MEMBER PARTICIPATION IN VIRTUAL COMMUNITIES

SOCIO-TECHNICAL DETERMINANTS OF MEMBER PARTICIPATION IN VIRTUAL COMMUNITIES:
AN EXPLORATORY MIXED METHODS INVESTIGATION

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Abstract

The recent unprecedented growth of virtual communities on the Internet has provided an impetus for researchers and practitioners to investigate factors that facilitate or encumber member participation in these communities. As interactive online spaces, virtual communities have the potential to enable high levels of information sharing, communication and social interactions among their members. Despite the crucial realization that engaging and involving members constitutes a fundamental requirement for successful and thriving virtual communities, research done to date to study the factors affecting member participation behavior is still in its infancy. The goal of this study is to identify and ascertain the sociological and technological factors for enhancing and sustaining member participation in virtual communities. Toward this objective, the study utilizes an exploratory mixed methods research design to collect and analyze qualitative and quantitative data from members of various social, professional and commercial virtual communities.

Qualitative data for the empirical investigation was gathered through online focus groups and open-ended questionnaires. Using principles and procedures associated with *grounded theory methodology*, this study presents an emergent theory characterizing the *member engagement process* as an underlying phenomenon integrating various socio-technical factors that influence member participation behavior. The subsequent phase of quantitative investigation deliberates the testing of salient theoretical constructs and relational propositions from the emergent theory. *Exploratory factor analysis* and *structural equation modeling* techniques were used to estimate a structural model of relationships among socio-technical determinants of member participation in virtual communities. The quantitative results provide a strong substantiation of the qualitative findings through triangulation and elaboration of the constructs and their interrelationships in the emergent theory.

The key findings from this study emphasize the role of factors such as information quality, member responsiveness, member trustworthiness, and perceived enjoyment in determining continued and active participation in virtual communities. The findings also illustrate the salience of perceived satisfaction and sense of virtual community in predicting members' participation. Based on these findings, this study offers theoretical implications and suggestions for future research, as well as guiding principles and actionable recommendations for virtual community practitioners.

Keywords: Virtual Communities, Online Communities, Member Participation, Engagement, Socio-Technical, Mixed Methods Research Design, Management Information Systems

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e-Companion Website Supplements

The e-Companion Website for this dissertation is accessible at:
http://www.umar.biz/research/phd/eCompanion

- The website consists of a few short compositions that were written by the researcher during the course of this study to identify and explicitly state his orientation towards different research methodologies and analysis modes. Due to space limitations, the full content of these compositions could not be included in this dissertation. As such, these are offered as background or supplementary reading to the readers.

  List of Compositions Available Online:

  - Role of Constructivist Research Paradigm in the Qualitative Phase of Investigation
  - Scope of Theory Generation in the Qualitative Phase of Investigation
  - Analytic Induction & Abductive Reasoning Modes for Theory Generation in the Qualitative Phase of Investigation
  - Role of Constructivist Research Paradigm in the Quantitative Phase of Investigation
  - Justification of Specification of Latent Constructs using Reflective Indicators in the Quantitative Methodology

- The website also offers flash-based interactive versions of mindmaps created during the open and axial coding phases of qualitative analysis.

  List of Mind Maps Available Online:

  - Mind Map of Principal Analytical Categories in the Emergent Theory
  - Tree Node Structure for Member Participation Behavior
  - Tree Node Structure for Member Characteristics
  - Tree Node Structure for Community Characteristics
  - Tree Node Structure for Technological Determinants
  - Tree Node Structure for Sociological Antecedents
  - Tree Node Structure for Participation Value Effects

Chapter 1: Introduction

> "Communities are the heart, the soul, the nervous system, and the lifeblood of human society." (Schuler, 1996, p. 1)

Originally defined as "social aggregations on the Internet" (Rheingold, 1993), virtual communities have attracted significant research attention from many academic disciplines, including sociology, psychology, management, communication, computer science, and information systems. Since their earliest inception, virtual communities (VCs) have been recognized as an important facet of the digital economy and as a critical success factor for e-Commerce on the Internet (Figallo, 1998; Hagel & Armstrong, 1997; Preece et al., 2004; Ridings & Gefen, 2004). Today, virtual communities are being touted as the fastest growing category of websites (Center for the Digital Future, 2007; Day, 2006). Their value in a variety of internal-facing business applications, such as knowledge sharing and organizational learning, as well as external-facing online activities, such as the provision of commercial and government services, have recently been the focus of popular press and academic research (Bell & Fader, 2006; Bughin, 2007; Center for the Digital Future, 2007; Center for the Digital Future, 2009; Nairn, 2006; Petouhoff, 2009). Furthermore, due to the recent emphasis on web 2.0 tools and applications that facilitate collaboration and user generated content, many organizations are refocusing their efforts on virtual communities in an effort to use new technologies as a basis for their online community initiatives. These initiatives may entail internal-, as well as external-, facing virtual communities that range from online knowledge networks for collaborative work to online consumer reference groups for collective intelligence.

Whether enabled through newer web technologies, such as wikis and microblogging applications, or the older well established platforms of mailing lists and discussion forums, an interesting characteristic of virtual communities is that irrespective of the type of community formed, their success or failure depends on the pervading social interactions and relationships within the community. Furthermore, the health of these interactions and relationships are shaped by the level and quality of member participation in the virtual communities. For these reasons, this research study aims to identify and ascertain the determinants for the successful adoption and continued use of virtual communities. Toward this objective, the discourse of this research is predicated upon a socio-technical perspective of the factors affecting member participation in a wide variety of virtual communities. The empirical investigation approach in this study aims to generate a substantive theory of member participation in virtual communities through a combination of qualitative and quantitative research methodologies. There are several benefits for pursuing such a research program: *First*, an investigation of member

participation can lead to insights about the changing requirements and needs of virtual community members at different stages in a community's lifecycle (Dannecker et al., 2007; Preece, 2001a; Schoberth et al., 2003). *Secondly*, a study of various types of virtual communities from the social, professional and commercial domains can help ascertain the positive and negative impacts of initiatives, such as site promotion and the introduction of new tools and features, on the satisfaction and participation levels of existing and potential community members (Lee et al., 2003). *Thirdly*, by examining the different types of interactions that develop in virtual communities, the results from this research can offer guidelines to organizations that wish to capitalize on the opportunities afforded by online communities. *Lastly*, from an academic standpoint, by adopting a pluralistic research approach that utilizes empirical evidence from diverse cases and harvests conclusions from multiple research methodologies, this study aims to formulate theoretical perspectives that have explanatory as well as predictive power. Such an orientation has increasingly been recommended to improve the state of current research in the area of virtual communities (Dannecker et al., 2007; Gupta & Kim, 2004a).

The next sections in this chapter provide further background of the research study by first stating the research premise and rationale, and then highlighting the significance and value of the study in academic and practical contexts. Finally, the structure of the dissertation is presented to provide a synopsis of the topics and focus of subsequent chapters in this dissertation.

1.1 Research Premise

As conceptual groundwork for this research study, the following subsections outline the treatise of virtual communities adopted in this dissertation. A preliminary definition of virtual communities is provided, and the various elements of virtual communities are subsequently delineated within an information systems research context.

1.1.1 What is a Virtual Community?

A Virtual community (VC) can be described as a computer supported social network (Garton et al., 1997) that facilitates information sharing, communication and social interaction among its participating members. Put more simply, virtual communities can be characterized as "gathering spots" on the Internet where individuals and organizations can share common interests and meet differentiated user needs and wants (Baim, 2006).

It should be noted that in their theoretical discourse on VCs, many researchers have highlighted the problem around the lack of a unanimous definition of the term (Lee et al., 2003; Li, 2004; Schoberth & Schrott, 2001)[1]. Consequently, the terms "virtual communities", "online

[1] As a core aspect of the conceptual foundations of this research, a multidisciplinary working definition of virtual communities is deliberated and articulated in the second chapter of this dissertation.

communities", "web communities", "cyber communities", "electronic communities" and "e-communities" are often used interchangeably in the research literature to refer to the same phenomenon[2]. Despite the absence of an agreed upon definition of the term, the idea of computer mediated communication (CMC) is often cited as a main characteristic of online communities. This computer mediated communication in virtual communities can take place through the use of information and communication technologies (ICTs) such as websites, computer networks, email lists, Usenet newsgroups, discussion forums, Internet chat applications, and networked databases (Coon, 1998; Lapachet, 2001). Additionally, modern web-based platforms such as weblogs (popularly known as blogs) for user generated content and wikis for online collaboration have also lately been considered in the list of potential technologies that can spawn a virtual community (Blanchard, 2003; Buss & Strauss, 2009).

The study of ICTs that form a core component of virtual communities can be approached from multiple research perspectives in various academic fields such as communication, information systems, computer science, information science, and organization science. The next section outlines the orientation of this research study by situating virtual communities in an information systems context.

1.1.2 Virtual Communities in an Information Systems Context

In setting out the agenda for this study, the investigation of virtual communities was pursued with an information systems (IS) research orientation. Based on various definitions in the extant literature (e.g., Cushing, 1990; Gregor, 2006; Hirschheim & Klein, 2003; Khazanchi & Munkvold, 2000; Orlikowski & Iacono, 2001), information systems research can be considered as the study of the effective use of information and communication technologies (ICTs) and their potential impact on human, organizational, and social world. Furthermore, as an applied discipline under the field of management, information systems research typically pertains to the design, management, use, valuation, and impacts of information and communication technologies at different levels of analysis (i.e., individuals, groups, organizations and societies). At the theoretical core of IS research is the concept of an IT artifact, which refers to information and communication technologies that act as enabling infrastructure for people and organizations in driving their individual activities and business processes, and ultimately affecting their overall performance and satisfaction levels (Bacon & Fitzgerald, 2001).

In addition to the aforementioned descriptive characterizations of IS research, some researchers have espoused stricter normative definitions that seek to set out principles and topics that can be included within the boundaries of IS research (Khazanchi & Munkvold, 2000). For example, Khazanchi & Munkvold (2000) and Bacon & Fitzgerald (2001) provide a systematic framework of subject categories and topics that can be considered to fall under the field of

[2] This research study uses the terms virtual communities and online communities interchangeably.

information systems. Similarly, Orlikowski & Iacono (2001) provide a classification of the various conceptualizations of IT artifacts that are commonly observed in the extant IS research literature. In yet another normative perspective of the field of IS, Benbasat & Zmud (2003) provide a cogent definition of an IT artifact and delineate the scope of IS research as relating to the IT artifact's immediate nomological network (capabilities, perceptions, uses, practices, behaviour, and impacts linked to the IT artifact).

In terms of this dissertation, the empirical investigation of member participation in virtual communities was framed within an IS research context. Specifically, the scope of research pertained to the exploration, identification, and analysis of factors that affect the adoption, acceptance and continued use of virtual communities and their underlying ICTs. Using the defining elements of an IT artifact as outlined by Benbasat & Zmud (2003), virtual communities were examined in terms of their underlying ICTs and their use by members, while also considering the context and structure of tasks embedded within the virtual communities and performed by their members. To illustrate the conceptualization of virtual communities as IT artifacts, Table 1-1 below provides examples of attributes of virtual communities that align with the defining elements of IT artifacts[3].

Table 1-1: Virtual Community Attributes as Elements of an IT Artifact

Defining Elements of an IT Artifact	Examples of Attributes of Virtual Communities
Information & Communication Technologies	▪ Websites and portals hosting the virtual community ▪ Groupspace platforms such as discussion forums, blogs, wikis, mailing lists, newsgroups ▪ Communication tools such as instant messaging and interactive chat applications
Tasks	▪ Information exchange in the form of sharing knowledge, asking and answering questions, providing commentary, and collaborating on new content ▪ Social interactions in the form of networking with other members, forming relationships, and seeking and providing emotional support
Task Structures	▪ Administrative policies and controls ▪ Interaction norms and etiquette ▪ Technology usability and accessibility ▪ Scope of information exchange and social interaction (diverse/narrow) ▪ Extent of participation (active/passive)
Task Context	▪ Member motivations and interests ▪ Membership duration ▪ Self-efficacy in technology use and personal knowledge and expertise ▪ Member trust levels and sense of community

Overall, from an IS research perspective, this study is concerned with the participation of members in virtual communities in terms of their utilization of ICTs for information exchange

[3] Please note that in Table 1-1, the examples of attributes of virtual communities pertaining to various elements of an IT artifact are only provided to familiarize the reader with the context of the current research and to set the tone for the dissertation. The examples provided should not be interpreted to be an exhaustive itemization of virtual community attributes. In fact, the qualitative results from the first phase of this research study (discussed in chapter 5) provide additional attributes of virtual communities that can be mapped to the various elements in the IT artifact definition.

and social interactions within the realm of the virtual community. The phenomenon of member participation is explored through user perceptions, attitudes, and behaviour. Furthermore, as elaborated in later chapters, based on the IT artifact nomological network, the conceptual framework and the theoretical model in this study comprise constructs pertaining to patterns, antecedents and consequents of member participation at cognitive, affective, and conative levels, and all constructs are within a few degrees of separation from the IT artifact.

1.2 Research Rationale

With respect to this dissertation, a socio-technical perspective of virtual communities is adopted. This perspective recognizes that the social and the technical interaction features in such communities are largely interwoven (Kling, 1996; Preece, 2001a; Ridings & Gefen, 2004; Wellman & Haythornthwaite, 2003), and that together these factors affect the uptake and outcomes of virtual community initiatives. The following subsections provide further justification to investigate member participation in virtual communities using a socio-technical perspective.

1.2.1 Why Study Member Participation in Virtual Communities?

One of the most important reasons to study member participation in virtual communities is to gain a fundamental understanding of the culture, mechanics and processes that subsist in such communities (Musgrave, 2004). With the recent proliferation of virtual communities in the domains of commercial (for-profit) services as well as public (not-for-profit) services, this fundamental understanding will help establish a common framework that will guide virtual community developers in their efforts to ensure continued active membership in their communities over the long-term. Under a research scheme suggested by Lee et al. (2003), it is hoped that such a framework will further lead to the advancement of best practices in the areas of: i) technology development, ii) functionality adoption, iii) implementation and outcome assessments, and iv) institutionalization.

Firstly, an investigation of member participation can lead to insights about the changing requirements and needs of the members in the virtual community at different stages in the community's lifecycle (Finin et al., 2008; Preece, 2001a; Schoberth et al., 2003). This knowledge can in turn facilitate the development of ICTs that can foster active participation from existing members, greater involvement from peripheral members, as well as potential contributions from new members.

Secondly, by studying the patterns of use of various technologies in a virtual community, the research can help in the analysis of enabling and inhibiting factors in the VC's evolution (Schoberth et al., 2003). Such an understanding can prove to be beneficial in the continued governance and operation of a virtual community by ensuring positive motivation of community members to contribute to its objectives.

Thirdly, a study of various types of virtual communities from the social, professional and commercial domains can help ascertain the positive and negative impacts of initiatives such as site promotion, and introduction of new tools, on the satisfaction and participation levels of existing and potential members in the community (Lee et al., 2003). An investigation of the implementation of different virtual community initiatives with respect to a variety of outcome variables can prove to be useful in informing an organization's future choices about services to be introduced and delivered through various virtual community technology platforms.

Last, through an examination of the types of interactions that develop in VCs over time, organizations can bear out the opportunities afforded by these communities at various stages in their evolution. This knowledge can lead to an appreciation of the best possible ways to integrate virtual communities with the overall objectives of the sponsoring organization, such as the provision of citizen services by the government or the marketing of products and services in an e-Commerce environment (Yoo et al., 2002a).

By facilitating a deeper understanding of member ecology in virtual communities, this study hopes to provide guidelines for the creation of multi-faceted technology spaces for virtual communities that can satisfy the needs and preferences of different online community member roles and end-user needs (Finin et al., 2008). Such a research program can also help answer questions that have lately been set forth as a useful research agenda for virtual community investigations (Dannecker et al., 2007), specifically:

- How can VCs be designed to meet the needs of different types of users (e.g., new vs. experienced users) with different levels of participation (e.g., active members vs. lurkers)?
- What types of technologies and services does a virtual community need in order to support interaction between the different user realms (offline vs. online community vs. external social media)?
- What practices constitute governance mechanisms that encourage effective information exchange and successful social interactions?
- How can effective community design impact the success of virtual community directly through technologies and policies, as well as indirectly through fostering improved member participation?

Overall, as businesses, governments and other organizations move towards the web based delivery of information, products and services through virtual communities, an understanding of member participation in these communities can lead to the identification and verification of key success factors (KSFs) for active user involvement in these communities and for the positive uptake and utilization of enabling technology platforms.

1.2.2 Why Adopt a Socio-Technical Perspective?

From the review of virtual communities and the preliminary definition presented above, it can be inferred that VCs are social entities supporting a variety of affinities among members while facilitating their interactions through means of various technologies. Moreover, based on the conceptualization of virtual communities as IT artifacts, it can be seen that the task structure and task context elements of the IT artifact have a strong sociological basis. To effectively address this dual sociological and technological nature of the IT artifact pertaining to virtual communities, a *socio-technical* perspective has been strongly recommended in academic research (Dannecker et al., 2007; Koh et al., 2007; Preece & Maloney-Krichmar, 2003) and industry practice (Gossieaux & Moran, 2008; Petouhoff, 2009).

The socio-technical perspective in information systems research is based on the premise that information systems comprise behavioural as well as technological sub-systems that need to be addressed in unison while investigating pertinent IS related phenomena (Becker et al., 2007; Lee, 2000; Walls et al., 1992). By adopting a systems thinking orientation, a socio-technical approach to IS research is purported to be both rigorous and relevant in its nature (Lee, 2000).

Whether a virtual community is internet-, intranet-, or extranet-based, researchers agree that engaging and involving members constitutes the basic requirement for successful and thriving communities (Cothrel & Williams, 1999; Hagel & Armstrong, 1997; Preece, 2001a; Preece et al., 2004). Recent research on virtual communities confirms that while technical design features that can improve information processing and the adoption of information in virtual communities (Zhang & Watts, 2008), it is the sociological factors that determine a member's long-term orientation towards the virtual community (Lin *et al.*, 2008). Despite this crucial realization, little research has been done to study the behavioural characteristics of community members (Schoberth et al., 2003) and the factors that motivate and sustain their participation (Franz & Wolkinger, 2003; Rotman et al., 2009). Similarly, within the context of contemporary web 2.0 technologies and social media applications which have gained popularity in the online community marketplace, experienced practitioners warn against adopting an implementation approach that focuses primarily on technological aspects of virtual communities. For example, Gossieaux & Moran's recent survey of successful firm sponsored virtual communities found that contrary to common belief, the greatest obstacles to making a community work are not technology or capital related at all, but rather are concerned with issues of attracting people to the community and getting them engaged and wanting to come back (Gossieaux & Moran, 2008). On a similar note, Porter characterizes virtual communities as an essential component of the social web and calls for practical considerations that combine interface design with social psychology (Porter, 2008, p. viii). Hence, there is widespread agreement among academics and practitioners alike for online community providers to balance sociological factors, that foster better member participation, with technology features that enable various member activities and interactions in the virtual community (Gossieaux & Moran, 2008; Rotman et al., 2009).

It is by virtue of the sociological needs and objectives of members in virtual communities that this research adopts a *socio-technical* orientation towards the study of member participation in online communities. Deliberating virtual communities as co-evolving socio-technical environments, the needs of members, and the informational and technical characteristics of the VC, can be thought of as impacting one another. Given this, the goal of this dissertation is to explore some of the determinants for enhancing member participation in virtual communities vis-à-vis *usability* as well as *sociability* factors. In her seminal work on virtual communities, Preece (2001a) refers to sociability as a construct, based on people, purpose and policies, and usability as a function of the enabling software technologies. Both sociability-, and usability-based perspectives have been regarded as imperative for virtual community research (Preece, 2001a; Preece, 2001d; Preece et al., 2004), and extant research is often found lacking in one of these two areas (Franz & Wolkinger, 2003; Kling, 1996; Kling et al., 2003). This dissertation aims to fill that gap by working towards a socio-technical description of member participation in virtual communities.

1.3 Research Significance

This research study aims to shed light on the sociological and technological factors that affect member participation in online communities. Through a combination of qualitative and quantitative research methodologies, this study hopes to provide a realistic description and a rich portrayal of virtual community use by its members. As such, this study attempts to answer the call for establishing a common theoretical framework that can help explain some of the dynamics of member participation processes in virtual communities (Akoumianakis, 2009; Buss & Strauss, 2009; Dannecker et al., 2007; Gupta & Kim, 2004a).

The following sub-sections highlight some of the expected benefits of this study to academics and practitioners.

1.3.1 Scholarly Value of the Research Study

From an academic perspective, this study propounds a substantive theory of member participation in virtual communities, taking into account sociological and technological factors that facilitate effective member engagement and positive participation outcomes such as satisfaction, enjoyment, and sense of community, ultimately affecting the willingness to continue participation in the virtual community. Toward this, the research study draws upon the points of views of actual users and their individual perceptions and experiences, and provides an integrated view of cognitive, affective and conative aspects driving the process of member participation in virtual communities.

In terms of its research approach, empirical results from a combination of qualitative and quantitative methodologies are used in the exploration of micro level facets of a member's

online behaviour, as well as the macro level context and conditions affecting a member's participation in a virtual community. Through an explanation of these facets, this study is expected to provide a rich conceptualization of member participation as a socio-technical phenomenon.

In terms of results, the emergent theory from the qualitative phase uses a social process description to scaffold the socio-technical elements underlying the dynamics of member participation in virtual communities. Through the central phenomenon of the *member engagement process*, higher order interactions in member participation are identified, and the associations among various sociological and technological factors that characterize those higher order interactions are explained. A process based approach such as this has been recommended by other researchers for describing social processes and technology use in virtual communities (Blanchard & Markus, 2003; Blanchard & Markus, 2007b; Butler, 2001; Daniel et al., 2002; Ellonen et al., 2007; Fernback, 1999). The quantitative phase tests a subset of the socio-technical factors that emerged from the preceding qualitative phase and provides further substantiation of the relational propositions among them.

As such, this study potentially offers to make a valuable contribution to the body of knowledge on virtual communities by providing an elaboration of the sociological and technological determinants of member participation in virtual communities. In addition, through the development and deployment of a mixed-methods approach in this dissertation (described in detail in Chapters 4 & 6), the study potentially offers the research community helpful procedures and techniques for investigating virtual communities in the future.

1.3.2 Practical Implications of the Research Study

From a practitioner standpoint, findings from this research study should appeal to virtual community providers at various levels including planners, designers, operators, administrators, and facilitators of online communities. Increasingly being bundled under the role of an online community manager, skills relevant to cultivation of virtual communities have recently been cited as the fastest growing job area for web workers (Connor, 2009; Foster, 2009; Kirkpatrick, 2008). This research study can help professionals assigned with the responsibility of managing virtual communities by providing guiding principles that can be incorporated within an organization's overall online communities or social media strategy.

Recent industry trends indicate that top global consumer brands are taking a strong interest in creating virtual communities through the use of traditional as well as new social media applications (Li, 2009). As organizations begin to investigate new social media platforms, such as microblogging and collaborative tagging, advanced interaction channels, such as mobile services, and sophisticated computing processes, such as semantic analyses of virtual community content, organizations need to manage these technology developments effectively

to ensure that their virtual community capabilities are aligned with their own needs, as well as with those of their existing and potential community members. One key output of this dissertation is the emergent theory of member participation explained in terms of the *member engagement process*. It is believed that this explanation can potentially provide a roadmap to organizations and enable them to base their technology-related decisions on the social requirements of members and their behavioural patterns in the virtual community.

By elucidating the factors underlying sociability and usability in virtual communities, the findings from this research can also potentially be used to enable higher levels of connection, commitment, and loyalty in virtual communities. Additionally, the emerging recommendations can potentially provide useful guidelines for organizations that expect to create value by supporting online communities for their stakeholders, including their customers and employees. For instance, predicated upon the premise that VCs can increase stickiness of commercial websites (Gupta & Kim, 2004b), and can help in the uptake of e-Government portals (Wagner et al., 2003), enacting upon the findings from this research can be expected to result in better business models in e-Commerce and e-Marketing, and best practices for e-Government initiatives.

On the whole, by utilizing the principles and guidelines derived from this research investigation, virtual community providers can find ways to attract new members, engage passive members, and encourage active members to continue their participation, hence saving themselves against the possibility of their virtual communities changing into virtual ghost towns. Toward this, the discussion chapter in this dissertation offers various interventions, and a roadmap for prioritizing these interventions so that virtual community providers are potentially better able to manage their technology development, operational, and administrative practices for the advancement and sustainability of their virtual community initiatives.

1.4 Structure of the Dissertation

This dissertation manuscript consists of eight chapters as outlined herewith:

- The discussion in *Chapter 1: Introduction* (the current chapter) has outlined the research premise through a general introduction to the problem area, and has presented the motivation for the research topic by highlighting its significance to both theory and practice.
- Following the introduction, *Chapter 2: Essential Facets of Virtual Communities* offers a broad discussion of the themes and topics that are typically considered in virtual community research. By providing a *working definition* of virtual communities and outlining a typology of virtual communities, the chapter offers a footing for the rest of the dissertation. Furthermore, different aspects of member participation behaviour are explored to aid the discussion of key success factors for virtual communities.

- *Chapter 3: Conceptual Framework & Research Design* builds on the interdisciplinary working definition of virtual communities provided in chapter 2 and formulates a *conceptual framework* that was used to instantiate the empirical research investigation in this study. Additionally, this chapter discusses the mixed-methods research design for this dissertation, and presents an *integrated research plan* that highlights the various phases of research investigation in this study.

- *Chapter 4: Qualitative Research Methodology* reviews the process and procedures followed in the qualitative research methodology. The chapter deliberates the adapted *grounded theory* approach used in this research, and highlights the data collection procedures and protocol for the administration of online focus groups and open-ended survey questionnaires.

- Using the analysis process outlined in the preceding chapter, *Chapter 5: Qualitative Analysis & Findings* presents the findings from the qualitative research phase. Through a discussion of the findings, this chapter provides an explanation of various *socio-technical* factors that affect member participation in virtual communities, along with their effects on various aspects of member participation behavior. An *emergent theory* framed around the central phenomenon of *member engagement process* in virtual communities is outlined. Lastly, this chapter deliberates the formulation of the *abridged theoretical model* consisting of various processual factors affecting member participation in virtual communities. This abridged theoretical model is used in the next section to instigate the quantitative research phase of the study.

- *Chapter 6: Quantitative Research Methodology* starts with a synopsis of the process and procedures followed in the quantitative phase of this dissertation's research. The chapter elaborates the development and design of the survey questionnaire resource instrument based on constructs from the *abridged theoretical model* from the previous chapter. The chapter also provides details of the data collection procedures including a synopsis of the sampling and response rate improvement techniques used in this phase. Lastly, the chapter discusses the statistical analysis procedures including *exploratory factor analysis* and *structural equation modeling* techniques that were used in the study.

- Using the data analysis techniques outlined in the preceding chapter, *Chapter 7: Quantitative Analysis & Results* presents the results from the quantitative research phase. The chapter provides descriptive statistics on demographic variables, and highlights technographic patterns identified through non-parametric tests and cluster analysis techniques. The next part of the chapter addresses the dimensionality of the abridged theoretical model's core constructs based on results from the exploratory factor analysis procedures. Finally, the results from structural equation modeling

procedures are used to corroborate the propositions from the abridged theoretical model, and the ensuing *structural model* is presented.

- *Chapter 8: Discussion & Conclusions* reports on the dissertation's overall findings and results from the qualitative and quantitative phases by proffering answers to the study's research questions that were outlined in chapter 3. Implications for theory are discussed by means of a synopsis of the value and limitations of the current research study and an outlook for future research directions. Implications for practice are considered via the provision of guiding principles for the design, administration and cultivation of virtual communities. Furthermore, based on the research results, a suggested prioritization scheme of practical interventions is offered to make the end product of this research more accessible to practitioners.

Figure 1-1 below depicts a navigational summary of the structure of this dissertation, and outlines the flow between various chapters through specific inputs and outputs.

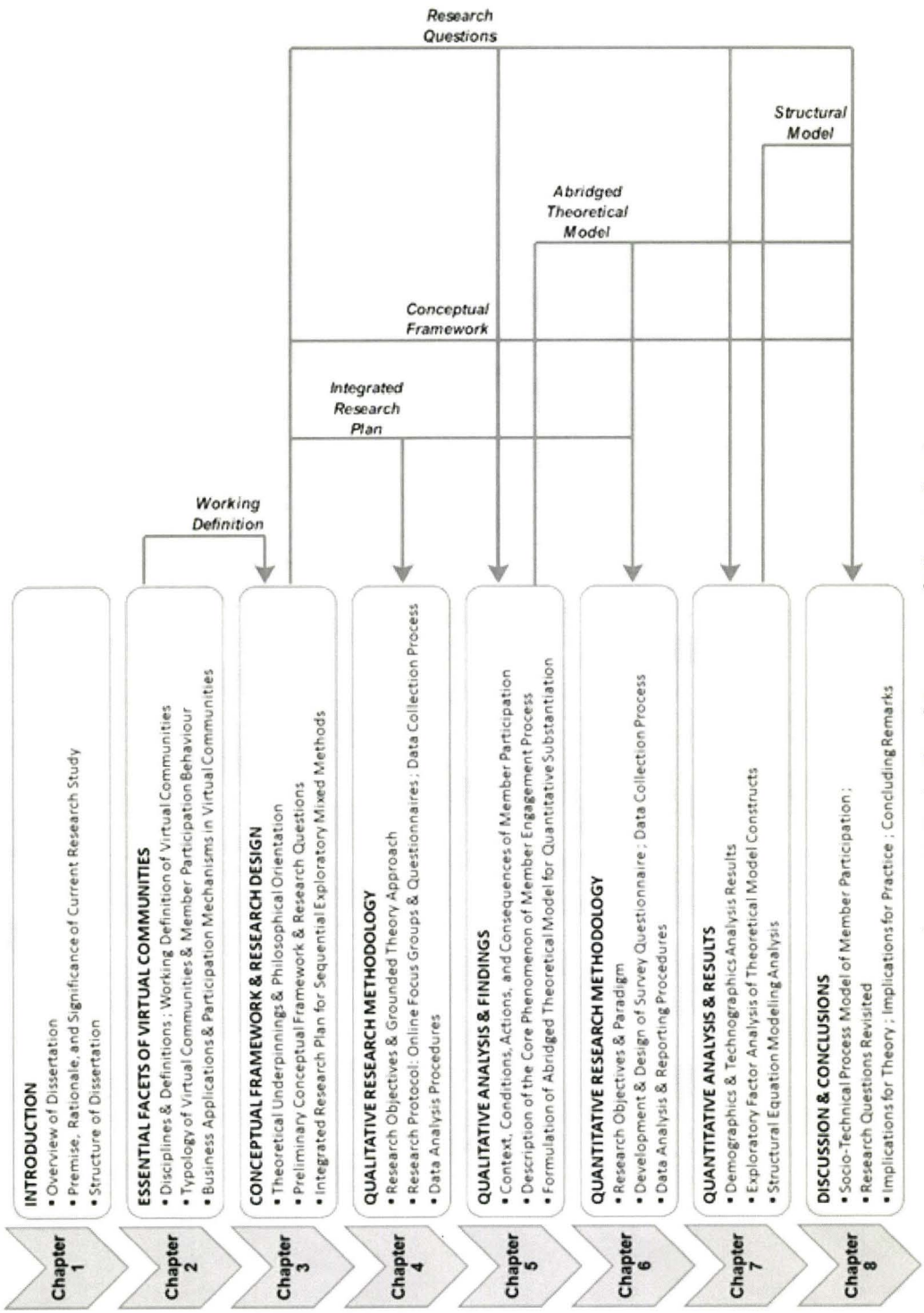

Figure 1-1: Navigational Summary of Dissertation Structure

Chapter 2:
Essential Facets of Virtual Communities

> "Virtual communities are not, ultimately, about aggregating information and other kinds of resources, although they certainly do that. Virtual communities are about aggregating people. People are drawn to virtual communities because they provide an engaging environment in which to connect with other people — sometimes only once, but more often in an ongoing series of interactions that create an atmosphere of trust and real insight. But what is the basis of this interaction? It is essentially based on people's desire to meet four basic needs: interest, relationship, fantasy, and transaction."
>
> Hagel & Armstrong (1997, p. 18)

The statement above by Hagel and Armstrong epitomizes a prevalent conceptualization of a virtual community and the essence of its functionality. The objective of this chapter is to further extend the reader's understanding of virtual communities (VCs) by explaining their underlying concepts and discussing their fundamental properties. Toward this, the chapter examines major streams of research that have studied virtual communities and specifically reviews the discourse on virtual communities in disciplines adopting a socio-technical lens of analysis. For purposes of this review, the survey of literature includes research that has been conducted surrounding notions of virtual communities, online communities, and electronic communities (e-communities). Academics and practitioners have often used these various terms interchangeably (Jones & Rafaeli, 2000; Schoberth et al., 2003).

The review of literature[4] in this chapter starts with a brief synopsis of the research perspectives that have been adopted in studies pertaining to virtual communities, and the types of topics that have been investigated through these orientations. Following this general introduction, the chapter presents a multidisciplinary socio-technical working definition of virtual communities based on four research literature domains including computer mediated communication, community informatics, knowledge management, and internet marketing. This definition is subsequently used as a lens of analysis for the description of key concepts relating to virtual communities including: i) typologies of virtual communities; ii) technology basis for virtual communities; and iii) types of member participation behaviour in virtual communities.

[4] As an exploratory research study based partly on suggested practices of grounded theory, the scope of initial literature review in this study was rather broad, constituting readings from information systems research and socio-technical research perspectives. Furthermore, the review of literature pertaining to virtual communities was not formally conducted in a single stage, but rather in multiple stages throughout the first empirical phase of qualitative investigation in order to support the qualitative research findings. For sake of convenience to the reader, this chapter presents the core ideas of virtual communities in one place.

2.1 Theoretical Research Perspectives in Virtual Community Research

Many researchers have noted the different fields that have embraced research programs related to virtual communities. These research fields include sociology, psychology, computer science, information systems, information science, communication studies, economics, management science, and marketing management (e.g., Iriberri & Leroy, 2009; Laine, 2009; Lee et al., 2003; Preece et al., 2004). In a recent bibliometric study, Laine (2009) found that the greatest number of publications related to virtual communities were in the technology related research fields of information science, information systems, and computer science, followed by publications in business and management. Similarly, in a more extensive search across multiple electronic databases, Iriberri and Leroy (2009) found that studies of virtual communities were more common in information systems and business research areas, but that a strong grounding in the psychology and sociology extant literature also existed.

In this dissertation, the scope of investigation was narrowed to various research streams in the social sciences. Specifically, prior studies on VCs were explored in categories by combining research fields that follow a common research orientation, namely the: i) *sociological/psychological*[5]; ii) *technological*; iii) *business/management*; and iv) *economic* perspectives. *Table 2-1* below presents a summary of a sample of studies from these four perspectives by outlining the core issues and common theoretical constructs addressed by each, as well as sample references and top cited publications[6]. A brief synopsis of each of the four perspectives follows.

[5] It should be noted that a combined research perspective across sociology and psychology does not imply a lightweight attitude toward the subject matter of either of the two separate disciplines that inform the field of information systems research. It simply reflects the belief of the researcher that theories from both these disciplines are often used in an integrated fashion to explain socio-technical phenomena which are of prime interest in this research study.

[6] The highlighted references in Table 2-1 are based on top ten citations on virtual communities from the ISI Web of Science Citation Index as reported in Laine (2009).

Table 2-1: Research Orientation & Principal Topics in Virtual Community Studies

Research Perspective	Core Issues	Common Theoretical Constructs	Sample References
Sociological / Psychological	▪ Social structure of virtual community environment ▪ Factors affecting online social processes and relationships ▪ Comparisons with face-to-face communities ▪ Cognitive and affective processes of trust building and psychological bonding among community members	▪ Social Capital (Structural, Relational, Cognitive) ▪ Social Ties (Centrality, Degree, Density etc.) ▪ Member Motivations and Social Behaviour ▪ Sense of Community	▪ Rheingold (1993) ▪ **Wellman et al. (1996)** ▪ Romm et al. (1997) ▪ Etzioni & Etzioni (1999) ▪ Kollock (1999) ▪ Wellman & Gulia (1999) ▪ **Turner et al. (2001)** ▪ Blanchard & Markus (2003) ▪ **Eysenbach et al. (2004)** ▪ Obst (2004b) ▪ Ling et al. (2005)
Technological	▪ Use of appropriate technology platforms for online interactions ▪ Interactivity and usability of virtual community interface ▪ Supporting sociability through technology tools and features	▪ Usability and Sociability ▪ Technology Acceptance Factors (Ease of Use, Usefulness, Intention to Use) ▪ IS Success Factors (System Quality, Information Quality, System Use, User Satisfaction)	▪ Erickson & Kellogg (2000) ▪ **Ridings et al. (2002b)** ▪ **Preece (2001c)** ▪ **Flake et al. (2002)** ▪ Yoo et al. (2002a) ▪ Ridings & Gefen (2004) ▪ Moore & Serva (2007) ▪ Lin & Lee (2006) ▪ Wise et al. (2006) ▪ Jin et al. (2007) ▪ Chen (2007)
Business / Management	▪ Fostering relationships with consumers through online communities ▪ Leveraging positive consumer behaviour in online customer reference groups ▪ Engaging customers and employees to contribute in business functions such as R&D and Sales	▪ Consumer Behaviour ▪ Loyalty and Commitment ▪ Purchase Decisions ▪ Knowledge Contribution ▪ Co-creation of products and services ▪ Competitive Advantage	▪ **Armstrong & Hagel (1996)** ▪ Kozinets (1999) ▪ **McWilliam (2000)** ▪ **Kozinets (2002)** ▪ Bauer & Grether (2005) ▪ Wasko & Faraj (2005; 2000) ▪ Lu et al. (2008) ▪ Porter & Donthu (2008) ▪ Petina et al. (2008)
Economic	▪ Sustainability of virtual communities as economic entities within a social context ▪ Study of virtual community members as rational utility-maximizers ▪ Mechanisms for value creation and resource conversion into benefits for collectives	▪ Return on Investment ▪ Membership Size ▪ Communication Activity Levels ▪ Community Growth	▪ Hagel & Armstrong (1997) ▪ Kollock (1999) ▪ **Balasubramanian and Mahajan (2001)** ▪ Butler (2001) ▪ Cothrel (2000b) ▪ Gu & Jarvenpaa (2003)

The *sociological/psychological research perspective* of virtual communities is primarily concerned with the social structure of collectives and the nature of those relationships within those collectives. In deliberating social practices and outcomes of participation in virtual communities, this perspective makes use of concepts from human cognitive and affective processes that lead to the development of psychological trust and sense of community among members. For instance, Etzioni & Etzioni (1999) examine aspects of bonding and culture in a VC and define it through two attributes, namely, a web of affect-laden relationships encompassing group of individuals (bonding), and commitment to a set of shared values, norms, meanings and a shared historical identity (culture). Frameworks based on social capital theory (Coleman, 1988; Jacobs, 1965; Putnam, 1995) and social cognitive theory (Bandura, 1986; Compeau & Higgins, 1995) are frequently used to discuss the development of ties through relational capital including trust, as well as cognitive capital through increased self-efficacy over the course of participation in a virtual community. From a social psychology viewpoint, researchers have also used the concept of psychological sense of community (McMillian & Chavis, 1986) to deliberate the presence of a similar affective and attitudinal construct in the context of virtual communities (Blanchard, 2007b; Blanchard & Markus, 2002; Obst & White, 2004b). Subsequently, recent research investigates and shows sense of community as an essential factor for the success and sustainability of virtual communities (Bagozzi & Dholakia, 2002b; Blanchard, 2007b; Blanchard & Markus, 2003; Preece, 2001a; Preece et al., 2004). This current research draws upon several theories and concepts from the sociological/psychological research perspective in order to formulate a conceptual framework for its empirical investigation (see Chapter 3).

Researchers investigating virtual communities from a *technological research perspective* refer to VCs based on aspects related to the functionality of the software supporting the interactions in the community (Flake et al., 2002; Lazar et al., 1999), as well as issues of usability of the application interface (Chen, 2007; Wise et al., 2006). To bring balance to this approach, through her seminal research work on virtual communities, Preece (2001d; 2004; 2003) urges system designers for virtual communities to concentrate on sociability aspects of VCs to help understand the social interaction requirements and preferences of community members. Parallel streams of research adopting the technological research perspective exploit the application of more well-established information systems models to investigate member participation. Theoretical constructs from the technology acceptance model (TAM) (Davis, 1989) have been used repeatedly in various contexts to link the constructs of perceived usefulness and perceived ease of use of virtual community technologies to a member's behavioural intention to continue participation in the virtual community (Hsu & Lu, 2007; Huang et al., 2008; Lin, 2006; Lin et al., 2008). Similarly, constructs of information quality and system quality from the information systems success model (DeLone & McLean, 1992; Delone & McLean, 2003; Petter et al., 2008) have been conceptualized and corroborated to affect the overall satisfaction with and use of the virtual community (Lin, 2008; Yoo et al., 2002a). In terms of this dissertation, as outlined in the previous chapter, an information systems orientation is adopted to frame the

attributes and processes in a virtual community, and as such, various theoretical models from the technological perspective were applied throughout the course of the research to explain different aspects of member participation in virtual communities.

Through the *business/management research perspective* of virtual communities, studies explore applications of virtual communities in a multitude of business functions including marketing, sales, research and development (R&D), and human resources (Armstrong & Hagel, 1996; McWilliam, 2000; Spaulding, 2009). In an integrated framework to highlight the benefits of virtual communities in a business context, Spaulding (2009) used the theory of social contract to explain the applications of virtual communities in each activity across a firm's value chain (Porter, 1980). More specifically, marketing related studies on virtual communities focus on brand communities and online consumer reference groups. The development of communal bonds among members of a virtual community to help promote a firm's products and services are a common area of discourse in the extant research literature (Bagozzi & Dholakia, 2002a; Dholakia et al., 2004; Kozinets, 1999). In terms of applications for R&D, the value of open innovation communities in improving and advancing products and service offerings has been also been discussed (Fuller et al., 2004; Ramaswamy, 2009). Finally, a major area of research in the business/management perspective relates to knowledge sharing and contributions in online communities of interest and electronic networks of practice (Wasko & Faraj, 2005; Wasko & Faraj, 2000). More recently, researchers are starting to explore the paradigm of collaborative intelligence in virtual communities through studies of new social media applications such as wikis (Lee & Lan, 2007; Wagner & Bollojum, 2005) and other social media applications (Hoegg et al., 2006).

Lastly, under the *economic research perspective*, virtual communities are viewed as economic entities embedded in a social environment in which value creation and resource utilization aspects can be improved through greater member contributions of informational content (Balasubramanian & Mahajan, 2001). This perspective assumes the actions of VC constituents conform to neoclassical principles that view society as a collective of egoist entrepreneurs with individual rationality and incentive compatibility (Gu & Jarvenpaa, 2003). As an example of the treatise of virtual communities from an economic research perspective, consider the research exposition by Balasubramanian and Mahajan (2001) where the authors argue that it is the strength of social interactions and focus on specific market activities in virtual communities that can help develop economies of scale and lead to a competitive advantage for the sponsoring firm. Another theoretical construct frequently seen in studies pertaining to the economic research perspective is membership size, where resource availability is regarded as directly proportional to membership size and a critical mass of members is required to sustain the interactions in a virtual community over the long term (Butler, 2001). The concept of return on investment (ROI) has also been discussed using the economic research perspective. Here, the ROI of a virtual community is viewed as a combination of factors, including: the incremental value of a business (with and without the VC), the size of the community membership, the

magnitude of active regular interactions, and the rate of conversion of site visitors to members who engage in commercial transactions (Cothrel, 2000b).

Having discussed these four main research perspectives, it should be reiterated at this point that the focus of this dissertation is the development of a socio-technical theory that explains the process of member participation in virtual communities. Toward this, this dissertation utilizes a combination of theoretical concepts from the sociological/psychological and the technological research perspectives as noted above. The next section provides a snapshot of four specific research disciplines that were consulted to gain an understanding of how a socio-technical lens of analysis may be used to define virtual communities.

2.2 Socio-Technical Literature Domains Discussing Virtual Communities

In their theoretical discourse on virtual communities, many researchers have noted that there is no unanimous definition of the term (Lee et al., 2003; Li, 2004; Schoberth & Schrott, 2001). As highlighted in the previous section, the disparity in opinions among researchers can be attributed to the diversity of contexts under which VCs are studied. Based on the sociological/psychological and technological research perspectives described above, four literature domains that have significantly contributed to the body of knowledge on virtual communities are identified, namely: i) *Computer Mediated Communication (CMC)*, ii) *Community Informatics (CI)*, iii) *Knowledge Management (KM)*, and iv) *Internet Marketing (IM)*[7]. An overview of the scope and exposition of research in these four domains is provided below.

Researchers who approach virtual communities from a *computer-mediated communication (CMC)* standpoint typically conceptualize them as technology tools that facilitate human communication via computers. Primarily based on a technological research perspective, they concentrate their efforts in describing different forms of synchronous, asynchronous or real-time interaction tools used in online communities to exchange text, images, audio and video (Hiltz, 1998; Hiltz & Turoff, 1993; Morris & Ogan, 1996; Olson & Olson, 1998; Sproull & Kiesler, 1991). Recent CMC research has also answered the call for the inclusion of sociability (Preece, 2001a) in the overall treatise of virtual community specifications, and there is a trend towards recommending solutions that incorporate sociability as well as usability in the design of virtual communities (Donath, 2005; Preece, 2001a; Preece, 2001d). Overall, the viewpoints adopted in CMC research can be seen as being geared towards the development of virtual communities from a human computer interaction (HCI) perspective, as they emphasize the functionality and usability aspects of the interaction media in VCs while taking into account the alignment of these technologies with the sociability objectives of the virtual community constituents.

[7] By no means are these the only socio-technical literature domains that discuss virtual communities. Nevertheless, they provide a modest view of cross-functional perspectives related to sociological/psychological and technological attributes of virtual communities.

The fast emerging multidisciplinary field of *community informatics (CI)* pertains to the design and application of information and communication technologies (ICTs) that can be utilized to enable community processes and achieve community objectives, including a community's social, economic, cultural, or political goals (Gurstein, 2000; Gurstein, 2004). By that token, virtual communities are often regarded as specific applications in community informatics (Lee et al., 2002; Lee et al., 2003; Marshall et al., 2004; Pitkin, 2001). On a macro level, CI researchers have studied the applicability of virtual communities and related technologies to facilitate the progress of local, regional and national communities, with frequent discussions of ideas of civic participation, economic development, education and learning, and community service delivery (Gurstein, 2000; Keeble & Loader, 2001; McIver, 2003; Taylor, 2004). Additionally, recent literature in community informatics has significantly contributed to the body of knowledge outlining success factors and best practice models for the administration of virtual community projects (Carroll & Rosson, 2007; Romm & Taylor, 2001). As such, researchers in the field of CI stress the importance of sociological as well as technological ingredients in the overall success of virtual communities which makes this literature area a worthwhile source of information on socio-technical perspectives of virtual communities.

Knowledge Management (KM) related research on virtual communities has primarily explored the effectiveness of different knowledge sharing processes in various online community settings, including virtual communities of practice (Davies et al., 2004; Droschl, 2004; Gongla & Rizzuto, 2001; Wasko & Faraj, 2005; Wasko & Faraj, 2000), online learning communities (OLCs) (Cothrel, 2000a; Palloff & Pratt, 1999), and online knowledge communities (OKCs) (Bieber et al., 2002; de Vries & Kommers, 2004). Common to the research discourse for these different types of virtual communities is the discussion on processes and technologies that facilitate information and knowledge sharing. The sharing of tacit knowledge in such communities is often considered to be a socio-psychological process for which effective social activities need to be instigated and sustained as an integral part of the community's institutionalization. For instance, success of knowledge contributions is often framed within the context of social capital constructs such as structural, relational and cognitive capital, and studies discuss how different technology and management interventions can be adopted to improve these social capital dimensions to enable higher level and better quality knowledge contributions (Wasko & Faraj, 2005; Wasko & Faraj, 2000). Hence, a great number of research expositions found in the extant KM literature on virtual communities also adopt a socio-technical viewpoint of interactions and activities in online communities, and this literature domain constitutes an effective basis for a definition of virtual communities germane to a socio-technical lens of analysis.

Finally, as an applied field of research, Internet Marketing (IM) has been at the forefront of virtual communities research since the earliest conception of online communities in the commercial realm. Content, Community, Commerce – the 3 Cs of electronic commerce as they are widely known in the internet marketing literature, have together been regarded as the

critical success factors that businesses need to manage in order to prosper in online marketing and sales (Chaffey et al., 2002). Jagannathen et al. (2002) refer to community as an "important driver leading to a condition where e-Commerce can occur". The focus of discussions in the IM literature is primarily concerned with the generation and maintenance of customer traffic while finding new ways to penetrate current market segments and discover new ones. Recent explorations of consumer reference groups and online customer service communities have focused on motivational factors that facilitate the involvement of customers in various business processes across the sponsoring firm's value chain (Goel & Mousavidin, 2007; Petouhoff, 2009). Practices related to improving user loyalty, enabling better feedback on products and services, accessing beta testers and early adopters, and promoting word-of-mouth have produced valuable guidelines and principles that relate the role of technology to sociological and psychological consumer behaviour processes (Araujo, 1999). Therefore, these studies from the internet marking literature domain can also prove useful in proposing a socio-technical characterization of virtual communities.

2.3 Toward a Multidisciplinary Socio-Technical Definition of Virtual Communities

From the review of the four selected literature domains above, it is apparent that although researchers from these subject areas offer discourse-specific descriptions of VCs and their applications, there is a distinct socio-technical undertone to their treatise of virtual communities. As such, these streams of research offer an adequate basis from which to devise a multidisciplinary socio-technical definition of virtual communities. In deliberating a working definition, a review of some of the definitions of virtual communities from the extant literature in the four areas above was conducted to reconcile and elaborate the primary notions of virtual communities. As a summary, various definitions proposed by researchers in the four literature domains are contrasted in Table 2-2.

Among the plethora of definitions that were found, those presented in Table 2-2 were carefully selected to reflect the viewpoints across the four literature domains. These definitions also vary in the style of their attribution – while some provide ascriptive characterizations of virtual communities, others are based on their descriptive representations. Researchers employing ascriptive portrayals of VCs focus on their underlying social constructions including the motivations of the members, and the interactions and exchanges among them. This is in contrast to the descriptive accounts of VCs which primarily emphasize their functional goals, often in a technophilic context, highlighting technology features of VCs over their social interaction aspects. In drawing upon the research from these literature domains, this research subsumes the definitions of equivalent terms such as online, web, or electronic communities.

Table 2-2: Definitions of Virtual Communities based on Various Literature Domains

Author(s)	Definition	Related Literature Streams			
		CMC	CI	KM	IM
Bagozzi & Dholakia (2002b)	Virtual communities [are] mediated social spaces in the digital environment that allow groups to form and be sustained through ongoing communication processes.				●
Bieber et al. (2002)	[A] virtual community include[s] anyone actively interested in, or associated with, a group formed around a particular domain of interest. Dispersed or local, the community requires electronic support to implement a continuous meta improvement strategy in its services.			●	
Cothrel & Williams (1999)	An online community is a group of people who use computer networks as their primary mode of interaction.			●	
Gurstein et al. (2002)	Virtual communities serve a diversity of groups, including people with common interests; groups fostered by particular organizations, industries or marketplaces; those who face similar life circumstances; as well as those who simply wish to socialize, play games or participate in fantasy experiences together on-line.		●		
Hagel & Armstrong (1997)	Virtual communities are computer-mediated spaces where there is a potential for an integration of content and communication with an emphasis on member-generated content.	●			●
Jones & Rafaeli (2000)	Virtual Publics are symbolically delineated computer-mediated spaces, whose existence is relatively transparent and open, that allow groups of individuals to attend and contribute to a similar set of computer-mediated interpersonal interactions.		●		
Lee et al. (2003)	[A virtual community] is a cyberspace supported by computer-based information technology, centered upon communication and interaction of participants to generate member-driven contents, resulting in a relationship being built up.		●		
Plant (2003)	A collective group of entities, individuals or organizations that come together either temporarily or permanently through an electronic medium to interact in a common problem or interest space	●			
Preece (2001a)	An online community consists of people, who interact socially; a shared purpose; policies; and computer systems, to mediate social interaction.	●			
Rheingold (1993; 2000)	[Virtual communities are] social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace.	●			

Despite the miscellany of depictions of virtual communities seen in the definitions above, several similarities can be highlighted. These similarities are briefly noted below to conceptualize a working definition of VCs.

The first similarity is the aggregation of *"participants"* (the first component of the proposed working definition) who share a common *"purpose"* (the second component of the proposed working definition). The term participants is used to incarnate both individuals as well as organizations who may partake different roles in a virtual community. Further, the concept of interaction is logically embedded in the term participation as well. The interactions in a VC revolve around a common purpose in virtual communities. This common purpose can subsist in a VC in the form of "shared interests, expertise, problems, ideas, or passions" (Nilan et al., 2004).

A second similarity is that interactions between members of a virtual community are mediated through various technologies. Hence, the presence of a mediating technology *"platform"* constitutes the third component of the proposed working definition. Note that most researchers realize the importance of non-computer based technologies in mediating interactions among community members (De Souza & Preece, 2004; Kollock, 1998; Rheingold, 2000; Stolterman et al., 1998). These technologies can include various audio/video conferencing tools, as well as advanced mobile technologies. Hence, the proposed working definition of a technology platform is not restricted solely to computer based technologies.

Thirdly, a salient feature that can be noted from Preece's original (2001a) as well as recent (2001d; Preece et al., 2004) definitions, is the notion of norms and policies. Sociologists assert that the policies and norms in a virtual community are in fact an ecological extension from traditional real-life communities (Brint, 2001; Valtersson, 1996). Hence, the idea of *"protocols"* constitutes the next essential part of the proposed working definition.

Last, an important characteristic of virtual communities that has recently come under intense discussion is the notion of a *sense of belonging* or a *sense of community* among VC members (Bagozzi & Dholakia, 2002b; Blanchard & Markus, 2003; Ellonen et al., 2007; Koh & Kim, 2003). Also described as a consciousness of kin that acts as an intrinsic connection to other members, researchers attribute this sense of affiliation with the shaping of a member's behaviours in the online community (Kleinman, 2000; Postmes et al., 1998; Wellman & Gulia, 1999). Therefore, the *"persona"* that a virtual community instils among its members to make them feel part of the community constitutes the final component in the working definition proposed in this research study.

Together, these salient attributes of a virtual community (the 5 Ps discussed above)[8] are assembled into components of a nascent working definition along the lines of an ascriptive socio-technical characterization of virtual communities: *A virtual community is an aggregation of*

[8] The constituents of the working definition have deliberately been named using 5Ps. Acronyms might be passé and this particular one may even be cliché, but it provides a short way of describing the essence of the proposed working definition.

"participants" (individuals as well as organizations) who share a common "purpose," have their interactions mediated through a technology "platform" and collective "protocols," while endorsing a unique membership "persona."

This working definition of a virtual community will be used as a touchstone to guide the research exposition of this study. Figure 2-1 depicts the components of the working definition as interlocking gears driving each another and the interactions constituting member participation in the virtual community.

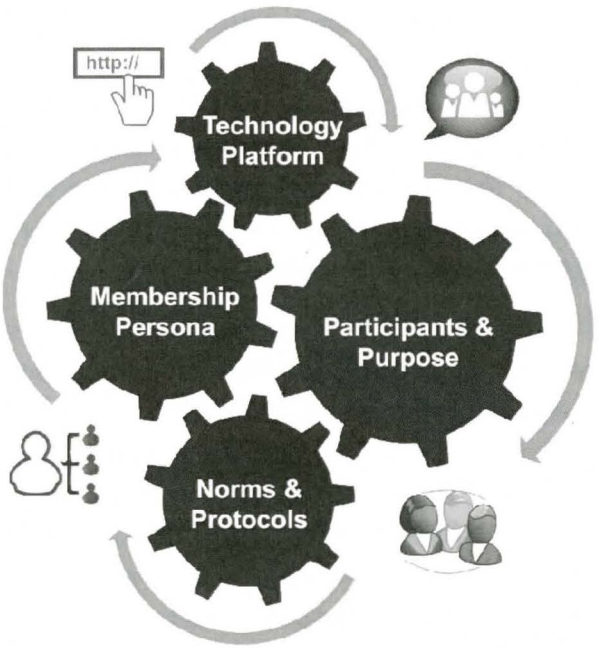

Figure 2-1: Components of a Working Definition of Virtual Communities

2.4 Typologies of Virtual Communities

In ensuring the successful institutionalization of virtual communities, stakeholders need to understand their underlying attributes (Hagel & Armstrong, 1997). Different typologies of virtual communities have attempted to address the need for a formal classification scheme to outline the principal characteristics of virtual communities, and in most virtual community typologies found in the literature today, authors classify VCs into different categories according to the context of the community (Lee et al., 2002). Hence, no single, widely supported typology of virtual communities exists to date. Nonetheless, this section aims to summarize some of the more prevalent typologies found in the extant VC literature.

Perhaps, Hagel & Armstrong's (1997) use-based typology is the earliest virtual community typology found in the virtual communities research literature. They provide a classification scheme based on the *basic needs of human,* and categorize virtual communities

into *interest-based*, *relationship-based*, *fantasy-based*, or *transaction-based* communities. Hence, their classification system is built upon identifying different categories of interactions that take place in a virtual community, ranging from the simple exchange of information along lines of common interests, to engaging in trading exchanges, possibly for profit. At a second level in their classification, the authors differentiate between two types of transaction communities: i) *consumer-focused* communities, and ii) *business-to-business* communities.

For consumer-focused communities, they may be further classified as geographic, demographic, or topical. Geographic communities are formed around a physical location in which all the community's participants share common interests. On the other hand, demographic communities are built around specific personal demographic attributes such as gender, life stage, or ethnic origin. Examples include online communities for teens, single parents, and seniors. Topical communities have a defined scope pertaining to specific topics of interest (excluding geography, gender, or life stage) and include communities such as those focused on hobbies and pastimes or on issues such as politics or spiritual beliefs.

In further categorization of business-to-business communities, Hagel & Armstrong (1997) identify four subclasses as follows: *vertical industry* communities, *functional* communities, *geographic* communities, and *business category* communities. A relevant example of a vertical industry community would be a community of software developers where developers come together as a collective to pursue activities that are of interest to their profession. Functional communities serve the needs of users representing specific business functions such as accounting, marketing or human resources. Geographic business-to-business communities may be offshoots of local consumer communities through which businesses cater to the needs of their customers in a specific location. Lastly, business category communities are typically focused on meeting the needs of certain types of companies, such as small businesses or franchises.

Through their extensive classification scheme of virtual communities, Hagel & Armstrong (1997) accommodate the possibility of the formation of sub-communities across the categories as well. For example, a vertical industry community based on certain products could evolve and branch into other functional or geographic communities.

Overall, based on the working definition of virtual communities presented in the previous section, it can be seen that the typology recommended by Hagel & Armstrong (1997) is based on a comprehensive list of possibilities defined according to the criteria of *people* and *purpose*.

Jones & Rafaeli (2000) later extended the typology proposed by Hagel & Armstrong (1997) by including two more criteria for classification of virtual communities, namely, *social structure* and *technology base*. Along the dimension of social structure, the authors categorize virtual communities into different types of networks formed by their users. The labels of *virtual*

voluntary associations, *virtual settlements*, and *cyber inns* symbolize different types of social norms being practiced in these communities ranging from strong to moderate to weak norms respectively. Additionally, along the technology base dimension, the authors classify virtual communities based on the type of software used for community interactions. Among others, these technologies can include web bulletin board systems, web-avatar meeting places, Usenet groups, email lists, and internet relay chat etc. Hence, the typology proposed by Jones & Rafaeli (2000) consists of classification criteria related to *purpose*, as well as *protocols* and *platform*.

In another seminal marketing based classification of virtual communities, Kozinets (1999) combines the criteria of purpose, protocols and platform in a similar fashion as Jones & Rafaeli (2000) to suggest a classification of virtual communities of consumption. Categorized as *rings and lists*, *boards*, *rooms*, and *dungeons*, the author first classifies the four types of VCs of consumption according to their focus on social interaction or information exchange. Secondly, the loose or tight nature of the social structure of the virtual community is considered in the classification scheme. Based on these criteria, *boards* are defined by their focus on information exchange and their loose social structure; *rings and lists* refer to information exchange communities with a tight social structure; *rooms* emphasize social interaction activities in a loose social structure setting; and *dungeons* are defined by a focus on social interaction within a tight social structure. By categorizing virtual communities into these four categories, Kozinets (1999) provides suggestions for supporting ICTs and other strategies to sustain activities and membership in the four types of communities. Therefore, based on the working definition of virtual communities articulated in this research, while Kozinets' typology explicitly addresses the criteria of purpose and protocols, it also implicitly includes the criterion for platform. According to the classification scheme, boards, rings and lists use asynchronous, time-delayed communication, while dungeons and rooms use synchronous, real-time communication (Kozinets, 1999).

In yet another categorization scheme for virtual communities, Porter (2004) proposes a typology of virtual communities taking into account the origin of the online community as a top-level criteria for classification. Based on the origin of the VC, the first level of classification includes two categories: *member-initiated* communities and *organization-sponsored* communities. Member-initiated communities are those established by, and typically also administered by its members. On the other hand, organization-sponsored communities are sponsored by either commercial or non-commercial (e.g., government, non-profit) organizations for any of its stakeholders including customers, clients, associates or partners. At the second level of the typology, Porter (2004) categorizes virtual communities based on the general relationship orientation of the community taking into account, the type of relationship fostered among members of the community. Member-initiated communities foster either *social* or *professional* relationships among members. Organization-sponsored communities foster relationships both among members (e.g., customers, employees) and between individual members and the sponsoring organization with a *commercial*, *non-profit*, or *government* service

orientation. On the whole, it can be seen that in providing a scheme for VC classification, Porter's (2004) typology addresses the criteria of *people* and *purpose* from the VC working definition.

The last typology that deserves a mention in the list of popular VC classification schemes is one proposed by Lazar & Preece (1998) in which the authors deliberate a classification scheme for virtual communities based on four dimensions, namely: *attributes*, *relation to physical communities, supporting software*, and *boundedness*. According to Lazar & Preece (1998), *attributes* of a community include its goals, topic of interest, type of activity, type of interaction, size, level of support, level of anonymity, type of conventions, language, and protocols. As for their *relation to physical communities*, online communities may or may not require frequent, or periodic face-to-face interactions based on the type of online community. For example, educational online communities may require relatively more face-to-face interactions than an online gaming community. Virtual communities may also be classified on the basis of their *supporting software* which includes applications and tools such as e-mail, lists, newsgroups, bulletin boards, internet-relay chat, and meeting rooms. Finally, in terms of *boundedness*, virtual communities can be tightly or loosely bounded to its sponsoring organization. Hence, the typology by Lazar & Preece (1998) is based on the criteria of people, purpose, protocols, and platform, and is by far the most exhaustive in its coverage of components from this study's proposed working definition of virtual communities.

Overall, the five typologies of virtual communities summarized above comprise an adequate representation of the conceptual mechanisms that researchers use to deliberate and assess the characteristics of virtual communities. As noted, some typologies do a better job than others, of incorporating multiple dimensions that characterize virtual communities. Ultimately, in deciding which of these should be used in particular research and practical scenarios, one should determine if the classification scheme and criteria are logical given the nature of the scenario, and whether the typology is collectively exhaustive across those criteria (Hunt, 1991).

2.5 Enabling Technologies for Virtual Communities

As highlighted previously in this dissertation, the role of information and communication technologies (ICTs) within a socio-technical context is to enable high level objectives pertaining to the use of specific information systems. In the case of a virtual community, these objectives include the facilitation of social interactions and information exchange among members of the online community. Furthermore, both research and practice recommend that technologies for enabling VC interactions be selected based on the purpose of the community as well as on the requirements of its members (Isakovic & Sulcic, 2008; Moore & Serva, 2007; Parks & Floyd, 1995; Petouhoff, 2009; Porter, 2008; Preece, 2001c; Preece et al., 2004). The following subsections provide an overview of the ICTs used in contemporary VC infrastructures.

2.5.1 Current Landscape of Technologies for Virtual Communities

Ranging from traditional computer mediated communication (CMC) environments such as email lists, newsgroups, and discussion forums, to newer platforms such as blogs and wikis, it is not unusual for contemporary virtual communities to consist of several technology types[9] that facilitate information exchange and social interactions among VC members (Blanchard & Markus, 2007a). Hence, an understanding of alternative virtual community technologies and their potential benefits is essential for anyone involved in the planning, development, or administration of a virtual community.

In helping VC architects make sense of the options available to them, Wenger et al. (2005) recommend an approach to understanding the extant technology landscape by considering: i) the *inventiveness of the technology market* (i.e., understanding the fast-changing market of relevant technologies as it provides new options for tools in virtual communities); ii) the *inventiveness of serving the community perspective* (i.e., considering the options available from the perspective of a thriving community in order to select technologies that fit the specific current and potential activities of its members); and iii) the *inventiveness of use* (i.e., supporting the way the community does and does not use its technological resources, attending especially to the members' efficacy in their use of technology).

To aid the discussion of technologies from the current set of options available to virtual communities, this section provides an overview of the various tools that are prevalent in VC implementations. Figure 2-2 below presents a list of various technology platforms and tools[10] that are currently used to enable and support different aspects of virtual community activities. Depicted as a Venn diagram, the technologies have been labelled as *traditional CMC*, *web 2.0*, or *social media* to facilitate a delineation of terminology that is currently used in the research and practitioner literature. A brief overview of these categories and tools is offered below.

[9] A quick visit to two well known and widely commended commercial virtual communities shows the array of tools and features that are commonly available on many online community websites today. The SAP Community Network (https://forums.sdn.sap.com) and the Dell Customer Service Community (http://en.community.dell.com) both deploy a number of technology platforms including discussion forums, wikis, blogs, and information repositories for enabling member interactions.

[10] The technology platform of a virtual community refers to the primary software application that enables member interactions (e.g. discussion forum, mailing list, newsgroup, blog, wiki). On the other hand, tools and features act as add-ons or extensions for supporting specific communication formats among members (e.g. private messaging, content tagging)

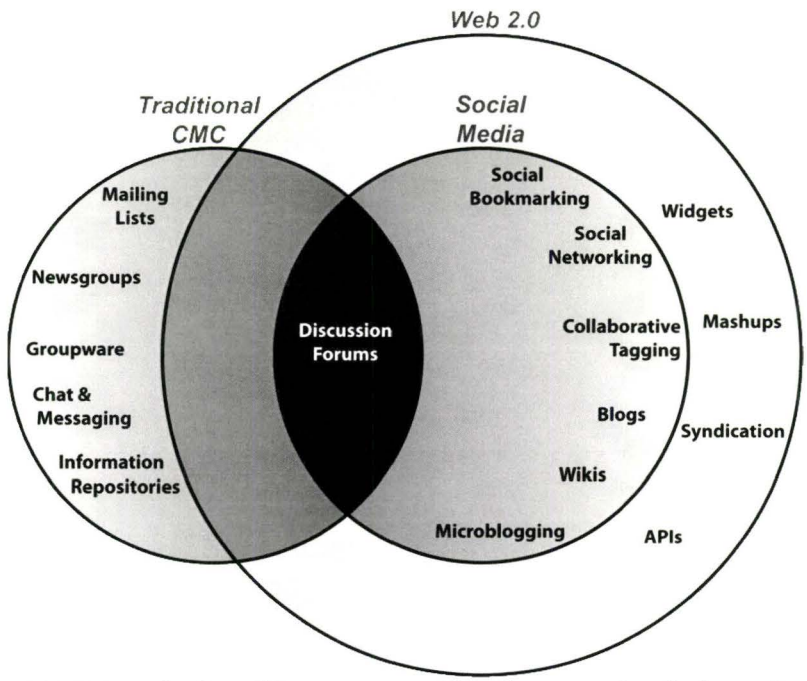

Figure 2-2: Categorization of Contemporary Virtual Community Platforms & Tools

Starting with a definition of the three categories shown in Figure 2-2, traditional computer mediated communication (CMC) platforms and tools refer to any interaction between participating individuals or groups through the use of software applications on two or more networked computers (McQuail, 1994; Preece, 2001d; White, 2001). Also, as depicted in the Venn diagram, the categories of web 2.0 and social media are interrelated as the latter constitutes a subset of the software applications that are commonly categorized as web 2.0 (Alexander, 2006). Put simply, web 2.0 , a term coined by Tim O'Reilly (2005), is often used as an umbrella term for technologies and principles that characterize user-generated content, a participation based architecture for applications and user interactions, and tools to facilitate easier integration of functionality across domains through application programming interfaces (APIs) and the mixing of content across sites through mashups and syndication (Downes, 2005; Murugesan, 2007)[11]. On the other hand, social media applications refer to a subset of web 2.0 tools that are concerned with communication, cooperation, connection, and collaboration (4Cs of social media) among individuals or groups (Cook, 2008). In terms of this dissertation, the scope of discussion of technologies for virtual communities pertains to ICTs that facilitate interactions in an online community context, and as such, the categories of traditional CMC and social media platforms and tools will be specifically considered. Table 2-3 provides a summary of the use and functionality of these tools.

[11] A discussion of all web 2.0 technologies including APIs, widgets, mashups and syndication tools is beyond the scope of this chapter. For a quick yet informative reading, Murugesan (2007) is highly recommended.

Table 2-3: Technology Platforms & Tools for Virtual Communities

Technology Platforms & Tools	Summary of Functionality and Use	References
Blogs (Weblogs)	▪ A content management system that primarily caters to community members who are interested in posting of thoughts, opinions, and knowledge. ▪ Blog writers typically make rich use of hypertext to connect to what others have written on a topic or to resources elsewhere on the Web. ▪ Blog entries typically allow feedback from the online community where members can post comments about and ratings of the content in the blog entry. ▪ Blogs can be easily linked and cross-linked to create larger online communities of like-minded individuals.	▪ Blood (2004) ▪ Borland (2007) ▪ Du & Wagner (2006)
Discussion Forums	▪ Web based conversation spaces known as discussion forums, boards, online forums or conferences. ▪ Forums are still regarded as the mainstay for online communities forming the most visible interaction space for online communities. ▪ The software application maintains a log of all messages in a threaded, hierarchical structure. ▪ Most discussion forums facilitate text and multimedia based interactions consisting of images, audio, videos, and other formats. ▪ As a result of add-ons and plug-ins for tagging, voting, rankings and ratings, modern discussion forums with these features are considered under the umbrella term of web 2.0 or social media.	▪ Preece (2001a) ▪ White (2001) ▪ Cook (2008)
Groupware	▪ Networking applications that support informal impromptu and opportunistic collaboration. ▪ Groupware applications contain features that show the presence and availability of members, and initiate lightweight initiation of interactions among them.	▪ Gutwin et al. (2008) ▪ Mittleman et al. (2009)
Information Repositories	▪ Also known as a knowledge base, it provides an environment for the codification, storage, and transfer of knowledge. ▪ Traditional information repositories can be combined with web 2.0 tools such as collaborative tagging to make them more accessible to community members.	▪ Wasko & Faraj (2005) ▪ Moore & Serva (2007)
Mailing Lists (Listserv)	▪ Communication system to enable member interactions in the form of email messages that are sent to email addresses of community members as a group. ▪ Mailing lists support one-to many communication like newsletters as well as many-to-many communications where each member of a list can respond to the entire group.	▪ Preece (2001a) ▪ White (2001)

Table 2-3 continued below

Table 2-3 (continued): Technology Platforms & Tools for Virtual Communities

Technology Platforms & Tools	Summary of Functionality and Use	References
Newsgroups (Usenet)	▪ A repository of messages posted by various members that pertain to specific topics of interest to the community. ▪ Member interactions are primarily text based with possibly links to other multimedia sources. ▪ Newsgroups are arranged into hierarchies, making it simpler to find related groups.	▪ Borgs et al. (2004) ▪ Joyce & Kraut (2006)
Wikis	▪ An open website environment that allows rapid creation and modification of content pages by community members in real-time. ▪ Modern wiki software packages support content history timestamps, identity management of contributors through profiles, and feedback and discussion features for members.	▪ Moore & Serva (2007) ▪ Borland (2007) ▪ Cook (2008)
Chat & Messaging	▪ Communication support tools that enable exchanges among members through short, spontaneous messages which closely mimic spoken exchanges. ▪ Messaging can take place between individuals or groups (conferencing) in public or private settings. ▪ Contemporary software packages allow creation of buddy lists and searching for message partners based on demographics and interests, and also support voice and video communication.	▪ Preece (2001a) ▪ White (2001) ▪ Cook (2008)
Collaborative Tagging (Folksonomies)	▪ Collaborative content categorization tools that allow members to use feely chosen keywords (tags) to label resources according their content attributes. ▪ Considered to be a democratized version of metadata, tags are intended to improve search and navigation of a content management system.	▪ Lai & Turban (2008) ▪ Cook (2008) ▪ Lombardi & Saba (2009)
Microblogging	▪ A form of blogging that allows users to send brief text updates or micromedia (small images, audio, or video files about their life on the go, or to share information. ▪ Messages can be sent ubiquitously via dedicated website, a desktop or mobile messaging client.	▪ Java et al. (2007) ▪ Krishnamurthy et al. (2008)
Social Bookmarking	▪ Web based reference tools that help members to publicly share links to websites and other Internet resources of interest to the community. ▪ Community members can refine descriptions of bookmarks, categorize them better, and apply content tags to enhance searchability of content.	▪ Alexander (2006) ▪ Borland (2007) ▪ Cook (2008)
Social Networking	▪ Tools that allow users to create personal profiles and connect with others with similar interests and affiliations. ▪ Application features typically support self-organization of members into small groups that are more tightly knit by virtue of their shared interests.	▪ Cook (2008) ▪ Lombardi & Saba (2009)

2.5.2 Task-based Typologies of Technologies for Virtual Communities

Based on the list of platforms and applications presented above, it is evident that when it comes to technology, virtual community providers have many options for consideration. However, in making a decision about the appropriateness and adequacy of certain technologies for their communities, it is recommended that VC architects consider the specifics of the technology, as well as the nature of the tasks that need to be supported through the technology (Isakovic & Sulcic, 2008; Porter, 2008; Preece et al., 2004). The task characteristics can be matched with the features of specific technologies using various criteria, some of which are identified below:

- *Synchronicity and Communication Scope*: On the outset, most technologies can primarily be characterized by their synchronicity (asynchronous, time-lagged vs. synchronous, real-time) and the number of communication partners (one-to-one or many-to-many) that are supported in a typical interaction session (Blanchard, 2007a; Preece et al., 2004; White, 2001). While synchronous software supports communication among members in real-time and requires them to be present for interaction at the same time, asynchronous applications allow their participants to communicate via messages and responses that can be posted at different times. Additionally, while tools such as instant or private messaging are typically used in a one-to-one communication context, mailing lists, newsgroups, and discussion forums can support many-to-many communication in group mode scenarios as well.

- *Structural Formality*: The relevance of different virtual community tools in different scenarios can also be deliberated by considering the objective of interactions in terms of specificity of conversation or tasks (Newson & Patten, 2008). While blogs and discussion forums allow for free-form discursive modes of conversation, wikis and information repositories are more functionally oriented and targeted in their discussion goals. Therefore, in situations where formal collaborative work is required, technology platforms such as wikis are preferred over discussion forums or blogs.

- *Interaction Intensity*: In addition to structural formality, Cook (2008) suggests that the extent and speed of interaction should be considered in identifying the appropriate social media applications. For example, compared to wikis and discussion forums, blogs tend to be slower in gathering responses from participants who only post comments after having read through the blog owner's entry in detail. Furthermore, the volume of posts and replies is typically expected to be lower in blogs. Similarly in comparison to social bookmarking applications which tend to be highly interactive in nature (multiple people collaborate on refining bookmark descriptions and categories), the interaction intensity for collaborative tagging applications is lower since each member assigns labels to a specific resource on an individual basis.

- *Common Grounding Opportunities*: Tools can also vary in the nature of common grounding that is offered to users of the communication medium (Clark, 1996; Preece, 2001a). Common grounding refers to the success of communication media in being able to support the requirements of the interaction in terms of characteristics such as *simultaneity* (sending and receiving messages seamlessly and instantaneously), *sequentiality* (order of interaction messages being maintained), *reviewability* (members can review each other's messages), and *revisability* (members can revise each other's messages). For example, while instant messaging and chat applications provide higher levels of simultaneity and reviewability, mailing lists and discussion forums are better suited for scenarios that require reviewability and revisability during member interactions. Wikis, as expected, would offer the highest level of revisability opportunities.
- *4Cs (Communication, Cooperation, Collaboration, Connection)*: Cook (2008) proposes a classification scheme of social media applications based on their primary function as related to one of the 4Cs listed above. Firstly, *communication* platforms facilitate conversations among community members using text, images, voice or video. Discussion forums, blogs and instant messaging applications belong in the communication category of tools. Secondly, tools which enable or enhance *cooperation* do so by allowing social media participants to share content among themselves in structured and unstructured ways. Social bookmarking and collaborative tagging are both good examples of cooperation based tools. Thirdly, *collaboration* tools such as wikis allow people to work with each other in a structured fashion, to tackle particular problems or specific projects. Last, *connection* based applications facilitate members to find associations and ties with other people or with content posted by those people. Social networking sites and applications are the essential archetype of a connection based functionality.

Overall, using the criteria highlighted above, virtual community providers can undertake a functional assessment of the current and potential technologies for their virtual communities. Using a technique that accounts for the tasks and activities of virtual community members while considering technology deployment has been regarded as a key success factor in the growth and sustainability of virtual communities (Porter, 2008; Preece et al., 2004).

2.6 Member Participation Behaviour in Virtual Communities

Based on the various viewpoints of information systems suggested by Orlikowski & Iacono (2001), so far, this chapter has presented an *ensemble view* (overarching perspectives and defining characteristics) as well as a *tool based view* (features of the underlying ICTs) of virtual communities. To complete the discussion on important issues in virtual communities, this section provides a *proxy view* of virtual communities based on the motivations, perceptions and behaviour of users of the IT artifact – in this case, members of virtual communities. Toward this, characteristics of different types of members in online communities are discussed from a behavioural as well as motivational perspective.

2.6.1 Typologies of Virtual Community Member Behaviours

Perhaps, one of the most prevalent debates in virtual communities surrounds the types of members that make routine use of the virtual community offerings, whether actively or passively. The *lurkers* (non-public, passive members) versus the *core* (public, active members)[12] issue has garnered significant attention from researchers and practitioners alike (Andrews et al., 2001; Li & Bernoff, 2008; Nonnecke et al., 2006; Nonnecke & Preece, 2003; Preece, 2001a; Sarner, 2008; Takahashi et al., 2003). The potential for virtual community providers to build self-sustaining communities has largely been regarded as being dependent on how effective VC providers are in enticing lurkers to become active members (Nonnecke et al., 2006; Takahashi et al., 2003) and how proactively they manage the participation inequality (Nielsen, 2006) in their online communities.

Advancing the knowledge on different types of virtual community members, recent research and practitioner literature has looked beyond the lurker-poster dichotomy as it only offers a limited perspective on the diverse and dynamic nature of virtual community participation behaviour. Different criteria and terminology have been used in the literature to delineate the types of members generally seen in virtual communities. A brief synopsis of various classification schemes is presented below.

Beyond the active-versus-passive and lurker-versus-core dichotomies, the practitioner literature on online communities provides some of the simplest typologies of virtual community members. Generally, based on simple criteria, these typologies categorize members of virtual communities according to the value they provide to the host or sponsoring organization of the virtual community.

For example, in a recent syndicated research report (Sarner, 2008), Gartner Research offered recommendations for firms using virtual communities to target Generation V (Virtual)

[12] The lurkers versus core members dichotomy is also sometimes referred to in the literature as lurkers vs. posters or active vs. passive users. This dissertation uses the terms core, active, or posters interchangeably while referring to the regular non-lurking members of a virtual community.

customers, which the company defines as "a demographic with increasing preference for the use of digital media channels to discover information, build knowledge and share insights." Based on its research of various online consumer reference groups, Gartner identified four levels of engagement as follows:

- *Creators* (constituting up to 3% of the online community membership base) who provide original content and act as advocates to promote different products and services;
- *Contributors* (between 3% and 10% of the total member population) who add to the conversation but rarely initiate new discussions. This group of members is likely to recommend products and services to other potential customers who are looking for purchase advice;
- *Opportunists* (between 10% and 20% of the membership base) who build upon previous conversations and add value by chiming in their own purchase experiences; and,
- *Lurkers* (about 80% of the total member population) who benefit from the information in the online community but only act as spectators without providing any personal input.

Following a similar line of thinking, based on their extensive survey of internet users in the U.S., Li and Bernoff (2008) of Forrester Research define six basic groups of online users of social media as follows: *inactives* (do not participate in online communities), *spectators* (passive participants and consumers of content), *joiners* (interested in social networking), *collectors* (involved with structuring online content, tagging, and sharing information), *critics* (provide informational reviews and content ratings for existing content), and *creators* (generate new content). Li and Bernoff visually depict these six groups of online users into what they call the *"Social Technographics Ladder"*[13] with six steps (the lowest being the inactives step and the highest the creators step) to illustrate progression in online participation along each step of the ladder. Although conceived in an industry context, the framework has also caught the attention of academics. For example, Isakovic & Sulcic (2008) recommend that community providers use the categories in Li and Bernoff's (2008) technographics ladder to create a profile of their prototypical average user in order to determine the categories of users who need to be engaged better, and the types of technologies that can help in attracting and retaining them.

In contrast with practitioner typologies of virtual community members, the academic literature has reported a combination of theoretical and empirically based member classification schemes.

[13] A brief summary of the social technographics typology can be found at the author's blog : http://blogs.forrester.com/groundswell/groundswell/

For instance, based on the criteria of public versus private modes of communication, and active versus passive styles of participation, Blanchard & Markus (2003) identify three types of online community members from their case study investigation, namely: *leaders*, *participants*, and *lurkers*. As with previous research, *lurkers* were categorized based on attributes of passive participation, where members only engaged in reading community content, and, at best, were only involved in private modes of communication, namely contacting specific individual community members. On the other hand, both *participants* and *leaders* referred to members who maintained public and active communication and participation modes in the community. Additionally, leaders were identified by virtue of their responsibilities of community operation or administrative tasks.

In another classification scheme, Kozinets (1999) identifies four types of members based on the strength of social ties that a member maintains in the community, and the alignment of a member's interests with the shared purpose of the virtual community. The first category of members, termed as *tourists*, are those who lack strong social ties to the social collective and maintain only a passing interest in VC activities. Secondly, *minglers* refer to the category of members who maintain strong social ties in the community, but who are still only superficially interested or involved in the proceedings of the community. The third category of members, referred to as *devotees*, is characterized by their strong interest in the activities of the virtual community, but they have a weak social attachment to other community members. Lastly, *insiders* refer to VC members who have strong social ties as well as strong interest in the activities of the community.

Although the two typologies proposed by Blanchard & Markus (2003) and Kozinets (1999) do a better job than a simple lurker versus poster categorization of members, both of these typologies are still rather static in their approach to characterize virtual community members. An alternative viewpoint on member classification is suggested by Kim (2000) who describes five prototypical member roles based on progressive stages of community involvement. She labels these five types as *visitors* (those without a persistent identity in the community), *novices* (new members who need to learn the ropes and be introduced into community life), *regulars* (established members who are comfortably participating in community life), *leaders* (volunteers, contractors, and staff who keep the community running), and *elders* (long-time regulars and leaders who share their knowledge, and pass along the culture to the rest of the community). Based on the duration of active membership that is maintained, this typology suggests an increasing involvement of members in their communities as they transition from their roles as visitors to novices, regulars, leaders, and eventually elders. Despite its focus on a process of evolution of user experiences, this lifecycle based view of member participation has been critiqued due to its normative assumption that most members would have experiences similar to those suggested in the progression continuum.

Based on the problems faced by researchers and practitioners in categorising VC members, many researchers have recommended that a different approach to characterize virtual community members be adopted in studies and in practice – one that takes into account the motivations that drive a member's behaviour (Carroll & Rosson, 2007; Wang & Fesenmaier, 2004). This is the subject of the next section.

2.6.2 Member Motivations to Participate in Virtual Communities

The extant research literature on virtual communities is replete with descriptions of what drives members of virtual communities to participate and contribute to their social collectives (e.g., Bateman et al., 2006; Kollock, 1999; Kozinets, 1999; Ling et al., 2005; Moore & Serva, 2007; Stockdale, 2008). While some research studies in this area have generally focused on aspects of individual member motivations to participate in their communities by deliberating personal benefits (Butler et al., 2007; Lakhani & Von Hippel, 2003; Wasko & Faraj, 2000), other research perspectives have highlighted organizational or group level benefits instead of personal, private benefits, paying special attention to the relationship and bonds between the individuals and their communities (Bateman et al., 2006; Blanchard & Markus, 2003).

At a personal level, researchers agree that the motivational drivers for VC members to participate in an online community are diverse and dynamic (Wang & Fesenmaier, 2004), but on the whole, these drivers may be construed in terms of tangible or intangible returns.

In online communities, *tangible returns* can include accessing useful information and expertise, getting answers to specific questions, and enhancing personal standing within the community, as well as other outside realms. Hence, a combination of *functional , psychological,* as well as *social needs* may drive an individual member to participate in virtual communities (Stockdale, 2008). Li and Bernoff (2008) offer examples from two categories of tangible benefits as follows:

- Members who participate on the basis of an *affinity impulse* do so in order connect with like-minded people who share similar interests and concerns.
- Members who wish to satisfy their *creative impulse* participate in virtual communities to show off their talents and express themselves while hoping for constructive feedback from the online community.

On the other hand, members may also participate in their online communities for *intangible returns* which lead to intrinsic satisfaction and self-actualization. Some examples of intangible returns that have been cited in previous research studies include reasons such as members enjoying helping others, members liking a challenge when a problem is posed, and members participating for their own learning and self-efficacy. Such pro-social behaviour is often seen as complementary to the behaviour that is driven on the basis of extrinsic incentives

(Constant et al., 1994; Sproull et al., 2005). Within this framework of intangible returns, Stockdale (2008) also accentuates the importance of *hedonic needs* as an important intrinsic driver for online participation. Other researchers have also suggested that activities that elicit elicit enjoyment, emotive stimulation, entertainment, and amusement are indeed a major driver for online participation in virtual communities. Li and Bernoff (2008) offer these examples:

- Members who participate out of a *prurient impulse* to be amused and entertained, often without a specific end-goal that needs to be attained through their participation.
- Members who wish to seek to fulfil their *validation impulse* participate in virtual communities to seek reassurance about their own knowledge and expertise from others in the community.

Overall, research studies that concentrate on individual benefits of member participation in virtual communities ascribe to the *theory of public goods* (Connolly & Thorn, 1990; Kollock, 1999; Kollock & Smith, 1996b) which suggests that individuals contribute to an initiative when they perceive the benefits of doing so to be higher than the costs that will be incurred (Bateman et al., 2006; Butler, 2001; Ostrom, 1990). This theory has also been proposed to explain the behaviour of *lurkers* (people who consume community content but never contribute to it) by deliberating that the informational benefits lurkers receive from passive participation in online communities far exceed their costs associated with time and attention (Butler et al., 2007; Nonnecke & Preece, 2003; Nonnecke et al., 2004b). To clarify this perspective, based on the assumption of self-interest being a major driver for member participation in virtual communities, Kollock (1999) offers three types of motivations for contribution in virtual community contexts as follows:

i) A*nticipated reciprocity* on the basis of which members may be motivated to make valuable contributions with the expectation that they will receive useful help and information in return, either reciprocally from another member, or in a generalized sense from the entire group over the long-term.

ii) *Increased recognition* which drives members to contribute because they expect the value of their contribution to be acknowledged by the community, eventually allowing the members to gain prestige in the community; and

iii) *Sense of efficacy* which motivates members to participate in the community because they feel they have had an impact on the community environment or its constituents, leading to their own self-image as an efficacious person.

Concerning the other line of research where studies approach the issue of member motivations from a social collective viewpoint, researchers describe motivations based on helping others and the community at large, identifying with the community and with its other

members, and developing psychological attachment and commitment to the community. To explain this type of motivation to participate, the theoretical construct of *sense of virtual community (SoVC)* comprising of *feelings of membership, influence, needs fulfillment and emotional connection* has been repeatedly proposed as a precursor for member behaviours in online communities, especially in terms of activities that concern the social collective (Blanchard, 2007b; Blanchard & Markus, 2003; Koh & Kim, 2003; Lin, 2007b; Yoo et al., 2002a). To complete their list of motivations, Li and Bernoff (2008) posit motivations related to the social collective as an *altruistic impulse* which drives members to participate because they think their communities are worthwhile contributing to. Kollock (1999) highlights the relevance of an altruistic orientation towards the virtual community by deliberating two further motivations for contribution as follows:

i) *Need* for a public good at the community level which drives altruistic members to contribution after the need has been made known to the community as a whole.

ii) *Attachment* to the community which leads members to contribute to the group because that is what members perceive to be best for the group. Individual and collective outcomes are typically merged in such scenarios leading to alleviation of social dilemmas among self versus community objectives.

Based on the synopsis of member motivations provided in this section, it may be surmised that the diverse and dynamic motivations that characterize participation and contribution patterns for virtual community members present a complex terrain for virtual community providers. In order to ensure growth and sustainability of their virtual communities, VC architects need to match member motivations and drivers with the technological and sociological offerings of the community. Furthermore, interventions that address the needs of archetypical virtual community members need to be devised and institutionalized. Needless to say that given the multifarious nature of member predilections, and their needs, expectations and preferences, ensuring a high level of participation and quality contributions from different types of virtual community members sounds like an immense undertaking.

This dissertation hopes to provide further insight pertaining to the process of member participation in virtual communities. By utilizing a socio-technical lens of analysis, and adopting a combination of qualitative and quantitative research methodologies, this study aims to provide a substantive theory of member participation that will add to the understanding of needs and requirements of virtual community members, and how these can be met effectively through technological and sociological interventions.

Chapter 3:
Conceptual Framework & Research Design

> "Generally, the lack of completeness in virtual community studie encompass three perspectives, lacking grounded theories, lacking empirical studies, and lacking studies in a real setting."
> (Li, 2004)

As stated in *Chapter 1* of this dissertation, the research objective of this study is to investigate the sociological and technological factors that affect member participation in online communities. Towards this, the study utilizes a mixed-methods approach to explore and substantiate the dynamics and processes that characterize member participation in virtual communities, and the patterns of use of various technologies by online community members.

The purpose of this chapter is to deliberate and present the *conceptual framework* that was used to instantiate the empirical research process for this dissertation. Additionally, the chapter outlines the research questions, and provides details of the mixed methods research design that was used to guide the qualitative and quantitative research methodologies followed in this study. By following a systematic and pluralistic research approach toward theory building and testing, this study hopes to fill the gap that exists in the extant literature due to lack of sufficiently grounded theories for explaining the member participation process in virtual communities (Casaló et al., 2009; Ju et al., 2006; Lee et al., 2003; Li, 2004).

The next section in this chapter provides an overview of the *conceptual framework* and its various components. The configuration of the components in the framework is discussed, followed by a synopsis of the theoretical underpinnings of the *sensitizing concepts* in the conceptual framework. The scope and focus of the research study are then outlined through the specific *research questions* that this research aims to address. Following the discussion of the conceptual framework and the research questions, the last sections in this chapter discuss the mixed-methods *research design* used in this study, and highlight the array of procedures followed in the qualitative and quantitative phases of the study.

3.1 Conceptual Framework

The *conceptual framework* in this research study provided the foundation for approaching the phenomenon of member participation in VCs in a general sense while encompassing specific socio-technical variables that capture the complexity of the processes underlying member participation. In contrast with studies that posit *theoretical models* at the beginning of a research investigation, a *conceptual framework* allows a researcher to capture the complexity of a phenomenon under investigation without formalizing specific interactions

among variables – something that is deferred to the theory that emerges from the ensuing empirical investigation (Porter, 1980). Moreover, this researcher's view of a conceptual framework was that of a scaffold that helped contextualize the research study, and facilitated the emergence of theory in the qualitative phase of investigation. It is similar to the use of a scaffold in the field of construction where it refers to a temporary structure or platform used by construction workers to stand on while working on a building, and from which workers can access difficult-to-reach areas. In a similar fashion, the *conceptual framework* in this study allowed the researcher to initiate the research project by defining the scope of investigation and by guiding the empirical investigation efforts.

The following subsections provide a general overview of the conceptual framework based on the researcher's viewpoints while formulating it. This is followed by a discussion of the individual components in the framework.

3.1.1 Pivotal Tenets & Overview of the Conceptual Framework

Based on a review of the extant literature, the previous chapter highlighted the core building blocks of virtual communities and factors that typify member participation behaviour in VCs. On the basis of that discussion, it can be reasoned that the following four tenets are pivotal to a socio-technical portrayal of member participation in virtual communities:

i) *Purpose & People* constitute the defining basis of interactions in virtual communities: Member participation in virtual communities is significantly shaped by the objectives of VC providers as well as the goals of members who participate in them. Additionally, a member's participation behaviour in the virtual community draws upon the nature of social interaction ties and relationships that characterize the virtual community;

ii) *Drivers & Motivations* of members vary across different virtual communities as well as among members within the same community: While *information exchange* and *social interaction* constitute the general drivers for member participation in most virtual communities, the membership base of virtual communities constitutes a heterogeneous group in terms of motivations to contribute to their online social collectives;

iii) *Sociability & Usability* are critical design aspects: The design of virtual community technology platforms and tools needs to be representative of the social processes that characterize high level interactions of its members, and the shared norms that constitute their social reality in the online space.

iv) *Adoption & Use* are context specific: With different types of technology platforms and tools available to members, the uptake and continued use of technologies in virtual communities hinges upon the attributes of member interactions and the task objectives that drive those interactions.

Based on these tenets, it is argued that member participation in VCs is determined by various socio-technical factors, and it is the interplay among these factors that characterizes the initial adoption, ensuing evolution, and the ultimate success or failure of a VC. This viewpoint provides the basis for the *conceptual framework* formulated in this study. The framework provides an analytical foundation to study member participation in virtual communities by considering aspects of social processes as well as attributes of technology artifacts.

Figure 3-1 provides a pictorial representation of the *conceptual framework* for this research study. While formulating the conceptual framework, components from the *working definition* of a virtual community (5 Ps as defined in the previous chapter) were considered en bloc along with various *sensitizing concepts* (Charmaz, 2003; Miles & Huberman, 1994; Strauss & Corbin, 1994) (initial constructs) that define the scope of the research investigation. Shown as radial components connected through the virtual community components, these sensitizing concepts epitomize a socio-technical basis for the research study. The following sections provide more details about the configuration of the various components in the conceptual framework.

3.1.2 Configuration of the Conceptual Framework

In formulating the conceptual framework for this research study, the researcher had two objectives in mind:

i) to incorporate broad-based thematic concepts that have been suggested in other analytical frameworks for virtual communities. Two such frameworks used as reference points were the *online community framework (OCF)* by De Souza & Preece (2004) (also see Akoumianakis, 2008), and the *evidential conceptual model of online community* by McArthur & Bruza (2001).

ii) to define the scope of research study through use of *sensitizing concepts* (Charmaz, 2003; Miles & Huberman, 1994; Strauss & Corbin, 1994) that are of interest in this study, and have also been formally demonstrated in previous research studies as constituting essential elements in the member participation process in virtual communities. These sensitizing concepts would also be used to guide the qualitative data collection efforts. The sensitizing concepts comprising *drivers and motivations* (*information exchange* and *social interaction)*, *technological factors* (*functionality* and *usability)*, and *sociological factors* (*trust* and *sense of virtual community)* are shown along the radial components in figure 3-1.

