

Individual and Social Motivations to Contribute to Commons-Based Peer Production

A THESIS  
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL  
OF THE UNIVERSITY OF MINNESOTA  
BY

Yoshikazu Suzuki

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
MASTER OF ARTS

Jisu Huh, Ph.D.

November 2011

© Yoshikazu Suzuki 2011

## Acknowledgements

I would like to express my upmost gratefulness to my thesis committee members for their profound insights, invaluable feedbacks, and sincere commitments in supporting my work. Thank you, Professor Jisu Huh, for your deepest dedication in guiding me through the pursuit of truly rigorous academic research. Every aspect of your mentorship and scholarship leaves me speechless with gratitude and admiration. Thank you, Professor Mark Snyder, for encouraging unconventional research with your deep theoretical insights and warm personality; it was a great pleasure working with you. Thank you, Professor Shayla Thiel-Stern, for your dedication in nurturing my inspirations with your expertise in user-generated content. Our independent study was a rich and eye-opening experience.

I would also like to express my gratitude for the Wikipedia user community. In particular, I would like to thank Dr. Dario Taraborelli, Mr. Aaron Halfaker, Mr. Oliver Keyes, and other members of the Wikimedia Research Committee for their invaluable advice and guidance. In addition, I would also like to thank the Wikipedia editors who took time out of their days to participate in my survey.

This thesis was supported by the Kriss Research Funds of the College of Liberal Arts, University of Minnesota.

## Dedication

This work is dedicated to several individuals and entities. First, to my family and Ava – to an extent, I take your love and support for granted just as I take for granted the air and water. Yet, I know for sure that I wouldn't care to live or die without your love and support, just like how I will not last long without air and water. You all make me happy and allow me to be myself, so thank you for that.

Second, to my previous co-workers at TYO-ID – thank you for allowing me to be selfish and to leave the company to pursue my curiosity. No words are enough to express my deepest respect for the best company in the world.

Finally, to my teachers and Professors at Nishimachi International School and Gustavus Adolphus College – the seeds of curiosity and scholarship that you have planted continue to inspire and enlighten me on the vast wonders of education. Thank you for your warmth and patience while you opened my eyes to an astounding journey of lifelong learning.

## Abstract

The present study uncovers the motivations driving certain Internet users to contribute to commons-based peer production. The study combines the literature of volunteerism, uses and gratifications, and social identity theory as the theoretical framework. Findings from the preliminary in-depth interviews were combined with that of prior literatures to develop a questionnaire, which was designed to uncover the individual and social motivations driving commons-based peer production. The questionnaire was administered to a random sample of top Wikipedia editors in the form of an online survey. The results revealed an eight-factor structure of motivation composed by both self- and other-focused, individual and social motivations such as “career benefits,” “social desirability,” “concern for others’ well-being,” “cognitive group membership,” “avoidance of negative self-affect,” “need to be entertained,” “seeking of creative stimulation,” and “providing information.” Additional analysis revealed that “providing information,” “seeking of creative stimulation” and “concern for others’ well-being” were the three strongest motivations while “seeking of creative stimulation,” “need to be entertained,” and “providing information” were the three significantly correlated motivations with one’s satisfaction gained from editing Wikipedia.

## Table of Contents

List of Tables .....	vi
List of Figures .....	vii
<b>Chapter 1: Introduction</b> .....	1
Commons-Based Peer Production .....	2
Purpose and Scope of Study .....	6
<b>Chapter 2: Literature Review</b>	
Commons-Based Peer Production .....	9
Existing Research on Commons-Based Peer Production .....	11
Research on Motivations of Functional Commons-Based Peer Production .....	15
Summary .....	18
<b>Chapter 3: Theoretical Frameworks</b> .....	23
Individual Motivations	
Uses and Gratifications .....	23
Volunteerism .....	27
Volunteerism and Commons-Based Peer Production .....	33
Social Motivations	
Social Identity Theory .....	35
<b>Chapter 4: Methods</b>	
Questionnaire Development .....	39
In-depth Interviews .....	40

Findings	
Altruism and Egoism .....	43
Creative Stimulation .....	46
Survey Participant Sampling and Recruitment .....	52
<b>Chapter 5: Results</b>	
Descriptive Statistics .....	54
Findings	
Motivations Driving Contributions to Commons-Based	
Peer Production .....	57
Relative Strengths of the Motivational Factors .....	63
Relationship between the Motivational Factors and Satisfaction .....	66
Summary .....	67
<b>Chapter 6: Discussion, Implications and Limitations</b> .....	70
Summary of the Findings.....	71
Discussion .....	72
Implications	
Theoretical Implications .....	77
Practical Implications .....	80
Limitations and Directions for Future Research .....	81
References .....	84
Appendix A: Survey Instrument .....	99

## List of Tables

Table 1. Summary of Existing Studies on Motivation of Functional Commons-Based Peer Production .....	20
Table 2. Volunteer Process Model (Snyder & Omoto, 2009) .....	30
Table 3. A Model of Commons-Based Peer Production Motivation .....	38
Table 4. Summary of the Interview Informants' Profile .....	42
Table 5. Final Set of Motivation Measurement .....	51
Table 6. Survey Respondents' Demographic Profiles .....	55
Table 7. Functional Commons-Based Peer Production Activities by the Survey Respondents .....	57
Table 8. Factor Component Matrix for Motivations of Top Wikipedia Editors .....	60
Table 9. Paired Samples T-Test Comparing the Scores of the Eight Motivational Factors .....	64
Table 10. Mean Scores of the Eight Motivational Factor Components .....	65
Table 11. Summary Matrix of Motivational Factors .....	66
Table 12. Correlations Between the Motivation Scores and Self-Reported Satisfaction .....	67

## List of Figures

Figure 1. Graphical Representation of the Power Law Distribution .....	13
Figure 2. Scree Plot of Factor Component Matrix.....	62

## Chapter 1: Introduction

As Web 2.0 has become a familiar term, our everyday lives have also become increasingly dependent on the Internet. Paralleling with the improvement of bandwidth infrastructure and computer processor speeds, Web 2.0 shifted the Internet from the interlinking of information to the interlinking people (O'Reilly, 2005, September 30). With the popularization of social networking sites and other services that build upon social interactions (e.g., BBS, online discussion forums, peer product ratings, etc.), common uses of the Internet have also shifted from passive consumption of static information to active consumption and production of dynamic information. In his book, *Convergence Culture: Where Old and New Media Collide*, media scholar Henry Jenkins mentions that social media and social networking sites are being used to actively seek, synthesize, and share information with one another, and to satisfy the highly specialized needs of the modern-day consumers (Jenkins, 2006). The modern Internet users enjoy the liberty of consuming, producing, and sharing information with one another with a high degree of autonomy and low economic cost that no previous generations had enjoyed.

According to Harvard Law professor Yochai Benkler, such “socialization” of the Internet is now allowing the consumers to engage in collaborative production of information in a magnitude that was unseen in the past: “[t]he material requirements for effective information production and communication are now owned by numbers of individuals several orders of magnitude larger than the number of owners of the basic means of information production and exchange a mere two decades ago” (Benkler, 2006; p. 4). Current Internet users are not only consuming and gathering information, but also

are using the social and communicative aspects of the Internet to gather, share, synthesize, and produce information with each other, for each other.

### **Commons-Based Peer Production**

Given the growing trend of user participation in social and productive activities online (Bruns, 2010), a phenomenon called commons-based peer production (otherwise referred to as “peer production” or “social production”) has emerged. Commons-based peer production is commonly described as a voluntary and collaborative mode of production that is facilitated by the Internet, and supported by the collective contributions of creativity, skills, and knowledge from a large number of people (Benkler & Nissenbaum, 2006). One example of such is online peer reviews, which individual users contribute their opinions toward certain products or services and thereby compile a collective of ratings. Just like how anybody would ask for others’ opinions before purchasing a new or unfamiliar product, online reviews function as peer-produced catalogues of product information, ratings and reviews that consumers can refer to before making purchase decisions.

Another often-cited example of commons-based peer production is Wikipedia. Wikipedia is a free online encyclopedia that is supported by voluntary user contributions for creating, editing, and maintaining its articles. Anyone with access to the Internet can make changes to more than 15,000,000 articles offered in more than 270 languages, and every contribution is open to be edited by other users as well (Wikipedia, n.d.). Due to this “free-for-all” nature of content creation and modification, there has been debate over the accuracy and credibility of Wikipedia (e.g., Fallis, 2008; Giles, 2005). Despite those concerns, Wikipedia’s accessibility and breadth of coverage attracts the sixth largest

global Internet traffic (Alexa, 2010, April 30). In addition, according to some scholars, Wikipedia “has now transcended the traditional functions of an encyclopedia” (Shirky, 2008, p. 116) due to its openness, ability to link to internal and external sources, and the immediacy of reflecting real-time changes to its articles.

Even some of the Internet browsers that are used to visit Wikipedia are supported by commons-based peer production (e.g., Firefox). Under the open source platform provided by the Mozilla Project, contributors offer their time and labor for a range of operations such as software development, bug fixes, and even product logo design (MacMillan, 2009, July 1). Another profound example of open source software development is the Apache HTTP Server, which has been the most widely used web server software in the world since 1996. It is a collaborative software development that started as a mailing list in 1995, which maintains robust and commercial-quality server software that is available for free (The Apache Software Foundation, n.d.).

While websites, tools, and online platforms have rapidly adopted the commons-based peer production model, its cultural and societal implications have become a topic of heated debate. Optimists claim that peer-production is by and large beneficial for the society (Anderson, 2009; Benkler, 2006; Shirky, 2010). One of the pioneering claims of Benkler (2006) argued that the decentralized, non-proprietary, and open collaborations of commons-based peer production would drive innovation and creativity, and therefore would increase overall social welfare. On the other hand, skeptics argue that the excessive openness and access to content production may in fact have disruptive consequences (Andrejevic, 2007; Keen, 2007). For example, Keen (2007) harshly criticized the economic damage that amateur participatory culture brought to the

professional content industries. Specifically, he lamented the deterioration of professional, quality-controlled, and reliable newspaper and publishing industries. Some skeptics also point out the theoretical limitations of commons-based peer production (Cammaerts, 2008; Kreiss, Finn, & Turner, 2010). Cammaerts (2008) and Kreiss et al. (2010) both make critical observations of the theoretical assumptions of commons-based peer production, juxtapose them to traditional critical cultural theories, and thereby criticize the naive presumptions that open participation would lead to a more democratic society.

Aside from the debates between optimists and skeptics, commons-based peer production has been embraced by an increasing number of Internet users. For example, according to a recent global survey conducted by Nielsen, 70 percent of online shoppers trust peer product reviews, which was ranked higher than TV, newspapers, magazines, or any forms of advertising (Nielsen, 2009, July 7). Wikipedia has become so widely used to the extent that Britannica was forced to halt their hardcopy production due to reduced profitability (Keen, 2007). Firefox currently holds roughly 23 percent of the worldwide usage share of Internet browsers (Net Market Share, n.d.), and its operating activities constituted a large portion of the \$78.6 million revenue of Mozilla Foundation in 2008 (Mozilla Foundation, n.d.). Finally, even after more than a decade from its inception, Apache server software currently powers roughly 56 percent of the world's web servers (Netcraft, 2010, September 17). Although these are just few examples of existing commons-based peer-production, they illustrate the increasing presence in our everyday lives.

If companies were able to produce these same products through traditional means of economic production, they would presumably charge a high price in exchange. For example, a full set Encyclopedia Britannica contained about 65,000 articles and was sold for roughly \$1,200. If a constantly updated encyclopedia with more than 15,000,000 articles that is offered in more than 270 languages were to be produced and sold through the traditional market system, it would likely cost more than \$1,200. Yet, Wikipedia is offered for free to all users, and none of the editors are compensated for their labor.

The present study is aimed to understand the motivations that drive certain Internet users to voluntarily contribute their time, skills, knowledge, and resources to contribute to and help support commons-based peer production projects. Very few studies have investigated the motivations for contributors to take part in commons-based peer production. Of those few studies, one of the emerging lines of research has explored the motivations of Wikipedia contributors by applying the social psychological (e.g., Nov, 2007) and uses and gratifications frameworks (e.g., Rafaeli & Ariel, 2008). Other studies have covered topics such as open source software production (e.g., Lakhani & Wolf, 2005; Roberts, Hann, & Slaughter, 2006), social bookmarking (e.g., Benbunan-Fich & Koufaris, 2008), and online communities (Lampe, Wash, Velasquez, & Ozkaya, 2010). Nonetheless, many of these studies are exploratory in nature, and hence do not provide adequate articulation of a conceptual linkage between their theoretical frameworks of choice and the subject of investigation. In addition, there is a general lack of attention given to the social motivations that may influence contributors to participate in peer production.

## **Purpose and Scope of Study**

Due to its infancy as a scholarly inquiry, there are few theory-based empirical studies that measure the participatory motivations of commons-based peer production. To fill the void in the literature, the present study proposes a cross-disciplinary theoretical framework for investigating the participatory motivations of peer-production contributors. In doing so, a conceptual linkage is established between commons-based peer production and theories in social psychology (volunteerism, social identity theory) as well as mass communication (uses and gratifications). These theories were selected to gain a comprehensive understanding of the multi-faceted motivations that drive contributions to peer production. Uses and gratifications, which is a useful conceptual framework for examining media users' motivations in various media settings including interactive and digital media, helps uncover the personal motivational factors that drive commons-based peer production as a form of media use behavior. Volunteerism shares strong conceptual similarities with commons-based peer production, and therefore sheds light on different aspects of personal motivations that drive the voluntary participation in commons-based peer production. In addition, social identity theory provides insight regarding the social motivations that drive contributions to peer production.

By applying these theoretical frameworks, the present study seeks to investigate three inquiries. First, it aims at uncovering the motivations that drive certain Internet users to contribute to commons-based peer production. Recent trends of the Internet have bolstered the societal and economic impact of peer-produced goods, yet the question regarding the motivations that drive individuals to contribute to commons-based peer production is under-investigated. Therefore, the present study seeks to contribute to and

forward the scholarly inquiry regarding commons-based peer production through revealing the motivations that drive the contributors of commons-based peer production.

Second, the present study examines the relative strengths of the motivations that drive commons-based peer production. This would provide a deeper understanding of the specific aspects of one's motivations that are more strongly tied to making contributions to commons-based peer production.

Finally, this study explores the relationship between the motivations that drive commons-based peer production and the satisfaction that contributors gain from making contributions. Such a relationship would provide valuable insights regarding the particular motivations that are related to the positive experiences that contributors gain from their activities, which is known to be positively associated with volunteer retention (e.g., Omoto & Snyder, 1995).

The following chapter provides a literature review regarding commons-based peer production. The chapter introduces the conceptual definition of commons-based peer production, discusses the current state of commons-based peer production and its impact on the society as well as individuals, and reviews existing studies that have investigated the motivations driving commons-based peer production. Chapter 3 introduces the theoretical framework that guides this study. This chapter reviews the uses and gratifications framework, volunteerism, and social identity theory, and discusses their relevance to commons-based peer production. This chapter thereby builds a foundation to the development of a set of motivational factors that are likely to influence one's participation in commons-based peer production. Chapter 4 presents this study's method including the development of the motivation measurement. The measurement

development procedure involved a series of in-depth interviews conducted to uncover motivational factors that might not have been identified in the existing studies. Chapter 5 presents the data analysis results, and Chapter 6 summarizes the key findings, discusses theoretical and practical implications of the present study, and proposes directions for future research.

## Chapter 2: Literature Review

### Commons-Based Peer Production

The term “commons-based peer production” was initially coined by Yochai Benkler in his book *The Wealth of Networks* (Benkler, 2006). He defined commons-based peer production as “a socio-economic system of production ... [realized by the] collaboration among large groups of individuals ... who cooperate effectively to provide information, knowledge or cultural goods without relying on either market pricing or managerial hierarchies to coordinate their common enterprise” (Benkler & Nissenbaum, 2006, p. 1). Benkler (2006) argues that “under conditions ... nonmarket collaborations can be better at motivating ... creative people to work on information projects more efficiently than would traditional market mechanisms and corporations” (p. 7-8).

Wikipedia and open source software production are two key examples of commons-based peer production that are mentioned by Benkler (2006). Wikipedia is the world’s largest online encyclopedia, which employs a unique system to create, maintain, and modify its articles. Specifically, the articles are by default open to any and all users to be created and edited. Wikipedia users thereby collectively and collaboratively maintain the content on Wikipedia. Open source is an online initiative to encourage free distribution of software, open-access to program source codes, and non-proprietary production and distribution of software (see Open Source Initiative, n.d., for the full list of criteria with which open source projects must comply). The open source initiative allows programmers to collaboratively produce, improve, and maintain software programs while encouraging innovation through non-proprietary production and distribution. In either case, Benkler (2006) underscores the decentralized, collaborative

and non-proprietary aspects of information production, which are undertaken by geographically distributed collaborators brought together by the Internet.

Because of the inherent breadth of its conceptual definition, the present study categorizes commons-based peer production activities into two groups according to the mutual goal for which groups of people gather (Johnson & Johnson, 1991). Particularly, this study applies Bagozzi and Dholakia's (2002) categorization of *functional* or *hedonic* virtual communities. Functional virtual communities are focused on attaining utilitarian goals and demands, whereas hedonic communities are focused on creating a positive and confluent experience. The researcher considers the application the functional and hedonic categorizations of virtual communities to be appropriate in the context of commons-based peer production, since the conceptual definition of virtual communities fits the definition of contributors of commons-based peer production.

Specifically, virtual communities are defined as “mediated social spaces in the digital environment that allow groups to form and be sustained primarily through ongoing communication” (Bagozzi & Dholakia, 2002, p. 3). Similarly, commons-based peer production is also defined as a mode of production that takes place “in the digitally networked environment ... [where] ... groups of individuals, sometimes in the order of tens or even hundreds of thousands ... cooperate effectively to provide information, knowledge or cultural goods” (Benkler & Nissenbaum, 2006). Therefore, the definition of commons-based peer production subsumes the participation of groups of users that are consistent to the conceptual definition of virtual communities – namely those who gather and form groups on computer-mediated environments through active participation and communication.

