming from developers. This early generation of the Web was largely viewed as a one-way communication channel. Gruber (2007) argues that collective intelligence through two-way or multi-way knowledge sharing is the tenet of Web 2.0. Because of the high potential for user collaboration, Web 2.0 is often called as ‘social web’ (Paroutis & Al Saleh, 2009). Participation is a feature of Web 2.0 and is constructed on open interfaces on which users create, organize, and share content (Anderson, 2007; Boulos and Wheeler, 2007). New implications of Web 2.0 on knowledge management in organizations are discussed by Levy (2009). Online services are at the core of Web 2.0; meaning that content is created, updated and shared through services rather than independent applications. These services are hassle-free in terms of programming and “are developed as lightweight modules are released constantly and almost continuously” (Levy, 2009, p. 123). Thus, users take over the role of content managers in online organizational Information Systems. We define a Web 2.0 online community as an online community in which Web 2.0 artifacts such as social bookmarking, commenting, and Really Simple Syndication (RSS) are utilized.

Although most Web 2.0 websites encourage collective action, the level of participation is not generally equal among users in different websites, meaning that dynamic reciprocal interaction among users is higher in some websites. For instance, Facebook provides information sharing through high levels of participation, while Web 2.0 wikis and blogs, act more as one-way information sharing gateways and do not necessarily require interactive participation among users. Web 2.0 websites can be divided into three general categories: social networks (e.g., Facebook or LinkedIn), aggregators (e.g., Reddit or Digg), and publicators (e.g., Wikipedia or Blogger). An online social network is a website that allows people to connect. Social networks are online communities in which socialization through interaction ties facilitates information/knowledge sharing. Aggregators provide a collection of content from the web, generated by individuals. Users can vote shared content ‘up’ or ‘down’, which is used to rank posts and determine their position on the website pages including the front page. Publicators are venues for users to share personal thoughts (weblogs) and facts (Wikis). The first two website types, social networks and aggregators, most fully reflect user participation tenet of Web 2.0. The number of social networks and their members are far greater than aggregators. For example LinkedIn has over 259 million users worldwide (en.wikipedia.org/wiki/LinkedIn), while Reddit has around 3 million members (www.reddit.com/about). As such, social networks are selected to represent Web 2.0 online community websites in this study.

Knowledge Management has gone through a paradigm shift from static knowledge-warehouse approach to a dynamic network approach (Kuhlen, 2003). The latter approach is people-centric (Hazlett, McAdam, and Gallagher, 2005). There are several unique characteristics of Web 2.0 communities that suggest traditional knowledge sharing research results may not be directly applicable to Web 2.0 social communities. First, intrinsic motivators (such as reputation) are assumed to have a far greater influence on users to participate than extrinsic motivators (for instance, rewards) in Web 2.0 online communities. There is little (if any) competition in sharing information/knowledge on Web 2.0 online communities. Second, most knowledge sharing research neglects social websites characteristics such as user anonymity and availability of Web 2.0 technologies. For instance, Facebook as a social network requires users to register with real names by which there are identified, whereas on Cnet–a technology-related Web 2.0 website, members can be anonymous with made-up usernames. People are more likely to engage in an interaction with another party if the other party’s identify can be verified (Ma and Agarwal, 2007). Third, Web 2.0 online communities offer a variety of technologies (artifacts) to facilitate knowledge sharing. Social bookmarking and commenting are two main artifacts available on most Web 2.0 online communities. These artifacts not only facilitate sharing of knowledge, but are also anticipated to create unique knowledge through the theory of social constructionism (as discussed in section 3.1.6). Previous research on Web online communities has not investigated the potential impact of applying multi-Web 2.0 artifacts (For example, Klamma, Cao, and Spaniol, 2007). Finally, the extant literature has examined knowledge sharing in voluntary or mandatory settings. Since the Web 2.0 online communities are being investigated in this research are general information/knowledge exchange or communities of relationship and not organizational communities of practice, voluntary behaviour is an important assumption. Previous studies of Web 2.0 artifacts and knowledge management are either in the organizational context (Levy, 2009), or explored the role of artifacts in knowledge sharing, such as blogs or wikis (publicators), in which user collaboration is far less than social network (Yu, Lu, and Liu, 2010; Chai, Das, and Rao, 2011; Hsu and Lin, 2013). Most of previous studies on Web 2.0 artifacts have been conducted in the Computer Science (CS) discipline in which the definition of knowledge sharing is radically different from the conceptualization in IS. In Computer Science, knowledge sharing is the sharing of sets of concepts within a domain with mutual vocabulary and the relationships between them called ‘ontology’ (Gruber, 1993). In contrast, knowledge sharing from an IS perspective is a more holistic view incorporating the dissemination of knowledge between two parties. The aforementioned discussion calls for research to study knowledge sharing in non-organizational Web 2.0 online communities. Table 2.3 presents studies that have examined Web 2.0 artifacts and their context and discipline.

As stated in Table 2.3, the IS literature on knowledge sharing and Web 2.0 has focused on weblogs as a Web 2.0 artifact. For instance, Yu et al. (2010) find a significant positive influence of enjoyment and helping others and shared culture on knowledge sharing behaviour in weblogs. Hsu and Lin (2008) report significant positive impact of technology acceptance factors (such as perceived ease of use) on weblog usage attitude. In another study, Chai et al. (2011) conclude significant positive influence of trust in bloggers, information, and blog service providers on knowledge sharing behavior in weblogs. Overall, the IS literature lacks investigation on the role of other Web 2.0 artifacts such as social bookmarking on knowledge sharing in Web 2.0 online communities. In terms of RSS and tagging, Levy (2009) suggests that organizational KM can be triggered using Web 2.0 artifacts. Most of previous studies in the context of IS centre on weblogs. A very few others report the influence of technology on knowledge sharing phenomenon.

**Table 2.3 Previous Studies on Web 2.0 Artifacts**

| **Reference** | **Artifact** | **Context** | **Discipline** |
| --- | --- | --- | --- |
| Yu et al. (2010) | Weblogs | Knowledge sharing | IS |
| Paroutis and Al Saleh (2009) | Weblogs/commenting | Knowledge sharing | IS |
| Hsu and Lin (2008) | Weblogs | Knowledge sharing | IS |
| Klamma et al. (2007) | Weblogs | Knowledge sharing | IS |
| Chai et al. (2011) | Weblogs | Knowledge sharing | IS |
| Anggia and DI Sensuse (2013) | Weblogs | Bloggers’ KM | CS |
| Zhi-guo (2004) | Weblogs | Knowledge sharing | CS |
| Ke (2009) | Weblogs | Knowledge sharing | CS |
| Qun and Ziaocheng (2012) | Weblogs | Information literacy | CS |
| Nasr and Ariffin (2008) | Weblogs | Learning | CS |
| Ping (2007) | Weblogs | Blog culture and knowledge sharing | CS |
| Yang, Callan, and Si (2006) | Weblogs | Knowledge Transfer | CS |
| Linjie (2011) | Weblogs | Knowledge Transfer | CS |
| Cammaerts (2008) | Weblogs | Media content | CS |
| Wongwilai and Anutariya (2007) | Weblogs | Semantic Web | CS |
| Golder and Huberman (2006) | Social bookmarking/tagging | Folksonomies | CS |
| Gordon-Mornane | Social bookmarking | Folksonomies | CS |
| Noll and Meinel (2007) | Social bookmarking | Web search | CS |
| Farooq, Song, Carroll and Giles (2007). | Social bookmarking | Digital libraries | CS |
| Cattuto et al. (2008) | Social bookmarking | Semantic Web | CS |
| Benbunan‐Fich and Koufaris (2008) | Social bookmarking | Knowledge contribution | CS |
| Braun, Schora, and Zacharias (2009) | Social bookmarking | Semantic Web | CS |
| Rezaei and Muntz (2013) | Tagging | Context-based search | CS |
| Voss (2007) | Tagging | Folksonomies | CS |
| Jung (2013) | Tagging | Folksonomies | CS |
| Huang, Huang, Liu, and Tsai (2013) | Tagging | Learning | CS |
| Kaljuran and Kuhn (2013) | Tagging | Semantic Web | CS |
| Atzmueller and Hörnlein (2008) | Tagging | Knowledge Management | CS |
| Zha and Lv (2012) | Tagging | Knowledge sharing | CS |
| Huang, Lin, and Chang (2012) | Tagging | Knowledge sharing | CS |
| Zhu, Chen, Cao, and Tian (2012) | Tagging | Knowledge sharing | CS |
| Wetzker, Zimmermann, and Bauckhage (2008) | Social bookmarking | Web intelligence and search | CS |
| Yanbe, Jatowt, Nakamura, and Tanaka (2007) | Social bookmarking | Web searching | CS |
| Arazy, Nov, Patterson, and Yeo (2011) | Wikipedia | Information quality | IS |
| Chu, Yu, and Lo (2007) | Wikipedia | Knowledge sharing | CS |
| Shim and Yang (2009) | Wikipedia | Knowledge sharing | CS |
| Cho, Chen, and Chung (2010) | Wikipedia | Knowledge sharing | CS |
| Yang and Lai (2011) | Wikipedia | Knowledge sharing | CS |
| Ho, Ting, Bau, and Wei (2011) | Wikipedia | Knowledge sharing | CS |
| Tseng and Huang (2011) | Wikipedia | Knowledge sharing and job performance | CS |
| Biasutti and El-Dahaidy (2012) | Wikis | KM in education | Learning and Education |
| DeWitt, Alias, and Hutaglung (2014) | Wikis | KM processes | Learning and Education |
| Jung (2013) | Wikis | Semantic Web | CS |
| Quan and Quan (2008) | Wikis | Knowledge sharing | CS |
| Suvinen and Saariluoma (2008) | Wikis | Knowledge sharing | CS |
| Pavliĉek (2009) | Wikis | Knowledge sharing | CS |
| Kang, chen, Ko, and Fang (2010) | Wikis | Knowledge sharing | CS |
| Wang and Wei (2011) | Wikis | Knowledge sharing | CS |
| Begoña and Carmen (2011) | Wikis | Knowledge construction and sharing | CS |
| Wilshusen (2010) | Wikis/weblogs/podcasts/mashups | e-Government | CS |
| Martinez-Aceituno et al. (2010) | Wikis/weblogs/social bookmarking | Corporate e-Learning | CS |
| Wen (2009) | RSS | Knowledge sharing | CS |
| McLean, Richards, and Wardman (2007) | RSS/wikis/weblogs/podcasts | Folksonomies in medical practices | CS |
| Levy (2009) | RSS/tagging | Collective intelligence | IS |
| Gruber (2008) | FAQ-o-spheres | Semantic Web/Collective Knowledge Systems | CS |
| Ankolekar, Krötzsch, Tran, and Vrandecic (2007) | Ajax technology | Semantic Web | CS |

**Chapter 3: Theoretical Background and Research Model**

**3.1 Theoretical Background**

In this chapter the backbone theories of the current study along with the proposed research model are presented. Sections 3.1.1 to 3.1.6 explore social and technical concepts and theories on which the current research is built on: Theory of Reasoned Action (TRA), the importance of context, Social Capital Theory, Web 2.0 artifacts, and Social Constructionism. Above theories support this research in constructing the theoretical framework and the research model.

**3.1.1 Socio-technical Paradigm**

The socio-technical paradigm argues that systems are composed of social and technical interrelated sub-systems. Two principles of socio-technical theory are that the interaction between socio and technical sub-systems creates functionality and condition for success for the whole system, and the optimization of both social and technical sub-systems could result in higher system performance (Trist and Bamforth, 1951). Socio-technical theory has developed in terms of systems and open system theory, since it is concerned both with interdependencies and the environment. As an organizational development approach in 1970’s, the ‘socio-technical’ movement was introduced to recognize the interrelatedness of social and technical aspects of organizations. Socio-technical studies tend to find methods for analyzing the relations of technologies and organizational forms in different settings and thus, identify criteria to best match between technology and social components (Trist, 1981). Applying socio-technical research in organizations resulted in identifying extrinsic (such as job security and benefits) and intrinsic (such as learning and recognition) job characteristics (Davis, 1977) which engendered various principles of work design (for example, Hackman and Lawler, 1971). Socio-technical studies are carried in different levels from macro social systems, such as institutions operating at the upper level of the society, to organizational work systems and micro social systems (Miller, 1975; Trist, 1977). Communities as micro social systems are not exceptions. Although one can argue that media are not organizations, they are socio-technical phenomena and their social characters have far reaching effects on users, as well of technical infrastructure (McLuhan, 1994). To fully understand the Internet, which has been transformed to a user-centric phenomenon, research studies benefit by following the socio-technical paradigm.

Socio-technical system theory has also been applied in the domain of Information Systems (Eason, 1988; Mumford, 1979). ETHICS (Effective Systems Design and Requirements Analysis) is a well-known socio-technical framework to ‘foster genuine participation’ of users in design and development of Information Systems (Mumford, 1983; Mumford, 1995). Dillon (2000) states that the socio-technical paradigm goes beyond the pragmatism of usability engineering and suggests motivations to design user-centreed Information Systems that supersede concern with efficiency. Bostrom and Heinen (1977) advocate the socio-technical paradigm in Management Information Systems. They argue that the major reason for MIS unsuccessful implementations is failure in viewing a system as “two jointly independent, but correlative interactive systems” and strongly suggest the diffusion of socio-technical approach to Information Systems among researchers and practitioners (Bostrom and Heinen, 1977, p. 30). For instance, Lee, Cheung, Lim, and Sia (2006) explore the nature of knowledge sharing in web-based discussion boards from social and technical standpoints. In the context of online communities, Yu and Jang (2011) show the impacts of technological and social factors (such as perceived effectiveness of knowledge repositories and perceived pro-sharing norms) on knowledge contribution in virtual communities.

**3.1.2 Theory of Reasoned Action (TRA)**

Drawn from socio-psychology, Theory of Reasoned Action (TRA) argues that intention to engage in behaviour is influenced by favorable or unfavorable attitude toward the behaviour (Ajzen and Fishbein, 1980). TRA is a framework to interpret volitional behaviour and is based on the assumption that individuals behave in a rational manner by considering available information and probable consequences of their behaviour. TRA posits that individual behaviour is in fact directed by behavioural intention which is driven by attitude toward the behaviour and subjective norms. Behavioural intention is a motivational construct that mirrors how hard people are willing to perform the behaviour. Attitude toward the behaviour is individuals’ positive or negative feelings about performing the behaviour. Attitude is about one’s beliefs of the consequences emerging from the behaviour. Subjecting norm is one’s perception of whether people to the individual believe that the behaviour should be acted (Venkatesh, Morris, Davis, and Davis, 2003; Fishbein and Ajzen, 1975). The subsequent of TRA, Theory of Planned Behaviour (TPB) suggests that the behavioural intention is also affected by the individuals’ perception of the ease with which the behaviour can be acted (Azjen, 1991). Both TRA and TPB offer an acceptable level of power to explain a behaviour and have been widely applied in various areas such as health, politics and marketing (Fishbein and Middlestadt, 1989; Fishbein and Coombs, 1974; Kalafitis, Polard, East, Tsogas, 1999). The aforementioned theories have been further used in the Information Systems literature and systems acceptance (for example, Venkatesh et al., 2003; Yang and Lai, 2011; Pavlou and Fygensen, 2006). In terms of Knowledge Management, there is evidence that TRA and TPB can influence human behavioural intention to share knowledge, and the quality and quantity of knowledge being shared (Bock and Zmud, 2005; Chiu et al., 2006). In the context of Web 2.0, TPB has been applied to explain knowledge sharing behaviour in blogs (Lu and Hsiao, 2007; Hsu and Lin, 2008) and wikis (Liu, 2010) and social networks (Hsu and Lu, 2004). Lu and Hsiao (2007) argue that knowledge self-efficacy and personal outcome expectations positively impact intention of continuing to update blogs. Hsu and Lin (2008) report that technology acceptance factors (perceived ease of use and perceived enjoyment) positively influence attitude towards using blogs. Liu (2010) advocates that the intention of using wikis in the educational context has a significant positive influence on Wikis actual blog usage.

**3.1.3 The Importance of Context**

Orlikowsky and Iacono (2001) argue that the future is progressively dependent on pervasive and invasive technological artifacts and IS researchers should place emphasis on these artifacts. As their investigation outlines, IT artifacts have been overlooked in the majority of IS research. Taking IT artifacts for granted results in misunderstanding their “critical implications” for individuals, groups, and society. Orlikowsky and Iacano (2001) suggest that to deeply engage in conceptualizing IT artifacts, IS researchers should comprehend and theorize IT artifacts’ contexts and capabilities.

Cappelli and Sherer (1991) describes context as “the surroundings associated with phenomena which help to illuminate that phenomena, typically factors associated with units of analysis above those expressly under investigation” (p. 56). Rousseau and Fried (2001) outline that “contextualization entails linking observations to a set of relevant facts, events, or points of view that make possible research and theory than form part of a larger whole” (p. 1). They advocate that the contextualization is more crucial in behavioral research than it was in the past (Rousseau and Fried, 2001) and it can affect hypothesis development, data analysis, and interpretation. In fact, Schneider (1983) advises that contextualization in behavioral science makes for accurate and robust models and interpretations. Johns (2006) stresses that context can have both subtle and powerful effects on research results. He stresses two important reasons for studying and reporting context. First, if context is not understood, then the person-situation interactions cannot be understood. Second, context can help to make research salient and relevant outside of the research community. Practitioners care about context as it can shape strategies and their implementation.

Brown, Dennis, and Venkatesh (2010) utilize a contextualization approach to understand how various contextual factors ultimately impact adoption and use of collaboration technologies. They argue that established technology adoption models mediate the relationship between contextual characteristics and ultimate outcomes, such as use. As such, a model that considers contextualization should begin with the contextual characteristics in which the technology might be used as antecedents to factors in an established adoption model or framework (such as Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Reasoned Action (TRA), etc.). Smith, Dinev, and Xu (2011) support this approach in their recent interdisciplinary review of information privacy research. Specifically, they outlined that most extant research examines the linkage between privacy concerns and outcomes with “very little attention having been paid to the linkage between antecedents and privacy concerns” (p. 1002). These antecedents correspond to the context-specific factors mentioned above.

Two salient contextual factors that seem to have impact on knowledge sharing phenomena in Web 2.0 online communities are user anonymity and community type. User anonymity is the degree to which online community members perceive themselves as being anonymous to other members (Yoon and Roland, 2012). Community type describes the purpose and nature of the online communities (Stanoevksa-Slabeva, 2002). The following sections discuss the nature of each of these contextual factors and their implications in online knowledge sharing.

**3.1.3.1 User Anonymity**

Various socio-psychology scholars originally report that reduced social contextual information has certain effects on groups such as inhabitation and liberation (Kiesler, Siegel, and McGuire, 1984; Kiesler and Sproull, 1992). Based on the Online Disinhibitation Effect (Suler, 2004), people act differently in cyberspace compared to their usual offline behaviour. Suler (2005) argues that Dissociative Anonymity is one principal reason for online disinhibitation. When users’ actions are detached from their identity, their online actions may differ. Connolly et al. (1990) proposed that user anonymity has a positive effect on stimulating knowledge creation in groups. Previous studies highlight the important notion of user anonymity in online knowledge sharing; however, mixed results are obtained for the role of user anonymity as a motivator or a barrier of knowledge sharing. In one study, it is presented that higher level of user anonymity results in higher level of contribution to an online community (Rains, 2007). On the other hand, user anonymity also happens to be a positive influence on participation and knowledge sharing in communities. A meta-analytic review reveals that less user anonymity brings about critical contributions to online communities, specifically Group Decision Support Systems (Postmes and Lea, 2000). Yoon and Roland (2012) show that user anonymity indirectly has a negative effect on knowledge sharing in virtual communities. Lower levels of user anonymity tends to engender better task-oriented focus from members, higher group interaction, and less suppressed information both on offline and online discussions (McLeod, Baron, Marti, and Yoon, 1997; Lea, Spears, and De Groot, 2001). Also, it is noted that less user anonymity (for example by providing photographs of users) will increase pro-social oriented individuals’ willingness to share their knowledge on online communities (Wodziki, Schwammlein, Cress, and Kimmerle, 2011). These diverged results may be due to the fact that user anonymity is a multi-dimensional phenomenon.

Table 3.4 presents different dimensions of user anonymity. Pfitzmann and Hansen (2008) define user anonymity as “a subject being unidentifiable among a set of subjects” (p. 9) and conceptually propose three dimensions for user anonymity: unobservability, unlinkability, pseudonymity. unobservability is the degree to which a user’s identity is undetectable “even his/her online identity is known” (Pfitzmann and Hansen, 2010, p. 16; Lee, Choi, and Kim, 2013, p. 5). Unobservability presents the extent of connection between senders and messages in online communities. Lee et al. (2013) defines unobservability as “the extent to which a sender is undetectable” (p. 5). For instance, if a member is known (identified) in a specific community but his/her real identity cannot be detectable in real world, then unobservablilty exists. Marx (2001) argues that there are identifiers to relate a known member in an online community to his/her real identity, such as affiliations and residential address. Unlinkability is defined as “the extent to which a recipient cannot distinguish whether an online identity and a message are related or not” (Lee et al., 2013, p. 5). It can be implied that if a contribution (such as a message or a comment) on an online community cannot be linked to the contributor (sender) due to the absence of his/her distinguishable ‘vocabulary’ or ‘jargons’ in the message, then unlinkability exist. Pfitzmaan and Hansen (2010) defines pseudonym as “an identifier of a subject other than subject’s real name”. Thus, pseudonymity can be achieved through identifiers such as usernames or symbols.

**Table 3.4 Dimensions of User Anonymity**

|  |  |  |  |
| --- | --- | --- | --- |
| **References** | **Dimensions of User Anonymity** | | |
| Pfitzmann and Hansen (2008) | Unobservability | Unlinkability | Pseudonymity |
| Hayne and Rice (1997) | Social | Technical | - |
| Valacich et al. (1992) | Content | Process | - |
| Marx (2001) | - | - | Pseudonymity |

Technical and social anonymity are introduced by Hayne and Rice (1997). Social anonymity-consistent with unobservability-refers to the perceptive lack of cues to associate an identity to an individual. Technical anonymity-consistent with unlinkability-is the extent to which essential information about individuals is eliminated in the sharing of content (Lee et al., 2013). Another scheme for user anonymity proposes content and process anonymity which are consistent with unlinkability and unobservability anonymity accordingly (Valacich, et al., 1992). Marx (2001) emphasizes on pseudonymity anonymity and the application of pseudonyms as identifiers. In the context of this research, anonymity is applied through the pseudonymity dimension. For example, on the Cnet website–as a Web 2.0 online community examined in this research–pseudonymity exists because the vast majority members of Cnet forums apply usernames (user IDs) instead of their real names.

**3.1.3.1 Community Type**

Komito (1998) views communities in terms of societal characteristics and explains that four types of communities exist: Moral communities (sharing a sense of responsibility and united by a sense of commitment), Normative communities (sharing a sense of common understanding, such as in communities of practice), Proximate communities (physically shared), and Fluid communities (such as online communities). Virnoche and Marx (1997) divide communities based on two dimensions of shared virtual space and sharde geographical space, thus explaining that online communities are gathering of individuals with shared virtual space who ‘never’ share a geographical space. An online community has been defined as a social gathering of individuals with shared interests mainly in the Internet environment (Preece, 2000). Stanoevksa-Slabeva (2002) defines online communities as “associations of participants who share a common language, world, values, and interests, obey a commonly defined organizational structure, and communicate and cooperate ubiquitously connected by electronic media” (p. 72). Porter (2004) describes an online community as an “aggregation of individuals” interacting with each others around similar shared interests where these interactions are supported/mediated by online technologies and a set of norms.

There are various conceptual typologies of online (virtual) communities in which communities are classified in business, technological, and social contexts (Table 3.5). Krishnamurthy (2002) explains their two business-oriented online communities: revenue generating (such as communities that host transactions or facilitate the exchange of product) and non-revenue generating. Stanoevksa-Slabeva (2002) classifies four online communities based on communities’ existence philosophy and members’ requirements: discussion communities, goal-oriented communities, virtual (fantasy) communities, and hybrid communities. In the same study, it is noted that discussion communities are further comprised on four subtypes: relationship communities (targeting the establishment of social relationships), interest communities (around a defined topic), communities of practice (professional and organizational communities that are focused on a domain of knowledge), and implicit discussion communities (also known as recommendation and reputation communities, such as eBay). Preece (2001) formulates communities into social support communities and discussion groups (such as political and religious communities). In another study, online communities are categorized based on membership policies to private and public communities (Jones and Rafaeli, 2000). Porter (2004) uncovers five types of virtual communities: social, organizational, commercial, non-profit, and governmental. Finally, Armstrong and Hagel (2000) identified four types of online communities as communities of transaction (facilitate buying and selling of goods and services), communities of interest (information exchange communities), communities of fantasy (to create new personalities), and communities of relationship (or emotional support communities). Armstrong and Hegel’s (2000) typology has been empirically investigated in the context of knowledge sharing (Ma and Agrawal, 2007). Adopted from their classification, this research studies two types of online communities (communities of interest and communities of relationship). Theoretically, in communities of relationship, users interact with each other through strong ties. In such communities, the ties are more essential than the topics being shared or the conversation over shared topics. In other words, communities of relationship are not built around specific common themes, directed to solve particular issues, and managed to engage individuals in purposeful arguments or concerns. Communities of relationship bring together participants around life experiences that can lead to stronger bonds. On the other hand, communities of interest are constructed to gather people with same interests, issues, or goals. In communities of interest users interact extensively with each other on specific topics and common concerns. What generates stronger and steadier ties in communities of interest is the fact that members seek accomplishments in shared concerns or resolution over common goals. Without this purpose, the ties seem to be desultory. This situation could eventually lead to destruction of bonds within the social network.

**Table 3.5 Online Community Typologies**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **References** | **Online Community Types** | | | | | |
| Armstrong and Hegel (2000) | Interest | Relationship | Fantasy | Transaction | - | - |
| Stanoevska-Slobeva (2002) | Discussion | - | Fantasy | - | - | - |
| Preece (2001) | Discussion | Social support | - | - | - | - |
| Porter (2004) | Organizational |  | - | Commercial | Governmental | Non-profit |
| Social | |
| Krishnamurthy (2002) | Revenue generating | | | | | - |
| Non-revenue generating | | | | | |
| Jones and Rafaeli (2000) | Public | | | | | |
| Private | | | | | |

**3.1.4 Social Capital Theory**

Just like physical capital in economics (such as natural resources or the labour force), human capital in psychology and sociology can enhance yields of individuals in groups (Lin, 1999; Adler and Kwon, 2002). Social capital is the anticipated collective prosperity acquired from participation between individuals in groups. Social capital is believed to be the true value of social networks (Coleman, 1994; Putnam, 1995). Adler & Kwon (2002) explain that “the core intuition guiding social capital research is that the goodwill that others have toward us is a valuable resource. By ‘goodwill’ we refer to the sympathy, trust, and forgiveness offered us by friends and acquaintances” (p. 18). Fukuyama (1992) posits that there is no consensual definition of social capital and explains it as “shared norms or values that promote social cooperation, instantiated in actual social relationships” (p. 27). Fukuyama (1992) believes that social capital is a necessity for democracy and growth in micro and macro groups and institutions. Albeit the structure of groups (networks) is assumed to be the social capital, it is more likely that the habit of creating and maintaining of such groups is what construct social capital. More or less, the explanations of social capital centre on the role of ties between actors (external social capital), the inner characteristics or actors themselves (internal social capital), or both. As an external view of social capital, Bourdieu (1986) defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition” (p. 52). As an internal view of social capital, Portes and Sensenbrenner (1993) describe social capital as "those expectations for action within a collectivity that affect goal-seeking behaviour” (p. 1323). The success and growth of groups are impacted by both views (Adler and Known, 2002). The behaviour of a collective actor, such as online social network, is influenced by both its linkage to other social networks and the Internet as a whole, and the nature of its members’ relationships. As an example of combined internal and external views of social capital, Pennar and Mueller (1997) defines social capital as the web of social relationships that influences individual behaviour and thereby affects economic growth. Internal and external viewpoints of social capital are not mutually exclusive.

In the context of Information Systems and rooted in theories of collective action, Social Capital Theory provides a conceptual framework to analyze the rationale behind human social behaviour. Social Capital Theory posits that interactive relationships among individuals within social networks could be productive resources to create and exchange intellectual capital such as knowledge. Nahapiet and Ghoshal (1998) define social capital as the “sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit” (p. 243). Social capital can enhance the flow of knowledge sharing in online communities (Wasko and Faraj, 2005; Chiu et al., 2006). In their review of various social capital definition, Robison, Schmid, and Siles (2002) note that most of the definitions of social capital described “what it can be used to achieve, where it resides, how it can be created, and what it can transform” (p. 14), rather than what social capital is. Moreover, they argue that many definitions fail to satisfy the requirements of capital. Although there is a lack of agreement in the literature of what constitutes social capital (Adler and Kwon, 2002), it has been developed around three dimensions which largely embody “many aspects of a social context, such as social ties, trusting relationships, and value systems that facilitate actions of individuals located within that context” (Tsai and Ghoshal, 1998, p. 465). Based on social capital theory, three dimensions (types) of capital (relational, cognitive, and structural) inherent in relationships among individuals enable identifying and accessing knowledge sources and assist individuals to understand the meaning of the knowledge being shared. Nahapiet and Ghoshal (1998) conceptualize three dimensions of social capital: relational, cognitive, and structural.

Relational dimension of social capital is about the nature of relationships between the nodes in a social network. Relational capital refers to assets that are rooted in relationships within the social network. Relational capital is stronger when members of a social network trust each other, establish and follow norms, see themselves as one with the network (identification), and perceive an obligation to participate in a collective.