The following subsections further discuss the configuration of the conceptual framework with respect to two objectives outlined above. First, the conceptual framework is compared and substantiated against other analytical frameworks for VCs from the extant literature. Next, the role of sensitizing concepts within the framework is briefly discussed.

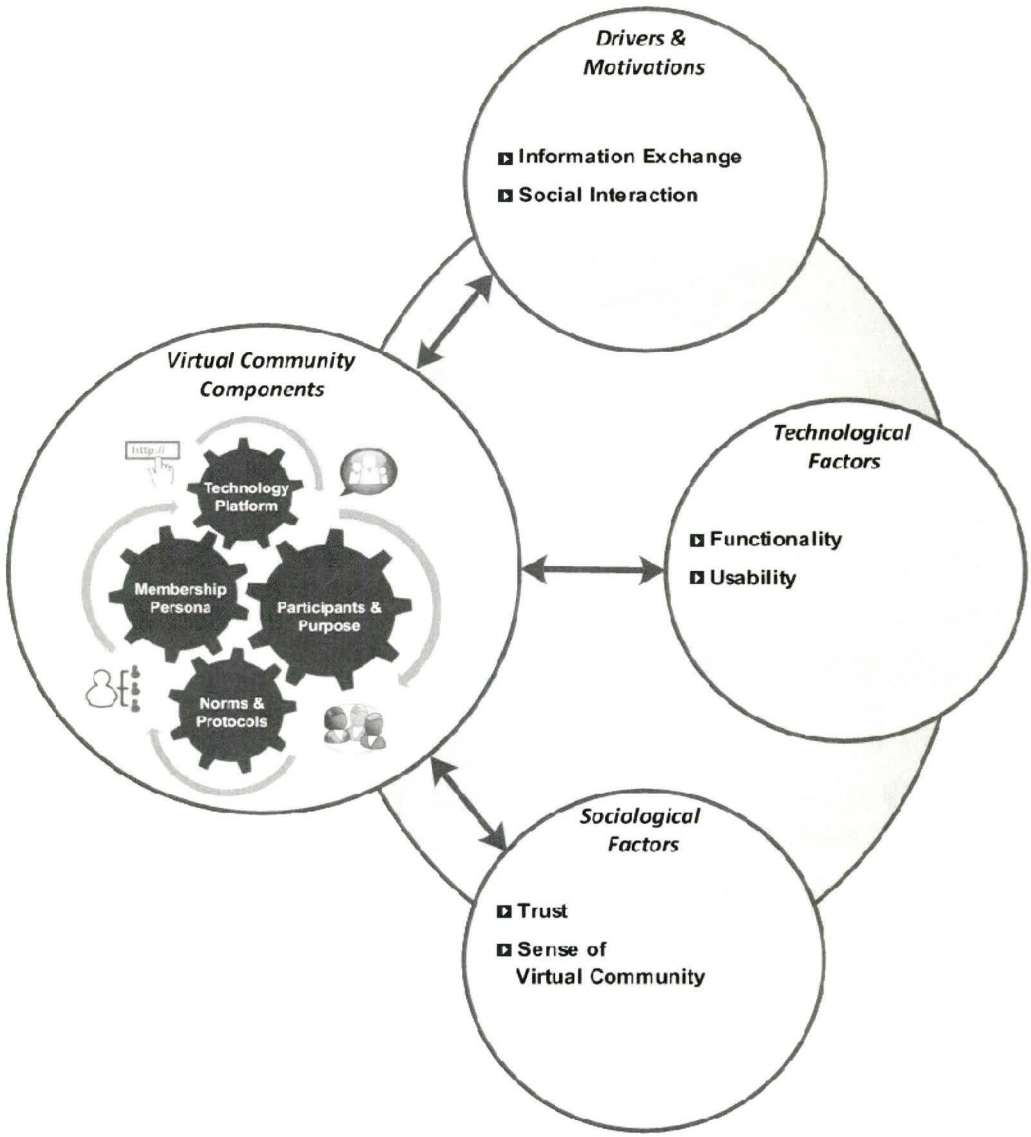

Figure 3-1: A Socio-Technical Conceptual Framework to Investigate Member Participation in Virtual Communities

3.1.2.1 Comparison with Other Analytical Frameworks for Virtual Communities

In terms of utilizing pre-existing analytical frameworks from the extant literature as a basis for this research investigation, the online community framework (OCF) (De Souza & Preece, 2004) provided initial ideas about the overall composition of the conceptual framework for this study. The OCF suggests that online communities be analyzed on the basis of three constituents: i) the *online community constituent* which represents an idealized abstraction of an online community in terms of its basic building blocks (people, purposes, and policies); ii) the *usability and sociability constituent* which refers to the goals and needs of community members that

must be considered in the development of supporting technology applications; and iii) the *interpretive constituent* which enables researchers to make sense of the human interaction processes in the virtual community. The conceptual framework in this study comprises all of these constituents as follows.

Firstly, the working definition of virtual communities (from the previous chapter) was used to operationalize the contextual elements in the conceptual framework. Shown as mutually constitutive components, the *5Ps* (participants, purpose, platform, protocols, and persona) are used in the conceptual framework to define the frame of empirical investigation for this study.

Secondly, the concepts of *usability* and *sociability* were explicitly incorporated in the framework using the sensitizing concepts of *functionality*, *usability*, *trust*, and *sense of community* since these factors refer to technological requirements of members as well sociological process elements at the community level (De Souza & Preece, 2004; Preece, 2001a; Preece, 2001c).

Thirdly, the *interpretive constituent* of the OCF was mapped to the interplay among the various components in the conceptual framework. This is shown in *figure 3-1* in the form of connected categories of sensitizing concepts situated along a radial, along with relationships among the various categories and the virtual community components. Together, the elements in the conceptual framework and their interrelationships were formulated to offer a process based explanation of the core phenomenon of member participation in virtual communities. Furthermore, member activities in the online community are contextualized through the *information exchange* and *social interaction* concepts which act as drivers for member participation (Porter, 2004; Preece, 2001a; Preece et al., 2004; Rheingold, 1993; Ridings & Gefen, 2004). In the OCF specification, the interpretive constituent interacts with the usability and sociability constituent, and in the current conceptual framework, this pattern is depicted by the mutual interaction (shown as double-headed arrows) between the sensitizing concepts categories and the virtual community components.

The other analytical framework which provided insights during the formulation of the conceptual framework was the *evidential conceptual model of online community* suggested by McArthur & Bruza (2001). According to this model, an online community can be modeled on the basis of four elements: *purpose* (common goals of members in the VC), *commitment* (affective attitude towards participation), *context* (norms and conventions), and *infrastructure* (technology and other shared resources). In the conceptual framework for this study, the aforementioned elements are included within the working definition of the virtual community. Additionally, commitment is included through the *sense of virtual community* construct which offers a dimension of affective attitude towards the VC (Blanchard, 2007b; Blanchard & Markus, 2004; Koh & Kim, 2003), and infrastructure is included in the form of the sensitizing concepts related to *functionality* and *usability* of the technology platform and tools in the VC.

On the whole, the conceptual framework satisfied the criteria for an analytical framework for virtual communities as recommended in previous research studies.

3.1.2.2 Sensitizing Concepts in the Conceptual Framework

Along the radial layer of the conceptual framework, the six sensitizing concepts (under three general categories) related to various socio-technical aspects of the member participation process were used to define the scope of the empirical investigation. Charmaz (2003) refers to sensitizing concepts as "those background ideas that inform the overall research problem". As background ideas, these concepts would still need to be improved and refined through the course of the research investigation according to the emergent findings (Bowen, 2006; Patton, 2002). In fact, as noted by Padgett, the real utility of sensitizing concepts "depends on where the data take us; emergent concepts may supplement or displace them altogether" (Padgett, 2004). Furthermore, it should be emphasized that even though these sensitizing concepts are based on formal theoretical constructs, their presence in the conceptual framework does not imply that the qualitative analysis procedures will use them as codes to force data into these specific categories. In this sense, these sensitizing concepts should not be thought of as predetermined codes for qualitative data, but rather as abstract guides to ensure that relevant data is gathered and analyzed during the empirical investigation.

The sensitizing concepts and their theoretical basis are discussed in the next section of this chapter, but briefly, the rationale for their inclusion in the conceptual framework is as follows:

i) *Information Exchange* and *Social Interaction* typify the general drivers for participation in a virtual community (Porter, 2004; Preece, 2001a; Preece et al., 2004; Rheingold, 1993; Ridings & Gefen, 2004);

ii) *Functionality* and *Usability* represent the technological factors that manifest the effectiveness of the technology platform and tools that are used by members of the virtual community (Isakovic & Sulcic, 2008; Moore & Serva, 2007; Preece, 2001a; Romm et al., 1997); and

iii) *Trust* and *Sense of Virtual Community* constitute important cognitive and affective components in the social processes that ensue during a member's participation in the virtual community (Blanchard & Markus, 2004; Ellonen et al., 2007; Koh & Kim, 2003; Ridings et al., 2002b).

Together, these sensitizing concepts provide an effective socio-technical basis to instigate the research program for this study by providing the foundations for cognitive, affective, and conative components to investigate the member participation process in virtual communities. The next section discusses its theoretical underpinnings by providing details about the sensitizing concepts used in the study.

3.1.3 Theoretical Underpinnings of the Sensitizing Concepts in the Conceptual Framework

In terms of the theoretical underpinnings of the sensitizing concepts utilized in the conceptual framework, this study draws upon the following two precepts: i) the key success factors for online communities elaborated by various researchers (2001a; 2001d; 2004; Romm et al., 1997), and ii) the interactive social processes in virtual communities that comprise a progression towards increased levels of member participation (Blanchard & Markus, 2003; Blanchard & Markus, 2007a; Ellonen et al., 2007; Wang & Fesenmaier, 2004). These precepts are incorporated in the conceptual framework through three sets of *sensitizing concepts* that were used in this study to guide the empirical investigation, namely, the *drivers and motivations for participation* (*information exchange* and *social interaction*), two *technological factors* related to attributes of IT artifacts (*functionality* and *usability*), and two *sociological factors* related to social processes in virtual communities (*trust* and *sense of community*). Together, these sensitizing concepts provided an initial footing for the research procedures in working towards a process based view of the member participation in virtual communities. The theoretical basis for each of these sensitizing concepts is summarized in the following sub-sections, along with preliminary definitions of each of the constructs and their associated dimensions[14].

3.1.3.1 Drivers for Member Participation: Information Exchange & Social Interaction

Depending on the type of virtual community formed, and the type of technology platform deployed, member participation can range from activities involving the search and exchange of information on websites, viewing and posting messages on discussion forums (bulletin boards), sending and receiving emails through distribution lists, to participating in interactive chat sessions among community members. In characterizing the participation of users in virtual communities, this research draws upon the most frequently cited reasons for joining a virtual community, and classifies them into the categories of *information exchange*, and *social interaction*. Such a classification scheme is based on online behaviors in virtual communities as highlighted by other researchers (Porter, 2004; Preece, 2001a; Preece et al., 2004; Rheingold, 1993; Ridings & Gefen, 2004). To illustrate this point, consider the following five reasons cited among the top motivations for participation in virtual communities (Wang & Fesenmaier, 2004):

- Low cost of providing information online (information exchange)
- Seeking / providing advice (information exchange)
- Finding friends / peers (social interaction)

[14] It should be noted that by providing definitions of sensitizing concepts and their associated dimensions, this chapter only lays the groundwork for empirical investigation. Based on the emergent theory from qualitative analysis, the actual manifestation of these concepts may turn out to be dissimilar to the ideas explored herewith.

- Product suggestions / evaluations (information exchange)
- Relationship building (social interaction)

Information exchange represents a core facet of member participation in virtual communities, especially in the context of professional, commercial, and research-oriented communities where the participants' objectives are to collect, compare, and contribute information relating to the community's general interests. According to several researchers, accessing information is the foremost reason given by users when asked about their motivations to join a virtual community (Furlong, 1989; Jones, 1995; Wellman, 1996; Wellman & Gulia, 1999). For example, in their exploratory study of 27 different virtual communities, Ridings & Gefen (2004b) describe information exchange as "the most popular reason for joining". This is in line with the findings of other researchers who emphasize that people participate in online communities for discussion and debates around topics of interest (Moore & Serva, 2007; Ridings & Gefen, 2004; Sangwan, 2005; Wang & Fesenmaier, 2004), as well as the recommendations of practitioners who have accentuated the importance of quality information and member generated content in attracting more users to online communities (Hagel & Armstrong, 1997; Hersberger et al., 2007; Koh et al., 2007; Lin, 2007b).

Social interaction is the other significant driver for member participation in virtual communities. In addition to serving a member's functional needs related to information seeking, online communities have also been known to satisfy their emotive needs through social interactions (Bishop, 2007; Sangwan, 2005) and social support (Ridings & Gefen, 2004; Wang & Fesenmaier, 2004). Whether it is to seek help, friendship, or support, VC members are often driven by their intent to develop social relationships with other members (Wang & Fesenmaier, 2004). In relating social interaction as a driver for member participation, prior research has shown that the quality of social interaction directly affects the satisfaction level of a VC's members, and member satisfaction itself is a potent predictor of continued participation in the virtual community (Chan et al., 2004).

It is also important to note that the two facets of member participation manifested in behaviours related to the drivers for information exchange and social interaction are not mutually exclusive. Previous research has shown that members exhibiting more of a certain type of behaviour are more likely to adopt the other in their future online interactions (Parks & Floyd, 1995; Utz, 2000). These findings are consistent with Walther's (1992) *social information processing* theory (SIP) which portends that users of CMC technologies exchange informational content not only to develop their own knowledge, but also to form impressions of other users. These personal impressions can consequently affect their relationships and any future interactions in the VC (Walther, 1995).

3.1.3.2 Technological Determinants of Member Participation: Functionality & Usability

Functionality and *usability* of the technology platform and supporting tools in the virtual community constitute a critical success factor for its sustainability (Koh et al., 2007; Romm et al., 1997). The uptake and continued use of these technologies is determined by how well they suite the requirements of members in the community, as well as the sociability needs of the community as a whole (Preece, 2001c; Preece & Maloney-Krichmar, 2003).

In terms of ***functionality***, as discussed in the previous chapter, an effective selection and deployment of technologies needs to be based on an assessment of the tasks and activities that VC members undertake in their communities. The choice of the primary platform for the virtual community (e.g. blog, discussion forum, wiki etc.) needs to take into account the purpose of the community and the type of information and interaction environment that is best suited for that purpose (Porter, 2008). For instance, while a wiki based site is suitable for collaborative information tasks in a professional virtual community, a discussion forum might serve the conversational interaction needs of users in a social virtual community. Similarly, through support tools in the community's infrastructure, multiple interaction modalities need to be supported (Broß et al., 2007; Preece, 2001b), and features to improve social presence need to be incorporated through use of features such as user profiles and avatars (Khalifa & Shen, 2004; Koh et al., 2007).

To aid in the discussion of functionality of VC platforms and tools, as suggested in recent research, rather than referring to the capabilities of a single digital medium as a whole, it is more appropriate to consider the set of features and tools that are offered by the medium (Dennis et al., 2008). The functionality of these different features and tools can subsequently be assessed separately as well as in tandem to make sure that the activity based needs and contextual needs of VC members are satisfied (Subercaze et al., 2009).

In deliberating the functional capabilities of different tools and features, various theoretical perspectives have been adopted by virtual community researchers. Most commonly, the choice of appropriate communication media has been addressed through theories such as *media richness theory* (Daft et al., 1987) and *social presence theory* (Short et al., 1976). In the context of the two drivers of information exchange and social interaction described earlier, media richness theory emphasizes the information processing capability, while social presence theory emphasizes the connectedness among users. Both forms of participation regard the degree of social presence and media richness as important factors in terms of how interactive and expressive a medium is (Kraut et al., 1998).

Social presence can be defined as the degree to which the medium facilitates awareness of the other social actors and interpersonal relationships during the interaction (Fulk et al., 1990). Using the theoretical perspective of social presence, researchers have looked at design characteristics of technologies that facilitate greater perceptions of *intimacy* and *immediacy*

which are core to the development of highly interactive online environments such as virtual communities (Khalifa & Shen, 2004; Short et al., 1976). Furthermore, communication media that differ in their levels of interactivity and vividness have been shown to produce different perceptions of social presence in online communities (Shen & Khalifa, 2008). In the context of VCs, tools and features such as user profiles, multimedia conferencing, and online awareness indicators can facilitate these varying perceptions of social presence (Blanchard & Markus, 2007a).

A parallel stream of research on functionality of VC tools and features used a *media richness* lens of analysis to look at the capabilities of the communication media in terms of the medium's capacity for immediate feedback, the number of cues and channels available, supported language variety, and the degree to which message can be customized for the recipient (Daft et al., 1987). Using this perspective, researchers have observed and ascertained the choice of specific CMC tools made by members of online communities on the basis of the type of message and the tools available to them (Williams et al., 2007; Wise et al., 2006).

Taken together, these theoretical perspectives provide a practical basis for the study of functionality of VC technologies through a detailed analysis of the capabilities of various tools and features that comprise the VC infrastructure.

Usability of VC technologies constitutes the second theoretical construct in the conceptual framework. Formally defined, usability consists of the three main dimensions of *effectiveness*, *efficiency*, and *satisfaction* that determine a user's satisfaction with the specific technologies in question (ISO 9241-11, 1998). Just as in the case of any other technology application, the successful uptake, adoption, and use of virtual communities depends upon high levels of effectiveness, efficiency, and satisfaction associated with its various features and functions. Despite the numerous definitions for what constitutes good usability, there is general agreement on the attributes that enable easy and intuitive interaction between the user and the technology. For instance, Nielsen (1995; 1996) recommends that user interfaces be learnable, efficient, memorable, error-resistant and subjectively satisfying, while Shneiderman (1998) considers consistency, controllability, and predictability as useful heuristics to gauge usability.

In discussing the importance of usability to virtual communities, many researchers agree that in addition to being able to satisfy the basic functional and emotive needs of users, successful virtual communities also need to cater effectively to the contextual needs of their members (Sangwan, 2005). These contextual needs relate to the user's interactions with the underlying technology platform that supports the virtual community. While availing the technical capabilities of a VC, members have highlighted the importance of usability features such as site structure (Andrews et al., 2001), website responsiveness (Leimeister & Krcmar, 2004; Schoberth et al., 2003), navigation (Preece, 2001a; Sangwan, 2005), and information design (Preece, 2001a; Preece, 2001d). For purposes of an operational definition of the usability concept as included the conceptual framework, this dissertation uses a combination of

attributes to typify the facets of usability that may potentially be important determinants of member participation in virtual communities. These facets include *navigation*, *access*, and *information design*. Variants of these usability facets have been previously cited by other VC researchers as being important in the overall assessment of VC technologies (Ho & Chignell, 2000; Koh et al., 2007; Preece & Maloney-Krichmar, 2003).

The element of *navigation* addresses the intuitiveness and usefulness of tools and aids in VC interfaces that play a supportive role in allowing users to peruse relevant information online. Prior research on VCs has confirmed the importance of consistency in interaction styles among the various software modules that are used on the VC site to ensure user satisfaction and continued member participation (Du & Wagner, 2007; Preece, 2001d). Similarly, the use of easy to use navigational aids has been shown to enhance the user's online experience in the VC (Kelly et al., 2002). Whether these aids enable *structural navigation* through maps and breadcrumb trails or include tools for *local navigation* for accessing linked information, efficient navigation design has been shown to be supportive of and responsive to fundamental user behavior in the virtual community hyperspace (Chignell et al., 2000; Du & Wagner, 2007; Preece et al., 2002).

Coupled with the appropriate navigation support for locating online resources, the *access* component of usability is meant to ensure efficiency and swiftness of the VC interface in allowing members to acquire information and interact with other members. This may require the hosting institution for the VC to pay attention to site uptime, reduce download delays, and utilize less resource intensive site features to enable communication among members (Preece, 2001d). Incorporating such elements in the design of the virtual community space can reduce the frustration that users experience from not being able to perform their intended tasks, and ensure higher levels of productivity.

Lastly, the *information design* component of the usability construct pertains to the error-free achievement of information oriented goals of VC members, and the learnability of the user interface itself (Albers & Mazur, 2003). The objective of incorporating good information design principles in websites has been linked to improving user engagement with technologies leading to an overall better total user experience (Albers & Mazur, 2003; Shedroff, 2000; Zappen et al., 2008). Towards this, particular attention needs to be paid to the organization and presentation of the informational content available within the VC interface (Chignell et al., 2000). In particular, usability experts recommend that careful consideration be given to designing the VC interface to incorporate aspects of interaction design for interpersonal communication through techniques that support story-creating and telling, and sensorial design for connecting with others through a multitude of senses including visual and auditory media (Shedroff, 2000). Such techniques can prove to be effective in the development of user friendly schemas which enable higher levels of scaffolding and retention while reducing the cognitive load of members in virtual communities.

Overall, past research has shown the afore-mentioned attributes of navigation, access, and information design to be important factors that affect usability in a virtual community (Du & Wagner, 2007; Koh et al., 2007; Preece, 2001b), and as such, these attributes provide a useful instantiation for the concept of usability in a virtual community setting.

3.1.3.3 Sociological Antecedents of Member Participation: Trust & Sense of Virtual Community

A number of research studies on virtual communities have highlighted the need for building *trust* and a *sense of virtual community* to improve member participation in virtual communities (Blanchard & Markus, 2004; Ellonen et al., 2007; Koh & Kim, 2001; Porter & Donthu, 2008; Ridings et al., 2002b). While some studies have focused on these individual concepts as key success factors for sustaining member participation in virtual communities, others have indicated them to be interrelated as specific process components that characterize member participation. For instance, from a process based perspective of member participation, Blanchard & Markus suggest a temporal ordering of social processes that lead to a *sense of virtual community*, and *producing trust* is proposed to be one the required social processes (Blanchard & Markus, 2004) in the model. This section offers an overview of these sociological concepts and highlights their relevance to the member participation process in virtual communities.

In the conceptual framework for this dissertation, ***trust*** constitutes the first of the two sociological factors that have been used as sensitizing concepts to explore the member participation process in virtual communities. In the context of VCs, trust plays an important role in helping members overcome their perceptions of risk and insecurity and in allowing them to share information more comfortably – i.e. enabling behaviours that are essential for increased participation in the VC.

Trust is a commonly discussed research construct in the IS discipline (e.g. Gefen et al., 2002; Jarvenpaa et al., 1999a; McKnight et al., 2002), and in the context of the current research study, researchers have also deliberated specific conceptualizations of trust in the virtual communities realm (Abdul-Rahman & Hailes, 2000; Andrews et al., 2001; Porter & Donthu, 2008; Ridings et al., 2002b). However, little work has been done towards proffering a unified model for investigating trust in a VC context (Casaló et al., 2008a; Eisentraut et al., 2001; Ellonen et al., 2007; Ridings et al., 2002b). For instance, in their work on the antecedents and consequents of VC trust, Ridings et al. (2002b) note the limitation of their model in not addressing issues surrounding trust that members have in the organization that hosts the VC. Similarly, other researchers have often concentrated their efforts in relating trust in online communities to a specific functional construct such as reputation indicators (Eisentraut et al., 2001) or subscription fees and member monitoring (Abdul-Rahman & Hailes, 2000). Hence, the issue of trust in virtual communities still remains largely under-explored and insufficiently investigated (Casaló et al., 2008a).

For purposes of this research, *trust* in the virtual community will be defined along two primary dimensions, namely, *organizational trust*, and *member trust*. These dimensions form the basis of various interactions that occur in the VC (Casaló et al., 2008b; Preece, 2001d; Ridings et al., 2002b), and their investigation in the context of VCs will be informed by trust research in other IS domains such as e-Commerce and online retailing (e.g. Jarvenpaa et al., 2004; McKnight & Chervany, 2001a; McKnight et al., 2002).

In rationalizing the specific dimensions of *organizational trust* and *member trust* that are of relevance in this study, the initial conceptualization of these forms of trust draws upon relevant underlying dimensions of trustworthiness beliefs found in the extant literature.

In characterizing the concept of *organizational trust*, this study draws upon the model of organizational trustworthiness originally proposed by Mayer et al. (1995). The model posits that an individual's perceptions of the organization's characteristics of *ability* (the competencies that allow the organization to command influence and authority), *benevolence* (the willingness of the organization to establish mutually satisfying exchanges rather than simply seeking its own gains), and *integrity* (the adherence of the organization to a code of moral or ethical values) play an important role in affecting the person's confidence, and consequently, trust in the organization. Together, these three dimensions of *ability*, *benevolence*, and *integrity* have been shown to parsimoniously capture the concept of trustworthiness. Variations of this model have been used in the IS literature to describe the antecedents of trust in online vendors in an e-Commerce context (Gefen et al., 2002; McKnight & Chervany, 2001a; Roy et al., 2001) as well as virtual community sponsor organizations (Porter & Donthu, 2008). In the case of virtual communities, credibility of the hosting organization, technical attributes such as usability and security of the online medium, relationship aspects such as the administration's enactment on user feedback, and issues surrounding confidentiality and privacy of information may affect the level of institution based trust in the VC.

Member Trust constitutes the second aspect under the concept of trust that will be explored in this study. It is worth noting here that this aspect of trust remains largely lacking in the IS research literature, as not many studies in the adoption of ICTs have considered person to person interactions (Ellonen et al., 2007; Ridings et al., 2002b).

On the outset, the few research studies that have explored the concept of member trust in a VC context have adopted the definition of *member trust* put forth by Jarvenpaa et al. (1998) due to its basis of operationalization in a similar realm of virtual teams in the workplace (e.g. Casaló et al., 2008a; Lu et al., 2008; Ridings et al., 2002a). However, despite the common basis for conceptualization (similar components of trustworthiness), the studies on member trustworthiness in virtual communities have used different dimensions in their theoretical models. For example, while Lin (2006) used a unidimensional conceptualization of member trustworthiness, Ridings et al. (2002) used two dimensions with *ability* as a distinct dimension,

and b*enevolence* and *integrity* combined into a second dimension, and Casaló et al. (2008) employed three dimensions labelled as *competence*, *benevolence*, and *honesty*.

In another approach towards conceptualizing member trust, some VC studies have adapted Jourard's (1971) attributes of trustworthiness by way of self-disclosure in real life social relationships. Based on this model, it is suggested that the underlying characteristics of *depth* (the intimacy and honesty in relationships), *reliability* (the dependability and accuracy of the relationship), and *intent* (the awareness and willingness to develop social relationships) form the basis for establishing and sustaining member (interpersonal) trust in a VC environment. Some of these dimensions were also validated in a study pertaining to the interpersonal trust in an online conversational context (Leung, 2002).

It is in light of these types of differences in formalization of the dimensions underlying *member trust* that Daneshgar and Ho (2008) recommend that researchers use a context-specific operationalization of this particular theoretical construct. Heeding to the advice, this study adopts the more widely used definition of member trust in VCs where the concepts of *competence* (knowledge and skills of other members), *benevolence* (willingness to ensure the well-being of their peers in a virtual community), and *integrity* (sincerity towards community peers) are incorporated into the preliminary definition, but a formal definition is deferred until after the qualitative data analysis phase of this research[15].

Together, these characteristics of *organizational* and *member trust* provide a useful basis for studying the formation of trust in the VC as a whole, and in exploring how varying levels of trust can affect member participation in virtual communities.

***Sense of virtual community** (SoVC)* is the second sociological construct that was included in the conceptual framework as a sensitizing concept to study the process of member participation in virtual communities. Prevalently conceptualized and investigated in the context of virtual communities, the SoVC construct draws upon the original *theory of sense of community* which constitutes an extensive body of knowledge in the field of community psychology (McMillian & Chavis, 1986; Peterson et al., 2008). In the context of virtual communities, the sense of virtual community construct has been adapted from its original version which applies to physical communities. Furthermore, SoVC is consistently regarded as an essential element for sustaining member participation in virtual communities (Bagozzi & Dholakia, 2002b; Blanchard, 2007b; Blanchard & Markus, 2004; Ellonen et al., 2007; Koh & Kim, 2003; Yoo et al., 2002a).

[15] It is worth re-iterating at this point that based on the results from the qualitative empirical investigation, the definitions and dimensions of any of the sensitizing concepts from the conceptual framework may be refined at a later point in the study.

In a seminal ethnographic study done by Mike Davis (1997) during the early days of virtual communities, the investigation focused on a mere extrapolation of the traditional sense of community from physical communities, and found it to be insufficient to describe the phenomenon in the context of online communities. Subsequent research has helped in answering Davis' call for better models of sense of community through studies of various VCs in different stages in their lifecycles (Davis, 1997). Subsequently, by observing the relationships and interactions in both new and well established VCs, researchers have been able to provide better explanations of how members develop a sense of virtual community over time. For example, in an empirical study of a virtual community, Blanchard & Markus (2002; 2004) investigated the application of four dimensions to operationalize their *sense of virtual community (SoVC)* model. These dimensions were: *feelings of membership, feelings of influence, feelings of integration and fulfillment of needs, and feelings of shared emotional connection*. The four dimensions were adapted from their original use in McMillan & Chavis' (1986) *sense of community index (SCI)* which has been regarded as the authoritative measurement instrument for sense of community in traditional face-to-face community contexts (McMillian & Chavis, 1986; cf., Peterson et al., 2008). Other studies on virtual communities have also adapted McMillan & Chavis' (1986) *sense of community index (SCI)* with minor modifications (Koh & Kim, 2001; Obst & White, 2004b; Yoo et al., 2002a). For instance, in their study of Korean virtual communities, Koh & Kim utilize two dimensions of the original SCI, and test a model of SoVC which includes the dimension of *immersion* to indicate an experience of *flow* (holistic sensation that people feel when they act with total involvement) (Csikszentmihalyi & Nightingale-Conant, 1991).

Realizing that there is still a gap in the current literature around the conceptualization of SoVC, the conceptual framework in this study initially adopted the more prevalent structural formulation of SoVC comprising of four dimensions as proposed by the original sense of community index (SCI) (McMillian & Chavis, 1986) adapted to a VC context. The preliminary dimensions of SoVC as adapted from the sense of community index (SCI) are briefly highlighted herewith:

- *feelings of membership* pertain to a member's emotions of belonging to and identification with a virtual community. In the context of VCs, these feelings of membership can emerge as a result of public and private exchange of information and socio-emotional support (Blanchard & Markus, 2002).
- *feelings of influence* relate to the bidirectional abilities of the individual member to be able to effect the functioning of the community, and the community to have some power over its members. In virtual communities, members may experience these feelings of influence, especially in the early stages of the community where users work together towards the establishment of norms, policies and mutually agreeable code of conduct and standards of participation (Greer, 2000; Kollock & Smith, 1996a).

- *feelings of integration and fulfillment of needs* originate when members achieve the goals they desire and the outcomes they value through their interactions. Within the context of a VC, these feelings emerge as a result of shared interests and the reciprocity of support among them (Blanchard & Markus, 2003).
- *feelings of shared emotional connection* have been regarded as "the definitive element for a true community" by the original theorists of the sense of community model (McMillian & Chavis, 1986). These feelings are symbolized in the community's shared history with respect to its evolution and development overtime. In the case of VCs, these feelings have been observed to develop on the basis of the frequency and the quality of interactions among members, and their identification with the online personalities of other members (Greer, 2000; Preece, 2001a).

Through their empirical study, Blanchard & Markus (2002; 2004) concluded that the sense of virtual community is more complex than its real life counterpart construct of sense of community in real-life communities. Since virtual communities are more flexible and adaptable to changing environments (Geyer, 1996), any one of the four dimensions may play a more important role than the others at different points in time. Furthermore, depending on the context and the shared interests of members, not all dimensions in the McMillan & Chavis' original model (1986) may be needed to maintain a sense of virtual community in an electronic meeting space. Hence SoVC will vary from one community to another (Blanchard & Markus, 2002). This conjecture was validated by Yoo et al. (2002a) who modeled sense of virtual community (measured using an adapted SCI) as a mediating factor between site traffic volume and member participation. Through their research, the authors were able to validate their hypothesis that SoVC plays an important role in ensuring high levels of member participation in a virtual community, and that the various dimensions underlying the SoVC assume varying influences depending on the type of virtual community under investigation.

Overall, the sensitizing concept of *sense of virtual community* in the conceptual framework provides a useful basis for the inclusion of affective and evaluative characteristics in the member participation process in virtual communities.

3.1.3.4 Dynamic Interaction among Sensitizing Concepts

The intent of this study is not to solely map each of the components of the conceptual framework to their individual effects on member participation, but rather to consider them in totality so as to afford a general view of the complex phenomenon of member participation.

Having outlined the principal elements in the conceptual framework along with their initial definitions, it is important to highlight their interrelationships which often constitute dynamic reciprocal interaction among the constructs. For example, with respect to the

interaction between the constructs of *trust* and *sense of community*, their mere compositions into their underlying dimensions can be observed to have significant overlap. For instance, aspects of *member trust* such as the *benevolence* and the *integrity* of VC members can be expected to be highly intertwined with the *SoVC* dimensions of *feelings of a shared emotional connection*, as well as with *feelings of integration and fulfilment of needs*. Hence, the factors pertaining to *member trust* can also be expected to reinforce a stronger *sense of virtual community*. In fact, this relationship between *member trust* and *sense of virtual community* has been studied and corroborated by other virtual community researchers (Blanchard & Markus, 2003; Ellonen et al., 2007).

As another basic example, consider the tools and features that members adopt and use in their information exchange and social interaction activities in the online community, i.e. the *functionality* is desired by VC members. As highlighted earlier, the choice of tools and features may depend upon the communication modality (e.g. text vs. voice or synchronous vs. asynchronous) preferred by the members, which will be determined by the nature of information exchange or social interaction tasks that the members undertake.

Concerning the nature of relationship between various aspects *functionality* & *usability* on the one hand, and *trust* (specifically, *organizational trust*) on the other, similar relationships have been explored in previous research, albeit not in the context of virtual communities. For example, in their research on the trustworthiness of Internet vendors, Roy et al. (2001) have substantiated the strong linkages between ease of navigation and the perceived benevolence of the e-commerce vendor, and the overall relationship between usability and the perceived ability of the vendor. Results similar to these can be expected in relating the *usability* of the VC technologies and various aspects of *organizational trust*. Along the same vein, *functionality* enhancements such as the use of reputation indicators to aid in the navigation for reliable information have been shown to have a positive effect on *trust* in the VC (Abdul-Rahman & Hailes, 2000; Andrews et al., 2001; Eisentraut et al., 2001).

Lastly, considering the link between *functionality* and *sense of virtual community*, recent research has focused on devising sets of feature related enhancements for improving the sense of virtual community (Ginsburg & Weisband, 2003). As a specific example, providing social cues (Zhang & Hiltz, 2003) such as member directories with photographs and video clips, the availability of social navigation tools (Dieberger, 1997) such as member referred pages and frequency of access indicators have been shown to help enhance the *sense of virtual community* among the community members.

Having highlighted the notion of dynamic interactions among the various constructs in the conceptual framework, it is important to emphasize that in terms of the relationships among the various constructs, some sources of influence may be stronger than others, and that they do not all occur simultaneously. This research study aims to not only provide a theoretical basis for the interactions among constructs that characterize member participation, but also to offer

additional insights on the nature of relationships among the various concepts in terms of their differential effects on one another as well as on member participation levels.

Keeping in mind the sensitizing concepts in the conceptual framework for this study, and their potential interrelationships, the next section discusses the specific research questions that guided the research investigation in this study.

3.2 Research Questions

As noted earlier, the main purpose of this research study was to offer a substantive theory about the socio-technical factors that affect member participation in virtual communities. For purposes of this research, a theory is defined as "a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena" (Strauss & Corbin, 1998, p. 15). To facilitate the generation of such a theory of member participation, the research questions specified in this section acted as a directional guide to aid the discovery of various theoretical components including constructs, definitions, and propositions that together present a systematic view of the member participation process in virtual communities.

Aligned with the nature of empirical inquiry in this study, the research questions below were formulated in accordance with various guidelines for investigations that assume an *inductive thrust* and *emerging stance* towards a core phenomenon of interest (Creswell, 1994; Miles & Huberman, 1994; Werner & Schoepfle, 1987). Specifically, two *grand tour questions* (Werner & Schoepfle, 1987) were formulated to state the overall purpose of the study in its most general form, followed by a list of more specific (sub-) questions. Furthermore, the sub-questions outlined below were articulated using the guidelines for *exploratory research design* (Bortz & Döring, 2002; Creswell, 1994). The open-ended, descriptive and non-directional disposition of these questions is well suited to the objective of generating an inductive empirically based theory of member participation in virtual communities.

On the outset, the overarching objective of this research was concerned with answering the following central research questions (i.e. the grand tour questions for this study):

Grand Tour Research Question 1	▪ What are the salient socio-technical factors that affect member participation in virtual communities?
Grand Tour Research Question 2	▪ How are these factors interrelated in their effects on member participation in virtual communities?

By asking these two broad questions, the study aimed to develop an inclusive view of various components in the member participation process. Through the first question, the research hopes to discern the various sociological and technological factors that influence participation levels and types of activities that members undertake in their VCs. On the other

hand, the second question is geared towards achieving an integrated perspective of the socio-technical factors and their roles in the overall member participation process in virtual communities.

These grand tour questions are addressed in this study using a combination of qualitative and quantitative research methodologies. Firstly, an adapted *grounded theory methodology* is used in the qualitative phase of investigation to enable the identification of the core phenomenon that ties together the context, conditions, actions, interactions, and consequences that characterize the dynamics of the member participation process. Secondly, the quantitative analysis phase utilizes structural equation modeling techniques to help establish the differential effects of various factors on the prospects for continued member participation in virtual communities.

Based on the grand tour questions specified above, the scope of the research was focused further through an operationalization of the sensitizing concepts from the conceptual framework presented in the previous section. This was done by asking a series of research questions as highlighted below.

Research Question 1 (RQ1)	▪ What are the drivers and motivations for member participation in virtual communities?

As a practical starting point to investigate member participation in virtual communities, the first research question (*RQ1*) inquires about the fundamental reasons on the basis of which members participate in virtual communities. As noted earlier in this chapter, *information exchange* and *social interaction* are typically cited as the generic reasons for participation in VCs (Ridings & Gefen, 2004; Wang & Fesenmaier, 2004). However, there may be other specific extrinsic goals and intrinsic motivations that influence member participation in virtual communities. By identifying these specific reasons, this study aims to provide insights into the requirements of members that need to be considered during the design of virtual community technologies, and in the development of policies for operation and administration of the virtual community. Furthermore, these research results may also potentially be used to create prototypical profiles for different types of members, and subsequently enable virtual community architects to devise relevant targeted strategies for the increasing member participation levels.

Research Question 2 (RQ2)	▪ What aspects of functionality and usability determine the choice of technology platforms and tools that members use during their online participation in virtual communities?

The second research question prompts an investigation into the technological facets of the member participation process in virtual communities. By ascertaining VC members' repertoire of technologies and their use patterns, this question aims to determine the types of features that are valued by VC members, and the reasons for high or low use of different

technology platforms and tools in the virtual community. To answer this question, the qualitative phase of investigation is used to gather subjective information about the technologies that members utilize during their participation, and statistical data from the quantitative phase is used to provide descriptive statistics about the use of various technologies. Together, these pieces of information can potentially help create a basic technographic profile of members in virtual communities.

Furthermore, through the grounded theory methodology in the qualitative phase of investigation, conceptual properties and dimensions of usability are determined specifically within the context of virtual communities, and these dimensions are subsequently corroborated in the quantitative investigation phase. Such context-specific operationalization of usability has been generally lacking from the extant virtual communities literature and this study hopes to fill that gap.

Research Question 3 (RQ3)	▪ How do various social processes in member participation affect the choice and use of technology platforms and tools?

Building on *RQ2*, to further elaborate the differential use of technologies in virtual communities, *RQ3* concentrates on the analysis of linkages among various social processes and the use of technologies that foster or impede those social processes. For instance, it is expected that members who are interested in different forms of interaction (e.g. communication vs. collaboration among members, or deep communication with specific individuals vs. broad communication with the community as a whole) will utilize different technologies based on their preferences. Similarly members who are at different stages of membership in terms of duration and intensity of participation may also demonstrate variations in their use of technology platforms and tools.

By discovering patterns of use of technologies within the context of various social processes, the answer to this question may potentially enable developers of technologies to improve their offerings based on the varying needs and preferences of VC members as they evolve through various participation experiences and establish preferred modes of interactions. Furthermore, the research findings can also potentially help virtual community providers in determining relevant technologies according to the types of social processes that they want to support in their communities.

Research Question 4 (RQ4)	▪ How does trust in the virtual community organization and trust in other virtual community members develop over the course of a member's participation?
Research Question 5 (RQ5)	▪ What attributes of organizational trust and member trust enhance or encumber member participation in virtual communities?

Research questions 4 and 5 address the notions of *organizational trust* and *member trust* in virtual communities. As highlighted previously, these concepts have been investigated in previous research and their significance as determinants of member participation is well established (Casaló et al., 2008a; Daneshgar & Ho, 2008; Ridings et al., 2002a; Wu et al., 2009). However, most studies have explored these concepts in a general sense by defining them in the same way as in other online end-user contexts such as e-commerce (e.g. Casaló et al., 2008a; Lu et al., 2008; Ridings et al., 2002a). In this dissertation, empirical evidence will be gathered and analyzed to offer context-specific archetypes of organizational and member trust.

RQ4 facilitates the formulation of a process based description of trust in virtual communities by determining the events and episodes that members experience during their online interactions. By using the *critical incidents technique* (described in the next chapter), the qualitative phase of investigation provides insights about experiences in the online community that affect trust-building processes in either a positive or negative manner.

The research findings on trust-building processes were also utilized to answer *RQ5* in order to offer a context-specific formulation of the organizational and member trust constructs and their various dimensions. The dimensionality of these constructs was subsequently substantiated during the quantitative analysis phase using exploratory factor analysis procedures.

Research Question 6 (RQ6)	▪ How does a sense of virtual community develop over the course of a member's participation?
Research Question 7 (RQ7)	▪ What characteristics of sense of virtual community improve or inhibit member participation in virtual communities?

The last two questions (*RQ6* and *RQ7*) deliberate the role of *sense of virtual community (SoVC)* as a core sociological construct in the member participation process in virtual communities.

Firstly, to derive a holistic view of SoVC, the qualitative investigation phase identified factors that foster or inhibit the formation of SoVC among members of virtual communities. The qualitative findings also help establish linkages between the formation of SoVC with other factors such as trust.

Secondly, the defining attributes of SoVC were formally analyzed to produce an operationalization of the construct and its various dimensions. Subsequently, this operationalization was verified through exploratory factor analysis procedures in the quantitative phase of investigation. A research treatise of sense of virtual community using pluralistic methodologies was expected to fill significant gaps in the extant research literature as most studies todate are either based on the original conceptualization of sense of community in a face-to-face community context (Obst & White, 2004b; Yoo et al., 2002a) or studied through

atheoretical models that have been subjected to simple confirmatory analysis procedures (Koh & Kim, 2001; Koh & Kim, 2003).

Overall, the research questions asked above are used as guidelines throughout the research investigation in multiple ways. Firstly, together with the conceptual framework, the research questions form the basis for a socio-technical lens of analysis for studying the member participation process in virtual communities. Secondly, these questions are formulated on the basis of filling gaps in the current literature, and as such, they express the essential value propositions for this research study. Lastly, the multifaceted disposition of the research questions provides the foundation for a mixed-methods research design based on a combination of qualitative and quantitative research methodologies.

Having introduced the overall need for a mixed-methods approach through the research questions, the next section in this chapter introduces and elaborates the basis and practicalities of the mixed-methods research design for this study.

3.3 Mixed-Methods Research Design

The preceding sections in this chapter have outlined this study's main components for investigation in the form of a conceptual framework along with their theoretical foundations, as well as the research questions guiding the empirical investigation in this dissertation. As such, these sections have outlined the overall purpose of research through a definition of the research problem and identification of the main issues that need to be addressed in order to formulate answers to the research problem. This current section moves the research scheme forward from planning towards execution by specifying a research design that acts as "an architectural blueprint" (Bickman & Rog, 2008) for the various phases of investigation in this research.

As noted in the specification and discussion of research questions, this study utilizes a *mixed-methods research design*[16] comprising qualitative and quantitative research methodologies. On the outset, the objective of the qualitative phase of research was to facilitate theory building through emergent factors and relational propositions that spawned from the sensitizing concepts in the conceptual framework, and to explain the member participation process in virtual communities. Subsequently, the quantitative phase concentrated on enriching the generated theory by testing salient relational propositions, and by providing qualified descriptions about the differential effects of various socio-technical factors on member participation in virtual communities.

[16] This study adopts a strict definition of *mixed-methods research* as constituting a combination of qualitative and quantitative research methodologies. Furthermore, while the term *research design* is used in this study to refer to the high-level strategy for research, the term *research methodology (or methods)* refers to techniques and procedures for data collection and analysis.

Figure 3-2 illustrates the operationalization of the research design by depicting its two main phases along with a mapping of the research questions that guided the empirical procedures in each phase. As discussed in the previous section, the two grand tour research questions set the course of the research investigation by providing a basis to combine qualitative to quantitative methodologies. Furthermore, the two phases comprising qualitative and quantitative methodologies can be characterized by their principal outcomes and the specific research questions they align with. Firstly, the qualitative phase is geared towards the generation of theory that situates member participation in virtual communities as a socio-technical phenomenon that can be explained through various factors pertaining to the context, conditions, and consequences of member participation behavior. Hence, the *emergent theory* offers a thick description of various socio-technical facets of member participation in virtual communities. As the primary methodology for this exploratory study, the qualitative empirical procedures form the principal basis for answering the research questions (RQ1 – RQ7) specified in the previous section. Subsequently, selective aspects of the *emergent theory* are used to construct an *abridged theoretical model* that offers a viable basis for quantitative verification and is also relevant in answering research questions that require quantitative elaboration (RQ4 – RQ7). Consequently, the quantitative phase of empirical investigation deduces a *structural model* that complements the research findings in the previous phase, and corroborates the propositions in the abridged theoretical model.

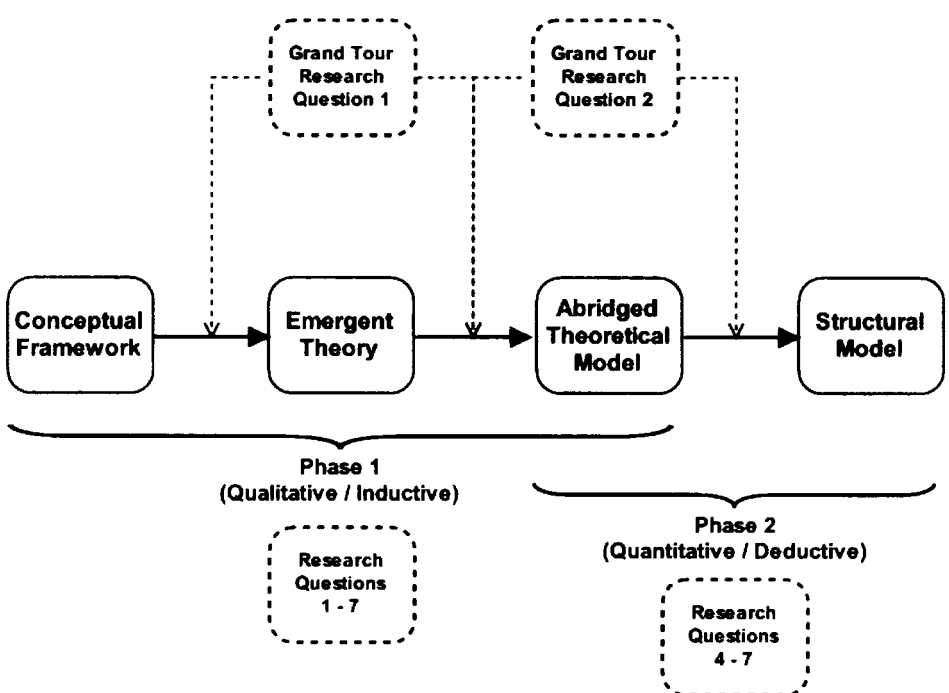

Figure 3-2: Operationalization of the Mixed-Methods Research Design Adopted in This Study

Overall, as shown in *figure 3-2*, the research design had an inductive thrust with a qualitative methodology acting as the dominant paradigm for the study. A scheme such as this is reflective of *sequential exploratory mixed-methods design* (Creswell, 1999; Tashakkori & Teddlie, 1998). The following subsections provide further details about the premise of the overall research design adopted in this study, the purpose of the sequential exploratory mixed-methods design, and the integrated research plan highlighting the empirical investigation procedures.

3.3.1 Post-Positivist Constructivist Research Paradigm

In specifying the research design for any study, it is recommended that researchers explicitly state their own world view and predispositions that lead them to their preferred *research paradigm* (Bryman & Bell, 2007, p. 16; Creswell, 1994, pp. 8-10). A research paradigm refers to a collection of logical assumptions, concepts, and propositions that guides individual thinking in research investigations (Bogdan & Biklen, 1982, p. 30; Guba & Lincoln, 1994).

In the case of this dissertation, the researcher identified his own philosophical predispositions to be primarily aligned with a *post-positivist constructivist* (also sometimes referred to as *critical realist*) research paradigm[17]. In terms of its epistemological foundations in the social sciences, the post-positivist constructivist school of thought posits that social reality is constructed by the individuals who participate in it, and these individuals gradually build their own understandings of the world through experiences over time (Lincoln & Guba, 2000). Therefore, there is no single objective external world view of social reality, an assumption that is at the heart of the alternative positivist research paradigm. Consequently, post-positivist constructivist research primarily focuses on the study of individual cases and tries to explain research phenomenon through *thick* verbal descriptions of observations of research participants (Krauss, 2005). Furthermore, the thick descriptions are usually sought through different methods of scientific inquiry that can enable the construction of theory based on multiple social realities.

Within the general realm of *post-positivism*, the researcher's specific alignment with *constructivism* also lead to an acceptance of *critical realism* as the core ontological perspective which facilitates a worldview based on multiple perceptions about social reality (Healy & Perry, 2000). As such, critical realism also encourages an amalgamation of multiple approaches towards the discovery and knowledge of social entities, hence allowing a synthesis of qualitative and quantitative research methodologies (Healy & Perry, 2000).

In the case of this research, the core phenomenon under investigation comprised the processes that underlie member participation in virtual communities. As such, individual members of virtual communities constituted the *unit of analysis* for the empirical investigation,

[17] For purposes of this dissertation, the researcher made a deliberate effort to jusify his choice of research methods and specific analysis mechanisms with reference to his choice of research paradigm. Details regarding the thought process behind many of these research decisions could not be provided in the text of this dissertation due to space limitations. Short essays pertaining to these decisions are available online on the e-Companion Website for this dissertation.

and any theory emerging from this research study was based on the experiences and perceptions of different individual informants who reflected upon their own version of social reality in virtual communities. Therefore, a subjectivist research approach such as *constructivism* was a basic requisite in approaching the empirical investigation. Additionally, the research aimed to utilize quantitative research techniques to provide information about the differential effects of various socio-technical factors on member participation, while contextualizing these effects within a process based theory of member participation in virtual communities. This required a synthesis of qualitative findings and quantitative results, and the *critical realist* orientation provided an effective basis to proceed with a mixed-methods research design for the study.

3.3.2 Sequential Exploratory Mixed-Methods Design

To operationalize the *constructivist* approach in this investigation, this study adopted a mixed-methods scheme of inquiry with an *inductive theoretical thrust*. The inductive thrust in the research methodologies ensured that the primary emphasis of the study was on the generation of theory rather than validating claims based on existing theoretical constructs. Therefore, the leading priority in terms of methodology was given to the qualitative research approach which constituted the predominant methodology in the empirical investigation. The quantitative phase of research was subsequently used to embellish and help interpret the findings from the previous qualitative phase.

Based on Greene et al.'s typology of rationales for mixed-methods studies (Greene et al., 1989; c.f. Petter & Gallivan, 2004), the purpose of using a mixed-methods research design in this dissertation was two-fold:

i) *Triangulation*: Using qualitative and quantitative research methodologies, this study aimed to capture a more "complete, holistic and contextual portrayal" (Jick, 1979) of the phenomenon of member participation in VCs. Toward this, the qualitative and quantitative approaches were utilized sequentially with the quantitative phase aiming to provide convergent validity for the findings from the qualitative phase. For example, exploratory factor analysis methods were used in the quantitative analysis phase to corroborate the dimensionality of various theoretical constructs that were formulated as part of the qualitative findings, and structural equation modeling techniques were utilized to substantiate the emergent relational propositions from the qualitative phase.

ii) *Elaboration*: Although the qualitative research methodology in this study constituted the primary means to generate theory, the quantitative methodology was used to add richness and detail to better understand member participation process in virtual communities, hence leading to "new perspectives on a given phenomenon" (Rossman & Wilson, 1985). For example, structural equation modeling techniques in the quantitative phase of research allowed complementation of the qualitative research findings on the

relationships among various theoretical constructs through an indication of the significance and relative strength of relationships among the constructs.

A mixed-methods research design such as the one followed in this study, where one research paradigm is given priority over the other is often regarded as an instance of a *dominant/less-dominant design* (Creswell, 1994; Morse, 1991). As highlighted above, in this dissertation, qualitative methods constituted the dominant paradigm, and quantitative methods were the less-dominant. Following the notation suggested by Morse (1991; 2003), the research design of this study can be abbreviated as: "QUAL ➔ quan". The upper and lower case in the abbreviation helps distinguish between the dominant and less dominant methods to be utilized in the study, and the arrow indicates sequence and direction of the planned investigation procedures. Additionally, based on the *constructivist* premise of this research where the main objective of the investigation is to build theory, this study follows a *sequential exploratory design* model to guide the progression of steps in the research project (Creswell, 1999; Tashakkori & Teddlie, 1998). A schematic of this model is depicted in *figure 3-3* below. In such a model, the qualitative methods assume priority, are implemented before the quantitative, and integration of results happens in the final interpretation phase (Morse, 2003). Furthermore, the overall design itself has an inductive theoretical thrust (Morse, 2003).

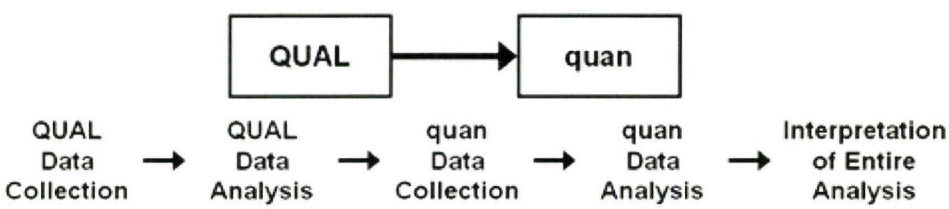

Figure 3-3: Schematic of Sequential Exploratory Mixed-Methods Research Design (Creswell et al., 2003)

A multi-method research design such as this has been used in many IS research studies (e.g. Chwelos et al., 2001; Gallivan, 1997). Moreover, in the case of research on virtual communities, this type of methodological pluralism is regarded as imperative not only in order to attempt a triangulation of methods (Andrews et al., 2001), but also to flesh out and test theoretical frameworks which are currently lacking in this field of research (Dannecker et al., 2007; Gupta & Kim, 2004b; Lee et al., 2003; Li, 2004; Preece et al., 2004).

Having discussed the sequential exploratory scheme underlying the research design of the study, the last section in this chapter highlights the specific empirical investigation procedures that were used in the two phases of the mixed-methods research design.

3.3.3 Integrated Research Plan

The specific data collection techniques for this research consisted of online focus groups, open-ended online survey questionnaires, and close-ended scaled online survey questionnaires. While the online focus groups and open-ended online survey questionnaires constituted the qualitative phase for this research, the close-ended scaled online survey questionnaires were used towards a quantitative substantiation of findings. In terms of analysis techniques, the qualitative phase of investigation utilized principles of *grounded theory methodology (GTM)* to analyze data and formulate a theoretical model of member participation. Subsequently, the quantitative analysis phase used *structural equation modeling (SEM)* techniques to corroborate salient components from the theoretical model formulated in the previous phase.

Although details of the qualitative and quantitative methodologies (including data collection and analysis procedures) are provided in their own specific chapters (chapters 4 and 6 respectively), this section presents an overview of the empirical investigation by outlining the operationalization of the *sequential exploratory mixed-methods design* for this study. *Table 3-1* presents a synopsis of the research plan illustrating the order of and relationships between the different phases in the research investigation, and the underlying data collection and analysis stages for each phase.

In determining what methods to pursue, which subjects to sample, and how long to run the study, this research utilized the triad of *goals*, *questions*, and *metrics* (*GQM*) (Basili et al., 1994) to derive an overall plan for the research investigation. Toward this, the integrated research plan shown in *table 3-1* incorporates the purpose of the various phases in the research, the types of research inquiry processes that were utilized in each phase, and the analysis procedures which were employed to help answer the research questions.

In addition to highlighting the purpose, processes, and products of each of the research phases in this study, *table 3-1* also exemplifies the functionality of the *sequential exploratory design* for in this study. It does so by indicating the *time order* of activities, and the *paradigm emphasis* (Greene et al., 1989). Firstly, along the dimension of *time order*, the precedence of qualitative methods is apparent in the sequence of phases where the qualitative phase (phase 1) paves the way for the quantitative phase (phase 2). Secondly, with the greater proportion of time being dedicated to the qualitative phase of research, the integrated research plan in table 3-1 underscores the paradigm emphasis on qualitative methods.

Finally, *table 3-1* paves the way for the next chapters in this dissertation which detail the methodology and results for the qualitative and quantitative phases of investigation. Chapters 4 and 5 discuss the methodology and findings from the qualitative phase of empirical investigation, while chapter 6 and 7 explicate the quantitative methodology and results.

Table 3-1: Integrated Research Plan for This Study

	Phase 1 (Qualitative / Inductive): Online Focus Groups & Open-Ended Online Survey Questionnaires		**Phase 2 (Quantitative / Deductive): Close-Ended Online Survey Questionnaires**	
Underlying Stages	**Qualitative Data Collection:** ▪ Synchronous Dialog Sessions ▪ Asynchronous Discussions ▪ Online Questionnaires (open-ended)	**Qualitative Data Analysis:** ▪ Focus Groups Transcripts Coding ▪ Questionnaire Response Coding ▪ Grounded Theory Methodology	**Quantitative Data Collection:** ▪ Online Questionnaires (close-ended)	**Quantitative Data Analysis:** ▪ Descriptive Statistics ▪ Exploratory Factor Analysis ▪ Structural Equation Modeling
Purpose	▪ Delve deeper into participant experiences in VCs w.r.t. factors affecting their participation. ▪ Construct a rich assay of the socio-technical factors affecting participation.	▪ Identify concepts, categories and properties related to member participation experiences. ▪ Particularize concepts along various themes. ▪ Discover the interplay among various factors.	▪ Cross-Validate the underlying structure of various factors affecting online participation. ▪ Substantiate differential effects of socio-technical factors on member participation levels.	▪ Establish the significance and strength of relationships among factors affecting member participation.
Sampling Frame	▪ Members from Social, Professional and Commercial VCs. ▪ Anticipated number of participants: 40 – 50 approx.		▪ Members from Social, Professional and Commercial VCs (other than those already surveyed in phase 1). ▪ Anticipated number of participants: 150 – 200 approx.	
Research Procedures	▪ Synchronous & asynchronous discussions. ▪ Open-ended Semi-structured Survey Questionnaire.	▪ Open, Axial, & Selective Coding. ▪ Constant Comparative Method in Grounded Theory.	▪ Likert-scale based Survey Questionnaire.	▪ Exploratory Factor Analysis with principal axis extraction. ▪ Component based Structural Equation Modeling.
Research Output	▪ Informant narratives highlighting substantive issues, events, and episodes related to their online participation in VCs.	▪ Construct definitions. ▪ Relational Propositions among constructs. ▪ Core phenomenon describing member participation in VCs. ▪ Abridged Theoretical Model for quantitative testing.	▪ Participant responses to likert-scale questions inquiring about cognitive, affective, and conative aspects of member participation in VCs.	▪ Structural Model of Latent variables for factors affecting participation. ▪ Convergence (or lack of) with the qualitative findings.
Analysis Tools	▪ Coding and theory building using NVivo CAQDAS.		▪ Statistical Analysis in SPSS ▪ Structural Equation Modeling in Smart-PLS.	
Time Duration	▪ 6 to 8 months		▪ 3 to 4 months	

Chapter 4: Qualitative Research Methodology

Following the research plan outlined in the previous chapter, the first phase of empirical investigation comprised qualitative data collection and analysis. This phase focused on the development of a substantive theory of member participation in virtual communities. Various principles and practices from the *grounded theory methodology* (GTM) were followed to systematically collect and analyze data from informants who belonged to different virtual communities. Online focus groups and open-ended questionnaires were used to collect data, and various coding procedures from GTM were used to analyze data in an iterative fashion. This chapter discusses these procedures and practices in detail.

The chapter begins with a brief overview of grounded theory methodology. Next, A unified process strategy for systematic collection and analysis procedures is presented, followed by a discussion of the specific data collection and data analysis techniques employed. Last, the procedures used for ensuring the quality and rigour of qualitative research procedures and the credibility of the emergent theory are presented.

4.1 Grounded Theory Methodology

The qualitative research phase in this study utilized GTM owing to its strength as a unified and systematic method for the collection and analysis of qualitative data (Glaser, 1992; Glaser & Strauss, 1967; Strauss, 1987; Strauss & Corbin, 1990).

There are several characteristics of grounded theory methodology that make it an appealing qualitative research methodology. First, it facilitates the development of concepts and relationships based on field data gathered within the context of the subject of investigation, hence, the theory is "grounded" in the data it emerges from. This encourages the generation of theory that represents the reality of the phenomenon under investigation (Charmaz, 2003; Glaser, 1992; Strauss & Corbin, 1990). In this way, GTM helps to generate theory that makes sense to members and stakeholders who are participants in the study, and it also has useful applications for practice. Further, the procedures and guidelines in GTM used for handling data interpretation and theory construction are rigorous, and can help develop theories that can be traced back to the data that gave rise to them (Charmaz, 2006). Last, GTM facilitates the development of rich substantive and formal theories that are laden with thick descriptions – i.e., central phenomena are described and located within the structures that give them meaning (Draper, 2004; Geertz, 1973) – as well as theories that are conceptually dense – i.e., contain many relevant conceptual relationships (Strauss, 1987; Urquhart et al., 2009).

Notwithstanding the specific version of GTM utilized, it is recommended that researchers following the methodology adhere to its principal tenets, and outline any adaptations they make to the recommended practices of GTM as formalized in the works of either of its founding architects, namely Barney Glaser and Anselm Strauss (Glaser, 1978; Glaser & Strauss, 1967; Strauss, 1987; Strauss & Corbin, 1990). This is especially important since there is considerable confusion and debate over the principles and procedures of GTM owing to its two main variants that were supported and popularized by its originators (Jones & Noble, 2007; Suddaby, 2006; Urquhart et al., 2009). Since the original publication of their co-authored book *The Discovery of Grounded Theory* (Glaser & Strauss, 1967), the two originators separately developed and advanced their specific ideas of GTM, leading to two distinct variants, hereafter referred to as the Glaserian and Straussian versions of GTM. The debate between the Glaserian and Straussian versions of GTM is well documented in the extant GTM literature (Bryant & Charmaz, 2007; Gurd, 2008; Jones & Noble, 2007), and as such, this dissertation does not explicitly address pros or cons for either version of GTM. Instead, following the lead of Bryant and Charmaz , this research considers the Glaserian and Straussian variants as well as various other strands of GTM as a 'family of methods' which bear 'family resemblances' rather than as a distinct group of methods (Bryant & Charmaz, 2007, p. 11). In this vein, the next section in this chapter discusses the GTM principles that were observed and practices that were adopted during the research, while attempting to highlight the origin and justification of those practices.

4.1.1 Constant Comparison and Theoretical Sampling

Referred to as the twin foundations of grounded theory methodology (Partington, 2000), *constant comparison* and *theoretical sampling* constitute an essential basis for all variants of GTM. Qualitative researchers using GTM are often reminded to adhere to these principles in their studies to ensure the emergent nature of grounded theory (Glaser, 1992; Jones & Noble, 2007; Strauss & Corbin, 1998; Suddaby, 2006; Urquhart et al., 2009).

The main directive of these two principles is toward ensuring that the researcher engages in data collection and data analysis in a joint and iterative fashion (Glaser & Strauss 1967, p. 43). *Theoretical sampling* is the process of data collection whereby the analyst jointly collects, codes, and analyzes data and decides what data to collect next and from which sources. This enables the dynamic and continuous development of theory in an emergent manner (Glaser & Strauss 1967, p. 45).

In attempting to build theory, the researcher also uses in the *constant comparative* method which involves a cyclical progression through four stages: i) generating categories and their properties; ii) integrating categories and their properties; iii) delimiting the theory; and iv) explaining the theory (Glaser & Strauss, 1967, p. 105). The first stage involves identifying concepts called *categories* and *properties*. A *category* is a conceptual element of a theory – an abstract representation of something the researcher identifies as being significant in the data;

and a *property* is a conceptual characteristic or attribute of a category (Glaser & Strauss, 1967, p. 36; Strauss & Corbin, 1998, p. 113). For example, in this dissertation, "*information quality*" is cited as a *category* representing the overall value of information provided through the virtual community, whereas "*relevance*" and "*timeliness*" of information to various members of the virtual community are cited as *properties* of "*information quality*". The constant comparative method requires that the researcher generate concepts (categories and properties) by comparing incidents in the data and looking for patterns. As concepts emerge, they are compared with other incidents for verification, as well as with previously identified concepts for establishing the best fit with the data. A direct consequence of following this approach is that with the progression of analysis, concepts tend to become increasingly integrated, and the researcher starts making sense of their interrelationships. Further, the process facilitates generation of explanations about the phenomena being studied, often via emerging propositions that begin to take form of a theoretical model. Subsequently, this emerging theoretical model serves as a guide for further data collection and analysis, hence leading to further theoretical sampling (Glaser & Strauss, 1967, pp. 117-119; Strauss & Corbin, 1998, pp. 144-145).

In this study, some aspects of the research process that exemplify the use of theoretical sampling and constant comparisons are as follows:

- Early in the project, theoretical sampling was initiated by collecting data from various types of virtual communities using a purposive sampling scheme (e.g. interest-based, social, professional, and commercial VCs);
- At various instances, based on interim analysis results, requirements for additional data were recognized and information was solicited from potential informants who vary in their participation patterns in their VCs (e.g. active versus passive users), as well as in the roles they assume (e.g. administrators, moderators, senior members, junior members) ;
- To enhance the quality of the emergent theory, the researcher opted to modify the questions asked of the informants, and to adopt new interview techniques (e.g. mirroring, laddering, critical incidents)[18]. This provided the opportunity to verify concepts generated in previous cycles of analysis, as well as to engage in value-added data collection as the research progressed.
- The researcher utilized flexible and opportunistic data collection methods to obtain input from potential informants who were difficult to reach (e.g. busy VC administrators who could not join online focus groups due to time constraints, and passive members who were hesitant to talk in a group setting were given the opportunity to respond via online open-ended questionnaires).

By incorporating these steps in the research process, the researcher attempted to alleviate concerns surrounding the negative effects of insufficient pattern variability in the data

[18] These qualitative interview techniques are described in a subsequent section.

which can consequently lead to theories lacking in conceptual richness and density (Jones & Noble, 2007).

4.1.2 Theoretical Sensitivity & Active Role of the Researcher

Theoretical sensitivity as introduced by the originators of GTM reflects researchers' level of insight into the research area and their familiarity with the nuances and complexity of responses being gathered from the informants (Glaser & Strauss, 1967; Strauss & Corbin, 1998). Further, it refers to the ability of researchers to use their personal and professional experiences to reconstruct meaning from the collected data and differentiate among pertinent information from unrelated or extraneous bits of data (Charmaz, 2000; Charmaz, 2003; Strauss & Corbin, 1994). Hence, the principle of theoretical sensitivity paves the way for the researcher to have an active role in the research process and ensures an enhanced theoretical output.

The orthodox view of GTM which advocates that researchers enter the field of inquiry with as few predetermined thoughts as possible (Glaser, 1978, p. 3) has been severely debated in recent GTM studies (Bryant, 2009; Suddaby, 2006). The idea in the Glaserian version of GTM advocating that the researcher operate as a *blank slate* or *tabula rasa* (Glaser, 1978, p. 3) has been adapted in the constructivist grounded theorists to connote that researchers need to approach the inquiry process with an *open mind*, and not necessarily with an *empty head* (Bryant, 2009). Furthermore, GTM researchers subscribing to the constructive school of thought believe that a researcher's own prejudices, in the sense of prior judgements, can provide a basis for innovative insights to be developed (Bryant, 2009).

The debate on theoretical sensitivity also ropes in a deliberation over Glaser's stance in the original version of GTM that a review of literature on the outset of the research project needs to be avoided, and the researcher needs to enter the field of inquiry with a blank agenda (i.e. without defined research questions) (Glaser, 1978, p. 31). This viewpoint has also been contested in the discourse on qualitative research studies (Miles & Huberman, 1994; Strauss & Corbin, 1990; Strauss & Corbin, 1994; Suddaby, 2006). Today, many GTM researchers acknowledge and accept the need to approach a study with some orienting ideas, rudimentary concepts about the phenomenon being studied, general research questions, hunches about where to look for answers, as well as biases from previous experience (Bryant, 2009; Hutchison et al., 2009; Miles & Huberman, 1994, p. 17; Suddaby, 2006). Also, as Ronald Coase aptly pointed out, to conduct reasonable research without clear research questions is likely to result in a random "mass of descriptive material waiting for a theory, or a fire" (Coase, 1988, p. 230). Similarly, the review of literature early in the project is no longer regarded as prohibited. For one, greater theoretical sensitivity towards the extant body of knowledge in one's own field as well as in other related areas can help keep researchers from reinventing the wheel (Wengraf, 2001). Also, to ensure that the analysis and findings are grounded in data, researchers have been encouraged to treat the extant literature as part of that data. This way, researchers can draw

upon the literature to formulate early research agendas, or to advance creative theoretical integration using abductive reasoning (Bryant, 2009).

In the case of this current study, a few aspects of the researcher's role and his theoretical sensitivity toward the subject of investigation are worth noting.

In terms of *theoretical sensitivity* through personal and professional background, the researcher relied upon his own experiences as a member and an administrator in two virtual communities. This provided him with an enhanced perspective of the research problem, and an improved familiarity with issues that were raised in the responses by the study's informants.

Avoiding a *literature review* on the outset of the research project was not an option. Conducting a preliminary review of the literature was a formal requirement for the researcher's doctoral program, and the researcher did not select the research methodology for his dissertation until after having reviewed the relevant literature to develop a better understanding of potential areas for investigation.

To alleviate concerns surrounding the possible use of themes from existing literature to force theory into those themes (as opposed to let the theory emerge from the data), this study made explicit use of a *conceptual framework* (see *Chapter 3*) to lay out the initial ideas of the researcher. The *conceptual framework* helped establish and state the assumptions that were absorbed from the literature in the form of sensitizing concepts for the research study[19]. Furthermore, these sensitizing concepts were treated as part of data to constantly compare with, and to further improve and refine during the course of research. Such practices have been recommended to reduce the adverse effects of literature contamination in GTM projects (Glaser, 1998, p. 94; Wengraf, 2001).

In order to improve the quality of research findings, the researcher immersed himself in the virtual communities that were included in the sampling frame for qualitative data collection. Although this was done for a limited duration for each virtual community, the experience provided the researcher with a valuable initial perspective of the social dynamics and the technology basis in each virtual community. This made it easier to relate to the input provided by the study's informants who belonged to those virtual communities.

Overall, the researcher's enhanced theoretical sensitivity and his active involvement in the data collection and analysis process allowed him to synergistically combine the emergent theory from inductive analysis with his own insights as well as themes from relevant literature. This enabled the application of abductive reasoning that constitutes a core component in the constructivist version of the grounded theory methodology. Furthermore, as recommended by Klein & Myers (1999), through sensitivity to possible contradictions between sensitizing concepts

[19] Recall from the discussion in *Chapter 3* that the sensitizing concepts were utilized in the conceptual framework in a general sense, not as definitive concepts to suggest theoretical hypotheses, but merely as directions along which the research can be conducted.

in the conceptual framework, and the emergent findings, the researcher engaged in *dialogical reasoning* throughout the course of research.

4.1.3 Iterative Conceptualization & Theoretical Saturation

As highlighted previously, a unique aspect of the grounded theory methodology is that it facilitates generation of theory in an iterative fashion through a battery of coding procedures, and analytical principles. For coding qualitative data, this study utilized the coding procedures of *open coding*, *axial coding*, and *selective coding* as suggested by Strauss & Corbin (1990). The purpose of these coding procedures is to build theory while providing a means for handling a massive amount of raw data, and to help the researcher transition from analyzing low-level discrete concepts to formulating high-level structures of relationships that constitute the central phenomenon in the emergent theory. The point of attaining *theoretical saturation* determines the stage at which the researcher can stop further data collection and analysis. These components of GTM, and their use in this study are discussed in the following subsections.

4.1.3.1 Open Coding

Through the procedure of *open coding*, the researcher identifies discrete concepts, labels them, and categorizes them along with their properties and dimensions. It is defined as "the analytic process through which concepts are identified and their properties and dimensions are discovered in data" (Strauss & Corbin, 1998, p. 101). As the initial step in theoretical analysis, open coding pertains to the discovery of categories and their properties (Glaser, 1992, p. 39). The data are broken down into discrete incidents, objects, events, actions, ideas, or any other elements that can provide a basis for further conceptualization. Elements in the data that the researcher deems to be significant are then assigned labels known as *codes* (Glaser, 1992, pp. 38-40; Strauss & Corbin, 1998, pp. 101-105). Carefully formulated codes present the researcher with a condensed, abstract view of the data that includes otherwise seemingly disparate phenomena (Glaser, 1978, p. 55). Elements in the data that share the same essential characteristics are labelled using the same code to indicate their common link, and depending on the scenario, a single element in the data may be assigned multiple codes.

In this study, the open coding process was initiated after conducting the first two online focus groups, and continued throughout the subsequent collection of data. Through the first few iterations of data collection and analysis, as many as 225 codes were assigned to the elements in the data. These were later focused and regrouped into a node tree that organized them into a smaller number of abstract codes (i.e., in the form of properties, dimensions and sub-categories of higher level categories). In this research, these higher order categories that pertained to the salient constructs in the data are referred to as principal analytical categories.

Despite the continuous refinement of codes into categories, subcategories, properties, and dimensions, during the later stages of analysis, the researcher became especially cautious of excessive open coding. With an overload of concepts with little theoretical meaning, it was becoming difficult to focus on the central themes that could integrate the identified categories. To avoid *conceptual foppery*, i.e., overly conceptualizing single data elements (Glaser, 2002), the researcher decided to move to the second phase of analysis (i.e., *axial coding*), with the intention to return to open coding at subsequent instances of data collection, or to refine the existing node structure.

4.1.3.2 Axial Coding

Axial coding follows directly and iteratively from open coding, and involves taking the concepts that emerged during open coding and reassembling them with relational propositions to link various concepts. Hierarchical structures between categories and subcategories are refined further leading to a higher level of conceptual abstraction. In essence, axial coding is the opposite of open coding. Whereas open coding entails the fracturing of data and its microanalysis, axial coding allows the researcher to relate categories to form a coherent structure for the salient categories in the emergent theory.

In the Glaserian version of GTM, the axial coding stage is referred to as *theoretical coding*. To facilitate theoretical coding, Glaser (Glaser, 1978, pp. 72-82) discusses eighteen theoretical coding families; the most commonly used is the *Six Cs* (*causes*, *contexts*, *contingencies*, *consequences*, *covariances* and *conditions*) (Glaser, 1978, pp. 72-82). Similar to the Six Cs, Strauss and Corbin provide a set of procedures, collectively referred to as the *coding paradigm*, which maps outs relationships among categories to form the *context*, *conditions*, and *consequences* of a particular phenomenon (Strauss & Corbin, 1990, p. 99). As an analytical device, the paradigm model is at the core of Straussian version of GTM. It consists of a systematized cause-and-effect schema entailing five parameters about the phenomenon in question, namely: i) the *conditions* that cause the phenomenon to occur; ii) the *context* (situational characteristics) of the phenomenon; iii) the *intervening conditions* (constraints) that impact actions that could be taken against the phenomenon; iv) the possible *actions and interactions* (strategies) that could be evoked against the phenomenon; and v) the *consequences* or possible outcomes of these contexts, conditions, and actions and interactions.

In this study, the process of axial coding was approached in a multi-tiered fashion. Firstly, the researcher attempted to utilize various theoretical coding families recommended in the Glaserian version of GTM to identify possible theoretical structures. Specifically, the researcher found the *process* family of theoretical codes to be useful in identifying and categorizing the stages, phases, and progressions characterizing the member participation experiences in virtual communities. Also, the *interactive* family of theoretical codes were used to conceptualize relationships of mutual effects, reciprocity, and mutual trajectories among

previously identified categories. Furthermore, in the later stages of analysis, as an aid to the organization and presentation of qualitative findings, the researcher adopted a perspective aligned with *functional behavior analysis* (Skinner, 1966) whereby linkages between theoretical constructs were explained in terms of *antecedents*, *behaviors*, and *consequences* (*ABC analysis*). Functional behavior analysis was specifically chosen to scaffold the qualitative findings in this study because the technique facilitated a distinction between *topographical* and *functional* aspects of behavior, i.e. what the behavior appears to be on the surface in terms of tasks and activities being performed, versus the actual function or purpose being served by those tasks and activities (Nijhof & Rietdijk, 1999). Furthermore, the function of a behavior can be analyzed in relation to underlying values, contexts, and conditions that drive the behavior (Andreoli & Lefkowitz, 2009). Various research studies in management and information systems have used functional behavior analysis as a framework to ascertain facets of individual and organizational behaviors (e.g., Andreoli & Lefkowitz, 2009; e.g., Lankton et al., 2010; e.g., Nijhof & Rietdijk, 1999).

At the end of several iterations of axial coding, the emergent theory started to gain shape. What remained was to explain the theoretical output at a higher level of abstraction around a central theme. This indicated the need to move on to *selective coding*.

4.1.3.3 Selective Coding

Selective coding is the process of selecting the core category in the qualitative analysis findings and systematically relating the *core category* to other major categories identified in the research (Glaser & Strauss, 1967; Strauss & Corbin, 1990). It differs from open and axial coding in that it does not deal with the development of any single category, but rather is interested in how major categories relate to one another around a central integrative phenomenon represented in the *core category*. The core category reflects the main theme of the study as it "sums up in a pattern of behaviour, the substance of what is going on in the data" (Glaser, 1978, p. 61).

In selecting the core category, researchers need to identify a central theme and ascertain that it offers a coherent story line in such a way that its relationships to other categories become the descriptive narrative for the emergent theory. There are several steps involved in selective coding: selecting the core category, relating it to other categories, validating the relationships against the data, and refining categories that may need further development in light of the new relationships (Strauss & Corbin, 1998).

In this study, different aspects of member participation in virtual communities were integrated through a core category that explained the *member engagement process* along various levels of progression. As the theory developed and crystallized around the core explanatory category, the data collection and analysis became increasingly focused towards the refinement of theoretical output. During this process, the researcher made sure the theoretical output had "*grab*" (Glaser, 2002) – i.e., it could be easily understood by an audience who has

background in the area of investigation. Toward this, the researcher simplified the category labels and formulated a configuration that would facilitate an inclusive understanding of the emergent theory. The template of a *reflective coding matrix* (Scott, 2004; Scott & Howell, 2008) was used to relate the categories and patterns from the preceding open and axial coding procedures in a structured fashion around the central phenomenon. Use of the reflective coding matrix enabled the description and explanation of the emergent theory as a story line, weaving its various categories and their interrelationships into the narrative.

In the final iterations of axial and selective coding, there was an increased emphasis on ensuring that a conceptually rich substantive theory had indeed emerged, and there were no significant issues remaining to be analyzed. This moved the research direction toward ensuring *theoretical saturation* of the salient categories in the emergent theory.

4.1.3.4 Theoretical Saturation

Theoretical saturation is defined as the point at which no additional data can be found to add to the empirical content of various categories in the theory. Strauss & Corbin provide a more precise definition, stating that a category is considered saturated when "(a) no new or relevant data seem to emerge regarding a category, (b) the category is well developed in terms of its properties and dimensions demonstrating variation, and (c) the relationships among categories are well established" (Strauss & Corbin, 1998, p. 212).

In this study, it was almost after five months of cyclical interplay between data collection and analysis, and interviewing a theoretical sample of 68 informants that the core category comprising the member engagement process emerged as a central theme in the emergent theory. The core category fulfilled the role of an underlying latent structure that explained the relationships among most other categories pertaining to the cognitive, affective, and conative elements of member participation in virtual communities. Once the core patterns around the central themes were identified and formulated, further empirical evidence added little in terms of new information that was relevant to the further development of the substantive theory. For instance, in combination, the last online focus group and the last three questionnaires only yielded two new codes at the properties level for categories constituting the central phenomenon in the reflective coding matrix. Consequently, the implications of these changes in the emergent theory were deemed to be fairly minimal. Furthermore, there was a sufficient and compelling basis for integration among salient conceptual categories in the emergent theory and the central phenomenon comprising the member engagement process. Reflecting upon these patterns, the researcher came to believe that *theoretical saturation* may indeed have been attained, at least within the scope of this study's research agenda.

To aid research reflexivity over issues such as theoretical saturation and the general progress of the research process, the researcher made extensive use of memos throughout the qualitative phase of investigation. Their use in this research study is highlighted as follows.

4.1.3.5 Memo Writing

Writing memos is considered to be an integral activity in GTM (Glaser, 1992; Glaser & Strauss, 1967; Jones & Noble, 2007; Strauss & Corbin, 1998; Urquhart et al., 2009). Memos can be characterized as "the researcher's record of analysis, thoughts, interpretation, questions and directions for further data collection" (Strauss & Corbin, 1998, p. 110), or as "the theorizing write-up of ideas about codes and their relationships as they strike the analyst while coding" (Glaser, 1978, p. 83). The use of memos is regarded as imperative in GTM as they can help capture and record various aspects of the emergent theory. However, memos are not simply ideas – they represent the means to continuous formulation and revision of theory during the research process (Strauss & Corbin, 1998).

During this study, as part of the qualitative data collection and analysis process, the researcher consistently engaged in the writing of memos to capture his thoughts and ideas. While some memos were formal in nature and the researcher expected to make use of them during the writing of his dissertation, others were casual and only used to help the researcher keep track of the analysis process and acted as a store of ideas for next steps in the grounded theory process. For instance, from an operational standpoint, the researcher made ample notes on what sources of data to tap into next, and what type of informants need to be interviewed to advance the theory generation process. In another memo, the researcher kept notes on similarities between emerging concepts and other theories from the extant literature that the researcher was familiar with. This helped immensely with the theory matching and integration process described in the next section.

As a researcher with little prior experience with GTM, the practice of memoing greatly facilitated the use of grounded theory methodology. Especially during the initial weeks of open coding, the researcher often experienced *analysis paralysis*, and it was the use of memos that helped the researcher transition to the next stages of coding while keeping track of his thoughts and ideas for later consideration.

Overall, the integrated use of coding and memoing in the analysis process facilitated the process of theorizing by collapsing many fuzzy categories into fewer clearer conceptual structures that explain the member participation process in virtual communities. Jointly, these procedures provided the basis for *empirical grounding* – i.e., the theory is grounded in empirical data, and *internal grounding* – i.e., an explicit congruence between the elements in the theory (Lind & Goldkuhl, 2006). The final consideration in constructivist GTM pertains to *theoretical grounding* – i.e., a qualification of the emergent theory vis-à-vis relevant pre-existing theories. The assessment of theoretical grounding is discussed in the next section on theory matching and integration.

4.1.4 Theory Matching & Integration

The searching and mapping process between relevant pre-existing theories and the researcher's empirical observations has been termed as *"theory matching"* or *"systematic combining"* (Dubois & Gadde, 2002). The practice of theory matching is said to enhance the internal validity and generalizability of the emergent theory (Eisenhardt, 1989), and has recently been utilized in several GTM based management and IS research studies (e.g., Aldhmour, 2009; e.g., Kovács & Spens, 2005; e.g., Rodon & Pastor, 2007; e.g., Shannak & Aldhmour, 2009).

In the case of this current study, the researcher proactively engaged in reviewing the extant literature during the later stages of theory elaboration in the axial coding stages, as well as throughout the process of selective coding. Initially, to make sense of the overall structure of theory, the researcher made comparisons with well recognized IS theories such as the *technology acceptance model* (TAM) (Davis, 1989; Davis et al., 1989) and the *IS success model* (DeLone & McLean, 1992; Delone & McLean, 2003). The latter was also subsequently used to provide a meta-theoretical narrative of the overall structure of the resultant theory's components owing to the similarities in the constructs and categories found between the two theories (see *Chapter 8*). Furthermore, the researcher consulted the extant mass communication literature, including the uses and gratifications theory (Blumler & Katz, 1974; Katz et al., 1973) and theories of media use patterns (Rubin, 1981; Rubin, 1983). These theories provided useful base of concepts and terminology to articulate the themes and relationships that the researcher had already discerned during the analysis phase. The concepts in the emergent theory were systematically contrasted with those in the extant literature, and formal terminology from these theories was adopted to hone the theoretical model's presentation and to enhance its theoretical grab[20].

Having described the overall approach and fundamental principles that supported the qualitative research process in this study, the next section highlights the project plan for various tasks and procedures in performing the qualitative empirical research in this study. This is followed by specific sections in the chapter that provide details of the specific procedures, devices, and mechanisms used for collecting data, sampling informants, analyzing data, and ensuring the quality and rigour of the research process.

[20] The experience of searching for supporting literature to compare the emergent theory, and stumbling upon various ideas that proved useful in contextualizing the results of the grounded theory process were intellectually rewarding moments. To a novice GTM researcher like myself, this provided some confidence in the long process of conceptualization and theorization the preceded the stage of theory matching and integration.

4.2 Unified Process Strategy for Qualitative Empirical Research

It should be reiterated at this point that the tasks and procedures for qualitative empirical research were performed in an interactive and cyclical fashion. This is in line with the requirements and recommendations of GTM as described above. However, during the write-up of these data collection, sampling, and analysis steps, the researcher felt constrained by simply following a linear approach to present the pertinent mechanisms and procedures in the form of sequential chapter sections. To aid the presentation of components in the qualitative research phase, the researcher conceptualized their interactive and overlapping nature in the form of a unified process strategy.

Figure 4-1 presents an outline of the qualitative empirical research process in this study as a unified process strategy. It juxtaposes various tasks that were performed during the course of research (vertical axis) with four interconnected phases that highlight the scope of activities over the duration of the qualitative research phase (horizontal axis). The emphasis of each phase is illustrated by the use of darker shaded cells in that phase. It can be noticed though that various tasks and procedures overlap the different phases, hence demonstrating an iterative model of proceedings.

The overall flow of tasks and activities in the GTM based qualitative research project can be divided into *inception*, *elaboration*, *construction*, and *corroboration* phases. The *inception* phase primarily deals with purposive data collection from various virtual communities, and concentrates on open coding procedures. The *elaboration* phase underscores the need for focused theoretical sampling and axial coding to refine the category node structure, and formulate connections among the identified categories. The *construction* phase has a greater emphasis on axial and selective coding procedures with more attention paid to identifying and formulating connections and relationships among concepts, and conceptualizing theoretical structures at a higher level of abstraction. The data collection in the construction phase is mostly focused toward acquiring data that clarifies specific theoretical relationships and questions about emergent theory. The *corroboration* phase predominantly consists of specific data collection tasks such as call-backs to previous informants for their insights and feedback on the results of the empirical investigation. This verification of theoretical output is also supplemented by the researcher's own checks of confirming coding consistency through inter-coder reliability.

The next section provides details of the tasks and procedures summarized in the unified process strategy by reviewing the specific mechanisms and procedures used for data collection, theoretical sampling, and data analysis.

	Tasks & Procedures	Inception	Elaboration	Construction	Corroboration
		Weeks 1 - 7	Weeks 8 - 15	Weeks 16 - 21	Weeks 22 - 24
Data Collection & Theoretical Sampling	Collect	▪ Synchronous (N=3, n=19), and Asynchronous (N=2,n=17) Focus Groups. ▪ Questionnaires (n=3). ▪ Purposive & Convenience Sampling.	▪ Synchronous (N=1, n=5), and Asynchronous (N=1, n=9) Focus Groups. ▪ Questionnaires (n=3). ▪ Stratified, Opportunistic & Critical case Sampling.	▪ Asynchronous Focus Groups (N=1, n=8). ▪ Questionnaires (n=4). ▪ Purposive & Critical case Sampling.	▪ Participant call-backs (n=7). ▪ Expert Feedback (n=2).
Analytical Coding & Theorizing	Code	▪ Open coding to create category node structure. ▪ Axial coding to decipher subcategories, properties and dimensions.	▪ Continued open coding to add to node structure. ▪ Continued axial coding to decipher subcategories, properties and dimensions. ▪ Axial coding to define conceptual relationships.	▪ Continued use of axial coding to define and refine conceptual relationships. ▪ Selective coding to ascertain a core category.	▪ Refine labels and descriptions based on theory-matching. ▪ Refine labels and descriptions based on feedback.
	Connect	▪ No significant attempt to connect categories. ▪ Memos to note fleeting ideas about possible connections in themes.	▪ Axial coding to connect categories using the paradigm model as a template. ▪ Concept maps to summarize relationships among categories. ▪ Memos to note emerging relational propositions.	▪ Refine paradigm model to connect major categories to the central phenomenon. ▪ Formulate process explanation of core category.	▪ Enhance explanation and presentation of theory components and relationships.
	Conceptualize	▪ Define and describe concepts based on interpretation of data. ▪ Enhance node trees into mind maps to summarize categories, dimensions, and properties.	▪ Formulate relational propositions among categories. ▪ Integrative diagrams to summarize relationships among categories.	▪ Continued integration of categories to paradigm model. ▪ Rendition of the theory through explanation of paradigm model.	▪ Enhance explanation and presentation of theory components and relationships.
Research Quality & Accuracy Verification	Check	▪ Verify codes through constant comparison with other slices of data.	▪ Verify statement validity through participant feedback. ▪ Confirm conceptual relationships through peer-debriefing.	▪ Engage in matching and integration with theories from extant literature.	▪ Conduct coding consistency checks through inter-coder reliability.

Figure 4-1: Unified Process Strategy for Qualitative Empirical Investigation

4.3 Qualitative Data Collection Instruments

Online focus groups and *online open-ended questionnaires* were used as data collection instruments in this study's qualitative investigation phase. Primarily, synchronous and asynchronous online focus groups were used to gather data from informants belonging to various virtual communities. The use of open-ended questionnaires complemented that of the focus groups, allowing the researcher to gather additional data from hard to reach informants.

Figure 4-2 illustrates a breakdown of the use of these three data collection instruments in terms of the number of informants interviewed using each procedure, as well as the procedure's use over the timeline of the research project. Altogether, data was gathered from 68 informants. While synchronous online focus groups were used extensively in the beginning phases of the project (i.e., the inception phase highlighted in the previous section), asynchronous online focus groups and online open-ended questionnaires were used in the mid to late phases of empirical research.

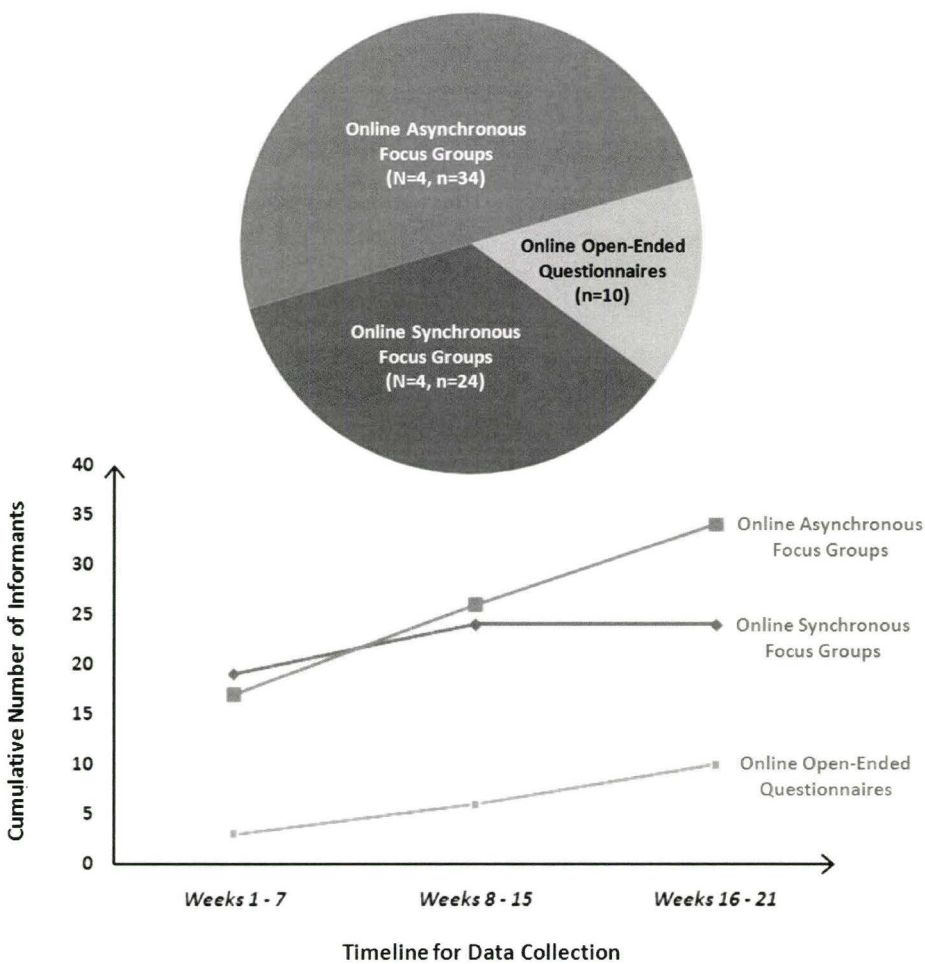

Figure 4-2: Composition & Timeline of Qualitative Data Collection Procedures

The semi-structured format of online focus groups allowed the researcher to explore issues related to member participation in a flexible manner. The focus group participants played an active role in providing explanations of events, patterns, and forms of behaviour characterizing their online participation in their respective virtual communities. The structured format of open-ended questionnaires allowed the researcher to survey certain types of informants individually, and to investigate specific topics of interest, some of which were derived from the findings of the focus groups. While the use of online focus groups facilitated a broader exploration of the views and experiences of virtual community members, the open-ended questionnaires assisted in generating descriptions of specific factors that affected member participation. As such, synchronous and asynchronous focus groups, and open-ended questionnaires were employed in a step-wise fashion moving from broader to specific topics of investigation, and each phase complemented the findings of the previous phase.

In the context of grounded theory methodology, the emphasis on the use of specific data collection methods also coincided with phases of open, axial, and selective coding. The most loosely structured interview format comprising synchronous focus groups were used to inform the open coding procedures, while asynchronous focus groups with more structure and open-ended questionnaires requiring responses to specific questions by certain classes of informants were used in the axial and selective analytical coding procedures. Together, these procedures provided a flexible implementation for qualitative data collection, and facilitated the iterative conceptualization process in grounded theory methodology.

4.3.1 Mechanisms

4.3.1.1 Internet Mediated Research Mechanisms

The procedures for qualitative data collection were administered online. These procedures can generally be classified as *Internet-Mediated Research (IMR)*, an umbrella term that typifies the use of the Internet for conducting primary research to gather novel, original data for purposes of empirical investigation (Hewson, 2003; Hewson, 2008; Mathy et al., 2003).