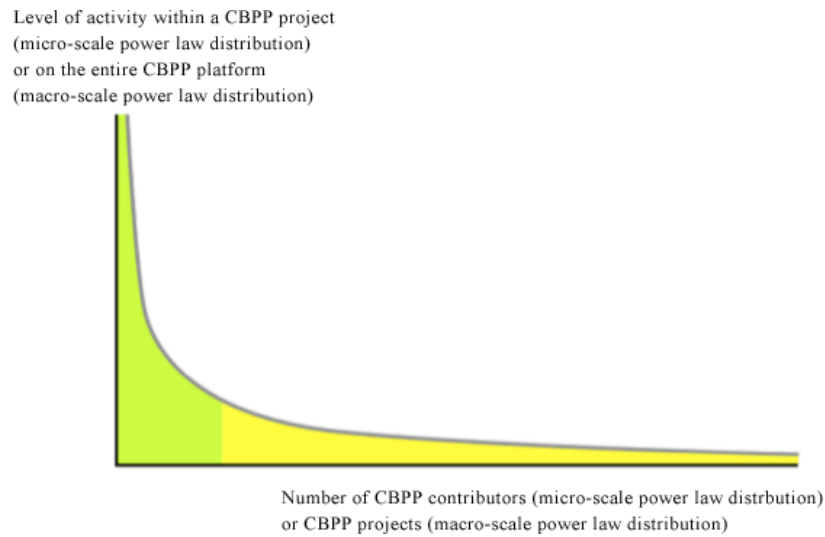
By applying the functional and hedonic categorization to the context of the present study (i.e., commons-based peer production), *functional commons-based peer production* is defined as the Internet-facilitated, collaborative and decentralized production which primarily focuses on producing products and services with utilitarian value (e.g., open source software production, wiki, product reviews, Q&A websites and knowledge repositories, etc.). On the other hand, *hedonic commons-based peer production* is defined as the Internet-facilitated, collaborative and decentralized production that primarily focuses on producing products and services for the purpose of attaining communal, positive, and confluent experiences (e.g., fan communities, derivative artwork and mash-up communities, etc.). Although one may argue that different constituents of a given virtual community may have varying goals for their participation, it is important to keep in mind that the functional and hedonic categorization is distinguished by the mutual “least-common-denominator” goals of the community upon which the individuals operate (Johnson & Johnson, 1991).

### **Existing Research on Commons-Based Peer Production**

A growing number of studies have examined web-based applications, services, and platforms that support hedonic and functional commons-based peer production, and such studies can be categorized into three broad lines of research. The first line of research focuses on the processes and dynamics in participant relationships that are involved in commons-based peer production. The second line of research focuses on the outcomes or consequences of commons-based peer production, and the third line of research focuses on the antecedents (i.e., motivations) that drive commons-based peer production.

Since commons-based peer production is still a relatively new topic of scholarly research, there are many studies that seek to provide understanding regarding the processes and dynamics in which commons-based peer production projects operate. For example, a majority of studies in this first line of research (e.g., Kittur, Chi, Pendleton, Suh, & Mytkowicz, 2007; Madey, Freeh, and Tynan, 2004; Sun et al., 2010; Wilkinson, 2008) investigates a phenomenon called the “power law distribution.” This term refers to a common trend in functional commons-based peer production, which is an unequal distribution of user contributions in peer-productive activities (see Figure 1 for a graphical representation of the power law distribution). On a micro level, the power law distribution in commons-based peer production refers to the state in which a small number of highly active users account for most of the productive activities within a single project (e.g., specific article on Wikipedia, specific open source software on GitHub, etc.). On the macro level, the power law distribution refers to a state in which contributions to a limited number of popular peer-productive projects account for majority of the total activities within the website or platform on which those projects are hosted (e.g., Wikipedia, GitHub; see Wilknsnson, 2008).

*Figure 1. Graphical Representation of the Power Law Distribution*



Wilkinson (2008) analyzed all of the historical data regarding the number of users, topics (articles or threads to which the users contributed), and user contributions on four functional peer productive-websites (Wikipedia, Bugzilla, Digg, and Essembly). Through comparing the distribution of the number of contributions per user (micro-level power law distribution) and the number of contributions per topic (macro-level power law contribution) with the power law equation, he found that both micro- and macro-level power law distributions existed in all of the four functional peer-productive websites. Madey et al. (2004) analyzed more than two million records of user (software developer) activities on SourceForge.com, a free hosting service for open source projects. Through ordinary least squares (OLS) regression in log-log coordinates, he found a significant model fit between the distribution of the number of projects per developer with the power law distribution hypothesis.

This first line of research could possibly address questions related to hedonic commons-based peer production. However, there are considerably fewer empirical studies that investigated the processes and dynamics involved in hedonic commons-based

peer production (e.g., Baym, 2007; Black, 2005; Thomas, 2006). Thomas (2006) conducted a case study of an online fan-fiction community, which involved a series of in-depth interviews with contributors of fan-fiction novels. Her findings suggested that the contributors were individually and collectively engaged in the discursive and social aspects of creative writing, which involved role-playing, identity exploration, and critical self-reflection (Thomas, 2006). Black (2005) conducted an ethnographic study on fanfiction.net, one of the largest and most active fan-fiction archives and communities. Through her one year-long participant observation, she concluded that the collaborative processes of fan-fiction writing and the peer-review structure of the community had significant pedagogical value in terms of adolescent literacy and English language learning. Specifically, the peer-review structure fostered a sense of community that tempered hostile criticisms, and thereby encouraged an interactive experience of creative writing while emphasizing the importance of peer feedback (Black, 2005).

The second line of research focuses on the consequences and implications of commons-based peer production (e.g., Cammaerts, 2008; Kreiss et al., 2010). Unlike the studies in the first line of research that mainly take an empirical approach, these studies tend to offer critical and theoretical arguments regarding the societal implications of commons-based peer production. For example, Cammaerts (2008) provide criticisms against the naïve postulation that increased participation through collective knowledge production (i.e., blogs) would create a utopian democratic public sphere. He observed that (1) radically diverse discourses lacked focus on the common good, (2) blogging services were owned by third-parties rather than the authors, and (3) the political and economic elites capitalized on blogs. He proposed that these characteristics would make

decentralized, collaborative, and participatory discourse more compatible with the concept of Mouffe's agnostic public spaces (Mouffe, 1999), and therefore could be destructive to democracy (Cammaerts, 2008). Similarly, Kreiss et al. (2010) counter the claim that commons-based peer production challenges the hierarchical structures of market-driven bureaucracies through the rapid democratization of content production. Through comparing commons-based peer production and Max Weber's account of the social value of bureaucracy, they argue that the concept of commons-based peer production has naïve and inconstant assumptions regarding its efficiency, equality, intrinsic drive and non-proprietary nature of production. With such, they concluded, a complete disregard for institutional bureaucracies (through advocating peer production) would in fact be disruptive to societies (Kreiss et al., 2010).

The third line of research, which the present study belongs to, investigates the antecedents of commons-based peer production (e.g., Hertel, Niedner, & Herrmann, 2003; Lampe et al., 2010; Nov, 2007; Shah, 2006; Yang & Lai, 2010). Search for past literature reveals that all of the empirical studies regarding the antecedents of commons-based peer production have focused on functional commons-based peer production websites and platforms. In addition, those studies have focused on revealing the psychological motivations that drive users to contribute to functional commons-based peer production. Each of the previous studies in this line of research is reviewed and discussed in the following section.

### **Research on Motivations of Functional Commons-Based Peer Production**

In the context of Wikipedia, a few recent studies have examined editor motivations. Nov (2007) conducted one of the pioneering empirical studies that used an

online survey with a random sample of 370 registered English Wikipedia users. This study combined the conceptual framework of volunteerism and the open source model to examine the motivations driving contributors to Wikipedia. Simple correlation analysis revealed that fun, enhancement, and protective factors had modest but statistically significant ( $r = 0.30$ ;  $p < 0.001$ ) relationships with the level of contributor commitment (measured in hours per week). In a more recent study, Yang and Lai (2010) conducted an online survey study that examined the relationship between frequency of contribution and intrinsic motivation, extrinsic motivation, internal self-concept, and external self-concept. A total of 235 responses from a random sample of registered English Wikipedia users were analyzed using structural equation modeling, and the results revealed that only internal self-concept based motivation (i.e., motivation to perform behaviors that meet one's inherent standards for positive self-feedback) significantly influenced knowledge-sharing behavior on Wikipedia (Yang & Lai, 2010).

Empirical studies of the motivations of peer production contributors are also found in the context of open source software development. Hertel et al. (2003) investigated the motivation of contributors of the Linux kernel projects by applying the framework of social movements (Karau & Williams, 2001; Klandermans, 1997). An online survey was conducted with a sample taken from relevant mailing lists of the Linux kernel community. Principal components analysis of 141 survey responses revealed that contributors' motivations to contribute to the Linux kernel projects were composed of self-identification, norms, utilitarian motives, hedonistic motives, and social or political motives.

Shah (2006) investigated the motivations to contribute to open source software development within two distinct open source software communities. Data were collected through 88 interviews, project descriptions, and more than 2,000 messages from relevant mailing lists. Textual analyses found that motivations to contribute to open source software development were distinctly different between need-based contributors and hobbyist (fun- or enjoyment-based contributors). While need-based contributors were motivated by the norm to reciprocate, desire to provide better solution to the problem in hand, and the need to integrate one's own code to the source code, hobbyist contributors were seeking for feedback and enjoyment (Shah, 2006).

Aside from studies on Wikipedia and open source software production, empirical research on motivations driving functional commons-based peer production in other contexts has been rare. However, one study deserves special attention since this study provides useful conceptual and methodological implications relevant to the present investigation. Lampe et al. (2010) conducted an online survey on "Everything2.com," a user-generated encyclopedia and writing platform that launched in 1999. They applied the uses and gratifications (U&G) framework and the construct of organizational commitment to explore the motivations of contributors, and the specific relationships between those motivations and behavioral outcomes (e.g., frequency of making contributions and intentions to engage in future contributions). Through factor analysis of more than 603 survey responses, Lampe et al. (2010) identified six U&G factors (information seeking, providing information, social enhancement, maintaining interpersonal connectivity, enhancement, and self discovery), two social identity factors (cognitive dimension and evaluative dimension), and two organizational commitment

factors (sense of belonging and normative commitment). Regression analysis revealed that sense of belonging and the motivation to provide information were both significantly related to the frequency of making contributions and intentions to engage in future contributions (Lampe et al., 2010).

### **Summary**

Past literature regarding commons-based peer production can be categorized into three broad lines of research. The first line of research focuses on the processes and dynamics that are involved in commons-based peer production. A majority of the studies in this line of research investigated the power law distribution of participation in various contexts of functional commons-based peer production. A small number of studies also looked at the unique experiences of contributors in hedonic commons-based peer production (namely, fan-fiction communities). The second line of research focuses on the broader societal consequences of commons-based peer production. Such studies offered critical and cultural arguments against the assumed implications of commons-based peer production to improve democracy through decentralized, participatory and non-proprietary production. The third line of research focuses on the motivational antecedents that drive commons-based peer production. All of the studies in this line of research have examined websites and platforms in the context of functional commons-based peer production, and the majority conducted online surveys as means of data collection. Table 1 presents a summary of all studies in this line of investigation.

Of the studies that investigated the motivations that drive functional commons-based peer production, Nov (2007) and Lampe et al. (2010) provide valuable empirical investigations of both individual and social level motivations. Such attempts have been

rare, since many existing studies regarding the use of Internet and online communities have relied on the U&G framework (e.g., Bumgarner, 2007; LaRose & Eastin, 2004; Shao, 2009), and hence the scope of analysis did not go beyond individual motivations. By focusing on both individual and social motivations, Nov (2007) and Lampe et al. (2010) expand our understanding of the breadth of motivations that drive one to contribute to commons-based peer production.

The present study seeks to build upon the conceptual approaches used by Nov (2007) and Lampe et al. (2010), and thereby explores both the individual and social motivations that drive contributions to peer production. To complement and expand on their approaches, three specific theoretical frameworks are chosen to guide the present study: uses and gratifications (U&G) framework, volunteerism, and social identity theory. As a popular framework of investigating both traditional and new media, the U&G framework contributes by shedding light on the gratifications that contributors may seek to obtain through contributing to functional commons-based peer production. The functionalist approach to volunteerism motivation (see Clary et al., 1998; Omoto & Snyder, 1995) serves as a conceptual guide in the investigation of individual and social motivations that drive willing and sustained helping of others. Finally, social identity theory (Tajfel, 1978) offers a useful conceptual framework for the social dimension of motivations to participate in various community activities including commons-based peer production. This theory particularly focuses on self-identification with a certain group (i.e., user communities of commons-based peer production) as one of the primary motivational factors.

The following chapter discusses each of these three theories and reviews relevant

literature, which then leads to the development of a set of motivational factors relevant to contribution to functional commons-based peer production.

*Table 1.* Summary of Existing Studies on Motivation of Functional Commons-Based Peer Production

<b>Context</b>	<b>Study</b>	<b>Methods</b>	<b>Key Findings</b>
Open Source Software	Bonaccorsi & Rossi (2004)	Survey with a sample of 146 Italian firms supplying open source software. The study investigated individual- and firm-level motivations to contribute to open source software.	Firms and individuals were largely motivated by pragmatic reasons. For firms, those reasons were economic and technological. For individuals, the reasons ranged from seeking of reputation and feedback, to the motivation to engage in creative production.
	David & Shapiro (2008)	Online survey with a sample of 1,588 open source software developers, focusing on the reasons why they contributed to certain open source software projects.	A wide range of motivations drove open source software developers, and distinct patterns existed depending on the size of the project to which one contributes.
	Hars & Ou (2002)	Online survey with a sample of 79 open source software developers. They investigated how various intrinsic and extrinsic motivations were related to contributions.	Correlation analysis revealed that external motivations (selling products, human capital, self-marketing, and peer recognition) were stronger motivators than internal ones (i.e., self-determination, altruism, community identify).

*Table 1 (cont'd).* Summary of Existing Studies on Motivation of Functional Commons-Based Peer Production

	Hertel et al. (2003)	Online survey with a sample of 141 Linux kernel developers regarding how social change-related motivations was related to contributing behaviors.	SEM revealed that contributors were motivated by self-identification, desire to improve the software, evaluation of team goals, and self-efficacy to make their contributions.
	Shah (2006)	A series of 88 in-depth interviews with open source developers regarding the frequency and length of contributions, individuals' role as a contributor, reasons to contribute, etc.	Contributors of open source development can be broadly grouped into need-based and hobbyist contributors. The former were motivated by the norm to reciprocate, problem solving, career concerns, and desire to integrate one's own code. The latter was motivated by hearing others' feedback.
Wikipedia	Nov (2007)	Online survey with a sample of 151 Wikipedia editors regarding their open source and volunteerism-related motivations to contribute content.	Correlation analysis revealed that fun ( $r = 0.32$ ), enhancement ( $r = 0.31$ ), and protective factors ( $r = 0.31$ ) were statistically and practically ( $r > 0.30$ ) related to the level of contributions' commitment, measured by hours per week.
	Yang & Lai (2010)	Online survey with a sample of 219 Wikipedia editors regarding their intrinsic and extrinsic motivation, and internal and external self-concept.	SEM revealed that only internal self-concept was significantly related to knowledge-sharing behavior on Wikipedia.

*Table 1 (cont'd).* Summary of Existing Studies on Motivation of Functional Commons-Based Peer Production

Other	Lampe et al. (2010)	Online survey with a sample of 603 users on "Everything2.com" regarding media use motivations, social identity and degree of organizational commitment.	Factor analysis revealed that sense of belonging and information giving motivations were significantly related to frequency of contribution, and likelihood of future use and contribution.
-------	---------------------	---	---

---

### **Chapter 3: Theoretical Frameworks**

To gain a comprehensive understanding of the motivations for commons-based peer production, the present study focuses on both individual and social motivations that drive participation in commons-based peer production. Specifically, the uses and gratifications framework, volunteerism, and social identity theory are applied as guiding frameworks of this study. This chapter discusses each of the theoretical frameworks and elaborates on how they are conceptually and theoretically relevant to the context of functional commons-based peer production.

#### **Individual Motivations**

##### **Uses and Gratifications**

The uses and gratifications (U&G) approach in mass communication research analyzes media use from an audience-centric perspective (Katz, Blumler, & Gurevitch, 1974). In the U&G approach, personal needs and desires are thought to drive media choice and consumption, and such behaviors are mediated by social, psychological, as well as environmental factors that surround the audience (Rosengen, 1974; Rubin, 2009). The U&G approach aims to explain how audiences use media to fulfill their specific needs, to understand different motives for media use, and to identify consequences of certain needs, motives, and the resulting media consumption behaviors (Katz et al., 1974).

U&G research has had several different foci throughout its history in mass communication research. In the 1940s, when the U&G research was still in its early stages, studies investigated the consumption of traditional popular media such as TV and radio. According to Katz et al. (1974), earlier studies often grouped open-ended

responses without the guidance of any conceptual frameworks. Hence, earlier studies ignored the variance in distribution of responses between the grouped responses, and also did not attempt to further explore the psychological or sociological origins of the needs of media consumption.

After several decades, in the 1970s, U&G research started adopting quantitative and mixed method approaches to not only identify individual motivations, but also to discover related issues that influence one's media consumption (Katz et al., 1974). For example, McQuail, Blumler, and Brown (1972) identified four factors that motivate TV viewing: diversion (emotional escape from reality), personal relationships (substituting TV for socializing with peers), personal identity (value reinforcement), and surveillance (information gathering). In addition, data from personal interviews with TV viewers suggested that various social contexts, expected gratifications, actual gratifications gained, and anticipated behavioral consequences influenced TV viewing (McQuail et al., 1972).

According to Rubin (2009), contemporary U&G studies have seven identifiable research directions. First, many studies continue the tradition of investigating the links between media use motives and media attitude and behaviors. The second direction is the comparison of motives between old and newer media use. Third, some contemporary U&G studies have extended the investigations from the 1970s in examining different social and psychological circumstances of media use. The fourth direction explores the link between gratifications sought and gratifications obtained, for which several models have been proposed. The fifth direction investigates the relationship between background variables, motives, and exposure effects to consequences of media use. The sixth

direction points to a line of studies that pursue theoretical development of U&G in respect to other communication and media effects theories. Finally, the seventh direction focuses on improving the reliability, validity and the methods of U&G research (Rubin, 2009).