Cognitive dimension of social capital represents “shared representations, interpretations, and systems of meaning among parties” (Nahapiet & Ghoshal, 1998, p. 253). Cognitive social capital explains the shared context in a social network. Shared language and shared narratives (for example, stories and metaphors) can develop strong means in social networks for creating and exchanging intellectual capital.

Structural dimension of social capital explains the structural characteristics of a social network such as network density or nodes’ centrality. Structural capital refers to “the overall pattern of connections between actors–that is who you reach and how you reach them” (Nahapiet and Ghoshal, 1998, p. 252).

Wasko and Faraj (2005) operationalize Nahapiet and Ghoshal’s (1998) framework and extend it by adding individual motivation dimension. They discuss, based on Social Exchange Theory (Blau, 1964), people engage in social interactions expecting different kinds of social awards like status and respect (Figure 3.1). They argue that individual motivations, structural, cognitive, and social capital influence knowledge contribution in electronic networks of practice. Rooted in theories of collective action, social capital theory provides a conceptual framework to analyze the rationale behind human social behaviour (Coleman, 1990; Putnam, 1993). Online communities such as Facebook and LinkedIn are social networks with actors (members) and ties (relationships). Such social networks adapt to the network model of social capital and can produce capital as aforementioned types. This research applies Wasko and Faraj’s (2005) model of social capital theory as a foundation to explain the social factors that motivates knowledge sharing on Web 2.0 online communities. In terms of individual motivations, Wasko and Faraj (2005) explore the influence of individuals’ reputation expectation and enjoyment in helping other in the community on the quality and quantity of participants’ knowledge sharing contribution in an electronic network of practice. In terms of the structural dimension of social capital, they suggest that centrality–the number of social ties an individual possesses–positively impact knowledge contribution. As for the cognitive capital, they propose that higher levels of expertise and longer tenure in the shared practice positively impact knowledge contribution. Similarly, for the relational capital, they suggest that individuals who are more committed to the network and those who are guided by a norm of reciprocity are more likely to contribute their knowledge in the online network of practice.

Individual Motivations

Structural Capital

Cognitive Capital

Relational Capital

Knowledge Contribution

**Figure 3.1 Wasko and Faraj’s (2005) Model of Social Capital and Knowledge Contribution**

**3.1.5 Web 2.0 Artifacts**

Web 2.0 represents a set of tools and technologies encapsulated to facilitate information sharing. These tool and technologies or artifacts convey information ‘intelligently’. The analogy of an ‘intelligent library’ can help to clarify the concept of Web 2.0 artifacts. Suppose you enter a huge library or bookstore in which there are thousands of books placed in an unorganized manner. From a customer’s point of view, there is no alphabetical order, catalog or useful information such as recently published, most popular, or customer reviews. This would be a cumbersome and unsatisfactory situation to find or select a book. Now imagine the library or bookstore is using a system packed with technologies that enable you, the customer, not only to effortlessly search books and find them faster through easy-to-use catalogs, but also offer the ability to use the tags on books to find similar titles, check customer reviews instantly, write a comment, chat with other customers or sale assistants, browse news regarding the exact or related titles, or add tags to selected books which could be used later to reclassify the book or further facilitate searches. Web 2.0 artifacts together act as an ‘intelligent system’ through which information sharing on the Internet is faster, easier (efficient), and more effective.

A number of artifacts have been developed and deployed since the dawn of Web 2.0. Wikis, social bookmarking, commenting, blogging, and RSS are among the most used and discussed Web 2.0 artifacts for which definitions are presented below (O’Reilly, 2005; Yanbe, Jatowt, Nakamura, Tanaka; 2007; Cattuto, Benz, Hotho, and Stumme, 2008; Wetzker, Zimmermann, Bauckhage, 2008).

Social bookmarking: is a method for Internet users to organize, store, manage and search for [bookmarks](http://en.wikipedia.org/wiki/Internet_bookmark) of resources online. With the advent of [social bookmarking](http://en.wikipedia.org/wiki/Social_bookmarking), shared bookmarks have become a means for users sharing similar interests to pool Web resources. In other words, social bookmarking is the process of posting a link from a source website to other websites called target websites. The target website is where one has an account/profile, which could be a social network (such as Facebook), an aggregator (such as Reddit), or a blog (such as Blogger or Wordpress). A social bookmark consists of three building blocks: a user, a post and a set of tags (Heyman, Goutrika and Garcia, 2008). A post is a URL bookmarked by a user with all associated metadata (source website information, data, etc). Tagging is the process of classifying resources by the use of informally assigned keywords (Barskey and Purdon, 2006). These keywords can be pre-defined by websites’ developer, user-defined, or both. Tagging is a significant feature of social bookmarking systems, enabling users to organize their bookmarks in flexible ways and develop shared vocabularies. Such shared vocabularies are called folksonomies and are built from the bottom up, mostly by users (Barskey & Purdon, 2006). These “inclusive democratic” folksonomies are non-hierarchical network-based structures that not only provide users’ behaviour and preferences through data mining tool (Schmtiz, Hotho, Jaschke and Stumme, 2006; Mathe, 2004), but are used as powerful tools for searching information. Examples of popular online bookmark management services are Delicious, Digg, Reddit, and Stumbleupon. Not all the websites with bookmarking feature allow tagging. To better demonstrate the social bookmarking process an example is provided (Figure 3.2). Suppose you find an interesting news article on the BBC website and you want to share it with your circle of friends (for example on Facebook) or with your professional network (such as LinkedIn). In this context, we call BBC the ‘source’ and Facebook the ‘target’ website. Normally, you can see a ‘share’ button either on the top or bottom of the article. If you click on the ‘share’ button, you will see a list of target websites to connect and post the news/article; however, not all the websites are integrated with as many social networks or aggregators as the BBC website. To share the article on Facebook, all you have to do is to click the Facebook button through which a new window will appear that connects you to your profile on Facebook. In this window, you can change the title of the bookmark (post) as you wish it to appear on your Facebook page, add a description, and add tags. News websites may offer a selected set of tags as examples to choose from. As in our BBC article example, six tags are suggested automatically: science & environment, earth, planet, solar systems, space, and universe. You are free to use these or create your own set of tags, as depicted in Figure 3.2. By clicking the ‘share’ button, the article will be bookmarked on your Facebook page. Another simpler way of social bookmarking is to copy and paste the URL on one’s social network or aggregator homepage. It is important to note that tagging is not presently available for all social networks and aggregators. Many websites allow users to only use pre-defined tags (such as the ones suggested in the BBC example). Nevertheless, the number of websites that offer user-defined tags on target websites are vastly growing.

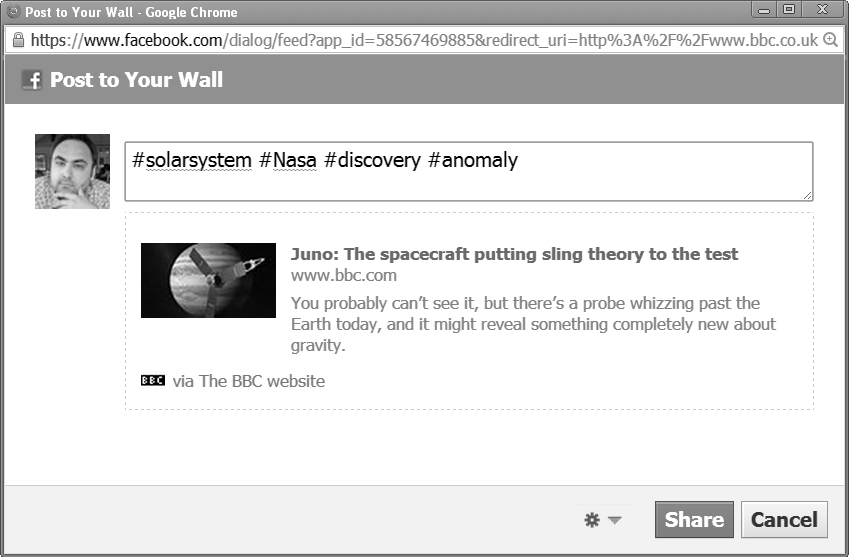


**Bookmarking window**

**Available target websites**

**Suggested tags**

**BBC article/post title**



**Figure 3.2 Social Bookmarking Process (source: www.bbc.com)**

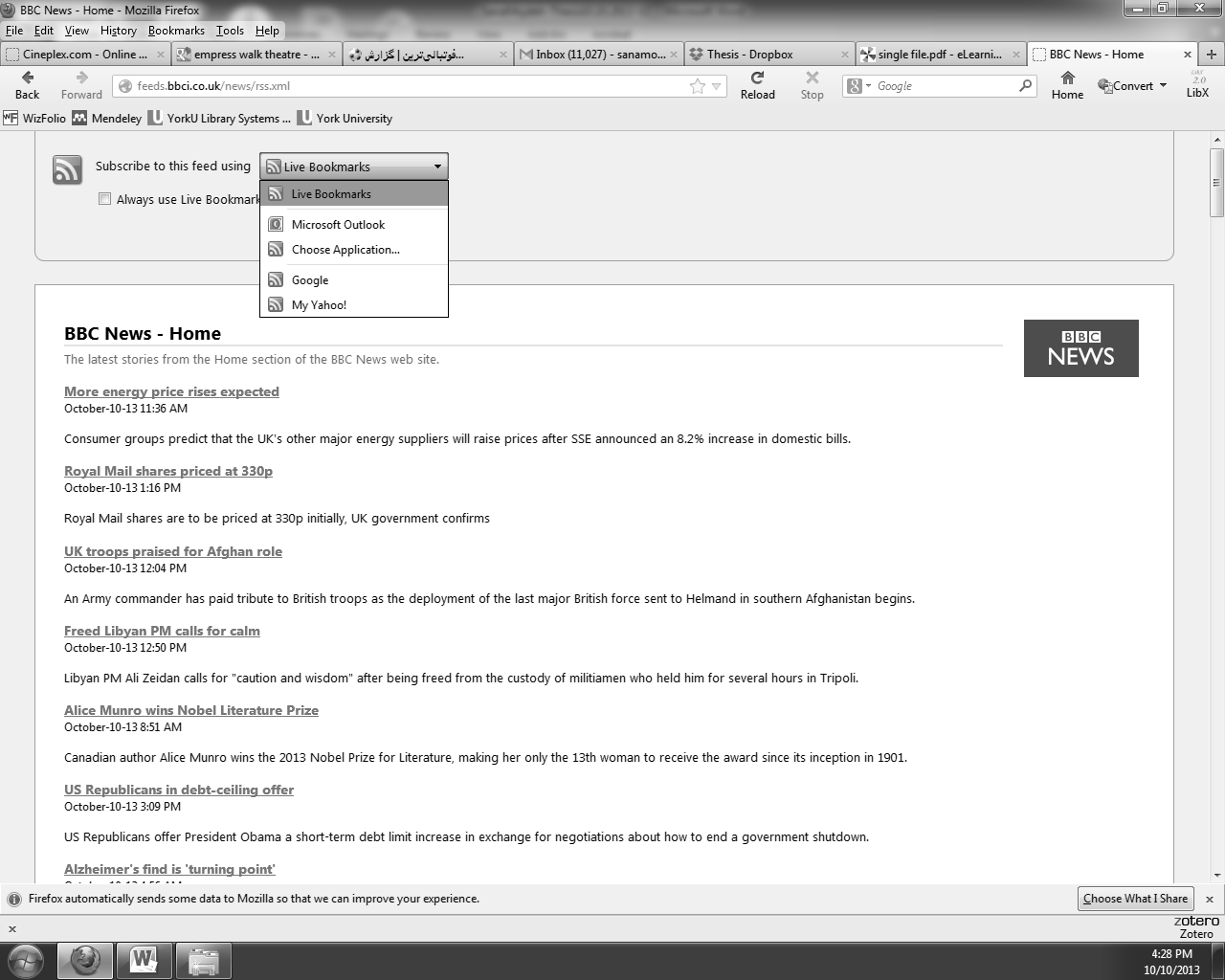
Commenting: A comment is a verbal or written remark often related to an added piece of information, or an observation or statement (online content in this context). Currently most web services provide commenting features for users to share their opinions. The comments can influence the popularity of the online content. Since a comment usually follows a blog update or a bookmark, commenting can be considered a passive reaction to other types of Web 2.0 tools such as social bookmarking or blogging. If freely circulated, comments can be a source of constructive criticism. Figure 3.3 demonstrates a set of comments on a Facebook post.

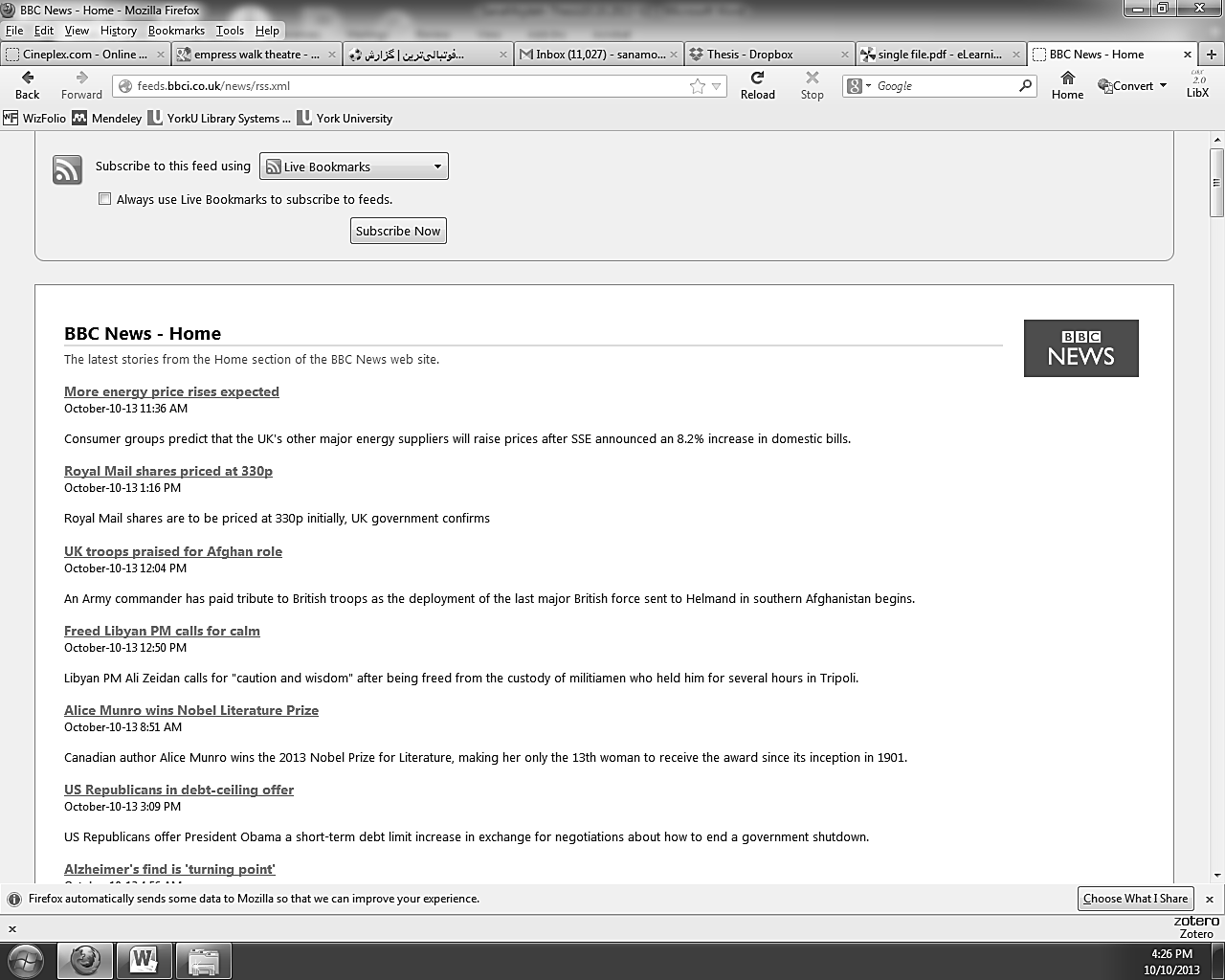
RSS: Really Simple Syndication (RSS) is a family of [web feed](http://en.wikipedia.org/wiki/Web_feed) formats used to publish frequently updated works–such as [blog](http://en.wikipedia.org/wiki/Blog) entries, news headlines, audio, and video-in a standardized format. An RSS document (which is called a ‘feed’, ‘web feed’, or ‘channel’) includes full or summarized text, plus [metadata](http://en.wikipedia.org/wiki/Metadata) such as publishing dates and authorship. RSS feeds benefit publishers by letting them [syndicate](http://en.wikipedia.org/wiki/Web_syndication) content automatically. Any web page with an RSS feed enables the user to track updates on that specific page in an automated manner through a single subscription, and without having to visit the page from time to time. Because the data is in XML (Extensible Markup Language), and not a display language like HTML, RSS information can be flowed into a large number of devices. One can subscribe to a website RSS feed using different feed reader applications such as Live Bookmarks, Google, etc. Figure 3.4 depicts a section of the BBC website RSS feed subscription page.





**Figure 3.3 Example of Comments on a Facebook Post (source: NASA Facebook page)**





**Figure 3.4 Example of RSS Feed Subscription (source: www.bbc.com)**

Wiki: Meaning fast in Hawaiian, a wiki is a [website](http://en.wikipedia.org/wiki/Website) whose users can add, modify, or delete its content via a [web browser](http://en.wikipedia.org/wiki/Web_browser) using a simplified [markup language](http://en.wikipedia.org/wiki/Markup_language) or a [rich-text editor](http://en.wikipedia.org/wiki/Online_rich-text_editor). In other words, wiki is a technology that supports conversational knowledge creation and sharing. Wikis are typically powered by [wiki software](http://en.wikipedia.org/wiki/Wiki_software) and are often [created collaboratively](http://en.wikipedia.org/wiki/Collaborative_software) by multiple users. Examples include community websites, corporate [intranets](http://en.wikipedia.org/wiki/Intranet), and [knowledge management](http://en.wikipedia.org/wiki/Knowledge_management) systems. The wiki’s uniqueness lies both in its software and in the use of the software by collaborating members. An important feature of Wikis is that they enable web documents to be authored collectively. Levels of privilege (such as editing rights or access control) are diverse for different wikis. Wikipedia is the largest collaboratively edited, multilingual free encyclopedia. Wikitravel, Wikihow, Wiktionary, and Wikibooks are other examples of popular wikis. Figure 3.5 shows a snapshot of the Wikihow homepage, a website including extensive quality how-to manuals.



**Figure 3.5 Wikihow Homepage (source: www.wikihow.com)**

Blogging: A blog is a personal [journal](http://en.wikipedia.org/wiki/Journal) published on the [World Wide Web](http://en.wikipedia.org/wiki/World_Wide_Web) consisting of discrete entries (posts) typically displayed in reverse chronological order so the most recent post appear first. Blogs are usually the work of a single individual or occasionally of a small group, and often are themed on a single subject. Many blogs provide commentary on a particular subject; however, a commenting feature is not always offered by the blogging website, or it might be locked by the owner. A typical blog combines text, images, and links to other blogs, [Web pages](http://en.wikipedia.org/wiki/Web_page), and other media related to its topic (www.wikipedia.com).  Microblogging is a type of blogging, featuring very short posts. Other types of blogs are personal and organizational. Blogs become popular typically by two measures of popularity through citations or bookmarking the posts, as well as popularity through affiliation. The latter is facilitated via a list of other blogs that a blogger might recommend by providing links to them (Marlow, 2004).

Applied independently (such as a blog with locked commenting) or interdependently (such as in Facebook, a social network with social bookmarking, commenting), the above Web 2.0 artifacts share mutual characteristics (Sharma, 2008): user-centred design, crowd-sourcing, power decentralization, cloud computing, and a rich user experience. Due to the nature of these artifacts, they cannot be compared by a measure such as frequency of use. One can update his/her blog once a week and comment on others on a daily basis and yet, his/her weekly update might be more critical from an information sharing perspective. Moreover, there is no evidence in the literature on the perceived importance of various Web 2.0 artifacts. Thus, in order to identify the most salient Web 2.0 artifacts for knowledge sharing, a Fuzzy Analytical Hierarchy Process (FAHP) model is conducted. Appendix 1 presents a brief description of FAHP. Appendix 2 outlines the results of the FAHP survey for Web 2.0 constructs**.** The results confirmed that bookmarking and commenting are two Web 2.0 artifacts to be the most salient for knowledge sharing and are the focus for investigation in this research.

**3.1.6 Social Constructionism**

To further support the salience of the above two artifacts, and in particular that of commenting, ‘Social Constructionsim’ could be used as a lens for understanding their significance. Social Constructionism is a sociological theory of knowledge that focuses on how social phenomena develop in social contexts. Individuals or groups participate in social interpretive nets woven around popular subjects to construct their perceived social reality. All human knowledge, from everyday common-sense to context-specific historical knowledge, is created and transferred in social situations (Berger and Luckmann, 1966). In other words, knowledge is socially constructed in ongoing and dynamic processes based on people’s interpretations. Web 2.0 is indeed a collaborative environment where sophisticated applications are provided for users to create and share information with fast and convenient web technologies. Social networks such as Facebook, Myspace, and Orkut, and aggregator websites such as Reddit, StumbleUpon, Digg, Delicious, and Pinterest are all based on a simple premise: online social interaction to share knowledge. Knowledge can be created and shared socially (Alavi and Leidner, 2001) which leads us to Social Constructionism as a supporting theory of this study.

While there is no universally accepted definition of Social Constructionism, there are certain characteristics of Social Constructionism that are widely accepted (Burr, 1995; Foucault, 1969). First, Social Constructionism is about building our own version of reality where there is no single version of the truth and all knowledge is derived from our perspectives. It states that time-bound theories cannot describe knowledge; to understand knowledge (or having knowledge transferred) one should look at the historical emergence of knowledge and social practices by which knowledge is created and shared. Second, the emphasis of Social Constructionism is on social interactions rather than individuals. Knowledge is derived and sustained by social processes or interactions (Goldman, 1999; Burr, 1995). Knowledge is not something that individuals possess, but it is what people come up with together. To understand knowledge, we must focus on social interactive processes rather than separately examining psychological traits or social structures.

Berger and Luckmann (1966) argue a general way of creating and sharing knowledge in Social Constructionism: individuals interpret objective social reality to subjective knowledge through internalization, participate in societal dialectics, and share their gradually crystallized knowledge back to society through externalization. In fact, Hegelian dialectics becomes a crucial notion in postmodern Social Constructionsim. According to Hegelian dialectics principles in the context of Social Constructionism, knowledge is created out of opposing forces (social interactions), gradual changes lead to turning points (socially constructed knowledge), and perhaps most importantly, any thesis with antithesis makes something different from the two (proposing and opposing viewpoints produces brand new ideas) (Berger and Luckmann, 1966).

Applying Social Constructionism to Web 2.0, popular news websites such as BBC, Euronews, or CNN provide a vast amount of information every day. For each news story or article, there is a ‘share this page’ or ‘bookmark this article’ link through which users can select a title, add tags, and ultimately share the original page with others on a target website; meaning that users can share information with either friends on Facebook or LinkedIn, or anonymous people on a technology news website like Cnet. Web 2.0 brings the capability of online resource sharing via ‘social bookmarking’. When a bookmark appears on a social network, it is usually followed by comments where users from different countries and cultural backgrounds can add their own opinions about the subject. Opinions usually vary from proposing to opposing ideas and are assumed to be based on users’ tacit (personal experience) or explicit knowledge (for example, an opinion accompanied by a supporting web link to another resource). These opinions are built upon each other and together construct a spiral path of knowledge creation and sharing. There is no time limit to close/end such an environment; hence, these ongoing spirals of knowledge can continuously grow and mature. Such a bookmark, together with its tags, and comments becomes a social situation where subject-related knowledge is socially constructed and shared through commenting over time.

**3.2 Research Model and Hypotheses**

As outlined in the previous sections, TRA argues that attitude forms behavior. Given that knowledge sharing behavior is very difficult to measure and observe, attitude is investigated in the research. The socio-technical paradigm advocates the influence of both social and technical factors in understanding attitude. Additionally, the importance of context (in this case, Web 2.0 online community contextual factors) in understanding social interactions is salient. To examine the main research thesis, understanding knowledge sharing in Web 2.0 online communities, we focus on the following research question: What are the factors affecting attitudes toward sharing knowledge in Web 2.0 online communities? More specifically, we intend to answer the following questions: What are the social and technical antecedents of knowledge sharing attitude? What is the role of community contextual factors on knowledge sharing attitude in Web 2.0 online communities? Specifically, what is the role of user anonymity and community type on the antecedents of attitude towards sharing knowledge on Web 2.0 online communities? Based on the foregoing discussion, Figure 3.6 provides a framework for this research.

**Web 2.0 Online Community context**

**Web 2.0 Online Communities Contextual Factors**

**Socio-technical framework**

User anonymity

Social factors

Community type

Attitude

Technical factors

**Figure 3.6 Proposed Research Framework**

Based on the research framework of Figure 3.6, the proposed research model, shown in Figure 3.7, is developed to help answer the above research questions. Identification, Reciprocity, Reputation, Enjoyment in helping others, and Engagement are independent exogenous variables that are proposed to be the social antecedent of attitude toward knowledge sharing. According to Social Capital Theory explained in section 3.1.4, identification and reciprocity belong to the relational dimension of social capital; reputation, enjoyment of helping others, and engagement are individual motivation factors affecting social capital. Bookmarking and commenting perceived usefulness represent technical exogenous variables that affect knowledge sharing attitude in online communities. These constructs are based on Technology Acceptance Model (TAM) which suggests that perceived usefulness of a technology affects users decision about usage. User anonymity and community type are Web 2.0 online community contextual factors that are proposed to have effects on certain antecedents of knowledge sharing attitude (section 3.2.3). Attitude toward knowledge sharing in online communities has been selected as the endogenous dependent variable. One reason is that this research intends to study the effects of social and technical constructs on users’ positive or negative feelings towards sharing their knowledge in online communities. Another reason is that attitude is a good predictor of intention or willingness to behave in voluntary settings (Azjen, 1991), which itself affects knowledge sharing behaviour. Also, Wasko and Faraj (2005) suggest a stream of research in which perceptual endogenous variables are applied instead of actual knowledge sharing behaviour.

**Web 2.0 Online Communities Contextual Factors**

**Social**

Reputation

Identification

Reciprocity

H1

User anonymity

Community type

**Relational capital**

H3

H2

Attitude toward Knowledge sharing in Web 2.0 online communities

Engagement

Enjoyment in helping others

H8c

H8b

H8a

H5

H4

H6

**Individual motivations**

H9a

H9b

H7

Social Bookmarking PU

H9c

Commenting PU

**Web 2.0 artifacts**

**Technical**

**Figure 3.7 Proposed Research Model [[1]](#footnote-1)**

As explained in section 3.1.4, knowledge is a form of social capital and Social Capital Theory provides a robust framework in which the factors affecting knowledge sharing can be investigated. As such, Social Capital Theory is the foundational theory on which this research is formed. Based on Social Capital Theory, Nahapiet and Ghoshal (1998) suggest three dimensions for social capital: structural, cognitive, and relational. They believe that constructs within these dimensions can theoretically affect the intellectual capital creation process and “new intellectual capital is created through combination and exchange of existing intellectual resources, which may exist in the form of knowledge” (Nahapiet and Goshal, 1998, p. 250). Wasko and Faraj (2005) were the first to practically test the three aforementioned dimensions of social capital in the context of Knowledge Management as well as the addition of individual motivation (as outlined in section 3.1.4). From the four types of antecedents of knowledge contribution proposed by Faraj and Wasko (2005), this research pertains to relational dimension of social capital and individual motivation. Cognitive and structural antecedents are excluded.

In terms of cognitive social capital, ‘Self-rated expertise’ and ‘tenure in the field’ belong to the cognitive dimension of the Wasko and Faraj’s social capital model. These constructs are used in the context of ‘communities of practice’ in which a specific expertise is the focus of the research; since the scope of current research are ‘communities of interest’ and ‘communities of relationship’ in which the exact expertise is not crucial, the cognitive dimension is excluded from the proposed research model.

Form the structural point of view, centrality, or how a node (member) is a focal individual in a network belongs to the structural dimension of Wasko and Faraj’s social capital model; however, due to measurement complexity, it is excluded from this research. In other words, centrality can only be measured for social networks with a limited number of nodes (members), or those for which all the members are willing to give information about all the ties (relationships) they possess. In the case of Web 2.0 online communities studied in this research (Facebook, LinkedIn, and Cnet), it is practically impossible to acquire of the information required to calculate measures such as centrality.

In terms of relational antecedents proposed by Wasko and Faraj (2005), obligations or commitment, represents a “duty to engage in future actions” and is mostly applicable in obligatory setting in which action on tasks are expected (Wasko and Faraj, 2005, p. 42). Since this research is conducted on a voluntary setting, commitment is excluded from independent constructs.

In terms of relational capital and individual motivation and from the extant literature on knowledge sharing, and specifically Wasko and Faraj (2005), reputation, reciprocity, identification, enjoyment in helping others, and engagement are considered to be significant antecedents of sharing knowledge in communities.

Engagement or in other words the degree to which users experience perceptions of involvement, is an individual (intrinsic) motivation and a major antecedent behaviour in computer-based systems and online environments (Moon and Kim, 2001; Webster and Ahuja, 2006). Engagement fits in the individual motivations dimension of Wasko and Faraj’s model (2005).

The rest of the current section explains the social and the technical constructs and the community contextual factors.

**3.2.1 Social Antecedents**

The hypotheses related to the social dimension of the model are developed are identification, reciprocity, reputation, enjoyment in helping, and engagement.