The use of IMR mechanisms suited the objectives of this current research owing to the subject of investigation and the informant pool that was required to help obtain data for answering the research questions. In addition, the use of IMR mechanisms also provided a cost and time effective means to gather data from an informant base that was geographically dispersed around the world. Further, the use of online questionnaires through a web-based form interface provided a non-intrusive means to gather data from informants who could supply as much or as little information in response to the open-ended questions in the survey.

It is also worth noting that across the span of the three methods, the advantages of interactivity were coupled with anonymity to ensure that participants could be more candid in their responses (Hewson, 2003; Joinson, 1999), and reduced the confounding effects of social

desirability that are a common concern in traditional face-to-face qualitative interview procedures (Joinson, 1999; Joinson, 2001; Murray & Sixsmith, 1998).

In order to ensure that the afore-mentioned advantages of IMR mechanisms are utilized to the greatest possible extent, the researcher also incorporated several inquiry techniques and suggested practices for qualitative research in his design of data collection instruments. These are briefly highlighted in the next sections.

4.3.1.2 Open-Ended Interview Protocol

In terms of the general format of questioning, open-ended questions were used across the three modes of inquiry (not just in the open-ended questionnaire). As the stock and trade of qualitative research, open-ended questions have an advantage over other formats since they allow participants to answer any way they see fit, using a variety of expressions (Bryman & Bell, 2007, p. 259; Litoselliti, 2003). Further, they tend to elicit discursive information by allowing participants to answer from their own frame of reference. By not imposing answer options on informants, they can produce rich, deep, and often, unexpected answers, all of which are extremely useful attributes for data in qualitative research studies.

In devising an interview protocol based on open-ended questions, this study followed various general guidelines from the literature on qualitative social science research methods (cf., Groves et al., 2009; cf., Gubrium & Holstein, 2002; cf., Hoffmann, 2007), as well as specific guidelines for focus group research (Bloor et al., 2001; Litoselliti, 2003). Some of these guidelines include: not wording questions in ways that might lead informants to respond in certain ways (Groves et al., 2009); avoiding dichotomous 'yes'/'no' questions; using *neutral* questions as much as possible to minimize bias and safeguard against value judgements that can be inadvertently made by the interviewer (Litoselliti, 2003); not asking 'why' questions since previous research indicates that these types of questions tend to elicit quick answers that seem superficially rational (Hoets, 2009; Kreuger, 1998; Litoselliti, 2003).

In the later stages of data collection, critical incident questions were utilized to operationalize the relatively more structured forms of interviewing through asynchronous focus groups and survey questionnaires. These are discussed next.

4.3.1.3 Prompts & Critical Incident Questions

In the qualitative interview process, questions that take the form of *prompts* can act as a cue or an aide for participants, allowing them to respond through recall by specifically triggering a memory association (Hoets, 2009). In the case of qualitative data collection instruments used in this study, various types of prompts were incorporated. Especially, in the conversational modes of interviewing using focus groups, various prompts were interjected into the question stream 'impromptu' to elicit details about specific aspects of online activities and experiences.

While ad lib prompts were possible in both variants of the focus group due to higher level of interactivity with the respondents, a more structured approach was needed to include prompts in the online questionnaire. This lead to the selection of *critical incidents technique* (CIT) (Flanagan, 1954) as the method of choice. The open-ended prompts using CIT were formulated to allow informants to talk about specific *incidents* that affected some aspect of their online participation in their respective virtual communities. An *incident* is defined as "any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act" (Flanagan, 1954, p. 327). The use of questions that elicit critical incidents can yield useful data by allowing respondents to recall events and experiences that hold a high degree of significance for the respondents (Andersson & Nilsson, 1964). Using the principles of CIT, participants in asynchronous focus groups and respondents of open-ended questionnaires were asked to identify specific incidents which they experienced personally and which had an important effect on their online participation.

According to Bownas & Bernardin (1988), a "good critical incident" has four characteristics: i) it is specific; ii) it focuses on observable behaviors; iii) it briefly describes the context in which the behavior occurred; and iv) it indicates the consequences of the behavior. This study adopted these guidelines in phrasing questions, and also drew upon the methodology employed by other studies that have used CIT (e.g. Johnson & Fauske, 2000; Query & Kreps, 1993; Serenko, 2006). While critical incident questions were included at a general level in the synchronous version of online focus groups, their use was more specific in asynchronous online focus groups as well as in the online open-ended questionnaires. More details are provided in later sections pertaining to the various data collection instruments.

4.3.1.4 Probes & Laddering Questions

In an interactive interview format, probes act as follow-up questions to elicit details, expansions or clarifications on previous answers by informants (Hoets, 2009; Litoselliti, 2003). To add probes to the interview protocol in online focus groups, the researcher adhered to the guidelines provided by other qualitative researchers who suggest that probes should be simple, clear, focused, and direct (Gillham, 2000; Litoselliti, 2003). Toward this, the *laddering technique* (Gutman & Reynolds, 1979; Reynolds & Gutman, 1984) of interviewing informants was utilized in several online focus groups to help draw out the drivers and motivations of member participation in virtual communities – a core subject area in the conceptual framework and research questions for this study. Using laddering, informants were asked to elaborate on the functional benefits, and emotional benefits of the activities they undertake in their virtual communities. As a result, the researcher was able to relate technology attributes and task characteristics of activities undertaken by members of virtual communities to the outcomes of those activities. Consequently, the outcomes indicated various gratifications that members sought through their participation in virtual communities.

Using a combination of various techniques for open-ended questions, prompts, critical incident questions, probes, and laddering questions, the researcher attempted to ensure that the qualitative data collection instruments facilitate an in-depth understanding and rich explanation of member participation experiences in virtual communities. The next sections introduce and describe the data collection instruments in more detail.

4.3.2 Online Focus Groups

Online focus groups (OFGs) were used as the primary mechanism for qualitative data collection in this research. As a relatively new tool in the qualitative methodology toolbox, online focus groups present an ideal means to facilitate real-time and simultaneous participation of research subjects (Sweet, 2001). Broadly, a focus group can be defined as "a group of individuals who are selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research" (Powell & Single, 1996, p. 499). A focus group can also be seen as an extension of group interviewing, except that in addition to interviewing a number of people at the same time, in a focus group, there is a heavy reliance on interaction within the group as well (Morgan, 1997). Online focus groups offer advantages over traditional face-to-face focus group encounters by overcoming temporal and spatial limitations. OFGs are known to generate similar quantity and quality of information as their traditional counterparts (Underhill & Olmsted, 2003), and there is research that suggests that OFGs may even generate significantly more ideas within similar time durations and group compositions without affecting the quality of data collected (Reid & Reid, 2005).

Based on the guidelines provided by Hughes & Lang (2004), the use of online focus groups is suitable in situations where the phenomenon under investigation occurs in an online environment, and if the studied actors perform online as well. Along a similar vein, Sweet (2001) points out the use of online focus groups as a logical choice in researching topics related to e-commerce based phenomenon. Furthermore, it is stipulated that online focus groups can be beneficial for exploratory experiential research especially for purposes of theory development (Hughes & Lang, 2004; Litoselliti, 2003).

Given this study's exploratory research design toward studying an Internet based phenomenon, i.e. member participation in virtual communities, and the geographically dispersed potential informants, OFGs were adopted as the primary means for qualitative data collection. Two variants of online focus groups were used in tandem, namely synchronous and asynchronous. The next section introduces the two variants and outlines the use of both formats in this study.

4.3.2.1 Synchronous & Asynchronous Online Focus Groups

Online focus groups can be conducted either *synchronously* (in real time) or *asynchronously* (not in real time) or a combination of both (Bloor et al., 2001; Reid & Reid, 2005; Tates et al., 2009). The interaction mechanism in *synchronous online focus groups* resembles that of a virtual chatroom or instant messaging, while asynchronous focus groups can take a form of communication similar to an email list, a newsgroup, or a discussion forum. The main feature in synchronous focus groups is that participants assemble online simultaneously at a pre-arranged time, and can immediately commence interaction with the moderator and react to each other's responses (Bloor et al., 2001; Tates et al., 2009). On the other hand, *asynchronous online focus groups* require participants to respond to a moderator's questions and the contributions of other participants at a personally convenient time over a set duration (usually, a few days) for which the focus group will run. The narrative in asynchronous focus groups accrues over the duration of their operation, and questions and probes are interjected by the researcher at regular intervals to keep the discussion going (Bloor et al., 2001; Moloney et al., 2003).

Based on the aforementioned characteristics of the two variants, this study utilized a combination of both formats to enable an expansive recruitment of informants from various virtual communities, as well as to tap into different conversational modes that may be used for responding to questions in the focus group. While a virtual chat interface was used to conduct the synchronous OFGs, a website discussion forum enabled the asynchronous format. The use of synchronous and asynchronous OFGs in combination allowed the researcher to balance the weaknesses of one format with the strengths of the other. The various tactics that were used to leverage the synergy between the two formats are highlighted herewith.

With respect to *recruitment*, the use of asynchronous focus groups alleviated the problem of convening a real-time session with participants from around the world at a time that was mutually convenient. Also, participants had specific preferences to engage in one form or the other based on prior experience with chat, messaging, discussion forums tools which were commonly used across various virtual communities.

In terms of *conversational characteristics*, the two formats for online focus groups complemented each other well. While the discussion in synchronous OFGs such as chat rooms are characterized by more fast-paced, punchy, spontaneous discussion, the conversations in asynchronous OFGs tend to be more well formed, better thought out, and more 'literate' than synchronous responses that tend to be more 'oral' (Stewart & Williams, 2005). Using these different modes of interaction, this study draws upon different forms of interaction with informants who offered a variety of responses – some based on immediate reactions, others developed through measured thoughts.

Building on the above mentioned idiosyncratic characteristics of conversations, the researcher adopted a *multi-tiered approach* to using the two formats where the asynchronous

OFGs were used in a more concerted fashion in the mid to late stages of the qualitative investigation. This allowed the researcher to broadly survey the perceptions, attitudes and experiences of participants using synchronous OFGs, and subsequently use a more customized topic guide and question list for the asynchronous OFGs.

From an *administrative viewpoint*, facilitating discussions in synchronous OFGs is considerably more challenging that in asynchronous OFGs (Fox et al., 2007; Murray, 1997; Stewart & Williams, 2005). The discussion in synchronous OFGs can be fast paced and the complexity of interactions can result in a chaotic transcript characterized by multiple overlapping threads of discussion (Fox et al., 2007; Murray, 1997). Consequently, to administer interactions in this setting effectively, as a moderator, the researcher needs to adapt to the pace and style of the group, and for analysis purposes, an additional step is required to sort and glean conversational fragments from the transcript. In the qualitative phase of investigation in this study, adapting to the real-time format of conversation was not a major concern for the researcher, owing to his prior experience with similar tools. This belief was confirmed after conducting a trial run of a synchronous OFG session with participants from a virtual community. The researcher was also able to get up to speed with the requirements of preparing the proceedings transcript after conducting a first round of analysis using transcripts from the trial focus group session, and another subsequent live session.

Lastly, in terms of *approaching potential participants* for the two versions of OFGs, the researcher recruited from each virtual community in multiple stages. Virtual community websites were selected based on theoretical sampling parameters (discussed in a later section), and a first call for participation on these sites was published to invite participants to a synchronous OFG session. Possible times for convening were made public, and over a five day period, potential participants were invited to sign up for a time slot most convenient to them by indicating their choice via an email or a private message (using the virtual community's messaging facility) to the researcher. At the end of the five days, the time slot that had the most number of potential participants signed up was selected, and these participants were sent a confirmation email or a private message with details about the online focus group and their login information. If not enough participants showed interest in signing up a synchronous OFG session, the researcher returned the following week to invite them to an asynchronous OFG instead. Asynchronous OFGs were also used in scenarios where if at a later stage in the investigation, more participants were required from the same virtual community.

Having highlighted the modus operandi for the joint utilization of synchronous and asynchronous focus groups, the next sections provide additional details about their design and deployment by outlining their group compositions, topic guides, and enabling technologies.

4.3.2.2 Composition of Online Focus Groups

One of the most important practical considerations in using traditional face-to-face focus group procedures is their composition in terms of the type and number of participants that the group comprises (Bloor et al., 2001; Kreuger, 1998; Litoselliti, 2003). Since random sampling is not a standard practice in selecting participants for focus groups, and the success of a group depends upon the interactions among group members, researchers need to sensibly deliberate the sampling schemes and selection procedures for their groups (Bloor et al., 2001). These considerations for traditional face-to-face focus groups also have a bearing on the successful operation of online focus groups (Stewart & Williams, 2005; Williams et al., 2007). Decisions about the size of a group as well as the desired level of homogeneity in the group play an important role in the success of traditional as well as online focus groups (Litoselliti, 2003; Stewart & Williams, 2005; Sweet, 2001).

In this research, the general makeup of each individual online focus group was primarily determined by the research requirements at particular instances in time. Theoretical sampling parameters were defined in response to research progress to-date and future needs for data collection along specific lines of inquiry. Various sampling schemes were used, including *purposive* and *stratified sampling* at the VC level to recruit from specific types of VCs, *purposive sampling* at the participant level to recruit informants with specific roles in their VCs, and *critical case sampling* to recruit participants with specific participation characteristics and patterns. These sampling schemes are outlined in a later section of this chapter.

Despite the dynamic nature of recruiting participants for the focus groups using a variety of sampling techniques, certain tactics and guidelines were followed consistently to ensure a productive composition for each group. These are specified below.

Firstly, the *size* of synchronous online focus groups was determined to ideally consist of six participants, but no more than eight, while a range of ten to fifteen participants was determined to be optimal for asynchronous OFGs. These decisions were made after conducting a trial run for each format of the focus group. Different samples of eight participants participated in each trial run, and it was noted that while this number worked relatively well in the asynchronous format, it lead to blurred proceedings in the synchronous version. This was evident to the researcher through a post-hoc replay of the interactions in the trial focus group, as well through comments from a debriefing with three participants of the focus group right after the conclusion of the session. For the asynchronous OFG, although there was sufficient and regular interaction among participants over the duration of the focus group (one week), it was felt that adding a few more participants might help bring more vibrancy to the group. These findings from the trial run sessions were aligned with the suggestions from other studies that have used OFGs as a data collection method. For example, Fox et al. (2007) suggested five participants as an optimal number for their synchronous OFGs, while Murray (1997) stipulated that more than eight respondents would have provided better results for his asynchronous

OFGs. In order to achieve the ideal number of participants for an OFG, the researcher over-recruited by 30% which is a recommended practice for focus group recruitment in order to alleviate problems with low show rates of informants (Rabiee, 2007; Sweet, 2001). There were no instances during the course of investigation where more participants than the desired maximum showed up. The ideal size parameters for each version of OFGs ascertained through the trial run OFG sessions helped operationalize Kreuger's (1998) guidelines for focus groups – the groups were small enough to share insights, but large enough to allow for diversity of views.

Secondly, in terms of the specific *makeup* of each group, after conducting the trial run OFG sessions, the researcher decided that it was best to limit each focus group to participants who belong to similar virtual communities (e.g. interest-based, professional, social, or commercial). This decision was made after the researcher noticed respondents not being able to draw on each other's comments as much as they should in these OFG settings. Consequently, in the live OFGs, it was confirmed that homogeneity at the level of VC type does indeed alleviate these problems. Samples of participants drawn from VCs of the same type were observed to enhance interaction among participants as they were now able to share similar experiences and events in their respective virtual communities. In synchronous OFGs, this tactic alleviated the problem of awkward silences, and in asynchronous OFGs, it facilitated the formation of simultaneous conversational threads among participants. The trial-and-error route to get to the conclusion of using relatively homogenous group of participants at the VC type level was, but unavoidable, since many focus group researchers have warned against too much homogeneity in focus groups which can potentially lead to dull interactions and monotonous data being generated (Kitzinger, 1994; Litoselliti, 2003).

Third, the researcher adopted suggested guidelines for ensuring *anonymity of participants* in both forms of the OFGs. While confirming the logistical details of the focus group sessions with potential informants, each informant was provided with login credentials including a generic username which they were instructed to use as a pseudonym while participating in the OFG. The username and password combination required to login also ensured that only confirmed participants could join in the OFG conversation and discussion sessions. Additionally, the identities of the virtual communities where the participant samples were drawn from were kept confidential. As is the case with traditional face-to-face focus groups where familiarity among participants has been linked to inhibited disclosure (Kreuger, 1998), OFGs that support greater anonymity among participants have been known to stimulate greater self disclosure and expressive articulation of participant experiences (Stewart & Williams, 2005; Tates et al., 2009). The notion was of anonymity leading to increased participation was further confirmed through comments made by trial run OFG participants during the debriefing that followed the discussion sessions. All participants agreed that they were more comfortable in talking about their experiences given their anonymity through pseudonyms that were not associated with their online identities in their respective virtual communities.

Lastly, with respect to the *duration* of each OFG, the researcher followed the guideline of restricting synchronous OFGs to a maximum of ninety minutes, and asynchronous OFGs to one week (Stewart & Williams, 2005; Sweet, 2001; Turney & Pocknee, 2005). These guidelines proved to be adequate for both versions of OFGs in this research. On average, the synchronous OFGs lasted about 75 minutes, with a few participants staying back at the end for an informal debriefing. The asynchronous OFGs were setup to be available to a specific group of participants for a duration of one week. In these asynchronous OFGs, on average each participant logged in three times over the duration of the week to answer the researcher's questions and to respond to comments from other participants.

Having delineated the 'group' parameters that characterized the OFGs in this study, the next section outlines the 'focus' elements that helped stimulate the rich interactions among OFG participants, and enabled the generation of a valuable range of ideas, opinions, and experiences that constituted the qualitative data for this research study. Toward outlining these 'focus' elements, the topics covered by the researcher and conversational guidelines followed by him as the moderator of OFGs are highlighted.

4.3.2.3 Moderator Script & Topic Guide for Online Focus Groups

In crafting a program and agenda for the OFG sessions, the researcher considered various factors that have been highlighted to be of importance in conducting traditional face-to-face as well as online focus groups (Bloor et al., 2001; Chase & Alvarez, 2000; Grim et al., 2006; Kreuger, 1988; Litoselliti, 2003). Firstly, a starter moderator script outlining administrative procedures, and template comments for *introduction*, *topic transitions*, and *closing the discussion* was drafted. Secondly, the key themes for discussion were listed and refined through a mapping with the research questions guiding this dissertation. Third, the dynamics of group interaction were monitored in a trial OFG setting. This enabled the researcher to tweak the wording and sequence of questions, and to also fine-tune the moderator script to better fit with the tone and dialog in the live setting. The moderator script and topic guide that resulted from these exercises is available in *Appendix A*. Various considerations that steered the development of the moderator script and topic guide are outlined in this section.

In terms of the moderator script, the researcher made notes of all administrative procedures that needed to be completed prior to, during, and after each OFG session. Additionally, the researcher created a few templates for comments that could be inserted into OFG conversations easily during introduction, transition, and closing stages of the session. Altogether, 15 comment templates were drafted, and this made the process of moderating focus groups more efficient.

To determine the overall flow of the topic guide, the researcher followed the standard *question route* for traditional face-to-face focus groups as suggested in the extant qualitative methodology literature (cf., Grim et al., 2006; cf., Kreuger, 1998). A four stage model for

interviewing was used with *warm-up* (introductory), *transition*, *key*, and *summary* (wrap-up) questions. *Factual questions* are generally recommended for the *warm-up* phase to build initial rapport with the participants (Litoselliti, 2003). Toward this, the researcher used factual questions to elicit information from participants about their respective participation levels and types of activities they engage in. This was followed by general background questions inquiring about participants' reasons for joining and participating in virtual communities. *Transition questions* were used to smooth the changeover to key questions pertaining to the main themes of investigation in this research. The researcher asked participants about the changes in their patterns of use over time and this lead to the discussion of technology tools and features that are commonly used by participants. The *key questions* in the topic guide were mapped to the core research questions guiding this research study. Their formulation is highlighted below. Finally, in the *wrap-up* phase, the researcher asked 'on-the-whole' style questions to get a sense of socio-technical factors that are of greater importance to member participation, and asked for factors that may affect the participants' decisions about continuing their participation in their respective virtual communities.

Overall, the use of the suggested question route along with the moderator's template comments that the researcher had drafted proved to be an effective means to direct discussion and maintain regular conversation throughout the duration of the focus group. It should be noted here that these methods were used in both the synchronous as well as the asynchronous versions of OFGs with minor differences. For example, the use of a question route in the topic guide may not be as obvious in asynchronous OFGs, but the researcher used it to standardize the sequencing of questions that were posted in the OFG over the duration of its use.

In addition to following a suggested question route, the topic guide also adhered to Wengraf's (2001) guidelines for qualitative interviewing which suggest a logical mapping between interview questions asked of informants and research questions guiding the research study. Furthermore, Wengraf suggests that the research questions should ideally govern the production of interview questions.

As discussed in the previous chapter, the *grand tour question* guiding the qualitative empirical phase in this study is: '*What are the salient socio-technical factors that affect member participation in virtual communities?*' This question has seven associated *research questions* that needed to be addressed first through the qualitative research phase, following which, a subset of the seven questions needed to be enhanced through the quantitative empirical phase in this study. The topic guide used in the online focus groups was derived through a logical mapping of the seven research questions to various interview questions. It should be noted that the interview questions for OFGs were tailored throughout the course of the qualitative research phase by adding new questions for novel issues that were being discovered through previous OFG sessions, and by adding probes and prompts for questions that required more input. For example, the category of '*Information Quality*' had featured dominantly in the proceedings from

the first few OFGs, and a specific question pertaining to the concept was added to the topic guide for future OFG sessions. Along similar lines, during the later stages of axial coding, once the central phenomenon related to *'Member Engagement Process'* in the grounded theory started to emerge, additional questions and probes were added to the topic guide to ascertain and validate the significance of the elements that may potentially explain the causes and consequences of the central phenomenon. These examples essentially characterize the working basis of the constant comparison approach in GTM that was used throughout the course of the qualitative investigation.

The moderator script and topic guide in Appendix B is a synthesized version of the various questions that were used in OFGs throughout the qualitative research phase. Questions that were added over the course of the investigation are clearly identified in the topic guide. As such, questions were added or modified in two cycles, with the first revision performed near the end of the open coding phase of analysis, and the second revision performed at the transition from axial to selective coding. The original topic guide consisted of 22 questions (with multiple probes), while there were 27 questions (with multiple probes) in the third version. A standard suggestion for number of questions in an OFG topic guide is that for a 90 minute synchronous OFG, 40 to 45 questions can be used, with the possibility for adding spontaneous probes (Sweet, 2001). Based on this rule of thumb, it was expected that the researcher would be able to cover all questions in the original as well as the revised topic guides, and still have sometime to address novel issues spontaneously during the discussion session. For the asynchronous version of OFGs, the length of the topic guide translated into a requirement for the researcher to post about 4 questions per day, so that all questions could be addressed over the duration of a week. Although this number of daily questions was a little on the high side vis-à-vis other studies indicating that 2 or 3 questions should be posted daily (Murray, 1997; Stewart & Williams, 2005), some researchers acknowledge that the number of questions really depends on the complexity of issues and relatedness of topics (Kenny, 2005; Sweet, 2001; Turney & Pocknee, 2005).

The number of questions in the topic guide did not raise any difficulties during the qualitative data collection using either format of OFGs. The researcher was able to cover all questions in most synchronous OFGs with the exception of one session where an additional 5 minutes were requested from participants to go over final administrative remarks. For the asynchronous OFGs, as highlighted previously, participants logged in three times on average over the course of the week to answer questions and respond to comments from other participants, and most participants addressed all the questions – some in detail, others more cursorily.

This section and the ones preceding it have elaborated the procedures and topics used to operationalize the online focus groups in this study's qualitative phase. The next section briefly highlights the design and deployment considerations that helped ensure their effective functioning in this study.

4.3.2.4 Technology Platform Considerations for Online Focus Groups

As highlighted in previous sections, the synchronous OFGs were operated through a virtual chat facility, while the asynchronous OFGs were conducted through a web discussion forum platform. In selecting the appropriate method and right technology platform for the online focus groups, various alternatives were considered.

Firstly, the alternative to use specific virtual chat facilities or web discussion forums within the virtual communities that constituted the sampling frame for the research investigation was rejected. This was done in order to maintain an arms-length and neutral position in relation to the various virtual communities being studied as part of the research investigation – a practice that is recommended by other VC researchers (Rezabek, 2000).

As a second alternative, the researcher deliberated the use of existing university infrastructure – specifically the learning management system (LMS) that was currently deployed for use by the university's faculty, staff, and students. Upon further consideration, the researcher felt that due to the number of steps required to generate login credentials for new users, the use of this solution might hamper the progress of research. The researcher was expecting to recruit new participants on an almost weekly or bi-weekly basis with OFG sessions scheduled for the same week. Contacting the administration of the learning management system to create usernames and passwords on a frequent basis may have been a challenge, and could potentially lead to delays in the scheduling of OFG sessions. In using an LMS as the basis for conducting online focus group sessions, Maloney et al. (2003)reported facing administrative problems similar to the ones anticipated by the researcher.

The third alternative which the researcher opted for was to utilize an online turnkey solution for hosting the OFG facilities. Compared to a self implemented solution which was the last alternative on the list, an online turnkey solution could help avoid overhead associated with deploying and managing the technology platform locally (Sweet, 2001). Although this meant relinquishing some control over the operational and customization aspects of the technology platform, the researcher felt that he could systematically select the best solution from a myriad of options that were available online. A checklist consisting of minimal technology requirements and end-user specific criteria was created to aid in the decision-making process for selection of the best possible facility for both versions of OFGs. This complete checklist is available in *Appendix B*. A few key points from the checklist are highlighted herewith:

The solution for either version of OFGs needed to be compatible with the kind of tools that virtual community members are familiar with through their online experiences. Alternatives related to sophisticated conferencing tools or groupware style solutions were hence discarded upfront, and it was decided that a simple chat interface and web discussion forum can be used to run the synchronous and asynchronous OFGs respectively.

The solution candidates were also evaluated on the basis of ease of first use. At the end-user level, the solution needed to be a stand-alone web-based tool that did not require participants to install additional plug-ins or local software. Following this criterion would also potentially alleviate browser compatibility problems.

In order to provide a rich interface for participant interactions, solutions were evaluated higher if they supported the use of standard expression features such as smilies and emoticons, as well as typographic variations (boldface, italics, coloured fonts) that are commonly available in most interaction spaces deployed by virtual communities. These features would help provide a more familiar interaction environment to the OFG participants, and also allow them to express themselves "paraverbally" (Montoya-Weiss et al., 1998). Additionally, such features can potentially help overcome the absence of social cues in OFGs (Moloney et al., 2003).

In order to maintain anonymity of participants while also providing only authorized access to confirmed participants who have consented to participation, the solution needed to support the use of authentication credentials to access the OFG sessions. To ease the administrative burden, solutions were sought in which the moderator would be able to simply upload new login credentials for participants or modify existing credentials to be re-used by new participants.

Lastly, from the researcher's standpoint, the solution needed to provide a simple facility for data transfer in order to export discussion comments and threads from the OFG sessions into a format suitable for data analysis. For this purpose, solutions which featured download or standard format export features were preferred over those where the conversations would have to be manually copied off the website interface.

Together, these criteria and others listed in *Appendix B* were used to select from a variety of online solutions for hosting virtual chat based or web discussion forum style interaction spaces. Ultimately, the researcher selected *CBox* (http://www.cbox.ws) as the tool of choice for synchronous OFGs and *QuickTopic* (http://www.quicktopic.com) as the enabling platform for asynchronous OFGs. While CBox offered a rich format chat widget that could be customized and embedded within any website, QuickTopic offered a quick and easy interface to create threaded discussion spaces.

For purposes of running the synchronous OFGs, CBox chat widget was customized and integrated into the researcher's website which made the transition between multiple pages very seamless. The *information & consent* webpage was linked to the pre-focus group demographics questionnaire, which in turn lead to the chat widget hosting the synchronous OFG session. A screenshot of the embedded chat widget is shown in *Figure 4-3*. As apparent from the sample strand of discussion shown in the screenshot, the interaction space supported typographical variations as well as rich expression features including emoticons. Although a link to the help

feature was prominently placed in the widget interface, the researcher also created a one-minute tutorial for participants who might need to get familiar with the interface[21].

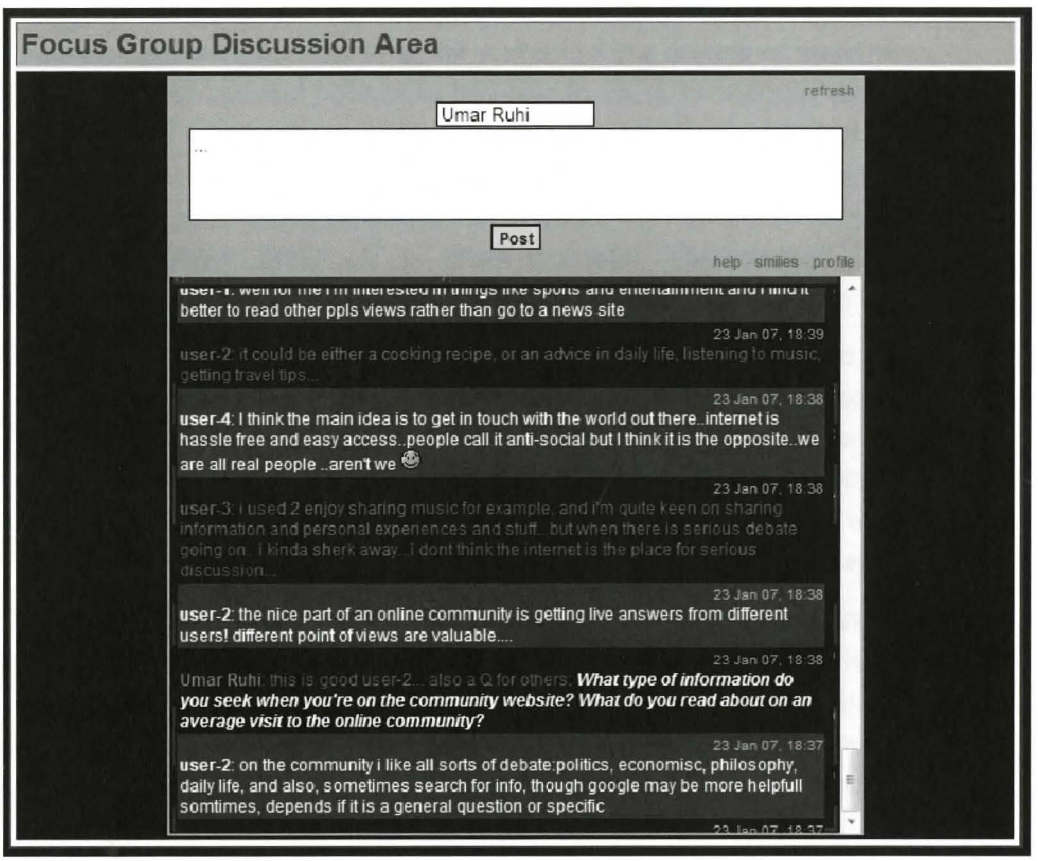

Figure 4-3: Screenshot of Virtual Chat Widget hosting a Synchronous Online Focus Group Session

The asynchronous OFGs were enabled through QuickTopic's discussion forum facility. A new discussion space with its own unique website address was created for every asynchronous OFG session, and the workflow linking the *information & consent* webpage to the pre-focus group demographics questionnaire on the researcher's website was linked to the website address for the asynchronous OFG session. A screenshot of a strand from an ongoing discussion session is shown in *Figure 4-4*. The interaction space in this case also supported typographical variations and rich expression features. Additionally, participants also had the ability to post links or upload images to supplement their comments. These features were availed by a few participants who provided links to specific parts of their virtual communities to illustrate their discussion comments, or to upload screenshots showcasing certain aspects of technology tools and features available through their VCs. In addition to text based comments, these objects provided the basis for rich qualitative data gathered through the OFG session.

[21] An archived version of the tutorial is available at http://www.umar.biz/research/phd/archive/Focus-Groups/tutorial.html.

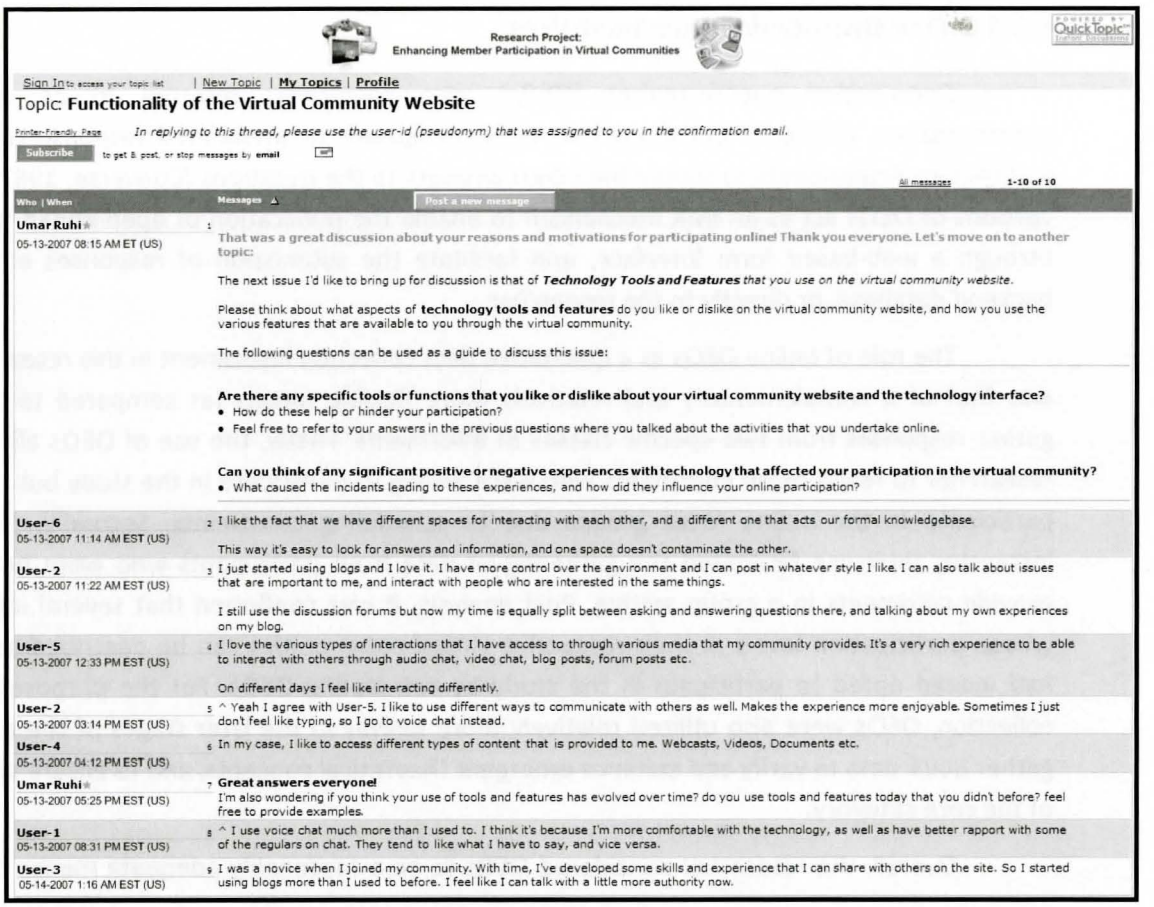

Figure 4-4: Screenshot of Discussion Forum hosting an Asynchronous Online Focus Group Session

On the whole, the two platforms highlighted above provided a simple yet effective mechanism for conducing synchronous and asynchronous OFG sessions. For the participants, the tools provided a familiar and easy-to-use environment, and ensured a rich interaction experience among participants. For the researcher, the tools offered functionally useful features such as authentication modules to check-in participants, and export features to download transcripts of focus group sessions into a standard format suitable for qualitative data analysis.

Having provided details of the design and deployment of online focus groups which constitute the primary data collection instruments for qualitative data collection in this study, the next section provides an overview of the online open-ended questionnaires that were used to complement the data gathered through focus group sessions.

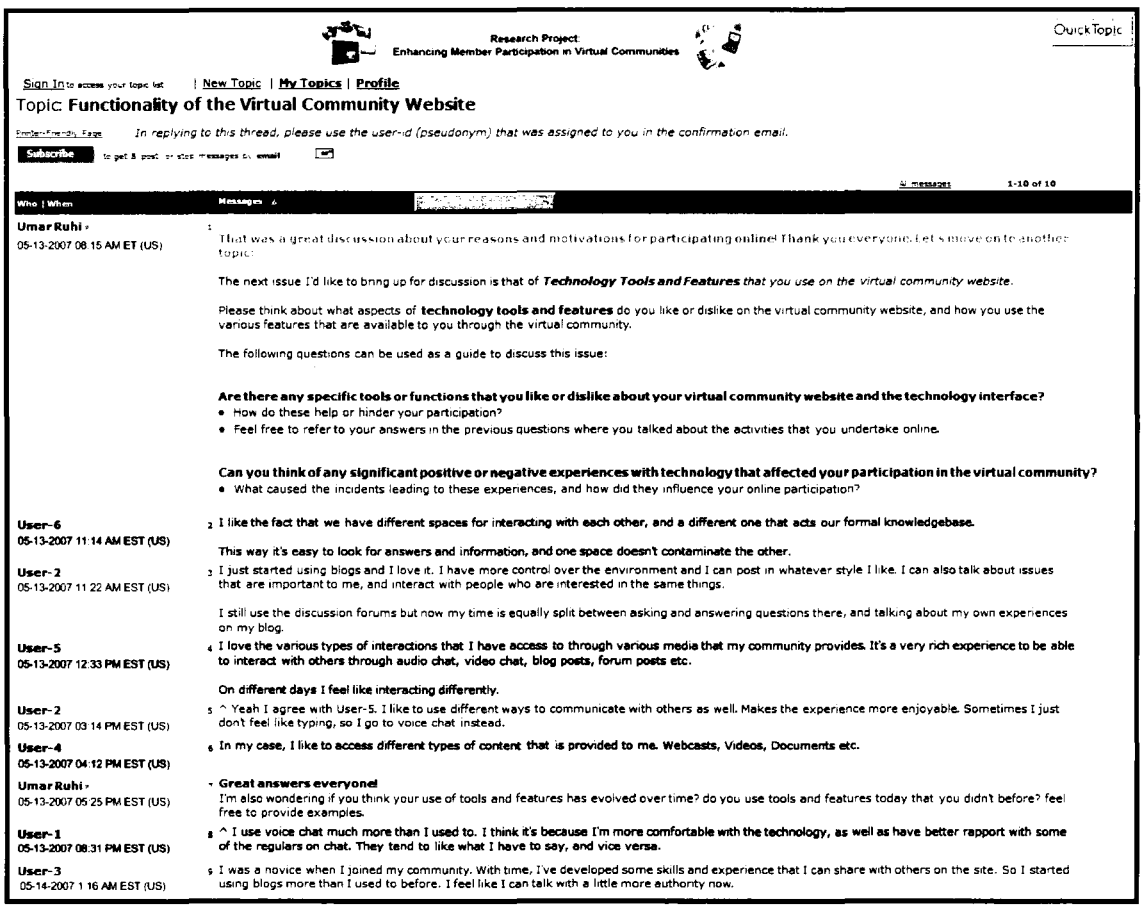

Figure 4-4: Screenshot of Discussion Forum hosting an Asynchronous Online Focus Group Session

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Having provided details of the design and deployment of online focus groups which constitute the primary data collection instruments for qualitative data collection in this study, the next section provides an overview of the online open-ended questionnaires that were used to complement the data gathered through focus group sessions.

4.3.3 Online Open-Ended Questionnaires

Open-ended questionnaires (OEQs), also sometimes referred to as subjective questionnaires, consist of questions that offer no options or predefined response categories, and require respondents to supply their own answers to the questions (Converse, 1987). Online versions of OEQs act as an IMR mechanism to enable the publication of open-ended questions through a web-based form interface, and facilitate the submission of responses either to a backend database, or directly to the researcher.

The role of online OEQs as a qualitative data collection instrument in this research study was that of a complementary and relatively more flexible means (as compared to OFGs) to gather responses from two specific classes of informants. Firstly, the use of OEQs allowed the researcher to reach those informants who were willing to participate in the study but could not participate in the online focus groups due to scheduling constraints. Secondly, in several instances, their use facilitated the gathering of data from participants who were hesitant to provide comments in a group setting. Post analysis, it was confirmed that several informants whose participation levels in their respective virtual communities can be described as passive had indeed opted to participate in the study by completing OEQs. For the purposes of data collection, OEQs were also utilized relatively more heavily in the later stages of the project to gather quick data to verify and enhance emergent theoretical concepts, and to ensure saturation of the core category.

Overall, the researcher considered OEQs to be a reasonably adequate means to gather additional data individually from hard-to-reach informants. Several recommended practices for the design of the online questionnaire were followed diligently to ensure that the responses generated are as rich and detailed as possible. Processes guiding the development and design of the online open-ended questionnaire are outlined in the next section.

4.3.3.1 Development & Design of Online Open-Ended Questionnaire

As with the formulation of questions for the OFG topic guide, the questions for the OEQ were formulated in accordance with Wengraf's (2001) guidelines for qualitative interview questions. Through a logical mapping between the research questions guiding the research study, the questions in the survey asked of informants of their participation experiences in virtual communities with respect to: i) drivers and motivations for participation; ii) experiential descriptions of functionality of the virtual community website and its tools and features; iii) views on usability of the virtual community website and its tools and features; iv) perceptions of trust in the organization; v) beliefs of trust in other community members; and (vi) feelings of sense of virtual community. Additionally, based on initial iterations of qualitative analysis, an additional question was also added to inquire about the importance of information available in the virtual community. The questions used in the online OEQ are available in *Appendix C*.

There were several differences between the OFG topic guide and the OEQ questionnaire. One the one had, the topic guide had multiple questions and probes pertaining to each research question in the study, and allowed the possibility for the researcher to modify or skip specific probes based on the needs of the situation. On the other, the questionnaire had a very structured presentation which needed to be deliberated in advance. As such, 10 questions were formulated, each with a single probe meant to elicit more descriptive responses. The questions focused on the various socio-technical constructs and process factors mentioned above. With previous research on open-ended questions indicating that informants might take anywhere between 2 to 5 minutes to respond to an open-ended question (Hughes & Lang, 2004; Sweet, 2001), it was estimated that the questionnaire would require about 30 minutes of a participant's time. The time estimate was highlighted in the request for participation that was posted online. A pre-test with two test informants indicated an average of 23 minutes being spent in answering the questions (see details of pre-test in the next section).

In terms of design guidelines for the questionnaire and the webpage that it was published on, the researcher adhered to various best practices that have been recommended by researchers who have used online OEQs in their studies, outlined below.

Firstly, the researcher observed guidelines based on *leverage-saliency theory* which suggests that the response quality to open-ended questions can be determined by the importance placed on the questions by the requestor (Groves et al., 2000; Holland & Christian, 2009) . This is due to the fact that people who are interested in a topic usually respond better if that topic is made salient within the survey instrument (Holland & Christian, 2009). Studies on web surveys have even shown that people's interest in the topic of a survey has greater impact on response rates than other features, including incentives provided to respondents (Cook et al., 2000). To improve the topic salience for the online questionnaire, the researcher copied the text highlighting the study's value proposition from the research information page and placed it prominently on top of the survey webpage.

Secondly, the sequence of questions was manipulated to make sure that informants don't implicitly link earlier questions simply to background information. This measure was taken in response to suggestions provided by Krosnick (1999) who showed that the order in which information is provided and requested can indicate different levels of importance to potential respondents. In the online OEQ used in this study, the researcher manipulated the placement of questions by interspersing questions requiring relatively factual responses among the other questions. By doing this, the researcher also attempted to reduce the effects of 'satisficing', i.e. respondents providing answers using lesser cognitive reflection than what is needed to generate optimal answers (Krosnick, 1999).

Third, the guidelines from *visual design theory* were observed by ensuring that the visual aspects of the web-based questionnaire are aligned with the desired results. Specifically, based on suggestions by various researchers, the answer boxes for each question were customized to

be appropriately sized for the type and length of response that was desired (cf., Jenkins & Dillman, 1997; cf., Smyth et al., 2009).

Lastly, the instructions for the questionnaire explicitly indicated the nature of open-ended questions in the questionnaire, advising respondents to 'take their time', and making sure they understand that their responses are 'not limited in length by the size of the response boxes'. Past studies have shown the use of such tactics to yield better quality of responses to open-ended questions (Smyth et al., 2009; Tourangeau et al., 2000).

Overall, by following these guidelines for the formulation of questions and their publication in the online open-ended questionnaire, the researcher attempted to ensure better response rates and higher quality of responses for the collection of rich descriptive information that would complement the data from online focus groups[22]. In addition to following these guidelines, a trial for these instruments was conducted through trial runs and pre-testing procedures. The next section highlights the procedures for trial runs of the online focus groups and pre-testing the online open-ended questionnaire.

4.3.4 Pre-Testing & Trial of Qualitative Data Collection Instruments

Although the trial runs of the OFGs and the pre-testing of the online open-ended questionnaire were performed in distinct time periods over the course of research (questionnaires were administered later in the project), this section outlines the procedures used to evaluate the effectiveness of the qualitative data collection instruments as a whole.

For this research project, both versions of online focus groups and the online open-ended questionnaire were subjected to multiple rounds of revisions using a three or four stage process. The use of a multistage process for testing and trial of data collection instruments has been recommended by many researchers in the past (Dillman, 2000; Krosnick, 1999; Oppenheim, 2001). The complex structure of online focus groups meant that each component had to be evaluated individually as well as in concert. The topic guide, moderator script, technology platform, and group interactions – all had to be assessed in a trial setting to iron out the kinks before the scheduling of the live focus groups. On the other hand, the pre-testing procedures for the open-ended questionnaire were relatively simpler, and were conducted in a linear fashion through an array of evaluation procedures such as expert reviews, cognitive testing, and technical testing of an emulated survey.

Expert reviews were used to evaluate the topic guide for the OFGs and the inventory of questions for the OEQ. The researcher's supervisor and advisory committee evaluated the questions and probes in both instruments and offered practical insights for the sequencing of questions in the topic guide and the wording of various questions in the questionnaire. For the

[22] An archived version of the online open-ended questionnaire is accessible at: http://www.umar.biz/research/phd/archive/Questionnaires/questionnaire-requested.html

OEQ, they suggested ways to combine multiple questions in order to reduce the length of the questionnaire.

Cognitive testing which asks trial respondents to '*think aloud*' while answering questions was used to assess the viability of the questions in the OEQ by representative informants. An interactive session was organized between the researcher and two undergraduate students who were recruited to individually complete the survey on lab computers with the researcher present. These undergraduate students were active members in online communities, and therefore constituted a representative basis for potential respondents to the survey. Using an adapted version of the think-aloud protocol (Ericsson & Simon, 1987; Lewis & Rieman, 1993), the researcher was able to gain a sense of the understandability of survey questions by respondents, the interpretation consistency of the respondent while answering the questions, as well as the overall impression of the questionnaire. The questionnaire was completed by the students in 20 and 23 minutes individually, which indicated that the estimated 30 minutes duration to complete all the questions in a real setting might be adequate (the students were talking to the researcher while completing the questionnaire). This procedure facilitated some additional changes in the questionnaire. Some wording in the introduction comments of the survey was improved to better inform the potential respondents about the nature of open-ended questions. Furthermore, the presentation of the questionnaire web page was improved by adding separators between different questions.

After the learnings from cognitive testing were applied to the online questionnaire, the researcher conducted another round of testing by inviting participation from three acquaintances who were members of a virtual community that the researcher also belonged to. This step acted as an *emulation* of the live questionnaire and allowed the researcher to verify the proper functioning of the form as well as download of response data into the appropriate format. The informants were also invited send any comments about the questionnaire to the researcher through email. The three informants completed the questionnaire within two days of the request, and reported an average completion time of 20 minutes. No major problems were identified during the emulation.

In terms of *emulation*, both versions of online focus groups were trialed with real virtual community members. Two communities of different types (interest-based and professional) where the researcher was already a member for the past several years were approached to help with the trial. Two groups with 10 and 12 members in each group were recruited across the virtual communities to participate in the online focus groups. The first group (with 10 members) participated in a scheduled 90 minute session for a synchronous OFG, while the second group (with twelve members) participated in a week long asynchronous OFG setting. After the trial runs, an online debriefing using email or the virtual community's private messaging facility was conducted with a few participants from each group. For each trial run, the researcher tried to

emulate the workflow for a live online focus group to the greatest extent possible through the following steps:

- A call for participation was posted in a public discussion space on both virtual communities;
- Possible dates and times for the synchronous session were listed in a message that was posted as an announcement for two days;
- Communication with participants who had expressed interest was handled through email or the virtual community's private messaging facility;
- A link to the research information webpage and consent form was made available to the interested participants in advance;
- Login credentials for the online focus group sessions (both versions) were made available to the confirmed participants three days prior to the scheduled sessions;
- Reminders were sent to the confirmed participants on the day before their scheduled sessions, and a two hour reminder was sent to the synchronous OFG participants.

Several key lessons were learnt from the two trial runs for OFGs and the debriefing that followed. These are highlighted below.

In both OFG sessions, only eight of the 'confirmed' participants attended. This confirmed that for the live sessions, the researcher needed to substantially over-recruit potential participants. Previous research on traditional face-to-face focus groups recommended over-recruiting by 10% to 25% (Rabiee, 2007), while researchers utilizing online focus groups recommended over-recruiting by as much as 50%. Based on the experience from the trial run, the researcher decided to over-recruit by at least 30%, and to do so, the length of time for which the call for participation was posted publicly was increased from two to five days. Additionally, the choice of times for synchronous OFGs was also posted for five days, and the lead time to the potential scheduled sessions was set to five days until after the expiration of the call for participation posting.

While the number of participants in the synchronous group was lesser than the expected attendance, even the eight participants proved to be a few too many. There were several instances during the real-time chat when the researcher had to re-post some questions for a couple of participants who had fallen behind in the discussion of topics. Also, the debriefing revealed that a few participants thought the group was too large for a cohesive discussion. Learning from this experience, the researcher determined that he would need to limit the number of synchronous OFG participants to a fewer number.

Somewhat related to the above point, part of the problem with not having a cohesive discussion experience in the synchronous group was also attributed to the fact that participants belonged to two different types of virtual communities. While the researcher had initially thought that this level of heterogeneity in the group might not pose a problem, the experience showed otherwise. Based on this, the researcher decided to maintain homogenous OFG sessions by inviting participants from similar virtual communities. Following this guideline was also expected to alleviate the problem with larger group sizes. Combined with the take-away from the previous point, the number of participants for synchronous OFGs with a homogenous participant base was limited to eight.

For the asynchronous OFGs, it was noticed that the participation dwindled after two days of discussion. To alleviate this problem, the researcher decided to send reminders to the confirmed participants at two day intervals. Furthermore, the researcher highlighted the post subscription facility in the discussion forum hosting the OFG whereby participants were able to subscribe to new posts and have an email delivered to them when something new is posted in the discussion forum. This information was included in the standard confirmation message to the participants as well as in the introduction posting for the OFG session.

During the debriefing, two participants from the synchronous OFG trial run had suggested the creation of a quick tutorial to introduce the chat interface. The researcher attended to this by creating a 1-minute tutorial with screenshots and information about the chat interface, and posted a link to the tutorial prominently on the main focus group webpage.

For the online focus groups, their trial runs (emulation) were followed by *behavioral coding* (Cannell et al., 1981; Fowler & Cannell, 1996) using which the researcher replayed the proceedings of the online focus groups trial runs to observe participant interactions and identify areas areas for improvement through better moderation of the OFGs. The researcher noticed that at several instances, he took more time than estimated to create transitions between key topics. This problem was resolved by drafting a few templates for transition comments in the moderator script. Additionally, in an instance of the synchronous OFG, when a participant shared a URL to a specific feature on her virtual community, it seemed to create a few minutes of distraction while other participants would have probably gone off to view the site themselves. Based on this observation, it was decided that posting of links during the synchronous OFG session was to be avoided.

These learnings from the trial runs and behavioral coding observations were successfully applied to the live runs of the online focus groups. In general, the modified administrative practices alleviated similar problems from surfacing during the live OFG sessions. Overall, the multi-stage process of pre-testing and trial runs proved to be effective in enabling revisions of the data collection instruments and offered practical guidelines for administration of the online focus groups and the open-ended questionnaire.

4.4 Sampling & Recruitment Mechanisms

As highlighted previously in this chapter, the qualitative empirical investigation phase made use of theoretical sampling guidelines aligned with the requirements of grounded theory methodology which constitutes the overarching qualitative research approach followed in this study. In theoretical sampling, the number of people interviewed or surveyed is not as important as the criteria used to select them (Strauss & Corbin, 1998; Wilmot, 2005). Toward this, based on the ongoing need for new data during the theory generation process, different sampling schemes were utilized throughout the course of the qualitative phase. This section highlights the main principles in theoretical sampling that were utilized to select an appropriate sampling scheme at various instances in the research project. All samples were drawn from one of 13 virtual communities that formed the sampling frame for the qualitative empirical phase of investigation. This sampling frame is described in the next section.

4.4.1 Sampling Frame for Qualitative Data Collection

The establishment of a *sampling frame* is generally recommended as an important first step in most empirical research projects. A *Sampling frame* for an empirical study is simply a list or a quasi list of elements from which a sample can be selected (Babbie, 2007; Bradburn & Sudman, 1988). The list typically represents those parts of the subject population that are accessible to the researcher to draw samples from (Babbie, 2007). A sampling frame must be representative of the population so that some findings may be extrapolated from the sample to the frame and ultimately to the population in form of generalizations (Babbie, 2007; Bradburn & Sudman, 1988). In grounded theory studies, researchers are directed to select a sampling frame to align with the scope and focus of their research. On the basis of the research questions, a researcher can select the organizations, sites, or groups to be analyzed (Strauss & Corbin, 1998).

In this study, following the recommendations of various researchers who have conducted empirical studies on virtual communities, a diverse cross section of online communities was used to draw samples of respondents (Andrews et al., 2001; Clemmensen, 2005; Preece, 2001d; Preece et al., 2004; Ridings & Gefen, 2004; Ridings et al., 2002b). Following the primary sampling technique recommended exploratory research, a *purposive sampling* procedure was used to select diverse virtual communities which varied in their age, membership size, and the nature of information exchange and social interaction activities undertaken by its members. Towards ensuring the latter criterion, the sampling frame was defined using the typology of virtual communities offered by Porter (2004). The researcher aimed to recruit respondents from *member-initiated* communities as well as *organizationally sponsored* ones. Furthermore, within these two broad categories of virtual communities, coverage of publicly accessible *social*, *professional*, and *commercial* virtual communities was sought. The use of purposive sampling techniques to initiate the qualitative data collection process is generally

recommended as good starting point for researchers following the grounded theory methodology (Pandit, 1996; Strauss & Corbin, 1998)[23].

Having defined the basis for a sampling frame, the researcher sought to compile a list of virtual communities that satisfied the criteria outlined above. As an aid to construct the sampling frame, the researcher consulted the Big Boards service (http://www.big-boards.com) to identify and short-list potential virtual community websites based on their short descriptions. Then, a manual perusal of the short-listed websites over a period of five days allowed the researcher to learn about the tools and features available on those websites, to observe the vibrancy of the community first-hand in terms of frequency of discussions, and to subjectively assess the suitability of the virtual communities for this research investigation in terms of the seriousness and quality of member interactions. To further assess the suitability of the virtual community sites that were short-listed, the Alexa Site Information service (http://www.alexa.com/siteinfo) was used to gauge the popularity of the virtual community in terms of overall site traffic, along with the Compete Site Analytics service (http://siteanalytics.compete.com) which was used to ascertain the vibrancy of the virtual community in terms of unique visitors to the site. Based on this process of establishing the final sampling frame, the researcher stopped after selecting 16 virtual communities. The administrators on these 16 virtual communities were contacted and information about the research project was shared with them through personal correspondence. Out of the 16 contacted sites, 10 gave permission to proceed with posting a request for participation on their sites, while four declined[24], and no response was received from two. VC researchers have strongly advised for the use of such an approach to obtain access to participants in virtual communities. A structured approach where access is negotiated first with gatekeepers before talking to potential participants helps alleviate privacy infringement concerns that some VC members or administrators might have (Stewart & Williams, 2005). Furthermore, researchers warn that although virtual communities offer "captive populations" for research studies, they should be not taken for granted, and their members should be approached for participation using proper channels (Stewart & Williams, 2005).

In addition to the ten communities that gave permission, the sampling frame was later extended to include two more virtual communities that had been recommended by other study participants. The researcher acted opportunistically to include the two communities since it was suggested that these communities had peculiar contextual characteristics that may be of relevance to the study[25].

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[23] As discussed in the upcoming section on the operationalization of theoretical sampling, purposive sampling is one of several sampling schemes that was used throughout the research phases.

[24] Administrators from two VCs simply declined the request without providing a reason; another declined because the site's administration considered the request as a form of solicitation ; and the last one declined citing the reason that the site's administration and sponsors conduct various polls and surveys with members from time to time to improve the VC offerings, and any additional requests for help with research may result in undue burden on the members of the VC.

[25] The researcher cannot associate attributions to the two communities explicitly due to the nature of confidentiality between the researcher, the study's informants, and the virtual communities that agreed to help with this study. In the

Table 4-1 below presents the complete list of virtual communities that comprised the sampling frame for the qualitative data collection phase along with various metrics that were used to screen them into the sampling frame. As shown by the last column titled *vibrancy indicators*, all virtual communities that were selected also satisfied the criteria for minimal traffic proposed by Nonnecke and Preece (2004a) who suggest at least 50 members in a virtual community and 4-5 people posting over a period of 90 days, as well as the more restrictive rules by Witmer et al. (1999) suggesting at least ten postings per day and 15 unique members posting over a period of three days.

As shown in table 4-1, through purposive sampling, the researcher attempted to have a broad basis for recruitment of informants for the study from various types of communities. Included in the list are virtual communities that clearly have an emphasis on different types of relationships including professional, interest-based, social, and commercial. Additionally, the selected virtual communities vary in their age, size of membership, and the types of groupspace platforms that are used for interaction among members.

Based on the sampling frame detailed herewith, the next section discusses the procedures used to ensure effective respondent recruitment for the online focus groups and open-ended questionnaires.

Table 4-1: Virtual Communities comprising the Qualitative Data Collection Sampling Frame

VC ID	VC URL	VC Description	Primary VC Groupspace(s)	Online Since[1]	Membership Base[1]	Site Traffic Rank[2]	Unique Monthly Visitors[3]	Vibrancy Indicators[4]
CG	codeguru.com	IT Professionals Community	Threaded Discussion Forum	1997	255,146	8,020	33,155	> 100 / > 10 / > 10
CC	canadiancontent.net	Society & Politics Community	Social Networking Platform	2006	8,385	NA	NA	45 / > 10 / > 10
CT	cartalkcanada.com	Automotive Enthusiasts Community	Threaded Discussion Forum, Site Blog	1999	12,364	55,825	29,372	> 50 / > 10 / > 10
EB	alt.marketplace. online.ebay	Auction Sellers Community	Newsgroup, Email List	1997	NA > 500	NA	NA	25 / > 10 / > 10

Table 4-1 continued below

information and consent statement, it was agreed that all attributions will be anonymized and reported in an aggregate form.

Table 4-1 (continued): Virtual Communities comprising the Qualitative Data Collection Sampling Frame

VC ID	VC URL	VC Description	Primary VC Groupspace(s)	Online Since[1]	Membership Base[1]	Site Traffic Rank[2]	Unique Monthly Visitors[3]	Vibrancy Indicators[4]
EN	eng-tips.com	Engineer Professionals Community	Threaded Discussion Forum	2000	NA > 5000	35,146	53,923	> 50 / > 10 / > 10
EP	epinions.com	Consumer Reviews Community	Threaded Discussion Forum	1999	NA > 5000	3,132	1,126,979	> 100 / > 10 / > 10
GS	gupshup.org	General / Social Community	Threaded Discussion Forum, Member Blogs	1997	66,378	24,165	26,185	> 100 / > 10 / > 10
HG	boards.hgtv.com	Home Improvement Community	Threaded Discussion Forum	2002	NA > 1000	4,189	17,822	> 100 / > 10 / > 10
MG	magictraders.com	Magic Merchandise Trade Community	Threaded Discussion Forum	2002	29,376	NA	7,234	> 50 / > 10 / > 10
MT	moneytec.com	Forex Traders Community	Threaded Discussion Forum	1998	NA > 5000	14,204	32,238	> 100 / > 10 / > 10
PT	perspectives.com	General / Social Community	Threaded Discussion Forum	1998	62,543	29,875	14,865	> 100 / > 10 / > 10
SS	skyscrapercity.com	Architecture & Cityscapes Enthusiasts Community	Threaded Discussion Forum	2003	185,356	3,674	197,232	> 100 / > 10 / > 10

[1] Year of launch, and site membership statistics obtained from virtual community website where available; Secondary statistics offered by Big-Boards (http://rankings.big-boards.com/) were consulted otherwise.

[2] Site traffic rank statistics obtained from Alexa.com Site Information (http://alexa.com/)

[3] Unique visitor statistics obtained from Compete.com Site Analytics Profiles (http://www.compete.com/)

[4] Vibrancy indicators were manually observed, and were utilized to comply with the minimal traffic volume criteria suggested by Witmer et al. (1999). Each virtual community was observed for three days to collect these metrics. The 3-tuple can be read as: posts per day / threads per day / unique members posting per day.

4.4.2 Recruitment & Participation Promotion Techniques

Since theoretical sampling allows a researcher to draw samples from the sampling frame based on requirements of the theory generation process, predetermined sample sizes and target response rates are not a significant concern in qualitative studies following the grounded theory methodology (Glaser, 1992; Strauss & Corbin, 1998). Despite this, several recommendations have been put forth by experienced qualitative researchers to aid in the recruitment of potential study participants, and to ensure better quality of participation. These recommendations largely depend on the scope of research study and the data collection methods being used by the researcher. In this study's case, the researcher followed several suggestions to improve participation levels in online focus groups, and to increase the response rates for questionnaires later in the research process. Several of these promotional techniques for improving recruitment, participation and response rate have already been highlighted in previous sections. This section provides a complete list for reference.

Firstly, by using online focus groups and online questionnaires, the qualitative empirical phase utilized data collection procedures that are compatible with the standards and routines for online activities of the potential informants in this study. It was expected that using internet mediated research mechanisms would provide a better overall participation rate than other traditional qualitative instruments such as personal interviews or face-to-face focus groups.

Secondly, modest monetary incentives were provided to the online focus group participants and questionnaire respondents in the form of a 1 in 10 chances to win a $25 gift certificate for an online vendor or website of the winner's choosing (some standard example sites as Amazon, eBay, Paypal were listed in the call for participation)[26]. Such monetary incentives align with suggestions in the extant literature on inviting online research participation from potential respondents (Cobanoglu & Cobanoglu, 2003; Simmons & Wilmot, 2004).

Third, the researcher also complied with the recommendation of ensuring a level of personal interaction with potential respondents from virtual communities to establish credibility for the research while also addressing any questions from potential respondents (Andrews et al., 2003; Wright, 2005). An interactive approach such as the one suggested by Andrews et al. (2003) and Wright (2005) is often associated with ethnographic studies and has been shown to be highly effective in surveys involving online community investigations (e.g., Nonnecke et al., 2006; e.g., Nonnecke et al., 2004a). In particular, once a call for participation was posted on a virtual community website, the researcher checked in multiple times during the day until the expiration of the announcement. This allowed the researcher to interact personally with

[26] Out of 68 total informants over OFGs and OEQs, 12 did not enter in the draw. However, seven winners were still selected and contacted for their gift certificates. All seven claimed their winnings: five participants opted to have a gift certificate mailed to them, while the other two opted to receive their winnings in the form of a paypal gift card emailed to them.

potential informants while enabling him to establish credibility for the research, and to create a level of trust with the members of the virtual community.

Lastly, in order to mitigate concerns of privacy intrusion and inconvenience, the researcher followed several recommendations made by Cho and LaRose (1999) who advise offering e-incentives as a trade-off for intrusion; using explicit disclosures; and using credible domains. In the context of this research, all of these recommendations were complied with. Specifically, as discussed above, the researcher offered a small incentive of a draw for a $25 gift certificate from a selection of online vendors; posted a summarized call for participation along with ethics approval information and the researcher's work contact information on the virtual community site; and used a custom URL (http://www.vcsurvey.org) for the data collection instruments.

Having outlined the sampling frame and informant recruitment procedures for qualitative data collection, the discussion in this chapter proceeds to provide details of specific sampling schemes that were used to operationalize the theoretical sampling approach in this study. Using these sampling schemes, the researcher was able to consider the dynamic requirements of the qualitative research process while drawing samples of participants from virtual communities comprising the sampling frame.

The next section describes the software used to carry out the analytical coding phases of open, axial, and selective coding.

4.5 Data Analysis Using CAQDAS Software

Originally developed to enhance the accessibility of qualitative data in research projects, today CAQDAS (Computer Assisted Qualitative Data Analysis) software applications have gained widespread acceptance in a qualitative researcher's toolkit (Bazeley, 2007; Bringer et al., 2006; Hutchison et al., 2009; Richards & Richards, 1998). Modern day CAQDAS applications provide many functions for data management; coding at levels of categories, properties, dimensions, and relations; memoing with links to different theory components; organizing codes into hierarchical structures; retrieving text for codes and patterns among codes; and diagramming conceptual models (Bazeley, 2007; Silver & Fielding, 2008). Despite the usefulness of many of these features in CAQDAS applications, some grounded theorists resist their use, claiming that it hinders and stultifies the process of grounded theory generation (Bringer et al., 2006; Glaser, 1998; Weitzman, 2000). However, it has also been observed that most of the criticisms of use of CAQDAS stem from its inappropriate or unexplained use, especially in misrepresenting quantitative content analysis quantitative such as term frequency counts as qualitative research (Bringer et al., 2004). Furthermore, problems in ensuring trustworthiness of research might arise if researchers select their theoretical perspectives and analysis methods based on capabilities of the CAQDAS applications as opposed to choosing pertinent methods that align with the scope

and type of their research studies (Bringer et al., 2004). To safeguard against such issues and alleviate concerns about suitability in the use of CAQDAS, researchers have repeatedly been advised to explicitly state their epistemological and theoretical assumptions, along with the rationale for methods of data collection and analysis (Bazeley, 2007; Bringer et al., 2004).

As such, in this study, the researcher has attempted to render a detailed description of the epistemological and theoretical basis underlying the choice of research paradigm and specific methodology, hopefully explicating the fact that the choice of specific analysis techniques and use of CAQDAS were premised on the paradigm, and not the converse.

Specifically, the qualitative analysis in this study was aided through the use of QSR NVivo (formerly NUD*IST)[27] which is one of the most commonly used CAQDAS applications in qualitative research. The researcher utilized various functions of the software application to streamline many mechanical aspects of data management such as storing, indexing, and retrieving records. Furthermore, use of NVivo facilitated the undertaking of fine grained coding in a line by line fashion, enabling the researcher to code concepts consistently and gradually at multiple levels of abstraction for theory development. While the software helped in organizational and programmatic aspects of managing qualitative data, by no means was the 'analysis' performed by the software in an automated style. For purposes of analysis, the researcher had to immerse himself in the interpretation, conceptualization, and theory development aspects of grounded theory methodology.

In general, as purported by various researchers, the purposeful use of the CAQDAS software in this study assisted in deeper and more detailed exploration of the qualitative data (Bazeley, 2007; Bringer et al., 2006). Specific features of the software utilized in this study are highlighted in the following sections.

4.5.1 Casebook

At the beginning of each round of analysis when data from focus group transcripts or questionnaire responses was imported into NVivo, the researcher spent some time in ensuring the specification of pertinent attributes for each case in those documents. Attributes such as demographic information for each participant was stored in a casebook which acted as a master list of all participants in the study. Toward this, each participant's assigned pseudonym acted as a reference for a new case node which was associated with the responses and contributions of that participant. Attributes were then specified at these case nodes. The purpose of this exercise was to provide a means for differentiating among concepts based on known characteristics of cases. For example, activity levels of participants (coded as a regular category in the node

[27] NUD*IST (Non-numerical Unstructured Data Indexing Searching & Theorizing) was the first of the two popular qualitative analysis software packages produced by QSR (Qualitative Solutions & Research) Pty Ltd. The subsequent NVivo package gets its name from the concept of "in vivo coding" (words which were used by interviewees) (Glaser, 1978; Strauss, 1987) as an appreciation of the grounded theory approach.

structure) in their virtual communities could be cross linked with the age, gender, education level, or employment status of a participant.

The attributes that were assigned to each case node included the information from the pre-interview demographic questionnaire, as well as other attributes that emerged during the course of analysis. For example, a specific field was created to store information about the primary location where a participant accesses the virtual community from – node coded as 'Access Environment'. Later in the project, there was some evidence to show that members who access the virtual community from home exhibit different behavioural patterns of participation from those who access the VC from work. Such comparisons using a contingency association between case attributes and other categories proved useful in the early stages of the project to derive early insights into context related factors that affect member participation in virtual communities.

4.5.2 Node Structure

NVivo facilitates the process of coding through the creation of *nodes*, where each node represents a concept identified from the qualitative data (Bringer et al., 2006). A node acts as a store for coded text that refers to the node's concept. In this study, during the open coding cycles of analysis, the researcher created a new node for each new concept that was identified from the qualitative data. Initially most new nodes were created as *free nodes* without an anchor point. Later in the project, once nodes began to multiply rather quickly, a more coherent structure representing nodes in a hierarchical tree like structure was formulated. Using this structure for nodes, the researcher regularly took up the task to place nodes in relevant areas of the tree to depict *categories*, *subcategories, properties*, and *dimensions*. Needless to say, the node structures evolved throughout the data analysis process, and each cycle of open coding provided the opportunity to rethink and restructure the node trees. It should be emphasized that the hierarchical model was only used as an organizational aid to analysis, helping the researcher visualize relationships among parent and child nodes, and as such, the tree structure did not imply a causal structure. It was only at the end of the project that a final tree structure was formalized to summarize all relevant concepts in the emergent theory.

4.5.3 Coding Stripes

The use of coding stripes greatly facilitated the axial coding process. Once the researcher began to reassemble data that were fractured during the open coding process, he needed to ascertain how existing codes related to one another. Toward this, the content coded at each node was viewed in the node browser to show coding stripes for fragments of text that were also coded at other nodes.

Figure 4-5 presents a screenshot of a node opened up in the node browser along with coding stripes in the right pane. In this case, the node pertaining to '*Perceived Satisfaction*' was opened for a systematic exploration to see what other codes co-occur with this code. In figure 4-8, the fragments of text shown in the node browser can also be seen to be coded at '*Information Quality*' or '*Website Usability*'. This shows that there is a relationship between these codes that co-occurred frequently in the data. Later in the analysis, it was determined that '*Information Quality*' and '*Website Usability*' are conditions that positively influence '*Perceived Satisfaction*'. In similar ways, the use of coding stripes helped the researcher examine links among various categories in the node tree, which subsequently lead to the development of an explanatory model of factors affecting member participation in virtual communities.

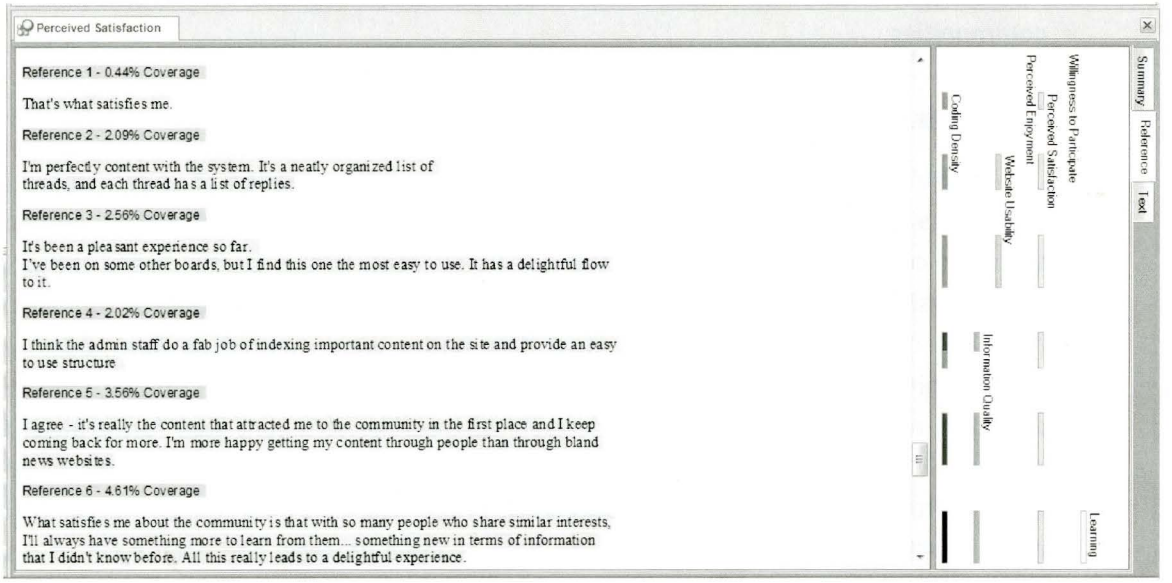


Figure 4-5: Node Browser Showing Coding stripes on the 'Perceived Satisfaction' Node

4.5.4 Relationship Nodes

NVivo's relationship nodes tool was the second main feature that was used extensively during the axial coding stages of qualitative analysis. Relationship nodes were used by the researcher to record connections of specific types between two nodes on a spectrum of simple associative relationships to two-way symmetrical relationships. Since the relationships themselves are stored as nodes inside the NVivo database, it was possible for the researcher to code data directly at these nodes. This helped the analysis process by consolidating information pertaining to a relationship in one single node. All instances of text alluding to a potential conceptual relationship were coded at the pertinent relationship node. Subsequently, opening the relationship node allowed the researcher to explore all relevant data in one place. Furthermore, by using coding stripes, the researcher was also able to identify other nodes that

contributed to the relationship, potentially in for role of mediators, moderators, consequences or conditions in the relationship. Consequently, this observation lent way to performing more constant comparisons among various nodes to ascertain the nature of their interrelationships.

4.5.5 Coding Queries

Different types of coding queries were used by the researcher throughout the data analysis process. In the early stages, the text search tool was employed to search previously coded focus group transcripts and questionnaire responses for instances of a newly created or a modified category. Using common synonyms for specific properties of a new or modified category, the researcher wanted to ensure that he had not missed any previous instances of that newly formulated concept. Using this technique, multiple coding passes were performed on each transcript – a practice that is not uncommon in GTM (Charmaz, 2000; Charmaz, 2006).

In later stages of the project, coding queries were used to compare the results of juxtaposing two categories with each other, and to see how the various combinations of their dimensions may be related to other categories in the node tree. As an example, three nodes for activity levels were created to represent the dimensions of *'active'*, *'intermittent'*, and *'passive'* participation activity levels, and two nodes for use patterns were created to represent the dimensions of *'ritualized'* and *'instrumental' use patterns* in virtual communities. By querying all instances of data that were coded at *'ritualized'* and *'active'*, and subsequently querying for *'ritualized'* and *'passive'*, the researcher was able to save the results of each query to make further comparisons. Opening up the results of each query, the researcher was able to see fragments of text that were coded at other nodes through a view of the coding stripes. This allowed comparisons to be made across the two dimensions of *activity levels* and *use patterns*. Multiple queries were repeated for each combination of dimensions of activity levels and use patterns to fully understand the behavioural differences among members of virtual communities. A 3x2 matrix model was then formulated to see the combinations of *active, intermittent, passive* activity levels vis-à-vis *ritualized* and *instrumental* use patterns.

4.5.6 Models

The use of NVivo also assisted in the creation of conceptual models during the course of the research project. Although these models were later ported to other specialized graphics and modeling tools for enhanced presentation[28], on an interim basis, most models were constructed using the modeler feature in NVivo.

[28] The researcher utilized MindJet MindManager (http://www.mindjet.com) and CMapTools (http://cmap.ihmc.us) to generate mind maps and concept maps. While mind maps were used to depict node tree structures that emerged from open and axial coding, concept maps were used to model the relationships among categories during the axial and selective coding stages. Several examples of mind maps are presented in the next chapter. Some concept maps depicting relationships among categories are available in *Appendix D.*

To create a new model, the researcher simply selected multiple nodes from the node tree and dragged them into the modeler. Nodes were then moved and positioned appropriately to develop abstract conceptual clusters of related nodes. Whenever there was a need to see how multiple nodes relate to one another, a node was simply double clicked within the modeler window to observe the content fragments coded at the node. Text fragments that were also coded at other nodes indicating a co-occurrence were then investigated further before connecting them together. This procedure helped the researcher oscillate between being close to the data for verification purposes, and being away from the data to work at higher levels of abstraction for the development of theory, a practice that has been recommended by various grounded theory researchers (Bringer et al., 2006; Glaser, 1978; Strauss & Corbin, 1998).

In deliberation various procedures associated with the grounded theory methodology, the researcher also paid special attention to recommended practices for ensuring quality and rigour of qualitative empirical research. These considerations and their adoption in this study are presented in the next section.

4.6 Qualitative Research Accuracy

Corroborating and validating results as part of the continuous and iterative cycle between data collection and analysis is an essential facet of qualitative research (Miles & Huberman, 1994). Although there is no unanimous perspective and consensus among qualitative researchers as to what measures constitute a good basis for reporting research accuracy (Creswell, 1994, p. 157), in recent years, general agreement seems to have been reached that quality concepts developed for quantitative research such as validity, reliability, and replicability cannot and ought not to be applied to qualitative research (Spencer et al., 2003).

In order to ensure rigor and the effective use of qualitative research methods, this study adopts the *trustworthiness criteria* for judging the soundness of qualitative research as proposed by Lincoln & Guba (1985). As an alternative to the more traditional quantitatively-oriented criteria, the standards purported by Lincoln & Guba better reflect the underlying assumptions involved in most qualitative research studies. Providing parallels to the criteria used in quantitative research, the four proposed criteria by Lincoln & Guba (1985) are: i) *credibility* (analogous to internal validity in quantitative research); ii) *transferability* (analogous to external validity); iii) *dependability* (similar to reliability); and iv) *confirmability* (similar to objectivity).

In order to satisfy these four criteria, a list of procedures to be followed while collecting and analyzing qualitative data has also been recommended by the originators of the four criteria. Some of these procedures have subsequently been refined by other qualitative researchers. For instance, Miles & Huberman (1994) provide a comprehensive list of strategies used to promote qualitative research validity. Inter alia, some of the strategies which have also been suggested by other researchers (e.g., Creswell, 1994; Tashakkori & Teddlie, 1998) include

receiving feedback from informants (also referred to as performing call-backs or member checks); conducting peer debriefings; maintaining a research audit trail; and triangulating via multiple data sources.

This study adhered to several of the strategies recommended by Miles & Huberman (1994) with the objective of satisfying the research trustworthiness criteria outlined by Lincoln & Guba (1985). Additionally, throughout the various stages of data collection and analysis, several best practices were followed to ensure credibility and dependability of data used in the study. For example, through prolonged engagement in various virtual communities during the recruitment process, the researcher was able to build a rapport with potential informants, as a result of which he was able to recruit informants with varying levels and patterns of participation in their respective virtual communities. Empirical practices that contribute to a richer variation of the phenomena under study have been purported to contribute significantly towards establishing research credibility in qualitative research (Graneheim & Lundman, 2004; Im & Chee, 2006). Furthermore, by importing data directly into NVivo while maintaining typographical variations such as different font faces used by the study's participants, and phatic expressions such as smileys and emoticons, the researcher ensured rigor in the transcription process, hence making the analysis process more dependable (Im & Chee, 2006).

Table 4-2 below outlines the specific strategies that were undertaken in this study to improve or substantiate the accuracy of the research process. Each strategy and its pertinent procedures are also mapped to the *trustworthiness* criteria they apply to. Overall, through the use of the procedures highlighted in table 4-2, the researcher attempted to engage in higher quality of empirical qualitative research process toward the development of a substantial theory of member participation in virtual communities.

Table 4-2: Trustworthiness Criteria & Adopted Strategies for Ensuring Research Accuracy

Criteria for Trustworthiness in Qualitative Research *(adopted from Lincoln & Guba, 1985)*	**Strategies for Ensuring Qualitative Research Validity** *(adapted from Miles & Huberman, 1994)*	**Procedures Followed in this Research Study**
Credibility: Criteria used to establish that the results of qualitative research are believable from the perspective of the participants in the research, or other relevant stakeholders.	**Participant Feedback:** Procedure involving the discussion of findings, interpretations, and conclusions with the research informants..	• *Participant call-backs* were performed near the end of the qualitative phase of investigation. Seven participants replied back with comments summarizing their views on the emergent theory of member participation in virtual communities. • *Expert feedback* was requested from three professionals who were employed in a virtual community related line of work. One expert replied back with detailed comments, further questions, and follow-up responses. • *See Appendix E* for transcript of responses and comments from the call-back informants and the expert.
	Statement Validity: Procedure to accurately transcribe informant responses to reflect facts, truths, and contradictions.	• All online focus group transcripts and questionnaire responses were downloaded and imported into the NVivo database without any modifications. Analytical procedures were performed on a copy of the original files. • Insights and ideas about the data collection and analysis procedures were continuously recorded in memos to maintain the immediacy of the researcher's thought process.
Transferability: Criteria referring to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings.	**Data Triangulation:** Procedures promoting the use of multiple data sources to help understand the phenomenon.	• The qualitative interview data was obtained through online focus groups and questionnaires administered across a multitude of virtual communities to help ensure that final results are generalizable to a variety of contexts.

Table 4-2 continued below

Table 4-2: Trustworthiness Criteria & Adopted Strategies for Ensuring Research Accuracy

Criteria for Trustworthiness in Qualitative Research *(adapted from Lincoln & Guba, 1985)*	Strategies for Ensuring Qualitative Research Validity (adapted from Miles & Huberman, 1994)	Procedures Followed in this Research Study
Dependability: Criteria indicating the replicability or repeatability of results.	**Methods Triangulation:** Procedures involving multiple research methods to study the phenomenon.	• This research is based on sequential exploratory research design involving the use of qualitative and quantitative research methodologies. The quantitative phase was used to further substantiate the research findings in the context of a parallel sampling frame of virtual communities.
	Investigator Triangulation: Procedures that engage multiple researchers in collecting, analyzing, and interpreting data.	• In the later cycles of open coding, two independent coders performed the coding at same slices of data pertaining to different conceptual categories. Agreement-coefficient (Cohen's Kappa) between the researcher and these independent coders are reported in this study *(See Appendix F)*
Confirmability: Criteria indicating the degree to which the results are bias free and can be confirmed by others who may not have the same perspective as the researcher.	**Peer Debriefing:** Procedure that engages a disinterested peer as a devil's advocate in the discussion of results.	• At the end of the qualitative investigation phase, the researcher discussed the findings of his research with another arms-length Ph.D. colleague who specializes in quantitative research methodologies. The discussion centered on the pragmatic use of different procedures to produce good theory in a reliable fashion. Furthermore, the colleague commented on the prospects of various constructs and relationships that the researcher was planning to validate in the quantitative investigation phase.
	Audit Trail: Procedures that examine the data collection and analysis to judge the potential for bias or distortion.	• The researcher maintained different date stamped versions of CAQDAS files to demonstrate the advancement of analysis process over the duration of the project. • The researcher's Ph.D. supervisor was engaged intermittently during the various phases of research to ensure the quality of the study's methods and procedures. In addition to helping in the trial and pre-test of qualitative data collection instruments, in multiple meetings, the supervisor provided feedback on procedures, interim research findings, and the final node structure emerging from the qualitative analysis.

Chapter 5: Qualitative Analysis & Findings

This chapter details the findings derived from the analysis of qualitative data gathered from online focus group (OFG) sessions and the online open-ended questionnaires (OEQs). The chapter begins with a synopsis of the theoretical sample of informants. Next, the emergent theory of member participation in virtual communities is elaborated through a discussion of the principal analytical categories from the open coding stages, and the salient patterns and relationships among various constructs that emerged during the axial coding phases of the analysis. The emergent theory section concludes with a discussion of the member engagement process which constitutes the central phenomenon that emerged during the selective coding phases of the analysis. The final section provides an abridged theoretical model that forms the basis for this study's subsequent phase of quantitative empirical research.

5.1 Data Sources, Informants & Theoretical Sampling Criteria

This section provides an overview of the sources of data and the criteria that drove the theoretical sampling of informants for the online focus groups and open-ended questionnaires. A breakdown of virtual communities and informant demographics is presented, along with a summary of the criteria that were used to recruit specific classes of participants for the study. The process of theoretical sampling was operationalized using techniques such as purposive and stratified sampling to ensure a diverse sample of participants from different types of virtual communities, and critical case sampling in the later stages of data collection to recruit informants with specific membership and participation profiles.

To aid the data collection and analysis procedures, a categorization scheme of structural codes was used by the researcher to organize cases and identify patterns in the data based on various case attributes. *Figure 5-1* below highlights the structural codes that were used during the collection and analysis of qualitative data. As shown, various attributes of data sources, interviews, and informants were recorded and compartmentalized into facesheet codes and base codes. The facesheet codes represented information that was either specified by the researcher or self-reported by an informant before participating in a focus group session or before completing a questionnaire, while base codes pertained to information that was itemized by the researcher during the course of the analysis. During the course of qualitative analysis, the enumerated case attributes were used in the formulation of specific queries to help identify different patterns of member participation in virtual communities.

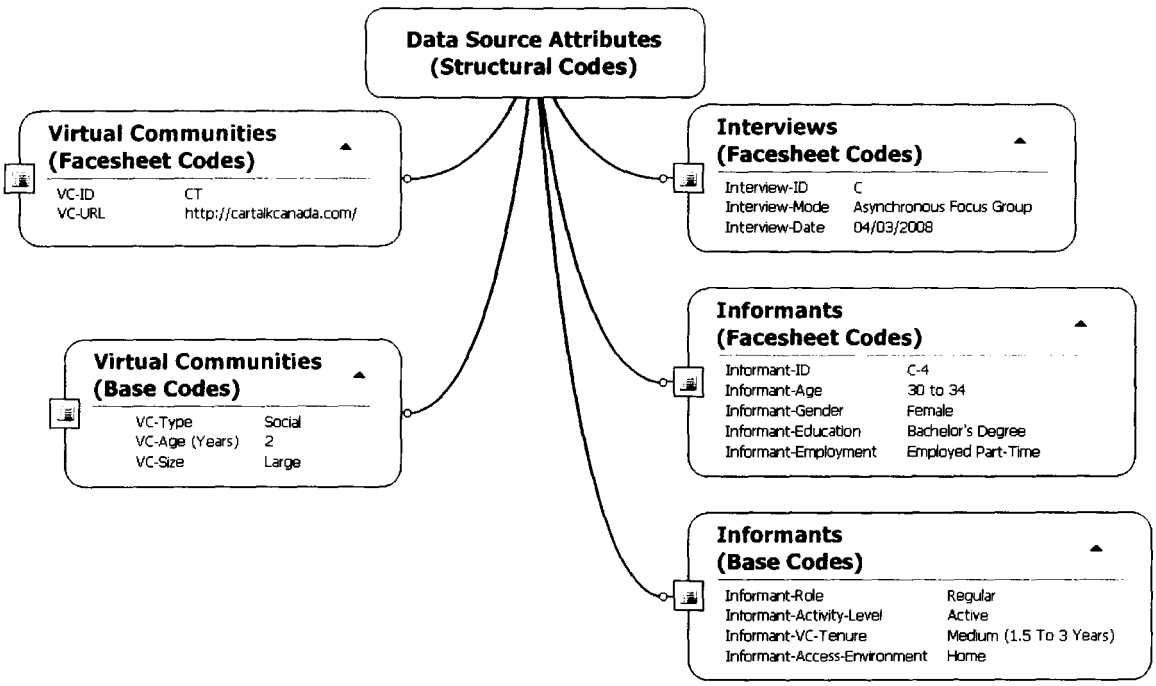


Figure 5-1: Summary of Qualitative Data Source Attributes

5.1.1 Data Sources: Stratified Purposive Samples across Virtual Communities

A combination of stratified and purposive sampling techniques was used at the level of virtual communities to draw diverse and useful sets of participants for OFG sessions and respondents for online OEQs. While a stratified sampling scheme helped recruit informants from different social, professional, and commercial virtual communities, a purposive sampling scheme was used to ensure a homogenous sample of participants for each OFG session[29].

Overall, 68 participants were recruited from 12 different virtual communities. *Table 5-1* provides an overview of the proportions of informants drawn from these VCs. As seen in the table, there was no single virtual community that significantly overshadowed others. Furthermore, it is believed that there was adequate representation of different types of VCs that needed to be investigated based on the requirements established through the constant comparative procedures in grounded theory methodology[30].

[29] As highlighted in the previous chapter, the need to recruit participants for a specific online focus group session from similar virtual communities was recognized after conducting trial runs in the pilot phase of the qualitative investigation.

[30] The virtual communities that were approached in this study were not only different in terms of their realms, but also by virtue of their age, size and technology platforms. For more information, see chapter 4, section 4.4.1 and table 4-1.

Table 5-1: Proportions of Informants from Different VCs

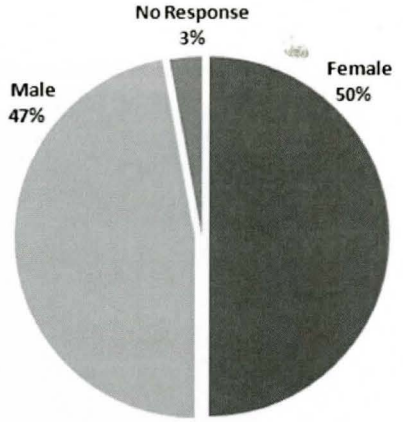
VC ID	VC URL	VC Description	Number of Informants	%
CG	codeguru.com	IT Professionals VC	7	10%
CC	canadiancontent.net	Society & Politics VC	4	6%
CT	cartalkcanada.com	Automotive Enthusiasts VC	6	9%
EB	alt.marketplace.online.ebay	Auction Sellers VC	5	7%
EN	eng-tips.com	Engineer Professionals VC	5	7%
EP	epinions.com	Consumer Reviews VC	8	12%
GS	gupshup.org	General / Social VC	8	12%
HG	boards.hgtv.com	Home Improvement VC	4	6%
MG	magictraders.com	Magic Merchandise Trade VC	6	9%
MT	moneytec.com	Forex Traders VC	4	6%
PT	perspectives.com	General / Social VC	6	9%
SS	skyscrapercity.com	Cityscapes Enthusiasts VC	5	7%
		Total:	**68**	**100%**

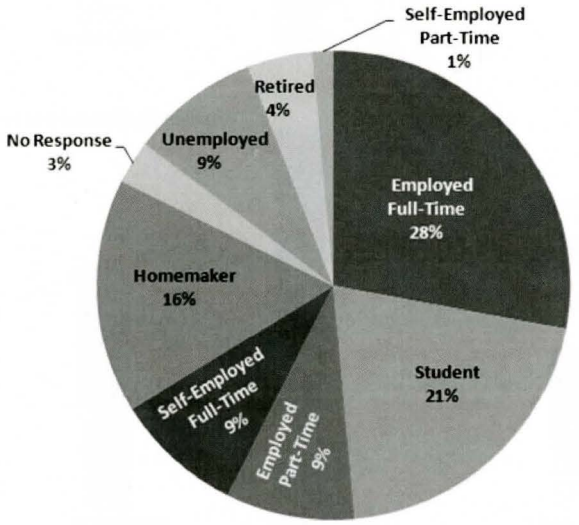
5.1.2 Informant Demographics: Convenience Samples within Virtual Communities

During the course of qualitative investigation, once the specific requirements for sampling distinctive types of informants from specific types of virtual communities were formulated, a convenience sampling scheme was used to recruit self-selected participants from VCs. In the early phases of investigation, the researcher requested participation on VC sites from the members at large, while later in the project, members with specific participation characteristics were invited to participate in the study.

Despite the use of a non-random sampling technique such as convenience sampling to recruit study informants, the demographic traits of the 68 informants demonstrated a diverse and varied sample overall. An aggregate summary of the demographic traits of the study's informants are presented in *Figure 5-2* below. As shown, about 80% of the informants were below the age of 50, while 70% were below the age of 35. Furthermore, 78% of informants had at least some college education. These demographic traits of informants indicating a relatively young age group and above average education profiles match the findings from other recent Internet research studies (cf., PEW Research Center, 2006), especially those investigating VCs (cf., Blanchard, 2007c; cf., Porter & Donthu, 2008). The matching demographics are indicative of the external validity of the sample of informants recruited for this study.

Age	Frequency	%
Below 18	6	9%
18 to 24	11	16%
25 to 29	14	21%
30 to 34	17	25%
35 to 39	3	4%
40 to 44	3	4%
45 to 49	1	1%
50 to 54	2	3%
55 to 59	2	3%
60 to 64	1	1%
65 and above	2	3%
No Response	6	9%
Total	**68**	**100%**





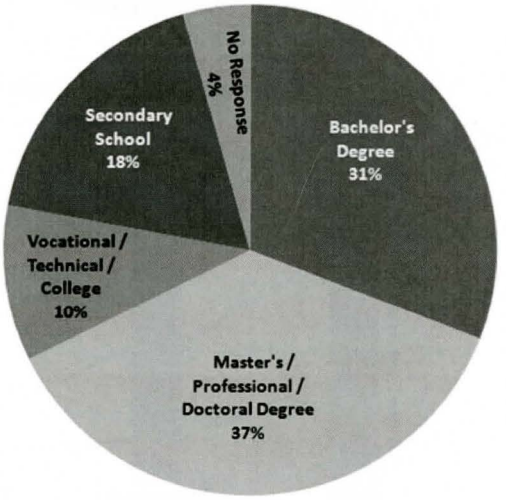


Figure 5-2: Aggregate Demographics of Informants

5.1.3 Informant Profiles: Critical Case Purposive Samples within Virtual Communities

In the mid to late stages of the research investigation, theoretical sampling was enhanced further through the application of *relational and variational sampling* principles. In grounded theory investigations, these principles can aid in the refinement of properties and dimensions of various conceptual categories and their interrelationships (Goede & de Villiers, 2003; Pandit, 1996; Strauss & Corbin, 1998). Toward this, the use of critical case samples allowed the researcher to interview VC members with specific topographical characteristics such as their tenure, activity levels, and roles in their respective VCs. A summary of specific types of informants recruited in this study is presented in *Figure 5-3* below. As illustrated, the qualitative investigation in this study drew upon samples of informants who not only belonged to different types of VCs, but also those who exhibited distinctive participation characteristics. A description of these characteristics is provided in subsequent sections in this chapter.