The U&G framework focuses on identifying individual motivations that drive media consumption. Based on the assumption that media consumption is a goal-directed behavior that focuses on fulfilling individual needs, the U&G framework sheds light on the motivations that drive the use of various media, the psychological and environmental circumstances that influence media consumption, and also the comparison of newer and traditional media usage (Rubin, 2009).

The U&G framework, however, is often subject to criticism for several reasons. First, many scholars (e.g., Elliot, 1974; Lometti, Reeves & Bybee, 1977) have criticized U&G for being atheoretical and conceptually vague. These critics point out that critical terms such as “needs” are not clearly defined, and its methodologies have little theoretical basis; hence leading to arguments such as it is “basically nothing more than a data-collecting strategy” (Severin & Tankard, 2000, p. 297). Second, U&G has been criticized for inadequate empirical investigations of exogenous factors (e.g., social, cultural) that may also influence media use (Elliot, 1974). Third, the reliance on self-report as a predominant form of data collection poses questions about measurement validity, especially with a potential for discrepancies between one’s reported and actual behaviors (Posakoff & Organ, 1986).

Despite the criticisms, U&G studies are still prevalent in the mass communication literature, particularly with the increase in research on interactive and audience-controlled

media (e.g., Bumgarner, 2007; Chung & Kim, 2008; Jansz & Martens, 2005; Lampe et al., 2010; Leung, 2009; Sangwan, 2005). For example, Bumgarner (2007) investigated college students' Facebook use motivations with a sample of 1,049 undergraduate students using Facebook. A principal component analysis revealed seven Facebook use motivations: social utility, directory, voyeurism, herd instincts, collection and connection, personal expression, and initiating relationships. Chung and Kim (2008) conducted a survey study to identify cancer patients' motivations to create and write blogs. They found four motivations for cancer patients and their companions to engage in active blogging: prevention and care, problem solving, emotion management, and information sharing (Chung & Kim, 2008).

Leung (2009) conducted a telephone survey with a probability sample of 798 Internet users to examine motivations that drive user-generated content creation (e.g., personal webpages, blogs, online forums, posting videos on YouTube, and contributing to Wikipedia). Factor analysis results identified four motivations driving user-generated content creation: cognitive needs (information-obtaining), social needs (self-expression), recognition needs (reputation building), and entertainment. Sangwan's (2005) study on virtual communities identified one functional need (information-obtaining), three emotional needs (social interaction, personal uses to meet people, and self-expression), and two contextual needs (entertainment and hosting communities). Lampe et al. (2010) applied the U&G framework to their study of online communities. Factor analysis of data collected from a sample of 504 users of "Everything2.com" revealed that social enhancement, information providing, and entertainment motivations significantly predicted the frequency of current use, intended future use, and intended future

contribution.

In summary, the U&G approach aims to explain how audiences use media to fulfill specific needs and desires, and also to identify social, psychological, and environmental factors that mediate media use. Despite the theoretical and methodological criticisms, the U&G framework has been widely applied to studies of motivations for using traditional and new media. In addition, contemporary U&G studies regarding peer production have extended the traditional U&G framework into the context of social media, social networking sites, and user-generated content. Thus, the U&G framework is incorporated into the present study's theoretical framework to explore the individual motivations that drive user contributions to commons-based peer production from the perspective of need satisfaction.

### **Volunteerism**

Volunteerism, according to Snyder and Omoto (2008), refers to “freely chosen and deliberate helping activities that extend over time, are engaged in without expectation of reward or other compensation ... [and] are performed on behalf of causes or individuals who desire assistance” (p. 3).

Within social psychological research on the topic of helping behaviors, volunteerism research has two distinct foundations (Omoto & Snyder, 1995). The first is composed of research regarding situations in which helpers encounter urgent or unexpected helping opportunities (i.e., bystander intervention; Darley & Latané, 1968), and the second deals with helpers providing long-term and sustained helping due to some sort of normative obligations (e.g., taking care of family members with chronic illness; Kinney & Stephens, 1989; Thompson & Pitts, 1992). Volunteerism is similar yet a

clearly separate concept compared to its foundations – specifically, volunteerism is a deliberate and willing act of helping that also continues for a sustained amount of time (Clary, Snyder, & Stukas, 1996; Omoto & Snyder, 1995; Snyder & Omoto, 2008).

According to Snyder and Omoto (2008), volunteerism has several defining characteristics. First, it occurs from free will and without the burden of obligation. Second, volunteerism involves deliberation and decision-making. Contrasting concepts are mere reflexive acts of helping such as bystander interventions (e.g., Darley & Latané, 1968) or more broadly, emergency helping. Third, volunteer activities must extend over a period of time rather than one-time helping. Fourth, the reasons to volunteer must come from one's values and goals rather than from expectation of reward or avoidance of punishment. If volunteering becomes a means for compensation (e.g., paycheck), such as missionary work or Peace Corps and AmeriCorps volunteering, such participants could be better described by the concept "quasi-volunteers" (Smith, 1981). Fifth, volunteering cannot be imposed and must serve those who actually are in need of help. Sixth, volunteer activities are offered through agencies or organizations that further a socially desired cause. According to Snyder and Omoto (2008), the last two points help to distinguish volunteerism from free and willing services with harmful or unethical consequences (e.g., suicide bombing, assistance of murder).

To conceptually align the vast number of empirical studies on volunteerism, Snyder and Omoto (2008) applied the Volunteer Process Model to their research. According to this framework, there are three stages of volunteer process (antecedents, experiences, and consequences) that are investigated from four levels of analysis (individual, interpersonal/social group, agency/organization, and social/cultural context)

(see Table 2). The antecedent stage, which is the primary focus of the present study, considers personal, motivational, and circumstantial characteristics that predict volunteering behaviors. The experience stage involves the psychological and behavioral development of individuals, groups, organizations, and volunteer-recipients during the process of volunteering. The consequence stage of volunteering deals with the impact of volunteering activity, including changes in attitudes and behaviors, interpersonal relationships, modes of retention and work evaluation, and socioeconomic impacts (Snyder & Omoto, 2008). The model provides a comprehensive perspective that underscores motivations, activities, and outcomes of volunteering for the agency providing the volunteering opportunity, the individual volunteers, and the community in which the agency and volunteers belong. Previous studies examining volunteerism through the scope of this model, therefore, seek to understand the cause, process and effects of the act of volunteering in various levels of analysis ranging from personal to social and cultural contexts.

Table 2. Volunteer Process Model (Snyder &amp; Omoto, 2008)

Level of Analysis	Stages of Volunteer Process		
	Antecedents	Experiences	Consequences
Individual	Personality, motivation, life circumstances	Satisfaction, stigma, organizational integration	Knowledge and attitude change, health
Interpersonal/ Social Group	Group membership, norms	Helping relationship, collective esteem	Composition of social network, relationship development
Agency/Organization	Recruitment strategies, training	Organizational culture, volunteer placement	Volunteer retention, work evaluation
Social/Cultural Context	Ideology, service programs and institutions	Service provision, program development	Social capital, economic savings

For example, Snyder, Omoto, and Crain (1999) investigated individual level antecedents that influence volunteerism. A series of field studies and controlled experiments showed that perception of stigma toward the nature of the volunteer work (i.e., volunteering at an AIDS organization) served as a barrier to volunteering activities. Flanagan et al. (1998) investigated interpersonal and social group level antecedents of volunteerism and found that family ethic of social responsibility predicted adolescent civic commitments. Gidron's (1985) study approached the individual and agency level consequences of volunteerism through conducting a longitudinal study of volunteers who stay with or leave from their commitments. Discriminant analysis identified organizational (task preparation) and individual variables (task achievement, relationship

with other volunteers, nature of the task) that predicted volunteer retention and turnover (Gidron, 1985).

Past studies have also proposed theoretical models that present a more comprehensive understanding of volunteerism. For example, there are several different models of volunteerism depending on the number of predictors considered. A unidimensional model of volunteering (Cnaan & Goldberg-Glen, 1991) proposes that volunteering happens from “a combination of motives that can be described overall as ‘a rewarding experience’” (p. 281). Several shortcomings of this model, as stated by Okun, Barr, and Hezog (1998), include the lack of theoretical framework and a failure of replication. A two-factor model proposes that people have altruistic and egotistical motives to volunteer. For example, Frisch and Gerrard’s (1981) survey study of Red Cross volunteers revealed that older volunteers tended to engage in volunteering from concern for others (altruistic motives), whereas younger volunteers were motivated more from reasons pertinent to themselves (egotistic motives).

Several multifactor models have also been proposed, which postulate the dynamic interplay of multiple factors of volunteer motivation. An example of such is the octagonal model of volunteer motivation (Yeung, 2004), which took a grounded theory approach in understanding volunteerism through a series of in-depth interviews and qualitative emergent coding analysis. Despite this novel approach, the study failed to provide generalizable empirical support for their model, and further replications are also not identified.

Wilson and Musick (1997) proposed a sociological theory of volunteer work, which is a model constructed based on a sociological theoretical framework. The model

conceptualized three factors as antecedents of volunteering: human capital, social capital, and cultural capital. Human capital was conceptualized as one's abilities and resources to carry out a volunteer work, social capital was conceptualized as the human connects that bring fourth volunteering opportunities or make volunteering possible, and cultural capital was conceptualized as one's moral values regarding volunteering. To test this model Wilson and Musick (1997) analyzed data from the *Americans' Changing Lives* panel survey conducted by the University of Michigan's Institute for Social Research (House, 1995), and found several significant predictors of volunteering that were conceptually consistent with the three sociological factors. Specifically, they found socioeconomic status (human capital), number of children and informal social interactions (social capital), and frequency of church attendance (cultural capital) to have strong direct relationships with formal volunteering activities (Wilson & Musick, 1997).

The Volunteer Functions Inventory (VFI; Clary et al., 1996) is another multifactor model that predicts volunteering activities by multiple motivational factors. Clary et al. (1998) approached volunteerism from a functional approach, which focuses on identifying the needs, goals, plans, and motives that the individuals seek to fulfill through volunteering. The study analyzed data from the Independent Sector's 1992 national survey, and the results supported the six conceptual functions of volunteering: expression of altruism (values function), the volunteer's need for different life experiences (understanding function), personal development and self-esteem (enhancement function), preparation or maintenance of career-related skills (careers function), social approval and membership (social function), and reduction of guilt for one's relatively fortunate life circumstances (protective function).

Clary et al. (1998) also conducted a series of factor analyses to further test their previous findings (Clary et al., 1996). Using data collected from 321 volunteers, an exploratory factor analysis was first performed, which generated six factors with eigenvalues greater than one. Second, two additional principal-axis factor analysis with oblique rotations were conducted with preselected five- and seven-factor solutions, which resulted in the items loading mostly on the intended factors. Third, confirmatory factor analyses testing for five-, six-, and seven-factor oblique models were conducted, which demonstrated the best fit for the six-factor model. They also successfully replicated the six-factor structure model with a sample of undergraduates.

### ***Volunteerism and Commons-Based Peer Production***

A review of research on volunteerism reveals four specific features that are commonly applicable to the conceptual definitions of volunteerism and commons-based peer production. First, both volunteerism and commons-based peer production are performed based on the participant's free will. Second, both acts are performed by deliberate choices. As articulated in Snyder and Omoto (2008), volunteering, by definition, cannot be coerced or take the form of emergency helping. Similarly, commons-based peer production must also be driven and sustained by the willingness of the participants to collectively produce an artifact autonomous from market forces, price system, proprietary laws, and other hegemonic frameworks of the society (Benkler, 2006). Third, the decision to engage in both volunteering and commons-based peer production is not guided by expectations of reward or avoidance of punishment. Some of the known motivations of volunteering include individual factors such as values and satisfaction (e.g., Omoto & Snyder, 2002), ego protection and enhancement (e.g., Clary et

al., 1998), and social factors (e.g., Omoto & Snyder, 1995; Wilson & Musick, 1997). Similarly, in the case of Wikipedia contributors, actors typically participate for personal fulfillment (Nov, 2007), creative fulfillment (Benkler, 2006) and social interactions and knowledge building (Benkler, 2006). Fourth, participation in volunteering and commons-based peer production both happen on behalf of those who are in need of help.

However, there is at least one aspect that commons-based peer production and volunteerism do not share in common; while volunteerism is considered a formal act (Snyder & Omoto, 2008), this notion of “formality” does not clearly translate into the context of commons-based peer production. For example, according to Snyder and Omoto (2002), formality of volunteer activities is gained when such acts are conducted through agencies or organizations (i.e., volunteer groups or church groups). In the context of the Internet, however, there is a vast diversity to the ways in which one becomes involved in peer production and the level of coherence of the facilitating platform. On one hand there are websites such as SourceForge.com, which is a central location where millions of open source projects are managed and developed. On the other hand, there are also many less organized platforms such as LISERV and BBS where contributions happen with more spontaneity and less coordination.

In addition, due to the nature of the Internet, there are many occasions where participants directly approach the entity that is in need of help (and vice versa). Therefore, there is less need for agencies and organizations to coordinate participation. The flexibility and accessibility of the Internet allows users to form organizations with various degrees of coherence and participation, and therefore “formality” in commons-based peer production becomes ambiguous and less critical of a concept. However,

considering the conceptual similarities that the two phenomena share otherwise, this difference in the “formality” of volunteerism and commons-based peer production stemming from the differences of online and offline environments, is perhaps marginal.

Taking into account the significant conceptual similarities that volunteerism shares with commons-based peer production, and a rich history of empirical investigation on volunteerism, the present study incorporates volunteerism as a conceptual guide to empirically investigate the motivations that drive commons-based peer production.

## **Social Motivations**

### **Social Identity Theory**

Developed in the 1970s by Henri Tajfel, social identity theory is the “social-psychological analysis of the role of self-conception in group membership, group process, and group relations” (Hogg, 2006, p. 111). According to Tajfel (1978), social identity is conceptually defined as the “individual’s self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership” (p. 63). Social identity theory, in other words, seeks to identify factors that contribute to the construction of one’s self-concept in relation to the social groups to which they perceive a sense of belonging.

Although there is no agreement on the exact number of dimensions that construct one’s social identity, many scholars believe that there is a theoretical basis to argue the multidimensionality of social identity (e.g., Brown, Condor, Mathews, Wade, & Williams, 1986; Cameron, 2004). For example, Brown et al. (1986) argue that there are three theoretical facets to social identity: (1) cognitive (awareness of group membership), (2) evaluative (positive or negative valuation attached to the membership) and (3)

affective (emotional attachment to the membership). Ellemers, Kortekaas, and Ouwerkerk (1999) conducted an experiment to test the tripartite model of social identity, using a minimal-group setting that manipulated group reputation (high/low), size (majority/minority), and formation (self-selected/assigned) as independent variables. They not only found support for the tripartite factor model (self-categorization, group self-esteem, and emotional commitment) of social identity, but also found that these three factors were differentially related to group characteristics (independent variables) as well as one's in-group favoritism (mediating variable). Similar to this study, Jackson (2002) also found support for the three-factor model and a strong impact of affective ties on in-group favoritism as well as perceived conflict with out-groups, resulting in exaggerated negative perception of the out-group. Cameron's (2004) multiple survey study and factor analyses also confirmed the three-factor model, and the data exhibited a significantly better fit of the tri-factor model compared to uni- or bi-dimensional models.

Majority of the studies that investigated the factor structure of social identity agree on that social identity has three sub-dimensions including cognitive, evaluative, and affective dimensions. It is also important to emphasize that social identity merely deals with one's self-concept, and behaviors (e.g., physical commitments toward a group) are strictly consequences of social identification. For example, Ashforth and Mael (1989) argued, based on a literature review, that there are three consequences of social identification. First, social identification heavily influences outcomes of group formation such as group cohesion, cooperation and altruism, and one's positive evaluation of the group. Second, social identification will reinforce antecedents of identification such as distinctiveness, values and practices, prestige, and salience of competition between out-

groups. Third and most importantly, individuals behave to support organizations that endorse salient aspects of one's identity.

Past studies on commons-based peer production offer some support for such claims in the context of peer production. For example, Lampe et al. (2010) found that sense of belonging to an online community (Everythings2.com) was moderately correlated with the likelihood of making future contributions to the website. In other words, social identification is related to behaviors that support the group with which one identifies. Dholakia, Bagozzi, and Pearo (2004) proposed and tested the social influence model of consumer participation in online virtual communities. A total of 545 participants completed an online survey, and the results were analyzed by confirmatory factor analysis and structural equation modeling. Alongside with significant statistical support for the model, the study found that group norms and social identification had significant direct and indirect influence on online participation. They also found three distinct dimensions of social identity: cognitive (one's self-awareness of in-group membership); affective (emotional involvement and commitment to the group); and evaluative social identity (the collective self-esteem that one gains from belonging to a community).

The theory of social identity contributes to the theoretical framework of the present study by shedding light on the social motivation factors that are likely to drive contributions to peer production. Productive online interaction is a form of physical and emotional commitment, which, in the context of peer production, often occurs among a networked cluster of people. Therefore, to gain a comprehensive understanding of the motivations that drive peer production, it is critical to consider the social motivations that

are fueled by one's attachment and sense of belonging to the group of people with which they identify.

To summarize, the theoretical framework of the present study is composed of the uses and gratifications framework, volunteerism, and social identity theory. By combining the three theories, this study focuses on both individual and social motivational factors for commons-based peer production. Table 3 presents this study's suggested model of commons-based peer production motivations. The following chapter presents the methods of the present study, including measurement development, sampling, and online survey data collection procedures.