**3.2.1.1 Identification**

Identification occurs when individuals’ interests merge with the community’s interests. In other words, people identify themselves with a community when a high degree of mutual understanding and even personal attachment is satisfied. Identification is the willingness of individuals to maintain a relationship with others in a community (Dholakia, Baggozi, and Pearo, 2004). Bagozzi and Dholakia (2002) define identification as “one's conception of self in terms of the defining features of self-inclusive social category” (p. 11). Identification cultivates behaviour in community settings, interprets members’ loyalty to communities, and sustains relationships in online communities (Bergami and Bagozzi, 2000; Meyer, Stanley, Herscovitch, and Topolnistky, 2002). Nahapiet and Ghoshal (1998) discussed that identification as a relational social capital that would lead to resource exchange among individuals. When people see themselves as one with the community, the community becomes a frame of reference, and identification acts as a motivation to exchange knowledge. Identification has been reported to be an influential factor in knowledge sharing behaviour (Chiu et al., 2006; Chang and Chuang, 2011) and a manifestation of collectivism (Batson, Ahmad, and Tsang, 2002). Identification with a community increases concern for collective results (Kramer and Tyler, 1996).

Belongingness which is a similar concept to identification and a central human motivation is supported to positively influence the level of contribution in online environments (Peddibhotla and Subramani, 2007). Sharratt and Usuro (2003) advocate that sense of community or “a feeling that members belong to the group” (p. 191) positively affects knowledge sharing in online communities of practice. Yoo, Suh, and Lee (2002) based on the idea from McMillan and Chavis (1986) propose that sense of community positively affects participation in virtual communities of practice. Koh and Kim (2007) suggest that having a sense of belonging encourages participation in virtual communities. Hars and Ou (2001) demonstrate that higher levels of group identification result in greater developer’s participation in online open-source software projects. Hsu and Lin (2008) argue that identification–as an intrinsic motivation–with the community has a significant positive relationship with users’ willingness to share knowledge on online communities. Chiu et al. (2006) show that identification is the positively associated with the quantity of knowledge being share on virtual communities, while it indirectly has a positive relationship with the quality of knowledge being shared through trust.

We expect that identification is an important motivational factor in Web 2.0 information exchange communities and specifically communities of relationship (for example, patientslikeme.com which is focused on members who share similar health challenges). Thus, we hypothesize:

*H1. Identification positively impacts attitude toward sharing knowledge in Web 2.0 online communities*.

**3.2.1.2 Reciprocity**

A series of righteous conversions develop when individuals have to interact for a long time (Thibault and Kelley, 1952). Reciprocity is the degree of fairness and perceived mutual benefits of relationships among individuals. In its simplest form, reciprocity is a “mutual indebtedness” in a sense that individuals “reciprocate the benefits they receive from others” (Shumaker and Brownwell, 1984; Wasko and Faraj, 2005, p. 43). Reciprocity as a strong predictor of human behaviour has been studied in various disciplines such as sociology, ethnology, and anthropology (Falk and Fischbacher, 2006). The sociologist Gouldner (1960) notes that the norm of reciprocity is a universal and important element of culture.

Social Capital Theory explains the role of reciprocity as a relational capital in resource exchange among individuals within social networks (Nahapient and Ghoshal, 1998). Social Exchange Theory also highlights reciprocity as an extrinsic benefit of social relationships (Blau, 1964). The Social Exchange Theory addresses that actions by individuals in groups are dependent on rewarding reactions and people stop acting when they are unsatisfied with reactions.

It has been noted that individuals are more likely to acquire the information they are seeking faster if they support others persistently (Rheingold, 1993). The more users perceive that their current contribution would result in future assistance from the other party, the more it is likely that they engage in knowledge sharing behaviour (Chiu et al., 2006). A norm of reciprocity influences the quantity of knowledge sharing in virtual communities (Chiu et al., 2006). Davenport and Prusak (1998) also call reciprocity as a social aspect which prompts knowledge sharing in knowledge markets. It is discussed that “a sense of reciprocity” enhances knowledge sharing in electronic networks of practice (Wasko and Faraj, 2005). Wasko and Faraj (2005) explain that people who contribute to online communities believe in reciprocity. Their related study revealed that one-to-one reciprocity does not affect knowledge contribution helpfulness, but proposed generalized reciprocity (current help received may result in future help giving, but not necessary to the same user in the online community) exist within the network.

Tohidnia and Musakhani (2010) show that anticipated reciprocity in enduring relationship has a high positive influence on knowledge sharing attitude in industrial communities. Chang and Chuang (2011) argue that the relationship between reciprocity and knowledge sharing. They found a positive significant relationship between reciprocity and knowledge sharing quality and quantity. Reciprocity has been proven to be a significant motivating factor for bloggers to share their content with others (Nerid, Schiarno, Gumbercht, and Swartz, 2004). Chai et al. (2012) conclude that reciprocity indirectly improves knowledge sharing behaviour of bloggers by positively increasing the rate of online social interactions. It is expect that reciprocity is an important motivational factor in information exchange communities and specifically communities of relationship. Thus, we hypothesize:

*H2. Reciprocity positively impacts attitude toward sharing knowledge in Web 2.0 online communities.*

**3.2.1.2 Reputation**

Davenport and Prusak (1998) explain that members of communities require sufficient incentives to engage in sharing their knowledge. Acting as an incentive, reputation is an essential resource that individuals can use to gain and sustain status in collective settings (Jones, Hesterly, and Borgatti, 1997). Bandura (1986) posit that social acceptance can be a source of motivation for engaging in social activities. It is important to note that by reputation we mean perceived reputation by individuals and not reputation of the system, or in this context, online communities (for example Chen, Xu, and Whinston, 2011).

One characteristic of Web 2.0 is user participation in flowing information over different websites. Whether a Web 2.0 online community is a community of relationship (such as Facebook) or an information exchange community (for example, Cnet), the more users contribute knowledge (through bookmarking and commenting), the better reputation they gain from others as reliable, respectful, and high-status members. Since there is no competition in sharing knowledge in the context of Web 2.0 online communities that are not organizational/business-oriented, users may have a high tendency to participate. Motivational models introduced extrinsic and intrinsic benefits.

Social Exchange Theory (Blau, 1964) posits that people engage in a social behaviour with expectations of some sort of social reward such as reputation and recognition. Donath (1999) argue that reputation is a powerful driver of participation in virtual communities. It is believed that user-to-user assistance increases when individuals expect to earn status by supporting others (Lakhani and Von Hippel, 2003). Wasko and Faraj (2005) present reputation as an individual motivating factor that affects knowledge contribution helpfulness and volume in electronic networks of practice. They provide evidence that forming reputation in online environments is a strong motivator for active participation and that “reputations in online settings extend to one’s profession” (Wasko and Faraj, 2005, p. 50; Stewart, 2003). Moreover, Kollock (1999) outlines recognition as an individual motivator for online knowledge sharing. Ma and Agarwal (2007) introduce reputation as an indirect antecedent of knowledge contribution in online communities. In addition, Hew and Hara (2008) introduced personal gain to increase one’s welfare as a motivator for knowledge sharing in online communities of practice. Wang and Lai (2006) provide evidence that reputation enhance knowledge sharing contribution in technology-related virtual communities. Chou and Chuang (2001) examine the effect of reputation on attitude toward knowledge creation in electronic networks of practice and report an influential positive relationship. Other prior research confirm the positive relationship between reputation or self-image and knowledge contribution, sharing, or creation in online communities and electronic networks of practice (Chang and Chuang, 2011; Chiu and Wang, 2007).

It is expected that reputation is an important motivational factor in Web 2.0 online communities (specially information exchange communities such as LinkedIn or Cnet); thus, we hypothesize:

*H3. Reputation positively impacts attitude toward sharing knowledge in Web 2.0 online communities.*

**3.2.1.4 Enjoyment in Helping Others**

Another intrinsic motivating factor in knowledge sharing is rooted in enjoyment in helping, which is a motivator in which one seeks to enhance the welfare of others (Hars and Ou, 2002). Krebs (1975) coins the term altruism as gaining intrinsic pleasure from helping others without anticipating anything in return. Fang and Chiu (2010) define altruism as “the voluntary helping actions where one attempts to improve the welfare of others at some cost to oneself” (p. 237). They note that members of virtual communities apply discretionary actions such as helping others by sharing their experiences and knowledge at their own costs (for example time and effort). It is believed that enjoyment in helping or altruism is a motivator of knowledge contribution in peer-to-peer communities (Kwok and Gao, 2004; Palmer, 1991). In the context of Information Systems design, altruism has been documented to be a socio-psychological driver of knowledge sharing (Ba, Stallaert, and Whinston, 2001).

Smith (1981) introduces two types of altruism: absolute altruism (total absence of self-concern in helping others) and relative altruism (self concern exists in actions). Davenport and Prusak (1998) regard relative altruism as a driver of knowledge sharing. Kankanhalli et al. (2005) provide evidence for the significant positive relationship between enjoyment in helping others and knowledge contribution to electronic knowledge repositories. Brazelton and Gary (2003) found enjoyment in helping others as a reason for sharing knowledge in an online community. In their qualitative study, Hew and Hara (2007) proposed enjoyment in helping as a motivational factor to share knowledge in online environments. Kollock (1999) propose that individuals feel good when supporting others with their problematic issues. Another study by He and Wei (2009) reveals that enjoyment in helping–as a sub-construct of contribution beliefs–positively impacts knowledge sharing intention in online Knowledge Management Systems. Wasko and Faraj (2000) also believe that helping other members of networks of practice is an intrinsic motivation and could be challenging and fun.

Yu and Jang (2011) report no significant impact of altruistic motive (in terms of moral obligation motive and motive to advance virtual communities) on knowledge contribution in problem-solving virtual communities. Wasko and Faraj (2005) report that enjoyment of helping others does not affect knowledge contribution in electronic communities of practice, they explained that the aforementioned relationship might be indeed different for other types of community such as communities of interest and communities of relationship where extrinsic rewards do not exist and individual motivations are more salient to users. Chang and Chung (2011) also argued the positive relationship between enjoyment in helping and both quantity and the quality of knowledge sharing.

We expect that enjoyment in helping others is an important motivational factor of knowledge sharing in information exchange communities and specifically communities of relationship (such as Facebook) where implicit knowledge sharing (sharing of experience) is anticipated more than explicit knowledge sharing. Thus, we hypothesize:

*H4. Enjoyment in helping others positively impacts attitude toward sharing knowledge attitude in Web 2.0 online communities.*

**3.2.1.5 Engagement**

Users of a technology are considered to be engaged when an activity holds their attention and they pursue it for intrinsic purposes (Webster and Ho 1997). In the context of Information Systems research, a number of studies affirm the impact of fun or pleasure on technology acceptance and use (Thong, Hong, Tam, 2006; van der Heijden, 2004; Brown and Venkatesh, 2005). Engagementhas been described as a type of playfulness, specifically the temporary state of playfulness, which occurs when an individual experiences perceptions of pleasure and involvement (Webster and Ho, 1997).

Engagement is rooted in and is a stream of the concept cognitive absorption. Vallerand (1997) defines cognitive absorption as an intrinsic motivation with which the behaviour is performed for itself, to experience the inherent pleasure and satisfaction. Based on the literature of cognitive absorptive, it can be derived that it streams in three inter-related concepts: the trait of absorption, the construct of flow, and the concept of cognitive engagement. Tellegan and Atkinson (1974) define absorption as a psychological trait that leads to “total attention”. Absorption is the state in which “the object of attention fully consumes the resources of the individual” (Lin, 2009). Flow–as a multidimensional construct–is described as “the holistic sensation people feel when they act in total involvement” and includes a feeling of intense focus, a sense of control, and a temporal transition (Csikszentmihayli, 2000). Webster and Martochhio (1995) define that cognitive playfulness as "the degree of cognitive spontaneity in microcomputer interactions" and argue that it strongly affects the state of flow. Flow has been suggested as a measurement for Information Systems users’ online behaviour (Skadberg and Kimmel, 2004). Cognitive engagement is defined as individuals’ instinctive experience with computer systems (Webster and Ho, 1997). Novak, Hoffman, and Yung (2000) advocate that members of virtual communities appear to show captivating/addictive behaviour toward their communities; hence, engagement is a relevant concept in the context of virtual communities.

Venkatesh et al. (2012) conclude that perceived enjoyment–as a hedonic motivation–is a critical determinant of behavioural intention particularly in non-organizational contexts. In a study of a large community of service providers, Lin (2009) show that cognitive absorption indirectly influences behavioural intention through perceived usefulness and ease of use of the community portal.

Empirical studies have shown that various intrinsic motivators including engagement and playfulness contribute to usage intentions (Davis, Baggozim and Warshaw, 1992; Webster and Ahuja 2006). Moon and Kim (2001) enjoyment as a dimension of playfulness affects Internet usage, thus can be applied to understand individuals’ judgment of virtual community usage. Venkatesh and Bala (2008) also explain the indirect effect of playfulness on behavioural intention.

Scott and Walczak (2009) explain the similarities and differences between the four related concepts of cognitive absorption, flow, engagement, and involvement. While all four aforementioned concepts include the notion of ‘focus’, only the first three are comprised of ‘interest’ or ‘enjoyment’ as a property. Moreover, cognitive absorption and flow–as a dimension of absorption–are fabricated with the notions of ‘control’ and ‘temporal dissociation’ or ‘transformation of time’. The latter appears to be a characteristics of communities in which users spends an extensive amount of time. Communities of fantasy (online games or websites such as second life) are better cases for control and transformation of time than communities of relationship (such as Facebook) or communities of interest (such as LinkedIn). Accordingly, engagement is believed to be a relevant construct to fit the context of the current research.

We believe that engagement in Web 2.0 online communities (for example, Facebook or Cnet) affect users’ attitude towards participation in such communities. We propose that the more users are engaged with Web 2.0 communities, the more they gain positive feelings for sharing knowledge. Thus,

*H5. Engagement is positively associated with attitude toward sharing knowledge attitude in Web 2.0 online communities.*

**3.2.2 Technical Antecedents**

Based on the discussion in section 3.1.5 and the results from the Analytical Hierarchy Process method applied in Appendix 2, social bookmarking and commenting are considered to be the most salient Web 2.0 artifacts influencing knowledge sharing attitude. The hypotheses related to the technical dimension of the model are developed below.

We introduce Web 2.0 artifacts as a construct representing two sub-categories of the most popular artifacts as identified in section 3.1.5: social bookmarking and commenting. Social bookmarking is the process of sharing online resources from a source website (such as a news website) to a target website (such as a social network). Social bookmarking is a major artifact of Web 2.0 first identified by O’Reilly (2005). Social bookmarking has become extensively popular in recent years (Kashoob and Cavarlee, 2012; Deka and Deka, 2012; Yoshida and Inoue, 2013; Cattuto et al., 2008). Tagging, a component of bookmarking, is labeling (annotating) the shared subject with metadata that could be used for subsequent classification and searching. Web 2.0 brings the advantage of allowing users to participate in assigning tags instead of only developers/designers. Assuming that shared basic understanding of the subject facilitates the flow of knowledge sharing (Alavi and Leidner, 2001), tags and thus, bookmarks could benefit users by suggesting a context of the bookmarked subject being discussed and a network structure of what else is related to the subject (Golder and Huberman, 2006). Previous studies suggest that social bookmarking can enhance information and knowledge sharing on web-based communities, both in commercial and non-organizational settings (Millen and Feinberg, 2006; Barskey and Purdon, 2006; Pan, 2008; Freberg, Palenchar, and Veil, 2013).

Commenting is another Web 2.0 artifact through which users are enabled to engage in collaborative discussions. A comment is a verbal or written remark related to a piece of information, observation, or statement. In the context of social networks, an individual’s comment is usually preceded or followed by other members’ comments on a specific piece of information. In other words, normally a shared content (specifically bookmarks) on social networks are followed by more than a single comment. This continuous spiral process of commenting allows users to share ideas and together create a unique perspective about the bookmarked subject. Commenting has previously been investigated in online environments; For example, Kuan and Bock (2007) assert the influence of positive comments on online purchase behavioural intention. Boulos et al. (2006) promote collaborative commenting in Web 2.0 environments to improve knowledge sharing in communities. Others signify the importance of commenting for knowledge sharing in online communities and social networks in healthcare, government, and education (Frost and Massagli, 2008; Osimo, 2008; Lai and Turban, 2008; Grosseck, 2009).

Adopted from the Theory of Reasoned Action, the Technology Acceptance Model posits that individual’s perceived usefulness of a system determines behaviour of system use by the individual (Davis, 1989). Perceived usefulness–the degree to which a user believes that using a system would improve his/her performance–is assumed to be a construct of performance expectancy and a determinant of behavioural intention of computer technologies (Davis, Bagozzi, and Warshaw, 1989; Venkatesh, Morris, Davis G. B., and Davis F. D., 2003; Venkatesh et al., 2012). Wixom and Todd extend the technology acceptance model and argue that behavioural beliefs (such as perceived usefulness) directly affects behavioural attitude toward using a technology/system. In their longitudinal study, Ventakesh and Davis (2000) provide support for the significant positive relationship between usefulness and behavioural intention in voluntary settings.

The effect of perceived usefulness on knowledge sharing has been previously mentioned by Information Systems scholars. He and Wei (2009) develop a knowledge sharing model in which the influence of both knowledge contribution and knowledge seeking beliefs on attitude is discussed. In accordance with the results from a web-based community, they argue that perceived usefulness has a significant positive relationship only with knowledge seeking attitude. The impact of perceived usefulness on web-based knowledge sharing in discussion boards is noted to be critical by Lee, Cheung, Lim, and Sia (2006). Li (2010) examines the impact of performance expectancy on knowledge sharing contribution and consumption in a cross-cultural context of virtual communities of practice and suggests a strong positive relationship. Sharrat and Usuro (2003) propose that perceived usefulness majorly influences knowledge sharing contribution in online communities and communities of practice. Yu, Lu, and Liu (2010) report the important determining effect of usefulness on knowledge sharing behaviour in weblogs.

As further explained in the methodology section, both commenting and social bookmarking will be modeled in terms of perceived usefulness of social bookmarking and commenting (hereafter referred to as bookmarking perceived usefulness and commenting perceived usefulness). We hypothesize as follow:

*H6. Perceived usefulness of social bookmarking positively impacts attitude toward sharing knowledge in Web 2.0 online communities.*

*H7. Perceived usefulness of commenting positively impacts attitude toward sharing knowledge in Web 2.0 online communities.*

**3.2.3 Web 2.0 Online Communities Contextual Factors**

As explained in section 3.1.3, user anonymity and community type are salient Web 2.0 online communities contextual factors. In this section, two constructs that are believed to have effects on the antecedents of knowledge sharing attitude in Web 2.0 online communities in the proposed knowledge sharing model: user anonymity and community type.

**3.2.3.1 User Anonymity**

Social networks are Web 2.0 online communities that bring individuals together. Social networks such as Facebook allow users to create a profile on which personal information of members is shared. A key difference between social networks types is in membership regulation. Most online information sharing communities have to deal with the notion of user anonymity. Many social networks require users to register with real names; others allow members to be anonymous by selecting random IDs. Cnet–a technology related community–is an example of a Web 2.0 online community that allows users either to be verified with real names or remain anonymous through anonymous user IDs.

User anonymity–as a deindividuated state where self-awareness is decreased (Diener, 1980)–can be further explained through the deindividuation concept. The Social Model of Deindividuation Effects (SIDE) explains the effects of user anonymity on the salience of social identity and social behaviour of computer-mediated communication in groups (Lea and Spears, 1991; Reicher, Spears, and Postmes, 1995). SIDE proposes user anonymity affects the balance between personal and social indentity, which consequently affect group behaviour (Spears, Lea, Postmes, and Wolbert, 2011). SIDE is further categorized into cognitive and strategic perspectives. Cognitive SIDE suggests that user anonymity may decrease the salience of social identity in a group when a sense of groupness exists and members are identifiable by a shared characteristic(s) or shared identity (such as disabilities) (Postmes et al., 1998). In other words, user anonymity can amplify individual independence when no shared identity is available (Postmes et al.; 2001). Strategic SIDE proposes that user anonymity of group members can have consequences on in-group behaviour (Spears and Lea, 1994). Strategic effects of user anonymity can include less support from group members (in this context, sharing of information) and less commitment to the group (Reicher et al., 1995).

Based on the above discussion, we believe that user anonymity will have an effect on three antecedents of knowledge sharing attitude. The more people perceive to be unidentified in an online community, the less they perceive reputation as a personal outcome expectation of knowledge sharing. When people are anonymous through the use of user IDs, reputation would not be an individual motivation since the actual identity is hidden and higher image means higher status of an anonymous ID, not an actual identity. Moreover, when users are aware of others’ identities, they are more likely to return the favor and reciprocate knowledge. Finally, when individuals are hidden behind user IDs, they have less information about others and thus, feel less identification with the online community. Thus, we hypothesize:

*H8a. User anonymity is negatively associated with identification in Web 2.0 online communities.*

*H8b. User anonymity is negatively associated with reciprocity in Web 2.0 online communities.*

*H8c. User anonymity is negatively associated with reputation in Web 2.0 online communities.*

**3.2.3.2 Community Type**

Most of the literature on online communities focuses on communities of practice (for example, Wasko and Faraj, 2005) and neglects the role of the type of community on knowledge sharing. As an exception, Ma and Agarwal (2007) address information exchange and communities of relationship as the antecedents of knowledge contribution. Ma and Agarwal (2007) only test perceived identity verification as the antecedent of knowledge contribution in online communities; however, their study calls for future research to investigate other antecedents of knowledge sharing considering the role community type.

Based on Armstrong and Hagel (2000), this study conceptualizes two types of online communities: communities of interest and communities of relationship. Communities of interest (information exchange communities) bring together users to interact on specific topics. The purpose of these communities is to gather individuals who share interest in various topics such as professional careers (for example LinkedIn) and advance technologies (such as Cnet).

Communities of relationship (emotional support communities) centre on building social support and personal connections/experience. These relations are considered to be general and not for a specific purpose such professional relationships in LinkedIn. A perfect example of communities of relationship is Facebook on which individuals focus on relationships and supportive ties rather than emphasizing specific topics or professional practices.

We argue that community type will have an effect on three antecedents of knowledge sharing attitude. In particular, it is stated that in communities of relationship, the degree of enjoyment in helping others and identification are higher. In Web 2.0 online communities and specifically, communities of relationship, reputation is not expected to be a personal outcome expectation and a motivational factor. Thus, we hypothesize:

*H9a. Web 2.0 online communities of relationship have a stronger positive effect on identification than Web 2.0 online communities of interest.*

*H9b. Web 2.0 online communities of interest have a stronger positive effect on reputation than Web 2.0 online communities of relationship.*

*H9c. Web 2.0 online communities of relationship have a stronger positive effect on enjoyment of helping others than Web 2.0 online communities of interest.*

**Chapter 4: Methodology**

This chapter outlines the research methodology used in the current study. The instrument design, data collection procedure and operationalization of constructs, data analysis method and sample size requirements, and the results of the pilot test are presented.

**4.1 Instrument Design**

The proposed research model is empirically operationalized and tested through a factorial design experiment and a survey involving individuals using Web 2.0 online communities. A two by two factorial design as demonstrated in Table 4.6 is applied to test the previously explained hypotheses.

**Table 4.6 Factorial Design for Two Categorical Constructs**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Factor 1: Community type** | |
| Level 1:  Community of interest | Level 2:  Community of relationship |
| **Factor 2:**  **User anonymity** | Level 1: Identified | LinkedIn | Facebook |
| Level 2: Anonymous | Cnet | N/A |

The effects of user anonymity and community type are at the core of this study. Both of these constructs are dichotomous categorical constructs with two levels. Based on the previous explanation in section 3.2.3, two types of communities are selected to test the proposed research model: communities of relationship and communities of interest.

User anonymity is another dichotomous categorical constructs and which consists of two levels: anonymous and identified. Although as per the conceptual discussion in section 3.2.3 there are different types of user anonymity, the current research employs user anonymity as a dichotomous construct as other conceptualizations lack a measurement scale.

This research defines a community member as identified if his/her full real name is disclosed on the community website. Similarly, if one uses an ID (also called nickname, screen name, or username) on the community website, he/she is considered anonymous. To better reveal the effect of user anonymity in the proposed research model, users were also asked their perceptions of user anonymity on the social network under study which is further analyzed in post-hoc analysis in section 5.9. Three websites are selected to represent the factorial design cells depicted in Table 4.6. Since members on almost all of communities of relations (for example, Facebook, Orkut, and Goolgle+) are identified based on the provided definition, the anonymous community of relationship cell cannot be empirically tested. Facebook (www.facebook.com) represents a community of relationship on which members are mostly identified. LinkedIn (www.LinkedIn.com) serves as a community of interest on which members are identified. Cnet represents a community of interest on which members are mostly anonymous. Sections 4.1.1 to 4.1.3 briefly describe those three communities.

**4.1.1 Facebook**

Facebook is the largest social network website. Founded in 2004, it fast became the most popular online social network with more than 1.15 billion members in November 2013 (newsroom.fb.com). The main purpose of Facebook as a community of relationship is to enable individuals to stay in touch with each other. Facebook requires members to register with their real identity. Since its creation, Facebook has had social, technological, and political impacts in many levels (For example, Charnigo and Barnett-Ellis, 2013; Cheung, Chiu, and Lee, 2011; Brodzinsky, 2008; ABC News, 2007).

Facebook features two main environments for users. The profile environment on which members can enter their personal basic information such as location, job and academic history, as well as personal photos, and list of friends. Other information including favorite books, films, places, and music are also provided on one’s profile. Additionally, this environment contains a section called ‘timeline’ on which users’ updates (status, photos and videos, places check-in, and life events) can be added and seen by individuals (friends) whom the profile’s owner is connected to. The second environment is called ‘home’ on which a collective of friends’ updates can be reached and sorted based on ‘top stories’ or ‘most recent’ updates. Members are able to comment on others’ updates. Other features of Facebook include managing events, groups, notes, and advertisements. As explained in section 3.1.4, bookmarking and commenting are available on Facebook. Members can bookmark a post on Facebook either by using a bookmarking feature (described in section 3.1.4) on source websites or just simply copy and paste the URL of the source webpage on to Facebook. Through bookmarking a new post, users can also add tags using hashtags. One can click on a tag created by others to see a list of all previous post related to that specific tag. Facebook allows members to search using keywords on the top of the home page. Aside from the environments explained above, users may also become a fan of specific ‘Facebook pages’ by ‘liking’ those pages. Facebook pages’ purpose is to update members on news about a person/group (for example a celebrity), association (such as National Geography), or a business. Facebook members are also technically empowered to create/join public groups or join private groups by invitations. Normally, users can post bookmarks and comment on posts on Facebook fan pages or groups as well. Figure 4.8 shows the TED (Technology, Entertainment, Design conferences) Facebook page.



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**Figure 4.8 TED Conferences Facebook Page**

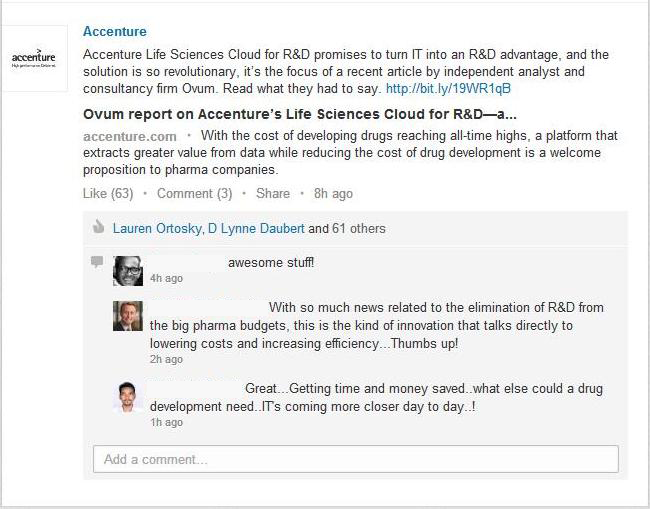
**4.1.2 LinkedIn**

Founded in 2002, LinkedIn is the largest social network website for professional occupations. With about 225 million members and 70 monthly North American unique users (as of September 2013), LinkedIn offers career networking building services in 20 languages (press.linkedin.com/about). Members are provided services such as job seeking, establishing contact networks, and joining professional communities. LinkedIn applies a gated-access approach through which contacting a professional requires an existing relationship. Members are allowed to publish content on their homepage. One can share content on his/her page by using the LinkedIn bookmark icon that is on many websites. Figure 4.9 shows how one is able to bookmark a BBC news page to LinkedIn. Where available, clicking the LinkedIn button opens a new window on which one can change the title/description and add tags and configure the privacy setting for the bookmark. Unlike Facebook, currently LinkedIn only allows connections to be used as tags. Since not all websites (for example news websites) provide a LinkedIn connection, another way of bookmarking is to copy and paste the URL on one’s LinkedIn homepage.

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**Figure 4.9 Bookmarking Content on LinkedIn (source: www.bbc.com)**

LinkedIn enables members to join various groups based on their career interests through which they can be introduced to new businesses and professionals. In addition to job listings and search, one can use LinkedIn to embed personal websites (such as blogs) to his/her page and share updates with connections (Figure 4.10). The content being published or bookmarked on LinkedIn is focused on members’ common interests in job-related technological, social, political, and environmental subjects which directly or indirectly influence job markets. Thus, LinkedIn is considered to be a community of interest (information exchange community). To become a member, individuals have to register with their real identity information.