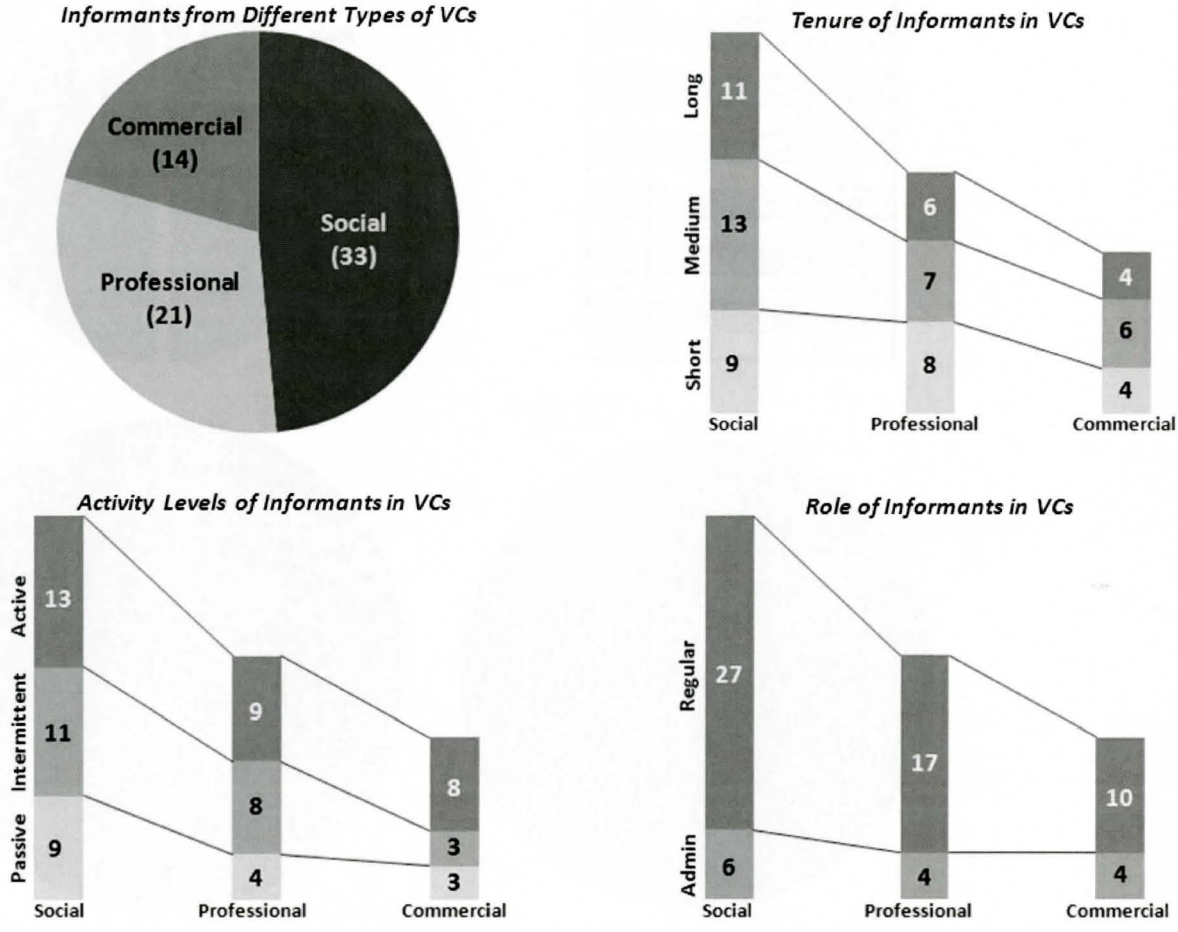


Figure 5-3: Overview of Informant Participation Profiles

5.2 Emergent Theory of Member Participation in Virtual Communities

This section aims to provide a coherent account of the findings from the qualitative investigation, and to describe the themes, concepts, and relationships that form the basis for a grounded theory of member participation in virtual communities. Toward this, the various subsections particularize the elements in the emergent theory in the following format:

iii) conceptual categories that emerged over the multiple iterations of the open coding procedures are explored;

iv) patterns among various categories that were identified during the axial coding phases are highlighted; and

v) the central phenomenon formalized during the selective coding stages to integrate various theoretical components is explicated.

Figure 5-4 below shows a high-level mind map comprising the various themes and conceptual categories that emerged during the analysis of qualitative data from OFG session transcripts and OEQ responses. The primary nodes represent major themes to which other nodes depicting theoretical constructs are attached. The order of nodes does not imply any type of sequence among themes and constructs, and it should be noted that some nodes may overlap by virtue of patterns and associations that exist among theoretical constructs.

In devising a hierarchical structure of emergent concepts, the researcher aimed to categorize and dimensionalize constructs in a most general way according to viewpoints of informants derived from the qualitative data. At no point in time were the constructs forced into a predetermined configuration. Category labels were refined over the course of analysis to align with emerging concepts, as well as through a theory-matching process (Dubois & Gadde, 2002; cf., Urquhart et al., 2009). The theory matching process helped map the researcher's empirical observations to relevant pre-existing theories in the extant literature, and provided a useful vocabulary to articulate the concepts and relationships in the emergent theory.

Together, the themes and concepts depicted in *Figure 5-4* form the basis for a grounded theory of member participation in VCs. The socio-technical constructs depicted under various themes constitute the cognitive, affective, evaluative, and conative factors that characterize member participation in VCs.

As an aid to the organization and presentation of qualitative findings, the researcher adopted a perspective aligned with *functional behavior analysis* (Skinner, 1966) whereby linkages between theoretical constructs can be explained in terms of *antecedents*, *behaviors*, and *consequences* (ABC analysis). Functional behavior analysis was specifically chosen to scaffold the qualitative findings in this study because the technique facilitates a distinction between *topographical* and *functional* aspects of behavior, i.e. what the behavior appears to be on the surface in terms of tasks and activities being performed, versus the actual function or purpose being served by those tasks and activities (Nijhof & Rietdijk, 1999). Furthermore, the function of a behavior can be analyzed in relation to underlying values, contexts, and conditions that drive the behavior (Andreoli & Lefkowitz, 2009).

The next sections discuss the qualitative findings from the principal analytical categories by following the suggested functional behavior analysis approach, i.e. by defining the behavior in concrete terms, describing the antecedents and consequences of the behavior, and highlighting patterns that link these various factors together. Toward this, the theme of *member participation behavior* is discussed prior to other themes and categories that pertain to various factors that impact and shape the behavior. Various contextual factors such as *member*, *community*, and *technology characteristics*; and conditional factors comprising *technological determinants* and *sociological antecedents are* discussed next. This is followed by a discussion of the consequential stimuli that promote member participation – labeled as *participation value effects* in *Figure 5-4*. Finally, the central phenomenon of the *member engagement process* that

integrates all of the above components into a grounded theory is explained. Following this sequence, it is expected that the reader will be able to better appreciate the explanatory power of the categories that characterize the member participation process in virtual communities.

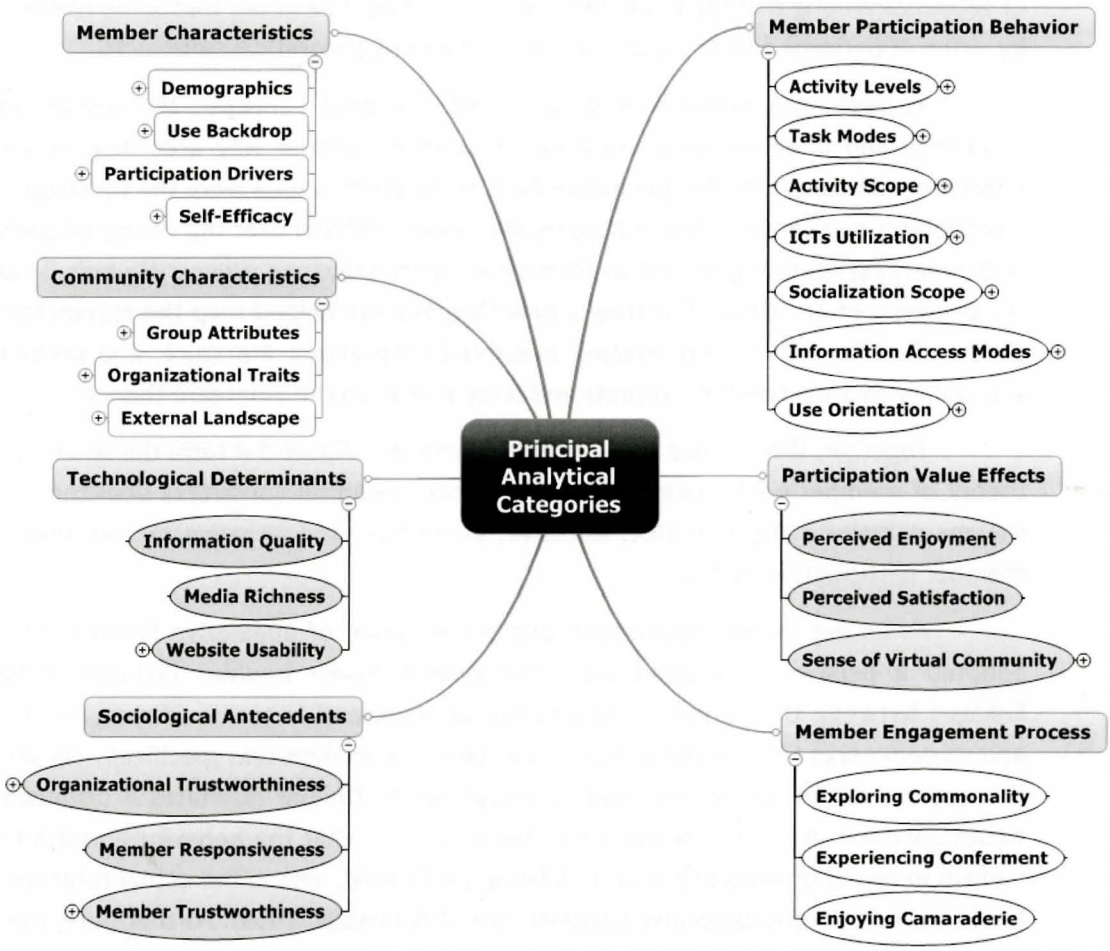


Figure 5-4: High-Level Mind Map of Principal Analytical Categories in the Emergent Theory[31]

5.2.1 Member Participation Behavior

Some of the first categories to emerge from the open coding phases during qualitative analysis comprised various topographical elements characterizing the participation behavior of study informants in their respective virtual communities. Informants participating in focus group sessions and responding to open-ended questionnaires highlighted their participation in VCs in terms of activity levels, modes of participation, scope of various activities, and participation

[31] Only the top level for each theme is shown in Figure 5-4. An interactive flash based version of the complete mind map is available available online on the e-Companion Website for this dissertation.. In *figure 5-4*, the shaded categories pertain to either factors that were included in the conceptual framework for this study (see *Chapter 3*) or additional socio-technical factors that emerged as significant determinants of member participation in VCs. These factors were later included in the *abridged theoretical model* that was tested in the quantitative investigation phase of the study.

orientation towards the virtual community. The specific categories that were designated to capture these aspects of member participation behavior are shown in the conceptual tree node structure depicted in *Figure 5-5* below, and are discussed in the following subsections.

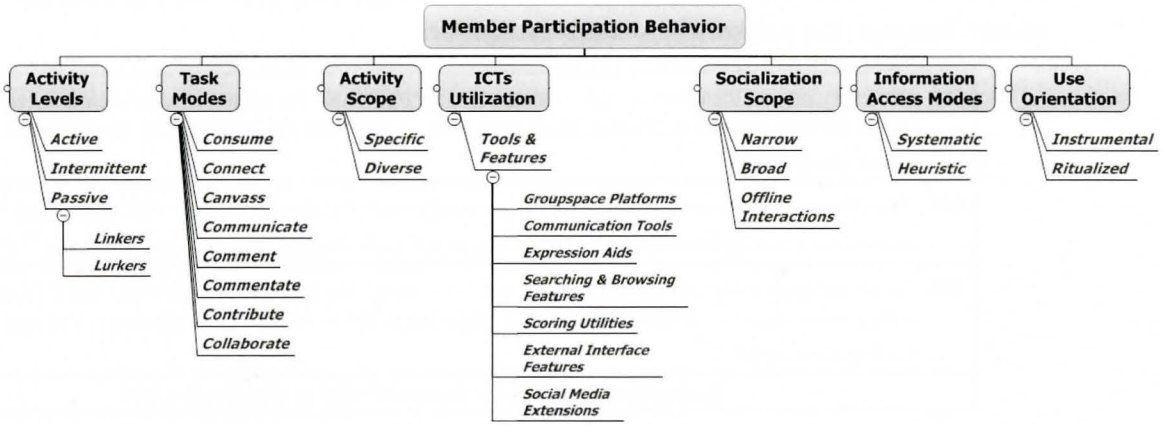


Figure 5-5: Tree Node Structure for Member Participation Behavior

5.2.1.1 Activity Levels

Activity levels highlighting the extent of use and frequency of interactions constitute one of the primary topographical depictions of member participation in virtual communities. In the focus group sessions and online questionnaires administered to study informants, most informants referred to the intensity of participation in their respective virtual communities by highlighting the frequency of their visits and the amount of time they spend on the VC site on a regular basis. Based on these parameters, many informants described the level of their participation as *active* or *passive*. Some comments coded at these nodes are as follows:

C-6	"I consider myself to be fairly active. I login multiple times during the week – from work, from home, and occasionally also check out the site from my handheld. I respond to other's questions, sometimes asking own questions. Sometimes, I even think I spend way too much time here!!"
F-4	"I'd say I'm an active user. I visit almost daily and spend anywhere between 45 minutes to an hour overall on any given day. In a typical visit, I would comment in multiple forums and threads, and communicate with other members through chat or messaging."
B-6	"I'm what you'd call a lurker. I just visit and read what others have to say. Sometimes I login, but there's really no need since I don't post."
Q-9	"I'm on the fringe… I mostly read and only post about once every couple of months. I really don't feel the need to post, or may be I'm just not sure about whether I have something useful to say."
Coding Query: Search for Content Coded at <Activity Levels/Active> OR < Activity Levels/Passive>	

Interestingly, among the informants who described themselves as passive members, some remarked that they were more peripheral than others since they only keep in touch with the community through external updates such as those through email, content feeds, or other push messages. This observation lead to the conceptual fracturing of the category for passive

behavior into two sub-categories, namely, *lurkers* and *linkers*, the latter being more peripheral style of participation. Whereas the quotations shared above characterize *passive lurking* behavior, the following accounts from informants regarding their *linking* behavior can help discern between the two conceptual sub-categories:

A-3	"I mostly rely on the email updates and newsletters I get from the admin. If something is interesting, I might visit the site and read more. Most of the time, I only read the highlights in the email, and I only rarely post in the forums."
G-7	"I'm a verrrry passive member. I don't even need to visit the site most of the time. RSS feeds enable me to passively receive updates from the site - I can then decide whether to read more on the site." (*sic*)
H-2	"I am a marginal user, I visit the website once in a while, but read the digest emails that I've subscribed to a little more regularly. Interesting material might tempt me to visit the site, otherwise, I'm satisfied with just getting these updates."
Coding Query: Search for Content Coded at <Passive/Linker>	

In addition to the active or passive activity levels, there were a number of informants who described their participation as *intermittent* or *"irregular"*, and they sketched a more fine-grained portrayal of their participation patterns. The comments below are representative of the nature of intermittent activity levels:

C-2	"I visit off an on. I like spending time here, but I can be off for multiple weeks, even months, and then trickle back in to catch up with the community and communicate with people I know."
Researcher	"What do you mean when you say you're somewhere in between?"
D-3	"I used to be an active user. I would make at least one post/response a day on average. However I take several months off at a time from the forum. Now I am more of a passive user where I post once every few days or weeks but I read it more often than I post."
H-5	"I participtate semi regularly, IE, I read the forums daily, and post when I feel I have something to contribute or to rant about a specific event." (*sic*)
Coding Query: Search for Content Coded at <Intermittent>	

As a foray into the topographical characterization of member participation, the activity levels of informants were referenced at various instances during the qualitative analysis. As an aid to querying these activity levels, a new base code reflecting this information was formulated for the casebook. Where activity level information was available, the case nodes for informants were coded with an attribute called "Informant-Activity-Level" with text values of "Active", "Intermittent", or "Passive". Consequently, patterns of member participation were identified by querying these values from the casebook.

5.2.1.2 Task Modes

In addition to talking about their activity levels, many informants also highlighted the types of tasks they commonly undertake in their virtual communities. These task modes reported by informants were aligned with their activity levels – active members reported more

hands-on tasks such as *commenting*, *commentating*, *contributing*, and *collaborating*, while intermittent and passive members alluded to tasks such as *consuming*, *connecting*, *canvassing*, and *communicating*. *Table 5-2* provides brief descriptions.

Table 5-2: Description & Informant Comments on Task Modes

Task Modes	Brief Description	Sample Comments from Informants
Consume	Tasks related to browsing the VC site and reading content.	B-6 "I only visit to read what others have to say. I typically browse, but sometimes use the search facility to find the content I'm looking for."
Connect	Activities oriented to establish contacts, or keep in touch with other members.	A-4 "I use the site to keep in touch with people I know. From time to time, I'd chat to them, but it's only mostly to check in and see what's going on with them. "
Canvass	Actions geared to soliciting information or requesting help from other VC members.	C-4 "Mainly to ask questions or ask for advice or suggestions from others who can relate to my problems."
Communicate	Tasks related to interpersonal conversation and restricted dialog among close members.	D-2 "I come here every couple of weeks to chat with people I know. I might read their blog posts and post my replies."
Comment	Tasks oriented to cursory discussion of topics.	D-7 "Generally, to post brief comments on topics in different forums, and rate others topics."
Commentate	Activities depicting a deeper and critical discussion of topics.	Q-4 "I also have my own particular interests (environmental regulation; global warming) that I don't feel the mainstream media acknowledges much. Therefore, I can start a thread on the website and use it to inform and solicit opinions for further discussion."
Contribute	Time-consuming individually driven activities geared towards adding value to the community.	Q-7 "I try to give back to the community by posting reviews of products I've used. Hopefully, others can make decisions in light of my experiences."
Collaborate	Time-consuming group based activities geared towards adding value to the community.	E-3 "On special occasions, the administration might initiate a project for the community to work together on, like making a video or a collage. I try to help out and get involved with these projects as much as I can."

It was discernable from the narrative accounts of informants that *value-added* task modes such as *commentating*, *contributing*, and *collaborating* typically correspond with higher activity levels. To substantiate this finding, a matrix query was formulated between the various task modes and the three dimensional attributes of activity levels that (designated as base codes in the case book). The numbers of relevant references in qualitative text that were coded at both dimensions are presented in the results of the matrix query shown in *Figure 5-6* below. Furthermore, the percentages in the second matrix were calculated based on number of cases in the codebook that were coded at the various activity levels. As seen in the second matrix, there were relatively more number of references pertaining to activity modes of *commentating*, *contributing*, and *collaborating* for cases designated as *active* members. For example, whereas 37% of the cases designated as active referred to collaborating as a pertinent activity mode in

their day to day online participation, only 6% of the informants who reported being passive members referred to collaborating as a relevant activity.

Activity Modes		Activity Levels		
		A	B	C
		Passive	Intermittent	Active
1	Consume	13	16	22
2	Connect	11	18	19
3	Canvass	11	19	14
4	Communicate	8	14	17
5	Comment	4	11	16
6	Commentate	3	5	17
7	Contribute	1	5	13
8	Collaborate	1	4	11

Activity Modes		Activity Levels		
		A	B	C
		Passive	Intermittent	Active
1	Consume	81%	73%	73%
2	Connect	69%	82%	63%
3	Canvass	69%	86%	47%
4	Communicate	50%	64%	57%
5	Comment	25%	50%	53%
6	Commentate	19%	23%	57%
7	Contribute	6%	23%	43%
8	Collaborate	6%	18%	37%

Matrix Coding Query:
with rows: <tree/Activity Modes/*>
with columns: <attributes/Informant-Activity-Level/*>
Search for content of rows AND content of columns

Figure 5-6: Matrix Coding Query Results for Activity Modes versus Activity Levels

5.2.1.3 Activity Scope

To probe further into the nature of member participation process, informants were asked to talk about their typical visits to the virtual community sites and the kind of activities they would undertake. In characterizing these details, some informants spoke about the broad or narrow range of activities they engage in during their visits. The experiences narrated indicated that the scope of activities could be dimensionalized as either *specific* or *diverse*.

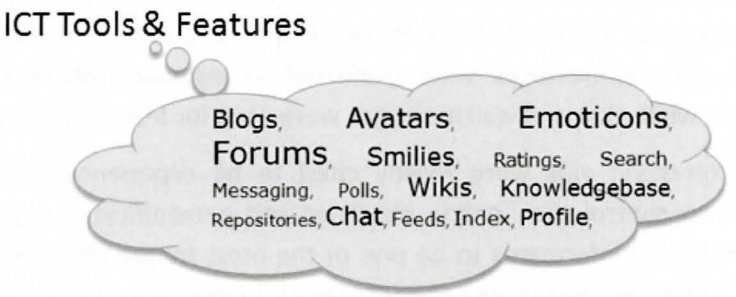
Informants who reported *specific* activity scopes noted that they only participated in limited areas of the virtual community site, often specific forums or member blogs. On the other hand, informants who described their activity scopes as *diverse* spoke of their visits to multiple forums or member blogs on a routine basis. The following accounts from informants illustrate:

D-6	"I visit the message board to browse through the areas that are directly related to my line of work - networking/hardware/software"
H-3	"I only post in Information Technology and Science & Technology forums. The other forums don't interest me as much."
Researcher	"What types of broad activities?"
A-1	"Visitng a handful of forums that interest me or amuse me + checking out new product reviews + reading user blogs. On any given day, I might do one or more of these things." (*sic*)
G-2	"My interests span the range. I visit almost all the forums depending on my mood."
Coding Query: Search for Content Coded at <Activity Scope/Specific> OR <Activity Scope/Diverse>	

To gain further insights into member participation behavior, the topographical aspects needed to be complemented further through information regarding the use of technology, nature of social interactions, and information exchange patterns. These are discussed next.

5.2.1.4 ICTs Utilization

With respect to patterns in member participation related to the use of ICTs in virtual communities, the informants were asked to comment on the range of *tools and features* they utilized in their day to day activities. In the early stages of open coding, each reported tool or feature reported in the focus group transcripts or questionnaire responses was coded on a word-by-word basis into its own node as well as a master node labeled as *"tools & features"*. *Figure 5-7* below depicts the most commonly reported tools and features in informant narratives in the form of a tag cloud derived from a word frequency query on the "tools & features" node. As shown in Figure 5-7, tools and features such as forums, blogs, avatars, chat, and emoticons were some of the most frequent reported ones in the narratives.



Note: Tags (keywords) are based on Word Frequency Queries for the "tools & features" category.

Figure 5-7: Tag Cloud for ICT Tools & Features

Upon further reflection in the axial coding stages, the tools were classified into various parent categories and the codes from the child nodes were copied into the parent nodes. This resulted in a node tree structure with parent categories designated to represent the function of tools and features, and the sub-categories coding the use of each tool and feature. *Table 5-3* below lists these categories and subcategories along with a brief description of the parent category. The table is organized according to the extent of use of ICTs reported by informants, with categories of tools most commonly referenced by them shown at the top of the table. Furthermore, in the examples provided within each category, the specific tools and features mentioned the most in informant narratives are listed at the top of the list.

In terms of the reasons provided by informants on the use of some specific tools over others, many of them cited their preferences and needs for certain types of tools. Especially, within the category of *groupspace platforms*, informants differentiated between the various choices based on their nature of their participation in virtual communities. Some reflective statements from a chain of focus group conversation are as follows:

E-1	"Blogs are good to express opinions, but they do not allow focused discussions like in the forums. Hence, I use forums more than blogs."
E-3	"I agree [*with E-1*]... I only use blogs to write about what matters to me at a particular instance. Forums on the other hand allow me to engage in deeper discussions. I also contribute regularly to the Knowledgebase and that is another giant in itself."
Researcher	"Can you explain your use of the knowledgebase?"
E-3	"I Well I mean KB are even more one-way than blogs. Typically only a few people write articles and contribute, and others only read often without providing any input or feedback." (*sic*)
Coding Query: Search for Content Coded at <Groupspace Platforms>	

Informants also commented on the use of *communication tools* as an essential element in their day to day online participation. Once again, the choice of specific communication tools was reasoned by virtue of the purpose of tasks and nature of communication messages. For example, private messages were preferred in instances where privacy and urgency were important, while chat and wall messages were used for transient needs for daily conversations.

Expression aids were mostly cited to be experience enhancing tools that allowed members to control their online identities and personifications. Emoticons (or smilies) were widely stated by informants to be one of the most frequently used features on their VC sites. Avatars, signatures and profile pages were also cited to be fairly widely used. On the opposite end of the spectrum, while only a few informants substantiated the use of *personalization features*, many noted that their virtual communities did not offer such tools even though they sounded like a good idea. A conversation chain from an OFG transcript is copied below:

G-4	"I use the templates and custom colors and fonts to design my own look and feel for my blog space, and take hints from other sites."
G-8	"[*replying to G-4*] unfortunately, we don't have similar customization schemes on the site. If we did, I think I would like to use it. The best I can do is change my avatar and signature every few months."
G-3	"[*replying to G-4 and G-8*] I've seen something like that... it's a really good idea. Our site is too bland"
Coding Query: Search for Content Coded at <Expression Aids/Personalization Features>	

Table 5-3: Description of ICT Categories & Examples of Tools & Features

Reported Frequency of Use of ICT Tools & Features ▲

ICTs (Categories)	Brief Description	Examples of Tools & Features (Sub-Categories)
Groupspace Platforms	Tools and features that facilitate information exchange and social interactions on a public level and many to many basis.	• Discussion Forums, • Blogs, • Email Lists, • Information Repositories, • Wikis, • Social Networking Interface, • Custom Social Groups, • Newsgroups.
Communication Tools	Tools and features that facilitate information exchange and social interactions on an interpersonal level and limited group basis.	• Private Messaging, • Interactive Chat, • Member Walls.
Expression Aids	Features and functions that allow members to control their online identity presentation to others in the community.	• Emoticons (Smilies), • Avatars, • Signatures, • Custom Titles, • Member Profile Pages, • Moods, • Visibility Indicators, • Personalization Features.
Searching & Browsing Features	Tools to help find relevant information and member contacts.	• Information Search Tools, • Content Index, • New or Popular Content Listings, • Content Subscriptions & Notifications, • Member Directories, • Buddy Lists.
Scoring Utilities	Features that facilitate summative feedback responses from the community.	• Polls & Voting Tools, • Content Ratings, • Member Rankings.
External Interface Features	Tools that allow access to the community's content and other internal functions through an external mechanism.	• Newsletters, • Content Feeds, • APIs (Application Programming Interfaces)
Social Media Extensions	Tools that offer collective publishing enhancements to augment the groupspace platforms.	• Collaborative Tagging Features, • Microblogging Streams, • Social Bookmarking Tools.

While tools and features related to *searching and browsing* were not talked about as often as some of the other categories, many members expressed their positive or negative experiences with these tools. As noted in the previous chapter, a critical incidents question regarding the use of technology tools and features was administered during the course of later

OFG sessions. Many reports of positive of negative critical incidents were related to the use of search and browsing features on VC sites as exemplified below:

F-2	"I tried using the advanced search functions once but wasn't able to find something that I had read only last week. I don't know if I was doing anything wrong but I haven't used the search bar ever since"
G-1	"I think the admins do a pretty good job of indexing content in a timely fashion. I use the search box on the main page quite regularly without problems. Sometimes it's just quicker to find what you're looking for that way"
E-5	"I don't really like the way the navigation index is displayed currently. It's hard to find the topics I'm looking for. I don't use it all that much now. On the other hand I'm really happy with the subscribed threads feature which I use daily to go over the threads that interest me. I only look around about once or twice a week to bookmark new threads"
Coding Query: Search for Content Coded at <Searching and Browsing Features>	

Scoring utilities such as site features related to ratings, rankings and polls were also referred to in an experience-enhancing context. Most informants who reported frequent use of the rankings and ratings explained that these tools make their lives simpler by offering suggestions for content and interactions in their communities:

A-1	"I use the 'top threads of the week' or other threads with high member ratings to decide what to read next. It could be in any forum really. "
G-2	"I find the ratings are representative of the quality of a topic especially in the more serious forums like careers and science forums. I usually go by the ratings to decide what to read"
Coding Query: Search for Content Coded at <Scoring Utilities>	

Lastly, the examples of tools and features categorized as *external interface features* and *social media extensions* were only scantily mentioned by informants. Newsletters and content feeds were available as a standard feature across many virtual community sites and some informants confirmed their use of these tools in their routine participation activities. Other advanced tools from these categories were only offered by two VC sites. Additionally, the small number of informants who reported the use of social media tools also admitted to their technology prowess or knowhow of these tools from other sites. Despite the reported marginal use of these advanced tools and features, it is expected that some of these tools will become mainstream in the near future. The following comments from the expert who reviewed the qualitative findings explain:

Expert-1	"I think the importance of this goes back to the content currency with a factor of trust in V.C users. Is the V.C up to date with current situations and news? How easily and quickly does the news filter in to V.C etc and by what channels." [*talking about external interface features*]
Expert-1	"These are important to consider in the current scheme of web 2.0 tools. These tools would become mainstream very soon and will pave the way for fostering newer models of participation that draw upon membership and content from multiple communities." [*talking about social media extensions*]
Coding Query: Search for Content Coded at <Social Media Extensions> OR at <External Interface Features >	

5.2.1.5 Socialization Scope

In addition to inquiring about the topographical characteristics of member participation behavior, the researcher also surveyed deeper and more specific aspects of participation, such as those related to social interaction and information exchange activities.

With respect to the nature of social interactions in virtual communities, informants characterized their routines on a scale of *narrow* to *broad* in terms of the number of people with whom they maintained regular ties. While some informants stated that they interacted with other active VC members at large, many reported that they had a specific circle of close colleagues and friends whom they relate to and interact with on a more frequent basis. Some comments are noted herewith:

B-2	"On the forums I communicate openly with everyone, but on my blog, I have a somewhat narrow group of friends who are on my buddy list and are able to see my entries"
C-8	"Yeah cafe ppl have their own little clique and Crickters have their own groupies" (*sic*) [*talking about two sub-forums in the VC site*]
Q-2	"I typically have watched Epinions and identified solid reviewers in various categories. I will read reviews by those members or email and ask questions about various purchases."
Q-3	"In addition to talking with others in the public forums, I also made my own social groups related to my interests, and some other members joined those groups. We talk about current topics of interest pretty regularly."
Coding Query: Search for Content Coded at <Socialization Scope/Narrow>	

In addition to online interactions with fellow community members, many informants remarked about offline interactions through personal email exchanges as well as face-to-face interactions. Some representative statements are as follows:

Q-5	"The people I'm close to, I talk even outside the community – often through email, but a couple of members I've also exchanged phone numbers with, and have chatted with them over the phone on a couple of occasions"
B-1	"A core group of us meets on a regular basis at a bar in the city. It's good to catch up in person and it doesn't stay virtual then… it becomes real."
Coding Query: Search for Content Coded at <Socialization Scope/Offline>	

5.2.1.6 Information Access Modes

In addition to talking about the nature of their socialization spawning from the virtual communities, informants also shared portrayals of their information exchange activities. As a first step in information exchange, informants spoke of ways through which they sought content that may be of interest to them, and which might potentially lead them to comment and contribute further content in the community.

On the outset, informants seemed to suggest that their use of virtual community sites for information access can take the form of either a logical and conscious route, or that of an unplanned impromptu activity. Following quotations are illustrative of these two modes:

D-6	"Sometimes, I have a specific agenda in mind while perusing the community website. I'm looking to certain type of information and I use specific tools like advanced search or archived thread index to find what I'm looking for. Once I find it, I can read and comment on it."
H-1	"I use a depth first approach to searching for information that interests me. I go to specific forums, run a search on specific keywords or members, check out the new content from specific contributors etc. and then decide what to read and contribute."
G-2	"I skim through the forum index and click on threads with more replies, better ratings, or sometimes threads of people I know"
Q-9	"When I do click in, I try to find information as quickly as possible and move on. Some of the reviews are excellent. Many are not."
Coding Query: Search for Content Coded at <Information Access Modes>	

The first two comments reflect a more deliberate and intentional approach to information access, while the latter accounts illustrate actions that are unstructured and spontaneous. In order to make sense of these reported modes of information access, the researcher consulted the extant literature in information science. The pursuit for *theory matching*[32] lead the researcher to consult literature on information processing and decision-making models such as the *elaboration likelihood model* (*ELM*) (Petty & Cacioppo, 1986) and the *heuristic-systematic model* (*HSM*) (Chaiken et al., 1989; Chaiken et al., 1996). From the latter of model, the concepts of *heuristic* and *systematic* information processing were adopted to conceptually describe the information access patterns that were evident from the qualitative data. In HSM, information is either processed in a high-involvement and high-effort *systematic way*, or through shortcuts or cues known as *heuristics* (Chaiken et al., 1989). These dual modes of information processing from HSM mapped well to the types of information access processes described by informants in the quotations presented above.

Additionally HSM facilitates conceptualization of systematic and heuristic modes of information access in a concurrent fashion – exemplified in comments by a few informants:

D-7	"I use a very top-down approach in my search for content that I wish to read. I usually go through my subscriptions, then specific forums, then top rated or most popular threads depending on how much time I have."
F-1	"In the forums that I browse regularly, I know what to look for by whom, so it's a quick trip to the index to find what I'm interested in. Other forums, I need to read the thread titles, and see the number of replies and the hotness indicator of the topic to make a decision whether to go into the topic or not"
Coding Query: Search for Content Coded at <Systematic> AND at <Heuristic>	

[32] Theory matching was highlighted in the previous chapter as an important component in the grounded theory methodology.

Another pointer to these dual modes of information access was derived by formulating a matrix query on various categories of ICT tools and features vis-à-vis the systematic and heuristic information access modes. The researcher expected to find a correspondence between *systematic* information access and *searching and browsing features*, and between *heuristic* information access and *scoring utilities*. The numbers in the matrix results presented in *Figure 5-8* below corroborate these correspondences. The patterns between information access modes and ICT tools & features typify that the desirability of ICT tools and features is influenced by specific forms of participation behavior, and in order to satisfy members, the VC should provide a multitude of tools and features related to the specific participation needs of its members.

ICT Tools & Features		Information Access Modes	
		A	B
		Systematic	Heuristic
1	Searching and Browsing Features	19	11
2	Scoring Utilities	12	23

Matrix Coding Query:
with rows: <Tools & Features/Searching and Browsing Features>, <Tools & Features/Scoring Utilities>
with columns: <Information Access Modes/*>
Search for content of rows NEAR content of columns

Figure 5-8: Matrix Coding Query Results for ICT Tools & Features versus Information Access Modes

To further validate the relevance of the HSM model in the context of member behavior in virtual communities, a compound coding query was formulated juxtaposing activity levels with information access modes. The results of the query illustrated a greater association between passive activity levels and heuristic information access modes suggesting that many members with low activity levels tend to have an unplanned approach often based on visible cues to access information, as opposed to active members who use their past experiences to engage in systematic or dual modes of information access. The following comments illustrate:

G-2	"I usually only drop by once every few weeks… and see what's going on – what type of topics are being discussed. What's hot and what's not. The thread popularity ratings and number of replies indicate to me what I should check out."
Q-1	"I was here after a few months and saw your thread asking for research help. It had a sticky note so I thought I'd check it out. I would have missed it otherwise. As an inactive member, I depend on stickies, ratings etc. to see what is important and worthwhile on the site since my last visit."
Coding Query: Search for Content Coded at <tree/…/Heuristic> AND at <attributes/…/Passive>	

5.2.1.7 Use Orientation

The final category labeled as *use orientation* was designated under member participation behavior to conceptualize the mindset and bearing of VC members towards participating in their virtual communities. The category of use orientation emerged from

multiple informant accounts that characterized their participation in VCs in terms of their affinitive dispositions towards the virtual community. Some informants characterized their participation as "by force of habit", while others referred to their respective virtual communities as "addictive". The common thread in the portrayals of these informants was that most of them cited reasons related to habitual and frequent use for passing time. On the other hand, some informants accounted for their routine participation as a deliberated undertaking for specific purposes. Still, there were some who reported to having oscillated between these two orientations at different instances in their membership tenure in their virtual communities.

To clarify these findings, the researcher engaged in theory matching process, and eventually mapped the emergent concepts from these qualitative findings to the media-use orientations formalized by communication studies and media ecology researchers who have studied the active engagement of audience with different types of media. Rubin (1983; 2002) introduced the concepts of *instrumental* versus *ritualized* use orientations towards media and its content, describing the former as intentional, attentive, and involved use of a medium, and the latter as habitual and passive use with greater affinity towards the medium.

These concepts mapped well to the emergent themes in the qualitative findings. Using these labels to dimensionalize the use orientation in virtual communities, *instrumental* use orientation refers to instances where members demonstrate a purposive and intentional activity profile in their participation, whereas *ritualized* use orientation refers to a frequent and habitual participation profile. Furthermore, it should be noted that these orientations do not constitute dichotomous behaviors and members can fluctuate between the two at different points during their tenure in the virtual community. The following statements from informants are illustrative of the two use orientations as well as their possible transformation over time:

H-5	"I only visit when I need to communicate with others or update my profile. I do tend to search for any interesting content while I'm here."
F-4	"I am addicted to it - in a positive way...at least this addiction is not as injurious to health and wealth as smoking and gambling is"
D-4	"I wish this site didn't exist. I say that because I am now addicted...and I feel like instead of having a life in the real world, I sit online and look at and spy on other peoples accounts which to me is a waste of time..but I do it anyways!"
D-9	"[*responding to D-4's comment*] see… I don't believe in addictions... I believe in the power of self-control! – I only visit a couple of times a week and only go over the topics that are of interest to me."
G-9	"With time, the nature of my visits to the community has changed drastically."
Researcher	"How has it changed?"
G-9	"I When I started, I used to come by every now and then whenever I had a specific reason for coming – e.g. asking question or sharing some news. Later on, the visits became a habit. I now find myself on the website for no specific reason, and I can spend a lot of time without even realizing"
Coding Query: Search for Content Coded at <User Orientation/Instrumental> OR <User Orientation/Ritualized>	

From the accounts cited above, it was surmised that typically, ritualized use orientations corresponded with higher activity levels. As shown in *Figure 5-9*, results of a matrix coding query substantiated this conjecture.

Use Orientation		Activity Levels		
		A	B	C
		Passive	Intermittent	Active
1	Instrumental	8	7	8
2	Ritualized	2	2	14

Matrix Coding Query:
with rows: <tree/Use Orientation/*>
with columns: <attributes/Informant-Activity-Level/*>
Search for content of rows AND content of columns

Figure 5-9: Matrix Coding Query Results for Use Orientation versus Activity Levels

A compound coding query provided revealed some representative instances of active members with a ritualized use orientation:

F-4	"I can spend hours on end and I visit the site frequently from multiple locations (work, home etc.) - I do it because I'm too used to doing it and don't really give it a second thought."
G-9	"In I spend upwards of 5 to 6 hours a week... [*more comments on participation*] It's so habitual right now that I don't even think about it consciously while doing it."
Coding Query: Search for Content Coded at <tree/.../Ritualized> AND at <attributes/.../Active>	

5.2.1.8 Relational Propositions pertinent to Member Participation Behavior

The analysis of the various themes and concepts related to *member participation behavior* discussed in this section reveal a number of superficial as well as deeper facets of activities and tasks that members undertake in their virtual communities. Additionally, the relationships among these facets provide further insights into the behavioral traits that can help make distinctions among members with different online participation profiles. *Table 5-4* provides a list of relational propositions pertaining to member participation behavior that were formulated during the axial coding stages of qualitative analysis.

Table 5-4: Relational Propositions pertaining to Member Participation Behavior

S No.	Member Participation Behavior Categories	Relational Propositions from Axial Coding
P1	Task Modes & Activity Levels	Value-added task modes such as commentating, contributing, and collaborating correspond with higher activity levels.
P2	Information Access Modes & ICTs Utilization	Systematic information access modes correspond with greater use of searching & browsing features.
P3		Heuristic information access modes correspond with greater use of scoring utilities.

Table 5-4 continued below

Table 5-4 (continued): Relational Propositions pertaining to Member Participation Behavior

S No.	Member Participation Behavior Categories	Relational Propositions from Axial Coding
P4	Information Access Modes & Activity Levels	Lower activity levels are associated with heuristic information access modes.
P5	Activity Levels & Use Orientation	Ritualized use orientations correspond with higher levels of activity.

5.2.2 Member Characteristics

During the open coding procedures, various analytical categories were designated as member characteristics to account for relevant individual psychological and social circumstances that influence member participation in virtual communities. These categories included member demographics, use backdrop, participation drivers, and member self-efficacy. *Figure 5-10* illustrates the conceptual tree node structure for the categories classified as member characteristics. The various themes and categories are discussed in the following subsections.

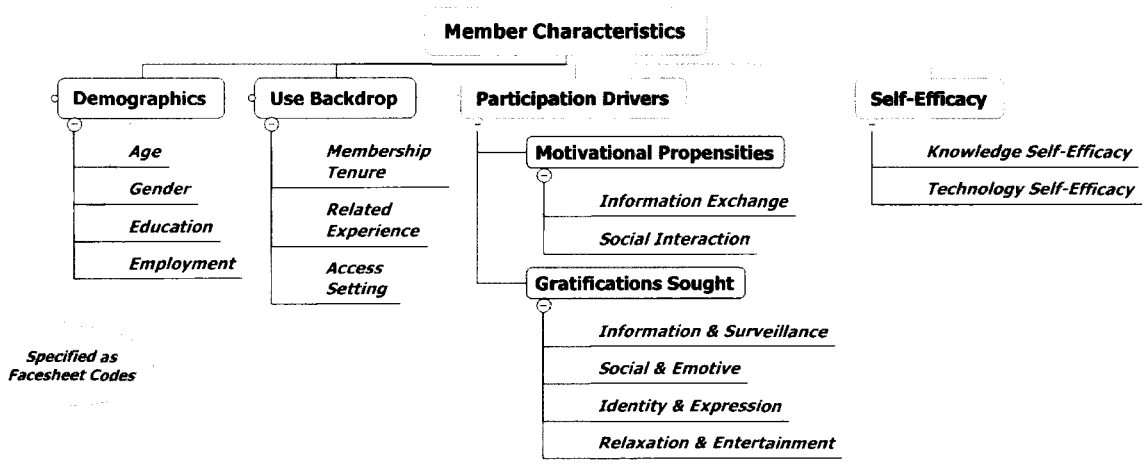


Figure 5-10: Tree Node Structure for Member Characteristics

5.2.2.1 Demographics

As outlined in previous sections, member *demographics* such as *age*, *gender*, *education*, and *employment* were gathered from study informants using a facesheet which was completed before informants participated in focus group sessions or completed the online questionnaires. These member demographic traits were coded in NVivo in the form of a casebook of informants comprising attributes that can be queried when required. Although the researcher recognized the potential for these demographic traits to act as moderating influences on various patterns

and associations in the emergent theory, to ascertain the direct or indirect effects on member participation in VCs was beyond the scope of this current research. Primarily, this research study concerns the interplay among socio-technical factors that affect member participation in VCs, and the demographic traits were catalogued to make sure that the researcher was tapping into a diverse base of virtual community members. Figure 5-2 presented earlier in this chapter illustrates the diverse demographic profile of participants in the qualitative phase of this study.

5.2.2.2 Use Backdrop

The conceptual category labelled as *use backdrop* was designated to capture variability in the user context in terms of various attributes such as a member's *tenure* in the current VC, a member's *related experience* with participating in other virtual communities, and their most frequent *access setting* (e.g., from home, work, or mobile).

Specifically, the attribute of *membership tenure* was used as a criterion in the theoretical sampling of informants within different virtual communities to ensure a range of perspectives of member participation. Overall, as shown previously in Figure 5-3, a reasonable number of responses from senior and junior members were obtained across the different virtual communities. In general, members reported increased levels of embeddedness in their respective virtual communities over longer durations of membership. This embeddedness was often a result of observations of activities and behaviors of other members in the VC which lead to vicarious learning of norms and expectations in the virtual community, ultimately leading to increased fluency in activities and tasks related to member participation. Ultimately, the tenure of members was linked to their level of *self-efficacy* (construct described in a subsequent section). The following statements from informants are illustrative of the changes in member participation behavior over a member's tenure in the VC:

C-8	"I started to interact mostly in a very superficial way, chit chat, and then I started being more thoughtful in my posts, and I looked for more debates, and idea exchange, more learning than only jokes and daily chat"
G-5	"In the first few months, I didn't participate much – but with time, I realized where I fit in and what I can contribute to the community. I learnt from others and wanted to give back"
G-8	"With time my use of site tools has changed."
Researcher	"How has it changed?"
G-8	"Lately, I've started using more site features that I originally thought were beyond my ability. I guess I'm more aware, and more confident"
Coding Query: Search for Content Coded at <Membership Tenure>	

With respect to *related experience*, many informants reported to have participated in multiple virtual communities, often simultaneously. While informants with ties to multiple VCs cited different motivations for participating in the different VCs, those who participated in other VCs in the past alluded to a change in priorities for adopting their current virtual community. The

broad priorities of these informants were also evident from the fact that most informants with ties to multiple VCs also spoke of different degrees of participation in those VCs ranging from passive to active participation. The motivations and priorities are detailed later in this section in the discussion on *participation drivers*. Also, similar to informants with longer tenures in their respective VCs, the informants who reported related experience exhibited higher levels of self-efficacy with participation in their current VCs. The following excerpts exemplify these:

B-4	"I am active on 6 or so internet forums (one is down right now) but have looked at a dozen or so. I participate on each forum for different reasons."
F-5	"I have participated in the past at several other on-line communities – some of them are not relevant to me today but I can apply skills I learnt from there."
Coding Query: Search for Content Coded at <Related Experience>	

Another aspect of the user context that seemed to be relevant to the nature of a members' online participation was their *access setting*. While most informants reported either accessing the VC from home, or work, a considerable number of them indicated that they currently access or would like to access the VC through their mobile devices while being on the move. Furthermore, most informants indicated their preference for accessing the VC either from home or from work citing only marginal use while not in their preferred setting. In terms of the significance of this attribute, the access setting of informants was linked to their most common activities and their use of tools and features on the VC website. For example, members who logged in from home reported using rich media applications and a diverse scope of activities, while those who browsed from work did so for more specific goals. These aspects of participation behavior are elaborated further in a later section. The following quotations reveal the significance of a member's access setting:

C-7	"I act differently at times. I don't always post comments when I read posts esp. from work. I work a seasonal job and don't always have time to post at certain times."
F-2	"On the weekends, I typically only check in once or so, but that's when I try to catch up with what's going on. From work, I access every day but only browse a couple of specific forums"
Q-5	"I've started to use my blackberry to access the website but find it's still cumbersome to browse. I typically only use it to reply to private messages or wall postings at the moment."
Coding Query: Search for Content Coded at <Access Setting>	

Overall, the attributes designated as *use backdrop* uncovered important contextual factors that had direct or indirect effects on member participation in virtual communities.

5.2.2.3 Participation Drivers

An important set of concepts were classified under *participation drivers*. These concepts included the two sensitizing concepts of *information exchange* and *social interaction* which were included in the conceptual framework for this study (see chapter 3). However, the analysis of

qualitative data substantiated a much broader basis of member motivations to participate in virtual communities. Consequently, the various perspectives about drivers and motivations that were shared by informants were categorized into *motivational propensities*, and *gratifications sought*. These are discussed below.

Motivational propensities refer to a member's basic inclination toward maintaining ties with the virtual community. Often, these inclinations figure prominently in a member's initial reasons to join the VC, and they cite these reasons as early motivations in their participation experiences. In this current research, most informants stated their basis for joining as either related to *information exchange*, or *social interaction*. The former motivation can be attributed to individuals who join a VC to seek or contribute information relating to the community's realm or the general interests of its members. On the other hand, social interaction acts as an early motivation for members who join a VC to seek help, friendship, or support from other VC members. The following accounts exemplify these motivational propensities:

C-3	"Online bulletin boards seem like a good idea to get multiple answers for typical questions.. you just post and wait for people to respond. Its a living google that works for you while you do other stuff." (*sic*)
E-2	"To get any specific query answered regarding virtually ANY thing. The users are literally RESOURCES, some of them very authentic." (*sic*)
H-8	"I joined this community while researching my current car. I joined because it seemed as though the community had a lot to offer (knowledge, fun, etc). I enjoy reading people's experiences, and giving advice when I can. It's just a fun place to be with a lot of good people."
A-8	"I use it as a tool to narrow down on a search for "potential" friends or partners...and then I go and interact with them in the real world."
A-6	"I am here to connect with other people, And for staving off boredom through mindless banter. In some sort, it is an escape from reality."
H-6	"[*I use the VC for*] socialization I guess – I have met many members and a core group of us meets up every now and then."
Coding Query: Search for Content Coded at <Information Exchange> OR at <Social Interaction>	

Although the above excepts indicate that members of VCs have a certain principal motivational propensities towards the use of their VCs, their drivers for participation often evolve over time, and the reasons that they maintain ties with their VCs can be different from the reasons they initially joined the VC for. Hence, the motivational propensities highlighted above can often assume primary and secondary roles. Informant G-1 explains how she participates primarily for exchanging viewpoints (information), but also to socialize with others:

G-1	"the main reason to start getting involved in an online comunity was to exchange ideas, i started long time ago with social debate, and political forums, then i shifted to more cultural ones. I am now mostly using online communities to discover foreign cultures, and languages, and also grow my social circle." (*sic*)
Coding Query: Search for Content Coded at <Information Exchange> AND at <Social Interaction>	

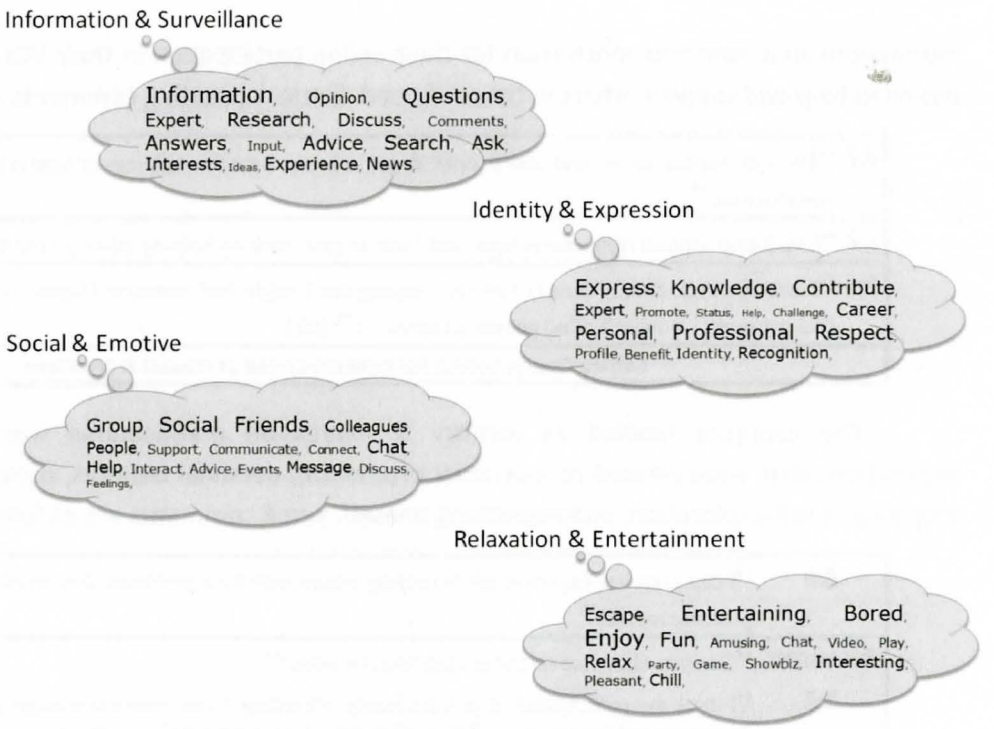
Among the reflective quotations on motivational propensities (posted above), informants H-8 and A-6 make a useful distinction between their motivational propensities and *gratifications sought*. While both act as precursors to member participation in virtual communities, the latter specifically relate to the conscious needs that members seek to satisfy (gratify) through regular involvement and day-to-day activities in their virtual communities. For example, informant H-8 (quoted above) refers to the informational value of the virtual community, i.e. for research and information seeking, but also to the relaxation based gratifications that keep him coming back, i.e. "enjoyment" and "fun". Similarly, informant A-6 cites social interaction as her primary reason for participation, along with the relaxation based needs that allow her to "escape from reality".

To further clarify the differences between motivational propensities and gratifications sought, in later interviews, the researcher included a two-pronged approach to inquire about drivers for member participation. The informants were asked *why they participate in their respective virtual communities*, as well as, *what they get out of participating in their virtual communities*. The latter question helped tap into the various long-term gratifications that members seek through their online participation in virtual communities. This comment from D-4 illustrates the difference between his *motivational propensities* leading him to join the VC as opposed to the gratifications he seeks through his continued active participation in the VC:

D-4 "In my case, I originally joined because I wanted to network with people and explore connections in my city, but over time I realized how useful the discussions can be from a learning standpoint, and to brainstorm ideas with like-minded people. That made me stay with the community for almost 11 years now..."
Coding Query: Search for Content Coded at <Motivational Propensities> AND at <Gratifications Sought>

To make further sense of the responses from informants, the researcher consulted academic literature on media and communication, and mapped the emergent concepts from these qualitative findings to the *uses and gratifications (U&G)* theory (Blumler & Katz, 1974; Katz et al., 1973). The uses and gratifications theory was deemed appropriate to explain the drivers and motivations for member participation since it provided an audience-centered perspective of the use of virtual communities (Hanson & Haridakis, 2008), and the constructs in the theory coincided well with the categories that emerged during the analysis.

Using the standard terminology from U&G theory, the gratifications that informants cited for continued participation in their respective virtual communities were labeled as *information & surveillance; social & emotive; identity and expression;* or *relaxation & entertainment*. These labels were adapted after consulting studies that explored user motivations in an Internet use context (e.g., Grace-Farfaglia et al., 2006; e.g., Hanson & Haridakis, 2008; e.g., Sangwan, 2005; e.g., Sun et al., 2008). The tag clouds in *Figure 5-11* illustrate the differences among the four types of gratifications based on representative keywords used by informants in their statements.



Note: Tags (keywords) are based on Word Frequency Queries for each Category.

Figure 5-11: Tag Clouds for Gratifications Sought

Gratifications related to *information & surveillance* were cited by informants in the context of their participation in virtual communities to actively seek information or passively scan for information that may be of interest to them. Seeking advice and opinions of other members, as well as learning from the experience and expertise of others were commonly stated reasons for participation:

C-1	"The community is attractive because it allows me to research into tech issues I can't solve or research into design questions I'm not sure about."
E-2	"Like most others here, I stumbled across the forum years ago and have found it to be a great place to expand my knowledge of all things automotive. As a marketer, I really enjoy learning about other people's thought processes as they go through decision-making and make a purchase."
Q-8	"Primarily, I would say it's for self-education. I learn from others and I also keep up with what's going on around different parts of the world and in my area of work."
Coding Query: Search for Content Coded at <Information & Surveillance>	

Social & emotive gratifications relate to a desire to find a basis for conversation and social interaction with other people, and seeking or providing support and empathy to others. Many informants reported establishing contacts, finding friendship, or maintaining social

interactions as a foremost motivation for their online participation in their VCs along with their desire to help and support others in times of need. Some supporting comments are as follows:

A-2	"The site enables me to meet new people, & get to know them through regular interactions & passive observations."
C-2	"I've found support from others here, and I like to give back by helping other people with their problems."
E-4	"I usually check out my friend's friends... hoping that I might find someone I know... or more like hoping to find someone i wouldn't mind getting to know! ;)." (*sic*)
Coding Query: Search for Content Coded at <Social & Emotive>	

The category labeled as *identity & expression* gratifications was used to code motivations that were related to individual promotion, personal benefits, building self-esteem, engaging in self-exploration, and expressing oneself. Some comments are as follows:

A-5	"I can share my expertise while helping others with their problems. It is an effective way to promote myself."
Researcher	"Can you elaborate on the professional benefits?"
B-3	"I think my participation is professionally rewarding. I can share knowledge, provide advice, and be recognized for my skills. I also often get asked about helping with other projects in a formal capacity."
F-1	"I get to express myself any which way I want and that's v important to me. Other members get to comment on my writing and this allows me to explore and improve myself even further." ...
F-3	"I agree... I come to express myself on issues that are important to me. I also feel a sense of accomplishment in sharing my views with others. Lastly, through other's comments in my blog regarding how I express my viewpoints, I have improved my writing style."
Coding Query: Search for Content Coded at <Identity & Expression>	

The category of *relaxation & entertainment* gratifications was designated to code informant viewpoints about motivations related to escape, leisure, and pleasure related needs. Many informants characterized their VC participation as a way to unwind and entertain themselves:

C-5	"I guess i'm more interested in keeping up with pics, jokes, etc...light hearted things to kind of escape from the routine and normal life, and keep up with the world outside my own." (*sic*)
D-1	"It's just a nice and easy place to hang out. Voice your opinion, and reply to others. Along with other fads and some games we sometimes have, like the "Legendary Lottery" which is a 30 day game where small events take place and points are rewarded."
Coding Query: Search for Content Coded at <Relaxation & Entertainment>	

It should be noted that the gratifications highlighted above are not mutually exclusive, and multiple gratifications were often cited by members. In fact, informants who reported to be active long-term members in their VCs reported a range of gratifications that they sought

through their online participation[33]. Informant C-6 explained it rather pragmatically citing gratifications related to information & surveillance, identity & expression, and relaxation & entertainment, while informant G-9 shared similar viewpoints citing social & emotive along with identity & expression gratifications:

C-6	"I have a few criteria I use when deciding on what to spend my time on. Following are those I use when deciding whether or not to follow, and participate on, websites, blogs and forums: 1. Does participating (reading, posting, passing on links) enrich my life (help to make me a more positive person) and get me closer to my goals (growth, learning, sharing, giving back, etc.)? 2. Does participating add to my base of knowledge in a meaningful way (not just add to my store of "fun facts to know and tell - think Rosie Perez in White Men Can't Jump)?" 3. Does participating bring me happiness and/or change my life in a positive way?"
G-9	"I think I'm here for the combination plate: ideas, good company, technical/professional/practical information, the chance to get help when I need it, the chance to give help in ways that can feel rewarding without carrying a big price tag."
Coding Query: Search for Content Coded at <Multiple Gratifications>	

Overall, these comments and remarks from informants illustrate that their initial reasons to join their virtual communities (*motivational propensities*) may have been different from the benefits they seek through their continued participation (*gratifications*). Furthermore, members with longer tenures in their communities reported multiple benefits, often citing asocial information and identity related gratifications along with increasingly collegial social activities.

To verify the pattern between *membership tenure* and *multiple gratifications*, a matrix query was formulated between the various gratifications and the three enumerations of membership tenure (short, medium, and long). The results of the query are shown in *Figure 5-12* below. As seen by the numbers in the matrix, informants with longer tenures generally reported more instances of each type of gratification sought, and *multiple gratifications* were reported by members who had been with their virtual communities for longer. This pattern typifies that longer membership tenures coincide with multiple gratifications – i.e. to get members to stay active for longer, the virtual community should provide them with a multitude of benefits in areas related to the various needs members seek to gratify through their online participation.

An exploratory path to differentiate between *motivational propensities* and *gratifications sought* also lead the researcher to examine different use patterns associated with ICTs when considering them vis-à-vis these two different types of motivations. Using *motivational propensities* as criteria, the researcher was only able to make broad observations about the utilization of ICTs – such as that the use of *information repositories* is linked strongly to *information exchange*, while the use of *expression aids* is associated more strongly with the propensity for *social interaction*. However, an analysis using the various categories of *gratifications sought* revealed a finer level of granularity with the identification of ICTs use

[33] In addition to coding multiple gratifications at the specific designated nodes, a free node labelled as "multiple gratifications" was created to code such instances, and to help formulate related queries through a single node.

patterns. More inferences could be derived within each group of ICTs such as groupspace platforms, linking each technology feature to various gratifications. *Figure 5-13* below shows the results of a matrix coding query on the various categories for ICTs versus *gratifications sought*. Based on the number of proximal instances of ICTs and gratifications coded in the data, the shaded cells identify the gratification(s) that best associate with the use of specific features or groups of features.

Gratifications Sought		Membership Tenure		
		A	B	C
		Short (Less than 1.5 Years)	Medium (1.5 to 3 Years)	Long (3 Years or More)
1	Information & Surveillance	52%	73%	81%
2	Social & Emotive	38%	35%	57%
3	Identity & Expression	29%	42%	43%
4	Relaxation & Entertainment	38%	54%	67%
5	Multiple Gratifications	24%	42%	71%

Converted to Percentages based on total number of informants base coded as Short, Medium, and Long in their membership tenures.
Original Matrix Coding Query:
with rows: <tree/Gratifications/*>, <tree/Multiple Gratifications>
with columns: <attributes/Informant-VC-Tenure/*>
Search for content of rows AND content of columns

Figure 5-12: Matrix Coding Query Results for Gratifications Sought versus Membership Tenure

Groupspace Platforms		Gratifications Sought			
		A	B	C	D
		Information & Surveillance	Social & Emotive	Identity & Expression	Relaxation & Entertainment
1	Discussion Forums	27	25	23	25
2	Blogs	13	23	21	17
3	Email Lists	19	7	9	4
4	Information Repositories	24	11	12	9
5	Wikis	12	3	5	3
6	Social Networking Interface	4	12	9	8
7	Custom Social Groups	6	16	8	7
8	Newsgroups	7	2	0	0
Other ICT Categories					
9	Communication Tools	22	25	19	22
10	Expression Aids	14	18	24	27
11	Searching & Browsing Features	29	14	11	9
12	Scoring Utilities	14	16	11	18
13	External Interface Features	4	1	6	0
14	Social Media Extensions	2	2	4	1

Matrix Coding Query:
with rows: <tree/ICTs Utilized/Groupspace Platforms/*>, <tree/ICTs Utilized/...>, ...
with columns: <tree/Gratifications /*>
Search for content of rows NEAR content of columns

Figure 5-13: Matrix Coding Query Results for ICTs Utilized versus Gratifications Sought

Following a similar approach, in the later analytical stages of the axial coding, the *gratifications sought* category was juxtaposed with various categories in *member participation*

behavior. Several interesting relationships were discovered at the category level as well as dimensional level as follows[34]:

- Many informants who reported a disposition towards *information & surveillance* gratifications also reported greater use of *systematic information access modes* in the virtual community while several informants who reported a greater disposition towards *relaxation & entertainment gratifications* also indicated the use of *heuristic information access modes*.
- In cases where *relaxation & entertainment gratifications* assumed a key role in an informant's participation, a *ritualized use orientation* towards participation in the virtual community was also usually demonstrated.
- Instances where *multiple gratifications* were stated also corresponded with higher *activity levels* in their virtual communities.
- Informants who stated *multiple gratifications* also generally narrated patterns related to a *ritualized use orientation*.

5.2.2.4 Self-Efficacy

As shown in the tree node structure for member characteristics (Figure 5-5), two categories related to self-efficacy emerged as important psychological elements that were related to member participation. The notions of *knowledge self-efficacy* and *technology self-efficacy* are related to members' perceptions of their abilities to undertake and accomplish tasks effectively. The former was often cited by informants who talked about an evolution in their behavior over time – having become more active in their virtual communities once they perceived that they had something valuable to share with the community. On the other hand, technology self-efficacy surfaced as an important factor in accounts where informants explained their lack of confidence with the use of more sophisticated technologies that they had not utilized prior to joining the VC.

From the following accounts and responses, *knowledge self-efficacy* can be construed to play an important role in ensuring members' embeddedness in their virtual communities. Informants related being able to form stronger ties to the community once they overcame psychological barriers to sharing information, expertise and experiences with others in their communities:

D-5	"I wasn't really sure if I would be able to contribute something useful and initially I held back 0 but once I started posting about my experiences, and received supportive comments from others, I gained more confidence and feel like I'm a part of the group"

[34] As with the other examples presented in this chapter, most of the relationships between categories and between dimensions were verified through matrix coding and compound coding queries. In the interest of space the results of each of the queries has been omitted, and only inferences have been provided in the form of relational propositions.

A-7	"I rarely post because I am no where as good as the folks on there. I look and I admire the talent so much. I think I am more than a little intimidated by the other members on there, but thankfully, they let me look and admire."
Q-6	"I developed more confidence in my postings over time – not only did I start to post more but I also used my real name and made stronger connections… this made me feel the community aspect of the website"
Coding Query: Search for Content Coded at <Knowledge Self-Efficacy>	

Similar in effect, *technology self-efficacy* seemed to act as a barrier for many informants who confessed to not being able to reap the full benefits afforded by their virtual communities due to perceived lack of ability with technology features. Other informants related their experiences of improving with the use of tools and features over time, through observation of others, or with the help of other members:

D-9	"With time, I've got fairly adept at making posts, editing, quoting others, referencing etc. – initially, I remember having to ask around [for help] with the most basic features but hey, that's what a "community" is for right?"
E-5	"I've learnt to use the standard tools for forums and blogs through my experience with other community sites. I think I've gotten better with time, and I interact more effectively now than I used to because I know how and when to use different tools."
F-2	"I still suck at using a lot of the tools that are available to us. I can probably do a lot of things I don't even know about. I'm still learning though. When I see something good, I ask others how they did it."
Coding Query: Search for Content Coded at <Technology Self Efficacy>	

From the quotations listed above, it is evident that junior as well as passive members report lower confidence with their abilities to share knowledge or use technologies, and self-efficacy perceptions develop with social and technology interactions over time. On the other hand, higher levels of self-efficacy not only coincide with higher participation levels, but also with enhanced community interactions and value-added task modes such as contributing relevant content and collaborating with other members. Also apparent from some statements, is the dual role of self-efficacy in the member participation process. On the one hand, a person's sense of abilities and confidence can act as a driver or barrier to their online participation, while on the other, increased participation levels and feedback or support from the community can improve and reinforce self-efficacy perceptions. The relationships that were discovered at the category level as well as dimensional level between self-efficacy and facets of member participation behavior are as follows:

- Informants who indicated higher levels of *self-efficacy* also generally reported higher *activity levels* in the virtual community.
- In many cases, higher levels of *self-efficacy* corresponded with informants relating their involvement in *value-added task modes* such as contribution and collaboration.

- Informants who expressed higher levels of *technology self-efficacy* indicated greater congruence with *systematic information access modes*.

5.2.2.5 Relational Propositions pertinent to Member Characteristics

The analysis of the various *member characteristics* discussed in this section reveal a number of factors that directly or indirectly affect the online participation of members in their respective virtual communities. While factors like demographics, *related experience*, *access settings*, and *motivational propensities* play their roles as context or control variables in determining the nature and extent of member participation, other factors such as *membership tenure*, *gratifications sought*, and *self-efficacy* affect the participation process in the form of intervening conditions or moderating influences. *Table 5-5* below provides a list of relational propositions pertaining to member characteristics that were formulated during the axial coding stages of qualitative analysis.

Table 5-5: Relational Propositions pertaining to Member Characteristics

S No.	Member Characteristics Categories	Relational Propositions from Axial Coding
P6	Membership Tenure & Gratifications Sought	Longer membership tenures are associated with the satisfaction of multiple gratifications.
P7	Related Experience & Self-Efficacy	Related experience is associated with higher levels of self-efficacy.
P8	Membership Tenure & Self-Efficacy	Longer membership tenures correspond with higher levels of self-efficacy.

In addition to relational propositions within the theme of member characteristics, as highlighted in the various subsections, the later stages of axial coding yielded a number of category level and dimensional level relationships between *member characteristics* and *member participation behaviour*. The relational propositions pertaining to these are listed in the concept map in *Table 5-6* below.

Table 5-6: Relational Propositions pertaining to Member Characteristics & Member Participation Behavior

S No.	Relevant Categories	Relational Propositions from Axial Coding
P9	Gratifications Sought & Information Access Modes	Information & surveillance gratifications correspond with systematic information access modes.
P10		Relaxation & entertainment gratification corresponds with heuristic information access modes.
P11	Gratifications Sought & Use Orientation	Relaxation & entertainment gratification is associated with a ritualized use orientation.
P12		Multiple gratifications are associated with a ritualized use orientation.
P13	Gratifications Sought & Activity Levels	Multiple gratifications are associated with a higher activity levels.
P14	Self-Efficacy & Activity Levels	Higher levels of self-efficacy correspond with higher activity levels.
P15	Self-Efficacy & Task Modes	Higher levels of self-efficacy are associated with value-added task modes such as contribution and collaboration.
P16	Self-Efficacy & Information Access Modes	Higher levels of technology self-efficacy correspond with systematic information access modes.
P17	Gratifications Sought & Information Access Modes	Relaxation & entertainment gratifications correspond with heuristic information access modes.
P18	Gratifications Sought & Use Orientation	Relaxation & entertainment gratifications are associated with a ritualized use orientation.

5.2.3 Community Characteristics

The open coding procedures also revealed a set of contextual factors related to the group of people that constitute the membership base for a virtual community, as well as those related to the management oriented and environmental attributes of the organization or administration of the virtual community. *Figure 5-14* illustrates the conceptual tree node structure for the themes and categories classified as community characteristics. These are discussed in the following subsections.

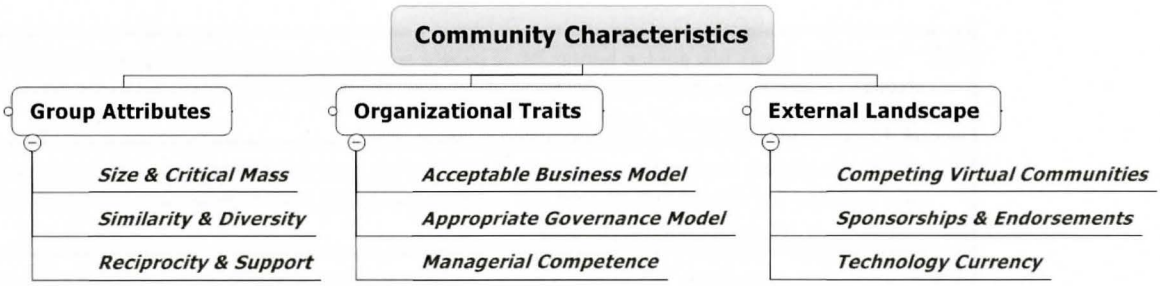


Figure 5-14: Tree Node Structure for Community Characteristics

5.2.3.1 Group Attributes

Many informants spoke of the attraction to their respective virtual communities by highlighting the positive traits of the group of members that constitute the membership basis for the VC. Attributes such as the *size & critical mass* and *similarity & diversity* of were cited as factors that influenced informant decisions to initiate and maintain their participation in the virtual community. Similarly, the reciprocity of the members toward others and the type of support offered were highlighted as important features that many informants took into account when deciding to initiate and pursue participation in the virtual community.

With respect to *size & critical mass*, many informants commented on the need for a group with a large enough contribution base to sustain the needs of its members. A critical mass of user generated content, and sufficient levels of regular member-to-member interactions were often cited as indicators of a viable online community. These comments illustrate:

A-5	"I joined this site when it was a very small group of may be about a 100 members or so. I didn't really find much that interested me at the time, so I left"
G-5	"The site needs more members… forums are smaller in terms of constant user base and the lulls are prolonged at times making it no fun"
Q-6	"The community was large and diverse – which is what I liked. I thought I'd be able to find the information I'm looking for, and also find like-minded people with whom I can interact"
Coding Query: Search for Content Coded at <Group Attributes/Size>	

In addition to the size of a community, as stated by informants A-5 and Q-6 above, the notion of *similarity & diversity* also emerged as a vital criterion for initial and continued member participation. Interestingly, while diversity in knowledge and expertise was seen as an important factor for the viability of an online community in terms of information exchange needs of its members, others talked about the need for commonalities in the groups at a social level to ensure maintenance of social interactions. The following excerpts exemplify these viewpoints:

D-5	"Over time things just got too boring. Most people only discussed things like browsers, cell phones and laptops. When I posted questions about anything else, I'd get not responses. That kinda annoyed me and I gradually stopped posting" (*sic*)
F-1	"The site attracts similar types of people. While that's a good thing in case you run into an issue – chances are someone has already experienced it… at times, you might not get the answer to a question if it is outside the domain of expertise of people here"
C-3	"It's a great crowd here. We're like a family because we have so much in common from our backgrounds to culture to values etc. – that's why I've made some strong connections and still seek social relationships through here"
H-6	"It is our common social background that keeps us here. I can relate to what a lot of people are going through in their lives, and that makes me feel part of the community"
Coding Query: Search for Content Coded at <Group Attributes/Similarity & Diversity>	

Lastly, with respect to *reciprocity & support*, many informants suggested that their observations of positive community exchanges over time had lead them to certain expectations of mutually beneficial and collectively useful interactions which helped them maintain the participation in the virtual community. Some representative quotations are listed herewith:

E-4	"Before becoming a regular, I observed the community for well over 4 months. I wasn't regular, but every time I came by, I saw members helping other members with their queries and in some cases members took a personal interest in other members' problems. This ensured me that my participation here will be worthwhile"
Q-8	"Most people try to give back somehow. I've helped members who in turn have helped others in similar problems when I haven't been around. This collective giving and taking is what makes us a true community."
Coding Query: Search for Content Coded at <Group Attributes/Reciprocity & Support>	

5.2.3.2 Organizational Traits

The theme of *organizational traits* comprised various governance and administration related aspects of the online community.

In terms of an *acceptable revenue model*, the revenue generation means and process should be aligned with the goals of the community and members should not have strong objections to these mechanisms. For example, while it may be reasonable to charge subscription fees to professional communities that offer specialized services for exclusive members, the same model may not be suitable for social VCs with a general membership. Furthermore, many informants highlighted cases of poor management decisions related to the use of advertising as a revenue generation scheme where ads detracted from a satisfactory online experience for members in multiple ways. Some informants narrated incidents where ads detracted from acceptable website usability, while others spoke of experiences where irrelevant or objectionable ads were not filtered out.

The issue of an *appropriate governance model* was also brought up by several informants in the focus group sessions. Whether an open for all or an invitation only policy is relevant; whether a moderated or a free-reign groupspace environment is suitable; and whether sponsors should be involved in the day to day administration of the community space were some of the issues that informants commented on.

Lastly, with respect to *management competence*, a number of informants related incidents where actions and abilities of the administration was praised or criticized. Essentially, members expected the administration of their online communities to be technologically savvy to ensure streamlined operations, to exercise sufficient control over the day-to-day proceedings in the public groupspaces, and to undertake prompt corrective actions when the need arises.

Sample comments with reflections on these organizational traits are as follows:

B-2	"We were all opposed to the idea of including google ads in the forum space... not because we opposed ads... but because we knew that the admin members wouldn't have the time to create proper filters for ads which may not be suitable for a family friendly website"
C-5	"We have an option for a paid subscription. With that you get access to a couple of restricted help forums. It works well because there are a couple of experts always available on a moment's notice to help with user problems. So people don't mind paying $5 per month for a useful service such as that. Also, with the $5, we get to download the custom toolbar that is synced with our personal profiles, so it makes browsing the website a lot easier"
F-3	"The corner space forum was a grand fiasco. In all their wisdom, the management decided to have an unmoderated forum. They forgot that we have peeps who abuse posting privileges even in moderated forums. With open membership and large size, our site just can't have that type of forum"
G-9	"I joined another car forum and noticed it had no language censorship. Someone else noticed and posted a simple question "Why?" He was heavily flamed and the final straw for me was when one of the senior moderators posted a profanity laced rebuttal. I thought if that is how you want to treat your members, I do not want to be a member. Nothing like that happens here, there is an excellent balance in the moderation of the site, very well done."
H-8	"Also, he tries to use a light hand in dealing with the occasional problem, but when he must be, he is quite decisive." [*talking about an administrator of the VC*]
H-1	"I agree with you... the moderators on my VC also keep things in check ... difficult users are given warnings and kicked out.. keep things clean and easy for other posters" [*replying to*]
Coding Query: Search for Content Coded at <Organizational Traits/*>	

5.2.3.3 External Landscape

As an emergent theme from open coding of informant narratives, concepts classified under *external landscape* pertained to issues that affected the virtual community, but were outside its sphere of membership or direct control of its management.

For example, many informants talked about their own online communities in comparison with *competing virtual communities*. Many informants spoke of joining their current VC after having been a member in a competing or similar online community. In some cases,

informants admitted to sporadic surveillance of competing VCs to compare their offerings. Junior members and passive members hinted that they had other choices in case their current VC fails to live up to their expectations.

Secondly, with respect to *sponsorships and endorsements*, several informants noted that they became members of their respective virtual communities due to their associations with other known brands and organizations. Furthermore, some participants indicated that their community's association with relevant sponsors provides additional value in the form of original and up-to-date information as well as exclusive offers.

Lastly, in reference to *technology currency*, a number of comments and responses from technology savvy informants underscored the need for virtual communities to keep abreast of new technology standards and modern tools and features to help members become more productive with their routine online tasks and activities.

Some comments on issues related to the external landscape are as follows:

Q-2	"Him and I started this community after the closure of the last site we were at. Today, after two years, we have just as many members as that site had in six years. I think we've done pretty well :-)"
Q-10	"I came from a different site where things had started to go in a different direction than what I had expected from the management. This site seemed to fit the bill perfectly in terms of relating to my interests as well as other online needs as a member"
D-1	"I suggested the use of tags to the tech admin. Other sites have it and we should too. I'm sure once its implemented, other members will see the value as well. We really need to update our site in more ways than one. We're living in Web 1.0 while the rest of the world is already in 3.0"
D-3	"IBM is a regular sponsor on the site. We get access to their webcasts and whitepapers sometimes even before they post it on their official website. It's a great resource for members here as well as good promotion for them. Win-win!!"
B-3	"I'm glad our site is at par with other community websites – even the new ones. The tech guru for our site is always hard at work implementing new features every few months. Some of them make it through user testing and community feedback… others get rejected. We recently got Wall postings for member profiles, moods for the forums, and new bots to pull content from other relevant sites. All this over the last year and most of us are very happy with these features"
Coding Query: Search for Content Coded at <External Landscape/*>	

In summary, the themes and concepts classified as community characteristics pertained to both the social and the management layers of a virtual community's edifice. The social layer illustrated in the form of various *group attributes* play a role in helping members internalize the norms and rituals of the community and its core membership base. In addition to these factors, the *organizational traits* represent policies and practices that foster a positive membership experience and also allow members to identify and understand the goals and mission of the virtual community. Finally, the community's association and interaction with relevant external bodies and its espousal of modern standards leads to member confidence in the establishment and operations of the online community.

5.2.4 Technological Determinants

During the open and axial coding procedures, various analytical categories were designated as technological determinants to account for relevant cognitive perceptions about technology that affect the adoption and use of various ICTs and influence member participation in virtual communities. The theme of technological determinants included the category of *website usability* – a factor that was included as a sensitizing concept in the conceptual framework used to instigate the empirical research investigation in this study (see Chapter 3). Other categories that were coded with as relevant technological determinants included *media richness* and information quality. *Figure 5-15* illustrates the conceptual tree node structure for the categories classified as member characteristics. The various categories are discussed in the following subsections.

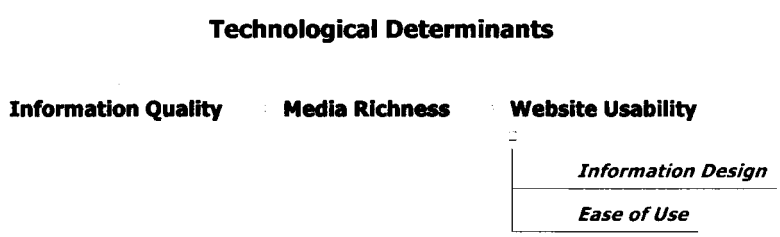


Figure 5-15: Tree Node Structure for Technological Determinants

5.2.4.1 Information Quality

During the open coding stages of the qualitative research, *information quality* emerged as a predominant category that influenced member perceptions about the value of their online participation in their respective virtual communities[35]. As illustrated by the following quotations, informants cited properties such as *relevance, timeliness, reliability, breadth of perspective,* and *usefulness* as criteria to gauge the quality of informational content available through their VCs:

A-8	"The members have a whole lot of experience in this area and they'll give you helpful advice and reliable answers. That's what matters to a lot of us who come here for quick and relevant information when we need it."
C-1	"The content here is top notch - there is always something new being posted which keeps my attention, and makes me wanna stick around."
C-2	"A lot of useful and relevant information for my needs. I drop by almost daily for my dose of content and information. The site owners help by initiating good topics and by also keeping an up-to-date index of popular posts"

[35] Although Information Quality is not strictly a category that belongs within the theme of Technological Determinants, it was classified as such because many IS studies consider it as an important factor that characterizes the overall quality of the IT artifact under consideration (cf., DeLone & McLean, 1992; cf., Petter et al., 2008)

D-9	"You'll really find a whole range of opinions on different matters... which keeps things interesting and the discussion rolling. I don't see that on a lot of different forums where people keep talking about the same things over and over again."
E-3	"The members have a whole lot of experience in this area and they'll give you helpful advice and reliable answers. That's what matters to a lot of us who come here for quick and relevant information when we need it."
Coding Query: Search for Content Coded at <Information Quality>	

The quotations posted above reflect cognitive perceptions about the value of informational content within a virtual community. In other IS studies, information quality perceptions have been shown to be important determinants of technology use (DeLone & McLean, 1992; Delone & McLean, 2003; Mishra et al., 1993; Petter et al., 2008), and the construct has also recently been illustrated to be an important factor in determining member participation in virtual communities (e.g., Lin, 2008; e.g., Porter & Donthu, 2008).

In terms of the various facets of member participation behavior explored previously in this chapter, the axial coding stages not only indicated higher activity levels for members who perceived their VCs to be superior information quality, but also pointed to a relationship between information quality and systematic information access modes. Informants who reported information quality as a positive attribute of their VCs also described greater use of systematic information access modes as illustrated by this comment by informant H-5:

H-5	"I can depend on the quality of information provided on the website through its members and the facilitators. I use the search function to browse through topic titles which I know will be reflective of the conversations within, and then I use the keywords that members associate with their postings to find the information I'm looking for"
Coding Query: Search for Content Coded at <Information Quality> NEAR <Information Access Modes>	

5.2.4.2 Media Richness

The concept of media richness emerged as an important element in the gamut of features that informants associated with website capabilities of their respective virtual communities. Several informants indicated their preference for multimedia content, custom formats for communication exchanges with other members, and the use of rich symbols in routine comments and messages to interact with other community members. Some exemplary comments are as follows:

B-4	"The website needs to have interactive expressions like animated smilies and emoticons... or moods – etc. I use a lot of these features whenever I'm on. It makes the experience more fun"
C-4	"I use UBB codes (bolding, text size, linking) a lot more now than I did when I was new to the board. I don't think I can go back to the plain text messages I used to write before. It seems too blah! now" (*sic*)
C-7	"smilies... they could be better.. but they have a huge effect on how you relay a message across"

D-1	"I like the ease of use in posting messages, and the fact that I can see them immediately. I dislike the fact that posting multimedia (audio/video/pictures) is rather difficult otherwise I'd use it much more than I do now"
Coding Query: Search for Content Coded at <Media Richness>	

These comments reflect cognitive perceptions about the technical adequacy of a virtual community's tools and features in meeting a variety of communication needs of its members based on the nature of their communication tasks. The label of media richness was designated to capture various interactive design elements indicated by informants after a theory-matching process. The extant academic literature on computer mediated communication showed that similar characteristics had been found to play an important role in the adoption and use of email (Carlson & Zmud, 1999), as well as online storefronts (Brunelle & Lapierre, 2008).

Informant comments about media richness also lead the researcher to explore the relationships between this category and other categories defined member participation behavior. Some relationships that emerged at the category level as well as dimensional level between media richness and facets of member participation behavior are as follows:

- In terms of *ICTs utilization*, greater use of expression aids corresponds with enhanced perceptions of *media richness*.
- In terms of information access modes, enhanced media richness supports greater use of heuristic information access modes.

5.2.4.3 Website Usability

As a sensitizing concept in the conceptual framework, special attention was paid to any elements in the qualitative data that were pertinent to the construct of *website usability*. As expected, the category of website usability appeared consistently in the qualitative data as an important factor that impacted member participation experiences. Many informants discussed the usability of their VC websites in the context of fostering or impeding their efficiency with the site and their overall effectiveness and satisfaction with the end-user experience.

Although the category of website usability was formulated to capture all aspects related to the technical adequacy of a VC website interface in meeting the functional and contextual needs of its members, later stages of axial coding revealed two specific manifestations of usability of the virtual community website – namely, *ease of use* and *information design*.

The usability dimension labelled as *ease of use* was linked to the design aspects of a virtual community website pertaining to its efficiency vis-à-vis a member's effortless and error-free use of the technology interface. As evident from the sample comments below, properties such as consistency of the user interface and learnability of the technology features were commonly cited as indicators of ease of use:

B-1	"Compared to another forum I am on [*name removed*] ,this is very easy to post, respond and add pictures. Also runs well on my browser (Firefox) and is relatively quick. I do not find anything here that hinders my participation."
G-8	"I suppose that I like the fact that in terms of usability, the forum is exactly the same as 1001 other forums, so its familiar in terms of style and usability (assuming that functionality works)"
Q-3	"Minimally, there are now buttons which act as shortcuts in doing UBB code, one of the things I like about this site is its simplicity"
Q-7	"I like the ease of use in posting messages, and the fact that I can see them immediately. I dislike the fact that posting multimedia (audio/video/pictures) is rather difficult otherwise I'd use it much more than I do now"
Coding Query: Search for Content Coded at <Website Usability/Ease of Use>	

The researcher was familiar with the *ease of use* dimension of website quality through his background in IS studies that use similar constructs such as the perceived ease of use (PEOU) construct in studies utilizing the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), and the system quality construct in the IS Success Model (DeLone & McLean, 1992; Delone & McLean, 2003). The quotations above illustrate that within the specific context of virtual communities, ease of use is still an important technological determinant of use.

The second dimension labelled by the researcher as *information design* entailed design aspects of a virtual community website pertaining to its effectiveness vis-à-vis the organization and presentation of its content, and how it aids a member's interactions with the technology interface and with other community members. The dimension was designated to code informant comments regarding features such as the organization and presentation of content, and the organization, layout and presentation of other site features. Some sample comments are provided herewith:

A-6	"It is user friendly - the site has a delightful flow to it. The owner is quite marvelous about making improvements in functionality, and making the new functions accessible and obvious to the members"
A-8	"Those aspects are important. I also find that its usable since it's readable and relatively easy to work your way around to find what you need or bookmark what you want" [*replying to A-6*]
D-2	"Usability is kind of a weakness – there is an overwhelming amount of information which is very hard to search – and although there are nice features available, they are difficult to find. Very discouraging for navigation"
F-5	"I like the layout and organization of the site. The quickie bar around the side, the nav bar at the top, the instant access to search bar and the search options containing commonly used filters make for a user friendly and enjoyable experience"
Coding Query: Search for Content Coded at <Website Usability / Information Design>	

The label of *information design* was designated to capture various interactive design elements indicated by informants after a theory-matching process. Prior studies in the context of e-Commerce websites (e.g., Cyr & Bonanni, 2005) had used similar conceptualizations of

information design which gave the researcher an indication of its relevance as a dimension of website usability in virtual communities.

From informant comments, it was also apparent that the categories of website usability and media richness were intertwined. A website that was easy to use and had enhanced information design made it easier for members to use the technology features to post media rich online content as well as to engage in rich and interactive interpersonal communication. The axial coding stages also revealed that website usability was related to certain aspects of member participation behavior as follows:

- enhanced *information design* was seen to be a factor that promoted greater use of *systematic information access modes*.
- enhanced *ease of use* also emerged as an important factor that helped in supporting the use of both *systematic* as well as *heuristic information access modes*.
- With respect to *ICTs utilization*, informants who reported *enhanced information design* as a quality of their VC site, also sometimes spoke of using *searching & browsing features* more frequently.

5.2.4.4 Relational Propositions pertinent to Technological Determinants

The analysis of the various *technology determinants* discussed in this section reveal a number of factors that directly or indirectly affect the online participation of members in their respective virtual communities. While factors like *media richness* and *website usability* are intertwined in their effects on various aspects of member participation behavior, information quality plays a significant role in offering a satisfying experience to members. *Table 5-7* below provides a list of relational propositions pertaining to *technological determinants* and *member participation behaviour*.

Table 5-7: Relational Propositions pertaining to Technological Determinants

S No.	Relevant Categories	Relational Propositions from Axial Coding
P19	Website Usability & Media Richness	Better website usability supports higher levels of perceived media richness.
P20	Information Quality & Activity Levels	Perceptions of superior information quality are associated with higher activity levels of members.
P21	Information Quality & Information Access Modes	Superior information quality is associated with greater use of systematic information access modes.

Table 5-7 continued below

Table 5-7 (continued): Relational Propositions pertaining to Technological Determinants

S No.	Relevant Categories	Relational Propositions from Axial Coding
P22	Website Usability & Information Access Modes	Enhanced information design promotes greater use of systematic information access modes.
P23		Enhanced ease of use promotes greater use of systematic information access modes.
P24		Enhanced ease of use promotes greater use of heuristic information access modes.
P25	Media Richness & Information Access Modes	Enhanced media richness supports greater use of heuristic information access modes.
P26	Website Usability & ICTs Utilization	Enhanced information design corresponds with greater use of searching & browsing features.
P27	Media Richness & ICTs Utilization	Enhanced media richness is associated with greater use of expression aids.

5.2.5 Sociological Antecedents

The discussion in the previous section focused on technology related factors that influence various aspects of member participation behavior in virtual communities. This section complements the discussion in the previous section by describing the sociological factors that play an important role in determining the level and nature of member participation as well. Combined with the technology related factors discussed in the previous section, it is hoped that the themes and concepts from this section will provide a holistic socio-technical portrayal of member participation in virtual communities. The emergent categories of sociological antecedents and their dimensions are depicted in the conceptual tree node structure in *Figure 5-16* below. As seen, *organizational trustworthiness* and *member trustworthiness* which were included as sensitizing concepts in the conceptual framework (see Chapter 3) also emerged as pertinent constructs in the qualitative data[36]. The other category that was coded as a relevant sociological antecedent was *member responsiveness*. These categories and their dimensions are discussed in the following subsections.

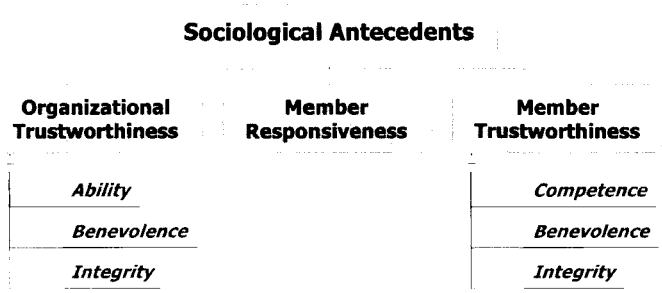


Figure 5-16: Tree Node Structure for Sociological Antecedents

[36] As noted previously, the sensitizing concepts from the conceptual framework were not used to force data into predefined categories. They only offered an appropriate basis for triggering the qualitative inquiry process.

5.2.5.1 Organizational Trustworthiness

Related to some of the management practices discussed in a previous section on community characteristics, members expressed their beliefs about a virtual community organization's or administration's quality of service based on perceptions of its reliability and dependability. To capture the real meaning in informant comments and responses, these concepts were coded at various dimensions pertaining to *ability*, *benevolence*, and *integrity* of the organization operating the VC. Such a conceptualization of organizational trustworthiness beliefs has also been used in previous IS studies in the research domains of marketing and e-Commerce (cf., Gefen et al., 2003; Gefen & Straub, 2004; McKnight & Chervany, 2001a; McKnight et al., 2002; McKnight et al., 2003; Serva & Fuller, 2005). Brief descriptions of these dimensions and representative comments are provided in *Table 5-8* below.

Table 5-8: Description & Informant Comments on Organizational Trustworthiness

Organizational Trustworthiness Dimensions	Brief Description	Conceptual Properties	Sample Comments from Informants
Ability	Traits of a virtual community organization or administration that pertain to its capabilities and competencies to support and advance a vibrant virtual community.	Capabilities ; Competencies ; Knowledge; Specialization	**B-3** "When the new admin took over control of the forum, many of us were apprehensive, but they have worked hard at building it to the much larger and more functional and user-friendly site it is now – they still encourage the input of forum members to constantly improve the site and help moderate it"
			C-5 "yes, they do look after the members - they're pretty proactive and have even gone as far as to take legal action against some bad users who were misusing the sites/hacking other users etc."
			H-1 "He is a very level-headed, neutral and logical thinker. When things heat up, he always makes the right decision." [*talking about the VC administrator*]
Benevolence	Traits of a virtual community organization or administration that pertain to its willingness to act in the best interest of its members.	Concern ; Responsiveness ; Care ; Help	**H-1** "And he always listens to suggestions, and will often use our input for any changes made to the board's functionality. We trust him, because he trusts us. It's a two-way street." [continued from H-1 above; *talking about the VC administrator*]
			F-5 "What is needed is an open line of communication and a sense that the admin person is able to 'understand' a concern brought to their attention"

Table 5-8 continued below

Table 5-8 (continued): Description & Informant Comments on Organizational Trustworthiness

Organizational Trustworthiness Dimensions	Brief Description	Conceptual Properties	Sample Comments from Informants
Integrity	Traits of a virtual community organization or administration that pertain to its commitment to fulfill its promises and act fairly towards its members.	Commitment ; Fairness ; Justice	**B-2** "I have noticed (maybe its just me) that admins are usually unbiased, quick and considerate when resolving situations."
			D-1 "The managment has consistently lied to the community over time about the running of the business, features, etc. There's been quite a bit of controvery there over the years. They (management) cannot be trusted in my view. People who kiss up to management types do get ahead there."

In addition to highlighting the essence of organizational trustworthiness beliefs, the quotations listed above also intimated a consistent relationship between these beliefs and the technology factors discussed previously. Many informants indicated that the basis for the organizational trustworthiness beliefs were related to the administration's technical ability to effectively operate the VC site and offer a satisfactory level of end-user experience with respect to *information quality*, *media richness*, and *website usability*. To substantiate these findings further, a proximity coding query was used between the *technological determinant* categories and *organizational trustworthiness* dimensions. Some excerpts from the query results are as follows:

A-2 "The high quality of articles they accept from writers (after a selection process), and the seed content they get from other sponsor sites improves my level of trust in their operations"
B-3 "The tech admin seems to be especially skilled at running forums. We rarely see downtimes, and the user interface is simply awesome - these make you trust that they are capable of running a site as big as this"
D-4 "There are a lot of rich internet applications available to the members if they're interested. Videos, slideshows, albums etc. can be posted online with the click of a button. By providing these extensive features, the admins show they care about their members needs and we can trust them to do the right thing"
Coding Query: Search for Content Coded at <Organizational Trustworthiness/*> NEAR <Technological Determinants/*>

5.2.5.2 Member Responsiveness

In terms of their contentment with interpersonal interactions, informants cited that the *promptness* and *quantity* of responses they receive from other members serve as important indicators of the usefulness of the VC site for social interactions. These concepts were coded as properties of *member responsiveness* which was designated as a separate category under the theme of *sociological antecedents*. Through the theory-matching process, the researcher found somewhat similar conceptualizations of *member responsiveness* in two other studies (Gefen &

Ridings, 2005; Ridings et al., 2002a). The following excerpts from informant narratives illustrate the defining properties of *member responsiveness*:

D-8	"Its discouraging to post comments on the forum if few responses trickle in slowly. That's the case with some of the forums we have in the community, and I tend not to use them as much"
G-6	"If I send someone a direct message and he/she doesn't respond within 3-4 days, then I start losing trust in that person. If that person does it too often, then I stop interacting with him/her (I only started to implement that last "kick-out" rule after I had a significant number of connections in the community"
H-4	"I like posting in the café forum because the response rate there is just awesome. You get multiple replies within a few minutes of posting and that improves my experience as an end-user"
Coding Query: Search for Content Coded at <Member Responsiveness>	

Besides the coding of *member responsiveness* as a distinct factor affecting member participation, the axial coding stages in qualitative analysis also ascertained the relationships between this category and the *technological determinants* of *information quality* and *media richness* categories from technology. Enhanced *media richness* seemed to correlate to higher levels of member responsiveness because members find it easier and enjoyable to engage in social interactions. With respect to *information quality*, higher levels of *member responsiveness* was cited as a basic criterion since many informants associated quicker access to information as an indicator of *information quality*. Some comments that exemplify these relationships are listed herewith:

C-7	"A quick message on the person's wall can be posted in a jiffy – that is of course if you know all the shortcuts to the smilies. The smilies make it so much easier to communicate – I don't have to write sentences to explain sentiments cuz the smilie says it all"
H-4	"The quality of content is pretty good and is at par with what a reasonable google search would yield. Its like asking a question and someone else does the google search for you and provides you the answer instantly. This instant access to information that I need keeps me around"
Q-4	"There are so many ways when it comes to communication. Private message, wall posting, chat, forum, blog etc. – and then you have audio and video chat as well. It makes communication easy and improves the frequency and form of responses. For eg, to post a video, you don't need to host it on youtube before you can share it with the community"
Coding Query: Search for Content Coded at <Member Responsiveness> NEAR <Technological Determinants/*>	

5.2.5.3 Member Trustworthiness

Related to some of the social characteristics of the VC as discussed in a previous section on *group attributes*, members expressed their beliefs about the quality of interactions and cooperation among virtual community members based on perceptions of their reliability, honesty and dependability. To capture the real meaning in informant comments and responses, these concepts were coded at various dimensions pertaining to *competence*, *benevolence*, and *integrity* of members in the VC as seen at a general level by the informants. Such a

conceptualization of member trustworthiness beliefs has also been used in previous IS studies in the context of virtual team contexts (Jarvenpaa et al., 1998), as well as recently in the context of virtual communities on virtual communities (Lu et al., 2008; Ridings et al., 2002a). Brief descriptions of these dimensions and representative comments are provided in *table 5-9* below.