*Table 3. A Model of Commons-Based Peer Production Motivations*

Theoretical roots	Motivational Factors
Uses and Gratifications (Katz et al., 1974)	<ul style="list-style-type: none"> <li>• Information giving</li> <li>• Self-discovery</li> <li>• Maintaining interpersonal connectivity</li> <li>• Entertainment (Lampe et al., 2010; Sangwan, 2005)</li> </ul>
Volunteerism (Omoto & Snyder, 1995)	<ul style="list-style-type: none"> <li>• Values</li> <li>• Understanding</li> <li>• Careers</li> <li>• Social</li> <li>• Ego enhancement</li> <li>• Ego protective (Clary et al., 1996)</li> </ul>
Social Identity (Tajfel, 1978)	<ul style="list-style-type: none"> <li>• Cognitive social identity</li> <li>• Affective social identity (Bagozzi &amp; Dholakia, 2002; Dholakia et al., 2004)</li> </ul>

## Chapter 4: Methods

In order to gain a comprehensive understanding of the motivations that drive contributors of functional commons-based peer production and to test the motivational factor model developed based on the aforementioned three theories, the present study conducted an online survey with a random sample of top contributors of the English language Wikipedia (<http://en.wikipedia.org/>).

An online survey was chosen as a method of data collection because it is the best method for reaching the top editors of the English language Wikipedia, which attracts a vast number of contributors from more than 10 countries (AyushKhanna, 2011).

Wikipedia was chosen as the context of this study because it is recognized as one of the most well-known and successful examples of functional commons-based peer production (Benkler, 2006). In addition, Wikipedia has a publically available list of their top 8,000 editors<sup>1</sup>, which provides a good sampling frame from which to draw a probability sample.

### Questionnaire Development

Based on the review of literature on U&G, volunteerism, and social identity theory, a 51-item motivation measurement was developed. These items included various measures of motivation such as the Volunteer Functions Inventory (Clary et al., 1996), cognitive and affective social identity scales (Bagozzi & Dholakia, 2002; Dholakia et al., 2004), and U&G scales (Lampe et al., 2010; Sangwan, 2005).

Volunteer Functions Inventory (Clary et al., 1996) is composed of 30 items that constitute six motivational factors of volunteerism (values, career, understanding, social, ego enhancement, and ego protection; each composed of five items). Cognitive and

---

<sup>1</sup> [http://en.wikipedia.org/wiki/Wikipedia:List\\_of\\_Wikipedians\\_by\\_number\\_of\\_edits](http://en.wikipedia.org/wiki/Wikipedia:List_of_Wikipedians_by_number_of_edits)

affective social identity scales are each composed of four items that measure the degree to which one's self-identity is cognitively and affectively overlapping with a certain group of people. The U&G scales (Lampe et al., 2010; Sangwan, 2005) include 13 items that constitute four factors of new media use motivation: information giving (Lampe et al., 2010; three-item scale), maintaining interpersonal connectivity (Lampe et al., 2010; Sangwan, 2005; four-item scale), entertainment (Lampe et al., 2010; Sangwan, 2005; four-item scale), and self-discovery (Lampe et al., 2010; two-item scale).

In addition, a series of in-depth interviews was also conducted as a critical part of questionnaire development. Considering the dearth of empirical research on motivations driving commons-based peer production, the purpose of the in-depth interviews was to explore and discover any additional motivational factors that might not have been revealed in the previous literature.

### **In-depth Interviews**

The in-depth interviews were conducted with contributors of functional commons-based peer production to complement the motivational measures identified from the theoretical frameworks and past empirical studies. Snowball sampling was used to recruit past or present contributors of functional peer production as informants. This researcher's friends and peers were approached in the initial stage of recruitment and they were asked to refer other contributors of functional commons-based peer production, if possible. A total of five informants were recruited for the in-depth interviews<sup>2</sup>.

---

<sup>2</sup> The small number of informants poses an obvious concern regarding the level of saturation that the in-depth interview data could reach (Lindloff & Taylor, 2002). Although scarcity of informants is understandable considering the general scarcity of contributors to functional peer production (see Wilkinson, 2008, or Chapter 2 Section

The interviews took place in various locations depending on the physical distance between the informants and the researcher, as well as the informant's personal preferences. The group of informants consisted of one female and four males from various ages, occupations, as well as experiences with different types of peer production activities (see Table 4). To ensure that the informants shared a common baseline understanding of commons-based peer production, the following definition of the term was provided prior to the interview, as a part of their consent forms:

Commons-based peer production (also referred to as: peer production, social production is a new model of production, which large numbers of contributions of time, skill and/or knowledge of people are coordinated into meaningful projects with the aid of the Internet. Examples include, but are not limited to, creating or editing Wikipedia articles and online reviews (e.g., product reviews, movie reviews, etc.), and participating in crowdsourcing and open source software development. By nature no single contributor can own nor profit from their contributions and/or the final product.

---

“Existing Research on Commons-Based Peer Production), nonetheless, this point is further discussed in Chapter 6.

*Table 4. Summary of the Interview Informants' Profile*

	<b>Age</b>	<b>Gender</b>	<b>Occupation</b>	<b>Activity</b>
Informant 1	19	Female	College student	Asking questions and providing answers on a Q&A website
Informant 2	25	Male	High school faculty	Editing Wikipedia articles
Informant 3	27	Male	Graduate student	Open source software development, asking questions and providing answers on a Q&A website
Informant 4	42	Male	Product designer at a major electronics manufacturer	Providing translations for a social media application through crowdsourcing
Informant 5	32	Male	Graduate student	Open source software development, creating and editing Wikipedia articles, providing answers on a Q&A website

The interviews were semi-structured, which allowed the researcher to explore different questions and topics depending on the flow of the conversations. The semi-structured interviews had a general structure that consisted of three questions: (1) projects with which they are (were) involved as contributors, (2) their depth of involvement, and (3) the reasons why they contributed to those projects. In addition to the above, the flow of the conversation allowed the researcher to explore number of different topics such as emotional involvement with certain projects, time commitment, reasons for continuing to contribute to certain projects, reasons for discontinuing their contributions, and technical

details regarding Wikipedia, open source production, crowdsourcing and online forums. Interview sessions had a duration ranging from 25 to 90 minutes with an average duration of roughly 45 minutes.

### *Findings*

The interviews broadly confirmed the motivation dimensions derived from the literature review and the theoretical framework. A variety of responses were received throughout the interviews with regards to why the respondents are (were) active contributors of functional commons-based peer production. For example, responses covered topics such as significant personal values and beliefs to make information open and accessible, helping others, affinity towards groups and communities in which the informants belong, emotional commitments, and the desire to socialize and relax with fellow contributors. From the in-depth interviews, three additional motivational dimensions were identified: altruism, egoism, and creative stimulation.

#### *Altruism and Egoism*

Interviews revealed that both altruistic and egoistic motivations are relevant to driving contributions to commons-based peer production. Although altruism and egoism are separate concepts that are distinguished by one's concerns for improving others or their own welfare (Batson, 1991; Hoffman, 1981), the informants frequently mentioned the two within the same conversations. Specifically, informants generally began a project driven by egoistic motivations, but later decided to share or publicize their products from altruistic motivations. Therefore, this section will elaborate on both altruistic and egoistic motivations.

Informants involved in open source software development mentioned both egotistic and altruistic motivations to create and share their works, but the two motivations operate on different stages of software development. Specifically, projects were often taken-on to fulfill the informant's personal and instrumental needs (i.e., egoistic motivation), yet as the project progresses those software were then made available to the public from the concern for others (i.e., altruistic motivation):

Informant 3: The particular work I do is usually driven by things I need. However, if I needed it, somebody else probably does too ... so it makes sense to have it [uploaded] somewhere, where we have a version that has been well-debugged and everybody can use ... I'll just save them the time [to develop a similar software].

Similarly, contributions to Wikipedia also seem to be driven by a mix of altruistic and egotistic motivations. In the case of Informant 2, his contributions are largely driven by altruistic personal values to serve for others' well-being, yet he also expressed an interest in maintaining a reputation among certain social groups by sharing the articles that include his contributions:

Researcher: What does being a Wikipedian<sup>3</sup> mean to you?

Informant 2: To me, it's being dedicated to the belief in free and accessible knowledge, [and] about empowering people to write their own histories in a responsible way.

Researcher: When you are making edits or creating new articles, is it for you or for others?

---

<sup>3</sup> Wikipedia users who write and edit articles.

Informant 2: I see it for others.

Researcher: Many literature point to the importance of “reputation” in a peer-productive environment. Is this not your case?

Informant 2: I think I would be more likely to boast to friends at school ... I show them articles I had created or [had] been a major contributor on. So with people who are relevant in my life, I definitely had a reputation as being sort of a Wikipedia-meister.

As these excerpts depict, altruism and egoism seem to play a role as separate motivational factors that drive one to contribute to functional commons-based peer production. The in-depth interviews suggest that altruism and egoism co-exists as distinct motivational factors, but the salience of each motivation seems to change depending on the stage of one’s involvement with a peer-productive project. Therefore, altruism and egoism were both added to the survey questionnaire as relevant motivations. Altruism was measured by two items that were based on the altruism scale (Monga, 2006) but modified to fit the context of the present study: “I believe peer production creates a better society” and “I want to give (give back) to the particular group(s) I am serving.” Egoism was measured by three items that were derived from the in-depth interviews: “I can benefit from what I contribute to others,” “I personally need the organization/website that facilitates the peer production,” and “Peer production helps me gain or maintain a reputation among those who I care about.” The egoism questions were all consistent with the desires in increasing one’s own welfare (Batson, 1991, 2002) by focusing on the instrumental and functional benefits that result from contributing to peer production, as revealed through the in-depth interviews.

*Creative Stimulation*

The third emergent motivational factor from the in-depth interviews was related to the sense of enjoyment, delight, and fulfillment that were gained through the contributors' active engagement with the necessary activities of functional commons-based peer production. For example, Informant 3 described the start of his involvement as an active Wikipedia editor as the following:

Researcher: How did you first get involved?

Informant 3: When the Internet and Wikipedia were very young, I ran across the site while doing research, and one day, I found an article that was inaccurate. I wanted to see how to contact the author to correct it. And then I discovered I could do it myself.

Researcher: How did you feel when you first discovered that [editing Wikipedia articles]?

Informant 3: A little empowered. I thought it was cool that I could change someone else's page!

This was clearly an important moment for the Informant 3; he not only discovered peer production in the process by which Wikipedia operates, but he also felt fascinated and empowered to discover his role as a contributor. Similarly, functional commons-based peer production may also elicit certain pleasurable mental states that accompany the active production of information. Informant 5, an open source programmer, mentioned moments where he would "zone out from the world":

Informant 5: Just 10-15 minutes concentrating and working hard, and you start to zone out from the world ... Once you reach that stage, all of a

sudden time starts flying. And it's a pretty cool place to be ... Every now and then it happens when I play the guitar too.

Researcher: You're sort of in the "zone."

Informant 5: You really get into that zone. I guess you could call it the altered mental state. Programmers sometimes chase that one. I think for programmers, part of it is solving the puzzle, and solving the puzzle well.

As the above excerpts illustrate, the open and participatory aspects of commons-based peer production elicits a feeling of empowerment, enjoyment, and pleasurable mental stimulation. This is consistent with past studies that found similar states of mental and creative stimulation as being a driving factor in contributing to functional commons-based peer production (e.g., Shah, 2006). It is also important to note that these positive sensations were gained through the contributors' active engagement with the necessary tasks involved in contributing to functional commons-based peer production.

That said, however, one might wonder the difference between this motivation and the "entertainment" factor of the U&G framework. Arguably, the positive sensations gained from contributing to functional peer production, in a sense, can be fun and entertaining. However, a more nuanced understanding of the "entertainment" factor of the U&G framework will allow one to recognize clear differences between it and the creative stimulation factor.

It is worthwhile understanding the roots of the "entertainment" factor of the U&G framework. Wright (1960) was one of the first studies that proposed entertainment as a function performed by the media, in addition to the ones previously proposed

(surveillance, correction, and cultural transmission; see Lasswell, 1948; Lazarsfeld & Merton, 1948). Wright (1960) argued that entertainment is subsumed within, or delivered together with other forms of media content, which are then passed onto the viewers to be consumed:

... the same mass media which provide surveillance and correlation often serve as a *source* of entertainment in a mass society. Indeed, the entertainment aspects of events may be interspersed with or woven into the news itself ... One function of mass-communicated entertainment, then, is to *provide* respite for the individual (Write, 1960, p. 620; emphasis added by author).

As seen from this passage, one of the earliest mentions of the entertainment function of media (i.e., aspects of media for which one seeks in order to fulfill their need to be entertained) points to the contents that are delivered through some source of mass distribution, which then *provide* relaxation and relief for its viewers. Hence, although the U&G framework focuses on one's active *seeking* of media content (Blumler & Katz, 1974), the viewer's need-gratifying *engagement* with entertainment was originally conceptualized as a predominantly receptive activity. The measurement items in classic U&G questionnaires are illustrative of this point. For example, Palmgreen, Wenner and Rayburn's (1980) study on TV news viewing revealed the following items as components of the entertainment factor: "I watch TV news because *it's* often entertaining;" "I watch TV news because *it's* often dramatic;" and "I watch TV news because *it's* often exciting" (Palmgreen et al., 1980; emphasis added by the author). As such, the traditional conceptualization of the entertainment motivation captures it as a trait of some media content, which is to be received, and then passively consumed by the viewer.

This is understandable, since the notion of active media engagement and interactivity were absent in mass media until recent. Hence, the question shifts to whether or not the traditional conceptualization of entertainment motivation has changed in the more recent U&G research, especially those that study digital media. In fact, even recent U&G research on the Internet use exhibits very little change in terms of the conceptualization of entertainment motivation. For example, Leung's (2009) mixed methods U&G research, which utilized focus groups and surveys, identified the following items as use motivations for user-generated contents online forums, blogs, Wikipedia, personal webpages, and YouTube): "to pass time," "because I am curious," "because it is entertaining," and "because it is trendy." Dholakia et al. (2004) identified the following four items as components of the entertainment factor in a context of small group virtual community participation email lists, BBS, newsgroups, chatrooms, virtual games, multi-user domains): "to be entertained," "to play," "to relax," "to pass time away when bored." In either of these cases, there is a mix of passive consumption of information i.e., "to pass time," "to be entertained") and active engagement through participation i.e., "because I am curious," "to play"). It is reasonable to separate the two as conceptually distinct motivational factors, because the present study focuses on the motivations that drive certain Internet users to actively engage in and contribute to rather than to passively consume the outputs of) commons-based peer production.

To summarize, considering the traditional conceptualization of entertainment as well as the recent emergence of interactive and participatory media, the researcher believes passive consumption of and active engagement with functional commons-based peer production should be kept conceptually distinct. The seeking of positive sensation

through *active engagement with content production* through websites or online platforms is a novel motivational factor that was not revealed through the literature review. The present study will label and refer to this factor as “creative stimulation,” which, from the in-depth interviews, was determined to be composed of the following three items: “I genuinely enjoy the tasks involved in peer production,” “the things that I do as a part of peer production is cool and fun,” and “there is a sense of enjoyment in peer production that I cannot experience elsewhere.”

After adding the three additional motivational dimension items, the final measurement set included five motivation dimensions and 59 measurement items, which represent the likely motivations that drive certain Internet users to contribute to commons-based peer production (see Table 5). All questions were on a 7-point Likert scale. Wordings of some of the original scales were modified to fit the context of the present study (i.e., changing “volunteering” to “commons-based peer production”; see Appendix A for the full survey instrument).

Table 5. Final Set of Motivation Measurement

Theoretical Frameworks	Motivational Factors
Uses and Gratifications (Katz et al., 1974)	<ul style="list-style-type: none"> <li>• Information giving (3 items)</li> <li>• Self-discovery (2 items)</li> <li>• Maintaining interpersonal connectivity (4 items)</li> <li>• Entertainment (4 items)</li> </ul> (Lampe et al., 2010; Sangwan, 2005)
Volunteerism (Omoto & Snyder, 1995)	<ul style="list-style-type: none"> <li>• Values</li> <li>• Understanding</li> <li>• Careers</li> <li>• Social</li> <li>• Ego enhancement</li> <li>• Ego protective (all 5 items)</li> </ul> (Clary, et al., 1996)
Social Identity (Tajfel, 1978)	<ul style="list-style-type: none"> <li>• Cognitive social identity (4 items)</li> <li>• Affective social identity (4 items)</li> </ul> (Bagozzi & Dholakia, 2002; Dholakia, et al., 2004)  <ul style="list-style-type: none"> <li>• Altruism (2 items)</li> <li>• Egoism (3 items)</li> <li>• Creative stimulation (3 items)</li> </ul>

The questionnaire also contained a question asking whether or not the respondent were involved in other forms of functional commons-based peer production (e.g., open source software production, contributing to online forums, etc.) and demographic questions (gender, age, education). Furthermore, considering the issue regarding the low retention rate of Wikipedia editors (Wikimedia Foundation, n.d.) and past studies that revealed a positive and significant relationship between volunteer satisfaction and length of volunteer service (e.g., Omoto & Snyder, 1995), the questionnaire also included one 7-point Likert scale item measuring the level of satisfaction gained from contributing to

Wikipedia, and another item asking about the average hours per week spent on contributing to Wikipedia.

### **Survey Participant Sampling and Recruitment**

In order to understand the motivations that drive Wikipedia contributors, 950 top editors were randomly sampled from a publically available list of the top 8,000 Wikipedia editors in terms of the cumulative number of edits. The Wikimedia Research Committee must approve all research studies that seek to collect data from Wikipedia or Wikipedia community members<sup>4</sup>. Hence, the researcher created a Meta page on the Wikimedia Research Committee that described the research question, theoretical framework, method and sampling, recruitment procedure, and timeframe of the present study. Recruitment started after the Wikimedia Research Committee reviewed and authorized the study. Because top Wikipedia editors are a scarce population that are frequently recruited for research studies, in order to minimize stress and disruption in that community, the Wikimedia Research Committee provided guidance and insights regarding the appropriate recruitment procedures. As a part of this, the researcher was advised to withhold from sending follow-up and reminder emails.

Randomly sampled editors were contacted through the Wikipedia email function available from user pages. The recruitment email contained a brief description of the researcher and the study, statement of potential risks and benefits, incentive, contact information, and the URL links to the research committee Meta page of the present study as well as the online survey. To maximize the response rate, the researcher offered a financial incentive to win a \$10 Amazon gift card for participants who complete the

---

<sup>4</sup> <http://meta.wikimedia.org/wiki/Research:Committee>

survey, as well as the access to a summary report of the study's key findings.