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**Figure 4.10 Commenting on LinkedIn (source: Accenture LinkedIn page)**

**4.1.3 Cnet**

Cnet (c|net) is a Web 2.0 media website that publishes technology-related articles, news, reviews, and podcasts. Founded in 1994, it originally produced content for television and radio. Preceding tech media such as Engadget and Gizmodo, recently Cnet is ranked 95 among most viewed websites in 2013 (www.alexa.com). In Canada, Cnet is the 78th ranking website with highest yearly traffic. Forty percent of all Cnet viewers are North Americans ([www.alexa.com/siteinfo/Cnet.com](http://www.alexa.com/siteinfo/cnet.com)). Figure 4.11 shows technology-related websites search interest on Google during 2011 to 2014 (The numbers on the graph reflect how many searches have been done for a particular term, relative to the total number of searches done on Google over time. They don't represent absolute search volume numbers, because the data is normalized and presented on a scale from 0-100). Cnet has the highest search interest on Google for media/technology followed by Wired, Pcworld, and Engadget.

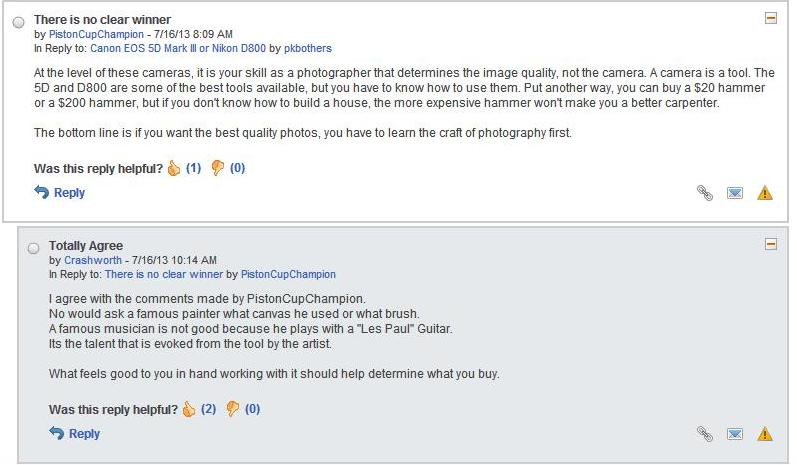
**Figure 4.11 Media/technology-related Websites Average Search Interest 2011-2014**

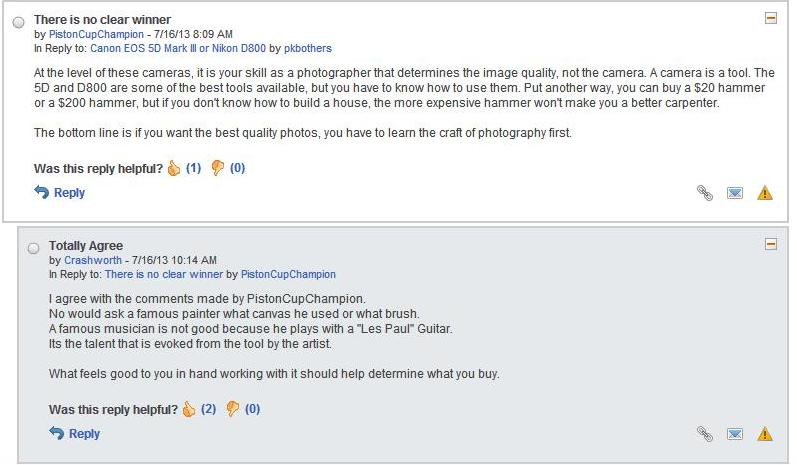
**(Source: www.google.com/trends)**

Cnet is divided into seven sections. The reviews section of Cnet publishes over 4,300 product (mainly consumer electronics) analyses every year. The news section shares frontline technological reports. The ‘downloads’ section generates over 3.5 million downloads (mostly software) yearly (www.Cnet.com). The ‘how to’ section offers assorted product tutorials. Cnet TV provides on-demand videos and ‘first-looks’ at consumer products. In addition to advertising, the Cnet business model contains revenue generation through the deals section. Most essential to members’ communication, is the forums section.

Individuals can register on Cnet and engage in forum discussions spanning over diversified hardware, software, digital media, web development, manufacturers, electronics, and internet services topics. As of October 2013, there are about 410,000 active and closed discussions in forums section, which makes Cnet the largest technology-related forum-enabled website (www.Cnet.com). Figure 4.12 presents a sample bookmark post and related comments. Although currently embedded bookmarking (like Facebook and LinkedIn) is not available for Cnet on many websites, Cnet members can always copy and paste the content from the source website to a Cnet forum discussion page. Similarly, tagging is not enabled in forums. Since Cnet members publish and share ideas around shared interests, Cnet can be studied as an information exchange community (community of interest). Except for professional reviewers, most Cnet members use a user ID which makes them anonymous on the website.



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**Figure 4.12 Bookmarking and Commenting on Cnet Forums (source: www.cnet.com)**

**4.2 Data Collection**

To empirically test the proposed model of this study (Section 3.2), a survey method is applied to collect data for analysis. H. A. Simon–notable Nobel Prize winner economist and sociologist–believes that knowledge production excessively depends on techniques and instruments for collecting and analyzing data (Simon, 1980). For years it has been established that applying surveys as instruments to collect psychological data could positively unite theoretical propositions and objective results (Mitchell, 1985). Surveys are noted to be a common approach for data collection (Webster and Trevino, 1995). In the context of the Management Information Systems discipline, whenever sample size requirements are met, surveys are advocated to be useful in answering ‘why?’, ‘how?’ and ‘how many?’ regarding a phenomena (Pinsoneault and Kraemer, 1993). When surveys are well-defined and followed closely, valid and easily interpretable data is anticipated (Pinsoneault and Kraemer, 1993). In their MIS Quarterly paper, Newsted and Huff (1998) promote the practicality of surveys as easy to administrate, allowing generalizability, predicting behaviour instruments. The current study utilizes an online survey to collect the required data for model validation including constructs items, demographics, control variables, and additional multiple-choice and open-ended question. The rest of this section explains the data collection procedure, measurement items for constructs operationalization, Fuzzy Analytical Hierarchy Process survey, requirements for participants, pilot test completion, and research ethics requirements.

**4.2.1 Data Collection Procedure**

A survey (three versions: one for Facebook; one for LinkedIn; one for Cnet) was designed to address the hypotheses posed by the proposed model for each website. Using Limesurvey–an open-source online survey application (www.limesurvey.org)–hosted on a server at the DeGroote School of Business. The survey was designed in six parts. Demographic questions were gathered in the first part. Second, questions regarding the Internet and specifically the particular website usage (including bookmarking and commenting) were asked. Participants’ perceptions on user anonymity were collected in the third part. Next, items regarding social antecedent constructs of the model were collected. Part five consisted of questions regarding technical antecedent constructs of the research model. Finally, a few multiple-choice questions and an open-ended one were added to provide further insights in a post-hoc analysis (section 5.9). Except for some different wordings in a couple of questions with respect to the context of the website being studied (Facebook, LinkedIn, and Cnet), the three surveys were designed consistently with the same questions. Each survey took about 20 to 25 minutes to complete by a respondent. Prior to answering the questions, participants were required to read and agree to a consent form (Appendix 4) describing the purpose of the research, the procedure involved, potential benefits and risks, confidentiality, withdrawal information, and researchers’ contact information. A tutorial page was created to ensure participants had a consistent understanding of the terms being studied in the surveys. Definitions of the terms ‘social network’, ‘social bookmarking, ‘tag’, and ‘commenting’ were also included in the questions where they appeared in case respondents did not carefully go through the tutorial.

**4.2.2 Measurement Instrument**

Based on the research model depicted in Figure 3.7, the questions related to the constructs can be divided to three groups: items measuring the attitude towards knowledge sharing, items measuring the social antecedents of knowledge sharing attitude, items measuring technical antecedents of knowledge sharing attitude. All the latent reflective constructs studied here are entities that are measurable with a series of positively correlated items. The technical antecedents (Web 2.0 artifacts of social bookmarking and commenting) are measured in terms of perceived usefulness. Coming from TAM, perceived usefulness is an acceptable measure when studying users’ adoption to new technology (Davis, 1989). The two Web 2.0 online community context constructs (community type and user anonymity) were both dichotomous categorical constructs (communities of interest or communities of relationship for community type; anonymous or identified for user anonymity). All the reflective constructs were drawn from credible previously highly cited references for scale development. Borrowing from the extant literature in social capital theory, Theory of Reasoned Action, knowledge sharing, and technology adoption, definitions of the constructs are cited in Table 4.7. Table 4.8 presents the items for the research constructs of knowledge sharing attitude, social and technical antecedents. Table 4.7 shows the items for the Facebook survey. The other two surveys have similar items appropriately contextualized for their social network

**Table 4.7 Research Model Constructs Definitions**

|  |  |  |
| --- | --- | --- |
| **Construct** | **Definition** | **Reference(s)** |
| Knowledge Sharing Attitude | The degree to which users possess positive or negative feeling about knowledge sharing. | Fishbein and Ajzen (1975), Ajzen and Fishbein (1980), Bock et al., 2005; Chow and Chan (2008) |
| Reputation | The degree to which users believe that sharing knowledge would enhance their status. | Wasko and Faraj (2005), Moore and Benbasat (1991), Kankanhalli, Tan and Wei (2005) |
| Reciprocity | The degree to which users believe that their relationships in an online community is fair with mutual benefits. | Wasko and Faraj (2005) |
| Identification | The degree to which users feel they belong to the community. | Chiu et al. (2006); Nahapiet and Ghoshal (1998) |
| Enjoyment in helping others | The degree to which users enjoy helping others through knowledge sharing beyond personal gains. | Kankanhalli et al. (2005), Wasko and Faraj (2005) |
| Engagement | The degree to which users experience perception of involvement. | Webster and Ho (1997), Webster and Ahuja (2006) |
| Perceived usefulness of social bookmarking; perceived usefulness of commenting | The degree to which users believe using a Web 2.0 artifact would enhance their performance of social interaction and information sharing. | Davis (1989) |

**Table 4.8 Measurement Items for Variables (Facebook)**

| **Construct** | **Items** |
| --- | --- |
| Knowledge sharing Attitude **(KS)**  (Bock et al., 2005) | **KS1**- My knowledge sharing with other Facebook members in my network on Facebook is good.  **KS2**- My knowledge sharing with other Facebook members in my network on Facebook is harmful.  **KS3**- My knowledge sharing with other Facebook members in my network on Facebook is an enjoyable experience.  **KS4**- My knowledge sharing with other Facebook members in my network on Facebook is valuable to me.  **KS5**- My knowledge sharing with other Facebook members in my network on Facebook is a wise move. |
| Identification **(I)**  (Chiu et al., 2006) | **I1**- I have a sense of belonging to Facebook.  **I2**- I have the feeling of togetherness/closeness on Facebook.  **I3**- I really care about Facebook. |
| Reciprocity **(RE)**  (Wasko and Faraj, 2005) | **RE1**- I know that other Facebook members in my network will help be by sharing their knowledge, so it is only fair that I help them by sharing my knowledge.  **RE2**- I trust that other Facebook members in my network would help me by sharing their knowledge if I were in a situation in which I need their help. |
| Reputation **(R)**  (Wasko and Faraj, 2005) | **R1**- I earn respect from other Facebook members in my network by sharing my knowledge.  **R2**- I feel that sharing knowledge with other Facebook members in my network improves my status on Facebook.  **R3**- Sharing knowledge with other members of Facebook in my network improves my image on Facebook. |
| Enjoyment in helping others **(EH)**  (Wasko and Faraj, 2005) | **EH1**- I like helping other Facebook members in my network through sharing my knowledge.  **EH2**- I enjoy sharing my knowledge with other Facebook members in my network.  **EH3**- It feels good to help other Facebook members in my network through sharing my experiences/knowledge. |
| Engagement **(E)**  (Webster and Ahuja, 2006) | **E1**- This website/community keeps me absorbed.  **E2**- This website/community excites my curiosity.  **E3**- This website/community is engaging.  **E4**- This website/community is inherently interesting. |
| Web 2.0 artifact perceived usefulness  **(PU)**  (Davis, 1989) | **BPU1**- Bookmarking improves my knowledge sharing experience on Facebook.  **BPU2**- Bookmarking enhances the effectiveness of knowledge sharing on Facebook.  **BPU3**- I find bookmarking to be useful in knowledge sharing on Facebook.  **CPU1**- Commenting improves my knowledge sharing experience on Facebook.  **CPU2**- Commenting enhances the effectiveness of knowledge sharing on Facebook.  **CPU3**- I find commenting to be useful in knowledge sharing on Facebook. |

There were a series of control variables used in this research. To fully understand the statistical population characteristics, age and level of education data were gathered. Additionally, questions were asked as to the respondents’ Internet usage frequency and purpose, perceived type of membership on the website, and the frequency of bookmarking and commenting. Table 4.9 presents questions related to the above control variables for the Facebook survey. The two other surveys (LinkedIn and Cnet) contain the same questions. The complete survey (for Facebook) can be found in Appendix 3.

**Table 4.9 Internet Usage, Perceived Type of Membership, and Perceived Frequency of Bookmarking/Commenting Questions (Facebook)**

|  |
| --- |
| **Internet usage frequency and purpose questions** |
| I use the Internet \_\_\_ per week.  1. Less than 1 hour 2. 1 to 5 hours 3. More than 5 but less than 10 hours  4. More than 10 but less than 20 hours 5. 20 hours or more |
| I \_\_\_ use the Internet to search for information.  I \_\_\_ use the Internet for social networking. \*  I \_\_\_ use the Internet for information exchange. \*\*  1. Never 2. Rarely 3. Sometimes 4. Frequently 5. Very frequently  **\***An online social network is a website, such as Facebook, that allows people to connect.**\*\*** Information exchange is the dissemination of information between individuals/groups. |
| **Perceived type of membership questions** |
| I consider myself an \_\_\_ member on Facebook.\*  1. Active 2. Observant  **\***An active member is defined as a member who posts bookmarks, comments on bookmarks, or both. An observant member is defined as a member who browses through posts (bookmarks), but does not contribute by posting bookmarks or commenting. |
| **Perceived bookmarking and commenting use questions** |
| How often do you post a bookmark on Facebook?\*  How often do you post a comment on a Facebook bookmark posted by other members?\*\*  1. Once a day 2. Multiple times a day 3. Once a week  4. Less than once a week 5. Once a month 6. Less than once a month  I usually post comments \_\_\_.  1. On bookmarks posted by myself 2. On bookmarks posted by others  3. On bookmarks posted by myself or others  **\***Bookmarking, in this case, is the process of posting a link on your Facebook page from another website. In other words, Bookmarking is the process of posting a link to a target website. The target website is where one has an account/profile such as Facebook.  **\*\*** A comment is a remark related to a bookmark posted by user. |

Tagging, as discussed in section 3.2.2, is an optional part of bookmarking. It not only defines the semantic perimeters of the subject at hand (being bookmarked), but produces a network of vocabulary for user search and web analysis. Tagging is available on Facebook for both members of the network and subjects. On LinkedIn, it is only possible to tag individuals on one’s network. On Cnet, tagging is not available. This contrast exists between many other online communities. Table 4.10 presents questions related to tagging for Facebook survey. The second question in Table 4.10 is the same for the other two surveys (LinekedIn and Cnet).

**Table 4.10 Tagging Questions (Facebook)**

|  |
| --- |
| **Tagging Usage Questions** |
| I \_\_\_ add tags (Hashtags #) when posting a bookmark on Facebook.\*  1. Never 2. Rarely 3. Sometimes 4. Frequently 5. Very frequently  I \_\_\_ use tags when I am searching for a topic on a website where tags are available  1. Never 2. Rarely 3. Sometimes 4. Frequently 5. Very frequently  **\***A tag is a piece of information assigned to a post bookmarked by a user. Tags act as identifiers for posts. In other words, they offer the reader an idea of the context and content of posts. For example a post on Facebook can be tagged "politics", "congress", "democrats", "media reform". Tags help to describe a post and allow it to be found again by browsing or searching. |

For the purpose of our post-hoc analysis and as a manipulation check, perceived user anonymity (the degree to which users believe the website allows them to be anonymous) was asked from participants. Participants were also requested to express their opinion about the nature of the community (website)–community of relationship or community of interest. Table 4.11 presents the four questions regarding the perceived community type and perceived user anonymity for Facebook. The other two surveys contain similar questions.

**Table 4.11 Perceived Community Type and Perceived User Anonymity Questions (Facebook)**

|  |
| --- |
| **Perceived community type questions** |
| I believe Facebook is better for emotional support rather than information exchange, so I believe it is a community of relationship than a community of interest.\*  1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Neutral 5. Somewhat agree  6. Agree 7. Strongly agree 8. Not applicable/unsure  **\***A community of interest is a type of community centred on users' information exchange on different topics. A community of relationship is a type of community centreed on users' shared experience and emotional support. |
| **Perceived User Anonymity questions** |
| I use \_\_\_ on my Facebook profile?  my full real name (for example, John Smith) 2. my real name my partial real name (for example, John1982 or Montreal3smith) 3. an obvious username (for example, catlover or filmnerd) 4. a partially obvious username (for example, psps-nerd) 5. a non-obvious username (for example, btcoo99 or ggg@tp!)  I use \_\_\_ as my Facebook profile picture.  1. use my personal photo 2. use a fake photo (for example a borrowed celebrity photo or an inanimate object) 3. do not have a photo  I believe that other members of Facebook to whom I am connected, perceive me as being identifiable (not anonymous).  I perceive Facebook members whom I am connected to as being identifiable (not anonymous).  1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Neutral 5. Somewhat agree  6. Agree 7. Strongly agree 8. Not applicable/unsure |

As explained in section 2.1, the definition of knowledge is not unanimously agreed upon among researchers. Likewise, the practical definition of knowledge is not yet collectively acknowledged by scholars in the field of Information Systems. To better understand and analyze what constitutes knowledge from participants’ points of view, 8 questions were included in the survey (Table 4.12). The last of these questions was open-ended and directly asked participants to describe their perception of knowledge.

**Table 4.12 Questions Related to Knowledge (Facebook)**

|  |
| --- |
| **Knowledge-related questions** |
| Posting a bookmark in isolation of any comments from the bookmarker or other users is not considered sharing of knowledge.  When I think of a bookmark, I feel that all comments taken together create knowledge that is different from each comment individually.  A pop singer's new concert information has been posted as a bookmark. Together with its comments, I consider this to be knowledge.  A new camera model specification has been posted as a bookmark. Together with its comments, I consider this to be knowledge.  A list of 2013 Academy Awards winners has been posted as a bookmark. Together with its comments, I consider this to be knowledge.  A new report on a type of blood cancer has been posted as a bookmark. Together with its comments, I consider this to be knowledge.  I apply the knowledge that has been shared on Facebook in practice.  1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Neutral 5. Somewhat agree  6. Agree 7. Strongly agree 8. Not applicable/unsure  Please define what knowledge means to you in a sentence or two. |

**4.2.3 Fuzzy AHP Survey for Prioritizing Web 2.0 Artifacts**

As previously described in section 3.1.4, a Fuzzy AHP survey was designed to determine the selection of Web 2.0 artifacts used in this study. After careful consideration, Chang’s (1996) Fuzzy AHP methodology was selected (Appendix 1) as his method has been successfully applied in various context (Kwong and Bai, 2002; Kahraman, Cebeci, and Ulukan, 2003) and is an acceptable and previously used Fuzzy AHP approach for prioritization (Chan and Kumar, 2007; Kulak and Kahraman, 2005). A pen-and-paper survey was conducted for 20 Computer Science and Business Administration graduate students. The results (Appendix 2) shows that bookmarking and commenting are the two most salient Web 2.0 artifacts and thus, selected as Web 2.0 constructs which represent the technical antecedents of knowledge sharing attitude in online communities. Prior to conducting the survey, McMaster Research Ethics Board (MREB) cleared the study and its questionnaire.

**4.2.4 Survey Administration and Requirements for Participants**

Participants for the full study research were recruited via ResearchNow. ResearchNow is a market research firm that provides survey samples on national and international populations. As an international online fieldwork and panel specialist company, ResearchNow has approximately half a million Canadians in its market research pool. Active in 29 countries, the company offers services in sampling, targeting, and recruitment in various industries. Participants were contacted by ResearchNow through email which included a link to the online survey hosted by the DeGroote School of Business. Participants were required to be over 18 years old to enter the survey and had to agree to the consent form to proceed. Moreover, for each of the three surveys, respondents had to be a member on the website (Facebook, LinkedIn, and Cnet. Due to ResearchNow’s sampling characteristics, utilizing their research pool can increase the generalizability of the outcomes.

**4.2.5 Pilot Test and Research Ethics**

Thirty participants from the DeGroote School of Business PhD and MBA programs filled out the survey as a pilot test with 18 completed responses (Facebook survey).Results from the pilot study resulted in some slight modifications in the phrasing of some of the survey instrument questions with no major changes in the design of the study procedures.

**4.3 Data Analysis**

This section describes the data analysis elements and procedures applied in the full study. To empirically test the research model in section 3.2, the following principles are explained in detail: Common Method Variance, model validation, impact of control variables, post-hoc analysis, sample size requirements, and pre-test results.

**4.3.1 Common Method Variance**

Common Method Variance (CMV) refers to the variance that is attributed to the measurement method rather than the research model, constructs, and the relationship among them (Podsakoff P.M., Mackenzie, Lee, and Podsakoff P.N., 2003; Straub, Boudreau, and Gefen, 2004). Albeit the argument that CMV cannot cause significant differences in IS research results (Malhorta, Kim, and Patil, 2006), there is evidence that CMV could be a threat to the validity of research results (Sharma, Yetton, and Crawford, 2009). Podsakoff et al. (2003) suggest that changing the order of questions in the survey could decrease the possibility of CMV. Indeed, presenting endogenous variables questions before exogenous variables questions could lessen the threat of CMV. Additionally, it is advised that ensuring participants’ anonymity could lighten the negative effect of CMV (Podsakoff et al., 2003). In order to reduce the threat of CMV in the current study, both of these suggestions were taken into account. First, the questions related to knowledge sharing attitude (endogenous construct) were presented to participants prior to the questions related to proposed social and technical antecedents (exogenous constructs). Second, the data collection procedure was designed in a way that respondents’ anonymity was protected.

In addition to the aforementioned considerations, an assessment of the impacts of CMV on the research findings is highly recommended (Chin, Thatcher, and Wright, 2012). Among the various techniques highlighted in the previous studies, two common methods were selected to test the presence of CMV. Herman’s one factor test and a unmeasured latent construct method were used and details are provided in section 5.6 (Podsakoff et al., 2003; Liang, Saraf, Hu, and Xue, 2007).

**4.3.2 Research Model Validation**

The data analysis of the proposed research model in this study was conducted applying Structural Equation Modeling (SEM). Through SEM–a second generation analysis technique–one is able to perform measurement and structural model analyses simultaneously (Gefen, Straub, and Boudreau, 2000). The Partial Least Squares (PLS) method was selected as an SEM technique for the current study. The following reasons justify the use of PLS. First, PLS offers accurate predication capability (Fornell and Cha, 1994). Such predictive direction was used here to anticipate knowledge sharing attitude in online communities. Second, compared to covariance-based methods (Such as AMOS and LISREL), PLS distributional assumptions are more flexible, which in turn could result in more reliable findings (Gefen et al., 2000). In other words, no distributional assumptions are required for PLS which is advantageous during data analysis (Teo, Oh, Liu, and Wei, 2003). Third, PLS generally requires a smaller sample size to validate models than other SEM techniques. Fourth, it is argued that PLS is a suitable method when the research subject being investigated is relatively new and still in development (Chin and Newsted, 1999; Chin, 1998a). Item loadings, internal consistency and discriminant validity of the measurement model are analyzed in PLS (Gefen et al., 2000). PLS is widely accepted and applied technique in IS and particularly in Knowledge Management (for example, Bock et al., 2005; Wasko and Faraj, 2005; Ma and Agarwal, 2007).

PLS was administrated using a two-step approach suggested by Chin (2010). The First step is to evaluate the measurement model using reliability and validity measures (Table 4.13). The second step is to evaluate the structural model. Table 4.14 presents a set of criteria used for the second step of applying PLS. SmartPLS 2.0 M3 (www.smartpls.de) was used to conduct the PLS analyses for this study.

**Table 4.13 Measurement Model Evaluation Criteria**

|  |  |
| --- | --- |
| **Criteria** | **Reference(s)** |
| **Construct Reliability**: the degree to which a measure gives consistent result. | Straub et al. (2004) |
| Cronbach’s α > 0.70 | Cronbach (1951), Nunnally and Bernstein, (1994) |
| Composite Reliability (CR) > 0.70 | Nunnally and Bernstein (1994) |
| Average Variance Extracted (AVE) > 0.50 | Chin (1998b), Fornell and Larcker (1981) |
| **Item Reliability:** the degree to which an item is sufficiently measuring its latent construct. | Chruchil Jr. (1979) |
| Correlated Item – Total Correlation > 0.40 | Churchil Jr. (1979), Doll and Torkzadeh (1988) |
| Item Loading > 0.50 | Chin (1998), Gefen et al. (2000) Hair, Ringle, and Sarstedt (2011) |
| **Discriminant Validity**: is an implication whether that concepts which are modeled to be unrelated, are indeed, unrelated | Campell and Fisk (1959), Chin, 2010 |
| The square root of the AVE of each  construct must be greater than correlations of that construct with other constructs | Chin (1998b) |
| Each measurement item should have a  higher loading on its corresponding construct than on other constructs | Chin (1998b) |

**Table 4.14 Structural Model Evaluation Criteria**

| **Criteria** | **Reference(s)** |
| --- | --- |
| PLS Path Coefficients (β) | Chin (2010a), Chin (2010b) |
| Coefficient of Determination (R2) | Chin (2010b), Falk and Miller (1992) |
| Cross-validation Correlation Coefficient/ Cross-validation redundancy (Q2) | Chin (2010b) |
| Effect Size (*ƒ*2) | Cohen (1998), Chin (2010b) |
| Model Goodness of Fit (GoF) | Meyers, Gamst, and Guarino (2006) |
| Relative Goodness of Fit | Meyers et al. (2006), Vinzi, Trinchera, and Amato (2010) |

**4.3.3 Impact of Control Variables and Post-hoc Analysis**

Various control variables will be examined for their potential effects on the model. Such control variables including age, level of education, Internet usage frequency and purpose will be analyzed in 5.8.1. Furthermore, there are additional concepts that call for post-hoc analysis, in the current study, such as the role of tags in bookmarking, perceived user anonymity, perceived community type, and perceived membership (active or observant). Additionally, the concept of knowledge will be discussed based on participants’ responses to the eight knowledge related questions.

**4.3.4 Sample Size Requirements**

Sample size determines the significance of correlations in research models. Improved statistical power can be reached through greater data collection sample size. With too small of a sample size, the correlation coefficient of relationships in the model will be of less value (Krejcie and Morgan, 1970; Goodhue, Lewis, and Thompson, 2006; Meyers et al., 2006). While there is no universal established rule for sample size requirement, the sample size required for the current research can be determined by two generally accepted rules of thumb. First, Chin (1998b) suggests that the minimum sample required in PLS is ten times the number of 1) items (formative indicators) in the most complex construct, or 2) paths leading the latent dependent construct with the most independent variables. The number of formative indicators in the most complex construct is 1 (Chin, 1998b). The dependent construct with the most independent variables is knowledge sharing attitude (7 paths leading to knowledge sharing). Thus, 70 is the minimum required sample size. The second approach argues the minimum number of participants to acquire sufficient statistical power and effect size for the relationships (Cohen, 1988). Based on the literature in Information Systems and Knowledge Sharing, the minimum number of sample size required to achieve a sufficient statistical power of 0.8, a medium effect size of 0.15, the probability level of 0.05, and with 7 predictors is 98 (Cohen, 1988, Chin and Newsted, 1999). As such, 100 participants were targeted for each treatment (total of 300 participants).

**4.4 Pre-test Study Results**

Prior to collecting data from the required number of participants, a pre-test was conducted for 30 participants of each group (90 participants in total) to check the overall validation of the proposed model. The pre-test was administrated by ResearchNow in December 2013. There were no outliers found. The cross-sectional construct reliability and validity were tested by SmartPLS (Table 4.15). In terms of AVE, the results pass the required minimum of 0.5 (Chin, 1998b). The reliability of the constructs (except knowledge sharing) was confirmed (Nunnally and Bernstein, 1994). The Cronbach’s alpha for knowledge sharing was very close to the minimum acceptable value of 0.7; thus, achieving a reliable construct via a larger sample of respondents was deemed to be promising.

**Table 4.15 Pre-test Construct Validity and Reliability Results**

| **Construct** | **AVE** | **Cronbach’s α** |
| --- | --- | --- |
| KS | 0.76 | 0.68 |
| I | 0.66 | 0.71 |
| RE | 0.79 | 0.84 |
| R | 0.74 | 0.79 |
| EH | 0.77 | 0.82 |
| E | 0.68 | 0.73 |
| BPU | 0.77 | 0.82 |
| CPU | 0.76 | 0.81 |

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others; E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

**Chapter 5: Data Analysis and Results**

This chapter covers data collection, data screening (treatment) results and demographics of respondents, descriptive statistics, the results for the measurement and structural models, an assessment for Common Method Variance applied in this study, and the results of the post-hoc analyses.

**5.1 Data Collection**

Data collection was administrated through ResearchNow–a market research firm–during December 2013. Participants from ResearchNow panels were invited by email to complete the survey. As described in section 4.1, three websites were selected to represent the two by one research design of this study. For the Facebook survey 301 responses were collected, from which 129 were completed. While 226 and 234 responses were collected for the LinkedIn and Cnet surveys respectively, from which 178 and 135 were completed. Consequently, acceptable completion rates of 43%, 78%, and 58% were secured. ResearchNow does not provide information on the size of the research pool it uses. As such, a response rate cannot be calculated. ResearchNow panel population are managed to be randomized on different criteria such as age, gender, and geographical location. A series of demographic parameters were defined for age, gender, and education for each of the three surveys. For age, no more than 45% of the participants were older than 40 years. No more than 60% of each gender was allowed to complete the survey and no more than 50% were allowed to have a high school diploma or lower. Within these sampling parameters, the random sampling conducted by ResearchNow enhanced the generalizability of the study (Newsted, Huff, and Munro, 1998).