Table 5-9: Description & Informant Comments on Member Trustworthiness

Member Trustworthiness Dimensions	Brief Description	Conceptual Properties	Sample Comments from Informants
Competence	Traits ascribed to other members as a whole that pertain to their knowledge and skills in shared mutual interests relevant within the scope of discussions in a virtual community.	Knowledge ; Skills ; Qualifications ; Experience ; Reliability	**A-8** "Just getting good, reliable information without the snarky "oh, look what the newbie posted" type comments goes a long way. Over time I have come to trust and appreciate the wisdom a lot of the members here have and are willing to share"
			E-2 "But, some 'trust' has evolved with a few members, based upon the consistency in the quality of their posts. Some members are very good writers, espouse a formidible and admirable education and therefore, garner my respect." (*sic*)
Benevolence	Traits ascribed to other members as a whole that pertain to their willingness to ensure the well-being of their peers in a virtual community.	Concern ; Cooperativeness ; Citizenship	**C-1** "If someone goes out of their way to answer a question or do something for someone else, that speaks to their character and I tend to trust them"
			G-3 "I trust the other members to be civil and kind, at least after they've been major posters on the forum. I have no faith in new members who use bad grammar and offer idiotic advice, but the others have mostly proved that they are worth the time it takes to read their posts."
Integrity	Traits ascribed to other members as a whole that pertain to their sincerity towards their peers in a virtual community.	Sincerity ; Fairness	**D-7** "Integrity of members is something you observe and form an opinion about in a few months or a year once you start on the site. People who seem to offer fair opinions, and don't ridicule others make you trust them more."
			E-3 "I also value their opinion and their thoughts on all things, not just automobiles. I respect them on how their carry themselves on the board and off the board. The integrity of the people I trust is very high, and it's good to have such a high concentration of great people contributing to the forum. You don't get that everywhere."

In addition to conceptualizing the three dimensions of *member trustworthiness* beliefs, the axial coding procedures also explored some relationships between these beliefs and other technological and sociological factors. Many informants indicated that *information quality* for content that was provided by members was a condition that affected their perception of the abilities of those members. Additionally, the timing and quantity of responses, i.e. *member responsiveness*, was also an important factor that helped some informants establish higher levels of trust in other VC members. Some sample comments from informants are as follows:

C-2	"Sincere efforts to provide highly relevant information make you trust members who take interest in the community"
E-5	"The responses by people here are always very accurate and helpful. They take the time to explain things to newbies and make the information understandable in simple terms. These things obviously produce trust in other members and encourage members to stick around"
E-2	"Yes – moreover, the seniors don't act conceited and respond to everyone right away. The promptness of their responses is what got me hooked on this site. Members and so called "experts" on some other sites take ages to respond to queries" [*replying to E-5 above*]
Coding Query: Search for Content Coded at <Member Trustworthiness/*> NEAR <Technological Determinants/*> OR NEAR <Sociological Determinants/*>	

Finally, in terms of relationships with theoretical categories of member participation behavior, member trustworthiness seemed to have a higher degree of association with higher activity levels and a ritualized use orientation. These relationships make intuitive sense as members who perceive other members as trustworthy engage more actively and regularly in their respective virtual communities. The emergent relationships among *organizational trustworthiness*, *member responsiveness*, *member trustworthiness* and *information quality* are depicted in the first concept map in *Appendix D*.

5.2.5.4 Relational Propositions pertinent to Sociological Antecedents

The analysis of the various *sociological determinants* discussed in this section reveal a number of factors that affect the online participation of members in their respective virtual communities. While factors like member responsiveness and member trustworthiness are intertwined in their effects on various aspects of member participation behavior, organizational trustworthiness plays a significant role in offering a satisfying experience to members. *Table 5-10* below provides a list of relational propositions pertaining to *sociological antecedents* and their relationships with other theoretical constructs related to *technological determinants* and *member participation behaviour*.

Table 5-10: Relational Propositions pertaining to Sociological Antecedents

S No.	Relevant Categories	Relational Propositions from Axial Coding
P28	Organizational Trustworthiness & Information Quality	Perceptions of superior information quality are associated with improved perceptions of organizational trustworthiness.
P29	Organizational Trustworthiness & Media Richness	Enhanced media richness is associated with improved perceptions of organizational trustworthiness.
P30	Organizational Trustworthiness & Website Usability	Enhanced website usability is associated with improved perceptions of organizational trustworthiness.
P31	Organizational Trustworthiness & Activity Levels	Higher levels of organizational trustworthiness are associated with higher activity levels of members.
P32	Member Responsiveness & Information Quality	Higher levels of member responsiveness are associated with perceptions of superior information quality.
P33	Member Responsiveness & Media Richness	Enhanced media richness is associated with higher levels of member responsiveness.
P34	Member Responsiveness & Member Trustworthiness	Higher levels of member responsiveness are associated with improved perceptions of member trustworthiness.
P35	Member Responsiveness & Activity Levels	Higher levels of member responsiveness are associated with higher activity levels of members.
P36	Member Trustworthiness & Information Quality	Perceptions of superior information quality are associated with improved perceptions of member trustworthiness.
P37	Member Trustworthiness & Activity Levels	Higher levels of member trustworthiness are associated with higher activity levels of members.
P38	Member Trustworthiness & Use Orientation	Higher levels of member trustworthiness are associated with a ritualized use orientation towards the virtual community.

5.2.6 Participation Value Effects

Within the template of *functional behavior* (*ABC*) *analysis*, the previously discussed themes and categories pertained to the antecedents and behaviors linked to member participation in VCs. This section moves the discussion forward to theoretical constructs that represent the consequences of the antecedents and the behavioral elements. It should also be noted that the theme of *participation value effects* was labeled as such to denote the role of various categories, not just as consequences that are linearly linked to antecedents and behaviors, but also as reinforcements for continued member participation in VCs. This viewpoint is aligned with the theoretical descriptions that use *ABC analysis* in which such factors are often described as consequential stimuli (Andreoli & Lefkowitz, 2009; Nijhof & Rietdijk, 1999).

In the emergent qualitative findings, the categories of satisfaction, enjoyment, and sense of virtual community surfaced as important factors which, in tandem, provide the basis for depicting the psychological and hedonic components of realized value from member participation. Together, they provide a useful basis to conceptualize the cognitive, affective and evaluative facets that provide a measure of the benefits members attain from their online participation. The emergent categories of designated as *participation value effects* and their dimensions are depicted in the conceptual tree node structure in *Figure 5-17* below. As seen, *sense of virtual community* which was included as a sensitizing concept in the conceptual framework (see Chapter 3) also emerged as a pertinent construct within the theme. These categories and their dimensions are discussed in the following subsections.

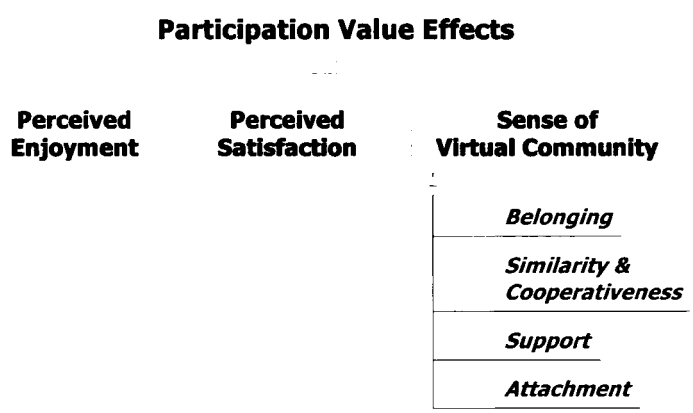


Figure 5-17: Tree Node Structure for Participation Value Effects

5.2.6.1 Perceived Enjoyment

During the open coding stages of the qualitative research, *perceived enjoyment* emerged as a prevailing premise that many informants used to describe their participation in their respective virtual communities. Highlighted as an intrinsic motivational factor for continued

participation, informants cited properties such as *entertainment*, *pleasure*, and *fun* to portray their contentment with their online participation experiences. Some sample comments are listed herewith:

A-6	"I'm still a member because I have fun in the community. My prime target is to have good time online.. thats Y.. I dont want to put my self in querel, thats Y." (*sic*)
F-5	"In addition to learning from others, I'm here just to chill! and relax... as a good pastime, its fun to hang around and interact with others"
Q-3	"From time to time, I'm just here to take a break...to participate in light chit chat with online friends and have some fun, throw some jokes at each other and use clever oneliners to make other smile."
Q-4	"The relaxing atmosphere, and chill out environment make this an ideal place. I can play an online game, or go into the chatroom if I just want to pass time."
Coding Query: Search for Content Coded at <Perceived Enjoyment>	

The quotations posted above reflect the affective response of informants based on views of their own participation in a virtual community as an intrinsically rewarding experience. Such a conceptualization of perceived enjoyment has also been used in other IS studies such as those pertaining to the use of the Internet (Teo et al., 1999) and the consumption of e-Commerce services (Cyr et al., 2007; Hassanein & Head, 2006). In the specific context of virtual communities, perceived enjoyment has also recently been conceptualized within the scope of uses and gratifications of participation in VCs (Dholakia et al., 2004; Jin et al., 2007).

In terms of the various antecedents discussed in this chapter, the axial coding stages indicated a relationship between perceived enjoyment and several technological and sociological factors. For example, both *member responsiveness* and *member trustworthiness* were often cited as precursors to ensuring congenial social interactions, while information quality and *website usability* were linked to pleasurable experiences with the use of ICTs on the VC website. Some sample excerpts of informant comments are as follows:

D-9	"I participate because I love the community... lots of intelligent people in a good environment that breeds intellectual commentary and fun times. I enjoy reading the viewpoints of other people that I trust"
H-4	"I like to read the range of opinions that people have, and it's the user generated content that I enjoy reading the most."
G-9	"I joined because I liked the interface, and I think I stayed because it's unique in a way. Most other websites have the same old discussion thread format whereas this one was really fun to use. They also keep introducing very interesting features which is something I like."
Coding Query: Search for Content Coded at <Perceived Enjoyment> NEAR <Technological Determinants/*> OR NEAR <Sociological Antecedents/*>	

5.2.6.2 Perceived Satisfaction

The category designated as *perceived satisfaction* constituted a combination of affective and evaluative characteristics that members use to describe their contentment with participation experiences in their virtual communities. Several informants indicated their satisfaction levels in their VC in terms of delight, contentment or happiness with their overall experiences. Some exemplary comments are as follows:

C-2	"I'm perfectly content with the system – whether it's the interface, the features, or the quality of content I get through the community"
C-5	"ever notice we have no pop-up's, spam or solicitation on this forum? I swear from a personal 'biased perspective' that this is what attracted me to this 'elite' piece of Internet 'Real-Estate, and combined with the high quality content available here, I've had a satisfactory experience so far"
G-9	"I I like the fact it has lots of forums and sufficient features for an enjoyable end-user experience. I don't like the fact that it crashes and/or doesn't work about 10% of the time" (*sic*)
Q-3	"I personally "feel" satisfied with my participation in the community. I enjoy my interactions, I like the GUI, and the information I get here is reliable too."
Coding Query: Search for Content Coded at <Perceived Satisfaction>	

These comments reflect affective and evaluative facets of informants' participation experiences. The extant IS academic literature shows satisfaction to be an important predictor of use, and as such, its inclusion as a value effect of participation in virtual communities coincides with many theoretical models that position it as a consequent of technology attributes and an antecedent for continued use of ICTs (Bhattacherjee, 2001; DeLone & McLean, 1992; Delone & McLean, 2003; Petter et al., 2008).

In the comments quoted above, the relationship of perceived satisfaction with several other antecedents of member participation is quite evident. While informants C-2, G-9, and Q-3 refer to *website usability* as an important element leading to *perceived satisfaction*, informants C-5 and Q-3 highlight the significance of *information quality* in ensuring a satisfactory member experience in the VC. Lastly, the comments from informants G-9 and Q-3 indicate the intertwined nature of *perceived enjoyment* and *perceived satisfaction*.

5.2.6.3 Sense of Virtual Community

Sense of virtual community (*SoVC*) was included as a sensitizing concept in the conceptual framework that instigated this study. Although the researcher was familiar with the background academic literature on virtual communities that has explicated the significance of this theoretical construct, it wasn't until the later stages of qualitative analysis that strict comparisons were performed between this emergent category and its equivalent conceptualizations in the extant literature.

Similar in disposition to perceived satisfaction, *SoVC* constituted a combination of affective and evaluative characteristics that members use to describe their participation experiences in their virtual communities. However, unlike the cases indicating perceived satisfaction where informants spoke of their general contentment, the narratives that highlighted SoVC primarily remarked about informants' experiences with assimilation and bonding, and their affinity for the virtual community. The following quotation by an informant aptly portrays her SoVC as it evolved over her membership tenure in the virtual community:

B-1 "I don't remember why I originally came to the site. It was a longgggg time ago. I've stayed (more or less – I went away for awhile and came back) for different reasons at different times. Sometimes I didn't log on for months, and then only when I had a question. Other times, I've logged in several times a day, sometimes posting, sometimes not. Sometimes friendships have grown. Sometimes emotional support has held me together through hard times. Sometimes I've been able to give some real help to someone who needed it. Sometimes it's interesting, sometimes it's fun, sometimes small pockets of the site and its members feel like ideal community to me, with lots of mutual support, kindness, brainstorming, sympathy, humor ... other times and places, it feels like community in a less ideal sense – grouchy obsessed humans practicing abrasiveness on each other. That's not my favorite aspect of community, be it VC or F2F."

Coding Query: Search for Content Coded at <Sense of Virtual Community>

The quotation above presents an inclusive rendering of the essence of SoVC, and it can be seen that this construct has affective as well as evaluative dimensions. To capture the real meaning in informant comments and responses, the SoVC related concepts were coded at the parent node as well as at various dimensions labelled as *belonging, similarity & cooperativeness, support,* and *attachment*. The labels designated to these dimensions were primarily specified in vivo according to the notions of SoVC as shared by informants. Also noteworthy is the fact that while this conceptualization indicated similar characteristics, it was different from the initial formulation of *SoVC* which was used in the conceptual framework (see Chapter 3) – hence bearing out its emergent nature. Brief descriptions of these dimensions and representative comments are provided in *Table 5-11* below.

Table 5-11: Description & Informant Comments on Sense of Virtual Community

Sense of Virtual Community Dimensions	Brief Description	Conceptual Properties	Sample Comments from Informants
Belonging	Feelings of membership, assimilation and identification with the virtual community.	Membership ; Assimilation ; Identification	**A-2** "More than the shared interest about cars, it's the people that form the sense of belonging, because they know information about me over time that makes the experience more engaging"
			G-6 "Online users told me tha I wasn't alone .. people Private messaged saying they had been in a similar situation.. that gave me the strength to fight/deal with my real life ordeals.. online communities wihtout a doubt can be life saving" (*sic*)

Table 5-11 continued below

Table 5-11 (continued): Description & Informant Comments on Sense of Virtual Community

Sense of Virtual Community Dimensions	Brief Description	Conceptual Properties	Sample Comments from Informants
Similarity & Cooperativeness	Feelings of collectiveness and commonality among members of the virtual community.	Collectiveness ; Commonality ; Assistance ; Shared Mutual Interests	**C-3** "I agree... it's a community and a family too – and a source for advice and direction and sometimes just to commissurate over a lot of varied topics other than just cars. What starts on the board usually stays on the board too and people usually respect each other. Cars bring us here - life keeps us here." (*sic*)
			E-5 "Yes - because I chat with certain people, they explain something to me if I do not understand and cheerfully assist me/correct me in my attempts at learning languages, and answer my queries."
Support	Feelings of bonding and dependability among members of the virtual community.	Member Bonding ; Resource Dependability	**Q-8** "There is a bond that builds through sharing these moments and minutiae, humour and fun create an initial bond, and we are all supportive of one another when times are fun, as well as when times are tough"
			G-3 "Private messages are helpful - people knowing what is goign on in your life and providing comments to help or support" (*sic*)
Attachment	Subjective assessment of the value of a virtual community based on its importance and appeal to its members.	Importance ; Attraction ; Appeal	**D-4** "as mentioned above I spend a disproportional amount of time here and it is because of the "sense of community" I feel very comfortable here."
			D-9 "I don't even know why do I come here, but I guess its because I enjoy the experience and value this site and its members as a true community, and that keeps me coming back"

In the comments quoted above, the relationship of *sense of virtual community* with several other antecedents of member participation is quite evident. While informants G-6 and G-3 refer to *member responsiveness* as an important element leading to *SoVC*, informants C-3 and E-5 highlight the significance of *member trustworthiness* as a precursor to *SoVC*. Lastly, the comments from Q-8 and D-9 indicate the intertwined nature of *perceived enjoyment* and *SoVC*. A concept map depicting these relationships between SoVC and its antecedents is provide in *Appendix D*.

5.2.6.4 Relational Propositions pertinent to Participation Value Effects

The analysis of the various *value effects* discussed in this section reveal a number of factors that act as consequential reinforcements for member participation in virtual communities. Their significance in the social process of member participation can be further

appreciated by underscoring their consistent pairing with a number of contextual or conditional antecedents that impact member participation behavior. In the later stages of qualitative research investigation, a major portion of the axial coding process was devoted towards ascertaining these relationships.

Firstly, during the axial coding stages, the efficacy of categories designated as value effects was ascertained further through an exploration of the conceptual linkages between various categories of value effects and pertinent categories classified under member participation behavior. The matrix coding queries that yielded noteworthy results are shown in *Figure 5-18* below. As shown by the numbers in the first matrix, the instances reported for value effects corresponded directly with informants who reported higher activity levels. The results in the second matrix illustrate that all three value effects are also associated with a ritualized use orientation, although no single value effect seemed to be a more dominant precursor.

Value Effects		Activity Levels		
		A	B	C
		Passive	Intermittent	Active
1	Perceived Enjoyment	23%	69%	81%
2	Perceived Satisfaction	21%	48%	72%
3	Sense of Virtual Community	10%	26%	64%

Converted to Percentages based on total number of informants base coded as Passive, Intermittent, and Long in their activity levels.
Original Matrix Coding Query:
with rows: <tree/Value Effects/*>
with columns: <attributes/Informant-Activity-Level/*>
Search for content of rows AND content of columns

Value Effects		Use Orientation	
		A	B
		Instrumental	Ritualized
1	Perceived Enjoyment	7	15
2	Perceived Satisfaction	9	12
3	Sense of Virtual Community	12	14

Matrix Coding Query:
with rows: <tree/Value Effects/*>
with columns: <tree/Use Orientation/*>
Search for content of rows NEAR content of columns

Figure 5-18: Matrix Coding Query Results for Value Effects versus Activity Levels & Use Orientation

Secondly, the value effect categories were juxtaposed with various categories classified under member characteristics. The matrix coding queries that yielded noteworthy results are shown in *Figure 5-19* below. As shown by the numbers in the first matrix, the three value effects of *perceived enjoyment*, *perceived satisfaction*, and *sense of virtual community* together are were able to account for the various gratifications that members seek through participation in their virtual communities. While perceived enjoyment was linked more strongly to the *relaxation & entertainment* gratifications, sense of virtual community corresponded strongly with both *social & emotive* as well as *identity & expression* gratifications.

Sense of virtual community also corresponded strongly with instances where multiple gratifications were reported by informants. Since the previous section had already substantiated a link between multiple gratifications and longer membership tenures, the researcher considered whether there was a temporal precedence relationship among the three categories of value effects. A separate matrix coding query was formulated between the casebook attribute of membership tenure and the three value effects. As shown in the results of the second matrix in *Figure 5-19*, indeed, a greater proportion of informants with longer tenures had comments coded at the sense of virtual community node. Interestingly, this pattern also repeated for the other two value effects which lead the researcher to formulate propositions that suggest a relationship between perceived enjoyment, perceived satisfaction, and sense of virtual community, in that order.

Gratifications Sought		Value Effects		
		A	B	C
		Perceived Enjoyment	Perceived Satisfaction	Sense of Virtual Community
1	Information & Surveillance	12	19	11
2	Social & Emotive	13	5	16
3	Identity & Expression	4	9	13
4	Relaxation & Entertainment	31	17	19
5	Multiple Gratifications	18	11	24

Matrix Coding Query:
with rows: <tree/Gratifications/*>, <tree/Multiple Gratifications>
with columns: <tree/Value Effects/*>
Search for content of rows NEAR content of columns

Value Effects		Membership Tenure		
		A	B	C
		Short (Less than 1.5 Years)	Medium (1.5 to 3 Years)	Long (3 Years or More)
1	Perceived Enjoyment	47%	54%	58%
2	Perceived Satisfaction	24%	41%	63%
3	Sense of Virtual Community	11%	44%	69%

Converted to Percentages based on total number of informants base coded as Short, Medium, and Long in their membership tenures.
Original Matrix Coding Query:
with rows: <tree/Value Effects/*>
with columns: <attributes/Informant-VC-Tenure/*>
Search for content of rows AND content of columns

Figure 5-19: Matrix Coding Query Results for Value Effects versus Gratifications Sought and Membership Tenure

Lastly, with respect to the *technological determinants* and *sociological antecedents* explored in the previous sections, it was shown through informant quotations for perceived enjoyment, perceived satisfaction, and SoVC that each of those categories was highly intertwined with factors such as website usability, information quality, organizational trustworthiness, member responsiveness, and member trustworthiness.

The complete list of relational propositions pertaining to the three value effects and their relationships with other factors are listed in *Table 5-12* below.

Table 5-12: Relational Propositions pertaining to Value Effects

S No.	Relevant Categories	Relational Propositions from Axial Coding
P39	Perceived Enjoyment & Website Usability	Enhanced website usability is associated with higher levels of perceived enjoyment.
P40	Perceived Enjoyment & Information Quality	Perceptions of superior information quality are associated with higher levels of perceived enjoyment.
P41	Perceived Enjoyment & Member Responsiveness	Higher levels of member responsiveness correspond with higher levels of perceived enjoyment.
P42	Perceived Enjoyment & Member Trustworthiness	Enhanced perceptions of member trustworthiness are associated with higher levels of perceived enjoyment.
P43	Perceived Satisfaction & Website Usability	Enhanced website usability is associated with higher levels of perceived satisfaction.
P44	Perceived Satisfaction & Information Quality	Perceptions of superior information quality are associated with higher levels of perceived satisfaction.
P45	Perceived Satisfaction & Perceived Enjoyment	Higher levels of perceived enjoyment correspond with higher levels of perceived satisfaction.
P46	SoVC & Member Responsiveness	Higher levels of member responsiveness are associated with an enhanced SoVC.
P47	SoVC & Member Trustworthiness	Enhanced perceptions of member trustworthiness are associated with an enhanced SoVC.
P48	SoVC & Organizational Trustworthiness	Enhanced perceptions of organizational trustworthiness are associated with an enhanced SoVC.
P49	SoVC & Perceived Enjoyment	Higher levels of perceived enjoyment correspond with an enhanced SoVC.
P50	Perceived Enjoyment & Activity Levels	Higher levels of perceived enjoyment are associated with higher activity levels of members.
P51	Perceived Satisfaction & Activity Levels	Higher levels of perceived satisfaction are associated with higher activity levels of members.

Table 5-12 continued below

Table 5-12 (continued): Relational Propositions pertaining to Value Effects

S No.	Relevant Categories	Relational Propositions from Axial Coding
P52	SoVC & Member Activity Levels	An enhanced SoVC is associated with higher activity levels of members.
P53	Perceived Enjoyment & Use Orientation	Higher levels of perceived enjoyment correspond with a ritualized use orientation.
P54	Perceived Satisfaction & Use Orientation	Higher levels of perceived satisfaction correspond with a ritualized use orientation.
P55	SoVC & Use Orientation	An enhanced SoVC correspond with a ritualized use orientation.
P56	Perceived Enjoyment & Gratifications Sought	Higher levels of perceived enjoyment are associated with relaxation & entertainment gratifications.
P57	SoVC & Gratifications Sought	An enhanced SoVC is associated with social & emotive gratifications.
P58	SoVC & Gratifications Sought	An enhanced SoVC is associated with identity & expression gratifications.

5.2.7 Member Engagement Process

During the qualitative analysis procedures, the transition to selective coding procedures in grounded theory methodology was marked by a focus on the conceptualization of the *member engagement process*. Within the emergent theory of member participation in virtual communities, the *member engagement process* was conceptualized as the *central phenomenon* that integrated the other predominant themes and patterns discovered and ascertained throughout the open and axial coding stages of analysis. With the analytic induction process focused on this category, the scope of qualitative analysis shifted from answering *"What all is going on here?"* towards answering *"What is the basic social process that underlies the phenomenon of interest?"* Transient models depicting relationships between theoretical constructs were revisited and formalized further to help identify the process based elements in the emergent theory.

There were several indications of an underlying process that integrated the various themes, categories and dimensions discussed in the previous section. For example, as noted in the previous section, a temporal precedence among the realization of value effects was

discerned. Similarly, the linkages between the development of *multiple gratifications* and *membership tenure*, as well as the relationship between *multiple gratifications* and lagged value effects such as *SoVC* indicated that over the course of their participation, members advance through different stages of engagement within their virtual communities.

The *member engagement process* was conceptualized as a process of advancement of virtual community members towards active participation levels and valuable modes of participation behavior, effecting a growing involvement in the virtual community. The process was conceptualized as a series of phases that members generally proceed through during their tenure in their respective virtual communities. The three phases were specified using the labels – *exploring commonality, experiencing conferment,* and *enjoying camaraderie.* Several informants had related the evolution of their online VC experiences in terms of stages that are aligned with this conceptualization. Some examples are as follows:

C-2	"My participation grew over time as I found others I could relate to and those I could help with my knowledge and skills. Participation is very second nature today as I have my own group of people I like to interact with and I know the types of things I enjoy engaging in when I'm here"
C-5	"I've definitely grown as a member of the community. Before, I used to simply ask questions and post simple comments, but over time I've realized what I can contribute, and I've become more confident in posting longer and hopefully more useful comments. I must say I enjoy my experience here much more today than I did when I started. I guess I'm more close to the community core than I used to be"
Coding Query: Search for Content Coded at <Member Engagement Process>	

Several other informants had similar experiences to share where they talked about a transformation in their participation profile over time. To make sense of these narratives, much of the qualitative data was revisited and re-coded to ascertain whether the three conceptualized phases are an appropriate characterization of the member engagement process. The following descriptions of the three phases were used to operationalize the coding process:

- *Exploring Commonality:* The first phase in the member engagement process is conceptualized to represent the early period of online participation where members explore connections and situate themselves among like minded members in the virtual community. Establishing awareness of the norms of the virtual community, discovering content that is of interest, and developing an initial network of connections are some of the activities that characterize the first phase in the member engagement process.

- *Experiencing Conferment:* In the second phase of member engagement, members develop a strong cognitive understanding of the virtual community and the resources it has to offer. Norms and expectations are internalized over duration of time, and members develop a stronger sense of self-efficacy with the use of various ICTs and with their own ability to add value to the virtual community through their contributions. This is the stage when members also start to feel part of the community since they get more recognition and attention from other members in the virtual community.

- *Enjoying Camaraderie:* The third phase of member engagement is when members develop a strong affinity to the community as a whole as a result of their continued use of the virtual community site, and regular pleasurable interactions with other members in the community. Whereas members in the previous stage were characterized by their cognitive embeddedness in the virtual community, those in this phase demonstrate an affective embeddedness and emotive attitudes towards the virtual community.

To make sense of some of the relationships explained by the member engagement process, the research constructed several models during the selective coding process. An example of an interim model for the member engagement process is shown in *Appendix D*. As more relationships and patterns began to be discovered, these models became increasingly complex and the researcher opted to use alternate means for explaining the central phenomenon and its relationships with other salient concepts in the emergent theory.

To aid the final configuration of findings from the selective coding process, the researcher utilized a *reflective coding matrix* – a tool that has been recommended for grounded theory studies by various qualitative researchers (Howell, 2006; Scott & Howell, 2008). As a descriptive and explanatory tool, the reflective coding matrix is designed to portray the central phenomenon by defining and describing within the context of patterns and relationships identified in the earlier phases of axial coding. In this way, it acts as "a relational bridge from the analysis of axial coding to the interpretation of selective coding" (Scott & Howell, 2008).

The reflective coding matrix for member engagement process was formulated to highlight the changes in participation dynamics as members advance through the three phases. Toward this, transformations in the various facets of *member participation behavior* are highlighted, along with the maturity in *member characteristics* as members become more experienced in their virtual communities. Additionally, the role of *technological determinants* and *sociological antecedents* throughout the member engagement process is traced to provide a holistic picture of factors that influence a member's involvement in the VC. Finally, the realization of value effects over the course of the member engagement process is highlighted. *Table 5-13* below presents the juxtapositions between the phases of the member engagement process and the pertinent categories from each theme.

Table 5-13: Reflective Coding Matrix for Member Engagement Process

Central Phenomenon	Member Engagement Process		
Process Stages	**Exploring Commonality**	**Experiencing Conferment**	**Enjoying Camaraderie**
Changes in Member Participation Behavior			
Activity Levels	- Passive activity levels with low frequency and duration of use	- Intermittent or active levels of participation with increased frequency and duration of use	
Task Modes	- Simple tasks modes such as consuming, connecting, and canvassing.	- Interactive task modes such as communicating and commenting.	- Value added task modes such as commentating, contributing, and collaborating.
Information Access Modes	- Heuristic information access modes to find content of interest.	- Heuristic information access modes to find content routine information. - Increased use of systematic information access modes to find accurate and reliable information.	- Concurrent use of both heuristic and systematic information access modes towards the realization of different tasks.
ICTs Utilization	- Use of public groupspaces to seek content of interest and to connect with other members - Dependency on scoring utilities for heuristic information access and to connect with core or popular members	- Greater use of semi-private groupspaces such as blogs and custom social groups - Extended use of expression aids for personalization and presentation of online identity - Some use of external interface features and social media extensions as an affirmation of identity and content preferences - Greater use of searching and browsing features for systematic information access	- Plurality in use of ICTs: - Different groupspaces based on gratifications sought; - Combination of searching & browsing features for important interactions as well as scoring utilities for routine participation ; - Continued use of expression aids to engage in interactive modes of communication
Use Orientation	- Primarily instrumental use orientation with specific goals and requirements to be met.		- Increased likelihood of ritualized use orientation with habitual and regular participation in the VC.

Table 5-13 continued below

Table 5-13: Reflective Coding Matrix for Member Engagement Process

<table>
<tr><th>Central Phenomenon</th><th colspan="3">Member Engagement Process</th></tr>
<tr><th>Process Stages</th><th>Exploring Commonality</th><th>Experiencing Conferment</th><th>Enjoying Camaraderie</th></tr>
<tr><td colspan="4">Maturity in Member Characteristics</td></tr>
<tr><td rowspan="2">Gratifications Sought</td><td rowspan="2">- Single gratifications related to the fulfillment of information & surveillance, or emotive and social needs</td><td>- Inclusion of Identity & expression gratifications</td><td>- Increased emphasis on relaxation & entertainment gratifications in addition to other gratifications.</td></tr>
<tr><td colspan="2">- Increased proclivity towards multiple gratifications</td></tr>
<tr><td>Self-Efficacy</td><td>- Relatively lower levels of technology and knowledge self-efficacy</td><td>- Improved levels of knowledge self-efficacy through member recognition and other positive reinforcements.</td><td>- Relatively higher levels of technology and knowledge self-efficacy through prolonged experience.</td></tr>
<tr><td colspan="4">Significance of Technological Determinants</td></tr>
<tr><td rowspan="2">Information Quality</td><td colspan="2">- Quick, accurate responses to questions and problems acts as a trigger for continued participation.</td><td>- Breadth of opinions and viewpoints on issues in addition to quick and reliable information.</td></tr>
<tr><td>- Rarity and novelty of information is important</td><td colspan="2">- Diversity of information is important.</td></tr>
<tr><td>Web Usability</td><td>- Ease of use of the primary groupspace platform is important to help intake of new members.
- Information design of VC site is important to help new members search, navigate and find the content that interests them.</td><td colspan="2">- Ease of use is important as an enabler for various ICTs that members use as they advance through the stages of engagement.
- Information design of VC site is important in helping members continue to find high quality information through the VC site.</td></tr>
<tr><td>Media Richness</td><td>- Features that facilitate effective interpersonal communication are important.</td><td>- Features that enable posting and sharing of personal content and self-expression are important.</td><td>- Features that facilitate rich and interactive modes of communication and collaboration are important.</td></tr>
</table>

Table 5-13 continued below

Table 5-13: Reflective Coding Matrix for Member Engagement Process

Central Phenomenon	Member Engagement Process		
Process Stages	**Exploring Commonality**	**Experiencing Conferment**	**Enjoying Camaraderie**
Significance of Sociological Antecedents			
Organizational Trustworthiness	- Organizational trustworthiness beliefs primarily based on observations of capabilities and competence of the management and technology administration.	- Organizational trustworthiness beliefs based on observations of concern for community, and fairness and justice in administration of VC.	
Member Responsiveness	- Prompt and sufficient number of responses act as a hook to continue participation.	- Sufficient number of responses act as a sign of respect and attention.	- Sufficient number of responses act as a sign of collective and shared identity as a community.
Member Trustworthiness	- Relatively lower levels of member trustworthiness beliefs, primarily based on perceptions of competence of members in answering queries and providing basic support	- Improved levels of member trustworthiness based on observations of cooperativeness of other members and their sincerity through interpersonal interactions over a prolonged duration.	
Realization of Value Effects			
Perceived Enjoyment	- Low levels of perceived enjoyment as members become aware of the benefits of the VC.	- Higher levels of enjoyment through consumption of useful content, and use of relevant ICTs towards various gratifications.	- Higher levels of enjoyment through interactive and pleasurable member interactions.
Perceived Satisfaction	- Contentment with information quality and website usability drive satisfaction.	- Contentment with member interactions drive satisfaction.	
Sense of Virtual Community	- Relatively lower levels of SoVC primarily based on perceptions of similarity and cooperativeness, and support of other members in the VC.	- Relatively higher levels of SoVC with feelings of belonging in the VC.	- Highest levels of SoVC with affective attachment to the VC.

Overall, the reflective coding matrix shows that as the *central phenomenon* in the emergent theory, the *member engagement process* (conceptualized over three phases) provides a central integrative means to bring together other emergent theoretical components. Using Strauss & Corbin's suggestion (1998, p. 168), the central phenomenon in this current study was conceptualizes as a *trajectory* . As the underlying process in member participation, the *member engagement process* helped explain the variation in member needs and priorities, changes in patterns of behavior, and shifts in valences attributed to technological and sociological factors over the course of a member's tenure in the virtual community.

In the later stages of selective coding, participant call-backs and expert feedback were used to determine the effectiveness of the member engagement process in terms of its efficacy to explain various aspects of member participation in virtual communities. The feedback comments from the seven call-back informants and one expert provided an acceptable substantiation of the research findings. Some examples of feedback comments are as follows[37]:

Researcher	"Does the member engagement process make sense?"
C-I-3	"I truly believe its spot on ... I went through it a few times to find a point which could have conflicted with my own experience on such communities , but I couldn't spot anything of concern really , coz the flow of the model was exactly as I progressed through my community" (*sic*)
C-I-2	"It's very thorough - I'm glad that you were able to use our focus groups to come up with this"
Researcher	"Does anything in particular stand out in the description of various relationships?"
C-I-5	"I was really intrigued at the way you explained our ritualized and instrumental behaviors in the model. I can totally relate to being in one mode or the other in the two different communities that I use. While one of them is a place I go to regularly without specific reasons, the other I use for asking specific questions and answering to others questions. I suppose this is what you mean with the "gratifications sought" component in the model, which again makes sense."
Expert-1	"I like how you explained the value-added task modes and related them to gratifications, ICTs, and ultimately engagement levels. I think practitioners can use this model in coming up with a roadmap for online communities."
Researcher	"On the whole, does the engagement process effectively capture the dynamics of member participation?"
C-I-2	"It makes a lot of sense to me - the way we end up acting in the community isn't always how we think about it, and this part of the model shows that well. How I feel about my community at a certain point in time is based on how engaged I am, how I act and what I do in my community is based on how engaged I am, and how committed I am to my community is based on how engaged I am. So, it works!."
C-I-4	"The description made sense to me for the most part. I enjoyed seeing it explicated in such a way.....made me really think about member participation."
Coding Query: Search for Content Coded at <Call-Backs/Member Engagement Process>	

In addition to an assessment of the *credibility* of qualitative research findings through participant and expert feedback, the *dependability* of the findings was also established through methods triangulation. Toward this, the next phase of quantitative empirical research was instigated using a subset of the socio-technical factors and their interrelationships. The next section provides a brief description of this abridged theoretical model which was formulated specifically for the quantitative phase of investigation in this study.

[37] A complete transcript of feedback from call-back informants and the expert reviewer is available in Appendix E.

5.3 Abridged Theoretical Model of Socio-Technical Determinants of Member Participation in Virtual Communities

The findings from the qualitative empirical investigation discussed in this chapter reveal a number of sociological and technological theoretical constructs that influence various aspects of member participation in virtual communities. Some of these constructs constitute enhanced representations of the sensitizing concepts which were used in the conceptual framework for this study, while others were discovered during the analytic induction process entailing open, axial, and selective coding procedures. Altogether, 58 relational propositions were also formulated to characterize the associations and linkages among the theoretical constructs and their various dimensions. This section deliberates the selection of a subset of the theoretical constructs and pertinent relational propositions for the construction of an abridged theoretical model suitable for quantitative testing. A quantitative substantiation of the empirical findings from the first phase advances the sequential exploratory research design used in this study.

5.3.1 Criteria & Selection of Constructs & Relationships

Various principles and criteria were used in selecting the constructs for further testing. These are briefly described in the five subsections below.

5.3.1.1 Significance of Theoretical Components in the Current Research Study

First, and foremost, the theoretical constructs that were considered for inclusion in the abridged theoretical model comprised the various themes and concepts that formed the basis of the current research study. Sensitizing concepts from the conceptual framework, as well as relational propositions applicable to the research questions were selected for inclusion in the abridged model. Specifically, *website usability*, *organizational trustworthiness*, *member trustworthiness*, and *sense of virtual community* (*SoVC*) were included in the abridged model to help answer the research questions that defined the preliminary agenda for this study.

With respect to each of these theoretical constructs, the qualitative findings revealed their multidimensional compositions. The category of *website usability* was conceptualized using information design and ease of use as subcategories; *organizational trustworthiness* comprised the dimensions of ability, benevolence, and integrity; *member trustworthiness* had competence, benevolence, and integrity as its dimensions; and *SoVC* had similarity & cooperativeness, support, belonging, and attachment as its characteristic dimensions. Further corroboration of the composite nature of these constructs was planned for the quantitative phase of this study.

Secondly, the relational propositions from qualitative findings that relate to the socio-technical constructs in the original conceptual framework are reproduced below. Further verification of these propositions was planned for the quantitative investigation phase.

Website Usability & Organizational Trustworthiness	Enhanced website usability is associated with improved perceptions of organizational trustworthiness.
Organizational Trustworthiness & Sense of Virtual Community	Enhanced perceptions of organizational trustworthiness are associated with an enhanced SoVC.
Member Trustworthiness & Sense of Virtual Community	Enhanced perceptions of member trustworthiness are associated with an enhanced SoVC.

5.3.1.2 Salience of the Theoretical Components

The second set of criteria adopted for the selection of relevant theoretical components was based on the salience of different constructs – considered in terms of their significance in the emergent findings, as well as their relationships with other constructs that had already been selected for inclusion in the abridged model.

A dominant theoretical construct that was screened in using these criteria was *information quality*. The category designated as information quality figured prominently in the emergent research findings as an important predictor of continued member participation. Furthermore, this category had relational propositions associated with the theoretical constructs pertaining to trustworthiness that were included in the conceptual framework of this research study. The relevant relational propositions from qualitative findings are replicated below.

Information Quality & Organizational Trustworthiness	Perceptions of superior information quality are associated with improved perceptions of organizational trustworthiness.
Information Quality & Member Trustworthiness	Perceptions of superior information quality are associated with improved perceptions of member trustworthiness.

Secondly, the construct of member responsiveness was accepted for the abridged model by virtue of its centrality to both member trustworthiness and sense of virtual community. Furthermore, the construct was also conjectured to be related to information quality. The applicable relational propositions from the qualitative findings are as follows.

Member Responsiveness & Member Trustworthiness	Higher levels of member responsiveness are associated with improved perceptions of member trustworthiness.
Member Responsiveness & Sense of Virtual Community	Higher levels of member responsiveness are associated with an enhanced SoVC.
Member Responsiveness & Information Quality	Higher levels of member responsiveness are associated with perceptions of superior information quality.

Based on similar criteria, the value effect pertaining to *perceived enjoyment* was also included in the abridged model. The axial and selective coding procedures revealed several relationships between *perceived enjoyment* and the other socio-technical constructs that were selected for the abridged model. The pertinent relational propositions are as follows.

Perceived Enjoyment & Website Usability	Enhanced website usability is associated with higher levels of perceived enjoyment.
Perceived Enjoyment & Information Quality	Perceptions of superior information quality are associated with higher levels of perceived enjoyment.
Perceived Enjoyment & Member Trustworthiness	Enhanced perceptions of member trustworthiness are associated with higher levels of perceived enjoyment.
Perceived Enjoyment & Sense of Virtual Community	Higher levels of perceived enjoyment correspond with an enhanced SoVC.
Perceived Enjoyment & Member Responsiveness	Higher levels of member responsiveness correspond with higher levels of perceived enjoyment.

5.3.1.3 Academic Scope of Research Investigation

The third consideration in the selection of relevant components for the abridged theoretical mode was that concerning the socio-technical scope of the current research investigation and its alignment with the information systems research discipline. While selecting additional constructs for the abridged model, the researcher considered the positioning of those constructs in the context of a nomological network of a virtual community's IT artifacts (e.g. constructs such as website usability and information quality). Aligned with Benbasat & Zmud's guidelines for IS research studies (2003), constructs within two degrees of separation from IT artifact specific features were given priority over those that had indirect relationships to IT artifact specific features. While many possibilities for theoretical constructs were eliminated based on these criteria, some constructs were screened in as well.

The construct of media richness was included as a relevant feature related to the characterization of virtual communities as IT artifacts. The construct was also shown to have relationships with other pre-screened socio-technical constructs including website usability, organizational trustworthiness, and member responsiveness. The following relational propositions are relevant to the inclusion of media richness in the abridged theoretical model:

Media Richness & Website Usability	Better website usability supports higher levels of perceived media richness.
Media Richness & Organizational Trustworthiness	Enhanced media richness is associated with improved perceptions of organizational trustworthiness.
Media Richness & Member Responsiveness	Enhanced media richness is associated with higher levels of member responsiveness.

Additionally, the value effect pertaining to *perceived satisfaction* was included in the abridged model. As a standard construct in DeLone & McLean's seminal model of IS success (1992; 2003), the construct is known for its efficacy as a predictor of technology use in various IS contexts (cf., Delone & McLean, 2003; cf., Petter et al., 2008), including those related to virtual

communities (Bhattacherjee, 2001; Lin, 2008). With relevance to the abridged theoretical model, the qualitative findings showed the category designated as *perceived satisfaction* to be associated with categories such as website usability, information quality, and *perceived enjoyment*. The relevant relational propositions are listed below.

Perceived Satisfaction & Website Usability	Enhanced website usability is associated with higher levels of perceived satisfaction.
Perceived Satisfaction & Information Quality	Perceptions of superior information quality are associated with higher levels of perceived satisfaction.
Perceived Satisfaction & Perceived Enjoyment	Higher levels of perceived enjoyment correspond with higher levels of perceived satisfaction.

Among the various categories that were screened out based on these criteria, those related to member gratifications were the most prominent in the qualitative findings. Typically, the subject of uses and gratifications has been considered in academic disciplines related to communication and media studies, and as such, these categories were outside the scope of further investigation in this current study. Furthermore, as highlighted in the next subsection, the non-inclusion of these constructs was not considered to be a major detriment in the study due to reasons related to the inclusion of surrogate constructs.

5.3.1.4 Feasibility of Quantitative Investigation & Parsimony of the Theoretical Model

Despite the prominence of the role of member gratifications as revealed in the qualitative findings, these categories were not included in the abridged theoretical model for quantitative investigation. There were multiple reasons for this decision – as follows:

The researcher considered the emergent qualitative findings related to member gratifications through the open, axial, and selective coding procedures to be a holistic depiction of the role these gratifications play as drivers and motivations for continued online participation. In fact, the qualitative findings in the previous sections have detailed relationships between these gratifications and factors from all other emergent themes including *member participation behavior*, *technological determinants*, *sociological antecedents*, and *value effects*. As such, their inclusion in the abridged model was not considered to add further value to the overall findings and results from this study.

Secondly, as described in the previous section on value effects, the three categories of perceived enjoyment, perceived satisfaction, and sense of virtual community were discerned to capture the effects of fulfilment of various gratifications. Hence, these value effects can essentially be considered as surrogates to the categories representing member gratifications. Together, the value effects capture psychological as well as hedonic benefits of online participation, and adding them to the abridged model would have unfavourably affected the parsimony of the model.

Lastly, the extant literature on uses and gratifications suggested that in quantitative models, a disconfirmation model approach should be used to measure the discrepancies between gratifications sought and obtained. Such an extensive undertaking was beyond the scope of this research study where the quantitative phase was primarily geared towards triangulating and complementing the findings from the qualitative phase.

Using a similar line of thought, instead of utilizing categories related to activity levels, the abridged model included a new latent construct designated as *willingness to participate*. Again, this decision was made in the interest of parsimony of the abridged model, and also to align with seminal theoretical models in the IS literature such as the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), and the IS Success model (DeLone & McLean, 1992; Delone & McLean, 2003) where similar constructs have been formulated to measure respondents' intentions to use technologies. As a conative component in the theoretical model, willingness to participate was linked to the three value effects that constitute cognitive and affective outcomes of member participation in virtual communities. The following three propositions were added to the model to complete the chain between cognitive, affective, and conative components in the abridged theoretical model.

Willingness to Participate & Perceived Enjoyment	Higher levels of perceived enjoyment are associated with a willingness to participate in the virtual community.
Willingness to Participate & Perceived Satisfaction	Higher levels of perceived satisfaction are associated with a willingness to participate in the virtual community.
Willingness to Participate & Sense of Virtual Community	An enhanced sense of virtual community is associated with a willingness to participate in the virtual community.

In summary, 22 propositions pertaining to 10 theoretical constructs were included in the abridged theoretical model. It was expected that the abridged model would adequately capture the socio-technical basis for member participation in virtual communities. Furthermore, through its testing, the abridged model was expected to yield a variance model description of member participation that triangulates and complements the findings in the process model description formulated during the qualitative research phase.

5.3.2 Abridged Theoretical Model Specification

In the specification of the abridged theoretical model, the researcher started with the itemization of constructs and relationships related to the IT artifact nomological network comprising the constructs of *website usability* (with ease of use and information design dimensions), *information quality*, and *media richness*. Other constructs with direct relationships to the IT artifact features were added next, followed by those at two degrees of separation. The relational propositions for quantitative testing were calibrated accordingly starting with propositions depicting relationships within the IT artifact nomological network, followed by

other direct and indirect relationships. The propositions are listed in *Table 5-14* below, and the abridged theoretical model is shown in *Figure 5-20*.

Table 5-14: Relational Propositions in the Abridged Theoretical Model

Degrees of Separation from IT Artifact Nomological Network	Proposition & Model Path	
0	**P1**	Website Usability → Media Richness
1	**P2**	Website Usability → Organizational Trustworthiness
	P3	Website Usability → Perceived Enjoyment
	P4	Website Usability → Perceived Satisfaction
	P5	Media Richness → Organizational Trustworthiness
	P6	Media Richness → Member Responsiveness
	P7	Information Quality → Organizational Trustworthiness
	P8	Information Quality → Perceived Enjoyment
	P9	Information Quality → Member Trustworthiness
	P10	Information Quality → Perceived Satisfaction
2	**P11**	Organizational Trustworthiness → Sense of Virtual Community
	P12	Member Responsiveness → Information Quality
	P13	Member Responsiveness → Perceived Enjoyment
	P14	Member Responsiveness → Member Trustworthiness
	P15	Member Responsiveness → Sense of Virtual Community
	P16	Member Trustworthiness → Perceived Enjoyment
	P17	Member Trustworthiness → Sense of Virtual Community
	P18	Perceived Enjoyment →Perceived Satisfaction
	P19	Perceived Enjoyment → Willingness to Participate
	P20	Perceived Enjoyment → Sense of Virtual Community
	P21	Perceived Satisfaction → Willingness to Participate
	P22	Sense of Virtual Community → Willingness to Participate

As an aid the quantitative phase of investigation, conceptual summaries were created for each construct included in the abridged theoretical model. Codebook data such as definitions of constructs, their properties, and dimensional subcategories were used in the quantitative phase to ensure that each construct is operationalized in the survey instrument to reflect its conceptualization in the emergent findings from the qualitative phase. *Appendix G* contains the codebook summaries for each construct in the abridged theoretical model.

It should also be noted that in the quantitative phase of investigation, the constructs pertaining to *website usability*, *organizational, member trustworthiness*, and *sense of virtual community* will be operationalized as multidimensional constructs using measurement items that align with their emergent conceptualization in the qualitative findings. The multidimensionality of these constructs will be tested using exploratory factor analysis procedures as detailed in the next chapter.

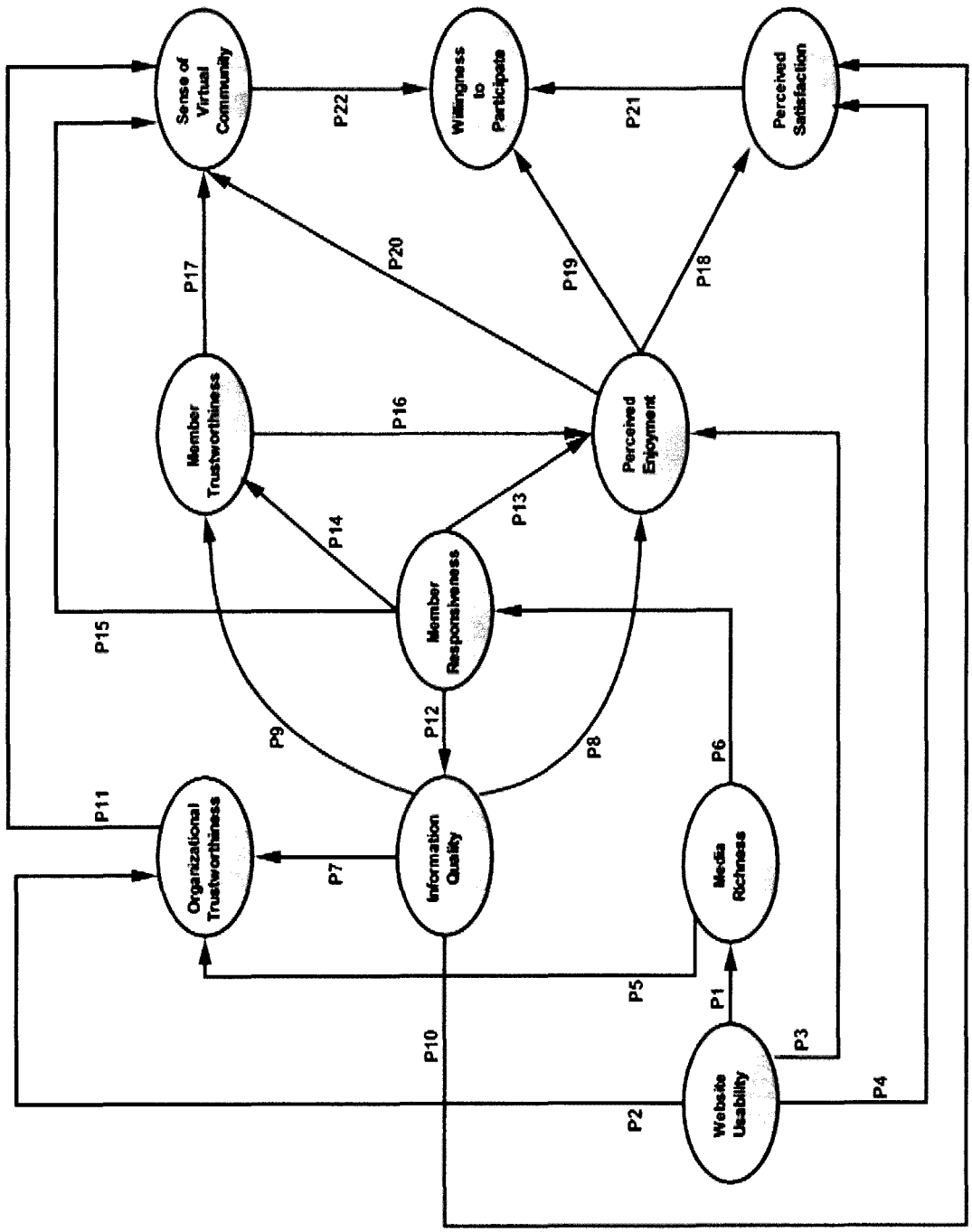


Figure 5-20: Abridged Theoretical Model for Quantitative Investigation

Chapter 6: Quantitative Research Methodology

This chapter discusses the research procedures followed in the second phase of empirical investigation of this dissertation. This quantitative phase aimed to triangulate and complement the findings from the qualitative research phase. By doing so, the *abridged theoretical model* presented in the previous chapter formed the basis of the deductive analysis in this quantitative phase of research.

This chapter begins with a description of the design of the survey instrument used in the collection of demographic, technographic, and psychographic data from a sample of virtual community members. Next, data collection procedures are discussed, including the processes followed to ensure adequate sample size and response rates. Last, data analysis techniques are described, including non-parametric statistical tests, exploratory factor analysis, and structural equation modeling (SEM) using partial least squares (PLS).

6.1 The Survey Instrument

The survey instrument used in this study comprised demographic, technographic and psychographic items. While the demographic and technographic characteristics of survey respondents could be measured with direct questions (i.e., questions that directly ask a person to report their age, gender, frequency of virtual community use, etc.), the theoretical constructs in the *abridged theoretical model* comprising latent variables could not be measured directly. Rather, the measurement of these latent variables required the utilization of psychometric scales that captured the shared variance among the indicators (items) that acted as manifestations of the constructs and their underlying concepts (Bollen & Lennox, 1991). As a result, the survey instrument comprised a combination of both psychometric scales to measure the model's latent variables, as well as direct questions to obtain pertinent demographic and technographic information from survey respondents.

Appendix H contains the complete survey instrument used for data collection in the quantitative phase. It details the operationalization of each construct in the *abridged theoretical model*, and also includes the technographic and demographic parts of the survey.

This section deliberates the selection of measurement items for the psychometric scales pertaining to each latent variable in the abridged theoretical model. While devising the scale of each construct, special attention was paid to the selection of indicators to ensure that these items aligned with the emergent conceptual categories, definitions, properties and dimensional subcategories of the construct as observed in the preceding qualitative analysis phase. These aspects of conceptualization also facilitated in the assessment of existing item scales that had been validated in other research studies.

By combining elements from the results of the analytic induction process (summarized in *Appendix G*) with other relevant items found in extant measurement scales, the researcher attempted to ensure initial content validity of the resource instrument. Where appropriate, indicators were adapted from item scales that had been previously validated in other research, especially in studies pertaining to virtual communities. Custom items were formulated in cases of constructs where a sufficient basis for relevant validated item scales was not found, or where the item scales from the extant literature did not agree with the emergent properties and dimensions of the theoretical constructs from the qualitative phase.

In the following subsections, the specific measurement items pertaining to each construct in the *abridged theoretical model* are discussed first, followed by a description of the technographic and demographic survey items. This is followed by a discussion of design considerations and how the survey items were validated with subject matter experts and virtual community members.

6.1.1 Construct Measurement Items

Consistent with the scheme followed in the elaboration of the abridged theoretical model presented in the last chapter, the sequence of discussion of the various theoretical constructs in this section is based on their relative positions in the IT artifact nomological network. Using degrees of separation of each construct from the antecedent constructs that constitute latent variables based on IT artifact features, the theoretical constructs and their measurement scales are discussed in the following sequence: *Website Usability*, *Media Richness*, *Information Quality*, *Organizational Trustworthiness*, *Member Responsiveness*, *Member Trustworthiness*, *Perceived Enjoyment*, *Perceived Satisfaction*, *Sense of Virtual Community*, and *Willingness to Participate*.

As purported in the discussion of the abridged theoretical model in the previous chapter, in the context of this research study, ***Website Usability*** appeared to be a multidimensional construct consisting of dimensions of *Information Design* and *Ease of Use*. The analytic induction procedures that were followed in the previous phase had shown the two dimensions to be manifestations of usability of the virtual community website. However, formal support for this proposition of multidimensionality was incorporated into the overall objectives of the quantitative phase of research. Consequently, it was decided that the construct of website usability should be operationalized using items from both dimensions, and the validation of the claim of multidimensionality be left for statistical analysis procedures such as exploratory factor analysis (used in the quantitative analysis procedures in this research study).

In considering the emergent properties of the *Information Design* and *Ease of Use* dimensions, abundant support was found for operationalizing the measurement scale for the latter of the two. The properties of *consistency*, *efficiency*, and *learnability* had been used in

item scales pertaining to the perceived ease of use (PEOU) construct in other studies utilizing the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), and the system quality construct in the IS Success Model (DeLone & McLean, 1992; Delone & McLean, 2003). Furthermore, a multitude of standardized usability evaluation instruments such as the System Usability Scale (SUS), NAU (Nielsen's Attributes of Usability), and CSUQ (Computer System Usability Questionnaire) provide similar operationalizations of usability using the afore-mentioned properties of consistency, efficiency, and learnability (see Perlman, 2002). Items from the PEOU and the system quality scales, as well as other standardized usability scales, have subsequently been used in measurement scales for surveying virtual community members about their perceptions of ease of use of their virtual community websites (Lin, 2006; Lin, 2007a). Upon considering the items in these various scales and comparing them with the conceptual properties that emerged out of the analytic induction phase of this research, the researcher opted to adapt items from the System Usability Scale (SUS) and the NAU (Nielsen's Attributes of Usability) scale. Overall, the items in these two scales mapped well to the properties of the ease of use dimension. The use of SUS has previously been recommended for low-cost and reliable website evaluations (Brooke, 1996), and questionnaires based on SUS have also been shown to produce more accurate results when compared to some of the other instruments mentioned above (Thomas & Stetson, 2004). Items from Nielsen's Attributes of Usability (NAU) were included in the list to ensure better content validity of the resource instrument.

In contrast to the website usability dimension of ease of use, the *Information Design* dimension had not been studied to the same extent in prior research. The analytical properties of this dimension of website usability included the *organization and presentation of content and features* on the virtual community website. The only prior studies that the researcher knows of that directly formulated measurement items for information design was the research conducted by Cyr & Bonnani (2005) in the context of e-Commerce websites. In the context of virtual commuities, Chignell et al. (2000) evaluated virtual community websites on the basis of their structure and presentation, factors matching the conceptual properties of the information design dimension that were identified in this research. Therefore, the measurement scale in this study adapted pertinent items from the questionnaires used by Cyr & Bonnani (2005) as well as Chignell et al. (2000) by modifying the wording of the scale items to better reflect the emergent properties of the information design dimension from the qualitative research phase.

In considering the item scale for ***Media Richness***, which was observed in the qualitative analysis phase to be an important theoretical construct affecting the interactive design aspects of a virtual community website, the researcher adapted four measurement items from Daft and Lengel's (1987) original instrument where the authors studied media richness in the context of organizational communication channels. The survey instrument used by Daft and Lengel (1987) has subsequently been used in the context of assessing media richness for email (Carlson & Zmud, 1999), as well as online storefronts (Brunelle & Lapierre, 2008). In the context of empirical research on virtual communities, however, media richness has only been evaluated in

experiment based studies (Williams et al., 2007; Wise et al., 2006) which meant that there no measurement items were found that would directly assess media richness in the specific context of virtual communities.

In assessing the applicability of Daft and Lengel's (1987) four item scale, these items were compared with the properties of the conceptual category of *Media Richness* from the qualitative findings. These properties included: *rich symbols*, *multimedia content*, *response immediacy*, and *custom message formats*. The items from Draft and Lengel (1987) directly addressed most of the properties and their underlying nuances except for the *multimedia content* property. Therefore, one additional item was added to include this missing conceptual property in the context of virtual communities. Furthermore, in addition to the single items that pre-existed in Daft and Lengel's (1987) scale for *custom message formats* and *rich symbols*, the researcher found it necessary to add one more item for each of these two properties to ensure coverage of all ascriptions of these properties (found during inductive analysis) and the overall content validity of the scale.

In the case of ***Information Quality***, the theoretical construct was formalized using the conceptual properties that were found during the open coding stages of the qualitative research, namely, *relevance*, *timeliness*, *reliability*, *breadth of perspective*, and *usefulness*. Other measurement scales in the extant literature have also adopted similar items to characterize information quality as a reflective first-order construct (Bailey & Pearson, 1983; DeLone & McLean, 1992; Delone & McLean, 2003; Mishra et al., 1993), and these instruments have also subsequently been utilized within the context of surveys on virtual communities (e.g., Lin, 2008; e.g., Porter & Donthu, 2008). Since these item scales have demonstrated internal consistency and reliability in prior research, the items from these scales were adapted for inclusion in this study's survey questionnaire resource instrument. The only exception was *breadth of perspective* which was added as a new item to the information quality scale, as during the qualitative analysis phase, this item had appeared to be a significant property manifesting information quality in virtual communities.

Moving to a single degree of separation from the IT artifact based constructs elaborated above (*Website Usability*, *Media Richness*, and *Information Quality*), the next construct in the abridged theoretical model pertains to ***Organizational Trustworthiness***. In a similar vein to the treatise of the *Website Usability* construct detailed above, the *Organizational Trustworthiness* construct was noted to be potentially multidimensional within the context of virtual communities – specifically, consisting of dimensions of *Ability*, *Benevolence*, and *Integrity based* beliefs that a virtual community member holds about the virtual community organization and administration. However, the validation of this postulate was deferred to exploratory factor analysis procedures (detailed in the next chapter on quantitative analysis), and it was decided that the initial measurement scale for the construct be operationalized using items from all three dimensions.

To instantiate a measurement scale for the *Organizational Trustworthiness* construct, the researcher corroborated the properties of the conceptual category of organizational trustworthiness from the qualitative analysis results against validated survey item scales from the IS literature, especially within the context of virtual communities. On the outset, there are many versions of measurement scales pertaining to institution and organization based trusting beliefs in the research domains of marketing and e-Commerce (Gefen et al., 2003; Gefen & Straub, 2004)[38]. For example, in the marketing literature, Doney and Cannon (1997) provided a unidimensional instantiation of organizational trustworthiness in buyer-seller relationships with survey items pertaining to all three trustworthiness dimensions that are of interest to this study. On the other hand, Ganesan and Hess (1997) used a survey instrument to assess perceptions of organizational benevolence and credibility, the latter being similar to the conceptualization of the dimension of *Integrity* within the overall Organizational Trustworthiness construct in this research study. Of particular relevance to this research study, the operationalization of organizational (or institution-based) trustworthiness beliefs in e-Commerce research provide further possibilities to consider for generating items for the survey resource instrument. However, the operationalization of organizational trustworthiness has varied across the e-Commerce research literature as well. While Jarvenpaa et al. (1999b; 2000) provide a unidimensional conceptualization of the construct, Gefen (2002), Gefen et al. (2004), McKnight et al. (2001b; 2002; 2003), and Serva and Fuller (2005) all provide an operationalization based on three dimensions similar to the dimensions observed in the qualitative analysis phase of this current research study.

In the afore-mentioned studies where organizational trustworthiness has been conceptualized along three dimensions, most researchers have used the trustworthiness components suggested by Mayer et al.'s (1995) conceptualization of ability, integrity and benevolence as the dimensions (Gefen & Straub, 2004; McKnight et al., 2002; Serva & Fuller, 2005).

In the specific context of virtual communities, there is generally a dearth of studies in which organizational trustworthiness has been an explicitly considered construct; therefore, specific measurement items are not available as extensively as in other research areas. Furthermore, in the few studies that have addressed the issue of organizational trustworthiness, conceptualizations have varied considerably. For example, Porter and Donthu (2008) utilized dimensions of benevolence, integrity, and judgment – three dimensions which were construed to be specific to the context of their research. Contrary to Porter and Donthu's operationalization, Chiu et al. (2006) presented a unidimensional version of organizational trustworthiness in their research on virtual communities, while Lin and Lee (2006) included aspects of organizational trustworthiness within the construct of service quality.

[38] Useful summaries of prior conceptualizations of organizational trustworthiness can be found in Gefen et al. (2003), (2003 - See Table 1 in Article) ; and Gefen and Straub (2004 - See Table 1 in Article).

The disparate conceptualizations of organizational trustworthiness, even within specific research contexts, lends support to the approach adopted in this study whereby the construct was operationalized using items from the three underlying dimensions of *Ability*, *Benevolence*, and *Integrity*. In doing so, this study adapted items based on the trustworthiness components suggested by Mayer et al.'s original conceptualization, and all items were corroborated against the emergent properties of each of the three dimensions observed during the qualitative analysis phase. This ensured a context-specific operationalization of the organizational trustworthiness construct, a practice that has been strongly recommended by other researchers who have extensively studied the construct and the implications of its contrasting conceptualizations (Jarvenpaa et al., 2004; Schoorman et al., 2007).

For the theoretical construct of ***Member Responsiveness***, this study directly utilized the validated three-item measurement scale suggested by Ridings et al. (2002a). These researchers noted an absence of research on the construct of member responsiveness and its relationship with other variables that affect participation in a virtual community. Gefen and Ridings (2005) later used the measurement items from Ridings et al. (2002a) in their study on the quality of member interactions where member responsiveness was used as a control variable.

In the context of this research study, the researcher too was unable to find other examples of previously validated instruments that measured the *promptness* and *quantity* of responses which were identified in the qualitative analytic induction phase as conceptual properties of the Member Responsiveness construct. The only other relevant studies which the researcher is aware of include Wise et al. (2006) in which the authors used an experiment based environment to manipulate the rate of responses to assess the impact of responsiveness on participation intention of members in a virtual community, and a study by Arguello et al. (2006) where responsiveness was analyzed through structured content analysis techniques. After a comparison of the previously validated scale items in Ridings et al. (2002a) with the conceptual properties of member responsiveness from the qualitative analysis phase, the researcher found the scale items to be an adequate basis for the purpose of a measurement instrument for the member responsiveness construct in this study. Table 6-5 below identifies the resulting measurement scale for *Member Responsiveness*.

Moving further downstream in the abridged theoretical model, the construct of ***Member Trustworthiness*** was considered to be another instance of a latent variable that might exhibit multidimensional characteristics with *Competence*, *Benevolence*, and *Integrity* as the three underlying dimensions[39]. However, similar to the treatise described for other potentially multidimensional constructs, the validation of this postulate was deferred to exploratory factor analysis procedures, and it was decided that the initial measurement scale for the construct be operationalized using items from all three dimensions.

[39] Recall from the previous chapter that although organizational trustworthiness and member trustworthiness comprise dimensions that are similar in nature, researchers generally agree on institutional and interpersonal trust constructs being discriminant from each other. See McKnight and Chervany (2001).

In the process of finding examples of previously validated measurement instruments for member responsiveness, the researcher consulted the original components of trustworthiness by Mayer et al. (1999; 1995) and Schoorman et al. (1996) who had conceptualized their theory of trust within the context of dyadic interpersonal relationships inside an organization. Jarvenpaa et al. (1998) later adapted and modified the measures from these previously validated instruments to fit the context of multiple interdependencies found in a team context. The conceptualization by Jarvenpaa et al. (1998) is also relevant for the operationalization of the member trustworthiness construct in the context of virtual communities, and as such it has been adapted in recent research studies on virtual communities (Casaló et al., 2008a; Lu et al., 2008; Ridings et al., 2002a). Despite the common basis for conceptualization (similar components of trustworthiness), the studies on member trustworthiness in virtual communities have used different dimensions in their theoretical models. For example, while Lin (2006) used a unidimensional conceptualization of member trustworthiness, Ridings et al. (2002a) used two dimensions with ability as a distinct dimension, and benevolence and integrity combined into a second dimension, and Casaló et al. (2008a) employed three dimensions labeled as competence, benevolence, and honesty. It is in light of these types of differences in formalization of the dimensions underlying member trustworthiness that Daneshgar and Ho (2008) recommend that researchers need to use a context-specific operationalization of this particular theoretical construct. The current research study heeds to this advice, and as such, the construct of member trustworthiness was operationalized using items from the three underlying dimensions of *Competence*, *Benevolence*, and *Integrity*. In doing so, this study adapted items from measurements scales that were used in virtual community research contexts, and all items were corroborated against the emergent properties of each of the three dimensions observed during the qualitative analysis phase.

As a proposed direct consequent of some of the cognitive variables, ***Perceived Enjoyment*** constitutes the first of the affective constructs in the theoretical model. In considering possible measurement items for the resource instrument for this construct, the researcher consulted the extant IS literature that discussed aspects of intrinsic motivational factors within the context of use of various types of information systems ranging from computing software at the workplace (Davis et al., 1992), to the use of the Internet (Teo et al., 1999), to the consumption of e-Commerce services (Cyr et al., 2007; Hassanein & Head, 2006). Also, as elaborated in the previous chapter, in the specific context of virtual communities, perceived enjoyment has been conceptualized within the scope of uses and gratifications of participating in virtual communities (Dholakia et al., 2004; Jin et al., 2007).

To aid in the formulation of the appropriate measurement items for perceived enjoyment, a comparison was performed between its conceptual properties identified during the analytic induction phase of this research, and the items from various measurement scales used in the studies highlighted above. As a result of this exercise, it was deemed appropriate to use a measurement scale similar to some of the ones used in e-Commerce literature, as the

definition of the construct and its underlying conceptual properties mapped better to items in those scales. As such, this study adopted the conceptualization offered by Davis et al. (1992) and the specific items from the measurement scale by Hassanein and Head (2006). Despite being formalized for an e-Commerce context, this scale provided a sound basis for measuring the conceptual properties of perceived enjoyment as identified in the qualitative research phase. One additional item was included in the scale to capture the conceptual property of *fun* as the qualitative analysis phase had shown it to be an important manifestation of perceived enjoyment in the context of virtual communities.

As one of the two penultimate outcome variables included in the abridged theoretical model, ***Perceived Satisfaction*** constituted a combination of affective and evaluative characteristics that needed to be included in the survey resource instrument. While searching for examples of a relevant previously validated scale, it was apparent that while some researchers had used their own specific formulations to measure member satisfaction in virtual communities (e.g., De Valck et al., 2007; e.g., Jin et al., 2007; e.g., Lin, 2007a; e.g., Lin & Lee, 2006), others had adopted satisfaction scales from studies from other disciplines where satisfaction with different aspects of technology- and organization-based interactions were being considered (cf. Bhattacherjee, 2001).

During the process of constructing an appropriate scale for perceived satisfaction, the researcher considered whether a disconfirmation approach should be adopted to measure the difference between a virtual community member's perceptions of actual performance and expectations of the community as a whole. This approach termed as the expectancy-disconfirmation approach to measuring satisfaction (Oliver, 1980; Oliver et al., 1994) has previously been used in the popular SERVQUAL instrument designed by Parasuraman, Zeithaml, and Berry (1985; Parasuraman et al., 1986), and has also been adopted in many IS studies (Chiu et al., 2005; Parasuraman et al., 2005). After an evaluation of the feasibility of the expectancy-disconfirmation approach to measure satisfaction, the researcher decided against it for the purposes of this study for reasons outlined herewith. Firstly, the original instrument for the expectancy-disconfirmation approach as well as its later adaptations constitute a cognitive model for measuring satisfaction, while the conceptual basis of the construct in this study was observed to be affective and evaluative in nature. Secondly, using the expectancy-disconfirmation approach would have essentially required a double-scale which was deemed infeasible for this study given the length of required resource instrument for satisfaction and the potential of the double-scale to extend the survey considerably. Finally, it was also noted that many researchers have warned against the use of a disconfirmation approach on the basis of theoretical and empirical grounds (Cronin & Taylor, 1994), while others have noticed psychometric problems with the approach in general (Peter et al., 1993). These researchers recommend the use of a performance-only scale, which displays better discriminant and nomological validity, and as such this study adopts a performance-only scale to measure perceived satisfaction of members in their respective virtual communities.

The scale items used in this study's resource instrument for perceived satisfaction were adopted directly from Bhattacherjee (2001) who used items from Spreng et al.'s (1996) overall satisfaction scale to assess member satisfaction in virtual communities. The items in Bhattacherjee's (2001) adapted scale mapped well to all the conceptual properties observed for the perceived satisfaction construct during the qualitative analysis phase. The scale was formulated to capture member satisfaction levels between four semantic differential adjective pairs: very displeased/very pleased; very frustrated/very contented; very terrible/very delighted; and very dissatisfied/very satisfied. This scale was deemed more appropriate than its alternatives because according to previous research, affect such as satisfaction can best measured along bipolar evaluative dimensions (e.g., good/bad) (Ajzen & Fishbein, 1977). Furthermore, as it will be elaborated in the upcoming section, this semantic differential approach also distinguished the satisfaction scale from other Likert-type measurement scales used in the survey. The use of multiple scale formats has been recommended as an effective approach to reduce common-method bias in survey research (Podsakoff et al., 2003).

Sense of Virtual Community typifies the other construct in the theoretical model with affective and evaluative characteristics. As noted in other research studies on virtual communities, there is a severe gap in the extant literature where this construct has been investigated empirically (Blanchard, 2007b; Koh & Kim, 2003). Furthermore, in studies that have investigated this construct empirically, many researchers have either utilized an adapted version the Sense of Community Index (SCI), a measurement instrument developed by McMillan and Chavis (1986) for their research on sense of community in face-to-face communities (Forster, 2004; Obst et al., 2002a; Obst & White, 2004a; Yoo et al., 2002a). However, Blanchard (2007b; 2007c) and Ellonen (2007) emphasize that this adaptation may be problematic as the SCI instrument may lack adequate content validity in the context of virtual communities, and they advise researchers to operationalize context-specific versions of the construct within the scope of their own studies. In fact, some studies have identified significant differences between the conceptual foundations of sense of community and sense of virtual community (Blanchard, 2007c; Blanchard & Markus, 2002; Ellonen et al., 2007).

The issues surrounding the lack of standardized measurement items for the construct are further expounded by a lack of agreement among researchers about the dimensionality of the construct. While some researchers have conceptualized sense of virtual community along the original four dimensions suggested by McMillan and Chavis (1986) (Obst et al., 2002b), others have found fewer dimensions to be a more appropriate operationalization of the construct (Blanchard, 2007c; Yoo et al., 2002a). In this current study, as discussed in the previous chapter, *Sense of Virtual Community* has been conceptualized along four initial dimensions that emerged out of the analytic induction phase of the research study, namely, *Belonging*, *Similarity & Cooperativeness*, *Support*, and *Attachment*. However, following the same mode of investigation as with other possibly multidimensional constructs in the theoretical model, validation of the construct's dimensionality was deferred to exploratory factor analysis

procedures. Consequently, the initial measurement scale for the construct was operationalized using items from all four dimensions. The items for the resource instrument for Sense of Virtual Community were directly adapted from Blanchard (2007c). The validated 18-item scale in Blanchard's study provided an adequate basis for measuring the four anticipated dimensions of the construct as the items addressed all of the conceptual properties identified in the qualitative phase for each of the four dimensions. Minor changes in wording had to be incorporated into the resource instrument for sense of virtual community consisting of 13 items in total.

Finally, in the theoretical model, ***Willingness to Participate*** constitutes the ultimate criterion variable symbolizing the conative response of members regarding their intention to continue participating in the virtual community.

The extant IS literature has articulated intention based criterion variables in different ways. The most popular formulation of a measurement scale for intention based consequents found in the IS literature is one that is based on the behavioral intention (BI) construct from the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), which itself was adapted from the behavioral intention construct in the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

While the behavioral intention construct from TRA and TAM provides a suitable generic basis for measuring user motivations to use different technologies, within the context of the current research study, the qualitative findings had indicated that members of virtual communities framed their intentions to keep participating in their virtual communities more explicitly in terms of their motivational propensities. Hence, many virtual community researchers have formulated measurement scales that assess the continuance intentions based on specific propensities (Jin et al., 2007; Porter & Donthu, 2008; Ridings et al., 2002a). While some item scales in these studies were customized by the researchers, others used the formulation suggested by Mathieson (1991) whereby respondents' intentions to use specific features of technologies are individually considered.

For this study, the researcher formulated the measurement of willingness to participate using a context-specific approach recommended by other virtual community researchers (Porter & Donthu, 2008; Ridings et al., 2002a). The resource instrument used to measure willingness to participate was based on the motivational propensities identified during the qualitative analysis phase, namely, the propensity for information exchange, and the propensity for social interaction. Therefore, two items were used to measure a member's willingness to participate in information exchange and willingness to participate in social interaction. A third item was added to meet Nunnally's (1978) suggested practice of at least three items per construct. This third item assessed members' overall willingness to participate in the virtual community. Using such an operationalization also aligned well with the properties of the willingness to participate construct as observed from the previous analytic induction phase.

Overall, in this study, the process of formulating a survey questionnaire resource instrument was based on corroborating and integrating the findings from the qualitative analysis phase with previously validated measurement instruments and using a context-specific operationalization of each theoretical construct. By doing so, it was believed that the survey questionnaire resource instrument used in this study would adequately capture cognitive, affective, evaluative and conative responses of the respondents.

6.1.2 Technographic and Demographic Measurement Items

In terms of the *technographic questions* included in the survey, these primarily pertained to inquiring about patterns of participation in virtual communities. The main purpose of these including these questions was to be able to use response data to characterize member participation in virtual communities along the lines of the extent of their participation, their motivations to participate, and their usage patterns pertaining to various virtual community tools and features.

Firstly, single item questions were included asking respondents about their ***Duration of Membership*** in the virtual community, and their ***Level of Participation*** reported using number of hours they spend in their respective virtual communities. Using the data from responses to these two questions, the researcher planned to produce a factual profile of respondents in terms of their self-reported participation levels, and gain a sense of the type of respondents who completed the survey (e.g. identifying them as core versus peripheral participants) to the establish external validity and generalizability of the results from the quantitative analysis phase.

Along similar lines, two multiple-item questions were included to ask respondents about their ***Reasons for Participation*** in their respective virtual communities. These questions reflected the findings on *motivational propensities* of virtual community members from the preceding qualitative analysis phase. Accordingly, the first of the two questions asked members about the characteristics of their participation in terms of *information exchange* activities, while the second question pertained to aspects of their *social interactions* in the virtual community. The purpose of including these questions in the survey was to allow the researcher to recognize any significant sample bias based on the virtual communities that were solicited for participation in the study or in terms of the members from these communities who chose to respond to the call. Furthermore, the researcher also planned to perform a cluster analysis of motivational propensities to be able to relate these clusters to other demographic and technographic information obtained in this research.

Lastly, in terms of technographic items in the survey, the final set of items pertained to the ***Tools and Features*** that virtual community members utilized within their virtual communities. A short-list of the most popular tools and features was generated based on the narratives of informants from the qualitative research phase, and survey items were created for

each tool or feature. Fourteen tools and features were incorporated into the survey and the respondents were asked to indicate their level of use of these tools and features on a 7-point scale ranging from "Use Very Rarely" to "Use Very Frequently". An additional open-ended item was included to allow respondents to mention any other virtual community tools or features they utilize on a regular basis.

The final section of the survey solicited respondents about *demographic information*. Although this research study did not formally include any propositions based on the role of member demographics as control variables in the theoretical model, it was deemed necessary to incorporate demographic information in the quantitative results to present a holistic picture that framed the analysis and results vis-à-vis the characteristics and attributes of the sample of survey respondents. Questions regarding the respondents' ***Age***, ***Gender***, ***Education***, and ***Occupation*** were included in the questionnaire.

6.1.3 Design Considerations for the Survey

While the theoretical model constructs and their relevant indicators were the primary driving force that influenced the formulation of the measurement scale, the statistical procedures that were planned to be used for data analysis were also taken into account during the development of the standardized questionnaire. Additionally, the researcher followed the design guidelines for surveying virtual communities as suggested by Couper et al. (2001) and Andrews, Nonnecke, and Preece (2003), as well as guidelines for self-report instruments offered by Podsakoff et al. (2003; 1986) to maximize survey data quality and minimize error attributable to method and format of survey questions.

Firstly, the alignment between the survey instrument scales and the planned quantitative analysis procedures was ensured. Germane to the proposed exploratory factor analysis and structural equation modeling procedures for statistical analysis, the survey questionnaire predominantly consisted of closed and direct questions. As illustrated in the previous two sections, fully anchored Likert-type scales (Likert, 1932) were used to operationalize the measurement of most indicators for the constructs in the theoretical model. The advantage of using Likert-type scales is that the data collected are ordinal, i.e. they have an inherent order or sequence, and when structured with equal intervals, these scales can provide a strong summative evaluation basis for both descriptive as well as inferential statistical analysis procedures (Mueller, 1986; Reid, 2006). The Likert-type scales used in this study's survey questionnaire were formulated using seven ordered response options (odd number of options has been recommended in prior research), and each response option was labelled verbally as well as numerically to ensure that the anchors were scaled to approximate equal intervals. Furthermore, to operationalize non-response in the survey, the scale for all items in the questionnaire contained a "Not Sure/Prefer Not to Say" option without a numerical label. The use of such an option in survey questionnaires has been known to "increase satisficing"

(Holbrook et al., 2003). The exceptions to Likert-type scale usage were the choice item questions used for demographic variables such as age, gender, education and occupation; and the questions on tools and features and perceived satisfaction which used a seven-point semantic differential scale. As highlighted earlier, these minor changes in the types of scales for a few questions in the survey are recommended by researchers for reducing the problems associated with common method bias (Podsakoff et al., 2003).

Secondly, with respect to the visual design aspects of the online survey questionnaire, the survey employed a simple layout with straightforward navigation and kept graphics based elements to a minimum to ensure quick download time (Andrews et al., 2003; Couper et al., 2001), and add credibility to the survey (Couper et al., 2001; Dillman, 2000).

Lastly, in terms of design aspects of the online survey that can affect the quality and validity of data obtained, the researcher adhered to various best practices that have been recommended by researchers for reducing common method bias (Podsakoff et al., 2003; Podsakoff & Organ, 1986). Special care was taken to alleviate bias associated with *item ambiguity* (Peterson, 2000; Podsakoff et al., 2003), *item priming effects* (Podsakoff et al., 2003; Salancik & Pfeffer, 1977), and *context cues (Podsakoff et al., 2003; Straub et al., 1995)*. To alleviate concerns of *item ambiguity*, the wording of the questions and items was ensured to be at a high school level of comprehension[40], and a three-stage pre-test was conducted with subject matter experts and virtual community members, and wording was modified to improve clarity and comprehensiveness of the questions and their items. The details of the pre-testing are provided in the next section. In terms of *item priming effects*, the section labels and question wording was carefully selected to ensure that respondents don't artificially correlate items to their specific constructs. This was done by using question and instruction wording that did not directly associate with the construct being measured by the items in the question. For example, the instruction wording for the items measuring *Perceived Satisfaction* was as follows: *"Please evaluate your feelings about this virtual community based on your participation experiences:"*, and the individual items pertained to various manifestations of perceived satisfaction. To counter *context cues* associated with the ordering of questions pertaining to antecedent and consequent variables, the questionnaire did not utilize a sequence that implied a logical association among different sections. Invariably, questions pertaining to downstream consequent constructs were placed before the questions related to their antecedents. By using these simple techniques, the researcher hoped that some sources of common method bias would not be as much of a concern during the administration of the survey.

[40] The Call for Participation, Information Sheet, and all other sections of the online survey were processed through the online readability assessment tool offered at http://juicystudio.com. The results of readability indices averaged across the various survey components showed the survey instrument to be comprehensible at a grade 10 reading level (Average of Gunning-Fog index: 10.68 ; Average of Flesch-Kincaid grade level index: 9.22). See website noted above for details on interpretation of these indices.

6.1.4 Survey Pre-Testing

Pre-testing of a survey instrument is regarded as a crucial step in the development and design of a survey questionnaire ensuring the adequacy of planned survey administration and data collection procedures (Andrews et al., 2003; Preece et al., 2002). The online survey questionnaire developed as part of this study was subjected to multiple rounds of revisions using a three stage pre-testing process. The use of a multistage pre-testing process for electronic surveys has been recommended by many researchers (Dillman, 2000; Oppenheim, 2001).

In the first stage of pre-testing, the resource instrument in the survey questionnaire was evaluated by the researcher's supervisor and advisory committee. Using their knowledge of conducting online surveys and with extensive background in studying some of the constructs in the theoretical model, these experts were able to offer practical insights for the sequencing of questions, formatting, and wording of the various questions and items in the survey instrument.

The second stage of pre-testing comprised an interactive session between the researcher and three undergraduate students who were recruited to individually complete the survey with the researcher present. These undergraduate students were active members in various online communities and therefore constituted a representative basis for potential respondents to the survey. Using an adapted version of the "think-aloud" protocol (Ericsson & Simon, 1987; Lewis & Rieman, 1993), the researcher was able to gain a sense of the understandability of survey questions by respondents, the interpretation consistency of the respondent while answering the survey, as well as the overall impression of the survey instrument. This stage facilitated some additional changes. Some wording in the introduction section of the survey was improved to better inform the potential respondents about the nature of the survey and its anticipated benefits. Furthermore, a navigation status bar was added to the survey to allow respondents to see the proportion of the survey that had been completed.

In the final stage of pre-testing, the survey was launched at two virtual community websites where the researcher was already a member for the past several years. Permission to post the call for participation was sought in advance from the administration of the two communities, and the survey link was posted by the researcher in the form of a posting on the discussion forum. The post remained active for five days during which the researcher got a chance to interact with potential respondents and addressed their questions. A total of 14 responses were received over the period of five days which allowed the researcher to verify the mapping between scale labels and values for the ordinal values to be used in the analysis, as well as the format of data file and its compatibility with the data analysis software (MS Excel, SPSS and SmartPLS) that were to be used in the quantitative analysis and reporting phase. This stage of pre-testing also facilitated the refinement of the call for participation into a format that is better suited for posting on discussion forums. The 14 responses from survey pre-testing phase were not included in the final dataset for analysis to ensure consistency of protocol across the responses received from the final version of the survey.

6.2 Data Collection and Survey Administration Procedures

6.2.1 Sampling Frame for Quantitative Data Collection

Following the recommendations of various researchers who have conducted empirical studies on virtual communities, this study utilized a diverse cross section of online communities to draw samples of respondents (Andrews et al., 2001; Clemmensen, 2005; Preece, 2001d; Preece et al., 2004; Ridings & Gefen, 2004; Ridings et al., 2002b). Following the primary sampling technique recommended for exploratory research, a *purposive sampling* procedure was used to select diverse virtual communities that varied in age, membership size, and the nature of information exchange and social interaction activities undertaken by members. Towards ensuring the latter criterion, the sampling frame was defined using the typology of virtual communities offered by Porter (2004) in the same way as it was utilized to delineate different types of communities that should be investigated in the qualitative research phase. On the outset, the researcher aimed to recruit respondents from *member-initiated* communities as well as *organizationally sponsored* ones. Furthermore, within these two broad categories of virtual communities, coverage of publicly accessible *social*, *professional*, and *commercial* virtual communities was sought. At the level of respondents, as in other studies on virtual community members, the non probabilistic sampling option of self-selection was used (cf. Andrews et al., 2003; Blanchard, 2007b; Ridings et al., 2002a; Yoo et al., 2002b).

The use of non probabilistic sampling techniques such as the one specified above has its limitations (Andrews et al., 2003; Remenyi et al., 1998) in that the results obtained from the sample are not generalizable to the entire population (Andrews et al., 2003; Couper et al., 2001), which, in this case, is the population of virtual community members . However, in the context of this research study, this limitation of non probability sampling was not as much of a drawback as it may be in other studies as the goal of the quantitative research phase in this study does not aim to ensure that the results are statistically representative of the population (see details in research design - chapter 3), but rather to triangulate and complement the findings from the preceding qualitative phase of research.

Also relevant to the selection of the sampling frame for the current phase of research being discussed, it should be reiterated that the virtual communities that were selected in the quantitative phase were different than the ones investigated in the qualitative phase. As highlighted in the research design chapter of this study, this practice was adopted to ensure credibility and transferability of research findings from the qualitative phase.

Having defined the basis for a sampling frame, the researcher sought to compile a list of virtual communities that satisfied the criteria outlined above. The same resources and tools were used in the selection process of virtual communities as the ones in the qualitative data collection phase. First, the Big Boards service (http://www.big-boards.com) was used to identify

and short-list possible virtual community websites based on their short descriptions. Then, a manual perusal of the short-listed websites over a period of three days allowed the researcher to learn about the tools and features available on those websites, to observe the vibrancy of the community first-hand in terms of frequency of discussions, and to subjectively assess the suitability of the virtual communities for this research investigation in terms of the seriousness and quality of member interactions. To further assess the suitability of the virtual community sites that were short-listed, the Alexa Site Information service (http://www.alexa.com/siteinfo) was used to gauge the popularity of the virtual community in terms of overall site traffic along with the Compete Site Analytics service (http://siteanalytics.compete.com) which was used to ascertain the vibrancy of the virtual community in terms of unique visitors to the site. Based on this process of establishing the final sampling frame, the researcher stopped after selecting fifteen virtual communities. Given the results from the pre-testing of the survey instrument where 14 responses were received over a period of five days, it was expected that a baseline of fifteen vibrant virtual communities would be adequate[41].

Table 6-1 below presents the list of virtual communities that comprised the sampling frame for the quantitative data collection phase along with various metrics that were used to screen them in. As shown by the last column titled *vibrancy indicators*, all virtual communities that were selected also satisfied the criteria for minimal traffic proposed by Nonnecke and Preece (2004a) who suggest at least 50 members in a virtual community and 4-5 people posting over a period of 90 days, as well as the more restrictive rules by Witmer et al. (1999) suggesting at least ten postings per day and 15 unique members posting over a period of three days.

[41] As specified in the next section on respondent recruitment and response rates, based on criteria accounting for the complexity of the theoretical model, the resource instrument items in the survey, the planned PLS analysis procedures, and the desired level of statistical power, a sample size of at least 144 usable responses was determined to be sufficient. Linearly extrapolating 14 responses from two virtual communities over five days (observed during the pre-testing period), approximately 300 responses in total were anticipated from 15 virtual communities surveyed over two weeks.

Table 6-1: Quantitative Data Collection Sampling Frame

VC ID	VC URL	VC Description	Primary VC Groupspace(s)	Online Since[1]	Membership Base[1]	Site Traffic Rank[2]	Unique Monthly Visitors[3]	Vibrancy Indicators[4]
ASK	askmehelpdesk.com	General Discussion Community	Threaded Discussion Forum	2002	570,256	6,602	745,110	37 / > 10 / > 10
BEYOND	forums.beyond.ca	Automotive Enthusiasts Community	Threaded Discussion Forum, Site Blog	2002	49,167	68,115	31,086	47 / > 10 / > 10
BOOK	bookcrossing.com	Online Book Club Community	Threaded Discussion Forum	2001	703,112	56,069	43,701	93 / > 10 / > 10
BYTES	bytes.com	IT Professionals Community	Threaded Discussion Forum	2001	197,144	3,363	296,520	29 / > 10 / > 10
DIET	lowcarber.org	Dieters' Support Community	Threaded Discussion Forum	2000	113,423	50,483	105,060	32 / > 10 / > 10
GAME	gamefaqs.com	Computer & Console Games Discussion Community	Threaded Discussion Forum	1999	3,201,658	305	156,654	43 / > 10 / > 50
GLOBV	globalvoicesonline.org	Participatory Citizen News Community	User Blogs, Email List	2005	22,567	19,663	43,000	22 / > 10 / > 10
JAPAN	japanforum.com	Japanese Pop Culture Community	Threaded Discussion Forum, Photo Gallery	na	48,581	51,956	24,410	> 50 / > 10 / > 10
OFFT	forums.offtopic.com	General Discussion Community	Threaded Discussion Forum	2000	201,254	16,316	13,494	> 100 / > 10 / > 50
POLITICS	politicsforum.org	Global Politics Discussion Community	Threaded Discussion Forum, User Blogs	2003	7,440	176,502	2,990	33 / 9 / > 10
RFD	edflagdeals.com/forums	Canadian Bargain Hunting Community	Threaded Discussion Forum, Site Blog	2000	215,581	4,776	124,172	> 50 / > 10 / > 10

Table 6-1 continued below

Table 6-1 (continued): Quantitative Data Collection Sampling Frame

VC ID	VC URL	VC Description	Primary VC Groupspace(s)	Online Since[1]	Membership Base[1]	Site Traffic Rank[2]	Unique Monthly Visitors[3]	Vibrancy Indicators[4]
TAZZU	tazzu.com	Business & Technology Community for Vancouver, BC, Canada	Threaded Discussion Forum, Site Blog	2005	515	376,725	383	14 / 3 / 7
TEACHERS	groups.msn.com/TeachersCafe	Teaching & Education Discussion Community	Threaded Discussion Forum, Email List	2001	5.725	na	na	13 / 3 / 8
TMS	groups.msn.com/Trading ModSpaces	Television Reality Show Community	Threaded Discussion Forum, Email List	2003	644	na	na	15 / 3 / 6
WELL	well.com	General Discussion Community	Threaded Discussion Forum	1993	5,240	65,265	124,274	38 / > 10 / > 10

[1] Year of launch, and site membership statistics obtained from virtual community website where available; Secondary statistics offered by Big-Boards (http://rankings.big-boards.com/) were consulted otherwise.

[2] Site traffic rank statistics obtained from Alexa.com Site Information (http://alexa.com/)

[3] Unique visitor statistics obtained from Compete.com Site Analytics Profiles (http://www.compete.com/)

[4] Vibrancy indicators were manually observed, and were utilized to comply with the minimal traffic volume criteria suggested by Witmer et al. (1999). Each virtual community was observed for three days to collect these metrics. The 3-tuple can be read as: posts per day / threads per day / unique members posting per day.