Recruitment took place between mid-May and late July of 2011. The following chapter presents the results of the data analysis.

## Chapter 5: Results

A total of 208 responses were collected from 950 randomly sampled top English Wikipedia editors. This translates to a response rate of 21.9 percent, which is considered as an acceptable response rate for online surveys (Wimmer & Dominick, 2006). This response rate also falls within one standard deviation from the mean response rate of existing online survey studies in major scholarly publications (Cook, Heath, & Thompson, 2000).

### Descriptive Statistics

Respondents' demographic profile generally did not exhibit significant deviations from the results of an earlier survey conducted in April 2011 with a sample taken from the general population of active Wikipedia editors<sup>5</sup> (AyushKhanna, 2011). Since 23 respondents (11.1 percent) discontinued their survey participation before the demographic profile section of the survey, their data were not included in the demographic profile. Table 6 presents the descriptive statistics of the remaining respondents.

---

<sup>5</sup> AyushKhanna (2011) operationalized "active editors" as those who make five or more edits in a month.

Table 6. Survey Respondents' Demographic Profiles

Variable		<i>n</i>	Percentage
Gender	Male	172	92.97%
	Female	11	5.95%
	Other	2	1.08%
	Total	185	100.00%
Age	10-14	3	1.62%
	15 - 19	21	11.35%
	20 - 24	21	11.35%
	25 - 29	32	17.30%
	30 - 34	24	12.97%
	35 - 39	16	8.65%
	40 - 44	18	9.73%
	45 - 49	12	6.49%
	50 - 54	9	4.86%
	55 - 59	10	5.41%
	60 - 64	8	4.32%
	65+	11	5.95%
	Total	185	100.00%
Highest education degree completed	Post graduate training or professional schooling after college	70	37.84%
	College graduate	65	35.14%
	Some college, no degree	26	14.05%
	High school graduate or the equivalent	14	7.57%
	9 - 12 grade (high school), no diploma	8	4.32%
	Nursery school to 8th grade (Kindergarten to the end of middle school)	2	1.08%
	Total	185	100.00%

In terms of gender, respondents of the present study included more male editors than female editors compared to the respondents of AyushKhanna (2011). In the present study, 92.97 percent of the respondents were male and 5.95 percent were female, whereas 91 percent and 9 percent of the respondents of AyushKhanna (2011) were male and female, respectively. In terms of age distribution, the respondents of the present study included a slightly larger proportion of editors who were older than age 40 than did the

respondents in AyushKhanna's survey. Specifically, 7.57 percent of the present study's respondents were under 17 years old (13 percent of the sample of general active Wikipedia editors), 8.65 percent were between 18 and 21 years old (14 percent of the sample of general active Wikipedia editors), 25.41 percent were between 22 and 29 years old (26 percent for the sample of general active Wikipedia editors), 21.62 percent were between 30 and 39 years old (19 percent of the sample of general active Wikipedia editors), and 36.76 percent of the respondents were over 40 years old (28 percent of the sample of general active Wikipedia editors). Compared to the sample of general active Wikipedia editors, the sample of top Wikipedia editors in the present study also included slightly higher proportions of those with advanced or higher education, and lower proportions of those with primary or secondary academic degrees. Specifically, 37.84 percent of the respondents of the present study had obtained or are in the process of obtaining a post-graduate degree (26 percent of the sample of general active Wikipedia editors), 35.14 percent had a bachelors degree or equivalent (35 percent of the sample of general active Wikipedia editors), 21.62 percent had a secondary degree (30 percent of the sample of general active Wikipedia editors), and 5.40 percent of the respondents of the present study had a primary degree (9 percent of the sample of general active Wikipedia editors).

Aside from contributing to Wikipedia, the survey respondents also contributed to other forms of functional common-based peer production, such as Q&A forums, product and service review websites, open source software development, and crowd sourcing. Of these activities, respondents spent the most hours per week on editing, creating and moderating Wikipedia articles (see Table 7).

Table 7. Functional Commons-Based Peer Production Activities by the Survey

Respondents

Activities Involved as a Contributor	<i>n</i>	Percentage	Average Time Spent (hours/week)			
			<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Wikipedia	185	100.00%	0.00	50	12.25	11.66
Q&A forums	52	28.11%	1.00	30	3.12	5.95
Online reviews	50	27.03%	0.00	14	1.74	2.43
Open source development	31	16.76%	1.00	50	6.68	13.00
Crowdsourcing	13	7.03%	1.00	20	3.23	5.17
Other	26	14.05%	1	40	8.92	12.13

## Findings

### Motivations Driving Contributions to Commons-Based Peer Production

The present study seeks to examine the structure of motivations that drive certain Internet users to contribute their time, knowledge, and resources to Wikipedia. To do so, responses to the online survey were analyzed using factor analysis. Factor analysis is a statistical method that reduces the number of variables into statistically related subgroups (factors) by detecting the underlying structure between related variables (Hill & Lewicki, 2006).

In order to reduce the motivation measurement items into theoretically coherent and statistically non-overlapping factors, multiple rounds of principal components analysis (PCA) were conducted with a Varimax rotation method. The initial analysis produced 13 factor components with eigenvalues greater than 1.0, which explained 73.59 percent of the total variance. According to the method suggested by Mertler and Vannatta

(2005), four statistical criteria were used to decide the retention or dropping of factors from the analysis: Kaiser's criterion of eigenvalue, scree plot, total variance explained, and the overall model fit. Kaiser criterion states that only components whose eigenvalues are greater than 1.0 should be retained, since those components would always have a non-zero component reliability (Kaiser, 1960). Scree plots were examined for their inflection points, since the factor number prior to the sharp drop of the eigenvalue would account for the most variance explained per factor for the fewest necessary number of factor components (Cattell, 1966; Field, 2009; Martler & Vannatta, 2005). Percentage of total variance explained points to the amount of total variability in the observed data that is accounted for by the number of factor components, and Stevens (1992) suggests that factors that account for at least 70% of the total variability should be retained. Finally, the model fit was assessed by comparing the degree of fit between raw observed correlations and reproduced correlations based on the factor analysis model. Field (2009) suggests that the number of non-redundant residuals between observed and reproduced correlations with absolute values greater than 0.05 must be below 50 percent and as low as possible.

Additionally, variables with factor loading scores of less than 0.50 or communality of less than 0.4 were dropped from the analysis, because they do not suggest a strong relationship with the respective factor structure or the overall factor components (Costello & Osborne, 2005). Interpretability of the factor components was also assessed in determining whether to retain or drop a factor; alternative factors were considered when no theoretical or conceptual explanations could be offered to a particular combination of variables under some factor component.

Using these criteria, 15 items were removed from the initial analysis due to low communality and factor loading scores, as well as poor interpretability. The second round of PCA with Varimax rotation identified 11 factor components with eigenvalues greater than 1.0, which explained 76.40 percent of the total variance. Upon examining whether there were more or fewer factors, the scree plot identified an inflection point at the sixth factor component. Since this suggested that a six-factor structure might produce a better alternative factor structure with a greater eigenvalue and total variance explained (Cattell, 1966; Field, 2009), another round of factor analysis was conducted. The six-factor structure extracted factors composed of multiple highly overlapping factors (factor loading score greater than 0.5 on two or more factors) and factor components that were conceptually difficult to interpret. Therefore, the third round of factor analysis was conducted with a Varimax rotation while forcing factor extraction to a seven-factor structure. The seven-factor PCA with a Varimax rotation explained 65.06 percent of total variance. The criteria indicated that 11 items were to be removed due to low factor loading scores.

The final round of factor analysis with 33 variables identified eight factors with eigenvalues greater than 1.0, which explained 75.26 percent of the total variance (see Table 8). The factors were statistically non-overlapping and theoretically interpretable. The scree plot of the final round of factor analysis also identified an inflection point at the eighth factor component, which adds empirical support for the eight-factor structure of the motivations associated with contributing to functional commons-based peer production (see Figure 2). In addition, each motivational factor had high internal consistency (Cronbach's  $\alpha > 0.70$ ), suggesting that they reliably captured the latent

motivations. A high degree of sampling adequacy and appropriateness were also confirmed: KMO = 0.85; Bartlett's Test:  $\chi^2(496) = 4344.92, p < .001$ .

*Table 8. Factor Component Matrix for Motivations of Top Wikipedia Editors*

	Factors							
	1	2	3	4	5	6	7	8
<b>Career Benefits (<math>\alpha = 0.92</math>)</b>								
Peer production can help me get my foot in the door at a place where I would like to work	0.85							
I can make new contacts that might help my business or career	0.84							
Peer production allows me to explore different career options	0.81							
Peer production experience will look good on my resume	0.78							
Peer production will help me succeed in my chosen profession	0.76							
<b>Social Desirability (<math>\alpha = 0.89</math>)</b>								
Others to whom I am close place a high value on peer production		0.81						
Peer production is an important activity to the people I know best		0.81						
People I am close to want me to be involved in peer production		0.80						
My friends are involved in peer production		0.74						
People I know share an interest in peer production		0.73						
<b>Concern for Others' Well-being (<math>\alpha = 0.87</math>)</b>								
I feel compassion toward people in need			0.86					
I am concerned about those less fortunate than myself			0.82					
I feel it is important to help others			0.79					
I am genuinely concerned about the particular group(s) I am serving			0.76					
I can do something for a cause that is important to me			0.66					
<b>Cognitive Group Membership (<math>\alpha = 0.89</math>)</b>								
When I am actually participating in peer-production, I feel as though my self-image overlaps with the identity of the end users of my contribution.				0.86				
When I am actually participating in peer-production, I feel as though my self-image overlaps with the identity of the other contributors of the peer production.				0.85				
In general, I feel as though my self-image overlaps with the identity of the end users of my contribution.				0.85				

*Table 8 (cont'd). Factor Component Matrix for Motivations of Top Wikipedia Editors*

In general, I feel as though my self-image overlaps with the identity of the other contributors.	0.84
Avoidance of Negative Self-Affect ( $\alpha = 0.89$ )	
Peer production is a good escape from my own troubles	0.85
Peer production helps me work through my own personal problems	0.83
No matter how bad I've been feeling, peer production helps me to forget about it	0.78
By being involved in peer production, I feel less lonely	0.75
Need to be Entertained ( $\alpha = 0.84$ )	
To play	0.83
To be entertained	0.79
To pass the time away when bored	0.77
To relax	0.69
Seeking of Creative Stimulation ( $\alpha = 0.78$ )	
I genuinely enjoy the tasks involved in peer production.	0.83
There is a sense of enjoyment in peer production that I cannot experience elsewhere.	0.76
The things that I do as a part of peer production are cool and fun.	0.74
Providing Information to Others ( $\alpha = 0.89$ )	
To contribute to a pool of information	0.88
To provide others with information	0.88

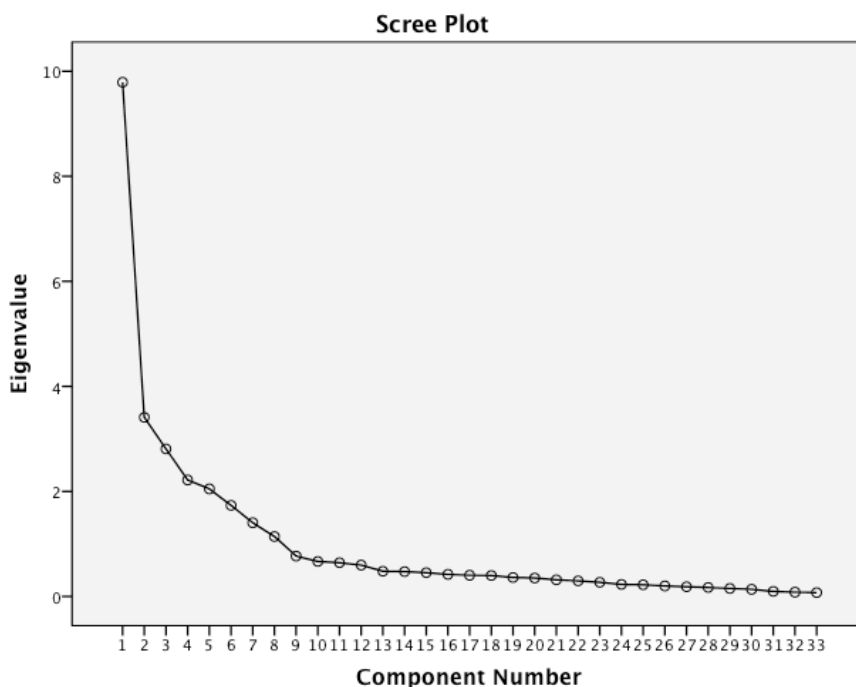
---

Notes:

N = 194.

Extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization.

Figure 2. Scree Plot of Factor Component Matrix



The first factor contained items regarding the tangible benefits related to one's current or future occupation; therefore the first motivational factor was named "career benefits" ( $\alpha = 0.92$ ). The second factor contained items regarding how one perceived their peers valuing peer production, and the degree of perceived social desirability regarding one's involvement in peer production; therefore, the second motivational factor was named "social desirability" ( $\alpha = 0.89$ ). The third factor contained items regarding one's concerns for others' well-being and one's drive to help others; therefore, the third motivational factor was named "concern for others' well-being" ( $\alpha = 0.87$ ). The fourth factor contained items regarding one's cognitive awareness of group membership (rather than the affective sense of belonging); therefore the fourth motivational factor was named "cognitive group membership" ( $\alpha = 0.89$ ). The fifth factor contained items regarding one's inclination to avoid feeling bad for choosing not contribute; therefore, this

motivational factor was named “avoidance of negative self-affect” ( $\alpha = 0.89$ ). The sixth factor was composed of items regarding the fulfillment of the need to be entertained; therefore, this motivational factor was named “need to be entertained” ( $\alpha = 0.84$ ). The seventh factor was composed of items regarding one’s desire to gain mental and creative stimulation through active engagement in peer production; therefore, this motivational factor was named “seeking of creative stimulation” ( $\alpha = 0.78$ ). Finally, the eighth motivational factor was composed of items regarding one’s need to provide and contribute information to others; therefore, this motivational factor was named “providing information” ( $\alpha = 0.89$ ).

### **Relative Strengths of the Motivational Factors**

The relative strengths of the eight motivational factors were examined through comparing the mean motivation scores of the eight factors by a series of paired samples *t*-tests. The results are presented in Table 9. There were 28 possible unique pairs of the eight motivational factors, and Bonferroni correction was applied to adjust for the increased chance of type-I error associated with 28 paired comparisons (adjusted alpha-level =  $0.05/28 = 0.0018$ ). Of the 28 pairs, all but one pair of motivations (Cognitive Group Membership - Avoidance of Negative Self-Affect) showed statistically significant differences. Among the eight motivational dimensions, providing information was found to be the strongest motivation, followed by seeking of creative stimulation and concern for others’ well-being. The weakest motivation was social desirability, followed by career benefits and cognitive group membership (see Table 10).

Table 9. Paired Samples T-Test Comparing the Scores of the Eight Motivational Factors

<b>Motivation A - Motivation B</b>	$M_A - M_B$	$t$	$df$	$p$
Career Benefits - Social Desirability	0.35	3.70	198	0.0003
Career Benefits - Cognitive Group Membership	-0.51	-4.34	194	0.0000
Career Benefits - Concerns for Others' Well-being	-2.01	-16.74	198	0.0000
Career Benefits - Avoidance of Negative Self-Affect	-0.57	-4.93	198	0.0000
Career Benefits - Need to be Entertained	-1.53	-11.76	194	0.0000
Career Benefits - Seeking of Creative Stimulation	-2.53	-21.14	193	0.0000
Career Benefits - Providing Information	-3.72	-31.86	194	0.0000
Social Desirability - Cognitive Group Membership	-0.86	-8.45	194	0.0000
Social Desirability - Concerns for Others' Well-being	-2.35	-24.92	204	0.0000
Social Desirability - Avoidance of Negative Self-Affect	-0.89	-8.14	201	0.0000
Social Desirability - Need to be Entertained	-1.88	-15.44	194	0.0000
Social Desirability - Seeking of Creative Stimulation	-2.87	-25.82	193	0.0000
Social Desirability - Providing Information	-4.06	-42.60	194	0.0000
Cognitive Group Membership - Concerns for Others' Well-being	-1.50	-12.21	194	0.0000
Cognitive Group Membership - Avoidance of Negative Self-Affect	-0.07	-0.61	194	0.5403
Cognitive Group Membership - Need to be Entertained	-1.02	-8.21	194	0.0000
Cognitive Group Membership - Seeking of Creative Stimulation	-2.00	-16.85	193	0.0000
Cognitive Group Membership - Providing Information	-3.20	-27.95	194	0.0000
Concerns for Others' Well-being - Avoidance of Negative Self-Affect	1.46	11.58	201	0.0000
Concerns for Others' Well-being - Need to be Entertained	0.48	3.51	194	0.0006
Concerns for Others' Well-being - Seeking of Creative Stimulation	-0.51	-4.33	193	0.0000
Concerns for Others' Well-being - Providing Information	-1.71	-17.19	194	0.0000
Avoidance of Negative Self-Affect - Need to be Entertained	-0.94	-7.92	194	0.0000
Avoidance of Negative Self-Affect - Seeking of Creative Stimulation	-1.94	-15.72	193	0.0000
Avoidance of Negative Self-Affect - Providing Information	-3.13	-25.44	194	0.0000
Need to be Entertained - Seeking of Creative Stimulation	-0.98	-9.83	193	0.0000
Need to be Entertained - Providing Information	-2.19	-19.09	194	0.0000
Seeking of Creative Stimulation - Providing Information	-1.20	-13.57	193	0.0000

Table 10. Mean Scores of the Eight Motivational Factor Components

	<i>M</i>	<i>SD</i>
Providing Information	6.43	0.69
Seeking of Creative Stimulation	5.23	1.23
Concern for Others' Well-being	4.73	1.33
Need to be Entertained	4.24	1.48
Avoidance of Negative Self-Affect	3.27	1.55
Cognitive Group Membership	3.23	1.46
Career Benefits	2.71	1.51
Social Desirability	2.39	1.17

In terms of the self- and other-oriented motivations for providing help, which is a common framework for explaining volunteer motivations (e.g., Gidron, 1978; Penner & Finkelstein, 1998; Sills, 1957), “career benefits,” “social desirability,” “avoidance of negative self-affect,” “need to be entertained,” and “seeking of creative stimulation” were self-focused motivations (the primary focus was to benefit the contributors themselves). On the other hand, motivations that were focused on the others included “concerns for others’ well-being,” and “providing information” (Table 11). When the two categories of motivations were compared, a marginally significant difference was found between the self- and other-focused motivations ( $t(6) = -2.37, p < 0.06$ ). However, no significant difference was observed between individual and social motivations to contribute to Wikipedia ( $t(6) = 1.59, p = 0.16$ ).