**5.2 Data Screening**

As discussed earlier in section 4.3.4, the minimum sample size requirement for each survey was 100. The number of surveys completed for each website was higher than the sample size requirement; however, some responses were eliminated from the analysis, as outlined below.

The value of one negatively worded question (KS2 in section 4.2.2) was used to decrease the Common Method Variance (Lindlell and Whitney, 2001) and diagnose inattentive respondents (Ruhi, 2010). Eight cases were identified where participants were not attentive to the negative wording of the negative question and were excluded from the study. This resulted in a total number of responses of 116, 139, and 112 for Facebook, LinkedIn, and Cnet surveys, respectively.

Next survey responses were examined to assess if any participants who completed the survey in a careless manner to quickly finish the survey. For example, one could select ‘neutral’ for all the constructs question items; hence, making a biased set of responses. Cases with indications of gaming were noted and eliminated from further analysis. Thus, the number of cases was reduced to 110, 126, and 108 for Facebook, LinkedIn, and Cnet, respectively.

Next, univariate and multivariate outliers were identified. In order to find univariate outliers, a z-test was conducted for all the variables in advance to make composite ones for each latent construct. (Tabachnik, Fidell, and Osterlind, 2001; Meyers, Gamst, and Guarino, 2012). As a result, 9 cases were identified to have z scores with extreme absolute values greater than the critical value of 3.29. Moreover, the data was examined for multivariate outliers using the Mahalanobis Distance approach (Meyers et al., 2012). Applying a chi-square test (p<.001, df=8) to 8 composite variables (knowledge sharing, identification, reciprocity, reputation, enjoyment in helping, engagement, bookmarking perceived usefulness, and commenting perceived usefulness), 7 cases appeared to have chi-square statistics greater than the critical value of 26.125 and were thus eliminated from the study. As a result, the number of cases for further analysis reduced to 106, 118, and 105 for Facebook, LinkedIn, and Cnet, respectively.

**5.3 Demographics of Respondents**

A number of demographic questions were asked from the participants. Tables 5.16 to 5.18 provide the result for participants’ gender, age, and the level of education while showing the cross-sectional total percentages. In total, 56% of participants were male. The highest male to female ratio belonged to Cnet. With regards to age, the largest age category was the 40-50 year olds. In the context of this study, Cnet had younger members comparing to Facebook and LinkedIn. One explanation for this is the subject matter of Cnet which is technology-oriented and specifically, new electronic consumer products. With respect to education level, 60% of participants were college educated, while 13% had a bachelor degree or higher. LinkedIn and Cnet members had a higher percentage of college/university educated individuals than Facebook. This is reasonable given the focus of LinkeIn.

**Table 5.16 Participants’ Gender**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Gender** | **Facebook (%)** | **LinkedIn (%)** | **Cnet (%)** | **Total (%)** |
| Female | 47 (44%) | 56 (48%) | 43 (41%) | 146 (44%) |
| Male | 59 (56%) | 62 (52%) | 62 (59%) | 183 (56%) |

**Table 5.17 Participants’ Age**

| **Age** | **Facebook (%)** | **LinkedIn (%)** | **Cnet (%)** | **Total (%)** |
| --- | --- | --- | --- | --- |
| 18-24 | 9 (8%) | 6 (5%) | 10 (9%) | 25 (8%) |
| 25-30 | 10 (9%) | 12 (10%) | 19 (18%) | 41 (12%) |
| 31-40 | 28 (27%) | 28 (24%) | 30 (29%) | 86 (36%) |
| 41-50 | 29 (28%) | 38 (32%) | 36 (35%) | 102 (31%) |
| 51-60 | 20 (19%) | 26 (22%) | 10 (9%) | 57 (17%) |
| 61+ | 10 (9%) | 8 (7%) | - | 18 (5%) |

**Table 5.18 Participants’ Education Level**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Level of Education** | **Facebook (%)** | **LinkedIn (%)** | **Cnet (%)** | **Total (%)** |
| High school | 40 (38%) | 28 (24%) | 15 (14%) | 83 (26%) |
| College diploma | 54 (51%) | 70 (59%) | 75 (72%) | 199 (60%) |
| Bachelor’s degree | 11 (10%) | 17 (15%) | 15 (14%) | 43 (13%) |
| Master’s degree | 1 (1%) | 3 (2%) | - | 4 (1%) |
| Ph.D. degree | - | - | - | - |
| Other | - | - | - | - |

In addition, participants were asked about their Internet usage frequency (hours/week) and purpose (Tables 5.19 and 5.20). Ninety four percent of participants used the target online community website 5 hours per week or less. About 2% of participants spent 10 hours or more per week on the website asked and interestingly, 11 participants spent more than 5 hours on LinkedIn per week. Ninety nine to hundred percent of participants declared that they ‘sometimes’, ‘frequent’, or ‘very frequent’ use the Internet for search, social networking, and information exchange. The results reveal that individuals on Cnet were more likely to search and exchange information than engaging in social networking, while members of Facebook and LinkedIn were expected to employ the Internet for social networking and search than exchanging information (dissemination of information between individuals/groups).

**Table 5.19 Participants’ Internet Usage Frequency**

| **Internet usage (hours/week)** | **Facebook (%)** | **LinkedIn (%)** | **Cnet (%)** | **Total (%)** |
| --- | --- | --- | --- | --- |
| Less than an hour | 61 (56%) | 50 (43%) | 70 (67%) | 186 (55%) |
| 1 to 5 hours | 38 (36%) | 55 (47%) | 33 (31%) | 126 (39%) |
| More than 5 but less than 10 | 5 (5%) | 7 (5%) | 2 (2%) | 14 (4%) |
| More than 10 but less than 20 | 1 (1%) | 6 (5%) | - | 7 (2%) |
| 20 hours or more | 1 (1%) | - | - | 1 (-) |

**Table 5.20 Participants’ Internet Usage Purpose**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Internet usage purpose** | | **Facebook (%)** | **LinkedIn (%)** | **Cnet (%)** | **Total (%)** |
| Search | Never | - | - | - | - |
| Rarely | - | - | - | - |
| Sometimes | 61 (57%) | 58 (50%) | 40 (38%) | 159 (48%) |
| Frequently | 37 (35%) | 45 (38%) | 46 (44%) | 128 (39%) |
| Very frequently | 8 (8%) | 15 (12%) | 19 (18%) | 42 (13%) |
| Social networking | Never | - | - | - | - |
| Rarely | 2 (2%) | 2 (2%) | - | 4 (1%) |
| Sometimes | 11 (10%) | 12 (10%) | 45 (43%) | 68 (21%) |
| Frequently | 74 (70%) | 76 (64%) | 51 (49%) | 201 (61%) |
| Very frequently | 20 (18%) | 28 (24%) | 9 (8%) | 57 (17%) |
| Information exchange | Never | - | - | - | - |
| Rarely | 2 (2%) | 2 (2%) | - | 4 (1%) |
| Sometimes | 58 (55%) | 46 (39%) | 28 (26%) | 132 (40%) |
| Frequently | 34 (32%) | 57 (48%) | 52 (50%) | 143 (44%) |
| Very frequently | 11 (11%) | 13 (11%) | 25 (24%) | 49 (15%) |

**5.4 Descriptive Statistics**

The descriptive statistics of the measurement items used in this study are provided in Table 5.21. The minimum item value on the Likert scale varies between 1 and 2, while the maximum value is a constant 7. The range between the minimum and maximum values of mean statistics is 0.604, while it is 0.3804 and 1.01 for standard deviation and variance, respectively. Although the PLS analysis method does not require normal distribution for data, skewness and kurtosis measures are also provided in Table 5.25. Accordingly the distributions vary from right to left skewness. Five items with skewness absolute values close to zero appeared to have symmetrical distributions around the mean. In terms of kurtosis, all the values are less than three which means the items have data with Platykurtic distributions. In other words, the values are wider spread around the mean.

**Table 5.21 Descriptive Statistic Results**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Statistic** | | | | | | | |
| N | Min. | Max. | Mean | Std. dev. | Var. | Skewness | Kurtosis |
| KS2 | 329 | 1 | 7 | 4.452 | 1.411 | 1.955 | -0.128 | -0.355 |
| KS3 | 329 | 1 | 7 | 4.479 | 1.222 | 1.483 | -0.366 | 0.439 |
| KS4 | 329 | 2 | 7 | 4.488 | 1.257 | 1.555 | 0.088 | -0.499 |
| KS5 | 329 | 1 | 7 | 4.451 | 1.384 | 1.907 | -0.044 | -0.188 |
| I1 | 329 | 2 | 7 | 4.387 | 1.106 | 1.143 | 0.077 | -0.169 |
| I2 | 329 | 1 | 7 | 4.306 | 0.985 | 0.992 | -0.362 | 0.607 |
| I3 | 329 | 1 | 7 | 4.408 | 1.307 | 1.204 | -0.939 | 1.208 |
| RE1 | 329 | 2 | 7 | 4.109 | 1.111 | 1.224 | 0.598 | -0.477 |
| RE2 | 329 | 2 | 7 | 4.305 | 1.104 | 1.119 | 0.465 | 0.603 |
| R1 | 329 | 1 | 7 | 4.433 | 1.302 | 1.802 | 0.232 | -0.505 |
| R2 | 329 | 1 | 7 | 4.682 | 1.206 | 1.501 | -0.255 | 0.103 |
| R3 | 329 | 1 | 7 | 4.822 | 1.204 | 1.544 | -0.166 | -0.277 |
| EH1 | 329 | 1 | 7 | 4.389 | 1.177 | 1.435 | -0.302 | 0.332 |
| EH2 | 329 | 1 | 7 | 4.444 | 1.311 | 1.699 | -0.576 | 0.256 |
| EH3 | 329 | 1 | 7 | 4.622 | 1.333 | 1.762 | -0.133 | 0.154 |
| E1 | 329 | 2 | 7 | 4.388 | 1.031 | 1.118 | 0.546 | 0.333 |
| E2 | 329 | 2 | 7 | 4.611 | 1.202 | 1.291 | 0.187 | -0.187 |
| E3 | 329 | 2 | 7 | 4.519 | 1.004 | 1.098 | 0.176 | 0.104 |
| BPU1 | 329 | 2 | 7 | 4.466 | 1.288 | 1.745 | 0.194 | -0.155 |
| BPU2 | 329 | 2 | 7 | 4.542 | 1.023 | 1.132 | 0.302 | -0.134 |
| BPU3 | 329 | 2 | 7 | 4.503 | 1.198 | 1.425 | -0.087 | -0.397 |
| CPU1 | 329 | 1 | 7 | 4.417 | 1.248 | 1.548 | -0.111 | 0.504 |
| CPU2 | 329 | 1 | 7 | 4.412 | 1.155 | 1.319 | -0.102 | 0.102 |
| CPU3 | 329 | 1 | 7 | 4.462 | 1.288 | 1.638 | -0.358 | 0.343 |

**5.5 Measurement Model Evaluation**

As outlined in section 4.3, evaluating the measurement model consists of three testing steps: individual item reliability (indicator reliability), construct reliability, and construct discriminant validity. Indicator reliability was assessed via item loadings and corrected item-total correlations (Table 5.22). Items KS1 and E4 were excluded from the analysis as they did not meet the reliability criteria. All other items passed the threshold value of 0.5 for corrected item-total correlations (Doll and Torkzadeh, 1988) and 0.5 for item loadings (Chin, 1998; Fornell and Larcker, 1981). Hence, we can conclude the data has satisfactory individual item reliability.

**Table 5.22 Individual Item Reliability Results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Construct** | **Item** | **Item Loading** | **Corrected Item-Total**  **Correlations** |
| Knowledge Sharing | KS1\* | 0.617 | 0.477 |
| KS2 | 0.922 | 0.862 |
| KS3 | 0.875 | 0.763 |
| KS4 | 0.794 | 0.826 |
| KS5 | 0.833 | 0.827 |
| Identification | I1 | 0.719 | 0.692 |
| I2 | 0.645 | 0.615 |
| I3 | 0.641 | 0.655 |
| Reciprocity | RE1 | 0.733 | 0.666 |
| RE2 | 0.779 | 0.689 |
| Reputation | R1 | 0.782 | 0.772 |
| R2 | 0.766 | 0.744 |
| R3 | 0.702 | 0.688 |
| Enjoyment of Helping others | EH1 | 0.712 | 0.702 |
| EH2 | 0.708 | 0.698 |
| EH3 | 0.762 | 0.788 |
| Engagement | E1 | 0.712 | 0.698 |
| E2 | 0.730 | 0.683 |
| E3 | 0.692 | 0.642 |
| E4\* | 0.580 | 0.473 |
| Bookmarking | BPU1 | 0.823 | 0.777 |
| BPU2 | 0.832 | 0.801 |
| BPU3 | 0.888 | 0.808 |
| Commenting | CPU1 | 0.766 | 0.702 |
| CPU2 | 0.834 | 0.804 |
| CPU3 | 0.815 | 0.785 |

*\* This item was removed from the analysis.*

Second, construct reliability was tested through three criteria: Cronbach’s α, Composite Reliability (CR) or internal consistency reliability, and Average Variance Extracted (AVE). The results from Table 5.23 show that Cronbach’s α values met the critical value of 0.7 (Nunnally and Bernstein, 1994). Additionally, CR and AVE values are higher than the suggested value of 0.7 and 0.5, respectively (Chin, 199b; Nunnally and Bernstein, 1994; Fornell and Larcker, 1981). Thus, sufficient construct reliability was demonstrated.

**Table 5.23 Construct Reliability Results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Construct** | **Cronbach’s α** | **Composite**  **Reliability (CR)** | **AVE** |
| KS | 0.908 | 0.902 | 0.793 |
| I | 0.783 | 0.881 | 0.703 |
| RE | 0.802 | 0.912 | 0.881 |
| R | 0.866 | 0.910 | 0.791 |
| EH | 0.898 | 0.906 | 0.855 |
| E | 0.877 | 0.870 | 0.777 |
| BPU | 0.833 | 0.938 | 0.828 |
| CPU | 0.872 | 0.922 | 0.824 |

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

Finally, the measurement model was tested in terms of validity. To assess the model’s discriminant validity through Confirmatory Factor Analysis (CFA), two approaches were taken. First, a matrix of item-loading was constructed (Table 5.24). Comparing the loading value of each item on its corresponding factor (construct), it can be concluded that each item loads on its latent construct stronger than other latent constructs (Chin, 1998b). Second, a latent variable correlation matrix was created (Table 5.25) in which the diagonal line represents the square root of AVE values. These values are greater than each correlation value on the associated row and column (Chin, 1998b). Additionally, as previously mentioned, all AVE values are greater than 0.5. Thus, given this analysis, the scales used in this investigation showed sufficient evidence of convergent and discriminant validity.

**Table 5.24 Item-Loadings Results**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Construct** | | | | | | | |
| KS | I | RE | R | EH | E | BPU | CPU |
| KS2 | **0.807** | 0.553 | 0.111 | 0.222 | -0.124 | 0.434 | -0.353 | -0.025 |
| KS3 | **0.866** | 0.503 | 0.119 | 0.322 | -0.178 | 0.355 | -0.230 | -0.200 |
| KS4 | **0.902** | 0.511 | 0.293 | 0.377 | -0.202 | 0.343 | -0.304 | -0.126 |
| KS5 | **0.888** | 0.583 | 0.228 | 0.344 | -0.147 | 0.208 | -0.388 | -0.120 |
| I1 | 0.642 | **0.843** | 0.209 | 0.508 | 0.244 | 0.466 | 0.043 | 0.030 |
| I2 | 0.598 | **0.883** | 0.166 | 0.444 | 0.238 | 0.543 | 0.078 | 0.045 |
| I3 | 0.545 | **0.829** | 0.055 | 0.388 | 0.328 | 0.422 | 0.070 | 0.060 |
| RE1 | 0.345 | 0.214 | **0.954** | 0.227 | 0.166 | -0.277 | -0.366 | 0.035 |
| RE2 | 0.256 | 0.118 | **0.894** | 0.214 | 0.119 | -0.119 | -0.301 | 0.176 |
| R1 | 0.555 | 0.104 | 0.388 | **0.844** | 0.545 | 0.379 | 0.084 | 0.176 |
| R2 | 0.268 | 0.101 | 0.204 | **0.905** | 0.560 | 0.327 | 0.010 | 0.081 |
| R3 | 0.249 | 0.077 | 0.209 | **0.899** | 0.501 | 0.322 | 0.055 | 0.059 |
| EH1 | -0.481 | 0.070 | 0.207 | 0.544 | **0.882** | 0.311 | 0.034 | -0.205 |
| EH2 | -0.321 | 0.089 | 0.205 | 0.544 | **0.893** | 0.245 | 0.079 | -0.196 |
| EH3 | -0.328 | 0.034 | 0.277 | 0.534 | **0.904** | 0.236 | 0.020 | -0.222 |
| E1 | 0.666 | 0.445 | -0.055 | 0.522 | 0.339 | **0.878** | 0.120 | -0.091 |
| E2 | 0.688 | 0.468 | -0.102 | 0.478 | 0.489 | **0.915** | 0.100 | -0.114 |
| E3 | 0.596 | 0.444 | -0.104 | 0.551 | 0.430 | **0.855** | 0.108 | -0.145 |
| BPU1 | -0.737 | 0.277 | -0.289 | 0.123 | 0.022 | 0.044 | **0.866** | -0.108 |
| BPU2 | -0.791 | 0.232 | -0.335 | 0.129 | 0.098 | 0.118 | **0.858** | -0.239 |
| BPU3 | -0.754 | 0.331 | -0.254 | 0.170 | 0.033 | 0.080 | **0.874** | -0.177 |
| CPU1 | -0.234 | 0.155 | 0.176 | 0.232 | -0.132 | -0.089 | -0.098 | **0.804** |
| CPU2 | -0.202 | 0.088 | 0.312 | 0.222 | -0.303 | -0.065 | -0.135 | **0.962** |
| CPU3 | -0.188 | 0.176 | 0.200 | 0.168 | -0.213 | -0.144 | -0.143 | **0.868** |

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

**Table 5.25 Construct Correlation Results for Discriminant Validity Analysis**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **KS** | **I** | **RE** | **R** | **EH** | **E** | **BPU** | **CPU** |
| KS | **0.880** |  |  |  |  |  |  |  |
| I | 0.520 | **0.823** |  |  |  |  |  |  |
| RE | 0.377 | 0.226 | **0.907** |  |  |  |  |  |
| R | 0.322 | 0.212 | 0.294 | **0.895** |  |  |  |  |
| EH | -0.190 | 0.107 | 0.298 | 0.518 | **0.905** |  |  |  |
| E | 0.655 | 0.405 | -0.143 | 0.504 | 0.466 | **0.877** |  |  |
| BPU | -0.483 | 0.114 | -0.203 | 0.173 | 0.081 | 0.103 | **0.888** |  |
| CPU | -0.288 | 0.108 | 0.266 | 0.144 | -0.202 | -0.090 | -0.110 | **0.885** |

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

Finally, the data set was investigated for multicolliniarity. When two exogenous (independent) variables are strongly correlated, there is a high probability that they measure similar things; thus, collinearity exists (Hair, Black, Babin, and Anderson, 2009; Meyers et al., 2012). There are three approaches to identify multicollinearity. First, through a correlation matrix between the variables (Table 5.25), all the values are below the suggested critical value of 0.8 (Tabachnik et al., 2001), indicating no multicollinearity between the variables. Second, condition index values were calculated to diagnose multicollinearity (Table 5.26). All the values are smaller than the suggested value of 30 (Meyers et al., 2006). Lastly, the Variance Inflation Factor (VIF) was calculated for all the independent variables of the study (Table 5.26). All the VIF values were below the suggested critical value of 2.5 (Allison, 1999), while the tolerance remained less than 0.2. Thus, given the above, thus no sign of multicollinearity was found in the data set.

**Table 5.26 Multicollinearity Results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Tolerance** | **VIF** | **Condition Index** |
| E | 0.444 | 2.009 | 17.664 |
| BPU | 0.289 | 4.665 | 22.580 |
| CPU | 0.277 | 3.545 | 23.373 |

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

**5.6 Common Method Variance**

Two methods were conducted to ensure that Common Method Variance (CMV) does not exist in this study: Harman’s one-factor Test (Podsakoff et al., 2003) and the added latent construct technique (Liang et al., 2007)[[2]](#footnote-2).

For Harman’s one-factor test, all items in the research model were entered into a factor analysis. The unrotated Principal Component Analysis accounted for the variance among 24 items resulting in six factors with Eigenvalues greater than one. The first extracted factor accounted for 30.6% of variance which is lower than the cut off value of 34% proposed by Wakefield, Leidner, and Garrison (2008). The other five factors accounted for 72.7% of variance. Thus, there is evidence that no single factor accounted for the majority variance in the data set, or in other words, the model did not load on a single factor.

Further, CMV was tested through an added latent construct approach applying PLS. First, a common method factor was added as a latent construct to the model in PLS, including all the items (indicators) in the model. Next, each of the measurement items were remodeled to a one-factor construct linked to a path from the common method factor and its substantive factor simultaneously. The results (Table 5.27) illustrate that there are no statistically significant method factor loadings. Moreover, the average value of principal factor loadings is 0.737, while the same measure for method factor loadings is 0.008, indicating that the majority of variance in the model is explained by the principle construct, rather than the method construct. Thus, Common Method Variance is unlikely to be a concern for this data set.

**Table 5.27 Common Method Variance Results**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Indicator** | **Method Factor** | | **Principal Factor** | |
| Loading | R2 | Loading | R2 |
| KS2 | 0.088 | 0.006 | 0.866\*\*\* | 0.788 |
| KS3 | 0.033 | 0.002 | 0.904\*\*\* | 0.844 |
| KS4 | 0.017 | 0.000 | 0.866\*\*\* | 0.710 |
| KS5 | 0.087 | 0.010 | 0.902\*\*\* | 0.855 |
| I1 | -0.120 | 0.015 | 0.793\*\*\* | 0.633 |
| I2 | 0.111 | 0.012 | 0.855\*\*\* | 0.777 |
| I3 | 0.165 | 0.031 | 0.863\*\*\* | 0.755 |
| RE1 | 0.031 | 0.005 | 0.878\*\*\* | 0.712 |
| RE2 | 0.084 | 0.011 | 0.776\*\*\* | 0.655 |
| R1 | 0.122 | 0.010 | 0.855\*\*\* | 0.718 |
| R2 | -0.065 | 0.018 | 0.931\*\*\* | 0.864 |
| R3 | -0.107 | 0.005 | 0.908\*\*\* | 0.813 |
| EH1 | 0.083 | 0.005 | 0.901\*\*\* | 0.732 |
| EH2 | 0.066 | 0.006 | 0.844\*\*\* | 0.771 |
| EH3 | 0.034 | 0.008 | 0.833\*\*\* | 0.688 |
| E1 | -0.055 | 0.001 | 0.877\*\*\* | 0.732 |
| E2 | 0.069 | 0.004 | 0.949\*\*\* | 0.906 |
| E3 | 0.022 | 0.002 | 0.868\*\*\* | 0.743 |
| BPU1 | 0.032 | 0.002 | 0.721\*\*\* | 0.555 |
| BPU2 | 0.018 | 0.001 | 0.777\*\*\* | 0.610 |
| BPU3 | 0.044 | 0.000 | 0.815\*\*\* | 0.624 |
| CPU1 | -0.077 | 0.012 | 0.923\*\*\* | 0.809 |
| CPU2 | -0.147 | 0.024 | 0.811\*\*\* | 0.650 |
| CPU3 | -0.132 | 0.007 | 0.865\*\*\* | 0.744 |
| **Average** | 0.013 | 0.007 | 0.854 | 0.737 |

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

Given the above analyses, we can conclude that the surveys appeared to be reliable, in terms of construct and indicator reliability, and validated through convergent and discriminant validity. Furthermore, the data has minimal possibility of Common Method Variance.

**5.7 Manipulation Check**

User anonymity and community type were the two factors (with two levels each) manipulated for this research. To ensure participants appropriately perceived the manipulations as per our study’s parameters, they were asked about their perceptions of their assigned online community and their anonymity on this community. Ninety six percent of participants perceived Facebook as a community of relationship, while 90% and 93% of LinkedIn and Cnet participants believed the corresponding websites as communities of interest. The Kruskal-Wallis non-parametric test was conducted to allow the comparison of the independent groups. The Chi-square value of 5.233 at *p*=0.073 suggests a marginal significant difference between members who perceive Facebook as a community of relationship and those who perceive it as a community of interest. The Chi-square value of 6.391 at *p*=0.040 indicates a significant between members who perceive LinkedIn and Cnet as communities of interest and those who perceive them as communities of relationship.

Recall from section 4.2.2 that user anonymity was assumed to be a categorical construct (identified or anonymous) related to the type of username an individual owns on a community. Facebook and LinkedIn members were considered identified and Cnet members were treated anonymous. Two questions pertaining to perceived user anonymity were asked as a part of a manipulation check: (1) I believe that other members of Facebook to whom I am connected, perceive me as being identifiable (not anonymous); and (2) I perceive Facebook members whom I am connected to as being identifiable (not anonymous) (Table 4.11). Seventy eight percent of people on Facebook ‘strongly agreed’ that they believe members of Facebook to whom they were connected, perceived them as being identifiable (not anonymous). Twelve percent of individuals ‘agreed’ with above statement, while 8% ‘somewhat agreed’. Two percent of participants responded ‘neutral’. These values for LinkedIn were 83%, 8%, 7%, and 2%, respectively. On the other hand, 55% of individuals on Cnet ‘strongly disagreed’ with the statement, while 28% ‘disagreed’, 10% ‘somewhat disagreed’, 5% were ‘neutral’, and only 2% people ‘somewhat agreed’. The second question asked about perceived user anonymity of other community members. Seventy seven percent of participants on Facebook ‘strongly agreed’ that they perceive Facebook members whom they are connected to as being identifiable (not anonymous). Eighteen percent of individuals ‘agreed’ and 5% ‘somewhat agreed’. Above values for LinkedIn were 67%, 18%, and 12%, respectively. In addition, 3% of members responded ‘neutral’. As for Cnet only 5% member ‘agreed’ with the statement, while 50% ‘strongly disagreed’, 27% ‘disagreed’, and 12% ‘somewhat disagreed’, and 6% were ‘neutral’. The significant Chi-square values of 6.888 (*p*=0.031), 6.101 (*p*=0.047), and 6.790 (*p*=0.033) show that there is significant difference between groups (for first and second questions) for Facebook, LinkedIn, and Cnet, respectively.

Overall, a vast majority of respondents perceived Facebook to be a community of relationship, Linked and Cnet to be communities of interest; Facebook and LinkedIn to be identified (not anonymous) and Cnet as anonymous. As such, participants appropriately perceived the manipulations as per our study’s parameters.

**5.8 Structural Model Evaluation**

This section discusses the results of evaluating the structural model in terms of effects, model fit, effect sizes, and post-hoc analyses.

**5.8.1 Effects Results**

The results from evaluating the structural model in SmartPLS with cross-sectional data via bootstrapping are shown in Figure 5.13. To understand the effects of anonymity and community type groups, cases with identified website members (Facebook and LinkedIn, n=224) were coded as 1, while cases with anonymous website members (Cnet, n=105) were coded as 0. Similarly, cases with community of relationship members (Facebook, n=106) were coded as 1, and those with community of interest members (LinkedIn and Cnet, n=223) were coded as 0. The results in Table 5.28 show that all the paths coefficients except for the effect of reciprocity on knowledge sharing (RE🡪KS) turned out to be statistically significant at least at the 0.05 level. The effect of reciprocity on knowledge sharing attitude is marginally supported at the 0.1 level (Dimoka et al., 2012). In terms of social antecedents of attitude toward knowledge sharing, identification appeared to have the most influential positive effect on knowledge sharing attitude (I🡪KS, *p*<0.001), while the *p*-value for the effect of reputation on knowledge sharing (R🡪KS), although statistically significant, was close the cut off value of 0.05. Regarding the technical antecedents of knowledge sharing attitude, commenting perceived usefulness appeared to have the most influential positive relationship with knowledge sharing (CPU🡪KS) among all the independent variables. The relationship between bookmarking perceived usefulness and knowledge sharing (BPU🡪KS) was statistically significant at a *p*<0.05 level. In terms of the antecedents of social constructs, the relationships UA🡪I, UA🡪RE, CT🡪I were supported while UA🡪R was marginally supported and CT🡪R and CT🡪EH was rejected.