6.2.2 Sample Size Requirement and Response Rate Promotion Techniques

6.2.2.1 Sample Size Requirements

While formalizing a sampling frame for this phase of the research project, the researcher also explicitly considered sample size requirements that would provide an appropriate level of statistical power to allow the researcher to make valid inferences with precision based on the planned statistical procedures for quantitative analysis.

Since structural equation modeling (SEM) using partial least square (PLS) was the planned multivariate statistical analysis procedure in the quantitative phase of this study, the minimum sample size heuristic for PLS studies (Chin, 1998b; Chin, 2001) was utilized for the a priori calculation of the required sample size for this study. The heuristic suggests that the minimum sample size requirement for PLS based models is determined by finding the larger of

the following values: i) ten times the largest number of antecedent variables that affect any consequent in the model, or ii) ten times the number of maximum indicators (manifest variables) in a latent variable in the model (Chin, 1998b; Chin, 2001).

For the theoretical model under investigation in the quantitative phase and its planned survey resource instrument detailed earlier in this chapter, the *Perceived Enjoyment* and *Sense of Virtual Community* latent variables both have four direct antecedents, while *Sense of Virtual Community* has the most indicators assigned to its measurement, specifically 13 items as shown in Table 6-9. Therefore, the minimum sample size for this study can be expressed as shown in Equation 6-1 below.

n = Max (10 x max number of antecedents affecting a consequent OR 10 x maximum measurement items in a latent variable)
→ n = Max (10 x 4, 10 x 13) = Max (40, 130) = **130**

Equation 6-1: Minimum Sample Size Calculation based on PLS Heuristic Suggested by Chin (1998b; 2001)

In addition to using the PLS heuristic which indicated a minimum sample size of 130 valid responses, an a priori power analysis procedure based on a regression model was also conducted. With the significance criterion set to 1% ($p < 0.01$), effect size set to medium ($f^2 = 0.15$), and desired level of statistical power set to 0.80 ($1 - \beta = 0.80$), the calculation of sample size yielded a requirement of 144 cases (n = 144) for a regression based analysis of the theoretical model.

Adopting a conservative approach and choosing the higher of two sample size requirements, ***144 cases*** was selected as the minimum number of valid responses required.

Taking into account non-completion and missing data rates of online surveys noticed by other authors in their respective research, it was imperative that the researcher ensure high overall response rate to the call for participation on all selected virtual community sites. Previous research on virtual communities has showed response rates as low as 2% per online community (Nonnecke et al., 2006). The next sections elaborate the procedures and techniques that were employed for the purpose of ensuring an adequate survey response rate.

6.2.2.2 Response Rate Promotion Techniques

In the case of data collection procedures based on survey questionnaires, response rate can be defined as the number of completed questionnaires divided by the number of participants who were asked to participate in the study. Although this definition may provide a workable solution to calculating response rates for surveys where population estimates and number of solicited potential respondents are known, it shows to be problematic in the context of online surveys investigating virtual communities (Nonnecke et al., 2006; Ridings et al., 2002a). This is due to the very nature of public online communities where it is virtually impossible to know the number or people who viewed the call for participation, and also distinguish viewership among members and non-members. Proxy measures for response rates based on

number of views of the discussion post where the call for participation was first posted, or the number of response to the post prove to be problematic for the same reasons.

While the various techniques to calculate response rates for online survey requests on virtual communities continue to be debated among researchers, most researchers agree about the importance of procedures that need to be used to ensure high levels of participation from representative virtual community members (Andrews et al., 2003; Nonnecke et al., 2006; Ridings & Gefen, 2004; Wright, 2005). In particular, Andrews et al. (2003) note that it is important to be aware of different types of non-responses including: unit non-responders (do no participate at all), lurkers (view but do not answer questions) ; item non-responders (only answer some questions) ; and drop-outs (drop out before completing), and accordingly, provide a list of procedures to alleviate concerns associated with each type of non-response. Also, many virtual community researchers recommend adapting guidelines and practices from the extant literature on electronic surveys and Internet based research that have been demonstrated to have a positive effect on response rates. For example, the methods advised by Dillman as part of the Tailored Design Method (Dillman, 2000) for mail and Internet based surveys have been effectively applied and demonstrated in virtual community survey settings as well (Andrews et al., 2003). The key suggestions in Dillman's Tailored Design Method include: 1) making the survey respondent-friendly ; 2) using a number of varied contacts with survey call recipients (including reminders and thank you notes) ; 3) providing the financial incentive alongside the actual survey itself ; and 4) personalizing correspondence with the survey call recipients. In the context of this study, all of these suggestions were addressed directly as follows: 1) through the pre-testing procedures, the researcher ensured survey comprehensibility at a semantic level ; 2) multiple reminders were posted over the duration of the two weeks that the survey was open, and notes were regularly posted publicly to thank the respondents who identified themselves as such ; 3) the information for the $25 gift certificate draw was included in the survey introduction as well as at the end of the survey ; and lastly, 4) the researcher posted requests and answers to questions in each virtual community by using the name of the virtual community and by addressing respondents using their online usernames.

In addition to the practices highlighted above, the researcher also complied with the recommendation of ensuring a level of personal interaction with potential respondents from virtual communities in the sampling frame to establish credibility for the research while also addressing any questions from potential respondents (Andrews et al., 2003; Wright, 2005). An interactive approach such as the one suggested by Andrews et al. (2003) and Wright (2005) is often associated with ethnographic studies and has been shown to be highly effective in surveys involving online community investigations (Nonnecke et al., 2006; Nonnecke et al., 2004a).

Lastly, in order to mitigate concerns of privacy intrusion and inconvenience, the recommendations made by Cho and LaRose (1999) have been endorsed by virtual community researchers as well (Andrews et al., 2003). These recommendations include: 1) the offering of e-

incentives as a trade-off for intrusion ; 2) providing disclosures ; 3) certifying privacy through 3rd parties ; 4) using credible domains ; and 5) using hypertext links for long disclosures. In the context of this research, all of these recommendations were complied with. Specifically, as discussed earlier in this dissertation (see chapter 3 for details), the five guidelines from Cho and LaRose (1999) mentioned above were addressed as follows: 1) the researcher offered a small incentive of a draw for a $25 gift certificate from a selection of online vendors ; 2) a summarized call for participation with contact information was posted on the virtual community site ; 3) ethics approval from the institutional research ethics board was noted on the virtual community site ; 4) a custom URL (http://www.vcsurvey.org) was used for the survey questionnaire ; and 5) links to the complete research information and call for participation web pages were provided with the post requesting participation from virtual community members.

6.3 Data Analysis and Reporting Procedures

This section provides an elaboration of the various statistical analysis procedures and techniques that were used in the quantitative phase of this research study. First, the analysis procedures for demographic and technographic variables are specified with a brief overview of their purpose and overall applicability to this current research. Next, the relevance and application of exploratory factor analysis techniques is highlighted in the context of ascertaining the validity of measurement items from the survey instrument and determining construct dimensionality. This is followed by a discussion of the structural equation modeling procedures used to test the theoretical model that is at the core of this phase's investigation.

6.3.1 Analysis and Reporting of Demographic and Technographic Variables

Recall from the previous section in this chapter that in addition to the psychographic variables comprising the theoretical model under investigation in the quantitative phase of this study, the survey questionnaire also included demographic and technographic variables. Questions pertaining to these two general types of variables were included in the survey to obtain data that would allow this research to report a characteristic profile of the sample of respondents in terms of their age, gender, education, and occupation, and synthesize this information with the respondents' patterns of use of various tools and features available through their virtual community.

In terms of the specific statistical procedures used to analyze and report on these variables and their associations with one another, this study utilized a selection of statistical analysis techniques including *Descriptive Statistics*, *Nonparametric Statistical Tests*, *Cluster Analysis*, and *Contingency Table Analysis* procedures[42].

[42] SPSS (Statistical Package for the Social Sciences) version 16.0 was used to perform the statistical analysis.

Descriptive Statistics were used to summarize the response data from the survey sample and report the characteristics of the sample in terms of each demographic variable. Appropriate visual aids such as frequency tables, bar charts, and pie charts were used to effectively summarize the key takeaways from the descriptive statistics.

For the purpose of comparisons across variables or across the categories within the same variable, this study did not use the standard univariate or multivariate analysis-of-variance (ANOVA, MANOVA) procedures due to the underlying assumption of distributional normality with the dependent variables in these procedures (Green & Salkind, 2003). Instead, ***Nonparametric Tests*** including the binomial test and the chi-squared test of independence were used to compare the proportions associated with various categories on different variables. These tests are known to be powerful in cases where distributional assumptions with parametric procedures cannot be met (Green & Salkind, 2003), and as such, are relevant to this study since the respondent recruitment process for quantitative empirical investigation did not strictly follow probabilistic sampling (as elaborated in the previous section of this chapter).

Cluster Analysis procedures including a combination of hierarchical and K-cluster analyses were applied to selected technographic variables to facilitate grouping of respondents into categories according to the similarities they shared within the context of the specific technographic attribute. For example, clusters of motivational propensities were analyzed to identify patterns of information exchange and social interaction among the respondents in the sample.

Finally, ***Contingency Table Analysis*** procedures paired with *Chi-Squared Tests of Association* were used to examine independence between variables or to assess the homogeneity of proportions among various levels of multiple variables (Wickens, 1989). Such an analysis was especially useful in relating demographic and technographic variables to present a more holistic picture of patterns underlying member participation in virtual communities.

6.3.2 Exploratory Factor Analysis for Assessment of Measurement Validity and Construct Dimensionality

Before commencing the structural equation modeling based deductive analysis of the theoretical model, the validity of the measures and factor structure had to be established. This was achieved by conducting an iterative exploratory factor analysis on the data obtained from the survey. Defined as "a statistical procedure used to uncover relationships among many variables", exploratory factor analysis allows numerous inter-correlated variables to be condensed into fewer dimensions called factors (Velicer & Jackson, 1990). In the context of this research, the variables pertained to the degree of agreement with various specific statements in the survey questionnaire resource instrument, and the factors constituted the general underlying behaviors, perceptions, attitudes, and beliefs pertaining to member participation in virtual communities.

In the context of this research, exploratory factor analysis was used for two purposes: i) to assess the validity of the various measures incorporated in the survey questionnaire resource instrument and subsequently recalibrate the instrument with the valid indicators ; and ii) to ascertain the dimensionality of various constructs in the theoretical model, especially the four constructs pertaining to website usability, organizational trustworthiness beliefs, member trustworthiness beliefs, and sense of virtual community which were posited to be potentially multidimensional.

6.3.2.1 Procedures for Extraction & Rotation

While performing factor analysis, three main decisions need to be made: i) the factor extraction method to be used; ii) the type of factor rotation to be used; and iii) the number of factors to be used (Costello & Osborne, 2005). Selecting the right methods and options in the statistical package can significantly affect the formation of the factor structure (Velicer & Jackson, 1990). In the case of exploratory analysis, it is the data that ultimately suggests the factor structure, and this is in contrast to a confirmatory analysis which is typically used to prove or disprove theory based factor structures (Suhr, 2005).

The analysis in this research study utilized *principal axis factoring (PAF)* as the method for extraction since it does not depend on distributional assumptions of multivariate normality (Costello & Osborne, 2005). Additionally using this method relaxes the assumption that through a linear transformation of the variables, the statistical procedure will be able to explain all of the variance in each variable. Since principal axis factoring generally provides more interpretable solutions for exploratory analysis (Coughlin & Knight, 2007; Fabrigar et al., 1999), it was used as the primary extraction method in the factor analysis process[43].

In terms of a suitable procedure for rotation, based on the potential overlap among some factors such as those pertaining to trustworthiness beliefs (cognitive factor) and sense of virtual community (affective/evaluative factor), oblique rotation methods were used in the generation of a final factor structure. Other researchers have also recommended these methods as they facilitate a simple interpretation of the data structure (Fabrigar et al., 1999) by allowing for correlations among the factors, especially since many attitudinal and belief dimensions are, in fact, likely to be correlated (Norusis, 1990). The specific oblique rotation method used in this analysis was promax rotation, which has the advantage of being a fast and conceptually simple rotation technique (Abdi, 2003). The combination of principal axis factoring and promax rotation

[43] While Principal Component Analysis (PCA) continues to be the popular extraction approach in factor analysis, recently, many statisticians have indicated that the premise of PCA is flawed in assuming that all of the variability of the items whether explained or unique can be accounted for in the analysis ; and hence, a procedure such as PCA should not be used in an exploratory factor model. See Coughlin and Knight's (2007) guide to exploratory factor analysis in SPSS (www.spss.com/airseries/part_one.pdf) for a reader friendly explanation of the differences between PCA and PAF.

has also been used in prior exploratory research studies on virtual communities (e.g., Blanchard, 2007c).

With respect to determining the number of factors to instantiate the factor analysis procedures, the approach followed in this phase was based on the suggestions of Velicer and Jackson (1990) who assert that the best method in an exploratory analysis is to "use the eigenvalue and scree cut-off points as general guides to the dimensionality of the factor space". Hence, the exact number of factors to be retained was guided by the number of factors extracted as well as the overall interpretability of the factors.

6.3.2.2 Assessment Criteria for Item Validity and Construct Dimensionality

Following the procedures and parameters discussed above, exploratory factor analysis was conducted at several levels for the theoretical model:

- at a *global level* with all the original measurement items pertaining to all constructs in the theoretical model;
- at a *construct level* for each individual construct with its original measurement items; and
- at a *construct level* for each construct with its retained recalibrated measurement items (after identifying and dropping items found to be problematic).

For each of these levels, various statistical criteria were used to assess the validity of the measurement items and the factor structure. Firstly, the *Kaiser-Meyer-Olkin (KMO)* measure of sampling adequacy (Kaiser, 1970) was consulted at a global level to ascertain whether it was feasible to proceed with further factor analysis at a construct level. As an index, KMO is used for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients (Coughlin & Knight, 2007; Kaiser, 1970). A large value for the KMO measure indicates that a factor analysis of the variables is a good idea with a value greater than 0.80 often recommended as good indicator of feasibility for a bigger model to be grouped into a smaller set of underlying factors (Coughlin & Knight, 2007).

At a construct level, during the item refinement stage, each item's *Loading (λ)* on its respective factor was assessed. Loadings of above 0.70 were considered adequate for items from previously validated measurement scales (Nunnally, 1978), while a lower threshold of 0.60 was used to assess loadings of items that were new to the resource instrument or were adapted from relatively newer instruments from past research (Chin, 1998b).

Lastly, once the final items for each construct had been selected and its scale was recalibrated, a last iteration of factor analysis was performed to confirm the internal consistency reliability of the construct as a whole. For this purpose, the overall *Cronbach's alpha (α)*

(Cronbach, 1951) value was assessed, as well as any changes in that value from the removal of each item in the construct. A value greater than 0.70 for each construct was taken as an adequate indication of internal consistency reliability[44] of the construct illustrating that the items in the construct were measuring a single, unidimensional latent variable (Cronbach, 1951; Nunnally, 1978). The threshold value of 0.70 for Cronbach's alpha is commonly used in social science disciplines (Allen & Yen, 1981).

6.3.3 Structural Equation Modeling Analysis of Theoretical Model

The theoretical model that is at the core of this dissertation's quantitative empirical investigation phase was analyzed in its full form using *structural equation modeling* (*SEM*) procedures. Also sometimes referred to as *latent variable path analysis* (*LVPA*) or *latent variable structural equation* (*LVSE*) modeling, *SEM* is regarded as a *second generation* data analysis approach used to test statistical conclusion validity (Gefen et al., 2000a; Rigdon, 1998). In recent years, the use of SEM as a battery of procedures to simultaneously analyze multiple measurements on individual model constructs has increased significantly in the IS research community (Chin, 1998a; Chin & Saunders, 2009; Straub et al., 2004a). Contrasting it from first generational data analysis techniques such as univariate and multivariate analysis of variance (ANOVA, MANOVA) which only analyze the *structural model*, SEM procedures also allow the assessment of the *measurement model*. A structural model refers to the set of one of more dependence relationships that link the model constructs, while a measurement model refers to the specific indicators for each construct and respective loadings on the target construct. It is this combined assessment of both the structural and measurement models in SEM that makes it a useful technique for more rigorous analysis of the theoretical model under investigation (Chin, 1998a).

The subsections below describe the *SEM* approach adopted in this research study, and the process undertaken to perform the analysis of the theoretical model.

6.3.3.1 Component-Based Approach to Structural Equation Modeling

From a methodological point of view, a researcher can select from two fundamentally different SEM approaches, namely, the *covariance-based* or the *component-based* (also known as *variance-based*) approach. In the covariance-based SEM approach, model parameters are estimated by minimizing the difference between observed and predicted variance-covariance matrices, and the estimation procedures require that the observed data being used to instantiate the model have a multivariate normal distribution (Byrne, 1994; Jöreskog & Sörbom,

[44] Although citing the value of Cronbach's alpha is often synonymous with "reliability", researchers suggest that it is more of a measure for internal consistency, and the latter term should be used for reporting purposes. Alternatively, some researchers prefer the more qualified terrn: "internal consistency reliability". See Allen et al. (1981) for more details.

1989). On the other hand, in the component-based approach, the estimation of model parameters is similar to that in multiple regression procedures with a series of interdependent regressions, and there is no requirement for the distributional form of the data that is being used to run the model estimation procedures (Fornell & Bookstein, 1982; Hsu et al., 2006).

Aligned with the quantitative research paradigm and other statistical procedures adopted in this research study (highlighted earlier in this chapter), the ***component-based SEM approach*** was adopted in this study. Also noteworthy is the fact that in discussing the differences between the two main SEM approaches, researchers contend that a covariance-based approach is ideally used for theory testing purposes in a confirmatory mode (parameter-oriented) whereas a variance-based approach is more suitable for predictive analysis in an exploratory setting (Anderson & Gerbing, 1988; Chin, 1998a) - hence providing further justification for use of the latter in this research study. Other distinctions between the two SEM approaches that helped the researcher make a final decision to use the component-based approach were based on criteria of model complexity and sample size. Component-based SEM is especially suitable for large complex models, hence capable of analyzing the theoretical model in this research study; and the procedures are considered to be adequate for small sample sizes (30 to 100 minimal cases are recommended) as compared to covariance-based procedures that require a minimum of 150 cases[45] (Chin & Newsted, 1999; Gefen et al., 2000b). It is for these reasons that covariance-based SEM is often referred to as a "hard modeling" approach (heavy distribution assumptions and larger sample size requirements), while the component-based procedures are considered under a "soft modeling" approach (minimal distribution assumptions and smaller sample size requirements) (Jöreskog, 1970; Tenenhaus et al., 2005).

More specifically, in this research, the component-based SEM analysis of the theoretical model was performed using the battery of procedures associated with the ***partial least squares (PLS)*** algorithm[46] (Wold, 1982; Wold, 1985). Over the last two decades, the practice of path modeling using PLS has been further developed and advanced through various theoretical developments and new software packages (Chin, 1998b; Chin, 2001; Lohmöller, 1989; Ringle et al., 2005). Today, PLS based analysis have a pervasive following from researchers in many fields including the information systems research community (see Chin & Saunders, 2009; see Goodhue et al., 2006; see Marcoulides & Saunders, 2006).

Based on the specification of PLS procedures and the underlying component-based algorithm, there are a series of steps that are recommended as standard practice in performing a complete analysis of structural equation models (Chin, 1998b; Chin et al., 2003; Lohmöller, 1989). Researchers typically start with the assessment of the measurement model (outer relations) for common method bias, and for the validity and reliability of the constructs in the

[45] Small sample size was not an explicit consideration in the choice of the SEM approach. An a priori power analysis had indicated a minimum of 144 valid cases, and respondent recruitment tactics were customized accordingly to ensure adequate number of total responses across the sampling frame. See section 7.3.2 for details.

[46] SmartPLS Version 2.0 M3 (Ringle et al., 2005) was used to perform structural equation modeling (SEM) analysis.

model. This is followed by an evaluation of the structural model in terms of variance explained for the latent variables, as well as the magnitude and significance of the structural paths between constructs in the inner model. The next three sections provide further details of these steps explicating the procedures and criteria used in this research study.

6.3.3.2 Assessment of Common Method Bias

Common method bias refers to the variance in models that can be attributed to measurement methods as opposed to the constructs those measures represent (Campbell & Fiske, 1959; Podsakoff et al., 2003; Podsakoff & Organ, 1986). As outlined in a previous section in this chapter, this study explicitly attempted to utilize several procedural remedies during the survey design stage for alleviating concerns of common method bias. However, given the very nature of self-reported data, especially in studies where the data for independent and dependent variables are obtained from the same source, there still is a potential for the negative confounding effects of common method bias to be evident after data has been collected.

According to Woszczynski and Whitman (2004), the problem of common method bias has generally not been adequately addressed in IS studies. To address the issue of common method bias within the context of this current research, in this study, two statistical procedures were performed to assess the severity of common method bias.

First, Harman's one-factor test (Podsakoff et al., 2003; Podsakoff & Organ, 1986) was conducted whereby all items pertaining to the theoretical model constructs were used in an unrotated solution to a principal components analysis. Using this procedure, the number of resulting factors were noted along with their eigen-values, and the total variance explained by each factor (Straub et al., 2004a). Multiple factors collectively accounting for the total variance in the model would suggest that common method bias was not a serious issue for the model.

Secondly, following the recommendation of Podsakoff et al. (Podsakoff et al., 2003) and it's demonstration in the context of an IS study by Liang et al. (2007), a PLS based procedure was used whereby a common method factor whose indicators included all the principal construct's indicators was included in the PLS model. Running the full model with the common method facts produces results that can be used in calculating indices such as the *average substantively explained variance* of the indicators, and the *average method based variance*. Average substantively explained variance can be calculated as the average of the squares of the factor loadings of each indicator on its target construct. Similarly, average method based variance can be calculated as the average of the squares of the factor loading of each indicator on the method factor. The two indices can be compared with each other to gauge the significance of common method bias (Liang et al., 2007) - a high ratio between the average substantively explained variance and the average method based variance would suggest that common method bias was not a serious issue for the model, i.e. most items loaded significantly better on their target constructs as compared to the method factor.

Using these two procedures, the researcher hoped to provide a stronger corroboration about the malignance or benignity of common method bias in this study. Assessment of common method bias is usually a first step in the evaluation of the overall measurement model in SEM. Other aspects of evaluation of the measurement model are explained next.

6.3.3.3 Evaluation of Measurement Model Reliability and Validity

The evaluation of the measurement model uses some of the same criteria for the assessment of reliability and validity as highlighted in the previous section on exploratory factor analysis. Specifically, item *Loadings (λ)* on their respective factors, and the internal consistency reliability of the constructs using Cronbach's alpha (α) needs to also be addressed within the context of the entire measurement model. In addition, other validation tests are used to determine the quality of the measurement model. These include tests pertaining to: *item reliability*, *convergent validity*, and *discriminant validity* (Bagozzi & Yi, 1988; Chin, 1998b; Gefen et al., 2000b). These tests are typically conducted by means of specific criteria and associated heuristics. For examples, item reliability is evaluated using communalities and factor loadings; construct reliability using internal consistency and composite reliability; convergent validity is assessed using composite reliability and Cronbach's alpha; and discriminant validity is assessed through inter-factor correlations and item cross-loadings. Together, these test criteria and their associated heuristics provide a sound basis for the assessment of a measurement model.

The test criteria and their associated heuristics used to assess the quality of the measurement model in this study are summarized in *Table 6-2* below.

Table 6-2: Test Criteria and Heuristics for Measurement Model Assessment

Purpose of Evaluation	Test Criteria	Heuristics Applied	Explanation
Item Reliability	Item Loadings (λ) on Target Constructs	▪ Item Loadings of 0.70 or higher are recommended widely ; ▪ For exploratory models or new measurement scales, a threshold value of 0.60 can be used (Chin, 1998b; Nunnally, 1978)	▪ The item loadings on their target constructs represent the strength of substantive association between items and their constructs.
Convergent Validity	Communality Index or Average Variance Extracted (AVE) for a Construct	▪ Value of Communality Index or AVE should be greater than 0.50 (Chin, 1998b; Fornell & Larcker, 1981)	▪ Communality Index or AVE represents a measure of the proportion of variance captured by a construct from its indicators. ▪ AVE of 0.50 or higher implies that a latent construct can account for at least 50 percent of the variance in the items.
	Composite Reliability (ρ)	▪ Value of composite reliability should be greater than 0.60 (Bagozzi & Yi, 1988); or according to some researchers, it should be greater than 0.70 (Fornell & Larcker, 1981)	▪ Composite reliability is a measure of internal consistency reliability of a construct as compared with other constructs in the model.
	Cronbach's Alpha (α)	▪ Value of Cronbach's alpha should exceed 0.70 (Chin, 1998b; Cronbach, 1951; Gefen et al., 2000b; Nunnally, 1978)	▪ Cronbach's alpha also measures the internal consistency reliability of a construct but only on the basis of a single construct, i.e. it is not a relative index like composite reliability.
Discriminant Validity	Inter-correlation among constructs cross-tabulated with square roots of AVE	▪ The square root of AVE should exceed the inter-correlations of a construct with other constructs in the model (Chin, 1998b; Fornell & Larcker, 1981; Gefen et al., 2000b)	▪ A construct should have discernable as a valid individual component within the overall model.
	Item Cross-Loadings	▪ Item Correlations with Target Construct should be higher as compared to its correlations with other constructs in the model (Chin, 1998b)	▪ Indicators that are meant to measure their target construct should be more strongly associated with them as compared to other constructs in the model.

6.3.3.4 Verification of the Structural Model

In order to estimate the structural model, this study used a bootstrapping procedure to assess the significance of the path beta coefficients in the structural model (provided as t-values). As a re-sampling technique that is meant to provide stable estimates for model parameters, bootstrapping is often preferred over other techniques such as jackknifing (Efron & Tibshirani, 1997). Furthermore, as opposed to traditional t-tests, bootstrapping procedures allow the testing of the significance of parameter estimates from data which are not assumed to be multivariate normal. Specifically, *bootstrapping* with 1000 replications was performed while also incorporating the construct level sign changes option which has the effect of reducing significance t-values, and hence provides a more conservative test of parameter significance (Chin, 2001; Fornell & Barclay, 1983).

In addition to bootstrapping, the *blindfolding* procedure was used to generate cross-validated indices that can help ascertain the quality of measurement blocks and structural equations, and subsequently help establish the *predictive relevance* of the structural model (Chin, 1998b; Tenenhaus et al., 2005). In the context of this study, the cross-validated redundancy indices were used to calculate the *Stone-Geisser Q^2 coefficient* allowing the researcher to ascertain how well the observed values of manifest variables can be reconstructed from the model parameters (Chin, 1998b; Tenenhaus et al., 2005). Analogous to the variance explained coefficient of determination (R^2), values of Q^2 need to be observed for each endogenous variable in the model. In his own words, Wold (1982; 1985) described the cross-validated indices as an element that fits the procedures of soft-modeling "like hand in glove".

Just as in the case of evaluation of a measurement model, several standard test criteria and heuristics are generally applied in the verification of a structural model. While certain test criteria are based on a direct interpretation of the statistics available from the bootstrapping and blindfolding procedures, other criteria require the calculation of composite indices that are based on the output from bootstrapping and blindfolding. The composite indices may also utilize one or more of the test statistics mentioned previously for the assessment of the measurement model. For example, the *global criterion for Goo*dness-of-F*it (GoF)* as highlighted below uses the value from average variance extracted (AVE) or communalities of each construct in order to calculate a scalar attribute for the model to indicate its goodness of fit. The test criteria and their associated heuristics used to assess the quality and relevance of the structural model in this study are summarized in *Table 6-3* below.

Table 6-3: Test Criteria and Heuristics for Structural Model Verification

Purpose of Evaluation	Test Criteria	Heuristics	Explanation
Nomological Validity	▪ Model Fit / Predictability: Variance Explained (R^2) for all constructs in the model ▪ Average Predictability of entire model ($\overline{R^2}$)	▪ No specific heuristics available. Value needs to be interpreted in comparison with other similar studies or norms in the discipline (Gefen et al., 2000b). ▪ Falk et al. (1992) recommend minimum values of 0.10 for a construct to be considered viable within the nomological network.	▪ R^2 value for an endogenous variable represents the proportion of its variance that can be explained by the predictors in the model. ▪ Average R^2allows comparisons across competing models.
	▪ Path Validity Coefficients: Significance (p-values) and Magnitude (β) of all inner model paths	▪ Inner model paths should be significant at $p < 0.05$ level to provide support for propositions in the theoretical model ▪ The paths can also be interpreted relative to one another using the magnitude of relationship as represented by low or high coefficient values (β)	▪ A significant path represents that an association between two latent variables was not a chance happening. ▪ Paths with higher coefficients represent stronger associations between variables.
	▪ Predictability Effect Size: Effect Size (f^2) for criterion variables based on the exclusion of a predictor variablefrom the model	▪ Predictor variables should ideally have a large or medium effect ▪ The following scheme can be used to determine effect sizes: Small Effect: 0.02 ; Medium Effect: 0.15 ; Large Effect: 0.35 (Chin, 1998b)	▪ f^2 value between a predictor and a criterion variable represents the effect of the predictor on the criterion variable. Higher values imply that greater importance
Predictive Relevance	▪ Predictive Relevance: Stone-Geisser (Q^2) for all constructs in the model ▪ Average Predictive Relevance of entire model ($\overline{Q^2}$)	▪ Value of Q^2 should be greater than zero (Chin, 1998b; Geisser, 1975; Tenenhaus et al., 2005)	▪ Q^2 value represents how well the observed values of manifest variables can be reconstructed from the model parameters. ▪ Average Q^2allows comparisons across competing models.
Goodness of Fit	▪ Global criterion of goodness-of-fit (GoF) of the model:	▪ The following baseline values can be used to assess overall model fit: Low Fit: 0.1 ; Medium Fit: 0.25 ; High Fit: 0.36 (Tenenhaus et al., 2005; Wetzels et al., 2009)	▪ GoF values allow a scalar based assessment (summative index) of the model as a whole. ▪ GoF values allows comparisons across competing models.

Chapter 7: Quantitative Data Analysis & Results

This chapter details the quantitative analysis and results of the survey questionnaire data collected in phase two of the research study. The survey was conducted based on the survey instrument and the administration protocol discussed in the previous chapter. This chapter begins with a diagnostic description of the survey response data and the procedures used to prepare the data for quantitative analysis. This is followed by descriptive statistics pertaining to respondent data, including the demographic and technographic context of the responses obtained. Next, the section on exploratory factor analysis provides a preliminary assessment of the measurements used in the survey by explicating the item validity of the indicators used in the survey, and by confirming the dimensionality of the various constructs, especially those that were postulated as possibly multidimensional in the *abridged theoretical model* from *Chapter 5*. The final section in this chapter completes the discussion on quantitative analysis by providing the results from the structural equation modeling (SEM) procedures used to evaluate the measurement and the structural model, and to validate the propositions in the theoretical model.

7.1 Survey Data Diagnostics & Treatments

Full data collection for the quantitative phase occurred between the months of March and April, 2008. In total, 237 survey responses were submitted from the 15 virtual communities that were solicited. On two of the virtual communities, the administration deemed the survey request to be a commercial solicitation, and removed the request for participation within three days of its posting. A total of five surveys were submitted from those two communities and they were dropped from the analysis as those communities were not afforded the same amount of time to respond as the other communities. Out of the remaining 232 responses, 18 more surveys were discarded upfront: 12 sets of responses were missing significant portions of incomplete data, including complete sections pertaining to questions about specific aspects of member participation (i.e., items pertaining to specific constructs); six were duplicate submissions, possibly from respondents who wanted to improve their chances of winning from the gift certificate draw after the survey. Hence, 214 cases were retained for further analysis. The following subsections provide details on the preparatory actions that were taken on the dataset of 214 cases to cleanse and prime the data for further analysis.

7.1.1 Missing Data & Treatment

A missing values analysis was conducted on the preliminary set of survey responses to identify potential patterns in missing values. It is important to ascertain the nature of missing data since systematic patterns of missingness can produce misleading results, and missing data may also reduce the precision of calculated statistics due to lack of information than originally planned (Olinsky et al., 2003). Establishing the characteristics of missing values can also help in deciding the type of missing values procedure that would be most suitable for the structural equation modeling phase of the analysis.

In conducting a missing values analysis, only the items pertaining to the main theoretical model were considered. The background demographic and technographic information was not factored in as these items did not constitute the primary focus of deductive analysis in this research study.

A quick test of missing data on the measurement items showed that the type of missingness in the survey dataset cannot be characterized as missing completely at random (MCAR), meaning that missing values were not randomly distributed across all observations. Results from the missing values analysis showed that Little's MCAR test was significant ($\chi 2$ (3933) = 4480, p = 0.000), implying that the data is not MCAR (Little, 1988; Little & Rubin, 1987). Further missing data tests were conducted to isolate cases with more than 10% missing data points, and these cases were dropped from the analysis. This resulted in a response dataset of 198 cases.

Having established that the missing data was not MCAR, it was assumed that the data was missing at random (MAR), an assumption that is regarded as more tenable in conducting statistical analysis (Little & Rubin, 1987; Roth, 1994). Based on this assumption, maximum likelihood estimation (MLE) was used by employing the expectation maximization (EM) algorithm (Dempster et al., 1977) in SPSS to impute the missing values. MLE procedures such as the EM algorithm work well in situations where data is assumed to be missing at random (MAR), and the procedures make fewer demands of the data in terms of statistical assumptions of distributional normality (Rubin, 1976). Furthermore, MLE procedures for missing data imputation are generally considered superior to other methods of handling missing data including listwise deletion and pairwise deletion, as well as imputation procedures such as mean substitution, group mean substitution, and imputation by regression (Azen et al., 1989; Graham & Donaldson, 1993; Malhotra, 1987). The EM algorithm has also previously been used to handle missing data in other IS studies (e.g., Wicks & Chin, 2008).

7.1.2 Anomalies & Treatment

The two reverse coded items in the survey (see items WU7, and MT10 in the original survey resource instrument) were utilized to identify responses from participants that were not paying complete attention while responding. The criteria used for removing a case from the dataset was based on the calculation of the difference between the average of forward coded survey items and the score of the reverse coded item. If the magnitude of the difference was half of the scale range (i.e., 3.5 for likert scale items on a 7-point scale), or greater, then the case was discarded from the dataset. For example, for the website usability item WU7: "I find the virtual community interface unnecessarily complex", cases of respondents where the following expression was evaluated as true: $\frac{WU5 + WU6 + WU8}{3} - WU7 >= 3.5$ were identified as inattentive during survey completion, and were discarded. Overall, 16 cases (approximately 8%) had to be discarded as a result of this procedure using survey items WU7, and MT10. Given the length of the survey questionnaire, this proportion of invalid responses seemed reasonable.

The resultant dataset after following the above treatments of survey data comprised 182 cases, from 13 virtual communities, i.e., 77% valid responses, and as such, this proportion was comparable to other recent virtual community studies (cf., Andrews et al., 2003; cf., Blanchard, 2007c; cf., Lin & Lee, 2006). The final dataset comprising the 182 valid responses was used in all subsequent analysis procedures detailed in this chapter. The next section provides descriptive statistics and context information for the finalized set of survey responses.

7.2 Respondent Characteristics and Descriptive Statistics

This section discusses the characteristics of the responses obtained through the online survey, and examines the demographic and technographic traits of the individuals who participated in the study. It should be noted that the survey instrument allowed respondents to skip questions, and since no missing data treatments were used on demographic and technographic items, this section may contain responses labeled as "prefer not to say."

7.2.1 Virtual Communities and Response Rates

It has been noted by researchers that response rate calculations in studies that elicit responses from virtual community members is difficult (Blanchard, 2007c; Ridings et al., 2002a). This is because it is usually not possible to know how many people on the virtual community site might have viewed the request for participation, nor is it possible to identify the number of people who read the title of the post containing the request for participation request, but opted to not open the post and read its contents (Ridings et al., 2002a). As an alternative, Ridings et al. (2002a) offer a potential mechanism for calculating response rates based on the ratio of the

number of completed surveys and the number of unique visits to the survey page. Using this metric for this current survey, the rate of completions per visit was 72%, and the rate of usable surveys per visit was 60%.

Table 7-1 below illustrates the proportions of responses from each of the 13 virtual communities which provided usable data for the analysis in this study. It can be seen from the description of these virtual communities that there is no single type of community that overshadowed the responses. On the outset, it was believed that there were adequate responses from virtual communities where members may engage in different types of activities, including information exchange, as well as social interaction activities.

Table 7-1: Responses from Participating Virtual Communities

VC ID	VC URL	VC Description	Responses	%
BOOK	bookcrossing.com	Online Book Club Community	23	13%
GAME	gamefaqs.com	Computer & Console Games Discussion Community	20	11%
DIET	forum.lowcarber.org	Dieters' Support Community	19	10%
RFD	redflagdeals.com/forums	Canadian Bargain Hunting Community	18	10%
TEACHERS	groups.msn.com/ TeachersCafe	Teaching & Education Discussion Community	15	8%
POLITICS	politicsforum.org	Global Politics Discussion Community	14	8%
BEYOND	forums.beyond.ca	Automotive Enthusiasts Community	14	8%
JAPAN	japanforum.com	Japanese Pop Culture Community	14	8%
BYTES	bytes.com	Bytes IT Professionals Community	13	7%
TMS	groups.msn.com/ TradingModSpaces	Trading Spaces Television Reality Show Community	11	6%
TAZZU	tazzu.com	Business & Technology Community for Vancouver, BC, Canada	8	4%
GLOBV	globalvoicesonline.org	Participatory Citizen News Community	7	4%
WELL	well.com	Salon.com/Well General Discussion Community	6	3%
		Total Responses	**182**	**100%**

7.2.2 Respondent Demographics

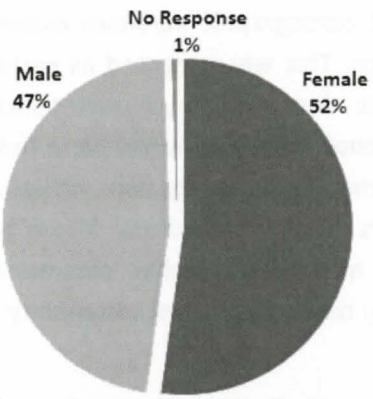
This section highlights the demographic traits of the respondents comprising the finalized dataset of 182 cases. It should be noted that like many other research studies eliciting responses from virtual community members on the Internet, self-selection is a limitation of this research study. To address this limitation, various procedures to improve external validity were followed as outlined in the previous chapter. Furthermore, to offer an indication of external validity, the demographics of the sample dataset in this study were matched with the demographics of respondents in other similar studies that utilized a different protocol for requesting participation than the one used in this study. Similar procedures have been used in other online survey based research studies (c.f., Andrews et al., 2003; Bellman et al., 1999; Ridings et al., 2002a). In particular, this study will draw comparisons to recent virtual community studies performed by academic as well as industry research authors. An aggregate summary of the demographic traits of the study's respondents are presented in *Figure 7-1*. Some key points for each demographic trait are briefly highlighted below.

In terms of ***gender***, the sample obtained through the survey comprised approximately 52% female, and 47% male respondents, while one percent of the respondents opted not to answer the specific demographic question. To compare this observation with other studies, a non-parametric binomial procedure was used to compare the observed frequencies of the two categories of the gender variable to the frequencies that are expected under a binomial distribution. The specified probability parameter for males to females was set to 52%. This was based on the average of reported gender demographics in other recent studies pertaining to virtual communities (c.f., Andrews et al., 2003; Blanchard, 2007c; Lin & Lee, 2006; Porter & Donthu, 2008). The Z-approximation of the test confirmed that that the differences between samples were not significant (significance level = 0.58).

With respect to ***age***, about 77% of the respondents were below the age of 50, while 54% were below the age of 35. These demographic attributes of age match the findings in other recent research studies of virtual communities (c.f., Blanchard, 2007c; Porter & Donthu, 2008).

For ***education levels***, 85% of the respondents indicated a college education or better, while 36% of the respondents had a graduate degree. Similar to other research studies on virtual communities, the dataset in this study comprised respondents who were well educated. The education level traits of respondents in this survey matched those in other virtual community research studies (cf., PEW Research Center, 2006; Porter & Donthu, 2008).

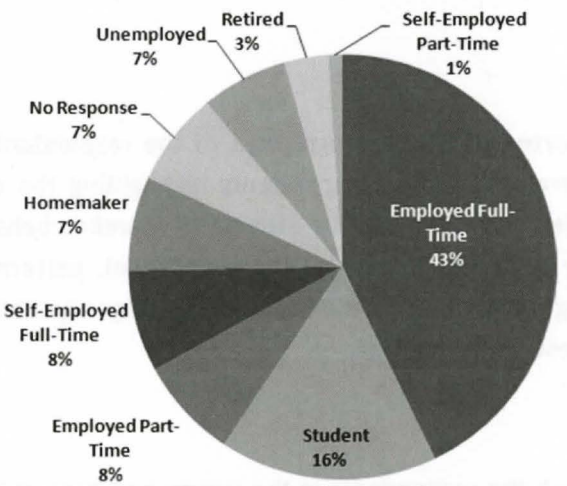
In terms of the respondents' ***occupations***, almost half of the respondents (51%) were employed full-time, while 16% of the respondents identified themselves as students. Again, the occupation demographics in this study are very comparable to those in other virtual community studies such as Andrews et al. (2003) where 18% of respondents were identified as students and 43% were reported as employed full-time.



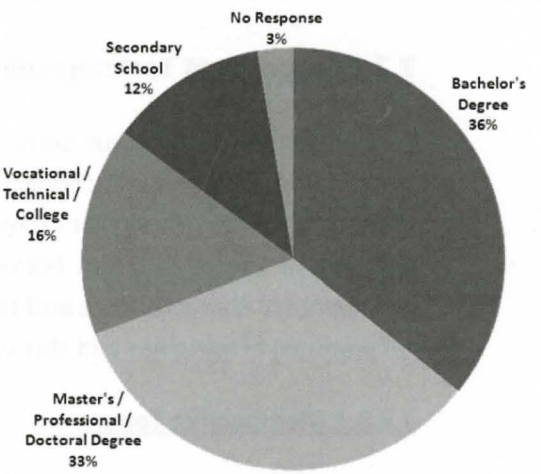
Percentage Responses by Gender

Age	Frequency	%
Below 18	11	6%
18 to 24	38	18%
25 to 29	31	17%
30 to 34	21	12%
35 to 39	15	9%
40 to 44	17	10%
45 to 49	10	6%
50 to 54	18	10%
55 to 59	7	4%
60 to 64	8	5%
65 and above	2	2%
No Response	4	2%
Total :	182	100%

Age Demographics of Respondents



Occupation of Respondents



Education Levels of Respondents

Figure 7-1: Aggregate Demographics of Survey Respondents

Once the demographic characteristics of the respondents were identified, they were cross-tabulated against the 13 virtual communities to observe whether there were any significant differences in respondents from each community. *Table 7-2* provides a summary of the significance statistics of the cross-tabulations.

Table 7-2: Contingency Table of Demographic Variables & Virtual Communities

Cross-Tabulations	Pearson Chi-Square		
	Value	df	Significance
Age x Virtual Communities	146.243	132	0.187
Gender x Virtual Communities	38.003	24	0.035
Education x Virtual Communities	67.826	48	0.0312
Occupation x Virtual Communities	124.587	96	0.027

As shown in the table above, all demographic variables except age ($p < 0.05$) were significantly related to virtual communities. This was expected as certain virtual communities were dominated by people with specific demographic characteristics. For example, many respondents from the bookcrossing.com book club community were female while the majority of the respondents from the gaming community gamefaqs.com virtual community were male. Similarly in terms of education, members from the teachers' forum teaching and education community had higher education than members in other communities, and in terms of occupation, members from the technology based bytes.com community were mostly employed full-time.

Overall, it is believed that the survey conducted in this study was able to tap into a fairly diverse base of virtual community members.

7.2.3 Respondent Technographics

While the previous section reported on the demographics of the respondent sample, this section details the technographic traits of survey respondents highlighting the nature of their participation in virtual communities, including various aspects of member behavior and patterns of use of different technology tools and features. Where pertinent, patterns among demographic characteristics and technographic traits are identified by contingency tables (cross-tabulations) of variables and statistical tests of association.

7.2.3.1 Membership Tenure

In terms of the duration for which the respondents in the survey had been members in their respective virtual communities, the bar chart in *Figure 7-2* shows that more than 50% of the respondents had been with their communities for more than 3 years, while the rest had been members for a medium duration of 1.5 to 3 years, or a short duration of 1.5 years or less.

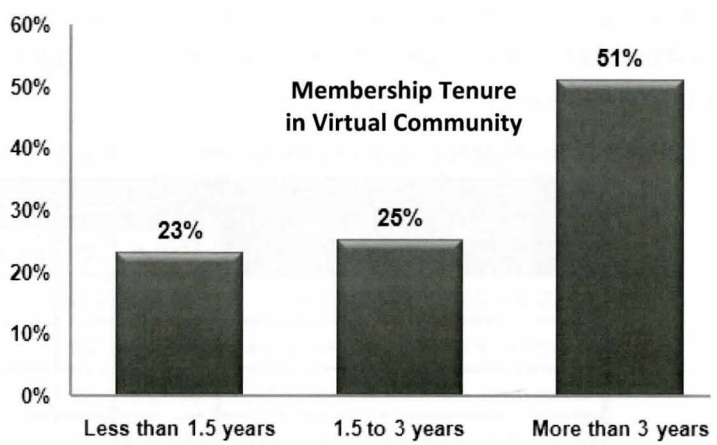


Figure 7-2: Membership Tenure in Virtual Community

The profile of the respondents' membership duration in their communities reported in this study matches the length of membership that has been reported in other self-selected response studies of virtual communities (c.f., Koh & Kim, 2003).

To ascertain whether there were significant differences among members from different virtual communities in terms of the membership duration reported, no significant relationship was found between the 13 virtual communities and the membership length reported by respondents who belonged to these communities (χ^2 (24) = 79.4, p = 0.621).

7.2.3.2 Participation Activity Levels

In terms of participating in their respective virtual communities, survey respondents were asked to identify the number of hours per week that they spent in the VC. The results from this survey item are summarized in *Figure 7-3* below.

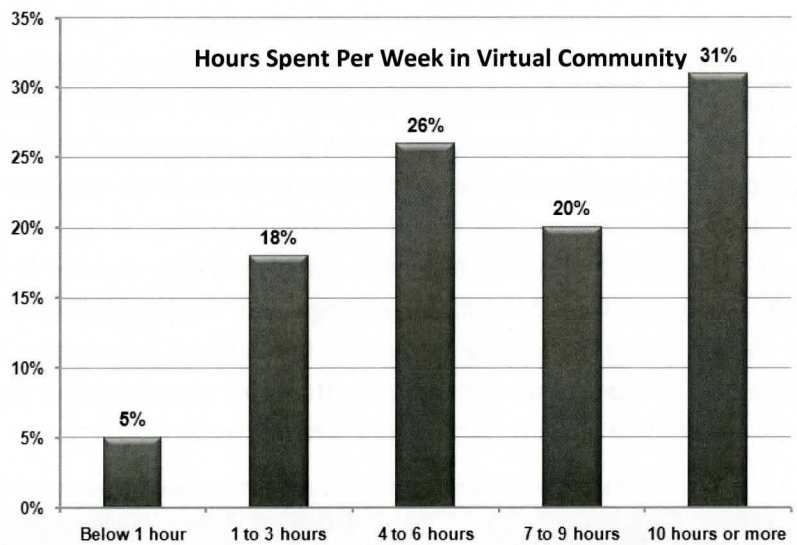


Figure 7-3: Participation Activity Levels (Hours per Week in the Virtual Community)

In terms of relating these participation activity levels to various demographic characteristics of respondents, the demographic variables of age, gender, education, and occupation were cross-tabulated against the five activity levels to observe whether there were significant differences in reported activity levels among the demographic variables. Table 7-3 provides a summary of the significance statistics of the cross-tabulations. As shown below, age was the only demographic variable that was significantly related to participation activity levels ($p < 0.01$). Further examination of the contingency table revealed that respondents in the age group of 18-30 exhibited higher participation activity levels as compared to the other age groups.

Table 7-3: Contingency Table of Demographic Variables & Participation Levels

Cross-Tabulations	Pearson Chi-Square		
	Value	df	Significance
Age x Participation Activity Levels	70.141	40	0.002
Gender x Participation Activity Levels	7.150	4	0.128
Education x Participation Activity Levels	11.799	12	0.462
Occupation x Participation Activity Levels	35.078	28	0.168

7.2.3.3 Motivational Propensities

The introductory section in the survey also asked respondents to identify the nature of their participation in their respective virtual communities in terms of their motivational *propensities* for *information exchange* or *social interaction*. To analyze the responses, a cluster analysis of cases was conducted using the six motivational propensity items in the survey instrument. A hierarchical cluster analysis using Ward's method (Ward, 1963) was performed first, and this yielded a three-cluster dendogram. A K-cluster analysis (with the number of clusters specified as three) was then performed to arrive at the finalized clusters. The means and the standard deviations for the motivational propensities of the three resulting clusters are shown in *Table 7-4*. The findings from the analysis indicate that the first cluster scored high on both the propensity for information exchange and the propensity for social interaction. The second cluster scored low on the propensity to exchange information but moderately high on the propensity for social interaction, while the third cluster scored high on the propensity to exchange information but low on the propensity for social interaction.

Table 7-4: Key Statistics for Three Motivational Propensity Clusters

Cluster	N	Information Exchange		Social Interaction	
		Mean	SD	Mean	SD
Motivaton-Cluster-1 (High Information, High Social)	58	5.81	0.93	6.43	0.74
Motivaton-Cluster-2 (Low Information, Moderate Social)	59	3.18	0.89	4.48	1.52
Motivaton-Cluster-3 (High Information, Low Social)	67	5.4	0.77	3.91	1.07

To make more sense of these clusters, further analysis was performed to determine whether these clusters comprised significantly different member demographic traits. Contingency tables were analyzed between the three clusters on the one hand, and the age, gender, education, and occupation demographic factors on the other. The results for the observed frequencies are presented in *Table 7-5* below.

Table 7-5: Contingency Table of Motivational Propensities & Demographic Characteristics (Frequencies are shown in each cell)

		Motivaton-Cluster-1 (High Information, High Social)	Motivaton-Cluster-2 (Low Information, Moderate Social)	Motivaton-Cluster-3 (High Information, Low Social)
AGE	Below 18	2	3	6
	18 to 24	6	9	18
	25 to 29	7	10	14
	30 to 34	9	5	8
	35 to 39	9	3	3
	40 to 44	7	5	6
	45 to 49	6	3	2
	50 to 54	7	9	3
	55 to 59	3	3	2
	60 to 64	2	3	4
	65 and above	0	3	1
GENDER	Male	18	28	41
	Female	40	28	26
EDUCATION	Secondary school	3	6	11
	Vocational/technical/college	12	6	11
	Bachelors degree	18	22	23
	Masters/professional/ doctoral degree	23	21	20
OCCUPATION	Employed full-time	24	24	29
	Employed part-time	7	5	4
	Unemployed	3	3	4
	Self-employed full-time	5	3	4
	Self-employed part-time	2	1	1
	Student	6	12	12
	Homemaker	6	3	2
	Retired	1	3	3

In terms of motivational propensity patterns by age, more respondents within the age group of 30 to 40 were found to be in the first cluster (high information exchange, high social exchange), while clusters two and three were primarily dominated by community members in

the 18 to 30 age group. In fact, there was a significant relationship between the demographic trait of age, and the motivational propensity clusters (χ^2 (20) = 31.91, p = 0.044).

As for gender based patterns in motivational propensities, male respondents were found to be more dominant in the third cluster (high information exchange, low social interaction), whereas female respondents dominated the first cluster (high information exchange, high social interaction). In terms of significance of these patterns, there was a significant relationship between gender and the motivational propensity clusters (χ^2 (2) = 13.21, p = 0.001).

For the education demographic trait of the respondents, no specific patterns could be identified within the educational groups or the three clusters. This observation was confirmed by the test of significance which showed no significant relationship between education and the motivational propensity clusters (χ^2 (6) = 9.09, p = .168).

Lastly, for the occupation of the subject, none of the occupations illustrated dominance in one motivational propensity cluster or another, and there was no significant relationship between occupation and the motivational propensity clusters (χ^2 (14) = 9.70, p = 0.784).

Cross-tabulations were also performed between *motivational propensities* and *membership tenure*. In identifying patterns related to membership duration and motivational propensities, it was found that members who have been with their communities longer exhibited significantly higher social interaction propensities (χ^2 (4) = 9.70, p = 0.014). Intuitively, members who have been with their communities longer are more likely to have established stronger social ties with members in that community.

Unlike membership duration, the participation activity levels did not show significant relationships with any motivational propensity clusters (χ^2 (108) = 111.8, p = 0.382). This implies that members with different motivational propensities can exhibit varying participation activity levels, and neither variable can be attributed to be dependent on the other.

As such, most of these results showed similar patterns of use as found in the qualitative phase of investigation.

7.2.3.4 Use of Virtual Community Tools and Features

The final section in the technographic portion of the survey asked users to identify the extent to which they used various virtual community ICTs tools and features. As noted in the previous chapter, the list of 14 tools and features provided in the survey was based on the findings from the qualitative research phase of this study. Respondents were also given the opportunity to mention any other technologies that they might use on a regular basis. Based on the tools and features listed in the survey, respondents identified message boards (discussion forums) as the most commonly used feature, while features such as RSS feeds, and content wikis were the least used by respondents. *Figure 7-4* presents a summary of the technology tools and

features by plotting them against their mean values (on a 7-point scale with 1 indicating rare use, and 7 indicating frequent use).

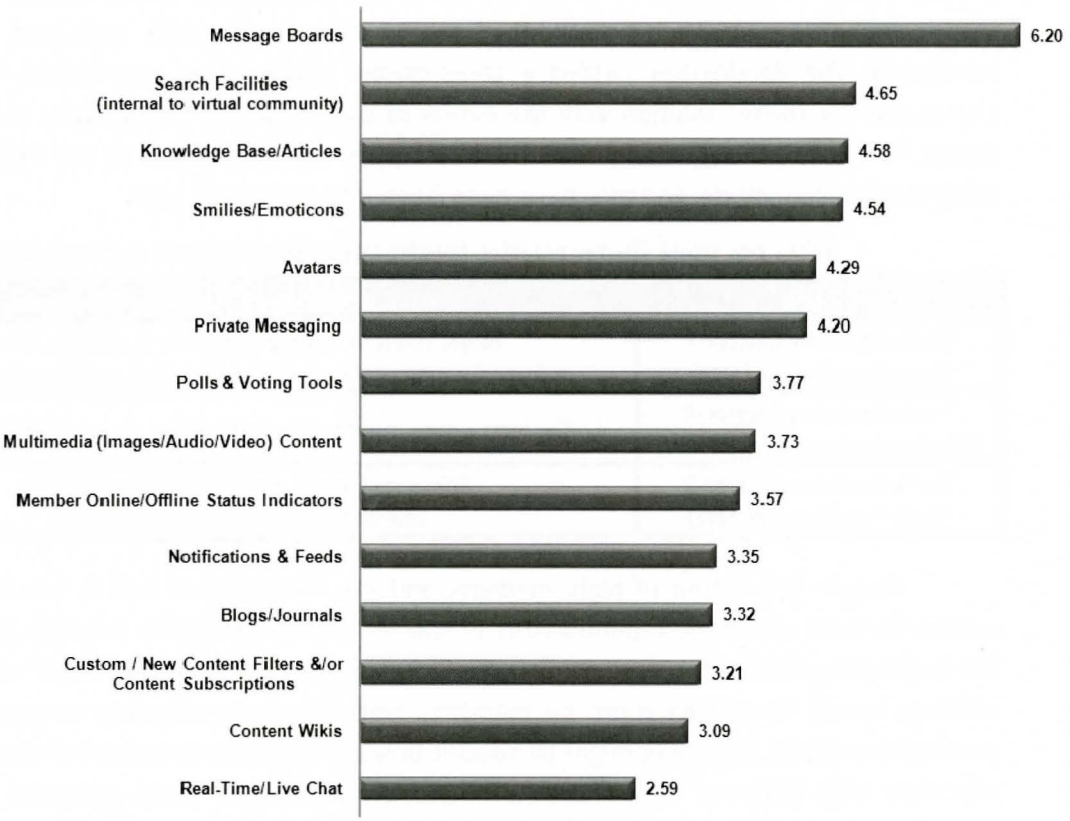


Figure 7-4: Extent of Use of Various Virtual Community Tools and Features

In addition to the features listed in the survey, some members used the free-text area to mention other features they use on a regular basis. Most of the features mentioned were specific to the respondents' virtual communities. For example, respondents from the book club community mentioned the books tracking tool that allows them to keep track of book titles of interest, and to collaborate with fellow book club members who share similar interests. Similarly, the respondents from the lowcarber.org diet and lifestyle community listed a diet plan diary tool that helps them log their progress and provide updates to the community. As explained in the qualitative results section of this dissertation, such community specific tools have the potential to provide value-added services to their community members, and this was apparent from some of the comments made by respondents. For example, respondent R-82 from the *lowcarber.org* community and R-120 from the *bookcrossing.com* community noted:

R-82 "*the online food nutrition tracker and calculator is a very useful tool, and it's free in this community – I use it daily*"
R-120 "*tracking traveling books is a useful feature available on the bookcrossings website*"

To further analyze the use of tools and features reported by respondents, a procedure similar to the one adopted for classifying *motivational propensities* was followed. A hierarchical cluster analysis (using Ward's method) of the 14 virtual community tools and features was conducted. The dendogram yielded a three-cluster structure as summarized in *Table 7-6*. Comparing the cluster solution with the extent of use of various technologies (summarized in *Figure 7-7* above), it can be seen that the clusters are primarily based on the frequency of use reported by respondents, and they have been labeled to indicate as such.

Table 7-6: Three Cluster Solution for Virtual Community Tools and Features

Cluster	Virtual Community Tools and Features
Tools-Features-Cluster-1 (Low Frequency of Use)	Blogs, content wikis, notifications, custom filters, polls and voting tools, real-time/live chat, multimedia content
Tools-Features-Cluster-2 (Moderate Frequency of Use)	Smiles/emoticons, member online/offline status indicators, avatars
Tools-Features-Cluster-3 (High Frequency of Use)	Message boards, knowledge base/articles, search facilities, private messaging

Despite the nature of high, medium, and low frequency of use, it was expected that certain features would correspond better to specific use scenarios. For example, drawing upon the qualitative results discussed in *Chapter 5*, it was expected that the lesser used advanced features would be utilized more by members with longer membership tenures and higher participation levels, and there might be specific types of tools and features that are preferred by members with different *motivational propensities*. To analyze these potential relationships among the use of tools and features and other technographic variables, a series of contingency table analyses was performed.

In terms of *membership tenure*, the cross-tabulation of the three tools and features clusters against the three membership duration levels revealed that although more respondents with longer membership durations utilized tools and features from cluster 1 (low frequency of use), there was no significant pattern in use of various features across the clusters by members with varying membership durations (χ^2 (4) = 17.39, p = 0.236).

Similarly, while the cross-tabulation of the three tools and features clusters against the *activity levels* revealed that more respondents with moderate to high participation levels utilized features from cluster 1 (low frequency of use), there was no significant pattern discernable in the use of various features across the clusters by members with varying participation activity levels (χ^2 (10) = 7.75, p = 0.634).

To investigate the relationship between the use of tools and features and *motivational propensities*, cross-tabulations were performed between the three tools and features clusters and the motivational propensity clusters yielding a 3x3 contingency matrix. The results for the observed frequencies from the contingency matrix are presented in *Table 7-7* below.

Table 7-7: Contingency Table of Tools & Features Clusters against Motivational Propensity Clusters (Frequencies are shown in each cell)

Tools & Features Clusters	Motivaton-Cluster-1 (High Information, High Social)	Motivaton-Cluster-2 (Low Information, Moderate Social)	Motivaton-Cluster-3 (High Information, Low Social)
Tools-Features-Cluster-1 (Low Frequency of Use)	15	11	19
Tools-Features-Cluster-2 (Moderate Frequency of Use)	15	17	13
Tools-Features-Cluster-3 (High Frequency of Use)	28	30	24

As shown in the table, and as one would intuitively expect, there appeared to be a pattern where tools and features cluster 3 (high frequency of use) is used pervasively by members across the different motivational propensity attribute. Cluster 1 of tools and features (low frequency of use) seems to constitute more respondents with a high motivational propensity for information exchange (motivation clusters 1 and 3), and cluster 2 seems to consist of more respondents with moderate to high motivational propensity for social interaction (motivation clusters 1 and 2). To confirm these observations, chi-squared tests of association were consulted which revealed that despite the patterns in the frequencies shown in Table 7-7 above, there was no significant relationship between each of the tools and features clusters and the motivational propensity clusters. The results are summarized in Table 7-8 below.

Table 7-8: Tests of Association between Tools & Features Clusters and Motivational Propensity Clusters

Cross-Tabulations	Pearson Chi-Square		
	Value	**df**	**Significance**
Tools-Features-Cluster-1 x Motivation-Cluster	0.791	162	0.536
Tools-Features-Cluster-2 x Motivation-Cluster	1.424	162	0.134
Tools-Features-Cluster-3 x Motivation-Cluster	1.18	162	0.253

Despite the non significant results in the cross-tabulation of the two sets of clusters, it seemed appropriate to refine the granularity of the analysis and test each tool and feature individually against the motivational propensities. For this purpose, composite scores for motivational propensities for information exchange and social interaction were calculated using the mean of the three items pertaining to each motivational propensity. These composite scores were then cross-tabulated with the 14 tools and features with the objective of identifying significant patterns in the use of certain features by members who are more inclined towards informational exchange or social interaction. The cross-tabulation revealed four significant relationships between specific tools and features and motivational propensities. There was a

significant relationship between motivational propensity for information exchange and the use of knowledge bases/article repositories; and between motivational propensity for information exchange and the use of internal search facilities. There were also a significant relationship between motivational propensity for social interaction and the use of private messaging; and between motivational propensity for social interaction and the use of avatars. The significance test results from these four relationships are presented in Table 7-9 below. Please note that for the sake of brevity, other non-significant values of the Chi-Square test between technology tools and features and motivational propensities have been omitted.

Table 7-9: Cross-Tabulations between Virtual Community Tools and Features and Motivational Propensities (Only Significant Relationships are shown)

Cross-Tabulations	Pearson Chi-Square		
	Value	df	Significance
Knowledge Base/Articles x Motivational Propensity for Information Exchange	203.094	162	0.015754199
Internal Search Facilities x Motivational Propensity for Information Exchange	218.749	162	0.001979638
Private Messaging x Motivational Propensity for Social Interaction	96.368	66	0.008731665
Avatars x Motivational Propensity for Social Interaction	95.273[a]	66	0.010659218

This concludes the analysis of the demographic and technographic variables in the study. It is believed that the various statistical procedures utilized in the analysis provided enough evidence to discuss the findings from the qualitative phase of the research study from a triangulation and complementation perspective. This integrated discussion of the qualitative findings and the quantitative results is deferred to the discussion chapter.

The next section in this chapter provides details of the exploratory factor analysis procedures used in this study, and the results from performing these procedures.

7.3 Exploratory Factor Analysis & Construct Dimensionality

Before commencing the structural equation modeling (SEM) based deductive analysis of the abridged theoretical model posited in chapter 5, the validity of the measures and factor structure had to be established. As explained in the previous chapter, this was achieved by conducting an iterative exploratory factor analysis on the data obtained from the survey.

Based on the series of steps and their specific procedures for exploratory factor analysis as described in the previous chapter, the researcher first proceeded with ascertaining the feasibility of the posited theoretical model as a whole using all the original measurement items pertaining to all constructs in the theoretical model. Based on an unrotated solution using principal axis factoring, the overall model with all items produced a Kaiser-Meyer-Olkin (KMO) index of 0.914. This suggested that it was feasible to proceed further with more refined

iterations of exploratory factor analysis, ultimately enabling the bigger model to be grouped into a smaller set of underlying factors (Coughlin & Knight, 2007; Kaiser, 1970)[47].

Having ascertained the feasibility of conducting exploratory factor analysis, the researcher then proceeded to perform an analysis at a construct level for each individual construct with its original measurement items (for scale refinement and dimensionality confirmation purposes). Finally, in the last run of factor analysis, the refined and recalibrated scale for each construct was validated. Principal axis factoring (PAF) and promax rotation were used as the extraction and rotation procedures for factor analysis in all the iterations.

The next sections provide details of the results from the multiple iterations of exploratory factor analysis procedures. First, model constructs that emerged as unidimensional are discussed along with the results of their scale refinement, item validity of the retained indicators in the recalibrated measurement scale, and construct reliability of the finalized latent variables. Next, the section on multidimensional model constructs begins its discussion by explaining the process followed in this study for the operationalization of these constructs. This is followed by a formal specification of multidimensional constructs in the study and the items in the recalibrated scales.

7.3.1 Unidimensional Model Constructs

Based on the original survey items used in this study, the exploratory factor analysis showed the following constructs to be operationally unidimensional: *Media Richness*; *Information Quality*; *Member Responsiveness*; *Organizational Trustworthiness*[48]; *Perceived Enjoyment*; *Perceived Satisfaction*; and *Willingness to Participate*. The following subsections provide additional details on the results of exploratory factor analysis for these latent variables. The sequence of discussion, as in the previous chapters, is based on the position of a construct in the nomological IT artifact network based on degrees of separation from IT artifact specific features.

7.3.1.1 Media Richness

The original survey instrument consisted of seven items pertaining to the *Media Richness* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with five of the seven items loading above the threshold of 0.70; this is the suggested minimum for ensuring internal consistency of a measurement scale (Nunnally, 1978). The two items that did not load well (items MR3 and MR7 in the original scale) were dropped, and the scale was recalibrated with the remaining items, i.e.,

[47] In their own words, the originators of the KMO index consider a value of KMO above 0.90 to indicate a "marvellous" opportunity for exploratory factor analysis (Kaiser, 1970).

[48] Organizational Trustworthiness was one of the constructs that was posited to be potentially multidimensional. The exploratory factor analysis results proved otherwise.

a new scale with five items was formulated with item labels MR1 – MR5. Table 7-10 shows the recalibrated scale with the descriptive statistics and loadings of the indicators on the unidimensional media richness construct.

As shown in *Table 7-10*, the Cronbach's alpha value of the new media richness scale exceeds the required threshold of 0.70. This suggests that the scale is reliable and the scale items measure the same underlying construct (Cronbach, 1951; Nunnally, 1978). Furthermore, the last column shows the effect of removing an item on the overall reliability of the scale. Also, as shown in the table, the removal of none of the items would result in a significantly higher coefficient alpha value than 0.877 (value with all items included). Hence the items constitute a good basis of manifest variables to measure the underlying latent construct of *media richness*.

Table 7-10: Reliability of the Recalibrated Media Richness Scale

Recalibrated Media Richness Scale				
Cronbach's Alpha	**0.877**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
MR1	5.208	1.640	0.765	0.852
MR2	4.675	1.936	0.799	0.843
MR3	5.090	1.732	0.819	0.840
MR4	5.490	1.530	0.659	0.871
MR5	4.768	1.868	0.794	0.843

7.3.1.2 Information Quality

The original survey instrument consisted of six items pertaining to the *Information Quality* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with five of the six items loading above the threshold of 0.70. Item IQ4 in the original scale did not load well and was dropped. The scale was recalibrated with the remaining four items i.e., a new scale with four items was formulated with item labels IQ1 – IQ5. *Table 7-11* shows the recalibrated scale with the descriptive statistics and loadings of the indicators on the unidimensional *information quality* construct.

Table 7-11: Reliability of the Recalibrated Information Quality Scale

Recalibrated Information Quality Scale				
Cronbach's Alpha	**0.936**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
IQ1	5.989	1.216	0.900	0.915
IQ2	5.937	1.199	0.806	0.930
IQ3	5.527	1.381	0.900	0.914
IQ4	6.043	1.141	0.860	0.922
IQ5	5.693	1.382	0.859	0.922

The Cronbach's alpha value of the new *information quality* scale exceeds the required threshold of 0.70 which suggests that the scale is reliable and the scale items measure the same underlying construct. Furthermore, the removal of none of the items from the scale would result in a significantly higher coefficient alpha value than 0.936 (value with all items included). Hence the items constitute a sound basis to measure the *information quality* latent construct.

7.3.1.3 Member Responsiveness

The original survey instrument consisted of three items pertaining to the *Member Responsiveness* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with all three items loading above the threshold of 0.70. *Table 7-12* shows the scale with the descriptive statistics and loadings of the indicators on the unidimensional *member responsiveness* construct.

Table 7-12: Reliability of the Member Responsiveness Scale

Member Responsiveness Scale				
Cronbach's Alpha	**0.907**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
MResp1	5.511	1.265	0.864	0.875
MResp2	4.835	1.408	0.902	0.850
MResp3	5.222	1.412	0.862	0.873

The Cronbach's alpha value of the member responsiveness scale exceeds the required threshold of 0.70. This suggests that the scale is reliable and the scale items measure the same underlying construct. Furthermore, the removal of none of the items from the scale would result in a significantly higher coefficient alpha value than 0.907 (value with all items included). Hence the items constitute a good basis of manifest variables to measure the underlying *member responsiveness* latent construct.

7.3.1.4 Organizational Trustworthiness

One of the research questions associated with the posited theoretical model in chapter 5 pertained to the dimensionality of the *Organizational Trustworthiness* beliefs construct within the context of virtual communities. Based on the results from the qualitative analysis phase in this research, it was expected that the organizational trustworthiness beliefs of community members may constitute a multidimensional construct. The items in the survey instrument were also selected to ascertain whether *organizational trustworthiness* is in fact a multidimensional construct, and the survey questionnaire included items pertaining to *ability*, *benevolence*, and *integrity* of the virtual community organization and administration (see items OT1 – OT10 in the original survey resource instrument). The original survey instrument consisted of ten items pertaining to the *organizational trustworthiness* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with nine of the ten items loading above the threshold of 0.70. The item that did not load well (item OT3 in the original scale) was dropped, and the scale was recalibrated with the remaining items i.e., a new scale with nine items was formulated with item labels OT1 – OT9. *Table 7-13* shows the recalibrated scale with the descriptive statistics and loadings of the indicators on the unidimensional organizational trustworthiness construct.

Table 7-13: Reliability of the Recalibrated Organizational Trustworthiness Scale

Recalibrated Organizational Trustworthiness Scale				
Cronbach's Alpha	**0.962**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
OT1	5.859	1.538	0.794	0.960
OT2	5.842	1.555	0.786	0.960
OT3	5.483	1.660	0.819	0.959
OT4	5.956	1.607	0.802	0.959
OT5	5.638	1.645	0.887	0.955
OT6	5.543	1.819	0.917	0.954
OT7	5.709	1.785	0.899	0.955
OT8	5.812	1.611	0.941	0.953
OT9	5.791	1.580	0.876	0.956

The Cronbach's alpha value of the new organizational trustworthiness scale exceeds the required threshold of 0.70. This suggests that the scale is reliable and the scale items measure the same underlying construct. Furthermore, the removal of none of the items from the scale would result in a significantly higher coefficient alpha value than 0.962 (value with all items included). Hence the items constitute a stable set of manifest variables to measure the underlying organizational trustworthiness latent construct.

7.3.1.5 Perceived Enjoyment

The original survey instrument consisted of five items pertaining to the *Perceived Enjoyment* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with all five items loading above the threshold of 0.70. *Table 7-14* shows the scale with the descriptive statistics and loadings of the indicators on the unidimensional perceived enjoyment construct.

Table 7-14: Reliability of the Perceived Enjoyment Scale

Perceived Enjoyment Scale				
Cronbach's Alpha	**0.939**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
ENJ1	6.093	1.126	0.850	0.928
ENJ2	6.033	1.155	0.850	0.928
ENJ3	6.038	1.109	0.960	0.911
ENJ4	5.878	1.168	0.874	0.924
ENJ5	5.945	1.183	0.818	0.934

The Cronbach's alpha value of the perceived enjoyment scale exceeds the required threshold of 0.70. This suggests that the scale is reliable and the scale items measure the same underlying construct. Furthermore, the removal of none of the items from the scale would result in a significantly higher coefficient alpha value than 0.939 (value with all items included). Hence the items form a stable set of indicators to measure the *perceived enjoyment* construct.

7.3.1.6 Perceived Satisfaction

The original survey instrument consisted of four items pertaining to the *Perceived Satisfaction* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with all four items loading above the threshold of 0.70. *Table 7-15* shows the scale with the descriptive statistics and loadings of the indicators on the unidimensional perceived satisfaction construct.

Table 7-15: Reliability of the Perceived Satisfaction Scale

Perceived Satisfaction Scale				
Cronbach's Alpha	**0.929**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
SAT1	6.165	1.095	0.898	0.900
SAT2	5.885	1.267	0.824	0.926
SAT3	5.963	1.060	0.922	0.895
SAT4	6.104	1.074	0.875	0.909

The Cronbach's alpha value of the perceived satisfaction scale exceeds the required threshold of 0.70. This suggests that the scale is reliable and the scale items measure the same underlying construct. Furthermore, the removal of none of the items from the scale would result in a significantly higher coefficient alpha value than 0.929 (value with all items included). Hence the items constitute a good basis of manifest variables to measure the underlying perceived satisfaction latent construct.

7.3.1.7 Willingness to Participate

The original survey instrument consisted of three items pertaining to the *Willingness to Participate* construct. Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a single factor model with all three items loading around the recommended threshold of 0.70. *Table 7-16* shows the scale with the descriptive statistics and loadings of the indicators on the unidimensional willingness to participate construct. Although items WP2 and WP3 showed loadings lesser than 0.70, they were retained to ensure content validity of the scale. It should be noted that the scale items ask respondents to indicate their willingness along dimensions of both social interactions as well as information seeking, and this may be the reason for lower loadings of the two items. Nevertheless, the loadings were close enough to the 0.70 threshold, and as shown in *Table 7-16*, removing the items would have resulted in lower coefficient alpha values than 0.752 (value with all items included)[49].

Table 7-16: Reliability of the Willingness to Participate Scale

Willingness to Participate Scale				
Cronbach's Alpha:	**0.752**			
Measurement Items	**Mean**	**Std. Deviation**	**Loading**	**Cronbach's Alpha if Item Deleted**
WP1	6.544	0.925	0.867	0.612
WP2	6.123	1.199	0.664	0.697
WP3	5.928	1.431	0.676	0.715

Overall, the refined and recalibrated item scales for the unidimensional constructs detailed in this section showed high internal consistency for a new measurement scale, as shown by item loadings that exceed the minimum value of 0.70), as well as high reliability, as shown by Cronbach's alpha value for constructs exceeding the minimum threshold of 0.70 compellingly in most cases. Furthermore, confidence in these scales was also established by observing that the potential Cronbach's Alpha value for each construct does not increase significantly by removing single items from the scale pertaining to that construct. These recalibrated unidimensional

[49] In this study, the scale items for *Willingness to Participate* were formulated based on the findings from the qualitative phase of research, and as such, the resource instrument constituted a custom scale for purposes of this research study. For new measurement scales, many researchers suggest that values of Cronbach's alpha as small as 0.40 are acceptable (Nunnally, 1978; Bagozzi et al., 1999).

constructs and their pertinent scale items were used in the structural equation modeling analysis that is explained later in this chapter. The next section discusses the analysis and formulation of the multidimensional constructs found in the theoretical model.

7.3.2 Multidimensional Model Constructs

In addition to providing a basis for analyzing the unidimensional constructs detailed in the previous section, the exploratory factor analysis, also facilitated the discovery and formulation of three multidimensional constructs, namely: *Website Usability*; *Member Trustworthiness*; and *Sense of Virtual Community*. The multidimensional nature of these constructs was somewhat expected (as postulated in *Chapter 5*).

In discussing the exploratory factor analysis and the resulting dimensionality of these constructs, this section also explains how these multidimensional constructs were operationalized for use in the structural equation model phase that followed the exploratory factor analysis procedures. Specifically, the analysis procedures utilized the *hierarchical components model* approach (using superordinate latent variables) originally suggested by Wold (1982), and recommended by other researchers who use component based structural equation modeling techniques, such as the partial least squares (PLS) (Chin et al., 2003; Lohmöller, 1989; Wetzels et al., 2009). Recall from chapters 3 and 6 that this study utilizes PLS for structural equation modeling, details of which are provided later in this chapter alongside the discussion of the structural model.

The next section highlights the rationale for operationalizing the multidimensional constructs as superordinate second-order latent variables. This is followed by the exploratory factor analysis results of the three multidimensional constructs and their respective operationalizations.

7.3.2.1 Superordinate Operationalization of Multidimensional Constructs

For purposes of analysis of the structural model, this study adopts the *hierarchical components approach* (Wold, 1982) to model the multidimensional constructs as reflective higher order latent variables that represent general concepts manifested by their specific dimensions, which are considered lower order latent variables. For example, in the context of the member trustworthiness construct described in an upcoming section, member trustworthiness is operationalized as a second order construct, while its dimensions of competence, and benevolence and integrity, are used as first order latent variables. This operationalization is based on the viewpoint that if the dimensions of a construct are correlated among themselves, these correlations may be the effect of an underlying higher order construct (Bollen & Lennox, 1991). In the example of trustworthiness, previous research has shown the dimensions of competence, benevolence, and integrity to share commonalities (McKnight et al.,

2003; Serva & Fuller, 2005). In fact, Serva & Fuller (2005) provide a conceptualization of trustworthiness very similar to the one adopted in this study. The *superordinate factor structure* between a higher order construct and its dimensions where the direction of relationship is from the higher order variable to its dimensions is often regarded as a *reflective higher order model*, the opposite of which is the formative or the aggregate higher order model where the relationship between lower and higher order constructs is reversed (Law et al., 1998). It should be noted that all multidimensional constructs in this study are reflective in nature, primarily because in formative multidimensional constructs, the underlying dimensions do not covary due to changes in the higher order construct (Bollen & Lennox, 1991; Chin et al., 2003).

In comparison with superordinate structures, an alternative representation of reflective multidimensional constructs is one where the dimensions are considered as logical groupings with each dimension acting as an independent latent variable (Edwards & Bagozzi, 2000; Law & Wong, 1999). Such a formulation allows the researcher to investigate specific dimensions and the antecedents and consequents of each of those dimensions. Such an undertaking was not an objective of this research study, and as such, the formulation of multidimensional constructs as composite higher order latent variables was deemed appropriate for analyzing constructs and relationships in the posited theoretical model.

In adopting the hierarchical component scheme for multidimensional construct, the researcher deliberately aligned himself with analytical objectives that stress *generality* and *breadth of interpretation* over specificity and precision of deduction. Such a position is in line with the overall exploratory orientation of this research study. Additionally, the choice of representation was also considered within the framework of *theoretical utility* and *abstraction levels* as suggested by Edwards (2001). From a theoretical utility standpoint, the multidimensional constructs in this study are theoretically more useful than their underlying dimensions because this study aims to derive a general theory of member participation in virtual communities through qualitative and quantitative exploratory research approaches. Toward this objective of developing broad theories, general constructs that combine specific dimensions are more appropriate than specific constructs where each dimension is investigated separately (Edwards, 2001). Similarly in terms of abstraction levels, hierarchical representations of multidimensional constructs have been recommended for analyzing relationships among general predictors with general outcomes (Edwards, 2001; Schmidt & Kaplan, 1971). In the case of the three multidimensional constructs in this study, their consequent latent variables in the theoretical model are general and not specific. For example *perceived satisfaction*, which is a consequent for the multidimensional *website usability* construct, represents an aggregate assessment of overall member satisfaction in the virtual community, and does not pertain to specific aspects of satisfaction related to the website interface. Similarly, *perceived enjoyment,* which is a consequent of multiple latent variables including the multidimensional *member trustworthiness* construct, does not relate to specific types of enjoyable experiences but overall

perceived enjoyment. Hence, in keeping with the generality of the other constructs in the theoretical model, a superordinate representation of multidimensional constructs matches the abstraction levels desired in this study.

Having established the basis for operationalizing higher order constructs, one needs to consider the various possible procedures for estimating the factor structures. In this study, the estimation approach used for analyzing the hierarchical components will be based on the *repeated indicators* (also known as *superblock*) technique (Lohmöller, 1989; Wold, 1982) which is the most commonly used approach for estimating hierarchical component models (Wilson, 2007). Using this technique, a second order factor is directly measured by observed variables for all the first order factors that are measured with reflective indicators. While this approach repeats the number of manifest variables used, the model can be estimated by the standard PLS algorithm (Chin et al., 2003; Lohmöller, 1989), and the technique has been successfully demonstrated in other information systems research studies (Chin & Gopal, 1995; Serva & Fuller, 2005; Turel et al., 2007; Wetzels et al., 2009)[50] .

Based on the rationale for formulating multidimensional constructs using the hierarchical components scheme, the next sections substantiate the three specific multidimensional constructs in this study. In order to provide a sound basis for these constructs, the exploratory factor analysis for these constructs was complemented by analysis of the factor structure using PLS. It was deemed appropriate to further validate the factor structures in PLS to provide confidence in the operationalization of multidimensionality of these constructs for subsequent analysis within the full nomological structural model which will provide more valuable insights by allowing an interpretation of the relationships with other model constructs that the multidimensional construct is associated with.

7.3.2.2 Website Usability

Website Usability was the first of the three multidimensional constructs to be identified through exploratory factor analysis. In formulating the theoretical model at the end of chapter 5, it was proposed that website usability may be a composite factor consisting of ease of use, and information design as the specific dimensions of usability, and the survey questionnaire consisted of nine items pertaining to these dimensions.

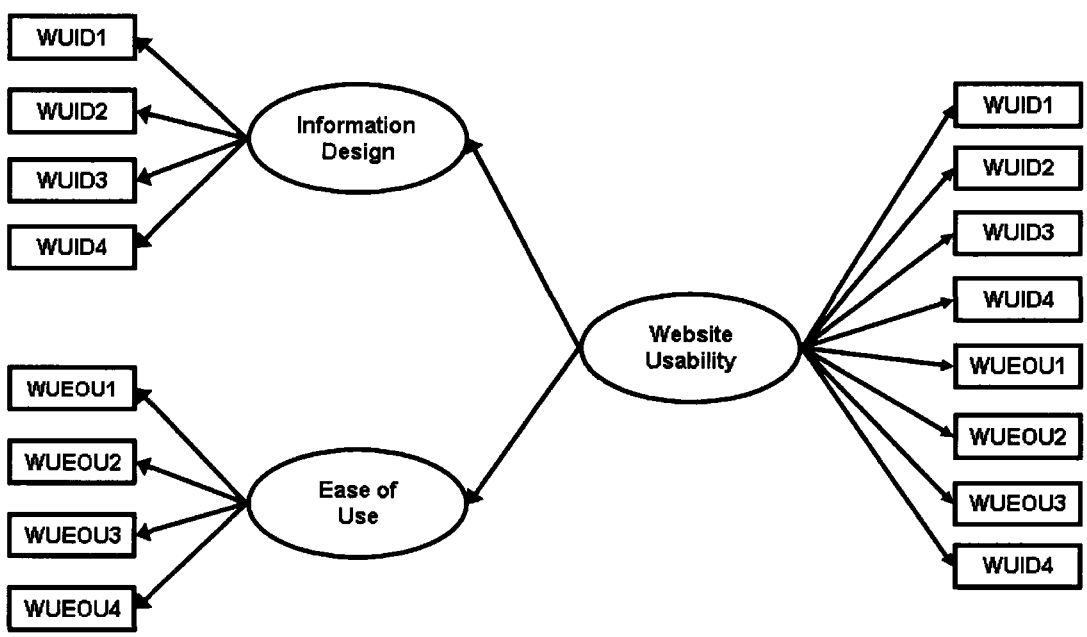
Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in the expected two factor model with four of the nine items loading on the first factor (information design), and four loading on the second factor (ease of use), all above

[50] In fact, the recent article by Wetzels et al. (2009) in MIS Quarterly recommends the same approach to modeling multi-dimensional higher order constructs as adopted in this research study. The authors provide a handy four-step procedure to modeling higher order constructs. Alas, were that article published earlier, it would have greatly helped the researcher in formalizing multidimensionality in the context of this study's theoretical model – the justification for which was sought in studies from other disciplines. Nonetheless, by virtue of its disciplinary alignment with this study, the article by Wetzels et al. (2009) provides stronger support for the approach adopted in this study.

the threshold of 0.70, with the exception of WU8 that had a loading of 0.692 – which was close enough to the 0.70 threshold for it to be retained. The item that did not load well (item WU6 in the original scale) was dropped, and the scale was recalibrated with the remaining items i.e., scales were formed for the each of the two dimensions with four items for the information design dimension of website usability (items labeled WUID1 – WUID4), and four items for the ease of use dimension of website usability (items labeled WUEOU1 – WUEOU4). Following this recalibration, all the items were analyzed a second time using the factor analysis procedure to obtain updated item loadings, and the superblock representation of the website usability construct and its dimensions were analyzed using PLS. *Figure 7-5* illustrates the updated factor structure, and the loadings of second order factors (information design and ease of use) on to the first order factor (website usability), along with the descriptive statistics and loadings of the indicators on the specific constructs.

As shown in *figure 7-5*, the Cronbach's alpha value for the scale (obtained through factor and reliability analysis in SPSS), as well as the Cronbach's alpha values for the specific dimensions (obtained through PLS) exceed the required threshold of 0.70, and the inner loadings in the two-dimensional factor structure (obtained through PLS) are also significant. These metrics provide confidence in the operationalization of the higher order multidimensional website usability construct consisting of information design, and ease of use as its second order constructs. The factor structure also provides support for the research findings from the qualitative analysis section which suggested that virtual community members value the organization and structure of information and functional features on the virtual community site, as well as ease of use of the website and its various features.

Recalibrated 2-Factor Structure & Scale for Website Usability					
Overall Cronbach's Alpha:	**0.911**	**Std.**	**Factors**		**Cronbach's Alpha**
Items	**Mean**	**Deviation**	**1**	**2**	**if Item Deleted**
WUID1	5.542	1.347	**0.773**	0.538	0.899
WUID2	5.729	1.339	**0.917**	0.598	0.889
WUID3	5.686	1.306	**0.933**	0.599	0.889
WUID4	5.695	1.376	**0.800**	0.559	0.897
WUEOU1	6.199	1.088	0.557	**0.803**	0.905
WUEOU2	5.762	1.281	0.783	**0.734**	0.892
WUEOU3	5.959	1.254	0.457	**0.757**	0.912
WUEOU4	6.245	1.034	0.536	**0.683**	0.907



Model Paths	Inner Loading	T-Statistic	P-Value	Significance Level	Validation
Website Usability -> Ease of Use	0.905	50.075	0.000	< 0.001	Supported
Website Usability -> Information Design	0.936	97.945	0.000	< 0.001	Supported
Model Constructs	**Cronbach's Alpha**	**R^2**			
Website Usability	0.910				
Ease of Use	0.832	0.818			
Information Design	0.915	0.876			

Figure 7-5: Multidimensional Website Usability Factor Structure

7.3.2.3 Member Trustworthiness

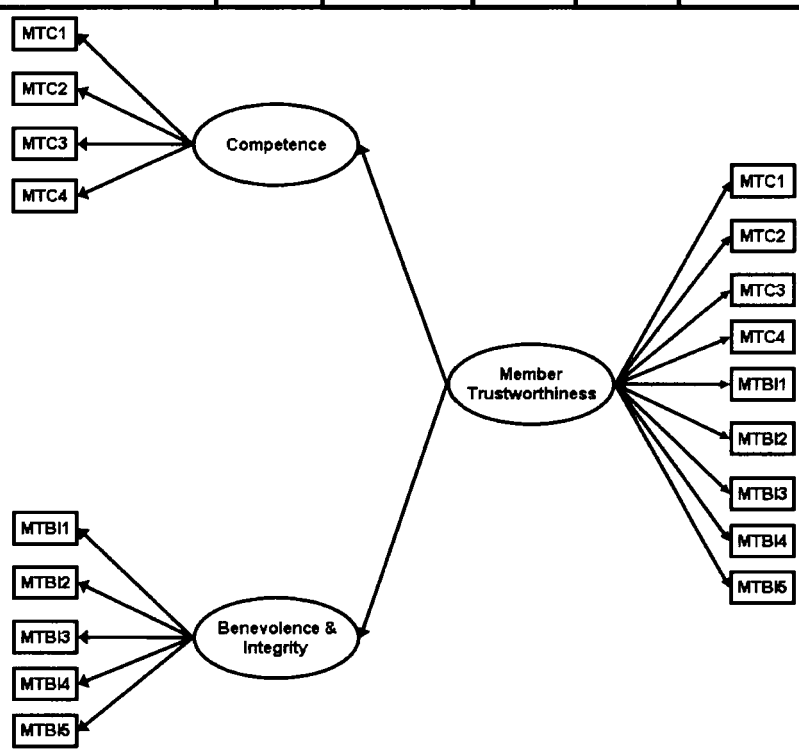
One of the research questions associated with the posited theoretical model in chapter 5 pertained to the dimensionality of the *Member Trustworthiness* construct within the context of virtual communities. The qualitative analysis in chapter 5 had indicated that member trustworthiness beliefs of virtual community members may be a composite factor comprising their perceptions of competence, benevolence, and integrity of other community members; further, the survey questionnaire consisted of ten items pertaining to these dimensions.

Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a two factor model with four of the ten items loading on the first factor (competence), and five items loading on the second factor (a combination of benevolence and integrity items), all above the threshold of 0.70. Although a three factor structure for member trustworthiness was anticipated, the two dimensional structure was not surprising. This factor structure is consistent with the findings from the qualitative analysis section which highlights that virtual community members often attribute fairness and consistency of other community members with the concern shown by those other members for their well-being. Also, in their research study, Ridings et al. conceptualized and validated a similar factor structure for member trust beliefs (Ridings et al., 2002a).

The item that did not load well (item MT5 in the original scale) was dropped, and the scale was recalibrated with the remaining items i.e., scales were formed for the each of the two dimensions with four items for the competence dimension of member trustworthiness (items labeled MTC1 – MTC4), and five items for the benevolence & integrity dimension of member trustworthiness (items labeled MTBI1 – MTBI5). Following this recalibration, all the items were analyzed a second time using the factor analysis procedure to obtain updated item loadings, and the superblock representation of the member trustworthiness construct and its dimensions were analyzed using PLS. *Figure 7-6* illustrates the updated factor structure, and the loadings of second order factors (competence, and benevolence & integrity) on the first order factor (member trustworthiness), along with the descriptive statistics and loadings of the indicators on the specific constructs.

As shown in *figure 7-6*, the Cronbach's alpha value for the scale (obtained through factor and reliability analysis in SPSS), as well as the Cronbach's alpha values for the specific dimensions (obtained through PLS) exceed the required threshold of 0.70, and the inner loadings in the two-dimensional factor structure (obtained through PLS) are also significant. These metrics provide confidence in the operationalization of the higher order multidimensional member trustworthiness construct consisting of competence, and benevolence & integrity as its second order constructs.

Recalibrated 2-Factor Structure & Scale for Member Trustworthiness					
Overall Cronbach's Alpha:	**0.938**	**Std.**	**Factors**		**Cronbach's Alpha**
Items	**Mean**	**Deviation**	**1**	**2**	**if Item Deleted**
MTC1	5.349	1.463	**0.907**	0.656	0.929
MTC2	5.560	1.336	**0.942**	0.610	0.931
MTC3	5.725	1.288	**0.847**	0.601	0.933
MTC4	5.315	1.391	**0.872**	0.644	0.931
MTBI1	4.977	1.583	0.657	**0.798**	0.931
MTBI2	4.231	1.884	0.458	**0.776**	0.941
MTBI3	4.751	1.656	0.626	**0.931**	0.928
MTBI4	5.181	1.557	0.706	**0.805**	0.929
MTBI5	5.131	1.485	0.710	**0.878**	0.927



Model Paths	Inner Loading	T-Statistic	P-Value	Significance Level	Validation
Member Trustworthiness -> Competence	0.916	60.476	0.000	< 0.001	Supported
Member Trustworthiness -> Benevolence and Integrity	0.934	77.716	0.000	< 0.001	Supported

Model Constructs	Cronbach's Alpha	R^2
Member Trustworthiness	0.942	
Competence	0.939	0.839
Benevolence and Integrity	0.921	0.873

Figure 7-6: Multidimensional Member Trustworthiness Factor Structure

7.3.2.4 Sense of Virtual Community

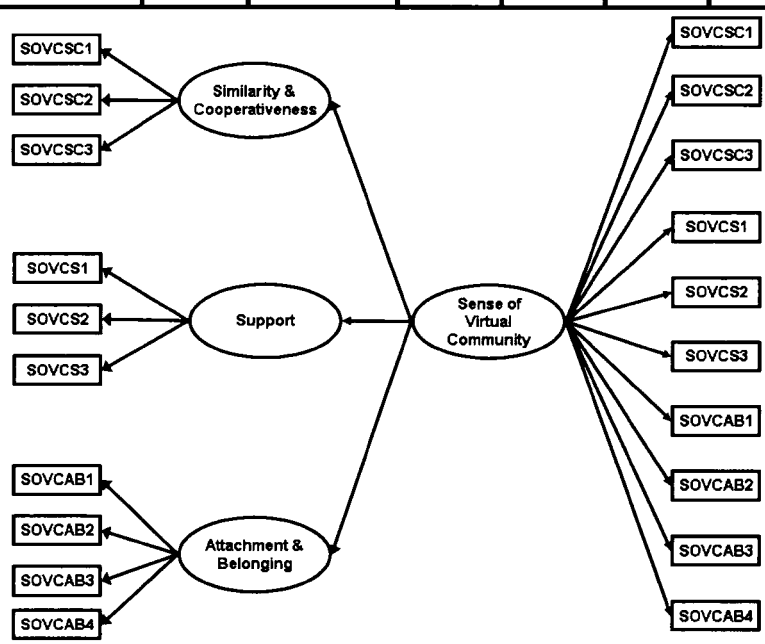
The final multidimensional construct discovered and formulated through factor analysis pertained to the *Sense of Virtual Community* construct. The qualitative analysis in chapter 5 had also indicated that SoVC may be a composite factor comprising of a member's cognitive perceptions as well as affective attitude towards the virtual community. More specifically, the perceptions of shared values, cooperativeness, support, and a sense of belonging and attachment were found to be relevant indicators of a member's sense of virtual community; these items formed the basis for the 13 sense of virtual community related questions in the survey questionnaire.

Preliminary exploratory factor analysis using principal axis factoring with promax rotation resulted in a three factor model with three of the ten items loading on the first factor (similarity & cooperativeness), three items loading on the second factor (support), and four items loading on the third factor (attachment & belonging combined into one factor), all above the threshold of 0.70, with the exception of SVC8 that had a loading of 0.685 – which was close enough to the 0.70 threshold for it to be retained. Although a four factor structure for sense of virtual community was anticipated, the three dimensional structure was not surprising. Other research studies on SoVC have conceptualized and validated three factor structures (c.f., Blanchard, 2007b; Koh & Kim, 2003; Yoo et al., 2002b).

The items that did not load well (items SVC1, SVC2, and SVC13 in the original scale) were dropped, and the scale was recalibrated with the remaining items i.e., scales were formed for the each of the three dimensions with three items for the similarity & cooperativeness dimension (items labeled SVCSC1 – SVCSC3), three items for the support dimension (items labeled SVCS1 – SVCS3), and four items for the attachment & belonging dimension (items labeled SVCAB1 – SVCAB4). Following this recalibration, all the items were analyzed a second time using the factor analysis procedure to obtain updated item loadings, and the superblock representation of the sense of virtual community construct and its dimensions were analyzed using PLS. *Figure 7-7* illustrates the updated factor structure, and the loadings of second order factors (similarity & cooperativeness, support, and attachment & belonging) on to the first order factor (sense of virtual community), along with the descriptive statistics and loadings of the indicators on the specific constructs.