Table 11. Summary Matrix of Motivational Factors

		Motivation		<i>M</i>
		Individual	Social	
<b>Focus of benefit</b>	Self	<ul style="list-style-type: none"> <li>• Seeking of Creative Stimulation (<math>M = 5.23</math>)</li> <li>• Need to be Entertained (<math>M = 4.24</math>)</li> <li>• Avoidance of Negative Self-Affect (<math>M = 3.27</math>)</li> <li>• Career Benefits (<math>M = 2.71</math>)</li> </ul>	<ul style="list-style-type: none"> <li>• Cognitive Group Membership (<math>M = 3.23</math>)</li> <li>• Social Desirability (<math>M = 2.39</math>)</li> </ul>	3.51
	Others	<ul style="list-style-type: none"> <li>• Providing Information (<math>M = 6.43</math>)</li> <li>• Concern for Others' Well-being (<math>M = 4.73</math>)</li> </ul>	-	5.37
	<i>M</i>	4.36	2.81	

### Relationship between the Motivational Factors and Satisfaction

Correlation analysis revealed that satisfaction gained from contributing to Wikipedia was significantly related to “seeking of creative stimulation,” “need to be entertained” and “providing information.” However, of the three, “seeking of creative stimulation” was the only motivation that had a sizable correlation coefficient (see Table 12). In other words, of the eight factors that composed the motivation to contribute to Wikipedia, ones’ “seeking of creative stimulation” was significantly related to half of the variance exhibited in the satisfaction that one gained from contributing to Wikipedia.

Table 12. Correlations Between the Motivation Scores and Self-Reported Satisfaction

<b>Factors</b>	<i><b>Pearson coefficient</b></i>
Seeking of Creative Stimulation	0.50**
Need to be Entertained	0.18*
Providing Information	0.18*
Concern for Others' Well-being	0.10
Career Benefits	0.09
Cognitive Group Membership	0.03
Social Desirability	0.02
Avoidance of Negative Self-Affect	-0.02

\*\*  $p < 0.01$ , \*  $p < 0.05$

### Summary

The first research question investigated the motivations that drove top Wikipedia editors to contribute to Wikipedia. Through multiple rounds of factor analyses using PCA with a Varimax rotation method, the present study identified eight motivational factors composed of 33 items: “career benefits” (five items,  $\alpha = 0.92$ ), “social desirability” (five items,  $\alpha = 0.89$ ), “concern for others’ well-being” (five items,  $\alpha = 0.87$ ), “cognitive group membership” (four items,  $\alpha = 0.89$ ), “avoidance of negative self-affect” (four items,  $\alpha = 0.89$ ), “need to be entertained” (four items,  $\alpha = 0.84$ ), “seeking of creative stimulation” (three items,  $\alpha = 0.78$ ), and “providing information” (two items,  $\alpha = 0.89$ ). The present study identified these eight factors as distinctive dimensions of one’s motivation to contribute to Wikipedia. These eight factors all satisfied the factor retention criteria

(Costello & Osborne, 2005; Mertler & Vannatta, 2005) as well as the necessary sampling adequacy and the appropriateness for factor analysis (Field, 2009).

The eight-factor motivational components closely mirrored the motivations that were proposed by the theoretical frameworks. Specifically, “concerns for others’ well-being,” “career benefits,” and “social desirability” had identical factor structures with the “values,” “career,” and “social” factors of the VFI, respectively (Clary et al., 1996). The factor structure of “avoidance of negative self-affect” (4 items) was identical to the “protective” factor of the VFI (5 items), except for the lack of one item that was dropped from the analyses due to low factor loading score (“Peer production relieves me of some of the guilt over being more fortunate than others”). The factor structure of the “cognitive group membership” factor was identical to the cognitive social identity scale (Bagozzi & Dholakia, 2002; Dholakia, et al., 2004). The factor structure of the “need to be entertained” factor, likewise, was identical to the “entertainment” factor of media uses and gratifications. “Providing information” factor (2 items) was identical to the “information giving” factor (3 items) of media uses and gratification except for the lack of one item that was dropped from the analysis due to the low factor loading score (“to generate new ideas”). In addition, the factor structure of “seeking of creative stimulation” was identical to the items added based on the findings from the in-depth interviews.

The second research question investigated the relative strengths of the eight motivational factors. A series of 28 paired samples t-tests revealed that 27 of the 28 possible pairs of motivational factors were significantly different from one another. The mean scores of the eight motivational factors revealed that “providing information,” “seeking of creative stimulation,” and “concerns for others’ well-being” were the three

strongest motivational dimensions, while “social desirability,” “career benefits” and “cognitive group membership” were the three weakest motivations. In addition, when the eight motivations were grouped into two categories according to self- and other-focused motivations, the other-focused motivations (i.e., “providing information” and “concerns for others’ well-being”) were found to be significantly stronger than the self-focused motivations (i.e., “seeking of creative stimulation,” “need to be entertained,” “avoidance of negative self-affect,” and “career benefits”) ( $p < 0.06$ ).

Finally, the third research question investigated the relationship between the eight motivational factors and the satisfaction gained from contributing to Wikipedia. Correlation analysis revealed that “seeking of creative stimulation” was significantly correlated with satisfaction, with a moderate ( $r = 0.50$ ) correlation coefficient.

The following chapter provides a discussion of the results and implications, and proposes suggestions for future research.

## **Chapter 6: Discussion, Implications and Limitations**

The present study defined functional commons-based peer production as an Internet-mediated, collaborative, non-proprietary, and decentralized mode of production that produces outputs with utilitarian values. The study aimed at revealing the motivations that drive certain Internet users to contribute to functional commons-based peer production. Specifically, focusing on Wikipedia as a prime example of functional commons-based peer production, the following three questions were addressed: (1) the motivations that drive top Wikipedia editors to make content contributions to Wikipedia, (2) the relative strengths of the motivational factors, and (3) the relationship between the motivational factors and the satisfaction gained from contributing to Wikipedia.

To gain a comprehensive understanding of the phenomenon, a thorough review of past literature was conducted in the field of social psychology, mass communication, and the contemporary Internet. This study's proposed theoretical framework encompassed both individual and social motivations that drive helping behavior and media use, which were derived from the theory volunteerism (Clary et al., 1998), the Uses and Gratifications (U&G) framework (Katz et al., 1974), and the social identity theory (Tajfel, 1978).

Furthermore, considering the dearth of empirical research on the motivations driving contributions to functional commons-based peer production, in-depth interviews were also conducted with peer production contributors to discover any additional motivations that might not have been identified in the existing literature. By combining the insights gained from the extant literature and in-depth interviews, a 64-item

questionnaire was developed for an online survey with a sample of top Wikipedia contributors.

### **Summary of the Findings**

To address the first research question regarding the motivations that drive top Wikipedia editors to make content contributions to Wikipedia, factor analysis was conducted. Four rounds of principal components analysis with a Varimax rotation method were conducted. As a result, the following eight motivational factors were revealed: “career benefits,” “social desirability,” “concern for others’ well-being,” “cognitive group membership,” “avoidance of negative self-affect,” “need to be entertained,” and “seeking of creative stimulation.”

To address the second research question regarding the relative strengths of the eight motivational factors, a series of paired samples t-tests were conducted to compare the mean scores of the motivational factors. All but one of the 28 possible combinations of the eight mean motivation scores showed statistically significant differences. Of the eight motivational factors, “providing information,” “seeking of creative stimulation,” and “concerns for others’ well-being” were the three most prominent motivations. On the other hand, “social desirability,” “career benefits,” and “cognitive group membership” were found to be relatively weaker motivations.

The third research question regarding the relationship between the motivational factors and the level of satisfaction gained from contributing to Wikipedia was investigated through a correlation analysis. The results indicated that, of the eight motivational factors, “seeking for creative stimulation” was significantly related to satisfaction with a moderate degree of correlation. The remaining seven factors were

found to have little to virtually no correlation with the level of satisfaction gained from contributing to Wikipedia.

### **Discussion**

Generally speaking, the eight-factor structure of the motivation to contribute to Wikipedia suggests that commons-based peer production activities are driven by the interplay of personal and social factors, which are focused on benefiting both the self and the others. In line with the previous literature on functional theorizing of psychological motivations and volunteerism (Cantor, 1994; Snyder, 1993), the eight-factor motivational structure suggests that active editing of Wikipedia is a purposeful and goal-directed behavior that serves different psychological functions within individuals.

Looking at the specific motivational factors provides further insights regarding the particular psychological functions that the commons-based peer production fulfills. In light of the VFI (Clary et al., 1996), it becomes clear that motivational factors that drive contributions to Wikipedia closely mirror some of the motivations that drive volunteering behaviors. First, the factor structure of the “concern for others’ well-being” factor was identical to that of the “values” factor of the VFI. This suggests that contributing to Wikipedia, like volunteering, is a form of a value-expressive behavior regarding the altruistic and humanitarian concern for others (Clary et al., 1996). The emergence of this factor in the present study as well as the findings of past studies (e.g., Nov, 2007) suggest that contributing to Wikipedia is a purposeful and expressive act that is motivated by the altruistic and humanitarian desire to improve others’ well-being through information production (i.e., editing Wikipedia articles).

Second, the factor structure of the “career benefits” factor was identical to that of the “career” factor of the VFI, which indicates that top Wikipedia editors were driven by the functional and practical motives related to one’s current or future careers (Clary et al., 1996). The research literature on volunteerism (Jenner, 1982) and open source software (Shah, 2006) revealed that these career-related benefits are typically tied to the maintenance or improvement of one’s skills, or for building career-related connections. These career-related benefits, however, cannot be directly applied to the context of Wikipedia for two reasons: Wikipedia (and computer-mediated communication, in general) has a relatively high degree of anonymity compared to offline volunteering, and therefore may not provide many opportunities to build connections that are beneficial to one’s occupation. In addition, editing of Wikipedia is open to all people and does not require specialized skills. One possible benefit is that, as suggested in this study’s in-depth interview data, being an active Wikipedia editor may help those editors gain a unique reputation with symbolic value (see Kuznetsov, 2006, p. 5) that can simultaneously serve as a career-related benefit (see interview excerpts of Informant 2).

Third, the “social desirability” factor also had an identical factor structure with the “social” factor of the VFI, which indicates that top Wikipedia editors were motivated by their concerns regarding how others would perceive them as a result of choosing to (or not to) contribute. In other words, the motivation to engage in activities that are viewed favorably by others (Clary et al., 1996) plays a role in driving the contributors to edit Wikipedia. Some of the previous studies have revealed that these social adjustive functions (e.g., DeBono, 1987; Smith et al., 1956) require a clear reference group (the “other” by which one is motivated), and that an individual’s degree of self-monitoring is

strongly related to their social adjustment. The “social desirability” factor may, therefore, suggest that top Wikipedia editors, in general, are high self-monitoring individuals with a clear reference group in mind when making their contributions.

Fourth, the “avoidance of negative affect” factor closely mirrored the factor structure of the “protective” factor of the VFI. According to Clary et al. (1996), the “protective” factor is concerned with the motivation to protect one’s ego from negative feelings by not offering help, such as feeling of guilt for not sharing their available resources or the confrontation of their own personal problems that can be avoided by participating in helping activities. In the present study, however, the “avoidance of negative affect” factor did not include the item “Peer production relieves me of some of the guilt over being more fortunate than others.” One possible explanation can be offered by focusing on the difference in social distance between the helper and receiver in online and offline environments (Small, 2010). Compared to offline helping (i.e., volunteering) where face-to-face interaction is required, online helping (e.g., contributing to Wikipedia) is offered in an computer-mediated environment with considerably less cues to determine social distance (Tanis & Postmes, 2006) between the helper and the receiver of help. Therefore, the feeling of guilt may not be salient enough to motivate its avoidance among the contributors. Nonetheless, past findings regarding volunteerism (e.g., Clary et al., 1996) and Wikipedia contributions (Nov, 2007) suggest that avoidance of other forms of negative self-affect (i.e., loneliness, confronting one’s own personal issues) does play a stronger role in driving contributions to Wikipedia compared to the avoidance of the feeling of guilt.

It is also important to mention that the eight motivational factors did not include the enhancement and understanding factors from the VFI. This suggests that one's motivation to improve positive self-affect by providing help to others in need (enhancement) and to gain new experiences and knowledge (understanding) were not salient motivations for top Wikipedia editors to make their contributions. Conceptual reasoning for the dropping of the enhancement factor may be similar to that of the dropping of the item in the "avoidance of negative affect" factor. Unlike offline volunteering where the helper and receiver relationship is explicit, the online and mass-collaborative nature of Wikipedia may expand the social distance between contributors and end users, and thereby prevent any single contributor from feeling that they are making an impact that truly benefits the others. The absence of the understanding factor from the final factor structure suggests that, in the context of Wikipedia, the motivation to gain novel experiences or knowledge regarding an unfamiliar topic is not salient. Rather, contributors are more motivated by contributing information with which they are already familiar.

Aside from the VFI, the factor structure of the "cognitive group membership" factor was identical to that of the cognitive social identity scale. Past literature revealed that the cognitive aspect of social identity involves categorizing the self and group members as well as non-members through scrutinizing similarities and differences (Hogg, 1992). Also, cognitive social identity plays a strong role as a means of categorization in computer-mediated environments (Lea, Spears, & de Groot, 2001; Spears & Lea, 1994). Consistent with the previous studies, the findings suggest that top Wikipedia contributors are motivated by their cognitive awareness of group membership

(i.e., self-identification; Bagozzi & Dholakia, 2002) as top Wikipedia editors as well as the general Wikipedia community members. It is also plausible that cognitive self-identification is more salient in the context of Wikipedia, since the criteria of group membership is often concrete or quantifiable (e.g., making certain number of edits, interacting with other users frequently, etc.), and thereby provide more means to distinguish the similarities and differences between oneself and (non) group members.

The “need to be entertained” and “providing information” factors also closely mirrored the “entertainment” and “information giving” factors of the U&G framework (Lampe et al., 2010; Sangwan, 2005). These factors underscore the fact that commons-based peer production is a phenomenon that is driven by both inputting and outputting activities. Specifically, peer-produced goods serve as an input as well as an output of production since one’s works could serve as another’s inspiration, and thereby produces a cyclical relationship between consumption and production that fosters innovation and creativity (Benkler, 2006). Likewise, the “need to be entertained” and “providing information” factors suggest that contributing to Wikipedia is driven by both the motivations to consume others’ works and to disseminate one’s outputs. The “seeking of creative stimulation” factor further suggests that the contributors of Wikipedia are not only motivated to provide information, but also are motivated to actively engage in the creative processes of producing information.

The results of the present study also revealed that one’s “seeking of creative stimulation” is moderately correlated with the satisfaction gained from contributing to Wikipedia. In terms active user engagement, studies regarding creativity and the accompanying feeling of enjoyment or stimulation has been rare. One exception is Xie,

Bagozzi and Troye (2008), which developed and tested the concept of prosumption, which they define as “value creation activities undertaken by the consumer that result in the production of products they eventually consume” (p. 110). Taking cooking as an example, they analyzed 380 survey responses and revealed that one’s interest towards a specific prosuming activity is significantly related with the sense of fun and excitement they perceive towards that activity. The findings of the present study, therefore, further suggest that these feelings of fun and excitement actually motivate the productive behaviors.

To summarize, the findings of the present study suggest that contributing to Wikipedia is a purposeful and goal-directed activity that fulfills a multitude of psychological motivations, namely the individual and social motivations that are focused on benefitting both the self and the others. These motivations range from those that are driven from individual needs as well as from self-identification with the various communities within Wikipedia, and motivations that range from purely altruistic and humanistic ones to those that only focus on one’s career-related instrumental benefits. Furthermore, the motivation to contribute content was motivated by the need to consume, disseminate, and actively engage in the production of information. Of these diverse motivational factors, only “seeking of creative stimulation” was significantly correlated with satisfaction gained from contributing to Wikipedia.

## **Implications**

### **Theoretical Implications**

The present study offers several theoretical implications to the literature of commons-based peer production, especially regarding the motivations that drive such an

activity. First and foremost, this study is one of the first studies to investigate the multifaceted motivations that drive certain Internet users to make active contributions to functional commons-based peer production. Specifically, under the premise that contributions to commons-based peer production are a form of “adaptive and purposeful strivings of individuals towards personal and social goals” (Clary et al., 1998), this study investigated both the individual and social motivations that drive individual’s contributions to commons-based peer production. In doing so, empirical findings and theories from the field of social psychology and mass communication were incorporated to develop a conceptual framework and motivation measurements, which were supplemented by the findings from in-depth interviews. To advance the scholarship in the area of mass communication and Internet use motivation, such a comprehensive and rigorous theoretical and methodological approach is critical.

Second, the present study made a conceptual distinction of commons-based peer production that happens in different contexts for different reasons. Rather than attempting to investigate the entirety of the concept of commons-based peer production, which has the breadth to incorporate any and all forms of Internet-mediated, non-proprietary, decentralized collaborative production, the concept was divided into functional and hedonic commons-based peer production based on the mutual productive goal for which a given community of contributors gather and strive (Johnson & Johnson, 1991). Adopting Bagozzi and Dholakia’s (2002) definitions, functional commons-based peer production was defined as those initiatives that strive to produce outputs with utilitarian and instrumental value, whereas hedonic commons-based peer production focuses on creating outputs that bring positive and confluent experiences to the respective

community. Such distinction is useful in classifying the vast number of distinctly different peer productive services, tools, and platforms into conceptually meaningful groups, which in turn helps narrow the focus of research and theory development on commons-based peer production.