**Social**

Commenting PU

Social Bookmarking PU PUPerceived Usefullness

Enjoyment in Helping helping

Engagement

Reputation

Reciprocity

Identification

-0.192\*

-0.196\*\*

User Anonymity

0.189\*\*\*

0.155\*

-0.034*+*

0.067*+*

0.029

Community Type

0.121\*

Attitude toward Knowledge Sharing in Online Communities

0.177

0.138\*

0.130\*\*

**R2=0.788**

0.120\*

0.366\*\*\*

**Technical**

**Figure 5.13 PLS Results for Direct Effects with Path Coefficients**

*\*p < .05; \*\*p < .01; \*\*\*p < .001; +p<0.1*

**Table 5.28 Effects Hypotheses Validation Results**

| **Hypothesis** | **Path** | **Path coefficient** | **Std. dev./ Std. error** | **t-stat.** | **Sig. level (*p*-value)** | **Validation** |
| --- | --- | --- | --- | --- | --- | --- |
| H1 | I 🡪 KS | 0.189 | 0.102 | 3.922\*\*\* | 0.000 | Supported |
| H2 | RE 🡪 KS | 0.067 | 0.091 | 1.735+ | 0.083 | Marginally supported |
| H3 | R 🡪 KS | 0.121 | 0.066 | 2.004\* | 0.046 | Supported |
| H4 | EH 🡪 KS | 0.130 | 0.065 | 2.868\*\* | 0.004 | Supported |
| H5 | E 🡪 KS | 0.138 | 0.061 | 2.332\* | 0.020 | Supported |
| H6 | BPU 🡪 KS | 0.120 | 0.052 | 2.241\* | 0.025 | Supported |
| H7 | CPU 🡪 KS | 0.366 | 0.088 | 4.007\*\*\* | 0.000 | Supported |
| H8a | UA🡪 I | -0.196 | 0.024 | 2.931\*\* | 0.003 | Supported |
| H8b | UA🡪 RE | -0.192 | 0.066 | 1.996\* | 0.046 | Supported |
| H8c | UA🡪 R | -0.034 | 0.087 | 1.844+ | 0.066 | Marginally supported |
| H9a | CT🡪 I | 0.155 | 0.069 | 2.114\* | 0.035 | Supported |
| H9b | CT🡪 R | -0.029 | 0.033 | 1.454 | 0.146 | Rejected |
| H9c | CT🡪 EH | 0.177 | 0.051 | 1.577 | 0.115 | Rejected |

*\*p < .05; \*\*p < .01; \*\*\*p < .001; +p<0.1*

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

*UA=User Anonymity; CT=Community Type*

The explanatory power of the model was evaluated via the coefficient of determination or R-squared. The acceptable R2 value of 0.788 indicates that only 21.8% of variance in knowledge sharing was left unaccounted by the independent variables. According to Chin (1998b), R2 value of 0.67, 0.33, and 0.19 are considered strong, moderate, and week, respectively. Thus, the model demonstrated strong explanatory power.

**5.8.3 Model Fit Results**

Unlike covariance-based SEM methods such as in LISREL, AMOS, and Mplus, variance SEM methods such as PLS do not support model fit indices such as Chi-square, Adjusted Goodness of Fit (AGoF), Normed-Fit Index (NFI), and Comparative Fit Index (CFI) (Chin 1998a). However, a Goodness of Fit (GoF) index can be calculated for PLS to evaluate the model fit. Applying Formula 5.1 (with n constructs and m endogenous constructs), resulted in 0.703, which is considered to be a high model fit, exceeding the cut off value of 0.36 (Wetzels, Odekerken-Schroder, Van Oppen, 2009).

Where n = number of total contructs

m= number of endogenous constructs

**Formula 5.1 Goodness of Fit Formula (Wetzels et al., 2009)**

Although being applied widely in the area of IS (Tennenhaus, Vinzi, Chatelin, and Lauro, 2005; Vinzi, Trinchera, and Amato, 2010), the GoF index has been criticized for its lack of power to validate models (Henseler and Sarstedt, 2012). Sharma and Kim (2012) argue that GoF increases model complexity by almost always choosing “complex models over parsimonious ones”. While Henseler and Sarstedt (2012) suggest that Path Coefficient assessment is the safest way to evaluate a model, another criterion known as Predictive Relevance (*Q2*) can be used to inform model quality. Predictive Relevance is an indicator that assesses model fit of structural models (Vinzi, Chin, Henseler, and Wang, 2008). The blindfolding technique was used in SmartPLS to obtain construct cross-validated redundancy values known as Sum of Squares of Observations (SSO) and Sum of Squares of Prediction Errors (SSE) (Table 5.29). Applying the formula (Formula 5.2) by Henseler, Ringle, and Sinkovics (2009), the *Q2* value resulted in a good model fit (predictive relevance) of 0.63>0 (Vinzi et al., 2008).

**Table 5.29 PLS Blindfolding Results**

|  |  |  |
| --- | --- | --- |
| **Case** | **SSO** | **SSE** |
| 1 | 168.22 | 56.82 |
| 2 | 173.96 | 51.33 |
| 3 | 164.44 | 69.43 |
| 4 | 177.55 | 58.82 |
| 5 | 175.56 | 77.43 |
| 6 | 167.92 | 51.77 |
| 7 | 166.33 | 67.87 |

Where D = mission distance

SSO = sum of squares of observations

SSE = sum of squares of prediction errors

**Formula 5.2 *Q2* Formula (Henseler et al., 2009)**

**5.8.4 Effect Size Results**

Effect size is another criterion to assess the strength of a model. It reflects the statistical power of the relationships in the population (Hair et al., 2009). To calculate effect sizes the *f*2 formula by Chin (1998b) is applied (Formula 5.3). According to Cohen (1988), 0.02<*f*2≤0.15, 0.15<*f*2≤0.35, and *f*2>0.35 are considered small, medium, and large, respectively. Calculating the *f*2 values, it was concluded that while identification and commenting perceived usefulness had large effect sizes, engagement and bookmarking perceived usefulness had medium effect sizes and reputation and enjoyment of helping others had small effect sizes. The effect size values with the corresponding F-test values are presented in Table 5.30.

**Formula 5.3 *f2* Formula (Cohen, 1988)**

**Table 5.30 Effect Sizes Results**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Independent Var.** | **R2 Included** | **R2 Excluded** | ***f2*** | **Effect Size** | **F-value** | ***p*-value** |
| Identification | 0.788 | 0.695 | 0.304 | Large | 104.443 | 0.000\*\*\* |
| Reciprocity | 0.788 | 0.776 | 0.053 | Small | 2.467 | 0.117 |
| Reputation | 0.788 | 0.772 | 0.070 | Small | 10.545 | 0.001\*\* |
| Enjoyment of Helping Others | 0.788 | 0.753 | 0.141 | Small | 37.226 | 0.000\*\*\* |
| Engagement | 0.788 | 0.722 | 0.237 | medium | 45.688 | 0.000\*\*\* |
| Bookmarking PU | 0.788 | 0.729 | 0.217 | medium | 66.373 | 0.000\*\*\* |
| Commenting PU | 0.788 | 0.691 | 0.313 | Large | 118.028 | 0.000\*\*\* |

*\*p < .05; \*\*p < .01; \*\*\*p < .001*

**5.9 Post-hoc Analysis**

The first post-hoc analysis focuses on the role of control variables on the proposed model. Next, the results of the saturated model are provided. Third, the answers to the open-ended question on the definition of knowledge will be analyzed. Finally, other insights will be presented based on the results of this study.

**5.9.1 Control Variables Results**

Seven control variables including three individual characteristics (age, gender, and level of education) and four variables on Internet usage frequency and purpose were included in the current study. Effect size analysis using SmartPLS was applied to interpret the potential roles of control variables.

To analyze the impact of the aforementioned control variables on the dependent variable (knowledge sharing attitude), a controlled model was run for each of the control variables separately. Next, the added control variable was linked to all the variables in the model. The R2 value of the knowledge sharing construct was noted for each of the controlled models. The R2 value of the endogenous construct in the default model was compared to the R2 value of the same construct in the controlled model. According to Cohen (1988), the effect sizes of 0.02, 0.15, and 0.35 are small, medium, and large, respectively. As the results show in Table 5.31, the effect sizes (*f*2) for age and gender are small, while the effect size for the level of education is non-significant. In terms of the Internet usage frequency and three variables related to Internet usage purpose, all the effect sizes are considered to be small.

**Table 5.31 Effect Sizes Results for Control Variables**

|  |  |
| --- | --- |
| **Variable** | ***f*2** |
| Age | 0.121 |
| Gender | 0.088 |
| Level of education | 0.008 |
| Internet usage frequency | 0.091 |
| Internet usage for search | 0.077 |
| Internet usage for social networking | 0.094 |
| Internet usage for information exchange | 0.079 |

*\*p < .05; \*\*p < .01; \*\*\*p < .001*

In their comprehensive study of IT acceptance, Venkatesh et al. (2003) target the effects of age and gender on the relationships of performance expectancy and social influence with behavioural intention of adopting new Information Technologies. In particular, the impact of effort expectancy on intention was stronger for men and younger users. The effect of social influence on intention was stronger for women and older people. In the context of the current research, the moderating effects of age and gender on the relationship between reputation–as a social influence factor–and knowledge sharing attitude were examined from which no significant results were obtained. Second, the role of age and gender on the relationships between bookmarking and commenting perceived usefulness–as a performance expectancy factor–with knowledge sharing attitude were tested. To ensure consistency of between-group comparisons, the age categories in Table 5.21 were combined to two categories of 18-40 years old and older than 40. As Table 5.32 shows, there were significant differences between the mean score of bookmarking and commenting perceived usefulness for younger and older members, and male and female users. To better understand the moderating effects of age and gender, Formula 5.4 was used to obtain the t-values from the cross-survey data obtained from SmartPLS (Table 5.33 and 5.34). It was found that the effects of bookmarking and commenting perceived usefulness on knowledge sharing attitude was significantly stronger for younger and male members of Web 2.0 online communities. These results are aligned with Venkatesh et al. (2003) work on the moderating role of age and gender on performance expectancy. While their dependent construct was behavioural intention of using Information Technologies, this study confirmed their assertion on Web 2.0 artifacts perceived usefulness in the context of knowledge sharing in Web 2.0 online communities.

**Where** t = t-statistic N1 + N2 – 2 degree of freedom

Ni = Sample size of group i

SEi = Standard error of path in structural model of group i

SMi = Path Coefficient sample mean of structural model of group i

**Formula 5.4 Multi-group Moderation Effect T-stat Formula (Keil et al., 2000)**

**Table 5.32 T-test Results for Age and Gender**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Leven’s test** | | **T-test for equality of means** | | |
| F | Sig. | t-stat. | df | Sig. (2-tailed) |
| Age | BPU | Equal Var. | 2.144 | 0.144 | 1.977 | 328 | 0.048\* |
| CPU | Equal Var. | 1.768 | 0.184 | 1.992 | 328 | 0.047\* |
| Gender | BPU | Equal Var. | 2.264 | 0.133 | 2.002 | 328 | 0.046\* |
| CPU | Equal Var. | 2.062 | 0.151 | 2.103 | 328 | 0.036\* |

*\*p < .05; \*\*p < .01; \*\*\*p < .001*

*BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

**Table 5.33 PLS Algorithm Results for Age and Gender Moderating Groups**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Moderating Group** | **Path** | **Sample Size** | **Sample Mean** | **Std. Error** |
| Male | BPU🡪KS | 183 | 0.466 | 0.075 |
| Male | CPU🡪KS | 183 | 0.617 | 0.091 |
| Female | BPU🡪KS | 146 | 0.247 | 0.033 |
| Female | CPU🡪KS | 146 | 0.326 | 0.080 |
| 18-40 years old | BPU🡪KS | 152 | 0.345 | 0.049 |
| 18-40 years old | CPU🡪KS | 152 | 0.528 | 0.064 |
| 40+ | BPU🡪KS | 177 | 0.277 | 0.043 |
| 40+ | CPU🡪KS | 177 | 0.318 | 0.044 |

**Table 5.34 Moderating Effects Validation Results for Age and Gender**

| **Path** | **t-stat.** | **Sig. level (*p*-value)** |
| --- | --- | --- |
| Gender 🡪 BPU-KS | 2.205 | 0.028\* |
| Gender 🡪 CPU-KS | 2.015 | 0.044\* |
| Age 🡪 BPU-KS | 1.983 | 0.048\* |
| Age 🡪 CPU-KS | 2.883 | 0.004\*\* |

*\*p < .05; \*\*p < .01; \*\*\*p < .001*

*KS=Knowledge Sharing; BPU=Bookmarking Perceived Usefulness;*

*CPU=Commenting Perceived Usefulness*

**5.9.2 Saturated Model Results**

In order to explore for any significant non-hypothesized relationships in the model, a saturated model test was conducted in SmartPLS wherein all the constructs were linked to each other. Using the bootstrapping method (with 500 samples), the results are shown in Table 5.35. Since the constructs were already linked to the endogenous construct of knowledge sharing in the original model, the R2 remained at 0.788; thus, the purpose of the saturated model was to identify any possible relationship between dependent variables. The *p*-values for the relationships between bookmarking and commenting and also, enjoyment of helping others and engagement were close to 0.05 and could be considered marginally significant (p<0.1). The *p*-values for the remainder of relationships in the saturated model are higher than 0.1, indicating that in the context of this research, no statistically significant path was found between any two dependent variables in the original model. This contradicts Nahapiet and Ghoshal’s (1998) proposition that “the dimensions and the several facets of social capital are likely to be interrelated in important and complex ways”. The explanatory power of current model did not undergo a significant change.

**Table 5.35 Saturated Model Results**

| **Path** | **Path coefficient** | **t-stat.** | **Sig. level (*p*-value)** |
| --- | --- | --- | --- |
| I 🡪 RE | 0.192 | 0.994 | 0.320 |
| I 🡪 R | 0.524 | 1.532 | 0.126 |
| I 🡪 EH | 0.425 | 1.655 | 0.098+ |
| I 🡪 E | 0.188 | 1.117 | 0.264 |
| I 🡪 BPU | 0.220 | 1.019 | 0.308 |
| I 🡪 CPU | 0.134 | 0.924 | 0.355 |
| RE 🡪 R | 0.173 | 1.244 | 0.214 |
| RE 🡪 EH | 0.082 | 0.865 | 0.387 |
| RE 🡪 E | -0.029 | 0.035 | 0.972 |
| RE 🡪 BPU | 0.081 | 0.775 | 0.438 |
| RE 🡪 CPU | -0.018 | 1.006 | 0.314 |
| R 🡪 EH | 0.343 | 1.445 | 0.149 |
| R 🡪 E | 0.173 | 0.686 | 0.493 |
| R 🡪 PBU | 0.163 | 1.222 | 0.588 |
| R 🡪 CPU | 0.210 | 1.012 | 0.312 |
| EH 🡪 E | 0.578 | 1.868 | 0.062 |
| EH 🡪 BPU | 0.166 | 1.322 | 0.222 |
| EH 🡪 CPU | 0.006 | 0.078 | 0.938 |
| E 🡪 BPU | 0.226 | 1.330 | 0.184 |
| E🡪 CPU | 0.039 | 0.541 | 0.588 |
| BPU 🡪 CPU | 0.559 | 1.943 | 0.052+ |
| UA🡪 EH | 0.322 | 1.555 | 0.120 |
| UA🡪 E | 0.313 | 1.634 | 0.103 |
| UA🡪 BPU | 0.144 | 1.007 | 0.314 |
| UA🡪 CPU | 0.165 | 1.046 | 0.296 |
| CT🡪 RE | 2.440 | 1.303 | 0.193 |
| CT🡪 E | 2.270 | 1.507 | 0.132 |
| CT🡪 BPU | 1.118 | 0.977 | 0.329 |
| CT🡪 CPU | 0.808 | 0.804 | 0.421 |
| UA🡪 KS | 1.802 | 1.322 | 0.187 |
| CT🡪 KS | 1.761 | 1.295 | 0.196 |

*\*p < .05; \*\*p < .01; \*\*\*p < .001*

*KS=knowledge sharing; I=Identification; RE=Reciprocity; R=Reputation; EH=Enjoyment of Helping others;*

*E=Engagement; BPU=Bookmarking Perceived Usefulness; CPU=Commenting Perceived Usefulness*

**5.9.3 Open-ended Question Results**

Although this study was designed as a quantitative one, an open-ended question on a debatable concept in IS–the definition of knowledge–could potentially shed some interesting insights on the subject. Recall from section 2.1 that despite the argued boundaries between data, information, and knowledge, ambiguity still remains as to what constitutes knowledge. The open-ended question that was added to the survey was:

“Please define knowledge.”

Since the question was open-ended, naturally the length of answers varied substantially. For instance, one participant answered “understanding” and another replied “learning”. For the sake of a rich post-hoc analysis regarding knowledge, thoughtful responses with longer answers were selected for further analysis. Thus, the total number of answers for investigation was reduced from 329 to 306. A classification open-ended question analysis technique was applied to interpret the results (Denzin and Lincoln, 2005; Schuman and Presser, 1979). The results of the review of 306 responses are shown in Table 5.36. After careful consideration, the responses were categorized into five categories or classes, using Alavi and Leidner’s (2001) classification of knowledge as a guide. Five out of six classes, as defined by Alavi and Leidner, were used in this adaption: Knowledge vs. information and facts; state of mind; object; process; and capability. The first class emphasizes the differentiation between knowledge and information and the characteristics that separate one from another. State of mind refers a state of knowing and understanding. Class three perceives knowledge as accessible/restorable object. Knowledge can also be perceived from a sharing and applying perspective. Lastly, knowledge as a capability refers to its ability for impact (for example, taking an action). There was no evidence in the open-ended question that related to the sixth perspective introduced by Alavi and Leidner (2001)–a condition of access to information. Thus, it was excluded from the list of classes (categories) being utilized in the current investigation.

In terms of knowledge vs. information vs. data class, most of responses were focused on characteristics of information. Twenty four respondents asserted that knowledge is useful, helpful, or beneficial facts or information, while 16 expressed that knowledge is relevant and proven/verified information. Another 14 agreed that knowledge is accurate, timely, or objective information. Viewing knowledge as state of mind into account, 13 participants thought knowledge is becoming/being aware or informed about something. Another 12 respondents perceived knowledge as a state of learning new facts, experiences, or skills. Following the majority of respondents in this class, 10 participants perceive knowledge as knowing about a certain object, fact, or happening. Conceptualizing knowledge as objects, 26 people think of knowledge as gained or acquired information, facts, or skills, or learned subjects, while 6 ones believe knowledge is a collection or accumulation of data, facts, skills, or information. The latter is surprisingly similar to Alavi and Leidner’s (2001) perspective on knowledge as object that can be collected and restored. In terms of knowledge as a process perspective, 12 participants viewed knowledge as acquiring, gaining, obtaining, or receiving information. Another 7 participants perceived knowledge as sharing useful or trustworthy information and 2 believed that knowledge is applying concepts or facts to a situation. Only 9 out of 306 participants viewed knowledge as a capability. For example, one perceived knowledge as the ability to understand and retain given information, while another thought of knowledge as the ability to interpret a phenomena. All together it was believed that the participants perceived knowledge differently, yet all the answers could be satisfyingly classified into the most recognized categorization of knowledge proposed by Alavi and Leidner (2001). This finding indeed confirms that the concept of a knowledge typology can in fact be empirically tested and analyzed.

**Table 5.36 List of Responses to the Open-ended Question and Related Classes**

| **Total**  **Number** | **Definition of knowledge** | **Class** |
| --- | --- | --- |
| 24 | Useful/helpful/beneficial information/facts | Knowledge vis-à-vis data and information (characteristic of knowledge) |
| 8 | Relevant information |
| 8 | Factual/verified/proven/true facts/information |
| 7 | Accurate information |
| 3 | Timely information |
| 3 | Objective information |
| 3 | New information/perspectives on subjects |
| 3 | Useful/helpful information for decision making |
| 3 | Facts/information about a topic/something |
| 2 | Reliable facts/information |
| 2 | Valuable information |
| 2 | Sharable/receivable information |
| 1 | Analyzed/processed information |
| 1 | Significant information |
| 1 | Innate information about something |
| 1 | Clarifying information |
| 1 | Non-frivolous facts |
| 1 | Justified true beliefs |
| 1 | Applicable information |
| 1 | Facts with scientific results |
| 1 | Empirical information |
| 1 | Information with factual history |
| 1 | Interesting information |
| 1 | Enhanced facts by interpretation |
| 1 | Quality information |
| 1 | Informative facts |
| 1 | Tangible information |
| 1 | Non-fiction facts |
| 1 | Purposeful facts |
| 1 | Global information on something |
| 14 | Being/becoming aware/informed of something | State of mind |
| 12 | Learning experience/things/new things/events |
| 10 | Knowing about a certain objects/something/facts/happening |
| 8 | Understanding about a subject/something |
| 5 | Becoming familiar/having familiarity with a topic |
| 4 | Understanding [analyzed] information/facts |
| 4 | Gaining information/insight/experience of the surround environment |
| 3 | Information absorption |
| 3 | Enhancing/expanding the understanding/awareness of a subject |
| 3 | To know or learn something about a subject/thing |
| 2 | Understanding useful information |
| 2 | Greater understanding of what is already known |
| 1 | Perceiving new facts about a subject |
| 1 | Perception change |
| 1 | The act of knowing things |
| 1 | Experiencing life |
| 1 | Growing of the mind |
| 1 | Experience of knowing information |
| 1 | Increased awareness |
| 1 | Developing a better understanding of something |
| 1 | Learning through communicating |
| 1 | Deeper understanding of information |
| 1 | Deeper information about something |
| 1 | The analysis of an experience or a feeling |
| 1 | Enriching professional knowledge and well-being |
| 1 | Having a profound understanding of something |
| 1 | Digesting information for future use |
| 1 | Understanding a concept to utilize in the future |
| 1 | Improved understanding of a concept |
| 1 | Linking facts to ideas or constructs |
| 1 | Improved learning with flexible thinking |
| 16 | Gained/acquired information/skills/personal experience | Object |
| 12 | Learned [relevant] things/information/subjects/facts |
| 6 | Accumulation/collection of data/facts/skills/information/’how-to’s |
| 3 | Retained information |
| 3 | Received or expressed information/facts |
| 2 | Shared information |
| 2 | Obtained information |
| 2 | Newly learned/added things/information |
| 2 | Accumulation of correct/applicable information |
| 1 | Transferred information |
| 1 | Thoughts/ideas/concepts |
| 1 | The know-how to do something |
| 1 | Evaluated information |
| 1 | Known subjects |
| 1 | Information that can be learned |
| 1 | A collection of experiences that can educate |
| 1 | Applied information |
| 1 | Possessed ideas for taking effective actions |
| 1 | Increased information |
| 1 | A compilation of expertise and education |
| 1 | Restored information in brain/memory |
| 1 | Understood factual content |
| 12 | Receiving/obtaining/acquiring/gaining/getting new information | Process |
| 7 | Sharing trustworthy/useful/professional information/facts |
| 2 | Applying new concepts/facts in life/to a situation |
| 2 | Passing on/giving information |
| 2 | Communicating and sharing practical information |
| 2 | Sharing new discoveries/theories/facts with others |
| 2 | Gathering information/facts from different resources |
| 1 | Information transfer |
| 1 | Information articulation |
| 1 | Share meanings with others |
| 1 | Socializing with people to share what one’s know |
| 1 | The beneficial application of a comprehension |
| 1 | Obtaining meaningful information for problem solving |
| 1 | Sharing intelligent information |
| 1 | Acquiring and retaining information about specific items |
| 1 | The ability to understand | Capability |
| 1 | The ability to understand and retain given information |
| 1 | The ability to provide useful information |
| 1 | The ability to learn or gain insight about something |
| 1 | The ability to perform tasks |
| 1 | The ability to interpret a phenomena |
| 1 | The ability to broadens one’s scope of something |
| 1 | Being able to identify a problem and a solution |

**5.9.4 Further Insights**

The remainder of this chapter discusses various observations obtained from the results of this study apart from the previously proposed hypotheses.

**5.9.4.1 Knowledge and Information**

There were six knowledge-related questions asked from the respondents followed by one single open-ended question (section 4.2.2 Table 4.12). The first question asked if respondents considered whether posting a bookmark in isolation of any comments from the bookmarker or other users should be considered an instance of knowledge sharing. Across the three surveys, 9% strongly agreed and 35% agreed, while 11% strongly disagreed and 41% disagreed.

This suggests that, in the context of this research, many think commenting is more paramount to sharing knowledge than bookmarking itself. This substantiates the results from the model path analysis in section 5.8.1. Next, participants were asked if they believed that all the comments to a bookmark together can create knowledge different from each comment individually. The results reveal that 17% of participants strongly agreed, whereas 34% agreed and 27% were neutral. Although marginal, the majority of sample respondents (52%) believed in social creation of knowledge. This is aligned with a tenet of social constructionism from the post-modernism perspective. Most previous studies/theories on knowledge creation spend little or no effort to bring this phenomenon to the social level, while few others explain the critical role of social knowledge creation (for example, Nonaka, Toyama, and Konno, 2000; Van Krogh, Ishijo, and Nonaka, 2000). Respondents from our study seem to support the view that knowledge is created socially; in alignment with Nonaka’s (1994) statement that “The reconfiguring of existing information through the sorting, adding, recategorizing, and recon-textualizing of explicit knowledge can lead to new knowledge”.

It is an established belief among scholars that data, information, and knowledge are different concepts (for example, Ackoff, 1989; Simon, 1999), but the boundaries between three concepts are not clear. This idea is assumed to be true not only in the area of IS, but in other disciplines such as sociology, socio-psychology, and anthropology. As outlined in section 4.2.2, four knowledge-related questions asked if participants considered particular statements in the form of bookmark together with its comments, a piece of knowledge. These statements centered on topics of entertainment, technology, and medical science. Three conclusions were made. First, more individuals were inclined to believe that technology and science bookmarks and comments were knowledge-developing compared to entertainment industry bookmarks and comments. In fact, 53% and 29% of participants agreed and strongly agreed that a new report on a type of blood cancer in the format of a bookmark together with its comments is considered to be knowledge. The Kruskal-Wallis non-parametric Chi-square value of 4.776 at *p*=0.091 suggests a marginal significant difference between members who ‘strongly agreed’ or ‘agreed’ and those who ‘strongly disagreed’ or ‘disagreed’. In comparison, 46% and 17% of participants agreed and strongly agreed that a bookmark and comments on a new camera model specification is considered knowledge, while only 18% and 7% thought the same for a singer’s new concert information and 20% and 3% for Academy Awards winner list bookmarks with comments. Relatively for above three subjects, the Chi-square values of 4.641 (*p*=0.098), 4.802 (*p*=0.090), and 4.888 (*p*=0.086), indicated that there are marginal significant differences between members who ‘strongly agreed’ or ‘agreed’ and those who ‘strongly disagreed’ or ‘disagreed’ that a bookmark and its comments is considered knowledge.

Second, it was revealed that the individuals on communities on interest (LinkedIn and Cnet) were more likely to perceive science and technology related bookmarks with comments as knowledge. More specifically, 27 participants in the LinkedIn survey agreed that blood cancer news with its comments was knowledge, while only 4 indicated the same for a singer’s concert information. These rates for Facebook survey respondents were 19 and 17, respectively. Lastly, it appears that the participants distinguished between information and knowledge. First, no one in the open-ended question equated knowledge to information. From Table 5.36, a few participants’ answers were categorized in the first class (knowledge vs. information), however they conceptualized knowledge as transformed information or data. For instance, they refer to knowledge as reliable, objective, valuable, verifiable, or sharable information. Second, 30 respondents added specific comments differentiating it from information, and 18 participants stated that the entertainment, technology, and medical science bookmarks/comments were information and not knowledge.

The participants were also asked if they had applied the knowledge that has been shared on the virtual community (Table 4.37). 64% of participants at least somewhat agreed with the statement, with the highest agreement being for LinkedIn and Cnet as opposed to Facebook. A non-parametric test was run for each website, dividing the groups to two: ‘strongly disagree’, ‘disagree’, ‘somewhat disagree’, ‘neutral’ being in one group, and ‘strongly agreed’, ‘agree’, ‘somewhat agree’ being in another group. Interestingly, the Chi-square value of 5.003 (*p*=0.081) indicated there is a significant difference between knowledge sharing attitude mean scores of the groups. Further the result of a cross-website regression analysis showed that the Pearson correlation coefficient of the relationship is significant at *p*=0.047, meaning that individuals who apply the shared knowledge on the community they are a member of, are more likely to have a positive attitude about knowledge sharing on those communities.

**Table 5.37 Shared Knowledge Application Results**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Knowledge Application** | | **Facebook** | **LinkedIn** | **Cnet** | **Total** |
| I apply the knowledge that has been shared on their virtual community in practice. | Strongly disagree | 8 | - |  | 8 |
| Disagree | 13 | 5 | 5 | 23 |
| Somewhat disagree | 32 | 15 | 11 | 58 |
| Neutral | 18 | 12 | 8 | 38 |
| Somewhat agree | 22 | 45 | 36 | 103 |
| Agree | 9 | 31 | 33 | 73 |
| Strongly agree | 1 | 10 | 12 | 23 |
| Not applicable/unsure | - | - | - | - |

**5.9.4.2 Membership and Community Types**

As outlined in section 4.2.2, a question was included in the survey asking about participant’s perceptions on their type of membership. An active member was defined as a member who posts bookmarks, comments on bookmarks, or both. An observant member was defined as a member who browses through posts (bookmarks), but does not contribute by posting bookmarks or commenting. Eighty four percent of participants perceived themselves as active members on Facebook, while the rest indicated they are observant members. The percentage of active members for LinkedIn and Cnet were 60% and 65%, respectively. Across the three surveys, 67% of the total respondents indicated that they were active members of the corresponding community. A t-test was run for each survey and the results confirmed that there was no significant difference between the mean score of active and observant members.

Two questions in each survey asked about respondents’ self-evaluated frequency of bookmarking and commenting on the community. The results are shown in Table 5.38. Fifty five percent and 68% of total participants expressed that they use bookmarking and commenting on the corresponding communities at least once a week. Two ANOVA tests were run on the cross-community sample for bookmarking and commenting. No significant difference was found between self-evaluated frequency of bookmarking and commenting and knowledge sharing attitude.