As shown in *figure 7-7*, the Cronbach's alpha value for the scale (obtained through factor and reliability analysis in SPSS), as well as the Cronbach's alpha values for the specific dimensions (obtained through PLS), exceed the require threshold of 0.70; further, the inner loadings in the three-dimensional factor structure (obtained through PLS) are also significant. These metrics provide confidence in the operationalization of the higher order multidimensional SoVC construct consisting of similarity & cooperativeness, support, and attachment & belonging as its second order constructs.

Recalibrated 3-Factor Structure & Scale for Sense of Virtual Community						
Overall Cronbach's Alpha	**0.923**	**Std. Deviation**	**Factors**			**Cronbach's Alpha if Item Deleted**
Items	**Mean**		**1**	**2**	**3**	
SOVCSC1	5.502	1.291	0.529	**0.719**	0.411	0.921
SOVCSC2	5.385	1.697	0.601	**0.796**	0.467	0.918
SOVCSC3	5.909	1.318	0.566	**0.803**	0.615	0.916
SOVCS1	6.124	1.241	0.494	0.481	**0.734**	0.922
SOVCS2	5.861	1.484	0.609	0.578	**0.962**	0.916
SOVCS3	6.219	1.161	0.503	0.713	**0.694**	0.918
SOVCAB1	5.714	1.589	**0.941**	0.651	0.582	0.909
SOVCAB2	5.423	1.744	**0.900**	0.644	0.554	0.911
SOVCAB3	5.664	1.553	**0.915**	0.643	0.624	0.909
SOVCAB4	6.214	1.191	**0.765**	0.625	0.578	0.915



Model Paths	Inner Loading	T-Statistic	P-Value	Significance Level	Validation
Sense of Virtual Community -> Similarity and Cooperativeness	0.857	29.295	0.000	< 0.001	Supported
Sense of Virtual Community -> Support	0.842	24.665	0.000	< 0.001	Supported
Sense of Virtual Community -> Attachment and Belonging	0.917	62.946	0.000	< 0.001	Supported

Model Constructs	Cronbach's Alpha	R^2
Sense of Virtual Community	0.925	
Similarity and Cooperativeness	0.814	0.735
Support	0.830	0.708
Attachment and Belonging	0.933	0.841

Figure 7-7: Multidimensional Sense of Virtual Community Factor Structure

7.4 Structural Equation Modeling Analysis

Based on these operationalizations of the unidimensional and multidimensional constructs along with their validated measures and recalibrated item scales, partial least square (PLS) structural equation modeling analysis was performed to corroborate the theoretical research model and propositions posited in *Chapter 5*. Recall that the suggested model of member participation in virtual communities consists of various cognitive and affective variables that are posited to be associated with one another, and ultimately affect the conative variable pertaining to a member's continued willingness to participate in the virtual community. The SEM procedures facilitated the corroboration of the 22 propositions that pertained to relationships among the 10 theoretical inner model constructs of *website usability, media richness, information quality, member responsiveness, organizational trustworthiness, member trustworthiness, perceived enjoyment, perceived satisfaction, sense of virtual community,* and *willingness to participate*. The structural equation model was estimated using SmartPLS Version 2.0 M3 (Ringle et al., 2005).

Based on the sequence of steps and procedures outlined in the previous chapter, the results from the SEM analysis detailed herewith start with a discussion on the assessment of common method bias, followed by a discussion on the reliability and validity of the measurement model. This is followed by analysis pertaining to the verification of the structural model.

7.4.1 Common Method Bias Assessment

Common method bias refers to the variance in models that can be attributed to measurement methods as opposed to the constructs those measures represent (Campbell & Fiske, 1959; Podsakoff et al., 2003; Podsakoff & Organ, 1986). As outlined in the previous chapter, in order to reduce the possibility of such a bias, this study proactively utilized various procedural techniques during the data collection phase by explicitly addressing issues in the survey questionnaire pertaining to *item ambiguity* (Peterson, 2000; Podsakoff et al., 2003), *item priming effects* (Podsakoff et al., 2003; Salancik & Pfeffer, 1977), and *context cues (Podsakoff et al., 2003; Straub et al., 1995).*

To ascertain whether common method bias was a potential problem in the context of this research study, two statistical procedures were performed, including Harman's one-factor test procedure (Podsakoff et al., 2003; Podsakoff & Organ, 1986), and a PLS-based procedure to include a common method factor (consisting of indicators from all the principal constructs) into the PLS model (Liang et al., 2007; Podsakoff et al., 2003).

Based on Harman's one-factor test procedure outlined by Podsakoff et al. (1986), all the items pertaining to the main research constructs were used in an unrotated solution to a principal components analysis. The resulting solution yielded 11 components with an eigen-value greater than one. The first factor accounted for 28.37% of the variance and the 11 factors taken together accounted for 78.5% of the variance. A rotated solution was also produced using a varimax rotation with principal component analysis. The first factor in this rotated solution accounted for 13.5% of the variance and it comprised some items from the *perceived satisfaction* and *perceived enjoyment* scales and a few items from the *member trustworthiness*, and *sense of virtual community* constructs. Some of these items also cross-loaded on other components in the rotated solution. The second component in the solution accounted for 12% of the variance and it comprised items from the *information quality* and *member trustworthiness* scales. Overall, since there was no conspicuous order or discernable pattern in the item loadings in the unrotated solution, and there were multiple components in the rotated solution that accounted for significant variance in the model, it was inferred that there was strong evidence to suggest that variables in this study do not load on to a single general factor solution, and common method bias would not be a plausible explanation for findings reported in this study.

In the second statistical procedure, following Podsakoff et al. (2003) and Williams et al. (2003), a common method factor was included in the PLS model. The indicators for the common method factor included all the principal construct's indicators except *perceived satisfaction* and *willingness to participate* which constitute the two final downstream latent variables in the model, and as such, the items of these criterion variables are likely to highly correlate with other antecedent constructs in the model. Straub et al. (2004a) suggest that items for the ultimate dependent variables in a model can be excluded from analysis of common method bias. Following the approach suggested by Liang et al. (2007), based on the results from the PLS output, the loadings of all items on their target constructs (substantive loadings) were compared to the loadings on the common method factor. These results are shown in *Table 7-17* below.

As shown, the results from this analysis demonstrate that the average substantively explained variance of the indicators is 0.702, while the average method based variance is 0.231. The ratio of substantive variance to method variance is about 3:1 suggesting that although method variance may be a limitation in the study, there is evidence to suggest that it does not account for the majority of the variance explained by the model.

Table 7-17: Common Method Bias Analysis Using a Method Factor in the PLS Model

Construct	Indicator	Substantive Factor Loading (R1)	$R1^2$	Method Factor Loading (R2)	$R2^2$
Website Usability	WUEOU1	0.719	0.516	0.525	0.276
	WUEOU2	0.853	0.728	0.522	0.272
	WUEOU3	0.637	0.406	0.413	0.170
	WUEOU4	0.693	0.480	0.523	0.273
	WUID1	0.792	0.627	0.529	0.279
	WUID2	0.874	0.764	0.528	0.279
	WUID3	0.881	0.776	0.530	0.281
	WUID4	0.813	0.661	0.527	0.277
Information Quality	IQ1	0.912	0.831	0.431	0.186
	IQ2	0.851	0.725	0.529	0.280
	IQ3	0.918	0.842	0.432	0.186
	IQ4	0.891	0.793	0.431	0.186
	IQ5	0.896	0.803	0.439	0.193
Media Richness	MR1	0.815	0.664	0.471	0.222
	MR2	0.824	0.679	0.316	0.100
	MR3	0.844	0.713	0.412	0.170
	MR4	0.776	0.602	0.490	0.240
	MR5	0.832	0.692	0.354	0.126
Member Responsiveness	MResp1	0.917	0.840	0.522	0.272
	MResp2	0.925	0.856	0.439	0.193
	MResp3	0.916	0.838	0.520	0.271
Member Trustworthiness	MTC1	0.868	0.753	0.432	0.187
	MTC2	0.856	0.732	0.439	0.193
	MTC3	0.819	0.671	0.431	0.186
	MTC4	0.850	0.722	0.432	0.186
	MTBI1	0.813	0.661	0.526	0.277
	MTBI2	0.683	0.467	0.434	0.189
	MTBI3	0.832	0.693	0.526	0.276
	MTBI4	0.840	0.706	0.528	0.278
	MTBI5	0.867	0.752	0.432	0.186

Table 7-17 continued below

Table 7-17 (continued): Common Method Bias Analysis Using a Method Factor in the PLS Model

Construct	Indicator	Substantive Factor Loading (R1)	$R1^2$	Method Factor Loading (R2)	$R2^2$
Organizational Trustworthiness	OT1	0.840	0.705	0.524	0.274
	OT2	0.831	0.691	0.439	0.193
	OT3	0.845	0.714	0.520	0.271
	OT4	0.827	0.683	0.435	0.189
	OT5	0.898	0.807	0.523	0.273
	OT6	0.910	0.829	0.431	0.186
	OT7	0.895	0.802	0.431	0.186
	OT8	0.934	0.873	0.438	0.191
	OT9	0.887	0.786	0.522	0.273
Sense of Virtual Community	SOVCSC1	0.676	0.457	0.525	0.275
	SOVCSC2	0.738	0.545	0.524	0.274
	SOVCSC3	0.770	0.592	0.530	0.281
	SOVCS1	0.665	0.442	0.437	0.191
	SOVCS2	0.775	0.601	0.523	0.273
	SOVCS3	0.733	0.538	0.522	0.273
	SOVCAB1	0.857	0.735	0.431	0.186
	SOVCAB2	0.837	0.701	0.529	0.280
	SOVCAB3	0.861	0.742	0.432	0.186
	SOVCAB4	0.801	0.642	0.431	0.186
Perceived Enjoyment	ENJ1	0.884	0.781	0.521	0.272
	ENJ2	0.877	0.769	0.488	0.238
	ENJ3	0.953	0.908	0.544	0.296
	ENJ4	0.902	0.813	0.563	0.317
	ENJ5	0.871	0.759	0.493	0.244
Average		**0.835**	**0.702**	**0.478**	**0.231**
			Average Substantively Explained Variance		**Average Method Based Variance**

7.4.2 Evaluation of Measurement Model Reliability and Validity

Before estimating the structural model, its suitability needs to be considered by addressing concerns of common method bias, and ensuring validity and reliability of construct measures (Gefen et al., 2000b). The previous section in this chapter provided an overview of the potential for common method bias to confound the interpretation of results from SEM. Furthermore, many of the tasks associated with assessing the reliability and validity of constructs and their indicators were already addressed, albeit indirectly, in a previous section on exploratory factor analysis, but a formal and direct evaluation of the robustness of the measurement model are detailed in the following subsections.

7.4.2.1 Assessment of Item Reliability & Discriminant Validity

In evaluating the validity of the measurement model, this study followed the specific tests suggested by Chin (1998a), and outlined in Table 6-15 of the previous chapter. In conducting the tests for reliability and validity, statistical tests related to item reliability and discriminant validity were conducted in tandem.

First, the loadings and cross-loadings of indicators were examined as a basic test for discriminant validity of measures. Following the approach recommended by Wetzels et al. (2009) for validating hierarchical models, the matrix of loadings and cross-loadings is shown in two tables, one with the first order latent constructs, and the other with second order constructs in the hierarchical model. The matrices of loadings and cross-loadings are presented below in Tables 7-18 and 7-19 with the highest loadings of items shown in bold. In order to ascertain discriminant validity, the loadings of an item on its associated latent construct (target variable) should be higher in comparison to the item's cross-loadings on other latent constructs.

In both tables, the higher loadings of items on their respective target latent variables are quite apparent. Also, the substantive loading of each item on its own construct is above than the minimum required threshold value of 0.70 which indicates item reliability (Chin, 1998b; Nunnally, 1978). Hence, using the two matrices of loadings and cross-loadings of items on model constructs, item reliability and discriminant validity at the item level are established.

Note that due to the presence of second order latent constructs in this study and the use of the superblock approach to operationalize those constructs, some manifest variables for second-order constructs may also load highly on the first order constructs. This is an expected outcome (Chin et al., 2003; Lohmöller, 1989; Wetzels et al., 2009), and as such, the practice of establishing discriminant validity usually precludes the high loading of items among the first and second order latent constructs in hierarchical component structures such as the ones used in the formulation of multidimensional constructs in this study. To determine discriminant validity at the item level, many studies recommend that the loading of the item on the inner-most related

latent variable can be used as a benchmark (Wetzels et al., 2009). This helps establish the discriminant validity of the inner model latent constructs that form the nomological network which is to be estimated through SEM. Keeping this in mind, subsequent exhibits in this chapter only report construct statistics and quality indices for second order latent factors from their respective hierarchical models along with other inner model constructs.

Table 7-18: Matrix of Loadings and Cross-Loadings in the First-Order Measurement (Outer) Model

	WU-EOU	WU-ID	MR	IQ	OT	MResp	INT	MT C	MT BI	SAT	SOVC-SC	SOVC-S	SOVC-AB	WP
WUEOU1	**0.858**	0.517	0.246	0.355	0.327	0.370	0.413	0.427	0.311	0.326	0.192	0.333	0.282	0.227
WUEOU2	**0.839**	0.750	0.414	0.459	0.417	0.414	0.434	0.492	0.386	0.484	0.363	0.276	0.403	0.326
WUEOU3	**0.787**	0.438	0.182	0.257	0.253	0.452	0.398	0.329	0.225	0.271	0.205	0.227	0.247	0.207
WUEOU4	**0.775**	0.525	0.276	0.495	0.423	0.478	0.529	0.550	0.307	0.483	0.367	0.421	0.449	0.493
WUID1	0.578	**0.847**	0.361	0.619	0.381	0.408	0.522	0.466	0.494	0.579	0.443	0.395	0.500	0.549
WUID2	0.658	**0.923**	0.389	0.581	0.404	0.379	0.489	0.540	0.445	0.550	0.411	0.345	0.469	0.475
WUID3	0.649	**0.940**	0.348	0.560	0.459	0.475	0.530	0.507	0.440	0.581	0.455	0.338	0.502	0.466
WUID4	0.605	**0.859**	0.399	0.466	0.529	0.454	0.506	0.441	0.381	0.533	0.496	0.321	0.516	0.424
MR1	0.298	0.385	**0.815**	0.379	0.328	0.291	0.239	0.341	0.315	0.408	0.377	0.223	0.321	0.265
MR2	0.207	0.247	**0.824**	0.202	0.357	0.222	0.178	0.187	0.163	0.225	0.246	0.063	0.192	0.105
MR3	0.312	0.336	**0.844**	0.274	0.250	0.290	0.201	0.316	0.314	0.252	0.358	0.220	0.239	0.170
MR4	0.356	0.387	**0.776**	0.350	0.407	0.281	0.302	0.420	0.302	0.301	0.398	0.288	0.263	0.294
MR5	0.248	0.331	**0.832**	0.212	0.381	0.228	0.183	0.218	0.219	0.163	0.301	0.123	0.164	0.146
IQ1	0.463	0.570	0.279	**0.912**	0.386	0.404	0.529	0.608	0.500	0.617	0.447	0.389	0.511	0.578
IQ2	0.442	0.494	0.290	**0.851**	0.371	0.477	0.580	0.576	0.462	0.519	0.425	0.391	0.516	0.555
IQ3	0.385	0.566	0.306	**0.918**	0.400	0.401	0.594	0.662	0.616	0.650	0.511	0.458	0.583	0.600
IQ4	0.433	0.537	0.364	**0.891**	0.458	0.382	0.479	0.638	0.535	0.604	0.501	0.440	0.541	0.634
IQ5	0.455	0.607	0.339	**0.896**	0.506	0.459	0.548	0.726	0.591	0.665	0.534	0.523	0.655	0.613
OT1	0.453	0.494	0.435	0.468	**0.840**	0.365	0.382	0.464	0.340	0.493	0.494	0.277	0.430	0.342
OT2	0.474	0.500	0.385	0.416	**0.831**	0.352	0.336	0.383	0.320	0.419	0.477	0.219	0.365	0.305
OT3	0.328	0.336	0.388	0.446	**0.845**	0.362	0.321	0.438	0.422	0.414	0.471	0.309	0.396	0.306
OT4	0.410	0.453	0.327	0.375	**0.827**	0.267	0.270	0.320	0.338	0.367	0.415	0.281	0.308	0.296
OT5	0.415	0.446	0.450	0.423	**0.898**	0.361	0.284	0.410	0.436	0.412	0.506	0.288	0.388	0.318
OT6	0.292	0.363	0.336	0.343	**0.910**	0.215	0.206	0.258	0.345	0.315	0.418	0.178	0.308	0.247
OT7	0.287	0.380	0.279	0.355	**0.895**	0.200	0.184	0.295	0.338	0.291	0.384	0.206	0.297	0.252
OT8	0.342	0.429	0.338	0.414	**0.934**	0.223	0.265	0.343	0.365	0.368	0.444	0.266	0.360	0.283
OT9	0.411	0.459	0.363	0.463	**0.887**	0.267	0.317	0.429	0.421	0.428	0.463	0.303	0.400	0.298
MResp1	0.480	0.448	0.311	0.469	0.326	**0.917**	0.493	0.515	0.348	0.562	0.473	0.434	0.421	0.490
MResp2	0.466	0.439	0.287	0.402	0.297	**0.925**	0.468	0.476	0.391	0.476	0.447	0.423	0.435	0.484
MResp3	0.494	0.434	0.293	0.437	0.311	**0.916**	0.516	0.464	0.399	0.519	0.464	0.419	0.445	0.438

Table 7-18 continued below

Table 7-18 (continued): Matrix of Loadings and Cross-Loadings in the First-Order Measurement (Outer) Model

	WU-EOU	WU-ID	MR	IQ	OT	MResp	ENJ	MT-C	MT-BI	SAT	SOVC-SC	SOVC-S	SOVC-AB	WP
ENJ1	0.515	0.474	0.247	0.566	0.283	0.495	**0.884**	0.569	0.433	0.673	0.468	0.475	0.642	0.597
ENJ2	0.480	0.451	0.208	0.468	0.237	0.455	**0.877**	0.529	0.409	0.568	0.354	0.443	0.559	0.543
ENJ3	0.536	0.555	0.255	0.610	0.343	0.525	**0.953**	0.649	0.525	0.781	0.565	0.518	0.700	0.705
ENJ4	0.468	0.540	0.246	0.505	0.293	0.507	**0.902**	0.575	0.534	0.676	0.513	0.517	0.625	0.659
ENJ5	0.438	0.536	0.274	0.581	0.327	0.420	**0.871**	0.621	0.666	0.709	0.543	0.530	0.552	0.634
MTC1	0.537	0.537	0.325	0.663	0.368	0.520	0.671	**0.930**	0.681	0.643	0.523	0.507	0.615	0.543
MTC2	0.535	0.544	0.338	0.731	0.435	0.510	0.614	**0.946**	0.643	0.629	0.516	0.510	0.620	0.574
MTC3	0.490	0.438	0.287	0.628	0.340	0.458	0.563	**0.893**	0.628	0.565	0.489	0.629	0.523	0.518
MTC4	0.483	0.495	0.416	0.630	0.448	0.453	0.572	**0.910**	0.668	0.570	0.596	0.593	0.565	0.535
MTBI1	0.374	0.452	0.317	0.500	0.308	0.376	0.578	0.644	**0.854**	0.524	0.550	0.484	0.454	0.471
MTBI2	0.212	0.321	0.239	0.450	0.364	0.270	0.384	0.449	**0.809**	0.342	0.502	0.352	0.338	0.289
MTBI3	0.352	0.420	0.247	0.524	0.399	0.324	0.495	0.613	**0.923**	0.475	0.490	0.468	0.418	0.428
MTBI4	0.326	0.429	0.307	0.521	0.340	0.399	0.505	0.687	**0.865**	0.504	0.541	0.526	0.447	0.451
MTBI5	0.390	0.507	0.308	0.644	0.443	0.416	0.536	0.689	**0.909**	0.522	0.591	0.540	0.488	0.464
SAT1	0.477	0.547	0.326	0.611	0.444	0.561	0.718	0.598	0.449	**0.920**	0.555	0.482	0.688	0.623
SAT2	0.364	0.497	0.280	0.594	0.352	0.420	0.635	0.588	0.481	**0.878**	0.499	0.427	0.634	0.628
SAT3	0.446	0.591	0.336	0.661	0.439	0.527	0.714	0.653	0.586	**0.935**	0.599	0.530	0.704	0.723
SAT4	0.482	0.643	0.279	0.634	0.413	0.546	0.715	0.546	0.472	**0.911**	0.528	0.458	0.662	0.679
SOVCSC1	0.300	0.456	0.339	0.461	0.443	0.456	0.509	0.469	0.523	0.521	**0.836**	0.448	0.533	0.492
SOVCSC2	0.197	0.389	0.425	0.456	0.414	0.368	0.378	0.456	0.540	0.458	**0.870**	0.520	0.599	0.386
SOVCSC3	0.399	0.449	0.306	0.475	0.480	0.465	0.523	0.551	0.509	0.557	**0.855**	0.638	0.588	0.513
SOVCS1	0.354	0.384	0.165	0.428	0.220	0.414	0.462	0.474	0.352	0.465	0.455	**0.835**	0.504	0.540
SOVCS2	0.281	0.299	0.239	0.419	0.260	0.390	0.498	0.565	0.545	0.440	0.531	**0.925**	0.622	0.572
SOVCS3	0.367	0.337	0.194	0.439	0.295	0.401	0.478	0.531	0.510	0.452	0.645	**0.830**	0.528	0.485
SOVCAB1	0.360	0.466	0.257	0.566	0.400	0.404	0.597	0.563	0.433	0.646	0.623	0.588	**0.943**	0.626
SOVCAB2	0.363	0.516	0.260	0.549	0.321	0.402	0.591	0.497	0.438	0.639	0.626	0.565	**0.916**	0.618
SOVCAB3	0.367	0.508	0.311	0.606	0.434	0.429	0.607	0.619	0.494	0.675	0.623	0.612	**0.934**	0.626
SOVCAB4	0.480	0.541	0.238	0.584	0.374	0.493	0.725	0.631	0.443	0.739	0.586	0.575	**0.856**	0.651
WP1	0.358	0.483	0.210	0.589	0.315	0.440	0.604	0.486	0.411	0.681	0.490	0.485	0.576	**0.876**
WP2	0.245	0.414	0.269	0.659	0.234	0.353	0.532	0.502	0.389	0.529	0.379	0.488	0.538	**0.791**
WP3	0.351	0.433	0.149	0.434	0.294	0.476	0.614	0.488	0.413	0.601	0.477	0.564	0.604	**0.826**

Table 7-19: Matrix of Loadings and Cross-Loadings in the Second-Order Measurement (Outer) Model

	WU	MR	IQ	OT	MResp	ENJ	MT	SAT	SOVC	WP
WUEOU1	**0.719**	0.246	0.355	0.327	0.370	0.413	0.398	0.326	0.310	0.227
WUEOU2	**0.853**	0.414	0.459	0.417	0.414	0.434	0.473	0.484	0.406	0.326
WUEOU3	**0.637**	0.182	0.257	0.253	0.452	0.398	0.298	0.271	0.263	0.207
WUEOU4	**0.693**	0.276	0.495	0.423	0.478	0.529	0.461	0.483	0.478	0.493
WUID1	**0.792**	0.361	0.619	0.381	0.408	0.522	0.520	0.579	0.518	0.549
WUID2	**0.874**	0.389	0.581	0.404	0.379	0.489	0.532	0.550	0.477	0.475
WUID3	**0.881**	0.348	0.560	0.459	0.475	0.530	0.511	0.581	0.505	0.466
WUID4	**0.813**	0.399	0.466	0.529	0.454	0.506	0.444	0.533	0.519	0.424
MR1	0.377	**0.815**	0.379	0.328	0.291	0.239	0.354	0.408	0.351	0.265
MR2	0.249	**0.824**	0.202	0.357	0.222	0.178	0.189	0.225	0.194	0.105
MR3	0.353	**0.844**	0.274	0.250	0.290	0.201	0.340	0.252	0.302	0.170
MR4	0.406	**0.776**	0.350	0.407	0.281	0.302	0.389	0.301	0.349	0.294
MR5	0.319	**0.832**	0.212	0.381	0.228	0.183	0.236	0.163	0.216	0.146
IQ1	0.569	0.279	**0.912**	0.386	0.404	0.529	0.598	0.617	0.523	0.578
IQ2	0.512	0.290	**0.851**	0.371	0.477	0.580	0.560	0.519	0.519	0.555
IQ3	0.530	0.306	**0.918**	0.400	0.401	0.594	0.690	0.650	0.601	0.600
IQ4	0.536	0.364	**0.891**	0.458	0.382	0.479	0.633	0.604	0.571	0.634
IQ5	0.587	0.339	**0.896**	0.506	0.459	0.548	0.710	0.665	0.665	0.613
OT1	0.519	0.435	0.468	**0.840**	0.365	0.382	0.433	0.493	0.461	0.342
OT2	0.531	0.385	0.416	**0.831**	0.352	0.336	0.379	0.419	0.405	0.305
OT3	0.363	0.388	0.446	**0.845**	0.362	0.321	0.464	0.414	0.446	0.306
OT4	0.472	0.327	0.375	**0.827**	0.267	0.270	0.356	0.367	0.376	0.296
OT5	0.470	0.450	0.423	**0.898**	0.361	0.284	0.457	0.412	0.447	0.318
OT6	0.361	0.336	0.343	**0.910**	0.215	0.206	0.326	0.315	0.344	0.247
OT7	0.370	0.279	0.355	**0.895**	0.200	0.184	0.343	0.291	0.336	0.252
OT8	0.426	0.338	0.414	**0.934**	0.223	0.265	0.383	0.368	0.406	0.283
OT9	0.477	0.363	0.463	**0.887**	0.267	0.317	0.459	0.428	0.444	0.298
MResp1	0.503	0.311	0.469	0.326	**0.917**	0.493	0.465	0.562	0.501	0.490
MResp2	0.490	0.287	0.402	0.297	**0.925**	0.468	0.468	0.476	0.496	0.484
MResp3	0.499	0.293	0.437	0.311	**0.916**	0.516	0.466	0.519	0.505	0.438

Table 7-19 continued below

Table 7-19 (continued): Matrix of Loadings and Cross-Loadings in the Second-Order Measurement (Outer) Model

	WU	MR	IQ	OT	MResp	ENJ	MT	SAT	SOVC	WP
ENJ1	0.535	0.247	0.566	0.283	0.495	**0.884**	0.540	0.673	0.624	0.597
ENJ2	0.503	0.208	0.468	0.237	0.455	**0.877**	0.506	0.568	0.536	0.543
ENJ3	0.594	0.255	0.610	0.343	0.525	**0.953**	0.633	0.781	0.698	0.705
ENJ4	0.553	0.246	0.505	0.293	0.507	**0.902**	0.600	0.676	0.642	0.659
ENJ5	0.536	0.274	0.581	0.327	0.420	**0.871**	0.696	0.709	0.619	0.634
MTC1	0.583	0.325	0.663	0.368	0.520	0.671	**0.868**	0.643	0.637	0.543
MTC2	0.587	0.338	0.731	0.435	0.510	0.614	**0.856**	0.629	0.638	0.574
MTC3	0.500	0.287	0.628	0.340	0.458	0.563	**0.819**	0.565	0.619	0.518
MTC4	0.533	0.416	0.630	0.448	0.453	0.572	**0.850**	0.570	0.662	0.535
MTBI1	0.454	0.317	0.500	0.308	0.376	0.578	**0.813**	0.524	0.556	0.471
MTBI2	0.296	0.239	0.450	0.364	0.270	0.384	**0.683**	0.342	0.440	0.289
MTBI3	0.423	0.247	0.524	0.399	0.324	0.495	**0.832**	0.475	0.514	0.428
MTBI4	0.416	0.307	0.521	0.340	0.399	0.505	**0.840**	0.504	0.563	0.451
MTBI5	0.495	0.308	0.644	0.443	0.416	0.536	**0.867**	0.522	0.604	0.464
SAT1	0.562	0.326	0.611	0.444	0.561	0.718	0.565	**0.920**	0.677	0.623
SAT2	0.476	0.280	0.594	0.352	0.420	0.635	0.576	**0.878**	0.613	0.628
SAT3	0.575	0.336	0.661	0.439	0.527	0.714	0.669	**0.935**	0.713	0.723
SAT4	0.623	0.279	0.634	0.413	0.546	0.715	0.549	**0.911**	0.647	0.679
SOVCSC1	0.422	0.339	0.461	0.443	0.456	0.509	0.537	0.521	**0.676**	0.492
SOVCSC2	0.333	0.425	0.456	0.414	0.368	0.378	0.539	0.458	**0.738**	0.386
SOVCSC3	0.465	0.306	0.475	0.480	0.465	0.523	0.572	0.557	**0.770**	0.513
SOVCS1	0.404	0.165	0.428	0.220	0.414	0.462	0.445	0.465	**0.665**	0.540
SOVCS2	0.317	0.239	0.419	0.260	0.390	0.498	0.599	0.440	**0.775**	0.572
SOVCS3	0.381	0.194	0.439	0.295	0.401	0.478	0.562	0.452	**0.733**	0.485
SOVCAB1	0.457	0.257	0.566	0.400	0.404	0.597	0.537	0.646	**0.857**	0.626
SOVCAB2	0.489	0.260	0.549	0.321	0.402	0.591	0.505	0.639	**0.837**	0.618
SOVCAB3	0.486	0.311	0.606	0.434	0.429	0.607	0.600	0.675	**0.861**	0.626
SOVCAB4	0.560	0.238	0.584	0.374	0.493	0.725	0.578	0.739	**0.801**	0.651
WP1	0.468	0.210	0.589	0.315	0.440	0.604	0.484	0.681	0.600	**0.876**
WP2	0.371	0.269	0.659	0.234	0.353	0.532	0.481	0.529	0.547	**0.791**
WP3	0.434	0.149	0.434	0.294	0.476	0.614	0.486	0.601	0.635	**0.826**

In addition to establishing the discriminant validity of the model at the item level through observing loadings and cross-loadings of indicators on their respective constructs, researchers are also advised to observe the correlations among the inner model constructs, and

compare these to the discriminant validity metric – which is calculated as the square root of the average variance extracted for each construct (AVE). AVE is defined as the proportion of variance in a construct that is not attributed to measurement error (Chin, 2001).

To confirm discriminant validity for the inner model of relationships among latent variables, the discriminant validity metric should exceed the correlations among the constructs. *Table 7-20* presents the correlation matrix of construct score correlations with the discriminant validity metric (square root of AVE) being shown along the diagonal. By quickly eye-balling the rows and columns in *Table 7-20*, one can verify that the values in the diagonal are indeed higher than the construct correlation values for that row and column, hence suggesting that the variance shared between each reflective construct and measurement items (AVE) is higher than the variance shared between each construct and other constructs in the model. Therefore, there is strong evidence of discriminant validity for the constructs in the model (Chin, 1998b; Fornell & Larcker, 1981; Gefen et al., 2000b).

7.4.2.2 Assessment of Convergent Validity

By using the criteria outlined in Table 6-15 from the previous chapter, thus far, the assessment of the measurement model seems satisfactory in terms of item reliability and discriminant validity. The last part in the assessment of the measurement model entails an evaluation of the *convergent validity* of the various model constructs. As summarized in Table 6-15, tests of convergent validity can be performed through an assessment of various quality indices such as the *communality index* (AVE), the *composite reliability index* (ρ), and *Cronbach's alpha* (α). Table 7-21 reports the values of these test statistics for the constructs in the measurement model.

As seen in the table, the values of the communality index (or the average variance extracted) are compellingly higher than the minimum threshold of 0.50 suggesting that each latent construct accounts for a major proportion of the variance in its indicators (Chin, 1998b; Fornell & Larcker, 1981). Furthermore, the composite reliability values for all constructs are higher than the minimum recommended value of 0.70, hence suggesting acceptable internal consistency reliability (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Finally, all the Cronbach's alpha values exceed the recommended threshold of 0.70 suggesting that the model constructs are internally consistent as a measurement scale comprising of their respective indicators (Chin, 1998b; Gefen et al., 2000b; Nunnally, 1978).

After having established the robustness of the measurements and constructs in the model, the structural model was estimated to provide details of the strengths of relationships among the latent constructs in the model, and the overall predictability of the endogenous latent variables in the model. The results from the evaluation of the structural model are discussed in the next section.

Table 7-20: Construct Correlations & Discriminant Validity Assessment

	Website Usability	Media Richness	Information Quality	Organizational Trustworthiness	Member Responsiveness	Perceived Enjoyment	Member Trustworthiness	Perceived Satisfaction	Willingness to Participate	Sense of Virtual Community
Website Usability	**0.920**									
Media Richness	0.423	**0.818**								
Information Quality	0.613	0.354	**0.894**							
Organizational Trustworthiness	0.513	0.426	0.476	**0.875**						
Member Responsiveness	0.541	0.323	0.475	0.339	**0.919**					
Perceived Enjoyment	0.608	0.275	0.611	0.333	0.536	**0.898**				
Member Trustworthiness	0.583	0.377	0.717	0.463	0.507	0.667	**0.925**			
Perceived Satisfaction	0.615	0.335	0.686	0.453	0.565	0.764	0.648	**0.911**		
Willingness to Participate	0.512	0.248	0.668	0.340	0.512	0.703	0.581	0.730	**0.832**	
Sense of Virtual Community	0.560	0.352	0.647	0.471	0.545	0.699	0.708	0.728	0.716	**0.872**

Correlations among constructs are shown. Square Roots of AVE are shown along the diagonal in bold.

Table 7-21: Convergent Validity Assessment in the Measurement Model

Test Criteria & Heuristics:	Communality Index (AVE) > 0.50	Composite Reliability (ρ) > 0.70	Cronbach's Alpha (α) > 0.70
Model Constructs			
Website Usability	0.847	0.928	0.910
Media Richness	0.670	0.910	0.877
Information Quality	0.799	0.952	0.937
Organizational Trustworthiness	0.766	0.967	0.962
Member Responsiveness	0.845	0.942	0.908
Perceived Enjoyment	0.806	0.954	0.940
Member Trustworthiness	0.856	0.951	0.942
Sense of Virtual Community	0.761	0.937	0.925
Perceived Satisfaction	0.830	0.951	0.932
Willingness to Participate	0.692	0.870	0.777

7.4.3 Verification of the Structural Model

As highlighted in the previous chapter, in order to estimate the structural model, this study used a *bootstrapping* procedure to assess the significance of the path beta coefficients in the structural model. The bootstrapping procedure was performed by using 1000 replications and incorporating construct level sign changes – an option that has the effect of reducing significance t-values, and hence provides a more conservative test of parameter significance (Chin, 2001; Fornell & Barclay, 1983).

As outlined in *Table 6-16* in the previous chapter, various test criteria and heuristics were applied for verifying the structural model and in establishing its *nomological validity*, *predictive relevance* and overall *goodness-of-fit*. The discussion in this section addresses each of these areas.

7.4.3.1 Predictability and Coefficients of Determination for Endogenous Model Constructs

As a first and important test of nomological validity, many researchers suggest the observations of ***coefficients of determination (R^2)*** values (Chin, 1998b; Tenenhaus et al., 2005; Wicks & Chin, 2008). The value of the coefficient of determination of every endogenous latent variable indicates the proportion of its variance that can be predicted by the other antecedent constructs in that model. For any given dependent variable in the mode, greater values of R^2 are considered better on the whole. It should be noted that there are no specific heuristics for comparisons of R^2 values against specific cut-offs (Gefen et al., 2000b), and the value obtained are suggested to be contrasted with other similar studies. Some researchers suggest a minimum

value of 0.10 to ascertain the usefulness of an endogenous variable within the overall model (Falk & Miller, 1992).

Table 7-22 below provides the values of the coefficient of determination for all inner model constructs. As seen, most variables compellingly exceed the minimum level of 0.10, with the exceptions being *media richness* and *member responsiveness* for which the values are only slightly above 0.10. This should not be a concern though, as both these variables only have one incoming path from other constructs that act as their antecedents. Moreover, media richness is the only antecedent for member responsiveness in the current model, hence explaining its low R^2 value. Most likely, other predictor variables not included in the theoretical model, or paths not posited in the current model could have influence over media richness and member responsiveness.

Also noticeable are the relatively strong R^2 values for the downstream criterion variables including *perceived satisfaction*, *sense of virtual community*, and *willingness to participate*, all in the 60% range in terms of variance explained by the model, hence suggesting strong evidence that the structural model is appropriate. In terms of the ultimate criterion variable in the model, i.e., *willingness to participate*, a significant portion of its variance (62.6%) can be explained by the model.

The value for ***average R^2*** is provided as an overall scalar attribute of the model that enables comparisons against other models with the same constructs but different competing path propositions.

Table 7-22: Assessment of Predictability of Endogenous Model Constructs in the Structural Model

Model Construct	Coefficient of Determination (R^2)
Website Usability	na (exogenous)
Media Richness	0.179
Information Quality	0.226
Organizational Trustworthiness	0.347
Member Responsiveness	0.105
Perceived Enjoyment	0.547
Member Trustworthiness	0.550
Perceived Satisfaction	0.669
Sense of Virtual Community	0.628
Willingness to Participate	0.626
Average R^2	**0.431**

7.4.3.2 Path Validity Coefficients in the Structural Model

Values of T-statistics from the bootstrapping procedure were used to derive the significance levels of each posited path in the model. *Table 7-23* provides a synopsis of the relevance of the paths posited in the model by revisiting the propositions formulated along with the abridged theoretical model in chapter 5 of this dissertation. *Table 7-23* lists the validation (support/reject) decision of these propositions alongside their path coefficients (β) and the significance of the relationship.

As apparent from the results of the estimated structural model shown in *Table 7-23*, most posited paths in the theoretical research model are supported. The only three paths that were rejected were: i) the path from *member responsiveness* to *sense of virtual community*; ii) the path from *member responsiveness* to *perceived enjoyment*; and iii) the path from *information quality* to *perceived enjoyment*. In order to test the extent of insignificance of these rejected paths, the model was re-tested after removing them, and this caused no changes in the validation of the other paths in the estimated model.

Based on the R^2 results shown in *Table 7-22* and the path validation statistics listed in *Table 7-23*, *Figure 7-8* provides a holistic view of the estimated structural model along with indices of strength and significance of the relationships among various latent constructs, and the relative predictability of the various constructs in the model (associated R^2 values).

Table 7-23: Path Strengths and Validation of Model Propositions in the Structural Model

Proposition	Model Path	Path Beta	T-Statistic	P-Value	Significance Level	Validation
P1	Website Usability → Media Richness	0.423	5.252	0.000	< 0.001	Supported
P2	Website Usability → Organizational Trustworthiness	0.279	2.896	0.004	< 0.01	Supported
P3	Website Usability → Perceived Enjoyment	0.226	2.783	0.006	< 0.01	Supported
P4	Website Usability → Perceived Satisfaction	0.123	2.024	0.043	< 0.05	Supported
P5	Media Richness → Organizational Trustworthiness	0.228	3.104	0.002	< 0.01	Supported
P6	Media Richness → Member Responsiveness	0.323	4.206	0.000	< 0.001	Supported
P7	Information Quality → Organizational Trustworthiness	0.225	3.102	0.002	< 0.01	Supported
P8	Information Quality → Perceived Enjoyment	0.145	1.640	0.101	n.s.	Rejected
P9	Information Quality → Member Trustworthiness	0.615	11.825	0.000	< 0.001	Supported
P10	Information Quality → Perceived Satisfaction	0.303	4.855	0.000	< 0.001	Supported
P11	Organizational Trustworthiness → Sense of Virtual Community	0.154	3.175	0.002	< 0.01	Supported
P12	Member Responsiveness → Information Quality	0.475	6.204	0.000	< 0.001	Supported
P13	Member Responsiveness → Perceived Enjoyment	0.170	1.737	0.083	n.s.	Rejected
P14	Member Responsiveness → Member Trustworthiness	0.215	3.461	0.001	< 0.001	Supported
P15	Member Responsiveness → Sense of Virtual Community	0.134	1.825	0.068	n.s.	Rejected
P16	Member Trustworthiness → Perceived Enjoyment	0.344	3.853	0.000	< 0.001	Supported
P17	Member Trustworthiness → Sense of Virtual Community	0.333	4.587	0.000	< 0.001	Supported
P18	Perceived Enjoyment → Perceived Satisfaction	0.504	6.937	0.000	< 0.001	Supported
P19	Perceived Enjoyment → Willingness to Participate	0.240	2.479	0.013	< 0.05	Supported
P20	Perceived Enjoyment → Sense of Virtual Community	0.354	5.382	0.000	< 0.001	Supported
P21	Perceived Satisfaction → Willingness to Participate	0.313	3.275	0.001	< 0.01	Supported
P22	Sense of Virtual Community → Willingness to Participate	0.320	3.694	0.000	< 0.001	Supported

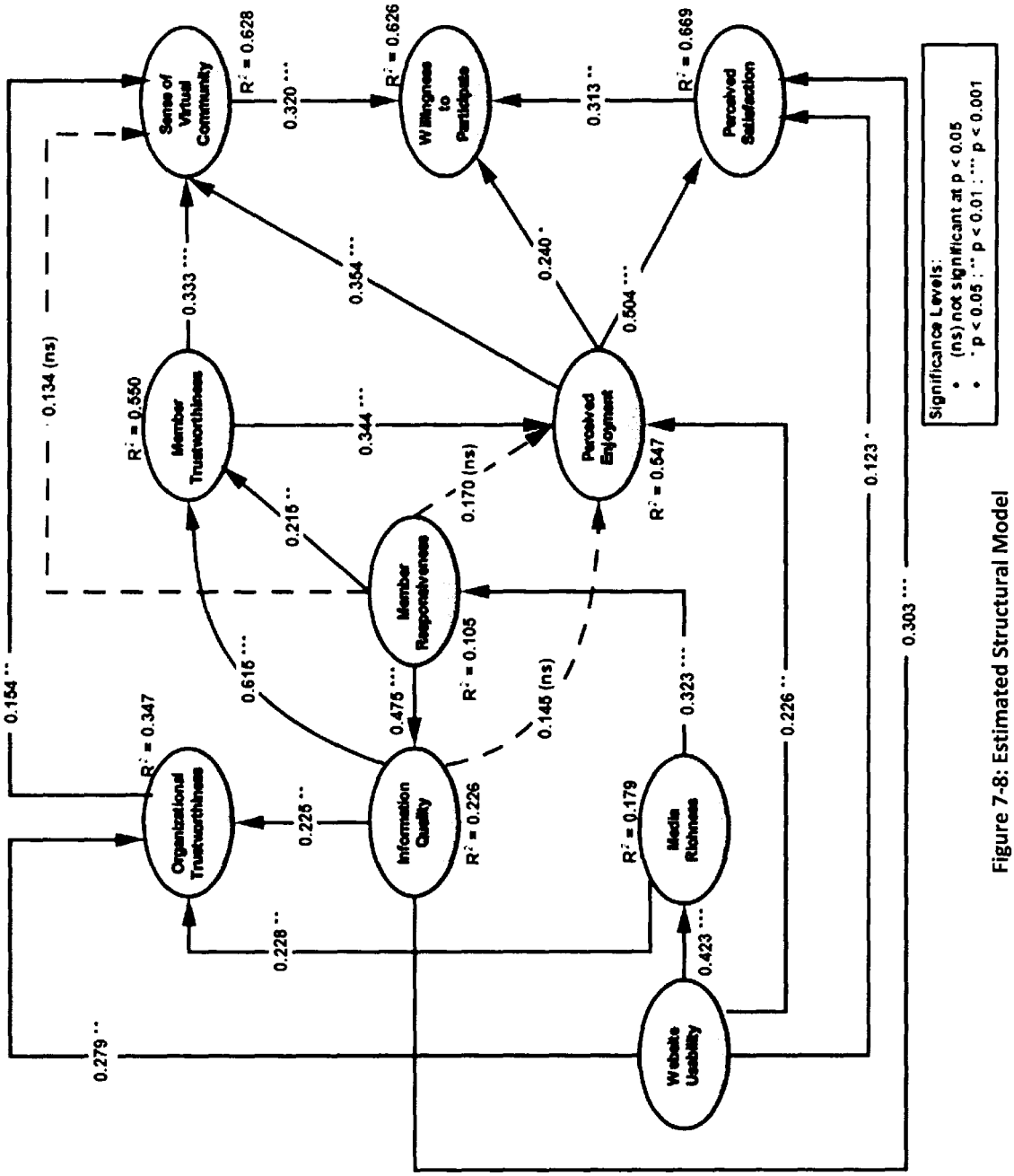


Figure 7-8: Estimated Structural Model

7.4.3.3 Addendum 1: Test of Mediation

Although not a planned procedure, or an a priori posited proposition, based on the results in the previous path validation section, it was decided with an *exploratory mode of evaluation* mindset[51] that a test of mediation between the constructs of member responsiveness and member trustworthiness was warranted.

Based on the results from the previous section, it was noticed that two out of three paths that were rejected were those emanating from *member responsiveness* and leading to *perceived enjoyment*, and *sense of virtual community* respectively. However, the model tested also contained indirect paths between the predictor and these criterion variables with *member trustworthiness* as a mediating construct. Furthermore, the path between member responsiveness and member trustworthiness was positive and significant (β=0.215 at $p < 0.001$), and same was the case for the paths between member trustworthiness and the criterion variables of perceived enjoyment (β=0.344 at $p < 0.001$) and sense of community (β=0.333 at $p < 0.001$). Hence, it was inquired whether member trustworthiness plays an important role as a mediator between *member responsiveness* and the two criterion variables of *perceived enjoyment* and *sense of virtual community*. Consequently, an alternative version of the model was run with the path between *member responsiveness* and *member trustworthiness* removed.

The results showed that indeed member trustworthiness played an important role as a mediator construct between *member responsiveness and perceived enjoyment*, as well as between *member responsiveness and sense of virtual community*. After removing the path between member responsiveness and member trustworthiness, the direct path from member responsiveness to perceived enjoyment became significant - path statistics changed from β=0.170 (n.s.) to β=0.170 ($p < 0.05$); and the direct path from member responsiveness to sense of virtual community also became significant - path statistics changed from β=0.134 (n.s.) to β=0.134 at ($p < 0.05$). The variance explained (R^2) for the criterion variables remained unaffected, as did the path statistics between member trustworthiness and the criterion variables of perceived enjoyment and sense of virtual community.

This quick test of mediation lead the researcher to believe that *member trustworthiness* mediates the effect of *member responsiveness* on both *perceived enjoyment* and *sense of virtual community*. Exercising research reflexivity at this point, this made a lot of sense to the researcher, as findings from the qualitative research phase had indicated that in relating their affective responses towards the virtual community, new members and passive members typically resort to *cursory cues* such as the responsiveness of other members to their queries and

[51] One of the defining characteristics of engaging in exploratory analysis is the researcher's control over the type of analysis conducted. Component-based SEM is especially suited to such undertakings. Unlike confirmatory analysis, the researcher does not have to abide by the a priori determined hypotheses.

posts, while over time, experienced members regard trustworthiness of their peers as a significant reason of their affective orientation towards the virtual community (see chapter 5).

7.4.3.4 Predictability Effect Sizes in the Estimated Structural Model

The next suggested test listed in Table 6-16 for verifying the effectiveness of the estimated structural model from a nomological validity viewpoint is associated with the predictability effect sizes of various antecedent constructs in the model on their consequents, thus highlighting the predictive power of the antecedent latent variables (Chin, 1998b).

For each dependent variable in the model, the contributions of the independent variables can be evaluated by comparing the R^2 value of the dependent variable with and without the independent variable present. This difference is calculated as the effect size score between the independent and dependent variable and is derived as:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$$

$R^2_{included}$ and $R^2_{excluded}$ are the variances explained in the dependent variable with the predictor variable included or omitted respectively.

Equation 7-1: Predictability Effect Size Calculation

Once calculated, the f^2 values can be compared to the effect size thresholds suggested by Cohen (1988), i.e. values of 0.02, 0.15, and 0.35 can be used to distinguish among small, medium, or large effect sizes at the structural level. Table 7-24 below presents the effect sizes between the dependent and independent variables in the original structural model based on performing the above calculation for all pairs of antecedent and consequent variables.

Based on the results of the effect size calculations shown in Table 7-24 above, one can identify the antecedent variables that have more of an impact on their respective consequent variables. Moving backward through the model, perceived satisfaction has the highest effect on willingness to participate, albeit it is still a small effect by Cohen's effect size conventions. Some noteworthy observations for *perceived satisfaction* are that while *perceived enjoyment has a large effect on perceived satisfaction, information quality has a medium effect*. This shows the relative importance of both cognitive as well as affective responses in determining the overall satisfaction level in virtual communities. The other large effect in the results is between *information quality and member trustworthiness*, a relationship that was seen to be significantly important in the qualitative findings (see *Chapter 5*).

Table 7-24: Effect Sizes in the Estimated Structural Model

Consequent:	Media Richness		Information Quality		Organizational Trustworthiness		Member Responsiveness		Perceived Enjoyment		Member Trustworthiness		Sense of Virtual Community		Perceived Satisfaction		Willingness to Participate	
Antecedent:	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded	R^2 Included	R^2 Excluded
Website Usability	0.179	0.000			0.347	0.304			0.547	0.520					0.669	0.661		
	0.218 (medium)				0.066 (small)				0.059 (small)						0.025 (small)			
Media Richness					0.347	0.306	0.105	0.000										
					0.064 (small)		0.117 (small)											
Information Quality					0.347	0.317			0.547	0.538	0.550	0.257			0.669	0.620		
					0.046 (small)				0.020 (small)		0.651 (large)				0.151 (medium)			
Organizational Trustworthiness													0.628	0.610				
													0.050 (small)					
Member Responsiveness			0.226	0.000					0.547	0.528	0.550	0.515	0.628	0.616				
			0.292 (medium)						0.0413 (small)		0.079 (small)		0.032 (small)					
Perceived Enjoyment													0.628	0.565	0.669	0.533	0.626	0.605
													0.168 (medium)		0.411 (large)		0.057 (small)	
Member Trustworthiness									0.547	0.496			0.628	0.576				
									0.113 (small)				0.140 (small)					
Sense of Virtual Community																	0.626	0.583
																	0.115 (small)	
Perceived Satisfaction																	0.626	0.594
																	0.088 (small)	

7.4.3.5 Predictive Relevance of Constructs in the Estimated Structural Model

In addition to evaluating the nomological validity of the structural model, recently, the PLS research community has strongly recommended the evaluation of model fit through tests of predictive relevance (sometimes also referred to as predictive accuracy) (Chin, 1998b; Tenenhaus et al., 2005; Wicks & Chin, 2008). The test of predictive relevance in PLS requires the use of *blindfolding* procedures that omit or "blindfold" one case from the dataset at a time, and re-estimate the model parameters based on the remaining cases (Tenenhaus et al., 2005). The results of the blindfolding procedures include cross-validated redundancy indices which can be used as the nonparametric ***Stone-Geisser test criterion Q^2*** (Geisser, 1975) for assessing the quality of each structural equation in the model (Tenenhaus et al., 2005). A Q^2 value greater than zero indicates the *predictive accuracy* for a particular construct.

Table 7-25 below shows the values of cross-validated (c-v) redundancy indices that were generated by the blindfolding procedure[52] and were used as the basis of the Q^2 values for each construct. Just as in the case of calculating predictability indices, the value for ***average Q^2*** in this case is provided in Table 7-25 as an overall scalar attribute of the model that can enable comparisons against other competing models.

Table 7-25: Assessment of Predictive Relevance of Endogenous Model Constructs in the Structural Model

Model Construct	Cross-Validated Redundancy Index (Stone-Geisser Q^2)
Media Richness	0.115
Information Quality	0.165
Organizational Trustworthiness	0.259
Member Responsiveness	0.089
Perceived Enjoyment	0.427
Member Trustworthiness	0.373
Sense of Virtual Community	0.375
Perceived Satisfaction	0.555
Willingness to Participate	0.431
Average Q^2	**0.349**

As shown in Table 7-25, all Q^2 values were greater than zero (with member responsiveness being close to zero for reasons highlighted earlier in the discussion on R^2 values). For the main outcome latent variables in the structural model, the Q^2 values of *0.431 for willingness to participate*, *0.555 for perceived satisfaction*, and *0.375 for sense of virtual community* indicate that the model constructs have adequate predictive relevance. In fact, *perceived satisfaction has the highest predictive accuracy* of 0.555 which suggests that the

[52] An omission distance (D) of 73 was used to instantiate the blindfolding procedure, as research suggests an optimal D to be a prime number between the number of items and the number of cases in the model (Tenenhaus et al., 2005; Chin, 1998b).

structural model is especially useful in predicting virtual community members' perceived satisfaction based on the other constructs included in the model.

7.4.3.6 Global Goodness of Fit of the Estimated Structural Model

Traditionally, component-based models have lacked an overall index that can provide researchers with a global validation of their models (Tenenhaus et al., 2005). However, recently many researchers have used the global criterion of goodness-of-fit (0 <= GoF <= 1) (Amato et al., March 24, 2004; Tenenhaus et al., 2005) as an indicator of model fit. Defined as the geometric mean of the average communality (same as average AVE in PLS) and the average R^2 (for endogenous constructs) (Tenenhaus et al., 2005; Wetzels et al., 2009).

The average communality needs to be calculated as a "weighted average" of communality (AVE) based on the number of items in each construct taken as its weight (Tenenhaus et al., 2005). Once calculated, the geometric mean of the average communality and the average R^2 can be calculated as follows:

$$GoF = \sqrt{\overline{AVE} * \overline{R^2}}$$

$\overline{AVE}$ and $\overline{R^2}$ are the weighted average weighted average of AVE and average R^2 respectively.

Equation 7-2: Global Criterion for Goodness-of-Fit Calculation

Although the original authors of the index did not specify heuristics for the GoF index, recent articles using GoF have extrapolated the heuristics for AVE and R^2 to come up with standard criteria for GoF (e.g., Wetzels et al., 2009). For example, if the proposed cut-off value of 0.5 for communality or AVE is used as suggested by Fornell and Larcker (1981), and effect sizes for R^2 as proposed by Cohen (1988), i.e., small: 0.02, medium: 0.13, large: 0.26, then the GoF criteria can be derived for small, medium, and large effect sizes of R^2 by substituting the minimum average AVE of 0.50 and the effect sizes for R^2 in the equation above. This yields the following baseline values for GoF: $GoF_{small} = 0.1$; $GoF_{medium} = 0.25$, and $GoF_{large} = 0.36$ (Wetzels et al., 2009). Once calculated, the GoF values can be compared to the baseline values noted above to infer the goodness of fit of a model.

Table 7-26 below presents the calculation of goodness of fit index for the estimated structural model. As shown, the GoF value of 0.581 exceeds the cut-off value of 0.36 for large effect sizes of R^2 allowing the inference that the model performs well compared to the baseline values defined above.

Table 7-26: Calculation of the Global criterion for Goodness-of-Fit (GoF) for the Structural Model

Model Construct	Communality (AVE)	Variance Explained (R^2)	Number of Indicators in Construct
Media Richness	0.670	0.179	5
Information Quality	0.799	0.226	5
Organizational Trustworthiness	0.766	0.347	9
Member Responsiveness	0.845	0.105	3
Perceived Enjoyment	0.806	0.547	5
Member Trustworthiness	0.856	0.550	9
Sense of Virtual Community	0.761	0.628	10
Perceived Satisfaction	0.830	0.669	4
Willingness to Participate	0.692	0.626	3
Weighted Average of AVE	**0.783**		
Average R-Square		**0.431**	
Goodness of Fit Index		0.581	

Based on the evaluation of the measurement model validity and reliability, as well as the verification of nomological validity, predictive relevance, and goodness-of-fit of the structural model, it is believed that the structural equation model was able to establish a strong basis for relationships posited in the theoretical model propositions; and the proposed model acts as an adequate predictor of member participation by providing an analytical basis for the criterion variables of *sense of virtual community*, *perceived satisfaction*, and *willingness to participate*.

7.4.3.7 Addendum 2: Test of Saturated Model

Once again, keeping in line with the exploratory orientation of this research study, to improve confidence in the estimated model, and investigate alternative model paths not originally posited in the theoretical model, a saturated model was tested with 45 paths in total among the 10 latent constructs. Out of the 23 new paths that were added and simultaneously tested (22 existed in the original structural model), only four new paths were statistically significant. In addition the new significant paths, the saturated model also rejected two paths that were supported in the original non-saturated model. A summary of these changes between the original non-saturated model and the new saturated model is provided in Table 7-27 below.

Table 7-27: Differences in Paths and Path Validity between the Original and the Saturated Models

Path	Path Beta	T-Statistic	P-Value	Significance Level	Validation	Notes:
Website Usability → Information Quality	0.473	5.686	0.000	< 0.001	Supported	New Supported Path in the Saturated Model
Website Usability → Member Responsiveness	0.492	6.954	0.000	< 0.01	Supported	New Supported Path in the Saturated Model
Information Quality → Willingness to Participate	0.302	3.829	0.000	< 0.001	Supported	New Supported Path in the Saturated Model
Sense of Virtual Community → Perceived Satisfaction	0.229	3.427	0.001	< 0.001	Supported	New Supported Path in the Saturated Model
Website Usability → Perceived Satisfaction	0.050	0.804	0.422	n.s.	Rejected	Previously Supported Path in Non-Saturated Model ; Rejected in the Saturated Model
Media Richness → Member Responsiveness	0.116	1.493	0.136	n.s.	Rejected	Previously Supported Path in Non-Saturated Model ; Rejected in the Saturated Model

In terms of the new significant paths identified in the saturated model, the paths from website usability to information quality may be worth investigating in future modifications to the model. On the outset, this path can be seen as somewhat analogous to the relationship between perceived ease of use and perceived usefulness in the technology acceptance model (TAM). Also recall that the construct of website usability as operationalized in this study consists of information design as a second order construct. It is possible that this conceptualization of website usability may help gain a better sense of relationship between perceptions of usability and information quality on a virtual community website. That being said, there is little support for such a relationship in the previous research literature, and a confirmatory investigation of paths without a theoretical basis lies outside the scope of this dissertation.

The existence of a path from website usability to information quality as noted above can also potentially explain the rejection of the path between website usability and perceived satisfaction. In case that the previous proposition is validation, it might imply a fully mediated relationship between website usability and perceived satisfaction through information quality.

In a similar fashion the newly supported path between website usability and member responsiveness can be related to the now rejected path between media richness and member responsiveness – i.e., media richness may be a mediator between website usability and media richness and in the presence of a direct path between the two, media richness has no significant

impact on member responsiveness. This, however, is purely a conjectural notion in trying to explain the results from the saturated model. There is no previous research showing that website usability is related to member responsiveness, and neither did the findings from the quantitative results indicate as such. More research needs to be conducted to support or reject a direct relationship between website usability and member responsiveness.

Lastly, the two paths from information quality to willingness to participate, and from sense of virtual community to perceived satisfaction may be plausible to pursue in future explorations, as they seem to make intuitive sense. However, in the context of this research, the findings from the qualitative analysis phase had indicated that virtual community members typically move through an evaluative and an affective experience in tandem leading to their overall decision to continue to participate, i.e., perceived satisfaction and sense of virtual community as two importantly equal factors that depend on their own sets of antecedents (some of which overlap). Together, the affective/evaluative process that virtual community members move through determines their continued participation. Without an adequate theoretical basis for the new relationships, this study does not aim to hypothesize and confirm more associations in the model.

To offer a more objective viewpoint, the scalar attributes of predictive relevance and goodness-of-fit as described in the previous sections of this chapter can be used by way of comparison between the original and the saturated model. In terms of average predictive relevance, there is little to compare between the saturated model's Stone-Geisser Q^2 (average $Q^2 = 0.346$) value and the original model's (average $Q^2 = 0.349$). Similarly, in terms of goodness-of-fit, the saturated model only scored marginally better (GoF = 0.594) than the original model (GoF = 0.581). Hence, there is evidence to suggest the overall adequacy of the original model.

In the end, the primary rationale behind the quantitative empirical investigation in phase 2 of this research study was to corroborate, triangulate and complement the research findings from the qualitative phase preceding it by testing the abridged theoretical model posited in chapter 5 of this dissertation. Through its sound psychometric properties as demonstrated by the measurement model, and a stable basis for predictive analysis, the researcher believes that the objective of triangulation and complementation has been met. The next section in this dissertation aims to bring together these findings from the qualitative analytic induction and the results from the quantitative data analysis phases and present an integrated view of member participation in virtual communities.

Chapter 8: Discussion & Conclusion

The findings and results from qualitative and quantitative phases of this research study were provided in *Chapters 5* and *7* of this dissertation. This current chapter draws upon those empirical research outputs to answer the research questions that formed the basis for this study. Additionally, this chapter highlights the contributions of this research to theory and practice. Next, the limitations of this study and directions for future research are discussed. Finally, the conclusion section marks a culmination of the ideas, insights, and outcomes of this dissertation.

8.1 Answers to Research Questions

This section revisits the two grand tour research questions and the seven research questions that were used to define the objectives and delineate the scope of this research study. Each research question is addressed separately, and empirical research findings from both phases of investigation are used to answer these questions. Where pertinent, relational propositions used in the *abridged theoretical model* for quantitative investigation are also highlighted along with the path beta coefficients from the structural model output to support or reject the proposition[53].

8.1.1 Overview of Socio-Technical Factors Affecting Member Participation

The two grand tour questions that defined the overarching objectives of this dissertation were as follows:

- **Grand Tour Research Question 1:** What are the salient socio-technical factors that affect member participation in virtual communities?
- **Grand Tour Research Question 2:** How are these factors interrelated in their effects on member participation in virtual communities?

These questions aimed to guide this study towards the investigation of various sociological and technological factors that influence participation levels and types of activities that members undertake in their virtual communities (VCs). Furthermore, by answering the second question, this study aimed to achieve an integrated perspective of the socio-technical factors and their roles in the overall member participation process in virtual communities.

[53] Please note that the propositions in this research study were not formulated or mapped to the study's research in an a priori fashion. They were formulated based on the emergent qualitative findings with the purpose to elaborate and triangulate those findings. As such, their order of appearance in this chapter will not be chronological – instead, the propositions will be introduced according to the constructs being discussed in the answers to the research questions.

With respect to the first grand tour question, the qualitative phase of investigation revealed a multitude of sociological and technological factors that affect member participation. In the principal analytical categories presented in *Chapter 5*, these factors were categorized under various themes. Most notably, the themes classified as *participation drivers*, *technological determinants*, *sociological antecedents*, and *value effects* appeared to play an important role in determining various facets of member participation behavior, including, *participation activity levels*, *task modes*, *ICTs utilization*, and *use orientation*.

Within *participation drivers*, *motivational propensities* related to *information exchange* and *social interaction* emerged as important stimulants for member participation. Furthermore, benefits for continued participation were associated with various *gratifications* that members seek to fulfill through their online participation. In *technological determinants*, *website usability* of the VC site, and *media richness* of the technology platform and its various tools and features were construed as important factors that allow members to perform their day-to-day tasks and activities more efficiently and enjoyably. *Sociological antecedents* included *organizational* and *member trustworthiness* beliefs, as well as perceptions of *member responsiveness* in the VC as essential catalysts for enhancing the member participation experience. Finally, the theme of *value effects* comprised factors that act as reinforcements for continued member participation – these included *perceived enjoyment*, *perceived satisfaction*, and *sense of virtual community*.

The socio-technical factors listed above comprised refined and often redefined versions of concepts that were included in the conceptual framework that set the stage for this research study. These factors were complemented by others that played a significant role in explaining the member participation process in VCs. Some of these factors are discussed further in the answers to subsequent research questions.

With respect to the second grand tour question, the emergent concepts in the qualitative phase of investigation were analyzed for their interrelationships using axial and selective coding procedures. The outcomes of these procedures illustrated the intertwined nature of many of the socio-technical factors, and also offered an explanation of their interrelationships through the *member engagement process*. The three phases in the member engagement process – *exploring commonality*, *experiencing conferment*, and *enjoying camaraderie* helped explain the dynamics of the member participation in virtual communities. Transformations in participation behavior, and the varying roles of different socio-technical factors were mapped to these three stages to explain the trajectory of participation experiences over the course of members' tenures in their VCs. The axial coding procedures also induced linkages among *technological determinants* comprising *website usability*, *media richness*, and *information quality* with the accomplishment of different activities and tasks by members, and also with other sociological factors such as *member responsiveness* and *member trustworthiness*. Furthermore, the qualitative analysis procedures also revealed relationships between technological factors and *value effects* pertaining to *perceived enjoyment* and *perceived*

satisfaction. In a similar vein, the sociological factors were surmised to dynamically interact together, as well as with other technological factors to produce similar *value effects*, as well as that of a *sense of virtual community*.

The interrelationships among socio-technical factors were also explored quantitatively in the second phase of research investigation. An *abridged theoretical model* with a subset of the emergent socio-technical factors from the qualitative investigation was tested using structural equation modeling procedures. The purpose was to corroborate the findings about construct relationships from the qualitative phase, and to also ascertain the strength of those relationships. With a few exceptions, most relational propositions linking *sociological antecedents*, *technological determinants*, and *value effects* were supported. Furthermore, the predictability of various dependent variables in the structural model was high, illustrating its appropriateness and corroborating the findings from the qualitative analysis phase. In the next sections, the relationships among socio-technical factors are highlighted in the answers to research questions specific to those factors.

8.1.2 Drivers & Motivations of Member Participation

This section addresses the first specific research question for this study – **RQ1:** What are the drivers and motivations for member participation in virtual communities?

This question was addressed primarily during the qualitative investigation phase. The analysis procedures revealed three sets of drivers and motivations discussed below.

8.1.2.1 Motivational Propensities

As a starting point, the concepts of *information exchange* and *social interaction* were included in the conceptual framework guiding this study. These motivations are typically cited as the generic reasons for participation in VCs (Ridings & Gefen, 2004; Wang & Fesenmaier, 2004). The findings from the qualitative analysis phase illustrate these motivations to constitute a basic inclination towards maintaining ties with the VC. Members typically characterized their reasons to join a VC as to seek or contribute information, or to seek connections, friendship or support from other members. Some members also cited the reasons for their membership to be a combination of these motivations – often in the form of primary and secondary motivations.

However, these motivations were classified as *propensities* as many members suggested more specific reasons that play a role in driving their continued online participation. In the findings, these motivations were categorized as *gratifications sought* –briefly highlighted next.

8.1.2.2 Gratifications Sought

During the qualitative analysis, a useful distinction was made between those motivations that act as precursors to member participation in VCs, and those that relate to the conscious needs that members deliberately seek to satisfy (gratify) through their participation. This distinction was better understood by asking informants "*why they participate in their respective virtual communities*" versus "*what they get out of participating in their virtual communities*". With respect to the latter, the responses provided by study informants lead to the categorization of various gratifications as related to *information & surveillance* needs, *emotive & social* needs, *identity & expression* needs, or *relaxation & entertainment* needs. Most informants cited one or more of these as their reasons to continue participating in the VC. *Information & surveillance* gratifications were cited by informants who participated in their VCs primarily to either actively seek information or to passively scan for information that might be of interest to them. *Social & emotive* gratifications were related to conversation and social interaction needs, and seeking or providing support and empathy to others. *Identity & expression* gratifications related to a member's desire to participate for reasons such as individual promotion, personal benefits, building self-esteem, engaging in self-exploration, and expressing oneself. Lastly, *relaxation & entertainment* gratifications related to escape, leisure, and pleasure related needs that members seek to satisfy through their participation in the VC.

The qualitative analysis findings also showed that as members advance through various stages of engagement in their VCs, these gratifications evolve over time. While *information & surveillance* or *emotive & social* gratifications constitute the initial benefits of member participation, many members also seek to gratify their *identity & expression* needs and *relaxation & entertainment* needs in the later stages of their participation. Axial coding results verified this emergent pattern by noting that senior members as well as active members typically seek *multiple gratifications* through participation in their VCs.

8.1.2.3 Participation Value Effects

In addition to the gratifications highlighted above, members also make decisions about their continued participation based on the overall value of their experiences in the VC. Toward this, they cite reasons such *perceived enjoyment*, *perceived satisfaction*, and *sense of virtual community*. Each of these factors emerged in the qualitative findings as a reinforcement mechanism for continued participation. As a consequential stimulus, *perceived enjoyment* reinforces participation behavior that is geared towards the realization of pleasure and fun in the VC. *Perceived satisfaction* expresses a member's overall contentment with their participation experiences. *Sense of virtual community* refers to members' desire to continue participation because of feelings of assimilation and bonding, and overall affinity with the VC.

The efficacy of these factors as drivers for member participation was corroborated further in the quantitative analysis phase. Specifically, two relational propositions depicting the intertwined nature of *perceived enjoyment*, *perceived satisfaction* and *sense of virtual community*, and three relational propositions linking each of the *value effects* to a member's *willingness to participate* were included in the *abridged theoretical model* and their appropriateness and strength was tested. The results from the *estimated structural model* supported these propositions as shown herewith.

P18	Higher levels of perceived enjoyment correspond with higher levels of perceived satisfaction.	Supported (β=0.504, $p < 0.001$)
P19	Higher levels of perceived enjoyment are associated with a willingness to participate in the virtual community.	Supported (β=0.240, $p < 0.05$)
P20	Higher levels of perceived enjoyment correspond with an enhanced sense of virtual community.	Supported (β=0.354, $p < 0.001$)
P21	Higher levels of perceived satisfaction are associated with a willingness to participate in the virtual community.	Supported (β=0.313, $p < 0.01$)
P22	An enhanced sense of virtual community is associated with a willingness to participate in the virtual community.	Supported (β=0.320, $p < 0.001$)

Hence, individuals who are satisfied with their participation, who enjoy their online experience, and those who associate more with the VC as members are more driven and are more likely to continue their participation in the VC. Furthermore, given the central positioning of *perceived enjoyment* with its direct effect on *willingness to participate* as well as indirect effects through *perceived satisfaction* and *sense of virtual community*, it acts as a strong predictor of a member's continued participation in the VC.

8.1.3 ICT Tools & Features for Member Participation

The next two research questions in this study concerned the use of technology platforms, tools and features. These questions are answered in the following subsections.

8.1.3.1 Role of Functionality & Usability

The first of two research questions related to the technological facets of member participation in virtual communities asked – **RQ2:** What aspects of functionality and usability determine the choice of technology platforms and tools that members use during their online participation in virtual communities?

Considering functionality, the findings from the qualitative and quantitative phases were used in this study to compile a basic technographic profile of members in virtual communities in terms of use patterns associated with the various platforms, tools and features that members utilize in their VCs. Discussion forums (message boards) were reported as the most frequently used groupspace platform by respondents in both phases of the study. Other tools and features that consistently ranked high in both phases of the study included private messaging, emoticons

(smilies), avatars, search tools, and polling & voting tools. To make sense of their use, during the open and axial coding procedures in qualitative analysis, these tools were classified into different categories including *groupspace platforms*, *communication tools*, *expression aids*, *searching and browsing*, *scoring utilities*, *external interface features*, and *social media extensions*. Each of these categories was further analyzed in relation to the task modes they facilitate and the motivational propensities they align with most. As expected, platforms such as information repositories and wikis associated strongly with the motivational propensity of *information exchange*, while blogs, social networking interfaces, and custom social groups were linked to a primary motivational propensity for *social interaction*. A similar approach was followed in the quantitative phase to map motivational propensities to the cross-section of tools and features that were reported by survey respondents. Significant correlations were found between *information exchange* propensity and the use of information repositories and search facilities, and between *social interaction* propensity and the use of private messaging and avatars.

In addition to use patterns of various tools and features, the qualitative phase also revealed the significance of *media richness* as a technology quality symbolizing the capability of virtual community platforms to support multimedia content, custom formats for communication exchanges, and the use of rich symbols in routine online conversations. This emergent concept was also found to be an enabler for *member responsiveness* suggesting that the use of flexible and interactive tools and features in communication and conversations can help improve the promptness and quantity of member responses. Subsequently, the construct of *media richness* was included in the *abridged theoretical model* for quantitative investigation. Among its related propositions, its link to *member responsiveness* was supported as shown below.

P6	Enhanced media richness is associated with higher levels of member responsiveness.	Supported (β=0.323, $p < 0.001$)

The second part of the research question concerns the attributes of *usability* that influence the choice of platforms, tools and features by VC members. Toward this, the qualitative findings uncovered two dimensions of *website usability* that seemed to be of more importance to VC members, namely, *ease of use* and *information design*. While *ease of use* reflected the member's desire for uncomplicated and effortless use of technology, the *information design* aspect of usability was concerned with the organization and presentation of content, and the organization, layout and presentation of other site features. The qualitative findings showed that enhanced *ease of use* and *information design* were associated with the use of more sophisticated tools such as various *searching & browsing features*. Better website usability was also found to be supportive of *media richness* perceptions – perhaps because members who are able to easily use certain interactive features available on the website are more likely to appreciate their true media rich functionality.

Website usability was subsequently included in the agenda for quantitative investigation on two fronts. Firstly, using exploratory factor analysis techniques, its composite structure was evaluated and confirmed, confirming *ease of use* and *information design* to be two dimensions underlying *website usability*. Secondly, in terms of its effect on other IT artifact related constructs, its posited link to media richness was tested as part of the structural model. The results supported a positive direct effect of website usability on media richness – corroborating the qualitative research findings.

P1	Better website usability supports higher levels of perceived media richness.	Supported (β=0.423, $p < 0.001$)

8.1.3.2 Effects of Social Process Factors

The second research question related to technological facets of member participation in virtual communities asked – **RQ3:** How do various social processes in member participation affect the choice and use of technology platforms and tools?

There were several elements in the qualitative findings that provided answers to this question. Firstly, in terms of use patterns associated with the groupspace platforms revealed that their use can be linked to the *gratifications sought* by members. For example, members who reported *information & surveillance* gratifications also frequently reported the use of information repositories, while those who reported *social & emotive* needs were also observed to prefer blogs and social networking interfaces over other groupspace platforms. The analysis between ICTs utilized and gratifications sought was extended to cover other categories of tools and features. *Communication tools* such as messaging and chat were used consistently by all members, but more so by members who reported *social & emotive gratifications* as a primary driver for participation. Similarly, while the popular features in *expression aids* such as emoticons, avatars, and signatures were used by many members, their extended and frequent use was noted for members who seek to gratify *identity & expression* needs through their online participation. These findings relating gratifications sought to ICTs utilized become more interesting when one considers the transformations in gratifications sought over the course of member participation. In the member engagement process, a trajectory of gratifications was mapped to the three process stages of *exploring commonality*, *experiencing conferment*, and *enjoying camaraderie*. Members who reported longer tenures in their VCs also invariably indicated multiple gratifications.

In the qualitative findings, the variation in use patterns of ICTs was also attributed to different levels of member *self-efficacy* and the changes in *information access modes*. With respect to self-efficacy, members reported increased frequency of use of a variety of tools and features during the later stages of their participation after having explored and learned their effective use. Support from community administration and other members as a method to improve self-efficacy levels was often cited by informants. In terms of *information access modes*,

many junior members reported the use of *heuristic information access* modes – i.e. unplanned and impromptu information access based on cues such as popularity indicators and content ratings. On the other hand, senior members reported increased use of *systematic information access* modes through deliberate and structured processes such as utilizing search facilities, a navigation index, or through content subscriptions. The findings also indicated that experienced members tend to toggle between these modes of information access based on the nature of tasks and activities being performed.

Member responsiveness constituted another social process factor that figured prominently in the qualitative findings. In terms of its role in relation to IT artifact attributes, its relationship with *media richness* has already been highlighted in the previous section. Furthermore, during the qualitative analysis phase, this concept emerged as an important determinant of *information quality* in virtual communities since many informants associated quicker access to abundant information as an indicator of *information quality*. The construct was also linked to early sentiments of enjoyment in the VC. Many members with a *motivational propensity* for social interaction associated *perceived enjoyment* with *member responsiveness*. These links were corroborated through the structural model which showed a positive direct effect of *member responsiveness* on *information quality*, but a non-significant link between *member responsiveness* and *perceived enjoyment*. For the latter, a test of mediation of *member trustworthiness* as a mediating variable was performed. The results showed that the construct fully mediates the effect of *member responsiveness* on *perceived enjoyment* – perhaps implying that members perceive their interactions with other members to be more enjoyable if they also trust those members.

P12	Higher levels of member responsiveness are associated with perceptions of superior information quality.	Supported (β=0.475, $p < 0.001$)
P13	Higher levels of member responsiveness correspond with higher levels of perceived enjoyment.	Not Supported (β=0.170, n.s.)

Lastly, in terms of other social process factors affecting the utilization of ICTs, informants invariably linked their experiences with *value effects* such as *perceived enjoyment* and *perceived satisfaction*. In particular, *information quality* of content available on the VC, and *website usability* were related to perceptions of *enjoyment* and *satisfaction*. These value effects, in turn, acted as reinforcements for continued use of the tools and features available through the VC. The relationship of IT artifact attributes of *website usability* and *information quality* with the *value effects* of *perceived enjoyment* and *website usability* were subsequently tested in the quantitative model. The results of the structural model corroborated three out of four relationships as shown below. For the relationship not supported in the structural model, a test of mediation of *member trustworthiness* as a mediating variable revealed that the construct fully mediates the effect of *information quality* on *perceived enjoyment* – perhaps implying that members perceive user generated content from trustworthy members to be more enjoyable. Trustworthiness beliefs are explored in more detail, next.

P3	Enhanced website usability is associated with higher levels of perceived enjoyment.	Supported (β=0.226, $p < 0.01$)
P4	Enhanced website usability is associated with higher levels of perceived satisfaction.	Supported (β=0.123, $p < 0.05$)
P8	Perceptions of superior information quality are associated with higher levels of perceived enjoyment.	Not Supported (β=0.145, n.s.)
P10	Perceptions of superior information quality are associated with higher levels of perceived satisfaction.	Supported (β=0.303, $p < 0.001$)
P16	Enhanced perceptions of member trustworthiness are associated with higher levels of perceived enjoyment.	Supported (β=0.344, $p < 0.001$)

8.1.4 Trustworthiness Beliefs & Member Participation

The next two research questions in this study pertained to the development and significance of *organizational* and *member trustworthiness* beliefs over the course of member participation in VCs. These questions are answered in the following subsections.

8.1.4.1 Development of Organizational & Member Trustworthiness Beliefs

The fourth research question in this study asked – **RQ4:** How does trust in the virtual community organization and trust in other virtual community members develop over the course of a member's participation?

With respect to the establishment and development of organizational trust, informants in the qualitative phase of investigation commented on their perceptions of quality of service offered by the management and administration of the VC site. Organizational traits such as the relevance of the institution's business model to the needs and wishes of the membership, the governance model to maintain effective control over VC proceedings, and general management competence in dealing with day-to-day technology, content, and people management issues were cited as important aspects of a community that drove perceptions about *organizational trustworthiness*. Of course, in addition to the above, members also spoke of prolonged observations of interactions between members and administration to form their opinions about the fairness to members and commitment to the VC. Aligned with the extant literature, these emergent dimensions of organizational trustworthiness were coded as *ability*, *benevolence*, and *integrity* (Gefen & Straub, 2004; McKnight et al., 2002; McKnight et al., 2003; Serva & Fuller, 2005). By virtue of its *ability* dimension, the qualitative findings also discovered relationships between the set of IT artifact related factors (*information quality*, *website usability*, *media richness*) and *organizational trustworthiness* – explicating that members often form perceptions of trust based on an organization's ability to offer reliable, user-friendly technology and maintaining and encouraging the production of high quality of informational content in the virtual community. The linkages from IT artifact factors to *organizational trustworthiness* beliefs were formulated and tested in the quantitative model. All relational propositions were

supported indicating a positive direct effect between perceptions of IT artifacts and *organizational trustworthiness* beliefs.

P2	Enhanced website usability is associated with improved perceptions of organizational trustworthiness.	Supported (β=0.279, $p < 0.01$)
P5	Enhanced media richness is associated with improved perceptions of organizational trustworthiness.	Supported (β=0.228, $p < 0.01$)
P7	Perceptions of superior information quality are associated with improved perceptions of organizational trustworthiness.	Supported (β=0.225, $p < 0.01$)

In terms of its dynamics, *member trustworthiness* beliefs appear to follow a similar process of development as *organizational trustworthiness* beliefs. VC members express their *member trustworthiness* beliefs on the basis of the quality of interpersonal interactions and cooperation among VC members, and form their opinions about the competence, reliability, honesty and dependability of other members. While group attributes such similarity of backgrounds, and perceptions about the initial reciprocity and support available in the virtual community can help members form an early estimation of the cooperativeness of the community, it is the long-term observations and interactions with others that enables them to establish the competence and credibility of other members and their concern and sincerity towards other members in the VC. Similar to *organizational trustworthiness*, during the qualitative phase, the emergent dimensions of *member trustworthiness* were coded as *competence*, *benevolence*, and *integrity.* In terms of its development path, *member responsiveness* was included in the structural model as a surrogate for group attributes related to reciprocity and support. The quantitative results showed a positive direct effect between the two constructs. Also, an indirect path mediated through *information quality* was supported in the model illustrating that perceptions of *member trustworthiness* are based on an awareness of other members through their responsiveness (as a proxy for *benevolence*), as well as through the stock of user generated content contributed by those members (as a proxy of their *competence*). The results of the paths leading to member trustworthiness are as follows:

P9	Perceptions of superior information quality are associated with improved perceptions of member trustworthiness.	Supported (β=0.615, $p < 0.001$)
P14	Higher levels of member responsiveness are associated with improved perceptions of member trustworthiness.	Supported (β=0.215, $p < 0.001$)

8.1.4.2 Dimensionality of Organizational & Member Trustworthiness Beliefs

The fifth research question in this study asked – **RQ5:** What attributes of organizational trust and member trust enhance or encumber member participation in virtual communities?

This question was geared towards a context-specific formulation of the organizational and member trustworthiness constructs vis-à-vis their various dimensions. As highlighted in the previous answer, based on the emergent findings from the qualitative analysis, both constructs

were conceptualized as three-dimensional in nature. The dimensionality of these constructs was subsequently substantiated during the quantitative analysis phase using exploratory factor analysis procedures.

With respect to *organizational trustworthiness*, even though it was conceptualized as a multi-dimensional construct with *ability*, *benevolence*, and *integrity* as its three dimensions, the exploratory factor analysis procedures yielded a unidimensional model with the survey scale items pertaining to the three conceptualized dimensions loading consistently on a single factor. Although this result conflicted with the qualitative findings, it was aligned with the operationalization of organizational trust beliefs in other research studies pertaining to online contexts of trust in website operators (Eastlick et al., 2006), as well as online community organizations (Wu & Chang, 2005). In the case of this research, the quantitative result illustrating unidimensionality may imply that members form their perceptions of trust in the online community organization as aggregate or unified viewpoints about their overall success in the administration of their VCs.

The multidimensionality of *member trustworthiness* beliefs was also tested using exploratory factor analysis procedures. Originally conceptualized along three dimensions of *competence*, *benevolence*, and *integrity*, the quantitative results yielded a two-factor model with competence as a single dimension, and benevolence and integrity combined into the other factor. This result was not surprising as the qualitative findings had indicated that various VC members attribute fairness and consistency of other community members with the concern shown by those other members for their well-being. Also, conceptualizations of member trust with a similar factor structure have been reported in other studies pertaining to virtual communities (Lu et al., 2008; Ridings et al., 2002a).

8.1.5 Sense of Virtual Community & Member Participation

The next two research questions in this study pertained to the development and significance of a *sense of virtual community* over the course of member participation in VCs. These questions are answered in the following subsections.

8.1.5.1 Development of Sense of Virtual Community

The sixth research question in this study asked – **RQ6:** How does a sense of virtual community develop over the course of a member's participation?

In the conceptual framework that guided the instigation of this research study, *sense of virtual* community (*SoVC*) was conceptualized as a sociological antecedent to member participation in virtual communities, and its position in the conceptual framework was parallel to that of trustworthiness beliefs. However, through the qualitative research process, the actual bearing of the concept of *sense of virtual community* was determined to be that of a *value effect*

that develops through a social process involving trust in other members and trust in the organization. Furthermore, it acts in tandem with other value effects such as *perceived enjoyment* and *perceived satisfaction* in reinforcing member participation behavior, and also as a predictor of continued member participation in the VC. On the outset, the construct of *SoVC* comprises a combination of cognitive, affective and evaluative characteristics that members use to describe their participation experiences in their VCs along the lines of similarity, assimilation and bonding, and their affinity for the VC.

The *SoVC* construct was conceptualized along four dimensions labelled as *belonging*, *similarity & cooperativeness*, *support*, and *attachment*. During the selective coding process, it became evident that members of VCs establish a *SoVC* gradually over the three stages of the *member engagement process*. While perceptions of *similarity & cooperativeness* and *support* may form early, the affinity for the VC through feelings of *belonging* and *attachment* develop later during the *experiencing conferment* and *enjoying camaraderie* stages.

In terms of its relationships with other socio-technical factors in the emergent theory, the qualitative findings highlighted *member responsiveness* as an important element leading to *SoVC*, as well as the significance of *organizational trustworthiness* and *member trustworthiness* as precursors to SoVC. Lastly, as highlighted in the answer to *RQ1* above, the relationship between *perceived enjoyment* and *SoVC* also emerged in the findings, demonstrating the intertwined nature of the two *value effects*. The results of the structural model corroborated three out of these four relationships as shown below.

P11	Enhanced perceptions of organizational trustworthiness are associated with an enhanced sense of virtual community.	Supported (β=0.154, $p < 0.001$)
P15	Higher levels of member responsiveness are associated with an enhanced sense of virtual community.	Not Supported (β=0.134, n.s.)
P17	Enhanced perceptions of member trustworthiness are associated with an enhanced sense of virtual community.	Supported (β=0.333, $p < 0.001$)
P20	Higher levels of perceived enjoyment correspond with an enhanced sense of virtual community.	Supported (β=0.354, $p < 0.001$)

For the relational proposition between *member responsiveness* and *SoVC* that was not supported in the structural model, the results in *Chapter 5* from a test of mediation on *member trustworthiness* showed that the construct fully mediates the effect of *member responsiveness* on *sense of virtual community* – perhaps implying that while junior members may form their early opinions about *SoVC* (related to the dimensions of *similarity & cooperativeness* and *support*) through *member responsiveness*, in the long-term, it is their beliefs about trustworthiness of other members that act as a catalyst for their affective orientation towards the virtual community (related to the dimensions of *belonging* & *attachment*).

8.1.5.2 Dimensionality of Sense of Virtual Community

The seventh and final research question in this study asked – **RQ7:** What characteristics of sense of virtual community improve or inhibit member participation in virtual communities?

By answering this question, a context-specific formulation of the *sense of virtual community* construct was desired. As highlighted in the previous answer, the emergent findings from the qualitative analysis pointed to a multi-dimensional structure for SoVC with four dimensions – *belonging, similarity & cooperativeness*, *support*, and *attachment*. This multidimensional conceptualization was also quantitatively tested using exploratory factor analysis procedures. The results yielded a three-factor model with the dimensions of *attachment & belonging* combined into one factor. Other research studies on sense of virtual community have conceptualized and validated similar three factor structures (Blanchard, 2007b; Koh & Kim, 2003; Yoo et al., 2002b), and some researchers have noted that the various dimensions underlying *SoVC* assume varying influences depending on the type of VC under investigation. In any case, a conceptualization of *sense of virtual community* using pluralistic methodologies such as those used in this study have been suggested to fill significant gaps in the extant research literature. Researchers have noted that in many studies exploring *SoVC* , the construct is either based on the original conceptualization of *sense of community* in a face-to-face community context (Obst & White, 2004b; Yoo et al., 2002a), or it is studied through atheoretical models that have been subjected to simple confirmatory analysis procedures (Koh & Kim, 2001; Koh & Kim, 2003). As such, this research study supports a three or four factor structure for *SoVC* comprising cognitive, affective, and evaluative dimensions.

8.2 Contributions to Theory & Practice

In addition to helping answer the research questions that delineated the scope of this dissertation, the empirical findings from this study's qualitative and quantitative investigation phases provide several theoretical and practical contributions. These are highlighted next.

8.2.1 Contributions to Theory

Four specific themes constitute the core theoretical contributions of this research study. These are discussed in the following subsections.

8.2.1.1 Empirical Basis for Member Engagement Process

The emergent theory from the qualitative investigation phase of this research was deliberated as a trajectory of member participation experiences over three stages of the *member engagement process* – namely, *exploring commonality*, *experiencing conferment*, and *experiencing camaraderie*. The portrayal of member experiences over these stages was based on

data from multiple VCs and an inquiry of members who varied in their *activity levels* and *membership tenures*. The findings from the qualitative and quantitative phases of this study helped explain various facets of member participation in VCs such as the motivations of members, their activity profiles, their use of various technology tools and features, and their overall use orientation towards the VC.

An amalgamated summary of the findings from both research phases is depicted in *figure 8-1* below. On the two axes, the figure depicts a conceptual relationship between *activity levels* and *value effects* of member participation in virtual communities. The trajectory of the *member engagement process* is shown along side with brief highlights of member participation behavior and the socio-technical factors that play a significant role in defining the behavior during each stage. The sequence and nature of influences between these socio-technical factors was discovered in the qualitative findings, and corroborated further during the quantitative phase of investigation.

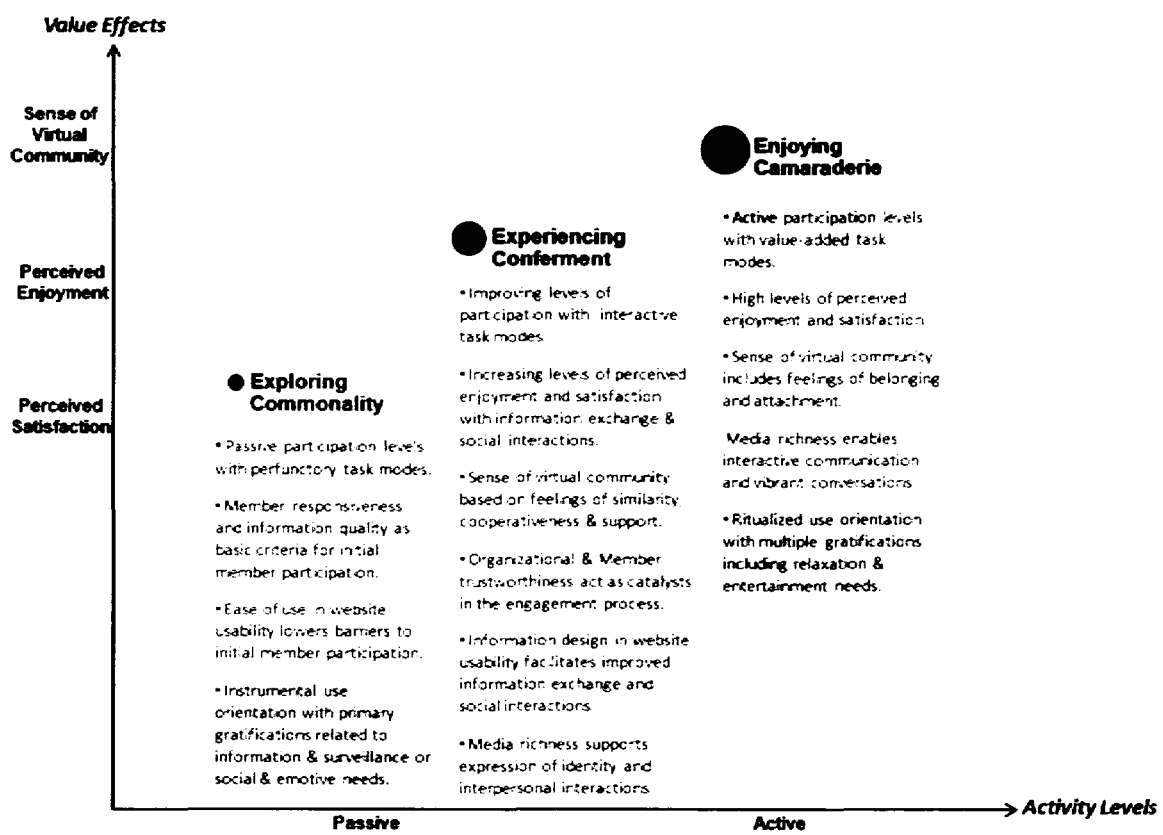


Figure 8-1: Socio-Technical Foundations of the Member Engagement Process in Virtual Communities

In order to ascertain the efficacy of the *member engagement process*, comparisons with other similar descriptions in the extant VC literature can be made. Brief highlights from comparisons with two studies are offered herewith:

- The empirically derived *member engagement process* in this research provides an empirical substantiation and extension of Kozinets' (1999) conceptual model of *developmental progression of individual participation*. While Kozinets' model describes the internalization of norms and development of affinity with the VC through information exchange and social interactions, the emergent theory in the current study offers a description of *gratifications sought* by members, and the relationships among these *gratifications*, *activity levels*, *task modes*, and *patterns of technology use* – together, resulting in *value effects* that determine continued participation in the VC.
- The emergent theory also provides support for empirical research findings such as those in Blanchard & Markus's (2007b) deliberation of micro-level ICT use patterns and the *identity*, *influence*, and *intimacy* needs of virtual community members. In the research findings in the current study, various *gratifications sought* by members were mapped to different ICTs they utilize during their online participation, offering similar suggestions for the incorporation of technology tools and features that meet the needs of members at various stages in the participation experiences.

Overall, through the central phenomenon of the *member engagement process*, the emergent theory in this study provides an empirical foundation for understanding the development of participation behaviors over a member's tenure in the VC, and for linking the macro- and micro- level facets of their behavior into a cogent framework.

8.2.1.2 Toward an Extended Typology of Member Participation Behavior

Chapter 2 of this dissertation discussed various typologies of member participation behavior found in the extant literature. While offering a synopsis of these typologies, it was observed that even the most recent classification schemes are based on single dimensions for differentiating behavior, such as activity levels (Nonnecke et al., 2006; Nonnecke & Preece, 2003; Preece, 2001a; Takahashi et al., 2003), types of activities (Li & Bernoff, 2008; Sarner, 2008), or member motivations (Li & Bernoff, 2008; Stockdale, 2008). This study provides an extended basis for the analysis of member participation behavior using multiple dimensions including the ones highlighted above, and these *additional* criteria:

i) *Activity* levels were categorized in this study at a finer level of granularity to include *active*, *intermittent* and *passive* members, while also differentiating between *linkers* and *lurkers* as two distinct forms of passive members. The researcher is unaware of other studies that have used a similar categorization of activity levels of VC members.

ii) In addition to initial motivations of members (described in this research as *motivational propensities*), four types of *gratifications sought* by members were analyzed. These include *information & surveillance*, *social & emotive*, *identity & expression*, and *relaxation & entertainment* needs. *Uses and gratifications (U&G)* theory (Blumler & Katz, 1974; Katz et al., 1973) which formed the basis for conceptualizing the emergent findings about member motivations has only recently been used by VC researchers to depict member motivations, and research in this area is still in its infancy (Moore & Serva, 2007; Sangwan, 2005). This study has taken a step forward by illustrating interrelationships among *gratifications sought* and various other facets of member behavior, such as activities undertaken, and use of technology tools and features.

iii) This study also differentiates between *instrumental* and *ritualized use orientations* that characterize a member's goal-oriented or habitual participation in VCs. Furthermore, this study explored the links among *use orientations*, various *gratifications sought* by members, and *value effects* of member participation in VCs. Once again, studies in the extant VC literature have only recently explored these use orientations (Courtois et al., 2009; Hanson & Haridakis, 2008), and this research hopes to inform studies in that area.

On the whole, the emergent theory offers a rich and distinct portrayal of member participation behavior along various macro-level dimensions, which, taken together, can potentially yield a useful description of members' micro-level patterns of social interactions, information exchange, and technology use.