Third, the present study discovered a number of meaningful similarities and differences between motivations that drive functional commons-based peer production (i.e., Wikipedia) and traditional volunteering as well as online media use. The findings suggest that motivations to contribute to commons-based peer production closely mirrored the values, career, social, and ego protective motivations of volunteering, while avoidance of guilt was not a salient motivation in the context of the present study. Comparing the present study's findings to the U&G framework suggests that contributors are driven by the motivation to provide information, to consume content for entertainment, and also to actively engage in the information production process.

On a related note, the coexistence of the "seeking of creative stimulation" and "need to be entertained" factors as two separate motivational factors suggests that these are conceptually distinct motivations that traditional U&G studies did not distinguish when the framework was applied to the Internet. On one hand, contributors are seeking to be mentally challenged and creatively stimulated through active engagement in information production, and on the other hand they are seeking to be entertained to relax, play, and pass time. Palmgreen (1984) mentioned concerns for the potential inadequacy of the U&G framework to capture need gratifications that are unique to newer media, since the development and replication of the U&G framework has happened mostly in the context of traditional mass media. This concern is perhaps emphasized by the recent

upsurge of interactive and semantic web technologies coupled by the increased client-side control over information transaction (Chang et al., 2009; Hendler, 2009). The emergence of the “seeking of creative stimulation” factor in this study, therefore, suggests that such active interaction and engagement with commons-based peer production could be one of the dimensions that the traditional U&G studies came short of capturing when applied to the context of the contemporary Internet.

### **Practical Implications**

The findings from this study offer some practical implications for commons-based peer production project organizers as well. One of the major benefits of knowing why people behave in a certain way is that such insights can then be used to encourage (or discourage) those behaviors. Considering the reality that the few prominent peer production projects attract majority of the contributors and majority of the projects are supported by a disproportionately small number of contributors (Kittur et al., 2007; Madey et al., 2004; Sun et al., 2010; Voss, 2005; Wilkinson, 2008), it is critical that commons-based peer production projects invest some efforts to encourage participation and contributions from users. The findings of this study suggest that groups and organizations that host peer production can use the various motivational factors to strategically communicate their cause and thereby to attract more active contributors. For example, given the stagnation in the number of edits made on Wikipedia (Suh, Convertino, Chi, & Pirolli, 2009), the Wikimedia foundation might be able to attract new editors through tapping on the three strongest motivations that drive editorial contributions: providing information, creative stimulation, and values factors. Promotional messages should be planned according to these factors such as “help us

make knowledge more open” (values function); “contribute to the world’s largest pool of information” (providing information); and “become a part of creating the world’s most comprehensive encyclopedia” (creative stimulation).

In addition, the present study also found a moderate correlation between one’s “seeking of creative stimulation” and satisfaction, which is related to volunteer retention. Therefore, Wikipedia could encourage the retention of editors in general, or for particular articles that require more editors, by making the editing process more intellectually and creatively stimulating or by eliminating potential burdens for one to become creatively stimulated through their editing experiences.

### **Limitations and Directions for Future Research**

The present study has several limitations. First, the findings of the present study are not generalizable to other forms of commons-based peer production because they are tied to the specific context of Wikipedia or similar forms of functional commons-based peer production. Various peer-productive websites, tools and services offer vastly different features, user experiences, and resulting outputs; therefore, this study’s findings may not be applicable to hedonic commons-based peer production or other functional commons-based peer production that are too dissimilar to Wikipedia. In addition, the sampling frame of the present study was the top 8,000 active Wikipedia editors, and therefore this study’s findings may not be generalized to the general population of Wikipedia editors or to the contributors of other functional commons-based peer production. This calls for the need for future studies to replicate the present study with various samples drawn from contributors of different initiatives that fit the definition of functional or hedonic commons-based peer production.

Second, because the present study focused on discovering the motivational factors driving contributors of functional commons-based peer production, the findings did not address the specific relationships between motivational factors and contributing behaviors, or the effects of different motivations toward contributing behaviors. Future studies could address these by either quantifying the relationships between each motivational factors and behavioral measures such as the average amount of contributing activities or future intentions to contribute to peer-productive activities.

Third, because the present study focused on a very specific group of Internet users who have already shown a high degree of commitment to functional commons-based peer production (i.e., top Wikipedia editors), the study did not take into account the differences in the strength of volunteer motivations depending on the varying length of commitment. For example, Clary et al. (1996) found significant differences in the mean scores of motivational factors among volunteers with various years of volunteering experience. It is plausible that similar changes in motivations could happen to the contributors of functional commons-based peer production, and therefore studies that are interested in longitudinal changes to motivations within individual contributions should pay attention to one's history of contributing during sampling procedures, data analysis, or both.

On a broader scale, with respect to the volunteer process model (Snyder & Omoto, 2008), the present study only covers the individual and social group antecedents of functional contributing to commons-based peer production. Therefore, the findings of this study sheds little light to the actual experiences of contributors while participating in commons-based peer production, and the consequences of such contributions for

individual contributors, a community of contributors, agencies or organizations that host the peer-productive platform, and for the society that host those activities. For the purpose of advancing research on commons-based peer production, future studies should not only focus on individual or social antecedents of contributing activities, but also shift the scope of interest to the individual, interpersonal, organizational, and societal experiences and consequences of contributing to commons-based peer production.

Finally, on a methodological note, the in-depth interviews gathered information from only five informants, which is insufficient for reaching saturation (Lindlof & Taylor, 2002). Therefore the findings from the in-depth interviews are limited to the emergent themes from the five informants who contributed to Wikipedia, open source software production, online forums, and crowdsourcing. Considering the dearth of theory-based and empirical research on the motivations driving commons-based peer production, more full-scale qualitative research is called for in future research studies.

## References

- Alexa. (2010, April 30). Wikipedia.org - Site Info from Alexa. Retrieved from:  
<http://www.alexa.com/siteinfo/wikipedia.org>
- Anderson, C. (2009). *Free: The Future of a Radical Price*. New York: Hyperion.
- Andrejevic, M. (2007). *iSpy*. Kansas: University Press of Kansas.
- Ashforth, B. E., & Mael, F. (1989). Social Identity Theory and the Organization. *The Academy of Management Review*, 14(1), 39.
- AyushKhanna. (2011). Wikipedia Editors Survey 2011. Retrieved from:  
[http://commons.wikimedia.org/wiki/File:Editor\\_Survey\\_Report\\_-\\_April\\_2011.pdf](http://commons.wikimedia.org/wiki/File:Editor_Survey_Report_-_April_2011.pdf)
- Bagozzi, R. P., & Dholakia, U. M. (2002). Intentional Social Action in Virtual Communities. *Journal of Interactive Marketing*, 16(2), 2-21.
- Batson, C. D. (1991). *The Altruism Question: Toward A Social-psychological Answer*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Batson, C. D. (2002). Addressing the Altruism Question Experimentally. In S.G. Post, L. B. Underwood, J. P. Schloss, & W. B. Hurlbut (Eds.), *Altruism & Altruistic Love: Science, Philosophy and Religion in Dialogue* (pp. 89-105). New York: Oxford University Press.
- Baym, N. K. (2007). The New Shape of Online Community: The Example of Swedish Independent Music Fandom. *First Monday*, 12(8), retrieved from:  
<http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/1978/1853>

- Benbunan-Fich, R., & Koufaris, M. (2008). Motivations and Contribution Behaviour in Social Bookmarking Systems: An Empirical Investigation. *Electronic Markets*, 18(2), 150-160.
- Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CT: Yale University Press.
- Benkler, Y., & Nissenbaum, H. (2006). Commons-Based Peer Production and Virtue. *Journal of Political Philosophy*, 14(4), 394-419.
- Black, R. W. (2005). Access and Affiliation: The Literacy and Composition Practices of English-Language Learners in an Online Fanfiction Community. *Journal of Adolescent & Adult Literacy*, 49(2), 118-128.
- Blumler, J. G., & Katz, E. (1974). *The Uses of Mass Communications: Current Perspectives on Gratifications Research*. Beverly Hills, CA: Sage Publications.
- Bonaccorsi, A., & Rossi, C. (2004). Altruistic Individuals, Selfish Firms? The Structure of Motivation in Open Source Software. *First Monday*, 9(1-5), retrieved from: <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1113/1033>
- Brown, R., Condor, S., Mathews, A., Wade, G., & Williams, J. (1986). Explaining Intergroup Differentiation in an Industrial Organization. *Journal of Occupational Psychology*, 59(4), 273-286.
- Bruns, A. (2010). Distributed Creativity: Filesharing and Producers. In S. Sonvilla-Weiss (Ed.), *Mashup Cultures* (pp. 24-37). Germany: Springer-Verlag/Wien.

- Bumgarner, B. A. (2007). You Have Been Poked: Exploring the Uses and Gratifications of Facebook Among Emerging Adults. *First Monday*, 12(11). Retrieved from: <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2026/1897>
- Cameron, J. E. (2004). A Three-Factor Model of Social Identity. *Self and Identity*, 3(3), 239-262.
- Cammaerts, B. (2008). Critiques on the Participatory Potentials of Web 2.0. *Communication, Culture & Critique*, 1(4), 358-377.
- Cantor, N. (1994). Life Task Problem Solving: Situational Affordances and Personal Needs. *Personality and Social Psychology Bulletin*. 20(3), 234-243.
- Cattell, R. B. (1966). The Scree Test for the Number of Factors. *Multivariate Behavioral Research*, 1(2), 245-276.
- Chang, M., Smith, E., Reitmaier, R., Bebenita, M., Gal, A., Wimmer, C., Eich, B., & Franz, M. (2009). Tracing for Web 3.0: Trace Compilation for the Next Generation Web Applications. In A. Hosking, D. Bacon, & O. Krieger (Eds.), *Proceedings of The 2009 ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments* (pp. 71-80). New York, NY: ACM.
- Chung, D. S., & Kim, S. (2007). Blogging Activity Among Cancer Patients and Their Companions: Uses, Gratifications, and Predictors of Outcomes. *Journal of the American Society for Information Science and Technology*, 59(2), 297-306.

- Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., & Miene, P. (1998). Understanding and Assessing the Motivations of Volunteers: A Functional Approach. *Journal of Personality and Social Psychology*, *74*(6), 1516–1530.
- Clary, E. G., Snyder, M., and Stukas, A. (1996). Volunteers' Motivations: Findings from a National Survey. *Nonprofit Volunteer Sector Quarterly*, *25*(4), 485–505.
- Cnaan, R., & Goldberg-Glen, R. S. (1991). Measuring Motivation to Volunteer in Human Services. *Journal of Applied Behavioral Science*, *27*(3), 269-284.
- Cook, C., Heath, F., & Thompson, R. L. (2000). A Meta-Analysis of Response Rates in Web- or Internet-Based Surveys. *Educational and Psychological Measurement*, *60*(6), 821-836.
- Costello, A. B., & Osborne, J. W. (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment Research & Evaluation*, *10*(7), retrieved from:  
<http://pareonline.net/pdf/v10n7.pdf>
- Darley, J. M., & Latané, B. (1968). Bystander Intervention in Emergencies: Diffusion of Responsibility. *Journal of Personality and Social Psychology*, *8*(4), 377-383.
- David, P. A., & Shapiro, J. S. (2008). Community-Based Production of Open-Source Software: What Do We Know About the Developers Who Participate? *Information Economics and Policy*, *20*(4), 364-398.
- DeBono, K. G. (1987). Investigating the Social-Adjustive and Value-Expressive Functions of Attitudes: Implications for Persuasion Processes. *Journal of Personality and Social Psychology*, *52*(2), 279-287.

- Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A Social Influence Model of Consumer Participation in Network- and Small-Group-Based Virtual Communities. *International Journal of Research in Marketing*, 21(3), 241-263.
- Ellemers, N., Kortekaas, P., & Ouwerkerk, J. (1999). Self-Categorization, Commitment to the Group and Group Self-Esteem as Related but Distinct Aspects of Social Identity. *European Journal of Social Psychology*, 29(2-3), 371-389.
- Elliot, P. (1974). Uses and Gratifications Research: A Critique and a Sociological Alternative. In J. G. Blumler & E. Katz (Eds.), *The Uses of Mass Communications: Current Perspectives on Gratifications Research* (pp. 249-268). Beverly Hills, CA: Sage Publications.
- Fallis, D. (2008). Toward an Epistemology of Wikipedia. *Journal of the American Society for Information Science and Technology*, 59(10), 1662-1674.
- Field, A. (2009). *Discovering Statistics Using SPSS* (3rd ed.). Thousand Oaks, CA: Sage.
- Flanagan, C. A., Bowes, J. M., Jonsson, B., Csapo, B., & Sheblanova, E. (1998). Ties that Bind: Correlates of Adolescents' Civic Commitments in Seven Countries. *Journal of Social Issues*, 54(3), 457-175.
- Frisch, M. B., & Gerrard, M. (1981). Natural helping systems: Red Cross volunteers. *American Journal of Community Psychology*, 9(5), 567-579.
- Giles, J. (2005). Special Report: Internet Encyclopaedias Go Head to Head. *Nature*, 438, 900-901. Retrieved from:  
<http://www.nature.com/nature/journal/v438/n7070/full/438900a.html>
- Gidron, B. (1978). Volunteer Work and its Rewards. *Volunteer Administration*, 11(3), 18-32.

- Gidron, B. (1985). Predictors of Retention and Turnover Among Service Volunteer Workers. *Journal of Social Service Research*, 8(1), 1-16.
- Hars, A., & Ou, S. (2002). Working for Free? – Motivations of Participating in Open Source Projects. *International Journal of Electronic Commerce*, 6(3), 25-39.
- Hendler, J. (2009). Web 3.0 Emerging. *Computers*, 42(1), 111-113.
- Hertel, G., Niedner, S., & Herrmann, S. (2003). Motivation of Software Developers in Open Source Projects: An Internet-Based Survey of Contributors to the Linux Kernel. *Research Policy*, 32(7), 1159-1177.
- Hill, T., & Lewicki, P. (2006). *Statistics: Methods and Applications*. Tulsa, OK: StatSoft.
- Hoffman, M. L. (1981). Is Altruism Part of Human Nature? *Journal of Personality and Social Psychology*, 40(1), 121-137.
- Hogg, M. A. (1992). *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity*. New York, NY: NYU Press.
- Hogg, M. A. (2006). Social Identity Theory. In P. J. Burke (Ed.), *Contemporary Social Psychological Theory* (pp. 111-136). Stanford, CA: Stanford University Press.
- House, J. S. (1995). *Americans' Changing Lives: Waves I and II, 1986 and 1989*. Ann Arbor, MI: Inter-university Consortium for Political and Social Research.
- Jackson, J. W. (2002). Intergroup Attitudes as a Function of Different Dimensions of Group Identification and Perceived Intergroup Conflict, *Self and Identity*, 1(1), 11-33.
- Jansz, J., & Martens, L. (2005). Gaming at LAN Event: The Social Context of Playing Video Games. *New Media Society*, 7(3), 333-355.

- Jenkins, H. (2006). *Convergence Culture: Where Old and New Media Collide*. New York: New York University Press.
- Jenner, J. R. (1982). Participation, Leadership, and the Role of Volunteerism Among Selected Women Volunteers. *Journal of Voluntary Action Research*, 11(1), 27-38.
- Johnson, D. W., & Johnson, F. P. (1991). *Joining Together: Group Theory and Group Skills* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Kaiser, H. F. (1960). The Application of Electronic Computers to Factor Analysis. *Educational and Psychological Measurement*, 20(1), 141-151.
- Karau, S. J., & Williams, K. D. (2001). Understanding Individual Motivation in Groups: The Collective Effort Model. In M. E. Turner (Ed.), *Groups at Work: Advances in Theory and Research* (pp. 113-142). Mahwah, NJ: Lawrence Erlbaum Associates.
- Katz, E., Blumler, J. G., & Gurevitch, M. (1974). Utilization of Mass Communication by the Individual. In J. G. Blumler and E. Katz (Eds.), *The Uses of Mass Communications: Current Perspectives on Gratifications Research* (pp. 19-32). Beverly Hills, CA: Sage Publications.
- Keen, A. (2007). *The Cult of the Amateur*. New York, NY: Doubleday.
- Kinney, J. M., & Stephens, M. A. P. (1989). Hassles and Uplifts of Giving Care to a Family Member with Dementia. *Psychology and Aging*, 4(4), 402-408.
- Kittur, A., Chi, E., Pendleton, B. A., Suh, B., & Mytkowicz, T. (2007). Power of the Few Vs. Wisdom of the Crowd: Wikipedia and the Rise of the Bourgeoisie. *ACM CHI 2007 Conference on Human Factors in Computing Systems (CHI)*, San Jose, CA, 2007. ACM.
- Klandermans, B. (1997). *The Social Psychology of Protest*. Cambridge, MA: Blackwell.

- Kreiss, D., Finn, M., & Turner, F. (2010). The Limits of Peer Production: Some Reminders from Max Weber for the Network Society. *New Media & Society*, 13(2), 243- 259.
- Kuznetsov, S. (2006). Motivations of Contributors to Wikipedia. *ACM SIGCAS Computers and Society*, 36(2), 1-7.
- Lakhani, K. & Wolf, B. (2005). Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects. In J. Feller, B. Fitzgerald, S. Hissam & K. Lakhani (Eds.). *Perspectives on Free and Open Source Software*. Boston, MA: MIT Press.
- Lampe, C., Wash, R., Velasquez, A., & Ozkaya, E. (2010). Motivations to Participate in Online Communities. In E., Mynatt, G., Fitzpatrick, S., Hudson, K., Edwards, & T., Rodden (Eds.), *Proceedings of the CHI Conference on Human Factors in Computing Systems* (pp. 1927-1936). New York, NY: ACM
- LaRose, R., & Eastin, M. S. (2004). A Social Cognitive Theory of Internet Uses and Gratifications: Toward a New Model of Media Attendance. *Journal of Broadcasting & Electronic Media*, 48(3), 358-377.
- Lasswell, H. (1948). The Structure and Function of Communications in Society. In L. Bryson (Ed.), *The Communication of Ideas* (pp. 37-51). New York, NY: Harper and Row.
- Lazarsfeld, P. F., & Merton, R. K. (1948). Mass Communication, Popular Taste and Organized Social Action. In L. Bryson (Ed.), *The Communication of Ideas* (pp. 95-118). New York, NY: Harper.