**Table 5.38 Self-evaluated Frequency of Bookmarking and Commenting Results**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Artifact Usage Frequency** | | **Facebook** | **LinkedIn** | **Cnet** | **Total** |
| Bookmarking | Once a day | 25 | 12 | 11 | 48 |
| Multiple times a day | 7 | 8 | 1 | 16 |
| Once a week | 68 | 25 | 28 | 121 |
| Less than once a week | 2 | 56 | 35 | 93 |
| Once a month | 2 | 8 | 26 | 36 |
| Less than once a month | 2 | 4 | 4 | 10 |
| Commenting | Once a day | 26 | 12 | 12 | 50 |
| Multiple times a day | 9 | 5 | 9 | 23 |
| Once a week | 62 | 37 | 60 | 159 |
| Less than once a week | 7 | 39 | 20 | 66 |
| Once a month | 1 | 23 | 9 | 33 |
| Less than once a month | 2 | 2 | 4 | 8 |

**5.9.4.3 Identification and Altruism Relationship**

Altruism has been defined as ‘the degree to which a person was willing to increase other people’s welfare without expecting returns’ and has been applied interchangeably with the ‘enjoyment of helping others’ construct (Hsu and Lin, 2008). Recall from Table 5.35 that the t-stat of the impact of identification on enjoyment of helping others was marginally significant at the *p*<0.1 level. This effect can be explained through the theory of Kin Selection (Hamilton, 1964; Smith, 1964). Kin Selection is a type of selection affected by the relatedness among individual. In other words, when an individual recognizes a kin, the probability that he/she acts in altruistic manners increases. The origins of Kin Selection theory suggest genetic correlation among individual loci or organisms as the basis for kinship; however, social behaviours such as identification can be the source of relatedness to bring about altruistic behaviour. Despite the scholarly arguments against Kin Selection theory (Wilson, 2005; Wilson and Wilson and Hölldobler; 2005), the relationship between relatedness and altruism has been advocated (Foster, Wenseleers, Ratnieks, 2006). In the area of IS, the possibility of social capital facets interrelatedness was noted by Nahapiet and Ghoshal (1998). However, no empirical investigations in IS have found significant relationships between identification and altruism. Nonetheless, evidence of such a relationship has been reported in Psychology. Nadler and Halabi (2006) note the effect of identification and intergroup helping. Other scholars advocate the role of in-group identification and member help-giving (Nadler, Harpaz-Gorodeisky, Ben-David; 2009). Zdaniuk and Levine (2001) indicate the positive relationship between group members’ identification and altruism as a pro-group behaviour. The results of this study support the advocated relationship between identification and altruism.

**5.9.4.4 User Anonymity State and Perceived User Anonymity**

Pinsounneault and Heppel (1997) argue that anonymity is a multidimensional and subjective phenomenon. On this basis, Tsikerdekis (2013) describe the relationship between anonymity state and perceived anonymity in online collaborative environments, advocating that the perception of anonymity increases with higher level of anonymity. Accordingly, a question was asked from participants to evaluate their level of anonymity. While Tsikerdekis (2013) categorize state of anonymity to ‘using real names’, ‘using pseudonyms’, and ‘completely anonymity’, this study expanded the concept to five categories (Table 4.11). The responses are shown in Table 5.39. Each category was given a value from 1 to 5 to quantify the concept with ‘my full real name’ as 1 and ‘a non-obvious username’ as 5. Next, the relationship between the state of anonymity and perceived anonymity (combination of two questions discussed earlier) was tested. The results showed a significant positive influence of anonymity state on perceived anonymity with t-value of 2.098 (*p*=0.041). This is in accordance with Tsikerdekis’s (2013) argument.

**Table 5.39 Anonymity State Results**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Anonymity State** | **Facebook** | **LinkedIn** | **Cnet** | **Total** |
| Full real name (for example, John Smith) | 104 | 118 | 9 | 231 |
| Partial real name (for example, John1980) | 2 | - | 23 | 25 |
| Obvious username (for example, filmnerd) | - | - | 21 | 21 |
| Partial obvious username (for example, psps-nerd) | - | - | 37 | 37 |
| Non-obvious username (for example, btcoo99) | - | - | 15 | 15 |

**5.9.4.5 The Open-ended Question and Commenting**

The open-ended question of this study was examined in section 5.9.3 through which five categories were identified for knowledge as per Alavi and Leidner’s (2001) classification. These categories are ‘knowledge vs. information’, ‘knowledge as object’, ‘knowledge as process’, ‘knowledge as capability’, and ‘knowledge as state of the mind’. The open-ended responses were then probed for further insights. For example, did the responses reveal an understanding about participants’ Web 2.0 knowledge sharing attitude? The responses were classified based on length. As a result, five categories were created (Table 5.40). 34 responses with two words (minimum response length) belong to the first class and so on. Next, the relationships between the length of response and bookmarking perceived usefulness, commenting perceived usefulness, and knowledge sharing attitude were tested in SmartPLS. No significant result was found for the influence of response length and bookmarking perceived usefulness. As for commenting perceived usefulness, the relationship turn out to be positively significant with a t-value of 2.011 (*p*=0.045). Response length resulted in a marginally significant relationship with knowledge sharing attitude (*p*=0.084). Participants with higher perceptions of commenting usefulness are those who actually responded to the open-ended question with longer sentences. It can be speculated that participants with longer sentences are potentially those with more thoughtful answers.

**Table 5.40 Open-ended Response Classification Based on Length**

|  |  |  |
| --- | --- | --- |
| **Responses** | **Class** | **Frequency** |
| 2 words | 1 | 36 |
| 3 words | 2 | 95 |
| 4 words | 3 | 78 |
| 5 words | 4 | 50 |
| 6 words or more | 5 | 35 |

**5.9.4.6 Tagging**

Tags, or pieces of information assigned to a post bookmarked by a user, are becoming more popular in online communities. Tags are identifiers that can be used to classify a post (relate the post to subjects) by the bookmarker, or used by others to search for particular subjects in communities. Various websites such as LinkedIn, Facebook, BBC News, Reddit, and DPReview organizes these user-defined tags in high-scale hierarchical structures called ‘folksonomies’. Recall from section 4.2.2 that two questions were asked about tagging: (1) the frequency of using hashtags (#) when bookmarking (this feature is currently only available for Facebook); and (2) the frequency of using tags for searching purposes on the Internet. Thirty six percent of Facebook survey participants replied ‘sometimes’ to the first question, while 17% responded ‘often’ and 60% answered ‘rarely’. This means that–at least in the case of Facebook–a low percentage of users care to add tags to their bookmarks. As for the second question, the cross-survey results showed that 46% of individuals ‘sometimes’ use tags for searching on the Internet, while 39% responded ‘rarely’. This finding revealed that more people use tags for searching purposes than to identify bookmarks with subjects.

**Chapter 6: Discussion and Conclusion**

This chapter outlines the answers to the current investigation’s research questions on knowledge sharing attitude in Web 2.0 online communities based on the results of the empirical study outlined in chapter 5. Specifically, a discussion on the social and technical motivators of knowledge sharing attitude as well as the community contextual factors are provided. Both academic and practical contributions are explored followed by research limitations. Last, suggestions for future research and a conclusion are presented.

**6.1 Research Questions Answers**

As previously introduced in section 1.2, the objective of the research was to investigate Web 2.0 online communities three major objectives:

1- To study the impact of the social antecedents on knowledge sharing attitude in Web 2.0 online communities.

2- To identify the impact of the technical antecedents on knowledge sharing attitude in Web 2.0 online communities.

3- To investigate the effect of the contextual factors on the antecedents of knowledge sharing attitude in Web 2.0 online communities.

**6.1.1 Social Antecedents of Knowledge Sharing Attitude**

With a t-value of 3.922 (*p*=0.000), this investigation found that identification–the degree to which users feel they belong to the community–has a positive significant relationship with knowledge sharing attitude in Web 2.0 online communities (H1, I🡪KS,). In others words, higher mutual understandings between an individual and the online community will result in a more positive attitude towards sharing the knowledge that individual possesses (Dholakia et al., 2004). The more people’s interests deepen and align with a community’s interests such as Facebook, LinkedIn, or Cnet, the more likely they are to retain their relationships with others on these websites through knowledge sharing. This finding supports Nahapiet and Ghoshal’s (1998) argument on identification as a social capital that could cultivate resource exchange (sharing knowledge in this context). From a broader perspective, our results favor Kramer and Tyler’s (1996) discussion that identification enhances members’ concern for collective results.

Hsu and Lin (2008) advocate that community identification positively impacts intention to share knowledge through blogging. Our results support their conclusion by showing the positive significant impact of identification on members’ attitude via two Web 2.0 artifacts–bookmarking and commenting. Bookmarking and commenting developed to be the most important Web 2.0 artifacts in the eyes of Web 2.0 experts based on a Fuzzy AHP study (Appendix 3). Thus, in alignment with previous research, this investigation highlights the importance community identification on generating positive knowledge sharing attitude in online communities (T(298)=3.604 at *p*<0.001).

Reciprocity was defined as the degree of fairness and perceived mutual benefits of relationships among individuals (section 3.2.1.2). Reciprocity is assumed to facilitate collective action (Shumaker and Brownell, 1984). Based on our study results (H2, RE🡪KS), reciprocity was only a marginally significant antecedent of knowledge sharing attitude. It was concluded that people’s mutual indebtedness does not encourage individuals to share their knowledge on Web 2.0 online communities as much as other motivations. With a t-value of 1.735 (*p*=0.083), indicating a marginal significance, the results are similar to the Wasko and Faraj’s (2005) conclusion on the impact of reciprocity on knowledge contribution behaviour in terms of helpfulness (t=0.07). Based on their discussion, one interpretation of the above marginal significance finding could be built on the meaning of indirect reciprocity. In the context of Web 2.0 online communities, it can be deduced that individuals tend to help each others with sharing knowledge in a chain pattern (A🡪B🡪C) rather than a direct reciprocal one (A🡪B🡪A). For example, someone that that has been informed about a new camera model’s performance, does not necessarily have a positive attitude to help the same member further in the future, but might be willing to pass on such information to help another member at another time. Another interpretation of such results might be established through the concept of knowledge creation in social environments. Recall from section 3.1.5 that postmodern social constructionism advocates social knowledge creation. In the context of bookmarking and commenting in online communities, it can be argued that knowledge creation can be the result of spiral patterns of repeated comments on a bookmark (post). In other words, the integrated knowledge of the aggregated comments is different and possibly more valuable (helpful) than any single one. There might be several members involved in shaping a deduction on a matter at hand manifested by a bookmark-comment combination. Thus, an informed/helped member faces not one individual to return the help to, but conceivably various members. As such, direct reciprocity might be replaced by indirect reciprocity. This finding supports Ekeh’s (1974) discourse of Social Exchange Theory which argues that in social exchanges the reciprocation of help given to an individual may be generalized and not be paid back to the giver. Wasko and Faraj (2000) also discover that direct reciprocity is not a knowledge exchange driver in online communities of practice. While Chai’s et al. (2012) found a positive influential effect of reciprocity on knowledge sharing via blogging, this effect is only marginal (*p*<0.1) for bookmarking and commenting. This inconsistent effect among the three studies above is interesting and calls for future research investigation.

Another possible explanation might be related to the theory of self-efficacy. Self-efficacy explains one’s ability to achieve goals or conduct tasks (Bandura, 1994). Based on this theory, one might see a member in need of information support as someone with low self-efficacy in terms of addressing/solving his/her issue and thus, would not expect him/her to reciprocate their support in the future. This may be more applicable in the context of communities of interest.

With a t-value of 2.004 (*p*=0.46), Reputation–the degree to which users believe that sharing knowledge would enhance their status in a community–had a significant positive relationship with knowledge sharing attitude in Web 2.0 online communities (H3, R🡪KS). Regardless of Web 2.0 artifacts (in this case, bookmarking and commenting), one’s image to other members can improve his/her positive feeling about sharing knowledge through those artifacts. This finding is not exclusive for Facebook, LinkedIn, and Cnet. Google+ (the fastest growing social platform) dominated monthly visits among all social networks averaging 1,203 million visits per month in 2013 ([www.6marketing.com](http://www.6marketing.com)). Canada was the leading country in Google+ usage penetration in 2013 (www.circlecount.com/ca). Accordingly, Google+, Facebook, and LinkedIn are among the top five social networks on which members had the highest engagement level in 2013 (www.vlogg.com). For instance, more than 2.4 million comments circulated on LinkedIn in the third quarter of 2013 (www.6marketing.com). The results of this research confirmed that enhancing one’s professional image could be a driver for members to engage through comments on LinkedIn. This is in alignment with the Social Exchange Theory position that individuals expects when engaging in social behaviours.

The result of this study is in accordance with Wang and Lai’s (2006) conclusion that reputation increases knowledge sharing contribution in technology-related virtual communities. In addition, this result affirms Chou and Chuang’s (2011) assertion on the strong positive influence between reputation and knowledge sharing attitude in electronic networks of practice. The results was also aligned with Wasko and Faraj’s (2005) study in which reputation as an individual motivating factor found to positively impact knowledge sharing in terms of helpfulness and volume.

For the enjoyment of helping others social construct of this study, with a t-value of 2.868 (*p*=0.004), it appeared that higher perceptions of altruistic behaviour on social network with Web 2.0 artifacts, availability can increase positive feeling about sharing knowledge on such communities (H4, EH🡪KS). In other words, members on Facebook, LinkedIn, and Cnet have a more positive attitude towards engaging on the corresponding websites through bookmarking and commenting when they enjoy helping other members via those artifacts. As Ba et al. (1991) asserted, altruism is a socio-psychological motivation for sharing knowledge. Results of the current study are in accordance with Hew and Hara’s (2007) qualitative finding in online networks of practice. The results also support Chang and Chung’s (2011) conclusion that enjoyment of helping others positively affects both the quantity and quality of knowledge sharing.

The fifth social construct in this study–engagement–had a strong positive effect on knowledge sharing attitude (H5, E🡪KS) with a t-value of 2.332 and p=0.020. The more members experience the perception of involvement in Web 2.0 social networks, the more they possess a positive attitude towards sharing their knowledge on such websites. If one senses isolation in an ambience that is captivating for other members, it is less likely that he/she would be in a productive mood to initiate a conversation on Facebook through a bookmark, or participate in a series of comments, even if the member possesses beneficial knowledge of the subject at hand. The current research explored the phenomenon from a sender’s perspective. It would be of interest to investigate the situation from a receiver’s perspective. Does one have the same feeling even if he/she is in need of knowledge from LinkedIn mebers? Regardless, our results are aligned with previously published materials such as Venkatesh et al. (2012) and Moon and Kim (2001). While most of these studies focus on behavioural intention (Venkatesh and Bala, 2008), our research in the context of online communities acknowledges that higher perception of involvement in a community positively impacts behavioural attitude towards knowledge sharing as well.

**6.1.2 Technical Antecedents of Knowledge Sharing Attitude**

Among various Web 2.0 artifacts, bookmarking and commenting were selected as the most salient Web 2.0 artifacts through a Fuzzy AHP approach (section 3.1.4). The usefulness of these two artifacts was investigated as antecedents of knowledge sharing attitude in three online communities. The path analysis results for both construct were significant for both bookmarking (H6, BPU🡪KS with a t-value of 2.241 at *p*=0.025) and commenting (H7, CPU🡪KS with a t-value of 4.007 at *p*=0.000). The perceived usefulness of commenting appeared to have the strongest positive path to knowledge sharing attitude among seven social and technical constructs antecedents. We speculate there may be two reasons for the strong effects of commenting perceived usefulness. First, commenting is an artifact that is available on most online communities which appears in a consistent format. Thus, it is one of the most familiar of the Web 2.0 artifacts available on online communities. Bookmarking, on the other hand, is a relatively newer artifact. Not all online communities support bookmarking via a direct bookmark button or icon (for example, LinkedIn), while several online communities are adding this feature, many still require their members to copy and paste the target web address link to their social network page. Likewise, tagging as an add-on feature to bookmarking is not available on all social networks. This variance in availability of Web 2.0 artifacts across different websites (Facebook and LinkedIn, for instance) may impact the perceived adoption of such artifacts and consequently impact knowledge sharing attitude.

Another reason might be related to the concept of social creation of knowledge. As suggested by social constructionism, the precedence of social network members to use commenting over bookmarking could be due to the fact that they believe a comment would result in another. Thus, circulation of comments would bring about multiple perspectives of the subject, while bookmarking might not result in commenting; hence, suggesting one perspective on the subject. In other words, commenting might be perceived as a better means to socially create new knowledge compared to bookmarking alone.

The results of our hypothesis testing were in accordance with extant literature on Web 2.0 artifacts and knowledge sharing (For example, Millen and Feinberg, 2006; Veil, 2013; Kuan and Bock, 2007; Boulos et al., 2006). Hsu and Lin (2007) show a positive strong relationship between perceived usefulness of blogs and their usage attitude.

**6.1.3 Web 2.0 Online Communities Contextual Factors**

As per the results in section 5.8.2, two categorical constructs were tested for possible effects on the social antecedents of knowledge sharing attitude within the community: user anonymity and community type. The results revealed that user anonymity has a positive strong effect on identification (H8a, UA🡪I-KS with the t-value of 2.931 at *p*=0.043). This means that for members of Facebook and LinkedIn identification with the community is stronger when compared to members of Cnet. These results are in accordance with the cognitive perspective of the Social Model of Deindividuation Effects which explains that anonymity may decrease the salience of social identity in a group when group members carry a feeling of belonging to the group (Lea and Spears, 1991; Reicher et al., 1995).

The effect of user anonymity on reciprocity was also statistically significant (H8b, UA🡪RE with a t-value of 1.996 at *p*=0.046). When individuals have information on other members’ identity, they are more likely to feel positive about sharing their knowledge with those members in terms of reciprocation. As such, members on Facebook and LinkedIn are more likely to reciprocate knowledge with fellow community members than members of Cnet. Although user anonymity was considered a categorical construct in this study, it can also be conceptualized on a fuzzy spectrum from a full real name to a meaningless random pseudonym. People are more likely to reciprocate help through sharing their knowledge when others’ usernames are closer to being full real names. This is in accordance with the strategic perspective of the Social Model of Deindividuation Effects which argues that the higher the level of anonymity that exists in a group, the less the support is provided from group members (Reicher et al., 1995; Spears and Lea, 1994).

The effect of user anonymity on reputation appeared to be marginally significant (H8c, UA🡪R with a t-value of 1.844 and *p*=0.066). Based on Social Exchange Theory, reputation is a value driver of sharing knowledge in social networks. In the case of online communities, whether on Facebook, LinkedIn, or Cnet–using real names or pseudonyms–people were highly encouraged to share their experience, judgment, expertise, or insight to improve their image/status on the subject at hand. For instance, if ‘mastermodern2000’ updates other members of a Cnet forum on a new DSLR camera lens products or technology, then ‘mastermodern2000’ would gradually become a knowledge expert on camera lenses. As such, it is not one’s true identity, nor that of other forum members that would significantly affect the positive impact of image on one’s attitude to share knowledge.

In terms of community type, two categories were selected for the investigation: communities of relationship and communities of interest. The results revealed that community type has a significant relationship with identification (H9a, CT🡪I with a t-value of 2.114 at *p*=0.035). As such, people who belong to communities of relationship (such as Facebook) are more likely to develop a sense of belonging and establish a stronger bond with the community. Based on these results, people who perceive a social network as a community of relationship care about the community itself more than those who perceive it as a community of interest. Members of LinkedIn and Cnet tend to use these communities as a gateway to achieve information, usually within a particular domain. LinkedIn members care about building professional relationships to help their careers, while those on Cnet are interested in maximizing their technology-related knowledge. In contrast, communities of relationship such as Facebook, encourage members to view the network more than just a gateway to achieving personal goals, but as an environment to reinforce personal relationships. PatientsLikeMe–as a community of relationship centered on medical issues–is another example where members of each support-group (such as diabetes) are more likely to identify themselves with the community and establish a sense of belonging to the network. Our results show that communities of relationship (or emotional support communities) strengthen the effect of community type on identification. Emotional support communities where relationships are developed would be characterized by more positive knowledge sharing attitude due to the bond the members have with the community.

Based on Actor-Network Theory, individuals are social entities who seek socialization in networks (Latour, 2005). Actor-Network Theory stresses relationship between actors (nodes), the strength of such relationships (ties), and the effect of strong or weak ties in exchanging capital among actors. However, it does not provide insight on the role of the nature of a network on actors. The results of the current research help fill this gap by providing insight on how different social network types affect the relationship between social network actors and attitude towards social exchange.

Contrary to above, community type appeared to have no significant effect on reputation (H9b, CT🡪R with a t-value of 1.454 at *p*=0.146) and enjoyment of helping others (H9c, CT🡪EH with a t-value of 1.577 at *p*=0.115). As such, individuals are more likely to have positive feeling about sharing their knowledge with other community members when they are triggered by the concept of reputation or enjoyment of helping others–regardless of the type of online social network they belong to. Both reputation and enjoyment of helping others constructs are believed to be intrinsic motivators (Wasko and Faraj, 2005). Unlike extrinsic motivators, intrinsic motivators are more independent in terms of their impact on human attitude or behavior (Kankanhalli et al., 2005). For example, people who perceive supporting others as a pleasing belief/act or those who place high value on altruism, are more prone to help others, disregarding the context in which they act. In the case of this research, whether the social network is a community of relationship (such as Facebook) or a community of interest (such as LinkedIn), people seem to have a positive mindset on sharing their knowledge, if they value helping others. Considering the inherent career-competition nature of LinkedIn, this result was surprising and interesting.

**6.2 Contributions**

The contributions of the current research in terms of theory and practice are outlined in the following sections. We believe that this socio-technical research approach in the context of online communities can be of interest to both academics in the discipline of IS as well as business practitioners.

**6.2.1 Theoretical Contributions**

This research follows a socio-technical approach. Social Capital Theory has widely been used in various disciplines including Information Systems. However, in the context of knowledge sharing, there are very few research investigations that cover both social and technical dimensions of knowledge sharing phenomena. Since vast knowledge sharing happens in online environments, it is appropriate to consider both dimensions. By developing a socio-technical model of knowledge sharing in online communities, IS scholars will be able to probe more deeply into the motivators and barriers of sharing knowledge.

Traditional literature on knowledge sharing investigates this phenomenon in the context of organizations. These investigations centre on the notion of online communities of practice. Such efforts neglect the fact that socialization–as the essential facet of knowledge sharing–can occur in diverse venues other than communities of practice. This calls for a research agenda to explore the nature of knowledge sharing beyond traditional organizational contexts. Specifically, there is a need to understand knowledge sharing in communities/social networks outside organizational practices. With modern Internet tools, knowledge sharing occurs in various online social networks such as Facebook, Google+, LinkedIn, DevianArt, Flickr, Cnet, and Monster, among many others. The current investigation helps us to understand knowledge sharing in non-organizational online social networks.

This study also helps to bridge the gap between Internet technology artifacts–as modern boundary-less tools through which global knowledge creation and sharing is facilitated–and conventional knowledge sharing research. Currently, there are several tools (artifacts) available on online social networks, including social bookmarking, commenting, blogging, wikis, and RSS. These artifacts have transformed the static Internet to a collaborative user-driven Web 2.0 environment. Web 2.0 enables individuals to create and share content through user participation. Most extant studies in this environment have focused on blogging where user participation is less compared to other artifacts such as bookmarking and commenting. To the best of the researcher’s knowledge, this research is the first rigorous examination of the impact of these Web 2.0 artifacts on knowledge sharing attitude.

Additionally, to the best of the researcher’s knowledge, the concepts of user anonymity and community type have not been previously examined in the context of Web 2.0 communities. User anonymity is central to the study social networks. When it comes to non-organizational online communities, individuals may not be obliged to register with their real names (true identity). This research investigates the impact of anonymity on the antecedents of knowledge sharing attitude in Web 2.0 online communities. Likewise, community type has been conceptualized in the extant literature but has not been investigated for its potential moderating impact on knowledge sharing. This work helps to fill this gap.

**6.2.2 Practical Contributions**

From a practitioner’s perspective, the results of this research can significantly impact Web 2.0 online communities both for organizations and Web 2.0 developer companies (such as Facebook, Digg, Declicious, Reddit, StumbleUpon, Badoo, Bebo, etc.). From an organizational viewpoint, businesses can utilize social networks, such as Facebook fan pages, as a reliable gateway to introduce the company, gather fans globally, and market products and services. Businesses can also use Web 2.0 aggregators such as Reddit to collect valuable insights on products and services or draw on collectively-created knowledge for research and development, planning, and marketing purposes. The more available and perceived usefulness of bookmarking and commenting, the more users will utilize such websites to share their ideas and experiences. For example, consider a Facebook fan page for a camera manufacturer. When a new camera model is launched, there will be a vast number of bookmarks and comments sharing perspectives and user experience for the new model. When there are more bookmarks and comments about the camera, there will likely be more visits to such a page. This brings about rich data analysis opportunities for the company. As the volume of comments and bookmarks increases, the ‘word-of-mouth’ will draw even more members to the target pages.

From a Web 2.0 company’s viewpoint (such as Cnet), when better information is conveyed and added from websites from all over the Internet to social networks and aggregators, users are more satisfied and the company’s reputation is strengthened. Suppose one finds valuable information through others’ comments on a technology-related social network such as Cnet. That member is satisfied, likely to return in the future and may encourage others to use such a community. Further, stronger reputations and more satisfied users can ultimately result in greater advertising power. Advertising is the main revenue source for Facebook–the leading social network website–and online aggregators. More satisfied users lead to a higher number of visits, and thus, a better online advertising potential.

**6.3 Research Limitations**

As with any empirical investigation, there are limitations that should be considered. First, this study utilized self-reported measures for the dependent variable and socio-technical antecedents. Although analyses showed that Common Method Variance is not likely to be an issue in our investigation, it is more accurate to measure the dependent variable through the actual behaviour of participants. For instance, in the case of knowledge sharing, it is valuable to measure subjects’ behaviour in term of quantity and quality of knowledge being shared. However, it is important to note that measuring knowledge and knowledge sharing are ambiguous and troublesome within IS and other disciplines.

Second, we obtained appropriate cross-sectional representation of Canadians belonging to the three online communities. While we can confidently generalize to the Canadian population, we cannot generalize to non-Canadian community members. Further investigations are called to examine the current research validity in cross-country studies.

Third, this study focuses on social networks as one type of Web 2.0 websites. Aggregators (such as Digg, Reddit, and StumbleUpon) and Publicators (such as Wikipedia) are other types of websites which offer Web 2.0 artifacts. The generalizibility of the current investigation is limited to online social networks.

Fourth, this study focuses on non-organizational environments. To reach a higher level of conclusion validity, it is recommended that further socio-technical research compare the results of analyzing the community contextual factors of knowledge sharing attitude/behaviour between an online community of practice and a non-organizational online community. Albeit the fact that organizational communities of practice are not typically based on voluntarily behaviour, some interesting insights could be revealed through this comparison.

Finally, since this research investigates users’ perception and attitude and not the actual behaviour, surveys are used as the data collection method. Surveys may lack rigour in the context of MIS. One reason is that they mostly measure the attitude not the actual behavior. However, “when used correctly, exploratory surveys can be very useful either as an independent research effort, or, more often, as the preliminary phase of a descriptive or explanatory study” (Pinsonneault and Kraemer, 1993).

**6.4 Future Research Suggestions**

While this research provides an important first step in understanding knowledge sharing in non-organizational online communities, there are several interesting research questions that remain to be answered in this domain. One potential investigation lies within the concept of self-efficacy or one’s perceived ability to conduct a behaviour. Self-efficacy has been identified to pose an essential role in motivating individuals (Bandura, 1986) and has been employed in previous studies with Computer Science (Compeau and Higgins, 1995a), Internet usage (Hsu and Chiu, 2004), and virtual communities (Hsu et al., 2007). Knowledge sharing self-efficacy can be an interesting topic for investigation in non-organizational communities which offer Web 2.0 artifacts.

Coming from the Computer Science area, Pfitzman and Hansen (2010) conceptualize unlinkablity, undetectability, and unobservability as parallel concepts to anonymity and argue that such concepts should not be discounted when studying identity management and communities. This study investigated the moderating effect of anonymity in terms of pseudonymity on knowledge sharing attitude. Further studies can look to incorporate the role of the above parallel concepts within a knowledge sharing model.

Seventy percent of Canadians use mobile devices of which 84% have smart phones (www.ctwa.ca). Canada is the leading country in smart phone usage penetration (www.6smarketing.com). Eighty seven percent of Canadian using smart phones have membership on at least one social network (www.6smarketing.com). From 2011 to 2013, there has been a 32% increase in total minutes spent on mobile social networking sites in Canada (www.6smarketing.com). The above statistics suggest that the phenomenon of social networking is heavily penetrating mobile devices. As a result, the nature of knowledge sharing through mobile devices may be different from conventional settings. For instance, commenting may be more convenient to perform through smart phones than via PCs (depending on the age of the user). Thus, the number of comments through a smart phone on a post/bookmark may be higher than those posted from PCs. Future studies can examine knowledge sharing in online communities in the context of mobile environments.

**6.5 Conclusion**

The purpose of this research was to understand the nature of knowledge sharing in Web 2.0 online communities using a socio-technical perspective. Based on Social Capital Theory and the Theory of Planned Behaviour, a number of constructs were selected to be tested as antecedents to knowledge sharing attitude: identification, reciprocity, reputation, enjoyment of helping others, and engagement. From a technical perspective, the two most salient Web 2.0 artifacts (bookmarking and commenting) were examined in terms of their perceived usefulness and impact on knowledge sharing attitude. Moreover, the concepts of user anonymity and community types were investigated for their influence on the antecedents of knowledge sharing attitude. Social networks were classified into communities with identified members and communities with anonymous members. In terms of community type, communities of relationship and communities of interest were selected. Facebook represented a community of relationship with identified members. LinkedIn and Cnet represented communities of interest with identified and anonymous members, respectively. Anonymity was tested as a potential antecedent of identification, reciprocity, and reputation. Community type was examined as a potential antecedent of identification, reputation, and enjoyment of helping others.