8.2.1.3 Deliberating an IS Success Model for Virtual Communities

As a research study aligned with the information systems discipline, this dissertation contextualizes virtual communities as IT artifacts (see *Chapters 1 & 2*), and provides several contributions to existing theory on the acceptance and continued use of technology tools and features in VCs. The *abridged theoretical model* tested in the quantitative phase supports propositions that link IT artifact attributes of VCs such as *information quality*, *website usability*, and *media richness* to consequents such as *organizational trustworthiness*, *perceived satisfaction*, and *perceived enjoyment*. Some of the supported paths in the *estimated structural model* (discussed in *Chapter 7*) share similarities to other seminal IS models, most notably DeLone & McLean's (D&M) IS success model (DeLone & McLean, 1992; Delone & McLean, 2003).

For instance, the relationship between *information quality* and *perceived satisfaction* in this study is also highlighted in the D&M model as a *semantic level* relationship that epitomizes the success of a system in terms of meanings that users associate with the system. Similarly, the *website usability* to *perceived satisfaction* path in the structural model for this study is similar to the *system quality* to *user satisfaction* link in the D&M model which is considered to be a success indicator at the *technical level* ascertaining the accuracy and efficiency of the system in its day-to-day use. Lastly, in the D&M model, *user satisfaction* is linked to *intention to use* indicating the

success of a system at the *effectiveness level*. In the current study, the path *from perceived satisfaction* to *willingness to participate* was supported. In addition to these links, the D&M model suggests that there may be more linkages from the use of a system to individual, group, or organizational benefits – addressed in the D&M model as *net benefits*. These *net benefits* can also help measure the *effectiveness* of a system, and also act as reinforcement mechanisms for continued use (Delone & McLean, 2003). In the current research study, latent constructs such as *organizational trustworthiness*, *member trustworthiness*, *perceived enjoyment*, and *sense of virtual community* can be considered as the *net benefits* resulting from participation in a VC.

Overall, in the resultant *estimated structural model* from the quantitative analysis phase of this study, *information quality* and *media richness* can be considered *semantic level predictors* of VC success, while *website usability* provides an indication of a VC's *technical level* of success. Furthermore, the constructs pertaining to *organizational trustworthiness*, *member trustworthiness*, *perceived enjoyment*, and *sense of virtual community* can be considered as the *net benefits* that establish the *effectiveness* level of the VC as an information system, and act as reinforcements for continued member participation in VCs.

By situating the *abridged theoretical model* used in the quantitative phase of this study alongside a well researched and widely applied IS model, this study provides the basis for future comparisons across various studies of member participation in VCs. Engaging in a practice that builds, extends and refines other existing research models has been recommended by IS researchers as a way to improve research validity and also to build a cumulative tradition of research (Rai et al., 2002; Straub, 1989).

8.2.1.4 Insight into Development & Dimensionality of Sense of Virtual Community

As highlighted in the discussion of the conceptual framework for this study (in *Chapter 3*), *sense of virtual community* (*SoVC*) has been a prevalent construct in studies concerning member participation in VCs. Despite its salience in VC research studies, its conceptualization has varied – creating confusion in the literature, and confounding future research investigations. Therefore, many researchers have recently called for studies that use pluralistic research methods for context-specific characterizations of this construct. This study answers the call.

In this research, the *SoVC* construct was originally explored and described during the qualitative phase of investigation. Development of participation experiences and changing member gratifications were linked to producing different feelings that constitute a weak or strong *sense of virtual community*. Furthermore, members who seek *multiple gratifications* from their online participation were observed to report higher levels of SoVC. In terms of sociological antecedents, while factors such as *organizational trustworthiness* beliefs and *member responsiveness* were observed to help form initial cognitive perceptions of SoVC, the lagged effect of *member trustworthiness* and *perceived enjoyment* were surmised to contribute much more towards the development of feelings of affinity with the virtual community. These

differential effects of antecedents on the *SoVC* construct were validated during the quantitative testing of the *abridged theoretical model*. The *estimated structural model* showed the following results: Organizational Trustworthiness ➔ SoVC (β=0.154, $p < 0.001$); *Member Responsiveness* ➔ *SoVC* (β=0.134, n.s.); *Member Trustworthiness* ➔ *SoVC* (β=0.333, $p < 0.001$); *Perceived Enjoyment* ➔ *SoVC* (β=0.354, $p < 0.001$). As such, this research corroborates other theoretical models that have posited trust as an antecedent of SoVC (Blanchard & Markus, 2002; Ellonen et al., 2007; Kim et al., 2009). Furthermore, through a combination of qualitative and quantitative methods, this study offers a possible redefinition for conceptualization of SoVC in studies that have utilized a hedonic underlying dimension to SoVC (Koh & Kim, 2003). This current research shows hedonic experiences such as those epitomized by *perceived enjoyment* to be an antecedent to the development of *SoVC*, rather than a dimension of *SoVC*.

In terms of dimensionality, in the current research, a four dimensional conceptualization of SoVC (*belonging, similarity & cooperativeness, support,* and *attachment)* was offered in the qualitative findings, and exploratory factor analysis procedures yielded a three-factor model combining *belonging* and *attachment* dimensions into one factor. As such, this research study supports a three or four factor model for the multidimensionality of SoVC comprising cognitive, affective, and evaluative dimensions. Such models have been suggested in other research studies as well (Blanchard, 2007b; Blanchard, 2007c; Kim et al., 2009; Yoo et al., 2002b).

8.2.2 Contributions to Practice

In addition to the various contributions this study makes to theory, the findings from this study are also relevant to VC practitioners. In particular, the findings from the qualitative and quantitative investigation phases can help suggest interventions and tactics for virtual community administrators and technologists. These are highlighted in the subsections below.

8.2.2.1 Leverage Points in the Member Engagement Process

Following from the emergent theory in this study's qualitative investigation phase, several management interventions and technology tactics can be suggested along the course of the member engagement process. These interventions and tactics can be strategically enacted at key junctures during of the engagement process to foster greater member participation and reduce churn in the virtual community. These *leverage points* along the *member engagement process*, along with some examples of interventions and tactics are outlined below.

Firstly, several management practices and technology propositions can be made at the *exploring commonality* stage of the *member engagement process*. At this stage, VC management should focus on integrating new members into the virtual community while aiming to activate passive members. On an administrative front, new members should be welcomed and introduced to other VC members who share similar traits. Newcomers should be directed to the

use of various features such as member listings and information directories – tools that can set the stage for initial *information exchange* or *social interactions*. Furthermore, administrators or moderators should engage in personal interactions, and recommend connections to other similar members or links to relevant informational resources. Such measures can help pave the way for the development of *organizational trustworthiness* beliefs. By replying to new member queries and encouraging other VC members to respond, administrators can create favorable impressions of *member responsiveness* in the VC. On the technology front, the designers and developers of VC site platforms and features need to ensure high levels of *website usability* through ensuring *ease of use* and efficient *information design*. An easy to use site can help lower barriers to initial participation and also support perceptions of adequate *technology self-efficacy* in new members. Similarly, efficient *information design* can help new members find relevant information faster while allowing them to also explore other parts of the virtual community.

Secondly, the *experiencing conferment* stage in the *member engagement process* provides a practical leverage point to VC administrators for reactivating fading members and motivating intermittent members to participate more actively. Reinforcements for continued participation in value-added tasks such as contributing useful content and collaborating with others can be offered, and members can be induced to interact with the community at large, on a more frequent basis. Media rich technology tools such as various types of *expression aids* that can help members identify themselves in a unique and personalized fashion should be offered and highlighted to members. Scoring tools such as content ratings and member rankings should be utilized to offer positive reinforcements to members who demonstrate interest and commitment through value-added tasks. Furthermore, to cater to the *multiple gratifications* of its members, VC sites should offer different groupspace platforms such as discussion forums, blogs, wikis, and information repositories.

Lastly, the *enjoying camaraderie* stage in the *member engagement process* offers a viable leverage point to help VC management maintain its active users. Offering advanced forms of conferment to members can help maintain their interest in the VC while instilling stronger feelings of affinity for the VC. Some possibilities are to involve members in site administration or moderation, and invite their participation in user-centered design for new technology initiatives. In addition to offering conferment, members at this stage should be provided with all the necessary technology facilities to enable interactive user experiences and media rich interactions with other VC members. Access to restricted areas for exclusive multimedia content areas or interactive media features may be a potential way to integrate the benefits of conferment and camaraderie to help invigorate participation of senior members in the VC.

The sample of interventions and tactics suggested above are only provided to exemplify the application of the *member engagement process* in the management of virtual communities. As an archetype of member participation experiences and patterns, the *member engagement process* does not only advance a theoretical understanding of socio-technical factors affecting

member participation, but it also provides actionable guidelines for an effective member relationship management strategy.

8.2.2.2 Value Effects Based Prioritization of Online Initiatives

In addition to the management applications of the emergent theory from qualitative investigation, this study also provides management recommendations based on the results from the quantitative phase.

From the *estimated structural model*, inferences can be made about the differential influence of various socio-technical factors on the *value effects* of member participation in VCs. A closer look at which determinants most significantly impact *perceived enjoyment*, *perceived satisfaction*, and *sense of virtual community* can help VC management in the prioritization of their initiatives for improving member experiences that pertain to those determinants. *Table 8-1* below shows the overall impact of each determinant on the three *value effects* using the metric of total effects (direct and indirect) from the *estimated structural model*. The top three impacting determinants for each value effect are highlighted. As seen, *information quality*, *member responsiveness*, and *member trustworthiness* regularly appear in the list of top factors for each effect (with the exception of *website usability* as an important factor for *perceived satisfaction*). Since *member trustworthiness* is a direct consequent of *information quality* and *member responsiveness* in the structural model, it follows that improving performance of the VC with respect to the latter would also translate into improvement of trust among members. Therefore, it is suggested that VC managers prioritize initiatives that produce original content, encourage better quality of user-generated content, promote social interactions among members, and find ways to ensure an adequate number of prompt replies to member postings in the VC.

Table 8-1 Total Effects of Socio-Technical Determinants on Value Effects

Determinants	Total Effect on Perceived Enjoyment	Total Effect on Perceived Satisfaction	Total Effect on Sense of Virtual Community
Website Usability	0.283	**0.286**	0.202
Media Richness	0.134	0.114	0.186
Information Quality	**0.357**	**0.482**	**0.365**
Organizational Trustworthiness	NA	NA	0.154
Member Responsiveness	**0.414**	**0.352**	**0.466**
Member Trustworthiness	**0.344**	0.173	**0.454**

In addition to the above, this study offers a starting list of priorities for virtual communities based on how well the VCs in this study's sampling frame performed in terms of the various determinants of *value effects*. During the quantitative analysis of data, priority

maps[54] were constructed for each *value effect* to illustrate the performance of the sample of VCs towards that *value effect*. These priority maps and their brief descriptions are available in *Appendix I*. To summarize the findings, it was observed that the VCs surveyed in this study performed well in terms of *information quality*, but lagged behind in fostering *member responsiveness* and cultivating overall *member trustworthiness*. The latter two scored low in terms of performance but high in terms of their potential impact on all *value effects*. Consequently, it is suggested that VCs, in general, and those comprising the sampling frame for this study's quantitative phase, in particular, should focus on improving these areas to enhance the overall participation experience of their members.

8.3 Limitations of this Study & Directions for Future Research

The findings from this investigation are constrained by several limitations. These are highlighted herewith, and some solutions to overcome these limitations for future studies are provided. Additionally, suggestions are provided for future studies to corroborate and extend the findings from this current study.

8.3.1 Limitations of this Study & Solutions for Future Research

Perhaps the most salient among the limitations of this study is the generalizability of its findings to all types of virtual communities. Although, both phases of investigation in this study used a sampling frame consisting of a variety of social, professional, and commercial virtual communities, all of these VCs were in the public domain, and many were member initiated. As such, it cannot be said with certainty whether the findings from this research will generalize to other virtual communities such as communities of practice or other exclusive, by-invitation-only VCs online. The inclusion of such VCs was beyond the scope and feasibility of this current study. Future research studies should attempt to replicate the premise of this study and gather empirical evidence in these new settings in order to provide refinements and extensions to the current research.

Secondly, with respect to the mixed methods sampling design followed in the study, the informants in both the qualitative and quantitative phase were recruited on a non-random basis. The recruitment of informants using purposive and critical case samples in the qualitative phase was a requirement to adhere to the principles of constant comparisons and theoretical sampling in grounded theory methodology. However, the use of non-random convenience samples of respondents in the quantitative phase could be considered as potentially confounding in the justification of interpretive consistency (Collins et al., 2007) . It should be noted though, that both phases of investigation utilized moderate to large sample sizes from a cross-section of

[54] Priority maps are also referred to as Impact-Performance maps, and have recently been used in many management studies to offer priority based recommendations for organizational initiatives (Martensen & Gronholdt, 2001; 2003)

virtual communities, and parallel samples were employed (i.e. from different VCs in each phase). These steps were taken to improve the interpretive consistency of the study's findings.

Thirdly, in terms of limitations to the generalizability of findings, both phases of investigation in this study relied on self-reported use measures such as activity levels. Previous IS studies have shown that self-reported use and actual use may not correlate in all instances, and ideally, both should be studied in empirical research (Delone & McLean, 2003; Straub et al., 1995). In the context of this study, guarantee of anonymity to study informants by the researcher, and privacy policies of virtual communities' administration prevented the use of such information for research purposes. Future studies that may gain access to objective use data should compare their results to those in this study.

Finally, the concerns associated with common method bias in the quantitative survey data was addressed in *Chapter 7*. Although the two methods used to ascertain common method bias showed low levels that should not be of concern, the limitation is noted herewith for completeness. Aligned with the suggestion to alleviate the previous limitation, future research studies should try to gain access to objective data or multiple sources of data for independent and dependent latent variables in the structural model.

8.3.2 Suggestions for Improvements & Extensions to the Current Study

In terms of future research investigations exploring member participation in virtual communities, several avenues for the refinement and extension of this current study may be explored. Some options are outlined below.

From a methodological standpoint, it is the recommendation of this researcher that future studies utilizing a quantitative survey questionnaire create and use an instrument that taps into different types of tasks and activities performed by VC members. This should be done in addition to incorporating self-reported activity levels, and obtaining objective use data if possible. A multidimensional measure of system use based on nature and purpose of a system has been shown to be more reliable than other measures such as self-reported overall use levels or intention to use a system (Doll & Torkzadeh, 1998). Toward this suggestion, the qualitative findings in this study provide some useful guidelines – participation can be measured in terms of *activity levels*, *task modes*, as well as *use orientation* toward the virtual community. Unfortunately, in this study's quantitative phase, a multidimensional system for measuring virtual community participation could not be deployed due to the already long survey instrument with measurement items for other latent variables.

With respect to quantitative studies, it is also suggested that researchers utilize principles and procedures associated with differential psychology to analyze variations among different groups of individuals. Specifically, variables such as membership tenure and motivational propensities can be used as moderator variables to analyze interaction effects with

other socio-technical variables affecting member participation in virtual communities. Such an extension to this current study is already being planned by the researcher.

Another methodological recommendation is that longitudinal studies can be undertaken to confirm or refute the findings in this study. Although the study used multiple methods of inquiry and collected qualitative and quantitative data from different sampling frames, the emergent theory and the structural models cannot make claims of causality among constructs (hence, the use of associative, non-causal wording in the formulation of relational propositions). In formulating relational propositions among constructs, this study has used the guiding principles of *consistency* (i.e. where concepts A are B are identified together in multiple instances), and *contiguity of Influence* (i.e. a plausible mechanism links concepts A and B) (Miles & Huberman, 1994, pp. 144–148). Future studies adopting a longitudinal approach can establish *temporal precedence* (i.e. concept A precedes B in their identified coincidences) in order to make claims of causality among constructs.

In addition to methodological improvements, future studies can extend the conceptual framework for qualitative investigation or the theoretical model for quantitative testing by incorporating new constructs. Two specific suggestions that the researcher has along these lines are as follows:

i) A multidimensional construct of *commitment* can be studied in the context of consequential stimuli or reinforcements of member participation in VCs. Bateman et al. (2006; 2010) have recently completed studies in this area, highlighting the applicability of organizational commitment theory to virtual community behaviours. Different dimensions of commitment, including cognitive and affective, can prove to be a useful addition to theoretical models to test associations among *trustworthiness* beliefs, commitment, and *sense of virtual community*. In the case of this current research, *commitment* was not included in the quantitative investigation because the construct did not surface as a salient emergent category in the qualitative findings.

ii) Future research should adopt an interdisciplinary approach to study virtual communities as embodiments of information systems as well as social media. By aligning with research traditions in communication and media research, constructs related to *gratifications*, and *use orientations* towards VCs can be incorporated into theoretical models. In the current research study, both gratifications and use orientations emerged as salient categories during the qualitative investigation phase. The findings presented in *Chapter 5* discuss these categories and their relationships with other aspects of member participation behavior in VCs. However, further quantitative substantiation of these concepts was beyond the scope of this research. In future studies, the researcher plans to incorporate these constructs in his own investigations, and makes the same recommendation to other VC researchers.

8.4 Conclusion

The objective of this research study was to shed light on the sociological and technological factors that affect member participation in virtual communities. Toward this goal, the study utilized a combination of qualitative and quantitative research methodologies to gather and analyze data. A conceptual framework with sociological and technological sensitizing concepts was formulated to instantiate the study's investigation. The sociological concepts in the conceptual framework included organizational trust, member trust, and *sense of virtual community*, while the technological factors included *usability* and *functionality* of the technology platforms and tools provided by the virtual community. These concepts proved to be a useful lens of analysis for the investigation, and they were refined further during the qualitative phase of investigation.

Data for the qualitative phase was gathered through online focus groups and open-ended questionnaires. Analysis procedures from grounded theory methodology were used to identify themes, categories, and relational patterns that explain the dynamics of member participation in virtual communities. An emergent theory providing a realistic description and a rich portrayal of virtual community use by its members was formalized using the *member engagement process* as an underlying phenomenon that integrates and explains various socio-technical factors affecting member participation. In particular, the emergent theory explained the changes in member participation behavior in terms of *activity levels*, *task modes*, *ICTs utilized*, *gratifications sought*, and the *use orientation* of VC members. These changes were explained in the *member engagement process* through patterns and relationships among various socio-technical constructs, and their combined consequences – termed as *value effects*, that act as reinforcements to enhance or inhibit members' future participation levels. The emergent theory consisted of a refined form of various factors from the study's conceptual framework along with their interrelationships, and also included additional categories related to member participation behavior and its socio-technical determinants. *Website usability*, *organizational trustworthiness*, *member trustworthiness*, and *sense of virtual community* surfaced as salient categories in the qualitative findings along with new categories related to *information quality*, *media richness*, *perceived enjoyment*, and *perceived satisfaction*.

Subsequently, the quantitative phase of investigation concentrated on enriching the emergent theory by testing its salient constructs and relational propositions, and by providing qualified descriptions about the differential effects of various socio-technical factors on member participation in virtual communities. The dimensional structure of various factors was tested using exploratory factor analysis techniques, and structural equation modeling was used to test an *abridged theoretical model* depicting relationships among these factors that were identified in the emergent theory from the previous phase. Most relational propositions from the emergent theory were supported. The exceptions were explained in terms of mediating effects of intervening variables on the consequent variables. The *estimated structural model*

demonstrated high predictive accuracy as well as strong predictability of all downstream latent variables with their explained variances in the 60% range. On the whole, the quantitative phase facilitated the objective of *triangulation* by providing convergent validity for the findings from the qualitative phase. It also offered an *elaboration* of the qualitative findings by adding richness and detail to better understand the dynamics of member participation in virtual communities. The model provided strong evidence of the salience of *perceived enjoyment*, *perceived satisfaction*, and *sense of virtual community* in predicting members' *willingness to participate*, and for each of these *value effects*, the model also explicated their socio-technical antecedents.

In addition to its theoretical implications, this study provides guiding principles and actionable recommendations for VC practitioners including administrators and technologists. Using the three stages in the *member engagement process*, several interventions and tactics at key points during the engagement process can be implemented for a more effective member relationship management strategy in the virtual community. In addition to these leverage points suggested through the qualitative findings in this study, the quantitative results can help in the prioritization of virtual community programs and initiatives. Based on the quantitative results explicating the impact of various socio-technical factors on member participation, it is recommended that priority be given to initiatives that enhance *information quality* and foster *member responsiveness*, while maintaining reasonably good levels of *website usability* and *media richness*.

This work represents an initial attempt to understand the dynamics of member participation in virtual communities and to provide guiding principles and actionable recommendations for virtual community practitioners. It is recommended that future researchers continue investigating the role of socio-technical factors outlined in this study, and extend this research by replicating the study in different contexts, as well as by incorporating other useful constructs that can help explain member participation in virtual communities.

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Appendix A: Moderator Script & Topic Guide for Online Focus Groups

(Used in synchronous and asynchronous versions of online focus groups)

Purpose:

The purpose of conducting the online focus groups is to gain an understanding of: i) the informants' drivers and motivations for online participation in virtual communities, especially with reference to information exchange and social interaction motivations and activities; ii) the informants' perceptions and experiences with the functionality and usability of the virtual community technology tools and features; and iii) the informants' perceptions and experiences with social processes that affect their participation in virtual communities, especially with reference to trust perceptions of the organization and other community members, and the sense of virtual community that is experienced through being a member of the virtual community.

Administration:

- Each synchronous online focus group will run approximately 60 to 90 minutes in length.
- Each asynchronous online focus group will be available to confirmed participants for one week (seven days).

Pre-Focus Group Procedures:

- All confirmed participants will be issued login credentials, including a username and a password. The username (User-1, User-2, ...) will be used by the participants as their pseudonym during the focus group discussion sessions.
- Each confirmed participant will be sent a link to the main Information & Consent webpage, which will subsequently lead to the brief demographic questionnaire, followed by the webpage hosting the online focus group.
- The login credentials and link will be sent 3 days in advance of the scheduled session.
- A reminder email or private message will be sent to the confirmed participants on the day before the start of the online focus group. Synchronous focus group participants will also be sent a reminder message 2 hours prior to the start of the scheduled focus group session.

Post-Focus Group Procedures:

- Participants will be thanked as a group for their help with the research study.
- A link to the optional contact information form will be provided to allow participants to register for the incentive raffle draw.
- A link to the optional contact information form will be provided to ask participants who can volunteer to act as call-backs for the study in order to obtain feedback on the study's findings.
- An email or a private message will be sent to each participant individually to thank him/her, and to provide the two links mentioned above.

Key Moderator Actions:

- The structure of asking questions in the online focus groups will oscillate between informants answering semi-structured open-ended questions, including the discussion of critical incidents related to their online experiences. This structure will repeat 5 times, once for each construct or group of constructs being investigated: (i) online participation drivers and motivations; (ii) technology factors related to functionality and usability; (iii) social process factors related to (a) trust in the organization, (b) trust in other community members, and (c) sense of virtual community.
- The objective of the semi-structured questions is to trigger participant opinions and get participants thinking about issues to be discussed during the critical incident questions. The objective of the critical incident questions is to gather detailed data concerning participant perceptions and experiences with the virtual community.
- Additional probes may be interjected by the moderator (researcher) as appropriate to facilitate regular conversation and to delve deeper into interesting or novel issues.
- At the end of each session, participants will be invited to bring up any other topics or issues pertinent to their online participation that may not have been covered during the discussion session.

Template Comments for Moderator Script:

- The following comments can be used in the introductory, transition, and closing stages of the online focus group sessions.
- **Introductory Comments:**
    - Reviewing the Purpose of the online focus group sessions:

      "As mentioned in my brief chat with most of you over the last few days, the purpose of this focus group session is to talk about your individual participation experiences as a member in your virtual communities. In this focus group, I have invited people from multiple virtual communities so that we all may interact and draw upon each other's insights."

    - Ensuring participants of their anonymity in the sessions as well as in reporting of research findings:

      "In case, you're wondering, since all of you are using pseudonyms, your participation in this focus group is completely anonymized, and your comments will not be linked to your online identities in your respective virtual communities. Also, in my reporting, I will not be associating your comments with your specific virtual communities. The comments will be recorded in the proceedings in anonymized and aggregate form."

    - Confirming instructions to participate in an open discussion format:

      "Just to make sure that everyone got this from the sticky note that is posted... most questions in our focus group discussion are intended to be open-ended. So feel free to answer them in whatever way you feel appropriate. Examples from your personal experiences are going be extremely valuable... so please share them whenever you can relate an experience to the topic of discussion. Also, feel free to post your responses without waiting for others to respond before you ... everyone can pretty much post comments simultaneously."

- **Transition Comments:**
    - Introducing a probe into the conversation:
        - *"Could you talk more about..."*
        - *"What do you think caused.."*
        - *"How important is..."*
        - *"What do you get out of..."*
        - *"What were the consequences of..."*
        - *"What changes did this bring about in..."*

- **Transition Comments (contd.):**
  - Introducing a new topic in the discussion:
    - *"We've had some good discussion so far on <<INSERT-TOPIC>>. I hope you are all learning from this exercise and enjoying the conversation. I would now like to move on to the next topic for discussion which is... <<INSERT-TOPIC>>"*
    - *"That was some great information on your experiences with <<INSERT-TOPIC>>. I would now like to focus on another important aspect of member participation which is... <<INSERT-TOPIC>>"*
- **Closing Comments:**
  - Bringing the discussion to a close:

    "I think that just about covers the topics I had planned for our discussion. It has been a very enjoyable experience talking and listening to all your experiences..."
  - Inquiring about additional topics or issues:

    "Although I've covered the topics I had in mind, I'd like to take this opportunity as ask if there is anything else that you think is important to our subject of discussion and was not touched upon..."
  - Asking participants whether they have questions about the study:

    "Now that we've ended our discussion, is there anything else that you would like to know about the study or its procedures?..."
  - Providing link to optional contact information form for the gift certificate draw, and ensuring confidentiality of email address information:

    "I'm sure many of you are wondering about the gift certificate draw :-) ... here's the link to the online form where you can register for the draw using your email address. I would like to stress that your email address is only required if you wish to participate in the draw, and I will be keeping it separate from your focus group responses. Actually, since I'm not asking you for your username in that form, there's really no way that I can associate the email address with your username."

- **Closing Comments (contd.):**
  - Providing link to optional contact information form to register volunteers for call-backs, and ensuring confidentiality of email address information:

    "Lastly, I would like to ask for another favour from those of you who may be willing to help with this. As part of my research study, I would like to contact some of you to obtain your feedback on the study's findings. This will be extremely useful information to help me verify or refute the findings from the study.

    If you are willing to help with this, please use this link to an online form to provide me with an email address where I can contact you at a later date (might be a few months) to talk to you about the research findings. I would really really appreciate your help with this! :-)

    Once again, your email address will be kept separate from your focus group responses. Since I'm not asking you for your username in that form, there's really no way that I can associate the email address with your username."

Draft Topic Guide & Focus Group Questions:

Notes:

- Items with * indicate those that were added in version 2 of the topic guide (included in both synchronous and asynchronous OFGs).
- Items with ** indicate those that were added in version 3 of the topic guide (included only in asynchronous OFGs).

Introduction / Warm-Up Phase:

A: *Participation Background & Activity Levels*

- A(1) How long have you been a member in your virtual community?
- A(2) What made you join the virtual community in the first place?
- A(3) How would you describe your level of participation in the virtual community?
  - Probe: How often do you visit the virtual community site?
  - Probe: Do you think of yourself as an active member or a passive one?
  - Probe: What factors do you think affect your level of participation?

B: *Motivations & Activities*

- B(1) What are your motivations for participating in your virtual community?
- B(2) Do you participate in the virtual community for purposes of social interaction?
  - Probe: What methods or tools do you use to interact with other people?
  - * Probe: Is there a specific group of members that you interact with more? What made you decide to interact with them more than others?
- B(3) Do you use the virtual community to seek or provide information?
  - Probe: What type of information do you seek through the virtual community?
  - * Probe: What sources of information do use? This can include people in the community as well as other sources such as content repositories etc.
- B(4) How frequently would you say you use the virtual community for social interaction or for information exchange? Do you use it more for either one or the other purpose?
- * B(5) Would you say that your participation activities have evolved over time? What has caused these changes in your participation or the activities you pursue?

* **C:** *Critical Incidents (General)*

- C(1) Can you think of any significant positive or negative experiences that affected your participation in your virtual community?
  - Probe: What caused the incidents leading to these experiences, and how did they influence your online participation?
  - Probe: Do you do anything differently as a result of your experience?

Transition Phase:

* **D:** *Gratifications*

- D(1) What do you get out of participating in your virtual community?
  - Probe: What do the benefits of participation mean to you at an individual level?
  - Probe: What factors lead to these benefits?
  - Probe: Are certain benefits more important than others?

** **E:** *Use Patterns*

- E(1) Do you have specific reasons for participating in your virtual community, or is it more of a habit now?
  - Probe: How would you describe the habit?
  - Probe: What types of habitual activities do you undertake?
  - Probe: Do you still participate in the virtual community for the same reasons as when you started, or are the reasons different?

Key Questions Phase:

F: *Functionality*

- F(1) With respect to technology, are there any specific tools or features that you like or dislike about your virtual community website and the technology interface?
  - Probe: How do these help or hinder your participation?
  - * Probe: How do these tools help in achieving the benefits that you are seeking through your participation?

- F(2) Has your use of technology tools and features in the virtual community evolved over time?
  - * Probe: Are there any tools or features that you use today, but didn't use before?
  - * Probe: What factors caused you to start using new tools or give up on some of them?

Key Questions Phase (contd.):

G: *Usability*

- G(1) Do you consider the virtual community website and its various tools and features to be user-friendly?
    - Probe: In terms of user-friendliness, what do you like or dislike about the website or the tools and features available on it?

- G(2) Does the interface of the virtual community website or its various tools and features facilitate the activities that you perform while visiting the virtual community?
    - Probe: What aspects of the user interface do you like or dislike?
    - Probe: Are there any aspects of the user interface that make it easy or difficult to interact with others?
    - Probe: Are the any aspects of the user interface that make it easy or difficult to exchange information?
    - * Probe: Would you change anything about the user interface to make it better?

H: *Critical Incidents (Technology Factors)*

- H(1) Can you think of any significant positive or negative experiences with the use of technology in the virtual community that affected your participation?
    - Probe: What caused the incidents leading to these experiences, and how did they influence your online participation?
    - Probe: Do you do anything differently as a result of your experience?

* **I:** *Information Quality*

- I(1) Do you consider the information you get through the virtual community to be of high quality?
    - Probe: What factors affect the quality of information you receive through the virtual community?
    - Probe: What can be done differently in your virtual community to improve the quality of information being provided through it?

Key Questions Phase (contd.):

J: *Trust in the Organization*

- J(1) What factors affect the level of trust you have in the organization or administration that is operating or managing your virtual community?
  - Probe: How much do you trust the organization or administration?
  - Probe: What aspects of administration or management affect your decision about trusting or not trusting them?

- J(2) Has your trust in the organization or administration of the virtual community evolved over time?
  - Probe: What made you change your mind to trust the organization or administration more or less?

K: *Critical Incidents (Trust in the Organization)*

- K(1) Can you think of any significant positive or negative experiences that affected your level of trust in the organization or administration in the virtual community?
  - Probe: What caused the incidents leading to these experiences, and how did they influence your online participation?
  - Probe: Do you do anything differently as a result of your experience?

L: *Trust in the Other Members*

- L(1) What factors affect the level of trust you have in other members of your virtual community?
  - Probe: How much do you trust the other members of your virtual community?
  - Probe: What is it about the members that make you trust them more or less?
  - Probe: Do your interactions play a role in making you trust other members more or less?

- L(2) Has your trust in other members of the virtual community evolved over time?
  - Probe: What made you change your mind to trust other members more or less?

M: *Critical Incidents (Trust in the Other Members)*

- M(1) Can you think of any significant positive or negative experiences that affected your level of trust in other members of your virtual community?
  - Probe: What caused the incidents leading to these experiences, and how did they influence your online participation?
  - Probe: Do you do anything differently as a result of your experience?

Key Questions Phase (contd.):

N: *Sense of Virtual Community*

- N(1) Do you feel a certain sense of community being a member of your virtual community?
  - Probe: What factors make it resemble a community?
  - Probe: What aspects of day to day use or interactions with other members lead to a sense of community?

- N(2) Have your feelings about being part of the community evolved over time?
  - Probe: What factors influenced your feelings about sense of community?

O: *Critical Incidents (Sense of Virtual Community)*

- O(1) Can you think of any significant positive or negative experiences that affected your feelings of sense of community?
  - Probe: What caused the incidents leading to these experiences, and how did they influence your online participation?
  - Probe: Do you do anything differently as a result of your experience?

Wrap-Up Phase:

** **P:** *Enjoyment*

- P(1) Do you enjoy the experience of participation in your virtual community?
  - Probe: What aspects of your experience are enjoyable?
  - Probe: What factors affect the level of enjoyment you get out of participating in your virtual community?

** **Q:** *Satisfaction*

- Q(1) Are you generally satisfied with your participation experiences in your virtual community?
- Probe: What factors influence your level of satisfaction or dissatisfaction in your virtual community?
- Probe: Is there anything different that could recommend that would make it more satisfying for you to participate in your virtual community?

R: *Willingness to Participate*

- R(1) Do you think you will continue to participate in your virtual community?
  - Probe: What factors are important to you in maintaining your continued participation?

- R(2) All things considered, what are the most important factors that you think determine your level of participation in your virtual community today and going forward?

Appendix B: Checklist for Selection of Online Focus Group Technology Platform

(Used in selection of technology platform for synchronous and asynchronous online focus groups)

Guidelines / Requirements	Explanation	Alternatives		
		...	...	...
Familiarity	• The solution platform should be based on commonly used interaction features on VCs such as text chat and discussion forums.			
Reliability	• The adopted hosting solution should have a high uptime, and should be able to support users with a variety of computing platforms.			
Transcript Download / Export Facility	• The application should provide the ability to save / download / export transcripts from the chat or discussion sessions. • The availability of standard formats such as RTF or CSV will be helpful.			
Firewall and Proxy Support	• Since many participants may not be technology savvy, the online chat module or discussion forum should be able to function via http tunnelling through firewalls and proxy servers without requiring intervention from the end-user.			
Authentication Module	• The solution should offer a way to store and update usernames and passwords that can be used to authenticate focus group participants.			
Interface Customization	• The researcher should be able to customize the user interface attributes such as color and layout schemes.			
Rich Interaction Features	• The moderator and the participants should be able to use expression (e.g. emoticons) and typographical cues (e.g. changing font faces) to compensate for personable social cues which exist in a face-to-face focus group.			
No Additional Software Plug-ins	• To ensure that the use of the application remains seamless for the focus group participants, the use of sophisticated interfaces requiring plug-ins needs to be avoided.			

Appendix C:
Online Open-Ended Questionnaire

A visual version of the online open-ended questionnaire is available at:
http://www.umar.biz/research/phd/archive/Questionnaires/questionnaire-requested.html

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Questionnaire Notes & Instructions

- *Please answer the open-ended questions below regarding your participation in your virtual community.*
- *All of the questions are open-ended and you can answer them in whatever way you deem appropriate.*
  - *Please take your time in responding to the various questions.*
  - *Also note that in providing your responses to the answers, you are not limited in the length of your response by the size of the response box.*
- Thank you in advance for your help with this research study. It is hoped that the research will make strong contributions to scholarship concerning community informatics and the adoption and diffusion of virtual community environments. Recommendations based on research findings will also help planners, administrators, designers and facilitators of virtual community sites, promote avid online participation and minimize abandonment, attrition and churn.

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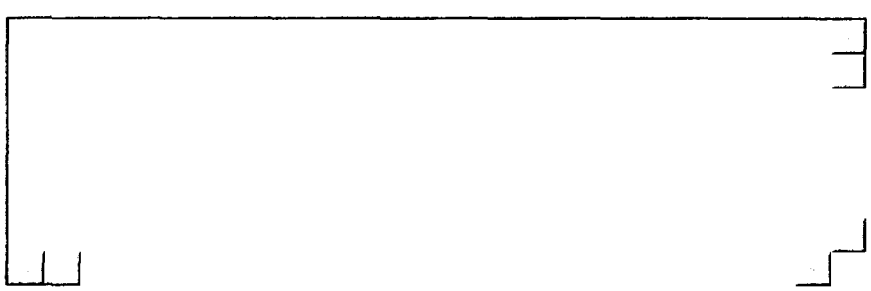
1. How long have you been a member in your virtual community and how actively do you participate in it?



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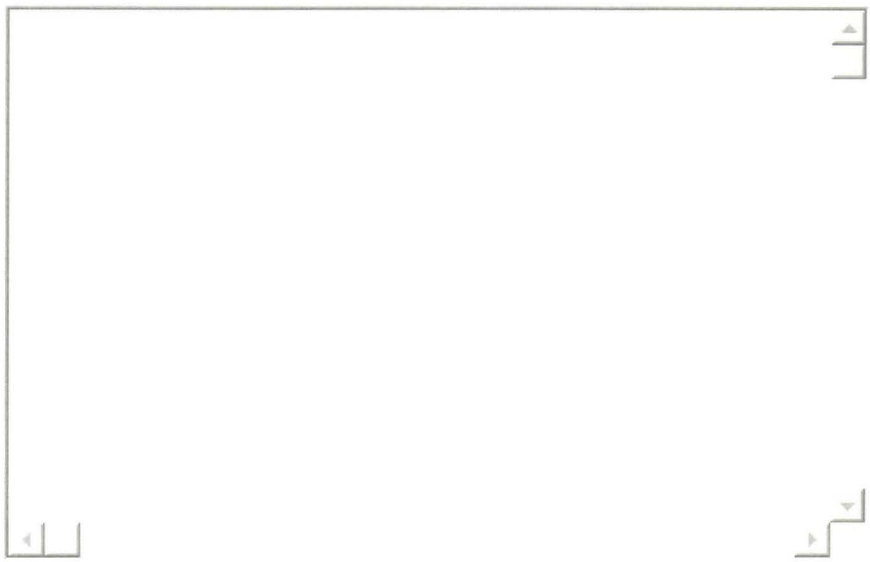
2. What are your primary motivations or reasons for participating in your virtual community, and what types of activities or tasks do you normally undertake in your routine participation?



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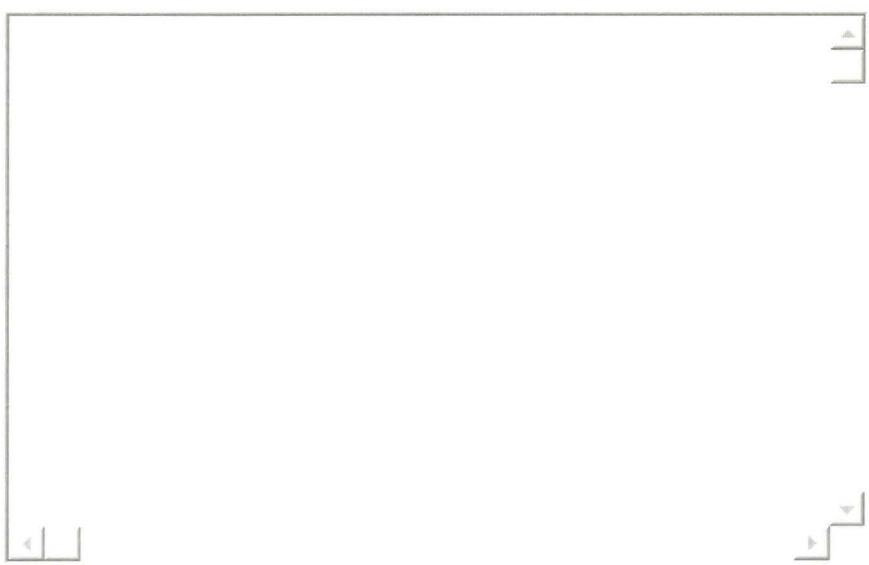
3. Are there any specific tools or features that you like or dislike about your virtual community website?

- How do these help or hinder your participation in the activities that you mentioned previously (in the question above)?



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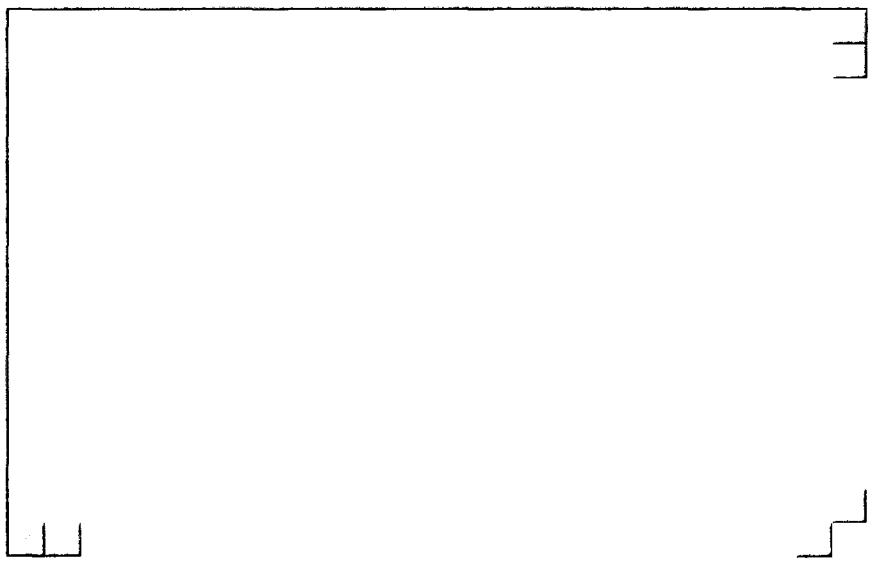
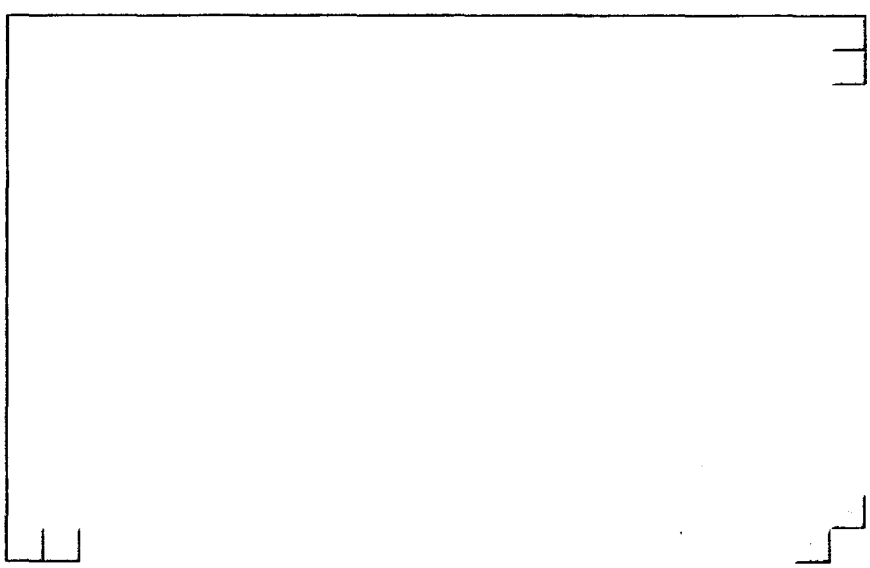
4. How has your use of the available technology on the virtual community website evolved over time?



5. Do you consider the virtual community website and its various tools and features to be user-friendly?

- Are the any aspects of the user interface that make it easy or difficult to exchange information, or to interact with others?



6. Is there any specific type of informational content that interests you more while surfing your virtual community?

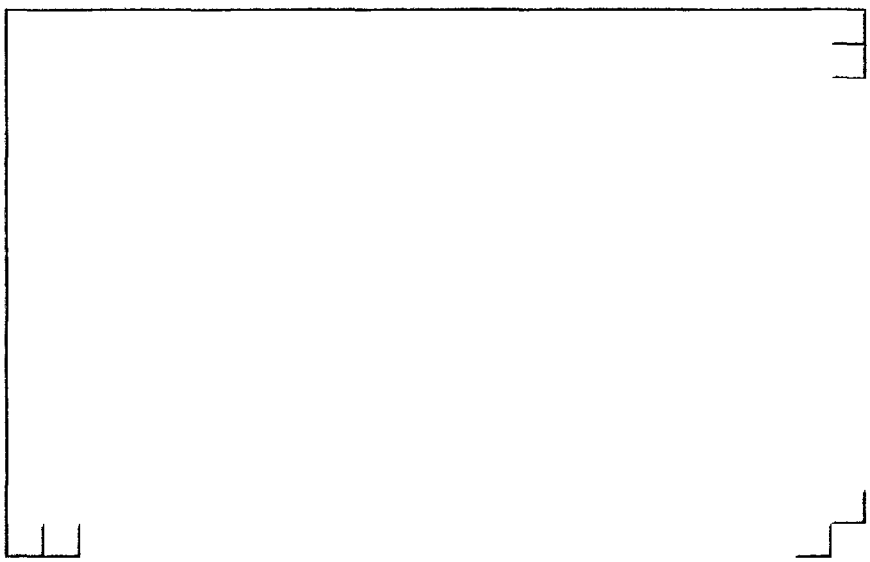
- Who or what is the primary source of the content and how do you normally access the content (e.g. message boards/forums, journals/blogs, featured articles, newsletters, RSS feeds etc.)?

7. What makes you trust or distrust the organization or administration running your virtual community?

- How has your trust in the organization or administration evolved overtime?

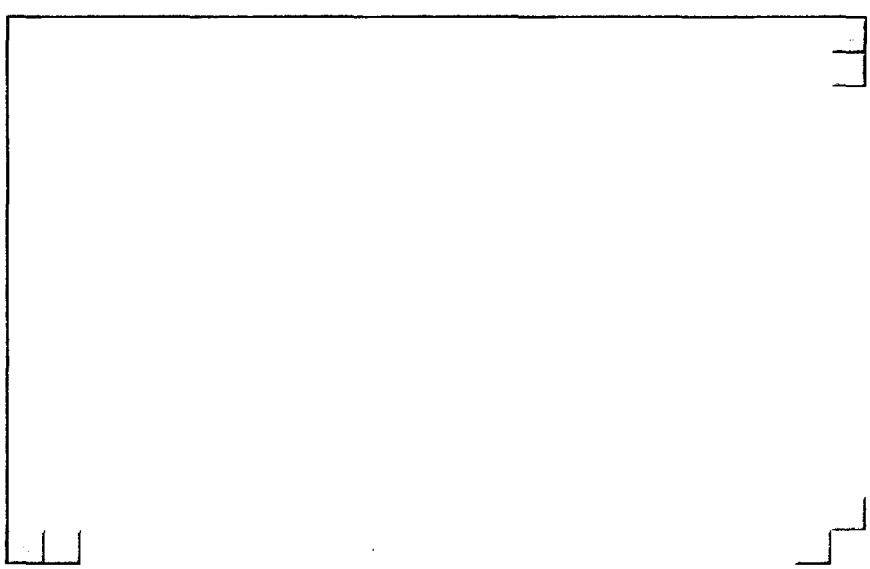
8. What makes you trust or distrust the other members of your virtual community?

- How has your trust in other members evolved over time?



9. Do you feel a certain sense of community being a member of your virtual community?

- What causes these feelings?



10. Can you think of any significant positive or negative experiences that affected your participation in the virtual community?

- What caused the incidents leading to these experiences, and how did they influence your online participation?

Please click the "Submit Questionnaire Responses" button below once you have answered the questions above.

Submit Questionnaire Responses

Appendix D: Examples of Interim Model Diagrams from Qualitative Analysis

- From the eight model diagrams that the researcher created during the course of qualitative phase of research investigation, three examples are provided in this appendix. These diagrams are referenced in the text of the dissertation at various instances.
- The model diagrams were originally created in QSR NVivo, but later transferred into the CMaps software for a legible depiction.
- All diagrams were created to show labeled relationships among categories.
- All diagrams were annotated to make notes about the purpose of the diagram and its main components.
- Diagram annotations were date stamped to maintain an audit trail of the emergence of theoretical concepts over time.

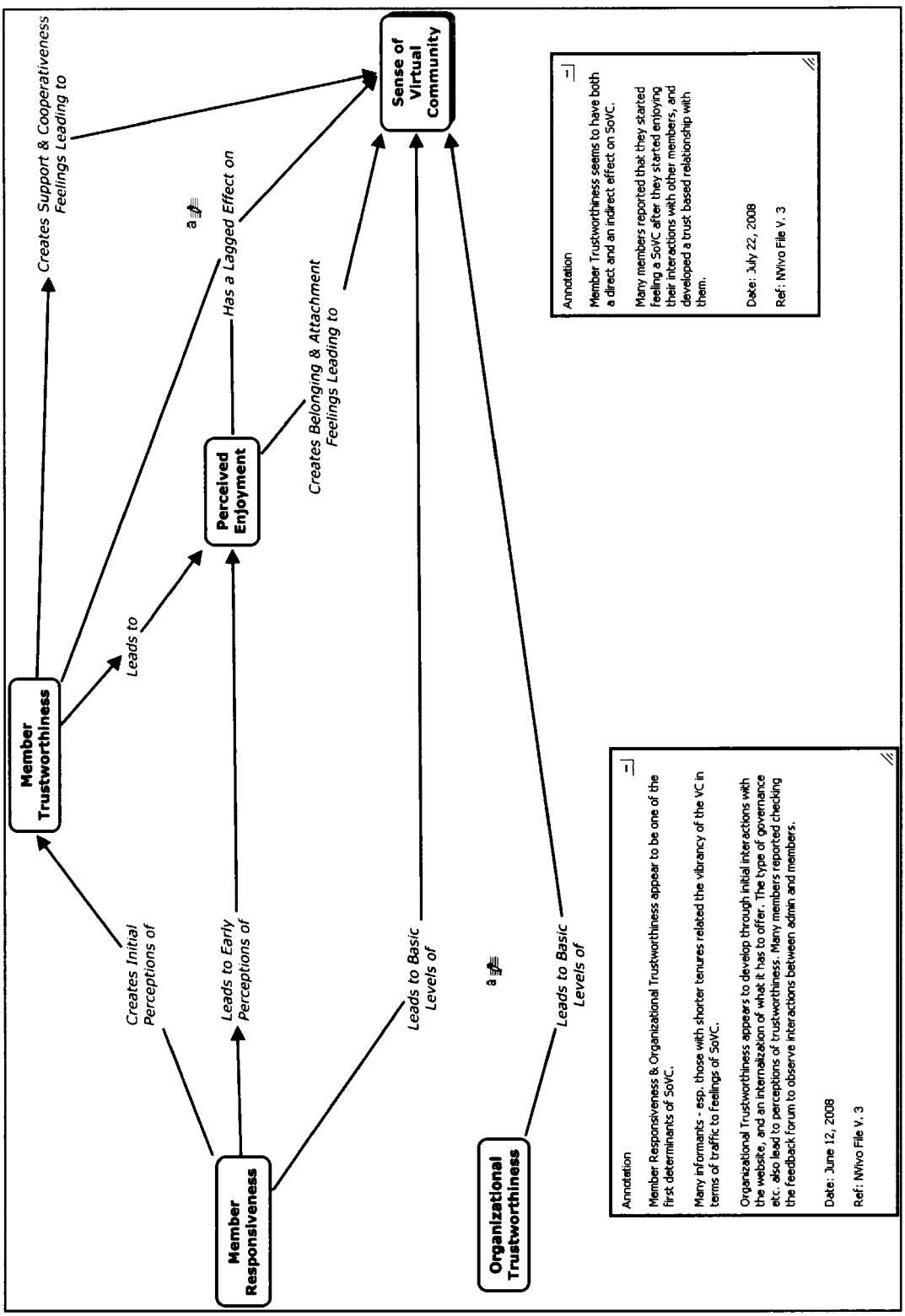
The following model diagrams are provided as examples:

- **Model Diagram 1:** A Concept Map depicting Centrality of Information Quality to Trustworthiness Beliefs & Perceived Satisfaction.

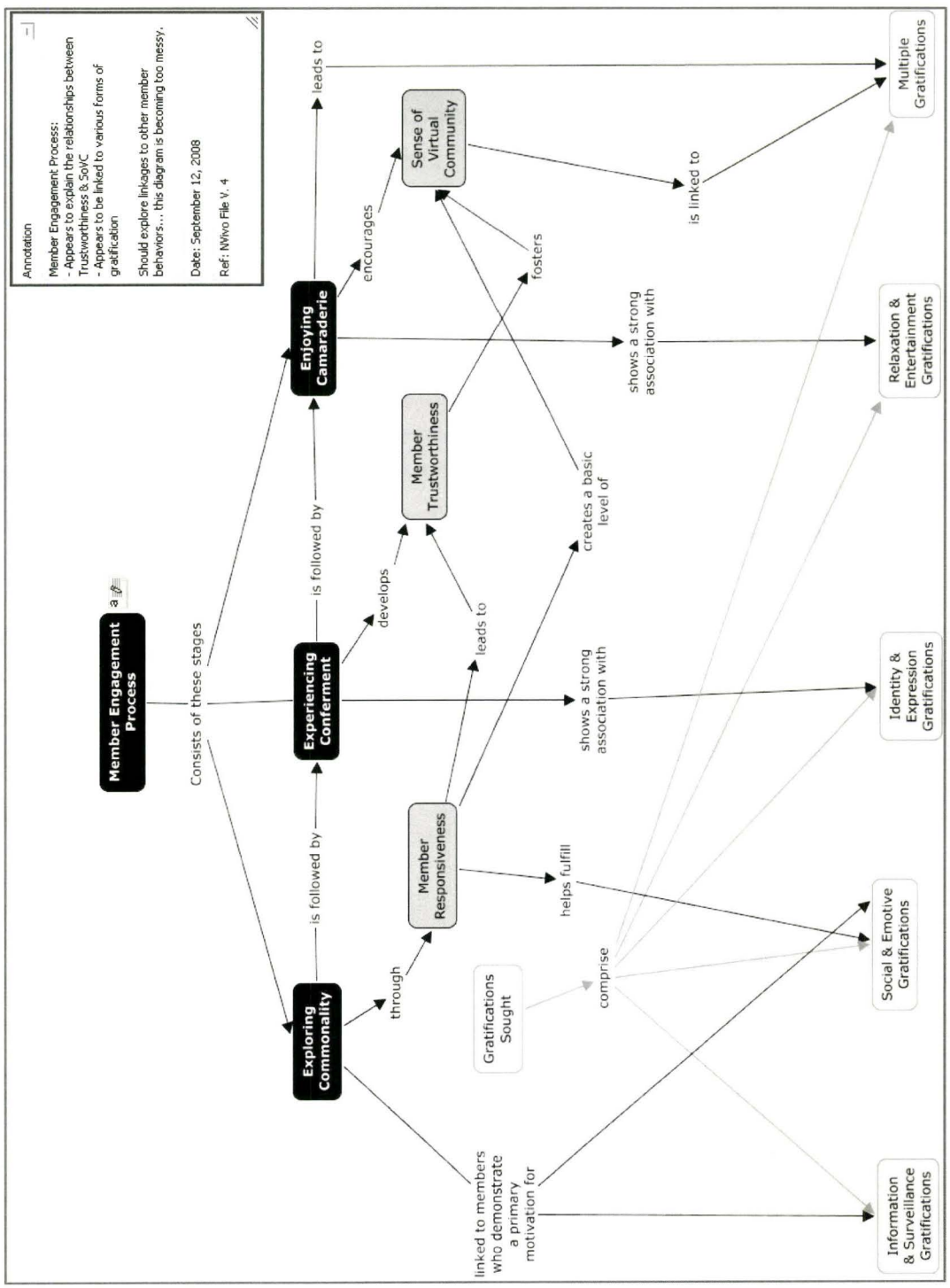
- **Model Diagram 2:** A Concept Map depicting an interim concepturalization of factors affecting Sense of Virtual Community.

- **Model Diagram 3:** A Concept Map depicting an interim conceptualization of the Member Engagement Process and its relationships with other sociological factors.

Centrality of Information Quality to Trustworthiness Beliefs & Perceived Satisfaction



Factors Affecting Sense of Virtual Community (Interim Concept Map)



Member Engagement Process & Relationships with Sociological Factors (Interim Concept Map)

Appendix E: Participant Feedback & Expert Reviews on Emergent Theory from Qualitative Analysis

- Seven call-back informants agreed to provide feedback on a summary of the emergent theory from this research study.
- An email was sent to each confirmed call-back informant with an early version of the reflective coding matrix that emerged during the selective coding stages of analysis. Two informants also looked at a summary diagram of the emergent theory (*Figure 8-1* provided in *Chapter 8*).
- Comments were invited from call-backs either as free flow opinions on the theory, or in the form of answers to four questions provided to the call-back informants as a checklist.
- The call-back informants belonged to four different virtual communities referenced in this appendix as follows:
    - VC-1 (General, Member-Initiated VC): 2 Call-back Informants
    - VC-2 (Interest-based, Member-Initiated VC): 2 Call-back Informants
    - VC-3 (Professional, Member-Initiated VC): 2 Call-back Informants
    - VC-4 (Interest-based, Organization-Sponsored VC): 1 Call-back Informant

Call-back Informant ID	Call-back Informant VC-ID	Call-back Informant's Relationship to the Study	Call-back Informant's Feedback Status
C-I-1	VC-1	Participated as an Online Focus Group Informant.	Replied to 4 questions in the checklist.
C-I-2	VC-3	Participated as an Online Focus Group Informant.	Replied to 4 questions in the checklist.
C-I-3	VC-2	Participated as an Online Questionnaire Informant.	Replied to 4 questions in the checklist.
C-I-4	VC-4	Participated as an Online Questionnaire Informant.	Provided general response to the findings.
C-I-5	VC-2	Participated as an Online Focus Group Informant.	Provided general response to the findings.
C-I-6	VC-3	Not a Participant in Original Data Collection.	Provided general response to the findings.
C-I-7	VC-1	Not a Participant in Original Data Collection.	Provided general response to the findings.

Call-Back Informant Responses to Specific Questions

- **Does the member engagement process make sense?**

  C-I-1: *Yes, it does. Everything from the member engagement process, to the use orientation, the value effects etc.*

  C-I-2: *It makes a lot of sense - I never quite saw it explained this way before but the relationships between how our mind thinks and how we act it out while participating in our VCs is captured nicely in the findings.*

  C-I-3: *I truly believe its spot on ... I went through it a few times to find a point which could have conflicted with my own experience on such communities , but I couldn't spot anything of concern really , coz the flow of the model was exactly as I progressed through my community.*

- **Does the description of the member engagement process seem holistic within the context of member participation in virtual communities?**

  C-I-1: *All points in terms of member participation in VCs are covered thoroughly in this model.*

  C-I-2: *It's very thorough - I'm glad that you were able to use our focus groups to come up with this.*

  C-I-3: *It's thorough and meaningful at the same time.*

- **Does anything in particular stand out in the description of the member engagement process?**

  C-I-1: *Distinguishing between the instrumental and ritualized patterns in the member participation orientation portion stands out as that is an area which is not easily identified. The model presented here captures that and makes it very clear.*

  C-I-2: *No Answer*

  C-I-3: *One strong thing that I feel you mentioned in the model is : Level AND the Quality of information that a user experiences --> leads to them being more then a habitual user and pushes them into contributing positively ---> that leads to high level of engagement and leads to a stronger healthier community. And ofcourse the ease of use (tools) is fundamental as well ... if one easily loses their way around technology , no matter how much communicative value they can add , they wont feel motivated to do so.*

- **Overall, does the engagement process and its association with participation behavior effectively capture and explain the dynamics of people's participation in virtual communities?**

  C-I-1: *Yes it does. Please see the answer to the question above for comments on successfully outlining the member participation orientation. The member engagement process is listed equally effectively, as the 3 items mentioned there clearly show the association members have with any given VC.*

  C-I-2: *It makes a lot of sense to me - the way we end up acting in the community isn't always how we think about it, and this part of the model shows that well. How I feel about my community at a certain point in time is based on how engaged I am, how I act and what I do in my community is based on how engaged I am, and how committed I am to my community is based on how engaged I am. So, it works!*

  C-I-3: *Yes... makes a lot of sense to me. I can relate to it.*

Call-Back Informant Responses with General Comments

C-I-4: *The description made sense to me for the most part. I enjoyed seeing it explained in such a way.....made me really think about member participation.*
I agree that it seems holistic within the context of member participation in vc. I particularly liked the part where you illustrated the "member participation"....where the use of vc can be instrumental at first, but over time can become ritualised thus leading to some form of attachment to that specific vc. That is so on the money...as it resonates true with me....and i'm guessing the majority of other users!!!! The Member Engagement process as a whole, i think, is effectively captured, namely the part about users exploring commonality/seeking identity and the commitment attitudes.

C-I-5: *I was really intrigued at the way you explained our ritualized and instrumental behaviors in the model. I can totally relate to being in one mode or the other in the two different communities that I use. While one of them is a place I go to regularly without specific reasons, the other I use for asking specific questions and answering to others questions. I suppose this is what you mean with the "gratifications sought" component in the model, which again makes sense.*

C-I-6: *Does it make sense? It makes sense for the most part, however it lacks in factoring the scope of communities, some are broad and some are very narrow focused e.g. for a car model, for people who like pens, for people looking to travel to a place. The engagement may be impacted as the factors determining that engagement change, you sell the car, you go on the trip or decide to go somewhere else, etc. ... Does the description seem holistic? For a large chunk of normal members in broad based interest communities which are not event/time bound, yes.*

C-I-7: *The model covers very well the real life experience of a user's involvement, the reasons and the outcomes. I can totally relate to that as I discovered GS through web searching on a topic and stayed their for the friendships that I built*

Transcript of Communication Exchange between Researcher & Expert

- The expert in this case was a senior portal advisor who had experience with implementing various communication and collaboration technologies for virtual communities.
- The expert was provided with a copy of the reflective coding matrix (Chapter 5), a summary diagram for member engagement process (Chapter 8), and online access to the interative node tree structure depicting the principal analytical categories in the emergent theory.
- The following Q&A communication exchange between the expert and researcher demonstrates the expert's intial concerns and the researcher's responses to those concerns.

Expert-1's Question: *The Member Use Orientation is a bit unclear to me. Maybe it could be represented in a different way. To me member participation and member orientation are two different things. Perhaps they should be discussed separately?*

Researcher's Answer: This is a very good question. Here's my thinking on the matter. In my analysis, it took me a while to conceptualize this, but eventually, it became clear to me that many end-users experience a change in their orientation as a result of their online interactions in the VC. This orientation coincides very closely with the level of engagement that they experience in the VC as well, and that's why I considered this to be part of the overall member engagement process. For example, many members join a community to search for information or to have a quick informational exchange about a particular issue. This is an example of *Instrumental* orientation (specific purpose) and at this stage, a member is only interested in interacting with people who can help him/her – hence, they're at the *Exploring Commonality* level of engagement. It's possible that the member will just remain at this level, and only use the VC in an information-seeking role over time on an as needed basis, and they're probably not likely to become an active member of the community. However, it is also possible that over a certain period of time, the member realizes more commonalities within the community that allow him/her to progress to a more *Ritualized* Use orientation where the member keeps coming back without a specific purpose in mind (habitually). Ritualized orientation is more noticeable with members who've persisted in the VC for longer, especially those who progress to the level of Engagement where they enjoy their interactions with others – i.e. at the *Enjoying Camaraderie* level.

Sorry for the long answer, but please let me know if this makes sense. *Any Comments?*

Follow-up Response by Expert-1: *Yes, makes sense. I have seen users toggle back and forth between Ritualized Use and Instrumental Use depending on VC member engagement, newness, change in user's needs etc.*

Expert-1's Question: Somewhere I would account for admin support, content freshness, collaborative aspects and integration other content (RSS etc).

Researcher's Answer: *Admin Support:* again, I'm glad you thought of this, because the *Organizational Trustworthiness* concept is related to this. In my research analysis, the trust perceptions of users about the VC administration/organization were determined by three factors: i) the *ability* of the administration (e.g. community moderation, control, implementing/supporting technologies etc.) ; ii) the *benevolence* of the administration (e.g. willingness to listen to members, show kindness, and cater to their needs); and iii) the *integrity* of the administration (e.g. consistency and fairness in their management).
Is this what you meant by Admin Support? Does this make sense?

Follow-up Response by Expert-1: *Yes, the three factors makes sense.*

Researcher's Answer: *Content Freshness:* I account for this in the Information Quality factor. Information Quality comprises three properties: Accuracy, Currency, and Relevance. Is this what you meant by Content Freshness? I think Currency is what you're trying to get at?

Follow-up Response by Expert-1: *Yes. I was referring to Currency*

Researcher's Answer: *Collaborative Aspects:* My theory includes different types of groupspace technologies such as blogs and wikis (this is included under *Technology Tools & Features*), and I explain the use of these tools with reference to different *Activity Modes* where I differentiate between modes such as "Consuming" information, "Commenting" on information, "Contributing" new information and ideas, "Collaborating" on projects and initiatives etc.
In my explanation of theory, I also talk about the *Gratifications* that people are seeking (e.g. learning, socializing, expressing, or creating) when they use technologies such as wikis and blogs and how these gratifications tie into different activity modes highlighted above. *Does this capture your thoughts about collaboration? Or was it something else?*

Follow-up Response by Expert-1: *I see collaboration expanding beyond wikis and blogs in other VCs. An example is medical virtual communities where parents, doctors and other scientists are utilizing knowledge banks.*

Researcher's Answer: *Integration other content (RSS etc).:* I also capture this in my descriptions of *Technology Tools & Features*. Within tools and features, I have a category called "External Interface" which describes some ways that people tie-into the VC from outside, or the community ties into other sites and tools. RSS feeds, Content Notifications, and other more specific APIs are some examples of these tools.
As an integration feature inside the community itself, these features have the potential to improve the usefulness of the community for its members – e.g. by improving the *Information Quality* for users (news feeds from relevant up-to-date sources being integrated into the community). Also, for end-users who want to create RSS feeds from the content posted in the community, possibly for their own consumption outside the community interface, or to link to other sites that they might be using, I've identified these users as "Linkers". *Is this the type of use of Integration that you had in mind? Or was it something else?*

Follow-up Response by Expert-1: *I think the importance of this goes back to the content currency with a factor of trust in V.C users. Is the V.C up to date with current situations and news? How easily and quickly does the news filter in to V.C etc and by what channels.*

General Feedback from Expert-1: *I think the themes in your tree map make sense and the theory behind them is pretty solid as well. Good luck with your thesis!*

Appendix F: Coding Reliability Checks

- In order to checking the reliability of his open coding, the researcher briefly employed two other people who independently coded 20 statements pertaining to four concepts in the node tree. The various dimensions of each concept were provided to the coders, but they were encouraged to code a statement as "Undecided" if they thought no code was applicable to a particular statement. This approach provided a more conservative estimate of reliability of the researcher's coding.
- In the table below, Rater-A refers to the researcher, Rater-B a senior year undergraduate student coder, and Rater-C was a graduate student.
- Procedure and Calculations are based on Cohen's Kappa (Cohen, 1960) using Krippendorff's generalization (1980).
- The reliability calculated using Cohen's Kappa approaches the value of 1 when there is complete agreement among coders, and a value of 0 symbolizes no better coding agreement than that based on chance.
- The calculations were performed using an online coefficient calculator available at: http://cosmion.net/jeroen/software/kappa/ (Last Accessed on November 15, 2008).
- Typical interpretations of Cohen's Kappa suggest that values of 0.60 or greater indicate reasonably good agreement among coders (Wheelock et al, 2000; Stemler, 2001).
- In this case, the calculation demonstrates substantial agreement among the three coders.

Variable:	**Kappa for Rater-A and Rater-B (20 Pairs)**	**Kappa for Rater-A and Rater-C (20 Pairs)**	**Kappa for Rater-B and Rater-C (20 Pairs)**	Average (60 Pairs)
Activity-Level (Active | Intermittent | Passive)	0.71	0.90	0.63	0.75
Member-Trust-Attribute (Competence | Benevolence | Integrity)	0.66	0.86	0.60	0.71
Motivational-Propensity (Information Exchange | Social Interaction)	0.62	0.94	0.57	0.71
Usability-Attribute (Information Design | Ease of Use)	0.71	0.90	0.63	0.75
Range:	0.62 - 0.71	0.86 - 0.94	0.57 - 0.63	**0.71 - 0.75**
Interpretation:	Substantial Agreement	Near Perfect Agreement	Moderate to Substantial Agreement	**Substantial Agreement**

Appendix G: Codebook Summaries for Categories Included in the Abridged Theoretical Model

- The codebook summaries below highlight the conceptualization of categories in terms of their assigned definitions, identified properties, and dimensional sub-categories (if any).
- Only categories included in the abridged theoretical model are listed in this appendix.
- Information about properties and dimensions was used to formulate the measurement items in the survey questionnaire resource instrument for the quantitative phase of investigation.

1. Codebook Summary for Website Usability

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Website Usability** Cognitive perceptions about the technical adequacy of a virtual community website interface in meeting the functional and contextual needs of its members.
Properties:	Efficiency ; Effectiveness ; Satisfaction
Dimensions:	Information Design ; Ease of Use
Principal Analytical Category & Definition:	**Information Design** Design aspects of a virtual community website pertaining to its effectiveness vis-à-vis the organization and presentation of its content and how it aids a member's interactions with the technology interface and with other community members.
Properties:	Organization of Content ; Presentation of Content ; Organization of Site Features ; Presentation of Site Features
Principal Analytical Category & Definition:	**Ease of Use** Design aspects of a virtual community website pertaining to its efficiency vis-à-vis a member's effortless and error-free use of the technology interface.
Properties:	Consistency ; Learnability

2. Codebook Summary for Media Richness

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Media Richness** Cognitive perceptions about the technical adequacy of a virtual community's tools and features in meeting a variety of communication needs of its members based on the nature of their communication tasks.
Properties:	Rich Symbols ; Multimedia Content ; Response Immediacy ; Custom Message Formats

3. Codebook Summary for Information Quality

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Information Quality** Cognitive perceptions about the value of informational content within a virtual community.
Properties:	Relevance ; Timeliness ; Reliability ; Breadth of Perspective; Usefulness

4. Codebook Summary for Organizational Trustworthiness

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Organizational Trustworthiness** Cognitive beliefs about a virtual community organization's or administration's quality of service based on perceptions of its reliability and dependability.
Properties:	Reliability ; Dependability
Dimensions:	Ability ; Benevolence ; Integrity
Principal Analytical Category & Definition:	**Ability** Traits of a virtual community organization or administration that pertain to its capabilities and competencies to support and advance a vibrant virtual community.
Properties:	Capabilities ; Competencies ; Knowledge ; Specialization
Principal Analytical Category & Definition:	**Benevolence** Traits of a virtual community organization or administration that pertain to its willingness to act in the best interest of its members.
Properties:	Concern ; Care ; Help
Principal Analytical Category & Definition:	**Integrity** Traits of a virtual community organization or administration that pertain to its commitment to fulfill its promises and act fairly towards its members.
Properties:	Commitment ; Fairness ; Justice ; Values and Principles

5. Codebook Summary for Member Responsiveness

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Member Responsiveness** Cognitive perceptions about the conversational sufficiency of member interactions in the virtual community as a function of speed and number of responses received from other members.
Properties:	Response Promptness ; Response Quantity

6. Codebook Summary for Member Trustworthiness

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Member Trustworthiness** Cognitive beliefs about the quality of interactions and cooperation among virtual community members based on perceptions of their reliability, honesty and dependability.
Properties:	Honesty ; Reliability ; Dependability
Dimensions:	Competence ; Benevolence ; Integrity
Principal Analytical Category & Definition:	**Competence** Traits ascribed to other members as a whole that pertain to their knowledge and skills in shared mutual interests relevant within the scope of discussions in a virtual community.
Properties:	Knowledge ; Skills ; Qualifications ; Experience
Principal Analytical Category & Definition:	**Benevolence** Traits ascribed to other members as a whole that pertain to their willingness to ensure the well-being of their peers in a virtual community.
Properties:	Concern ; Cooperativeness ; Citizenship
Principal Analytical Category & Definition:	**Integrity** Traits ascribed to other members as a whole that pertain to their sincerity towards their peers in a virtual community.
Properties:	Sincerity ; Fairness

7. Codebook Summary for Perceived Enjoyment

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Perceived Enjoyment** Affective response of members based on views of their own participation in a virtual community as an intrinsically rewarding experience.
Properties:	Entertainment ; Pleasure ; Fun

8. Codebook Summary for Perceived Satisfaction

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Perceived Satisfaction** Affective response of members based on views of their own participation in a virtual community as an overall rewarding experience.
Properties:	Delight ; Contentment ; Happiness

9. Codebook Summary for Sense of Virtual Community

Findings from Analytic Induction Procedures in the Qualitative Phase of Research	
Principal Analytical Category & Definition:	**Sense of Virtual Community** Affective response and subjective assessment by members about the value of a virtual community based on their feelings of commonality, conferment and camaraderie in the virtual community.
Properties:	Commonality ; Conferment ; Camaraderie
Dimensions:	Belonging ; Similarity & Cooperativeness ; Support ; Attachment
Principal Analytical Category & Definition:	**Belonging** Feelings of membership, assimilation and identification with the virtual community.
Properties:	Membership ; Assimilation ; Identification
Principal Analytical Category & Definition:	**Similarity & Cooperativeness** Feelings of collectiveness and commonality among members of the virtual community.
Properties:	Collectiveness ; Commonality ; Shared Mutual Interests
Principal Analytical Category & Definition:	**Support** Feelings of bonding and dependability among members of the virtual community.
Properties:	Member Bonding ; Resource Dependability
Principal Analytical Category & Definition:	**Attachment** Subjective assessment of the value of a virtual community based on its importance and appeal to its members
Properties:	Importance ; Appeal

Appendix H: Survey Questionnaire Resource Instrument for the Quantitative Investigation Phase

- This appendix details the items used in the survey instrument for the quantitative phase of investigation.
- Operationalization of each construct (latent variable) in the abridged theoretical model is provided below in terms of a list of measurement items (manifest variables) used in the scale for that construct.
- Where appropriate, the source(s) of measurement items are listed.
- Items dropped from final measurement after exploratory analysis are indicated.
- The technographic and demographic portions of the survey are outlined at the end of this appendix.

1. Operationalization of Measurement Scale for Website Usability

Measurement Items & Scale for Survey Questionnaire	
Construct	**Website Usability**
Source(s)	Adapted Ease of Use items from SUS (System Usability Scale) (see Brooke, 1996) and NAU (Nielsen's Attributes of Usability) (Nielsen, 1994) ; and Information Design items from Cyr & Bonnani (2005), and Chignell et al. (2000).
Scale	Measured on a Likert-type Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**Please evaluate the virtual community website interface and its various technology features:**
Instrument Items (item labels were not displayed in the live survey) *Note: * reverse coded*	
WU1	I find the information in the virtual community to be logically presented
WU2	I find the information in the virtual community to be well organized
WU3	I find the various information related features in the virtual community to be well presented
WU4	I find the various member interaction features in the virtual community to be well presented
WU5	I think the virtual community interface is easy to use
WU6	I find the various functions in this virtual community interface to be well integrated ***(item dropped)***
*** WU7**	I think there is too much inconsistency in this virtual community interface
WU8	I would imagine that most people would learn to use this virtual community interface very quickly
WU9	I feel very confident using the technology features of the virtual community interface

2. Operationalization of Measurement Scale for Media Richness

Measurement Items & Scale for Survey Questionnaire	
Construct	**Media Richness**
Source(s)	▪ Adapted items from Daft and Lengel (1987) and Carlson and Zmud (1999) ▪ Added item MR4 to extend the conceptual property of Custom Message Formats ; item MR5 to include Multimedia Content ; and item MR6 to extend the property of Rich Symbols.
Scale	Measured on a Likert Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**Please evaluate the virtual community website interface and its various technology features:**
Instrument Items (item labels were not displayed in the live survey)	
MR1	The virtual community website features allow me to design messages to my own or others' preferences and requirements
MR2	The virtual community website features allow me to transmit different cues beyond pure text messages
MR3	The virtual community website features allow me to use rich and varied language ***(item dropped)***
MR4	The virtual community website features allow me to design messages to my own or others' personal situation
MR5	The virtual community website features allow me to convey multiple types of information
MR6	The virtual community website features allow me to transmit varied symbols
MR7	The virtual community website features allow me to provide immediate feedback ***(item dropped)***

3. Operationalization of Measurement Scale for Information Quality

Measurement Items & Scale for Survey Questionnaire	
Construct	**Information Quality**
Source(s)	▪ Adapted from Bailey et al. (1983) and DeLone and McLean (1992; 2003) ▪ Added item IQ4 to include the conceptual property of Breadth of Perspective.
Scale	Measured on a Likert Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**How good is the information provided through the virtual community?**
Instrument Items (item labels were not displayed in the live survey)	
IQ1	This virtual community provides relevant information
IQ2	This virtual community provides timely information
IQ3	This virtual community provides reliable information
IQ4	This virtual community provides information through different points of view ***(item dropped)***
IQ5	This virtual community provides useful information
IQ6	This virtual community provides high quality information

4. Operationalization of Measurement Scale for Organizational Trustworthiness

Measurement Items & Scale for Survey Questionnaire	
Construct	**Organizational Trustworthiness**
Source(s)	▪ Adapted selective items based on Mayer et al. (1995) from McKnight et al. (2002), and Gefen (2002) ▪ Added item OT10 to enhance the conceptual property of values and principles in the integrity dimension
Scale	Measured on a Likert-type Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**The next set of questions asks how you feel about the organization/administration that operates and manages your virtual community:**
Instrument Items (item labels were not displayed in the live survey)	
OT1	This virtual community's organization/administration is very capable of performing its job
OT2	This virtual community's organization/administration has much knowledge about the work that needs to be done
OT3	This virtual community's organization/administration has specialized capabilities that can increase its performance ***(item dropped)***
OT4	The organization/administration of this virtual community is very concerned about the welfare of its members
OT5	This virtual community's organization/administration would not knowingly do anything to hurt its members
OT6	This virtual community's organization/administration really looks out for what is important to its members
OT7	This virtual community's organization/administration has a strong sense of justice
OT8	This virtual community's organization/administration tries hard to be fair in dealing with others
OT9	I like this virtual community organization/administration's values
OT10	Sound principles seem to guide this virtual community organization/administration's behavior

5. Operationalization of Measurement Scale for Member Responsiveness

Measurement Items & Scale for Survey Questionnaire	
Construct	**Member Responsiveness**
Source(s)	▪ Three scale items adopted directly from Ridings et al. (2002a) ; also in Gefen and Ridings (2005)
Scale	Measured on a Likert Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**The next set of questions asks how you feel about member interactions in your virtual community:**
Instrument Items (item labels were not displayed in the live survey)	
MResp1	The other participants in this virtual community are very responsive to my posts
MResp2	I can always count on getting a lot of responses to my posts
MResp3	I can always count on getting responses to my posts fairly quickly

6. Operationalization of Measurement Scale for Member Trustworthiness

Measurement Items & Scale for Survey Questionnaire	
Construct	**Member Trustworthiness**
Source(s)	▪ Adapted selective items from Ridings et al. (2002a) and Casaló et al. (2008a)
Scale	Measured on a Likert-type Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**The next set of questions asks how you feel about the members in your virtual community:**
Instrument Items (item labels were not displayed in the live survey)	*Note: * reverse coded*
MT1	I feel very confident about the skills that the other participants on this virtual community have in relation to the topics discussed
MT2	The other participants on this virtual community have much knowledge about the subject we discuss
MT3	The other participants on this virtual community have specialized capabilities that can add to the conversation on this virtual community.
MT4	The other participants on this virtual community are well qualified in the topics we discuss
MT5	The other participants on this virtual community seem to be successful in the activities they undertake ***(item dropped)***
MT6	The other participants on this virtual community are very concerned about the ability of people to get along
MT7	The participants on this virtual community are concerned about what is important to others
MT8	The other participants on this virtual community would not knowingly do anything to disrupt the conversation
MT9	The participants on this virtual community try hard to be fair in dealing with one another
* MT10	The other participants on this virtual community do not behave in a consistent manner

7. Operationalization of Measurement Scale for Perceived Enjoyment

Measurement Items & Scale for Survey Questionnaire	
Construct	**Perceived Enjoyment**
Source(s)	▪ Four scale items adopted directly from Hassanein and Head (2006). ▪ Added item ENJ4 to capture the conceptual property of Fun.
Scale	Measured on a Likert-type Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**The next set of questions asks you about your experiences in the virtual community:**
Instrument Items (item labels were not displayed in the live survey)	
ENJ1	I find my visits to this virtual community interesting
ENJ2	I find my visits to this virtual community entertaining
ENJ3	I find my visits to this virtual community enjoyable
ENJ4	I find my visits to this virtual community fun
ENJ5	I find my visits to this virtual community pleasant

8. Operationalization of Measurement Scale for Perceived Satisfaction

Measurement Items & Scale for Survey Questionnaire	
Construct	**Perceived Satisfaction**
Source(s)	▪ Four scale items adopted directly from Bhattacherjee (2001); also in Jin et al. (2007)
Scale	Measured on a Semantic Differential Scale ranging from 1 (Negative Affect) to 7 (Positive Affect)
Question / Instruction	**Please evaluate your feelings about this virtual community based on your participation experiences:**
Instrument Items (item labels were not displayed in the live survey)	
SAT1	On a scale of 1 (Very Displeased) to 7 (Very Pleased), indicate your experience with this virtual community:
SAT2	On a scale of 1 (Very Frustrated) to 7 (Very Contented), indicate your experience with this virtual community:
SAT3	On a scale of 1 (Very Terrible) to 7 (Very Delighted), indicate your experience with this virtual community:
SAT4	On a scale of 1 (Very Dissatisfied) to 7 (Very Satisfied), indicate your experience with this virtual community:

9. Operationalization of Measurement Scale for Sense of Virtual Community

Measurement Items & Scale for Survey Questionnaire	
Construct	**Sense of Virtual Community**
Source(s)	▪ Adapted selective items from Blanchard (2007c)
Scale	Measured on a Likert-type Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Question / Instruction	**The next set of questions asks how you feel about the virtual community:**
Instrument Items (item labels were not displayed in the live survey)	
SVC1	I feel at home in this virtual community ***(item dropped)***
SVC2	I can recognize the names of most members in this virtual community ***(item dropped)***
SVC3	Other members and I want the same thing from this virtual community
SVC4	I care about what other virtual community members think of my actions
SVC5	If there is a problem in this virtual community, there are members here who can solve it
SVC6	I've had questions that have been answered by this virtual community
SVC7	I've gotten support from this virtual community
SVC8	Some members of this virtual community can be counted on to help others
SVC9	I think this virtual community is a good place for me to be a member of
SVC10	This virtual community means a lot to me
SVC11	It is very important to me to be a member of this virtual community
SVC12	I get a lot out of being in this virtual community
SVC13	I really like this virtual community ***(item dropped)***

10. Operationalization of Measurement Scale for Willingness to Participate

Measurement Items & Scale for Survey Questionnaire	
Construct	**Willingness to Participate**
Source(s)	▪ Custom items generated ; Consulted formulations in Porter and Donthu (2008) ; Ridings, Gefen and Arinze (2002)
Scale	Measured on a Semantic Differential Scale ranging from 1 (Negative Affect) to 7 (Positive Affect)
Question / Instruction	**The next set of questions asks you about your plans for future participation in this virtual community:**
Instrument Items (item labels were not displayed in the live survey)	
WP1	I will continue to participate in this virtual community
WP2	I will continue to use this virtual community for information exchange
WP3	I will continue to use this virtual community for social interaction

Survey Instrument for Technographic Information

Nature of Participation in the Virtual Community	
Question	**How long have you been a member of this virtual community?**
	0.5 to 1 year | 1 to 1.5 years | 1.5 to 2 years | 2 to 2.5 years | 2.5 to 3 years | More than 3 years
Question	**How many HOURS PER WEEK do you spend in your virtual community?**
	Below 1 hour | 1 to 3 hours | 4 to 6 hours | 7 to 9 hours | 10 hours or more
Question	**What types of activities do you participate in your virtual community?**
Scale	Measured on a Likert Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree)
Instrument Items (item labels were not displayed in the live survey)	
MPIE1	I come to this virtual community to get information on particular topics
MPIE2	I use this virtual community when I want advice on how to carry out some task
MPIE3	I come to this virtual community to give other participants information I know about a particular subject
MPSI1	I come to this virtual community to connect and converse with other members in the community
MPSI2	I use this virtual community to socialize with other members in the community
MPSI3	I come to this virtual community to network with other people
Question	**Please indicate your frequency of use of the following tools and features (*if available in your virtual community*):**
Scale	Measured on a Likert Scale ranging from 1 (Use Very Rarely) to 7 (Use Very Frequently)
Instrument Items (item labels were not displayed in the live survey)	
TF1	Message Boards
TF2	Blogs/Journals
TF3	Knowledge Base/Articles
TF4	Content Wikis
TF5	Search Facilities (internal to virtual community)
TF6	Notifications & Feeds
TF7	Custom/New Content Filters &/or Content Subscriptions
TF8	Polls & Voting Tools
TF9	Real-Time/Live Chat
TF10	Private Messaging
TF11	Multimedia (Images/Audio/Video) Content
TF12	Smilies/Emoticons
TF13	Member Online/Offline Status Indicators
TF14	Avatars
Optional	**Are there any other virtual community tools or features (not included in the list above) that you use on a frequent basis?**
TF15	Please specify: _____

Survey Instrument for Demographic Information

Demographic Information	
These last set of questions asks you for some demographic information about yourself.	
How old are you? Please Select.	
Age	< 18
	18 – 24
	25 – 29
	30 – 34
	35 – 39
	40 – 44
	45 – 49
	50 – 54
	55 – 59
	60 - 64
	65+
	Prefer Not to Say
What is your gender? Please Select.	
Gender	Male
	Female
	Prefer Not to Say
What is your highest education level obtained? Please Select.	
Education	Primary School
	Secondary (High) School
	Vocational/Technical/College
	University Undergraduate (Bachelors Degree)
	University Graduate (Masters/Professional/Doctoral Degree)
	Prefer Not to Say
What is your current occupational status? Please Select.	
Occupation	Employed full-time
	Employed part-time
	Unemployed
	Self-employed full-time
	Self-employed part-time
	Student
	Homemaker
	Retired
	Prefer Not To Say
	Other (please specify): _____

Appendix I: Priority Maps for Value Effects

The priority maps in this appendix depict the impact and performance of various socio-technical factors included in the abridged theoretical model that was quantitatively tested using structural equation modeling.

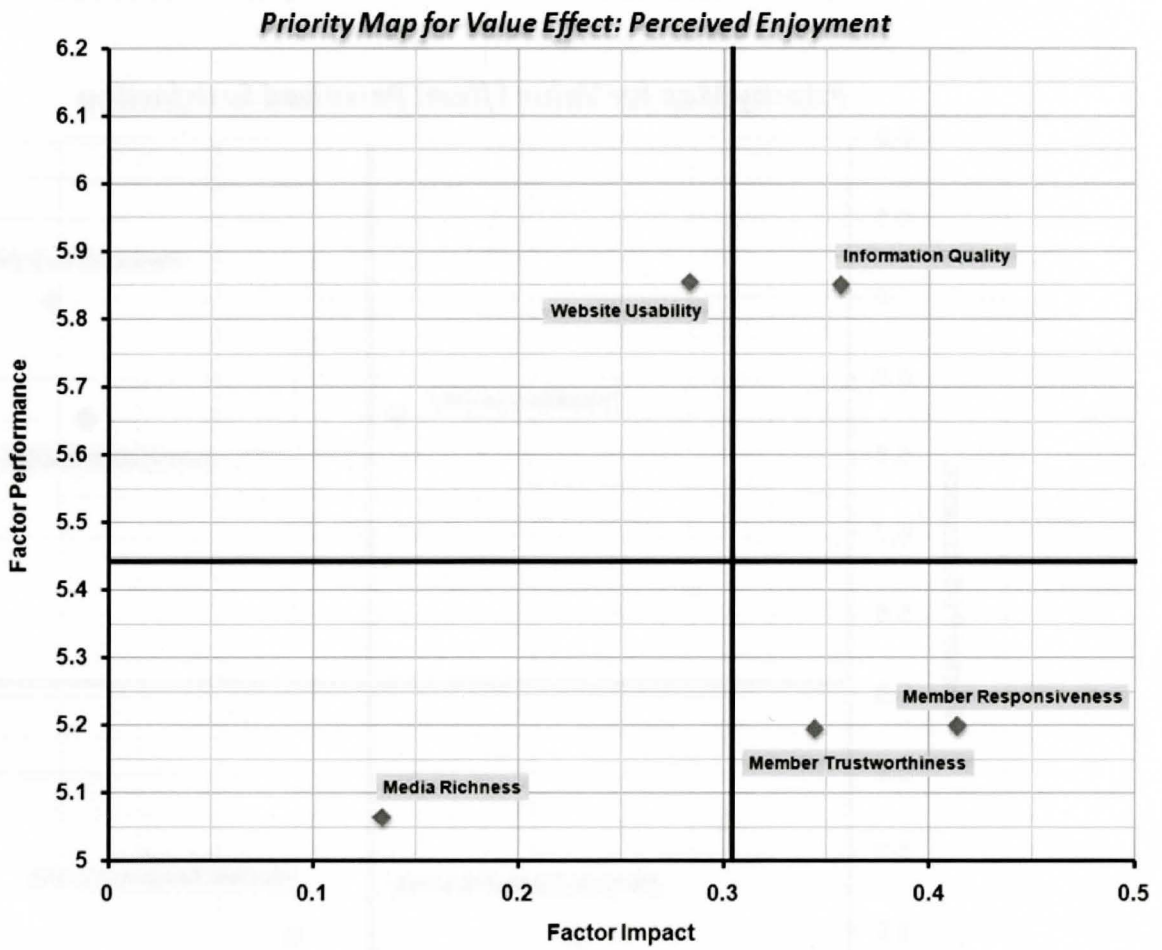
- The factor impact value (on the x-axis) for a latent variable depicts total effects of each antecedent latent variable on the consequent variable calculated by adding the direct effect on the consequent variable to the indirect effect via measurement values per latent values.
- The performance index value (on the y-axis) for a latent variable is estimated by a weighted average of scores from its corresponding measurement items.

A priority map juxtaposing the two values can be used to interpret the current areas of strengths and weaknesses, allowing management interventions in the right areas. A quick interpretation guide is offered herewith:

- The upper-left quadrant represents areas where performance is strong, but the impact is low. At best, this suggests maintaining the status quo. In some cases, there may be opportunities for transferring resources from the areas in this cell to other more important areas.
- The upper-right quadrant is where performance is strong and impact is high. The areas present in this cell depict strengths, and therefore strategic initiatives in these areas should be persisted with and renewed on a regular basis.
- The lower-left cell consists of areas where performance is low, but it makes little difference to the success measure being considered. The initiatives in these areas may be put on the backburner and resources re-allocated to other more important areas.
- The lower-right cell represents areas with the greatest opportunities for improvement. The areas belonging to this quadrant are significant in terms of their overall contribution to the success measure being considered. Management interventions toward these areas should be prioritized, and more resources should be allocated to improve the performance of these areas.

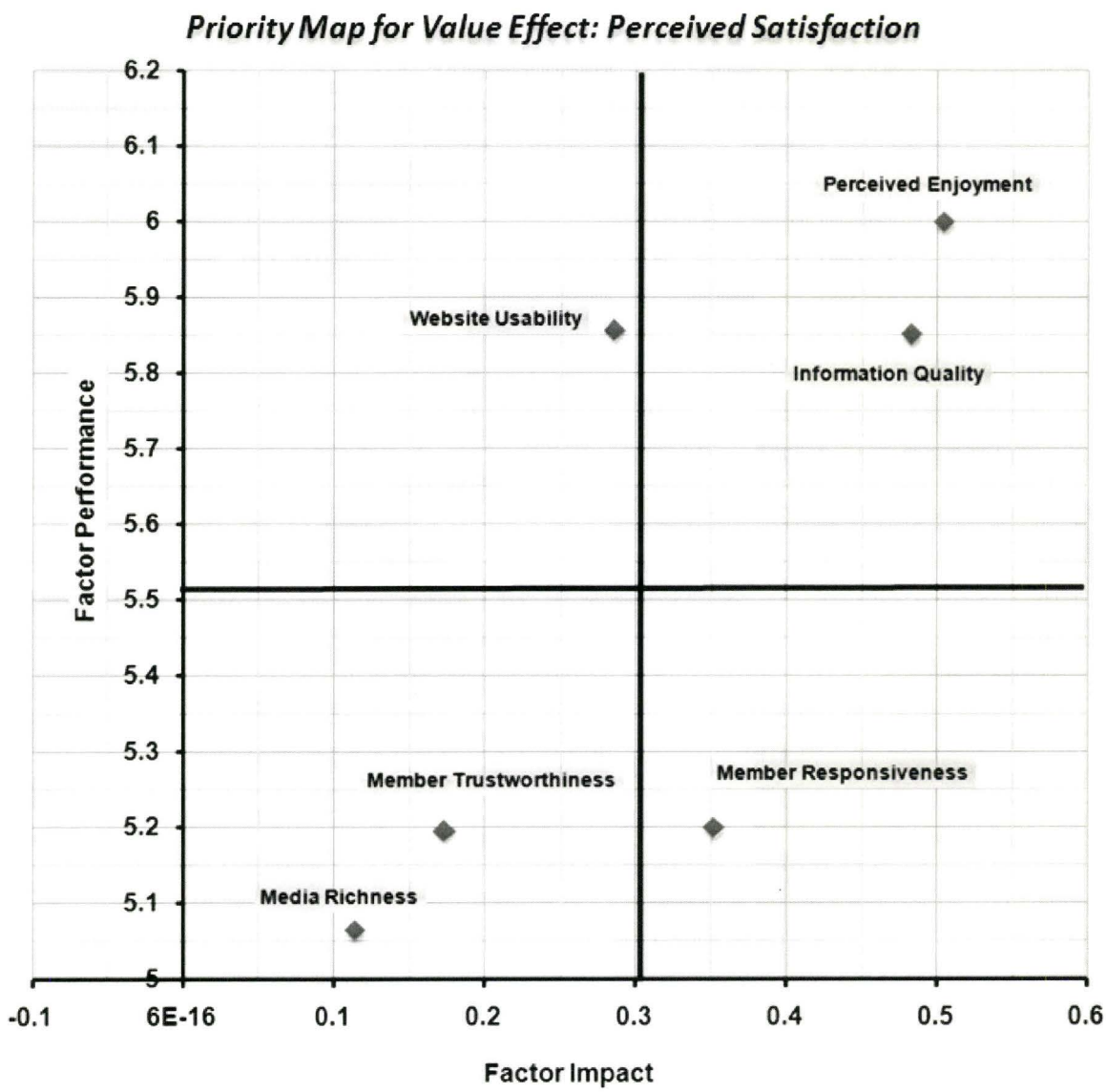
Take-Aways from Priority Map for Perceived Enjoyment:

- Information quality, member responsiveness, and member trustworthiness are important factors that contribute towards enjoyable participation experiences of virtual community members.
- For the specific virtual communities surveyed in this study's quantitative phase of investigation, these sites seemed to perform well in terms of providing high information quality. However, member perceptions about responsiveness and trustworthiness of other members need to be improved considerably.



Take-Aways from Priority Map for Perceived Satisfaction:

- Information quality, perceived enjoyment, and member responsiveness are important factors that contribute towards satisfactory participation experiences of virtual community members.
- For the specific virtual communities surveyed in this study's quantitative phase of investigation, these sites seemed to do perform well in terms of providing high information quality and enjoyable member experiences. However, member perceptions about responsiveness of other members need to be improved considerably.



Take-Aways from Priority Map for Sense of Virtual Community:

- Information quality, perceived enjoyment, member trustworthiness, and member responsiveness are important factors that contribute towards an overall sense of virtual community.
- For the specific virtual communities surveyed in this study's quantitative phase of investigation, these sites seemed to perform well in terms of providing high information quality and enjoyable member experiences. However, member perceptions about responsiveness and trustworthiness of other members need to be improved considerably.