- Lea, M., Spears, R., & de Gooit, D. (2001). Knowing Me, Knowing You: Anonymity Effects on Social Identity Processes within Groups. *Personality and Social Psychology Bulletin*, 27(5), 526-537.
- Leung, L. (2009). User-Generated Content on the Internet: An Examination of Gratifications, Civic Engagement and Psychological Empowerment. *New Media & Society*, 11(8), 1327-1347.
- Lindlof, T. R., and Taylor, B. C. (2002). *Qualitative Communication Research Methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Lometti, G. E., Reeves, B., & Bybee, C. R. (1977). Investigating the Assumptions of Uses and Gratifications Research. *Communication Research*, 4(3), 321-338.
- MacMillan, D. (2009, July 1). Mozilla's Crowdsourcing Mystique. *Bloomberg Businessweek* Retrieved from:  
[http://www.businessweek.com/technology/content/jul2009/tc2009071\\_384108.htm](http://www.businessweek.com/technology/content/jul2009/tc2009071_384108.htm)
- Madey, G., Freeh, V., & Tynan, R. (2004). Modeling the Free/Open Source Software Community: A Quantitative Investigation. In S. Koch (Ed.), *Free/Open Source Software Development* (pp. 203-220). Hershey, PA: Idea Group Publishing.
- McQuail, D., Blumler, J. G., & Brown, J. R. (1972). The Television Audience: A Revised Perspective. In D. McQuail (Ed.), *Sociology of mass communication* (pp. 135-165). Middlesex, England: Penguin.
- Mertler, C., & Vannatta, R. (2005). *Advanced and Multivariate Statistical Methods: Practical Application and Interpretation*. Glendale, CA: Pyrczak Publishing.

- Monga, M. (2006). Measuring Motivation to Volunteer for Special Events. *Event Management, 10*(1), 47-61.
- Mouffe, C. (1999). Deliberative Democracy or Agonistic Pluralism? *Social Research, 66*(3), 746-758.
- Mozilla Foundation. (n.d.). Mozilla Foundation and Subsidiary: Independent Auditors' Report and Consolidated Financial Statements. Retrieved from:  
<http://www.mozilla.org/foundation/documents/mf-2008-audited-financial-statement.pdf>
- Netcraft. (2010, September 17). September 2010 Web Server Survey. Retrieved from:  
<http://news.netcraft.com/archives/2010/09/17/september-2010-web-server-survey.html>
- Net Market Share. (n.d.). Market Share for Mobile and Desktop. Retrieved from:  
<http://www.netmarketshare.com/>
- Nielsen. (2009, July 7). Global Advertising: Consumers Trust Real Friends and Virtual Strangers the Most. Retrieved from:  
<http://blog.nielsen.com/nielsenwire/consumer/global-advertising-consumers-trust-real-friends-and-virtual-strangers-the-most>
- Nov, O. (2007). What Motivates Wikipedians? *Communications of the ACM, 50*(11), 60-64.
- Okun, M. A., Barr, A., & Herzog, R. A. (1998). Motivation to Volunteer by Older Adults: A Test of Competing Measurement Models. *Psychology and Aging, 13*(4), 608-612.

- Omoto, A. M., & Snyder, M. (1995). Sustained Helping Without Obligation: Motivation, Longevity of Service, and Perceived Attitude Change Among AIDS Volunteers. *Journal of Personality and Social Psychology*, 68(4), 671-686.
- Omoto, A. M., & Snyder, M. (2002). Considerations of Community: The Context and Process of Volunteerism. *American Behavioral Scientist*, 45(5), 846-867.
- Open Source Initiative. (n.d.). *The Open Source Definition*. Retrieved from:  
<http://www.opensource.org/docs/osd>
- O'Reilly, T. (2005, September 30). What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. Retrieved from:  
<http://oreilly.com/web2/archive/what-is-web-20.html>
- Palmgreen, P. (1984). Uses and gratifications: A theoretical perspective. In R. Bostrom (Ed.), *Communication Yearbook* (pp. 20-55). Beverly Hills, CA: Sage.
- Palmgreen, P., Wenner, L. A., & Rayburn, J. D. (1980). Relations Between Gratification Sought and Obtained: A Study of Television News. *Communication Research*, 7(2), 161-192.
- Penner, L. A., & Finkelstein, M. A. (1998). Dispositional and Structural Determinants of Volunteerism. *Journal of Personality and Social Psychology*, 74(2), 525-537.
- Posakoff, P. M., & Organ, D. W. (1986). Self-Report in Organizational Research: Problems and Prospects. *Journal of Management*, 12(4), 531-544.
- Rafaeli, S., & Ariel, Y. (2008). Online Motivational Factors: Incentives for Participation and Contribution in Wikipedia. In A. Barak (Ed.), *Psychological Aspects of Cyberspace: Theory, Research, Applications* (pp. 243-267). Cambridge, UK: Cambridge University Press.

- Roberts, J., Hann, I-H., & Slaughter, S. (2006). Understanding the Motivations, Participation and Performance of Open Source Software Developers: A Longitudinal Study of the Apache Projects. *Management Science*, 52(7), 984-999.
- Rosengen, K. E. (1974). Uses and Gratifications: A Paradigm Outlined. In J. G. Blumler & E. Katz (Eds.), *The Uses of Mass Communications: Current Perspectives on Gratifications Research* (pp. 269-286). Beverly Hills, CA: Sage.
- Rubin, A. M. (2009). Uses- and-Gratifications Perspective on Media Effects. In J. Bryant and M. B. Oliver (Eds.), *Media Effects: Advances in Theory and Research* (pp. 165-184). New York, NY: Routledge
- Sangwan, S. (2005). Virtual Community Success: A Uses and Gratifications Perspective. In *Proceedings of the 38th Hawaii International Conference on System Sciences*. Los Alamitos, CA: IEEE.
- Severin, W. J., & Tankard, J. W. (2000). *Communication Theories: Origins, Methods, And Uses In The Mass Media* (5th ed.). White Plains, NY: Longman Publishing Group.
- Shah, S. (2006). Motivation, Governance, and the Viability of Hybrid Forms in Open Source Software Development. *Management Science*, 52(7), 1000-1014.
- Shao, G. (2009). Understanding the Appeal of User-Generated Media: A Uses and Gratification Perspective. *Internet Research*, 19(1), 7-25.
- Shirky, C. (2008). *Here Comes Everybody: The Power of Organizing Without Organizations*. New York, NY: Penguin Press.
- Shirky, C. (2010). *Cognitive Surplus: Creativity and Generosity in a Connected Age*. New York, NY: Penguin Press.

- Sills, D. L. (1957). *The Volunteers: Means and Ends in a National Organization* (re-print ed.). New York, NY: Arno Press.
- Small, D. A. (2010). Sympathy Biases and Sympathy Appeals: Reducing Social Distance to Boost Charitable Contributions. In D. M. Oppenheimer & C. Y. Olivia (Eds.), *The Science of Giving: Experimental Approaches to the Study of Charity* (pp. 149-160). New York, NY: Psychology Press.
- Smith, D. H. (1981). Altruism, Volunteers, and Volunteerism. *Nonprofit and Voluntary Sector Quarterly*, 10(1), 21–36.
- Smith, M., Bruner, J., & White, R. (1956). *Opinions and Personality*. New York, NY: Wiley.
- Snyder, M. (1993). Basic Research and Practical Problems: The Promise of a “Functional” Personality and Social Psychology. *Personality and Social Psychology Bulletin*, 19(3), 251-261.
- Snyder, M., & Omoto, A. M. (2008). Volunteerism: Social Issues Perspectives and Social Policy Implications. *Social Issues and Policy Review*, 2(1), 1-36.
- Snyder, M., Omoto, A. M., & Crain, L. A. (1999). Punished for Good Deeds: Stigmatization of AIDS Volunteers. *American Behavioral Scientist*, 42(7), 1175-1192.
- Spears, R., & Lea, M. (1994). Panacea or Panopticon? The Hidden Power in Computer-Mediated Communication. *Communication Research*, 21(4), 427-459.
- Stevens, J. (2002). *Applied Multivariate Statistics for the Social Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Suh, B., Convertino, G., Chi, E., & Pirolli, P. (2009). The Singularity is Not Near: Slowing Growth of Wikipedia? In D. Riehle, & A. Bruckman (Eds.), *Proceedings of the 5th International Symposium on Wikis and Open Collaboration*. New York, NY: ACM.
- Sun, T., Chen, W., Liu, Z., Wang, Y., Sun, X., Zhang, M., & Lin, C. (2010). Participation Maximization Based on Social Influence in Online Discussion Forums. *Microsoft Research*. Retrieved from:  
<http://research.microsoft.com/apps/pubs/default.aspx?id=140935>
- Tajfel, H. (1978). *Differentiation Between Social Groups*. London UK: Academic Press.
- Tanis, M., & Postmes, T. (2006). Social Cues and Impression Formation in CMC. *Journal of Communication*, 53(4), 676-693.
- The Apache Software Foundation. (n.d.). What IS the Apache HTTP Server Project? Retrieved from: [http://httpd.apache.org/ABOUT\\_APACHE.html](http://httpd.apache.org/ABOUT_APACHE.html)
- Thomas, A. (2006). Fan Fiction Online: Engagement, Critical Response and Affective Play through Writing. *The Australian Journal of Language and Literacy*, 29(3), 226-239.
- Thompson, S. C., & Pitts, J. S. (1992). In Sickness and in Health: Chronic Illness, Marriage, and Spousal Caregiving. In S. Spacapan & S. Oskamp (Eds.), *Helping and Being Helped: Naturalistic Studies* (pp. 115-152). Newbury Park, CA: Sage.
- Voss, J. (2005). Measuring Wikipedia. In O. Persson, I. Wormell, & P. Ingwerson (Eds.), *Proceedings of the 10th Conference of the International Society for Scientometrics and Informetrics*. Leuven, Belgium: ISSI.

Wikimedia Foundation (n.d.). Editor Trends Study/Results. *Wikimedia Foundation*.

Retrieved from: [http://strategy.wikimedia.org/wiki/Editor\\_Trends\\_Study/Results](http://strategy.wikimedia.org/wiki/Editor_Trends_Study/Results)

Wikipedia. (n.d.). Help:About. Retrieved from: <http://en.wikipedia.org/wiki/Help:About>

Wilkinson, D. M. (2008). Strong Regularities in Online Peer Production. In J. Fortnow, J.

Riedl, & T. Sandholm (Eds.), *Proceedings of the 9th ACM Conference on*

*Electronic Commerce* (pp. 302-309). New York, NY: ACM.

Wilson, J., & Musick, M. (1997). Who Cares? Toward an Integrated Theory of Volunteer

Work. *American Sociological Review*, 65(5), 694-714.

Wimmer, R. D., & Dominick, J. R. (2006). *Mass Media Research: An Introduction*.

Belmont, CA: Thomson Wadsworth.

Wright, C. R. (1960). Functional Analysis and Mass Communication. *The Public Opinion*

*Quarterly*, 24(4), 605-620.

Xie, C., Bagozzi, R. P., & Troye, S. V. (2008). Trying to Prosume: Toward a Theory of

Consumers as Co-Creators of Value. *Journal of the Academy of Marketing*

*Science*, 36(1), 109-122.

Yang, H-L, & Lai, C-Y. (2010). Motivations of Wikipedia Content Contributors.

*Computers in Human Behavior*, 26(6), 1377-1383.

Yeung, A. B. (2004). The Octagonal Model of Volunteer Motivation: Results of a

Phenomenological Analysis. *Voluntas: International Journal of Voluntary and*

*Nonprofit Organizations*, 15(1), 21-46.

## Appendix A: Survey Instrument

### Commons-based Peer Production Motivation Survey Study Description and Consent Page

Hello, my name is [Yoshi Suzuki](#), a graduate student at the School of Journalism and Mass Communication, University of Minnesota. You were randomly selected as a possible participant of this survey from the list of [top 8000 most active contributors of Wikipedia](#).

This survey research has been reviewed and approved by the [Wikimedia Foundation Research Committee](#). For more information, please refer to the [project page](#) and the [discussion page](#) of this research.

#### **About this survey:**

This survey is an integral part of my master's thesis, in which I am investigating the motivations that drive commons-based peer production. Specifically, the core idea of this study is to find motivational factors that drive Internet users (like yourself) to participate in and contribute to peer production.

#### **What is Commons-based Peer Production?**

Commons-based peer production (peer production) is when a large number of voluntary contributions of time, skill and/or knowledge of people is coordinated (with the aid of the Internet) into larger, meaningful outputs. *Examples include, but are not limited to, creating or editing Wikipedia articles and online reviews (e.g., product reviews, movie reviews, etc.), and participating in crowdsourcing and open source software development.* By nature no single contributor can own nor profit from their contributions and/or the final product.

In particular, I am inviting you to take this online survey. Before you can take the survey, however, I need you to read this page. At the end of the page, I will ask you to agree to take the survey. You may decline to take the survey. If you decline, there will be no penalty, and you may also discontinue participation at any time.

#### **Procedures:**

If you agree to be in this study, I would ask you to complete a survey regarding your motivations, level of identification, and commitment with peer production. The survey should take **no longer than 15 minutes** to complete.

#### **Risks and Benefits of being in the Study:**

**This study involves minimal risk**, and the survey will require a small amount of your time and attention. There are several benefits in the study. First, **upon completing the survey, 10 participants will be randomly chosen to receive a \$50 Amazon gift card.**

Furthermore, if you wish, I will deliver an executive summary of the survey findings upon your request.

**Confidentiality:**

**This survey is completely confidential.** In the concluding page of the survey, you may disclose your Wikipedia username for the purpose of receiving incentives upon completing the survey. However, you will also have the choice to not disclose your username and thereby remaining anonymous through the survey. Wikipedia usernames will be stored separately from the survey results, and no connections will be made between the usernames and individual survey responses. Only I will have access to the survey results, and all data will be saved on a password-protected computer and on the secure servers of SurveyMonkey.com. Survey results on the SurveyMonkey server will be deleted shortly after the data collection phase of the study, which will last for roughly one month from June 10th, 2011. The results of this study may be used in research presentations, journal/magazine articles, and in book chapters.

**Voluntary Nature of the Study:**

Participation in this study is voluntary. Your decision of whether or not to participate will not affect your current or future relations with the University of Minnesota, Wikipedia, or any other individuals and organizations that are mentioned in this survey. If you decide to participate, you can withdraw at anytime without affecting those relationships.

**Contacts and Questions:**

If you have concerns or questions about this study, please contact the researcher using the information below:

Yoshikazu Suzuki  
 School of Journalism and Mass Communication  
 University of Minnesota  
 330 Murphy Hall 206 Church Street S.E.  
 Minneapolis, MN 55455 USA  
 Phone: 612-262-0221  
 Email: suzuk040@umn.edu

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are **encouraged to contact** the Research Subjects' Advocate Line:

D528 Mayo  
 420 Delaware St. Southeast  
 Minneapolis, MN 55455 USA  
 Phone: +1 (612) 625-1650.

**By clicking the "Next Page" button below, you acknowledge that you have read the above statements and grant your consent.**

("Next Page" button about here)



**I participate in peer production because... (cont'd)**

7. I believe peer production creates a better society.
8. My friends are involved in peer production.
9. People I am close to want me to be involved in peer production.
10. Others to whom I am close place a high value on peer production.
11. Peer production is an important activity to the people I know best.
12. People I know share an interest in peer production.
13. No matter how bad I've been feeling, peer production helps me to forget about it.
14. By being involved in peer production, I feel less lonely.
15. Peer production helps me work through my own personal problems.
16. Peer production is a good escape from my own troubles.
17. Peer production relieves me of some of the guilt over being more fortunate than others.
18. I can learn more about the issue for which I am working.
19. Peer production allows me to gain a new perspective on things.
20. Peer production lets me learn through direct hands-on experience.
21. I can learn how to deal with a variety of people.
22. I can explore my own strengths.
23. Peer production can help me get my foot in the door at a place where I would like to work.
24. I can make new contacts that might help my business or career.
25. Peer production allows me to explore different career options.
26. Peer production will help me succeed in my chosen profession.
27. Peer production experience will look good on my resume.







We are almost done! Finally, I would like to ask just a few more questions about you for statistical classification purposes.

60. What year were you born? (Please enter the last two digits of the year that you were born)

- 19 \_\_ \_\_

61. What is your gender? (Select one)

- Male
- Female
- Transgender
- Other

62. What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received (select one).

- None
- Nursery school to 8th grade (Kindergarten to the end of middle school)
- 9 – 12 grade (high school), no diploma
- High school graduate or the equivalent (for example: GED)
- Some college, no degree
- College graduate (Bachelors, associates, Magister/Diplom, Ahli Madya/Sarjana, grundnivå, or equivalent)
- Post graduate training or professional schooling after college (Masters, avancerad nivå, Doctorate, forskarnivå, MBA, or equivalent)

63. What is your religious affiliation? (Select one)

- Buddhism
- Christianity
- Confucianism
- Hinduism
- Jainism
- Judaism
- Muslim
- Shinto
- Sikhism
- Taoism
- I prefer not to answer
- Other World Religions (please specify): \_\_\_\_\_.

64. How many hours per week, on average, did you (do you) spend participating in the following peer production activities that you selected?

- Editing/creating/moderating Wikipedia articles \_\_\_\_\_ hours / week
- Open source software production \_\_\_\_\_ hours / week
- Answering questions on Q&A Websites \_\_\_\_\_ hours / week
- Creating online reviews (reviews for products, restaurants, movies, etc) \_\_\_\_\_ hours / week
- Crowdsourcing (please specify): \_\_\_\_\_ hours / week
- Other (please specify): \_\_\_\_\_ hours / week