Our analysis of 329 participants revealed that identification, reputation, enjoyment of helping others, and engagement positively and significantly impact knowledge sharing attitude, while there was evidence of marginal significance for the relationship between reciprocity and knowledge sharing attitude. In terms of community contextual factors user anonymity had a significant impact on identification and reciprocity. There was marginal support for the effect of user anonymity on reputation. Similarly, community type was shown to have a significant effect on identification. As such, members of communities of relationship are more inclined to develop a sense of belonging to their communities. However, community type did not show a significant effect on reputation and enjoyment of helping others.

Overall, this investigation showed relevant and profound understanding of knowledge sharing in Web 2.0 online communities. This research provides evidence that knowledge sharing in online environments is a socio-technical phenomenon. When studying social behaviour in online environments, it is important to acknowledge the impact of technical components (artifacts) of the Web and the community contextual factors as well as social factors. Furthermore the current study helps to fill the gap in the extant Knowledge Management literature by exploring knowledge sharing in non-organizational online communities where members’ behaviour is assumed to be voluntarily. The results of this investigation can inform and guide future IS research in knowledge sharing in Web 2.0 environments and practitioners in understanding the impacts of social constructs and Web artifacts in online business.

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**Appendix 1**

**Fuzzy Analytical Hierarchy Process (FAHP)**

The Analytical Hierarchy Process (AHP) is a Multiple Criteria Decision Making (MCDM) method first introduced by Saaty (1980). AHP is a structured mathematical model method to prioritize and rank alternatives based on multiple criteria. AHP constructs a hierarchy of goals (ranking, resource allocation, benchmarking, quality management, etc), a set of criteria, and alternatives through which entities in each level are compared pairwise regarding the level above (Figure A.1). Pairwise comparison is the main concept in AHP (Saaty, 1977; Saaty, 2008). The first step in AHP is determining the goal, criteria, and alternatives. Suppose we want to select a vehicle brand to purchase. In real life situations, more than one criterion affects our decisions. In our example, color, safety, price, and performance are instances of criteria. Next, three brands such as BMW, Mercedes, and Audi are to be selected as alternatives. Not all the criteria have the same weights in the process; one might simply judge that price (a quantitative criterion) is more important than color. Stage two of AHP involves comparing the criteria based on our perceptive judgment of their relative importance with respect to the goal.

Goal

Criteria 1

Criteria 2

Alternative 2

Alternative 3

Alternative 1

**Figure A.1 The AHP Hierarchy**

This pairwise comparison is conducted through a numeric scale (Table A.1) and will result in weighted criteria. For instance, one might judge that safety is 3 times more important than performance with respect to ranking the vehicles or color is 7 times less important (1/7 more important) than price. The third step is to similarly compare the preferability of alternatives with respect to each criterion. The results of two previous steps are two numerical matrices accordingly. Multiplication of these matrices will give us a normalized one-column matrix showing the final ranks of alternatives with respect to the goal. Although inconsistency and rank reversal are two major problematic issues with hierarchy structures and pairwise comparisons, AHP is known as the most applied MCDM method in business and management areas (e.g. Saaty, 1982; Saaty, 1994, Badri 1999; Hafeez et al. 2002). Several advantage of AHP compared to other MCDM methods such as TOPSIS, ELECTRE, and MACBETH have been reported (e.g. Salomon & Montevechi, 2001). Applying the concept of Fuzzy Logic (Zadeh, 1965; Zadeh, 1968; Zimmerman, 2001) to AHP, some scholars have extended AHP in fuzzy environments and suggested fuzzy pairwise comparison to gain better prioritization and ranking accuracy (Laarhoven & Pedricz, 1983; Buckley, 1984; Ruoning & Xiaoyan, 1992; Chang, 1996). Chang (1996) proved that his Fuzzy Extended Analysis Method (EAM) offers better performance than other major Logarithmic Least Squares (LLSM) Fuzzy AHP methodology proposed by Laarhoven & Pedricz (1983).

**Table A.1 AHP Pairwise Comparison Numerical Scale**

|  |  |
| --- | --- |
| **Numerical value** | **Verbal judgment** |
| 1 | Equal importance |
| 2 |  |
| 3 | Weak importance of one over another |
| 4 |  |
| 5 | Essential or strong importance |
| 6 |  |
| 7 | Demonstrated importance |
| 8 |  |
| 9 | Absolute/Extreme importance |

**Appendix 2**

**FAHP Results**

A survey was designed to rank five popular Web 2.0 artifacts in terms of importance for knowledge sharing: RSS, wiki, bookmarking, commenting, and blogging. With these five alternatives, two criteria were considered: usefulness and ease of use of the artifact. Usefulness measures the degree to which users believe using a particular Web 2.0 artifact would enhance performance of social interaction/communication with others to share information (Davis, 1989). Ease of use measures the degree to which users think applying a particular Web 2.0 artifact would be free of effort (Davis, 1989). Twenty-five graduate students majoring in Computer Science and Information Systems with Web 2.0 familiarity participated in this survey. Applying Chang’s (1996) Fuzzy AHP methodology, the results are presented in Table A.2. With commenting and social bookmarking ranked the highest, these two Web 2.0 artifacts are determined to be the most salient for knowledge sharing and are the focus for investigation in this research. Table 2 present the results acquired in pages 171-175.

**Table A.2 The Results of Ranking Web 2.0 Artifacts Applying Fuzzy AHP**

|  |  |  |
| --- | --- | --- |
| **Rank** | **Web 2.0** | **Normalized Score** |
| 1 | Commenting | 0.489 |
| 2 | Social Bookmarking | 0.4 |
| 3 | Wiki | 0.055 |
| 4 | Blogging | 0.025 |
| 5 | RSS | 0.023 |

**Fuzzy AHP Calculations**

**1- Pairwise Comparisons Average values**

**Matrix 1: Comparison with Respect to the Goal**

|  |  |  |
| --- | --- | --- |
|  | Usefulness | Ease of Use |
| Usefulness |  | 1.85, 2.66, 3.66 |
| Ease of Use | 0.27, 0.37, 0.54 |  |

**Matrix 2: Usefulness**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | RSS | Wiki | Bookmarking | Commenting | Blogging |
| RSS |  | 055, 0.6, 0.7 | 0.37, 0.4, 0.63 | 0.29, 0.22, 0.49 | 1.55, 2.26, 3 |
| Wiki |  |  | 0.48, 0.8, 1.12 | 0.26, 0.36, 1 | 0.97, 0.97, 1.15 |
| Bookmarking |  |  |  | 1,.56, 1.9, 2.32 | 1.6, 2, 2.4 |
| Commenting |  |  |  |  | 2, 2.9, 3.8 |
| Blogging |  |  |  |  |  |

**Matrix 3: Ease of Use**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | RSS | Wiki | Bookmarking | Commenting | Blogging |
| RSS |  | 0.84, 0.85, 1.11 | 0.41, 0.47, 0.63 | 0.23, 0.28, 0.54 | 0.65, 0.80, 1.05 |
| Wiki |  |  | 0.2, 0.26, 0.36 | 0.35, 0.59, 0.67 | 0.97, 1.1, 1.24 |
| Bookmarking |  |  |  | 0.86, 1.27, 1.66 | 2.4, 3.2, 4.38 |
| Commenting |  |  |  |  | 2.2, 3, 3.6 |
| Blogging |  |  |  |  |  |

**2- Finding S Values, V Values, and Matrix W:**

**Matrix 1:**

S1 = (2.85, 3.66, 4.66) 🞊 [1/6.2, 1/5.03, 1/4.12] = (0.46, 0.72, 1.13)

S2 = (1.27, 1.37, 1.54) 🞊 [1/6.2, 1/5.03, 1/4.12] = (0.2, 0.27, 0.37)

V (S1S2) = 1

V (S2S1) = [(0.46 – 0.37) / (0.27 - 0.37) – (0.72 – 0.46)] = 0.25

d (C1) = V (S1S2) = 1

d (C2) = V (S2S1) = 0.25

**W = (0.8, 0.2)T**

**Matrix 2:**

S1 = (3.76, 4.63, 5.83) 🞊 [1/39, 1/31.53, 1/23.88] = (0.09, 0.14, 0.24)

S1 = (4.14, 4.8, 6.15) 🞊 [1/39, 1/31.53, 1/23.88] = (0.1, 0.15, 0.25)

S1 = (6.64, 8.12, 10.5) 🞊 [1/39, 1/31.53, 1/23.88] = (0.17, 0.25, 0.44)

S1 = (6.47, 9.9, 12.73) 🞊 [1/39, 1/31.53, 1/23.88] = (0.16, 0.31, 0.53)

S1 = (3.21, 3.31, 3.79) 🞊 [1/39, 1/31.53, 1/23.88] = (0.08, 0.1, 0.15)

V (S1S2) = 0.17

V (S1S3) = 0.06

V (S1S4) = 0.11

V (S1S5) = 1

V (S2S1) = 1

V (S2S3) = 0.13

V (S2S4) = 0.5

V (S2S5) = 0.25

V (S3S1) = 1

V (S3S2) = 1

V (S3S4) = 0.5

V (S3S5) = 0.25

V (S4S1) = 1

V (S4S2) = 1

V (S4S3) = 1

V (S4S5) = 1

V (S5S1) = 0.6

V (S5S2) = 0.5

V (S5S3) = 0.15

V (S5S4) = 0.05

d (C1) = V (S1S2, S3, S4, S5) = 0.6

d (C2) = V (S2S1, S3, S4, S5) = 0.13

d (C3) = V (S3S1, S2, S4, S5) = 0.82

d (C4) = V (S4S1, S2, S3, S4) = 1

d (C5) = V (S5S1, S2, S3, S4) = 0.05

**W = (0.023, 0.063, 0.398, 0.485, 0.024)T**

**Matrix 3:**

S1 = (3.76, 4.63, 5.83) 🞊 [1/40.05, 1/31.84, 1/25.41] = (0.07, 0.1, 0.17)

S1 = (3.12, 4.0, 4.46) 🞊 [1/40.05, 1/31.84, 1/25.41] = (0.07, 0.12, 0.17)

S1 = (8.61, 10.63, 14.09) 🞊 [1/40.05, 1/31.84, 1/25.41] = (0.21, 0.33, 0.55)

S1 = (7.1, 10.04, 12.71) 🞊 [1/40.05, 1/31.84, 1/25.41] = (0.18, 0.31, 0.5)

S1 = (3.27, 3.79, 4.46) 🞊 [1/40.05, 1/31.84, 1/25.41] = (0.08, 0.12, 0.17)

V (S1S2) = 0.83

V (S1S3) = 0.21

V (S1S4) = 0.05

V (S1S5) = 0.81

V (S2S1) = 1

V (S2S3) = 0.23

V (S2S4) = 0.5

V (S2S5) = 1

V (S3S1) = 1

V (S3S2) = 1

V (S3S4) = 1

V (S3S5) = 1

V (S4S1) = 1

V (S4S2) = 1

V (S4S3) = 0.93

V (S4S5) = 1

V (S5S1) = 1

V (S5S2) = 1

V (S5S3) = 0.23

V (S5S4) = 0.06

d (C1) = V (S1S2, S3, S4, S5) = 0.05

d (C2) = V (S2S1, S3, S4, S5) = 0.05

d (C3) = V (S3S1, S2, S4, S5) = 0.82

d (C4) = V (S4S1, S2, S3, S4) = 1

d (C5) = V (S5S1, S2, S3, S4) = 0.06

**W = (0.025, 0.025, 0.41, 0.505, 0.03)T**

**3- Final Matrix**

0.023 0.025 0.023

0.063 0.025 0.8 0.055

0.398 0.41 🞊 0.2 = 0.400

0.485 0.505 0.489

* 1. 0.03 0.025

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**Appendix 3**

**Survey Questions (Facebook)**

## Tutorial

### 2 [001]

### This is a quick tutorial for the terms being used in this survey. The definitions are also provided at the bottom of each question.  Social Network: An online social network is a website that allows people to connect, such as Facebook, LinkedIn, or Cnet forums.

Social Bookmarking:  
Social bookmarking is the process of posting a link from a source website to a target website - a social network for example.

 The figure in below demonstrates an example of social bookmarking.

Suppose you find an interesting news or article (Figure 1) on BBC website and you want to share it with your circle of friends (for example on Facebook) or with your professional network (such as LinkedIn). In this context, we call BBC the ‘source’ and Facebook the ‘target’ website. Normally, you can see a ‘share’ button either on the top or bottom of the news/article. If you click on the ‘share’ button, you will see a list of target websites to connect and post the news/article.   
  
Now, suppose you intend to share it on Facebook; all you have to do is to click the Facebook button through which a new window (Figure 2) will appear so you can connect to your profile on Facebook. On this window, you can change the title of the bookmark (post) as you wish to appear on your Facebook page, add a description, and add tags. Various news websites offer a selected set of tags as examples to be added. In our BBC news article example, six tags are suggested automatically: science & environment, earth, planet, solar systems, space, and universe. You may use them or write your own set of tags, as depicted in below figure. Next, clicking the ‘share’ button will bookmark this article.

[](http://oi44.tinypic.com/24yram8.jpg)  
Figure 1

  
  
  
Figure 2 - Source: www.bbc.com

Commenting:  
A comment is generally a verbal or written remark often related to an added piece of information, an observation or statement (online content in this context). Currently most web services provide commenting features for users to share their opinions.  
  
An example of commenting is provided below.







Source: NASA Facebook fan page

To continue to the survey select 'proceed' and 'next'.

Only answer this question if the following conditions are met:  
° Answer was 'I agree' at question '1 [001]' (Consent: I understand the information provided for the study of online communities as described herein. My questions have been answered to my satisfaction, and by selecting “I agree” below, I agree to participate in this study. I understand that if I agree to participate in this study, I may withdraw from the study at any time during the survey. Once I completed the survey, I will not be able to withdraw from the survey. )

Please choose **all** that apply:

* Proceed Proceed

## Part 1

### 3 [001]Are you over the age of 18? \*

Please choose **only one** of the following:

* Yes Yes
* No No

### 4 [002-2]What is your age? \*

Only answer this question if the following conditions are met:  
° Answer was 'I agree' at question '1 [001]' (Consent: I understand the information provided for the study of online communities as described herein. My questions have been answered to my satisfaction, and by selecting “I agree” below, I agree to participate in this study. I understand that if I agree to participate in this study, I may withdraw from the study at any time during the survey. Once I completed the survey, I will not be able to withdraw from the survey. ) and Answer was 'Yes' at question '3 [001]' (Are you over the age of 18?)

Please choose **only one** of the following:

* 18-24 18-24
* 25-30 25-30
* 31-40 31-40
* 41-50 41-50
* 51-60 51-60
* 61+ 61+

### 5 [002]What is your highest education level? \*

Please choose **only one** of the following:

* High School High School
* College diploma College diploma
* Bachelor's degree Bachelor's degree
* Master's degree Master's degree
* Ph.D. degree Ph.D. degree
* Other Other

### 6 [003]What is your gender? \*

Please choose **only one** of the following:

* Female Female
* Male Male
* Prefer not to say Prefer not to say

### 7 [004]I use the Internet \_\_\_\_ per week. \*

Please choose **only one** of the following:

* less than one hour less than one hour
* 1 to 5 hours 1 to 5 hours
* more than 5 but less than 10 hours more than 5 but less than 10 hours
* more than 10 but less than 20 hours more than 10 but less than 20 hours
* 20 hours or more 20 hours or more

### 8 [005]I \_\_\_\_ use the Internet to search for information. \*

Please choose **only one** of the following:

* never never
* rarely rarely
* sometimes sometimes
* frequently frequently
* very frequently very frequently

### 9 [006]I \_\_\_\_ use the Internet for social networking. \*

Please choose **only one** of the following:

* never never
* rarely rarely
* sometimes sometimes
* frequently frequently
* very frequently very frequently

An online social network is a website, such as Facebook, that allows people to connect.

### 10 [007]I \_\_\_\_ use the Internet for information exchange. \*

Please choose **only one** of the following:

* never never
* rarely rarely
* sometimes sometimes
* frequently frequently
* very frequently very frequently

Information exchange is the dissemination of information between individuals/groups.

## Part 2

### 11 [008]Are you a member of Facebook? \*

Please choose **only one** of the following:

* Yes Yes
* No No

### 12 [009]How long have you been a member of Facebook? \*

Only answer this question if the following conditions are met:  
° Answer was 'Yes' at question '11 [008]' (Are you a member of Facebook?)

Please choose **only one** of the following:

* Less than 6 months Less than 6 months
* 6 months to a year 6 months to a year
* 1 to 2 years 1 to 2 years
* More than 2 years More than 2 years

### 13 [010]I use Facebook \_\_\_\_ . \*

Only answer this question if the following conditions are met:  
° Answer was 'Yes' at question '11 [008]' (Are you a member of Facebook?)

Please choose **only one** of the following:

* once a day once a day
* multiple times a day multiple times a day
* once a week once a week
* less than once a week less than once a week
* once a month once a month
* less than once a month less than once a month

### 14 [011]I believe Facebook is better for emotional support rather than information exchange. So I believe it is a community of relationship than a community of interest. \*

Only answer this question if the following conditions are met:  
° Answer was 'Yes' at question '11 [008]' (Are you a member of Facebook?)

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

A Community of Interest is a type of community centred on users' information exchange on different topics. A Community of Relationship is a type of community centred on users' shared experience and emotional support.

### 15 [016]I consider myself an \_\_\_\_ of Facebook. \*

Please choose **only one** of the following:

* active member active member
* observant member observant member

An active member is defined as a member who posts bookmarks, comments on bookmarks, or both. An observant member is defined as a member who browses through posts (bookmarks), but does not contribute by posting bookmarks or comments.

### 16 [017]How often do you post a bookmark on Facebook? \*

Please choose **only one** of the following:

* once a day once a day
* multiple times a day multiple times a day
* once a week once a week
* less than once a week less than once a week
* once a month once a month
* less than once a month less than once a month
* Other Other

Bookmarking, in this case, is the process of posting a link on your Facebook page from another website. In other words, Bookmarking is the process of posting a link to a target website. The target website is where one has an account/profile such as Facebook.

### 17 [020]How often do you post a comment on a Facebook bookmark posted by other members? \*

Please choose **only one** of the following:

* Once a day Once a day
* multiple times a day multiple times a day
* once a week once a week
* less than once a week less than once a week
* Once a month Once a month
* Less than once a month Less than once a month
* Other Other

A comment is a remark related to a posted bookmark.

### 18 [021]I usually post comments \_\_\_ . \*

Please choose **only one** of the following:

* on bookmarks posted by myself on bookmarks posted by myself
* on bookmarks posted by others on bookmarks posted by others
* on bookmarks posted by myself or others on bookmarks posted by myself or others

### 19 [022]I \_\_\_\_ add tags (Hashtags #) when posting a bookmark on Facebook. \*

Please choose **only one** of the following:

* never never
* rarely rarely
* Sometimes Sometimes
* often often
* always always

A tag is a piece of information assigned to a post bookmarked by a user. Tags act as identifiers for posts. In other words, they offer the reader an idea of the context and content of posts. For example a political post on Facebook can be tagged "politics", "congress", "democrats", "media reform". Tags help to describe a post and allow it to be found again by browsing or searching.

### 20 [023]I \_\_\_\_ use tags when I am searching for a topic on a website where tags are available. \*

Please choose **only one** of the following:

* never never
* rarely rarely
* Sometimes Sometimes
* often often
* always always

## Part 3

### 21 [020]I use \_\_\_\_ on my Facebook profile (If you have more than one Facebook account, this question only apply to your primary personal account). \*

Please choose **only one** of the following:

* my full real name (for example John Smith) my full real name (for example John Smith)
* my partial real name (for example John1982 or Montreal3smith) my partial real name (for example John1982 or Montreal3smith)
* an obvious username (for example catlover or filmnerd) an obvious username (for example catlover or filmnerd)
* a partially obvious username (for example John34pnm@ or psps-nerd) a partially obvious username (for example John34pnm@ or psps-nerd)
* a non-obvious username (for example btcoo99 or ggg@tp!) a non-obvious username (for example btcoo99 or ggg@tp!)

### 22 [02]I \_\_\_ as my Facebook profile picture (If you have more than one Facebook account, this question only apply to your primary personal account). \*

Please choose **only one** of the following:

* use my personal photo  use my personal photo
* use a fake photo (for example a borrowed celebrity photo or an inanimate object) use a fake photo (for example a borrowed celebrity photo or an inanimate object)
* do not have a photo  do not have a photo

### 23 [021]I believe that other members of Facebook to whom I am connected, perceive me as being identifiable (not anonymous). \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 24 [022]I perceive Facebook members whom I am connected to as being identifiable (not anonymous). \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

## Part 4

### 25 [001]Please select an appropriate answer for the following 20 questions with reference to Facebook. \*

Please choose the appropriate response for each item:

|  | Strongly Disagree | Disagree | Somewhat Disagree | Neutral | Somewhat Agree | Agree | Strongly Agree | Not Applicable / Unsure |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| My knowledge sharing with other members in my network on Facebook is good | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My knowledge sharing with other members in my network on Facebook is harmful | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My knowledge sharing with other members in my network on Facebook is an enjoyable experience | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My knowledge sharing with other members in my network on Facebook is valuable to me | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My knowledge sharing with other members in my network on Facebook is a wise move | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I earn respect from other members in my network on Facebook by sharing my knowledge | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I feel that sharing knowledge with other members in my network on Facebook improves my status on Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| Sharing knowledge with other members members in my network on Facebook improves my image on Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I know that other members in my network on Facebook will help me by sharing their knowledge, so it is only fair that I help them by sharing my knowledge | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I trust that other members in my network on Facebook would help me by sharing their knowledge if I were in a situation in which I need their help | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I have a sense of belonging to Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I have a feeling of togetherness to Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I really care about Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I like helping other members in my network on Facebook through sharing my knowledge | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| I enjoy sharing my knowledge with other members in my network on Facebook | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| It feels good to help other members in my network on Facebook through sharing my experiences/knowledge | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My network on Facebook keeps me absorbed | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My network on Facebook excites my curiosity | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My network on Facebook is engaging | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |
| My network on Facebook is interesting | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png | http://limesurvey.degroote.mcmaster.ca/templates/default/print_img_radio.png |

## Part 5

### 26 [021]Bookmarking (posting links) improves my knowledge sharing experience on Facebook. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

Bookmarking, in this case, is the process of posting a link on your Facebook page from another website. In other words, Bookmarking is the process of posting a link to a target website. The target website is where one has an account/profile such as Facebook.

### 27 [022]Bookmarking (posting links) enhances the effectiveness of knowledge sharing on Facebook. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

Bookmarking, in this case, is the process of posting a link on your Facebook page from another website. In other words, Bookmarking is the process of posting a link to a target website. The target website is where one has an account/profile such as Facebook.

### 28 [023]I find bookmarking (posting links) to be useful for knowledge sharing on Facebook. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

Bookmarking, in this case, is the process of posting a link on your Facebook page from another website. In other words, Bookmarking is the process of posting a link to a target website. The target website is where one has an account/profile such as Facebook.

### 29 [024]Commenting on bookmarks (posts) improves my knowledge sharing experience on Facebook . \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

A comment is a remark related to a posted bookmark.

### 30 [025]Commenting on bookmarks enhances the effectiveness of knowledge sharing on Facebook. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

A comment is a remark related to a posted bookmark.

### 31 [026]I find commenting on bookmarks to be useful for knowledge sharing. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

a comment is a remark related to a posted bookmark.

## Part 6

### 32 [001]Posting a bookmark in isolation of any comments from the bookmarker or other users is not considered sharing of knowledge. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 33 [002]When I think of a bookmark, I feel that all comments taken together create knowledge that is different from each comment individually. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 34 [003]A pop singer's new concert information has been posted as a bookmark. Together with its comments, I consider this to be knowledge. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 35 [004]A new camera model specification has been posted as a bookmark. Together with its comments, I consider this to be knowledge. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 36 [005]A list of 2013 Academy Awards winners has been posted as a bookmark. Together with its comments, I consider this to be knowledge. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 37 [006]A new report on a type of blood cancer has been posted as a bookmark. Together with its comments, I consider this to be knowledge. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 38 [007]I apply the knowledge that has been shared on Facebook in practice. \*

Please choose **only one** of the following:

* Strongly Disagree Strongly Disagree
* Disagree Disagree
* Somewhat Disagree Somewhat Disagree
* Neutral Neutral
* Somewhat Agree Somewhat Agree
* Agree Agree
* Strongly Agree Strongly Agree
* Not Applicable / Unsure Not Applicable / Unsure

### 39 [008]Please define what knowledge means to you in a sentence or two. \*

**Appendix 4**

**Consent Form**

**A study about understanding knowledge sharing in Web 2.0 online communities**

**Investigators:**

**Student Investigator:** **Faculty Supervisor:**

Sana Mojdeh Dr. Milena Head

DeGroote School of Business DeGroote School of Business

McMaster University McMaster University

Hamilton, Ontario, Canada Hamilton, Ontario, Canada

**(905) 525-9140 ext. 26396** **(905) 525-9140 ext. 24435**

E-mail: mojdehs@mcmaster.ca E-mail: headm@mcmaster.ca

**Purpose of the Study**

You are invited to take part in this study which seeks to understand the factors that motivate people to share knowledge in online communities.

**Procedures involved in the Research**

You will be asked to answer 58 questions regarding online communities.

It is expected that the survey will take no more than 20-25 minutes of your time.

**Definitions**  
Here are a couple of definitions that you might find useful during this survey. Please note that provided definitions are in the context of this study.  
  
- Bookmarking: (or social bookmarking) is the process of posting a link from other websites (with or without tags) on an aggregator (such as Delicious, Stumbleupon, Reddit, etc).   
  
- Aggregator: is a website that aggregates bookmarks (post) by users who can vote "up" or "down" post to rank them. Reddit, Delicious, Stumbleup, and Digg are examples of aggregators.   
  
- Tag: a tag is a non-hierarchical keyword or term assigned to a piece of information. This kind of metadata helps describe an item and allows it to be found again by browsing or searching.  
  
- Commenting: in the context of aggregators, a comment is a remark related to a bookmark posted by user.   
  
- Community of Interest: a type of community centreed on users' information exchange on different topics.  
  
- Community of Relationship: a type of community centreed on users' shared experience and emotional support.

**Potential Harms, Risks or Discomforts**

It is not likely that you feel any discomfort as you fill the survey. There is no right or wrong answer. You will be asked about your opinions or perceptions, Please note that you are not obliged to complete the survey. You do not need to answer questions that you do not want to answer. You may withdraw from the survey before August 1st. 2013.

**Potential Benefits**

While the research will not benefit you directly, we hope that what is learned as a result of this study will help the research and practitioner communities to better understand the potential of Web 2.0 tools for knowledge sharing. This investigation will be the basis for a Ph.D. student’s thesis.

**Confidentiality**

All information collected will be kept secure and in strict confidence. Only the researchers named above will have access to the data, which will be stored securely. Participants are anonymous and will not be identified individually in any reports or analyses resulting from this research project.

OpenVenue (now renamed Research Now), strictly follows highest ethical and professional standards of the European Society for Opinion and Market Research (ESOMAR). The following link will be provided to Research Now's research integrity statements (including documentation on the ESOMAR standards:

http://www.researchnow.com/en-CA/Panels/PanelQuality/ResearchIntegrity.aspx

Data collected from the survey will be completely anonymous and no identifying information will be kept. Identities of the participants will be stripped before the encrypted data is sent from OpenVenue.

Information on Research Now policies could be accessed via:  <http://www.researchnow.com/en-CA/Panels/PanelQuality/ResearchIntegrity.aspx>

**Participation and Withdrawal**

You may quit the survey by closing the browser.

You may withdraw at any time before August 1st 2013, should you choose to do so. Participants through OpenVenue are provided a randomly assigned number for each survey which they can use at a later time should they choose to withdraw their responses after submitting their survey.

Participants from OpenVenue (Research Now) will still receive their OpenVenue rewards but will not be eligible for the draw if they choose to withdraw.

**Information about the Study Results**

This study will be completed within six months. You may request a copy of the results by contacting Dr. Head at headm@mcmaster.ca

**Questions about the Study**

If you have questions or need more information about the study itself, please contact us at:

[mojdehs@mcmaster.ca](mailto:mojdehs@mcmaster.ca) or [headm@mcmaster.ca](mailto:headm@mcmaster.ca)

This study has been reviewed by the McMaster University Research Ethics Board and received ethics clearance. If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

McMaster Research Ethics Secretariat

Telephone: (905) 525-9140 ext. 23142

c/o Research Office for Administrative Development and Support

E-mail: [ethicsoffice@mcmaster.ca](mailto:ethicsoffice@mcmaster.ca)

Consent: I understand the information provided for the study of online communities as described herein. My questions have been answered to my satisfaction, and by selecting “I agree” below, I agree to participate in this study. I understand that if I agree to participate in this study, I may withdraw from the study at any time. \*

Please choose **only one** of the following:

* I agree I agree
* I disagree and wish to withdraw from the study I disagree and wish to withdraw from the study

1. As will be discussed in chapter 4, for user anonymity construct, identified members are coded as 1 and anonymous members are coded as 0. For community type construct, community of relationship members are coded as 1 while community of interest members are coded as 0. [↑](#footnote-ref-1)
2. Chin, Tatcher, and Right (2012) have discounted this technique in terms of usefulness; however, it was decided to deploy this method as the second method to detect CMB, as it is still commonly used among IS researchers and appropriate alternatives have not been proposed yet. [↑](#footnote-ref-2)