Consumer software piracy in virtual communities

An integrative model of heroism and social exchange

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Abstract

Purpose – In consumer marketing literature, the ethical/moral components of consumer behavior have been recognized as important factors in individuals' involvement in software piracy. However, there remains unanswered the question of which specific components are being referred to and how they explain consumer software piracy in the virtual knowledge-sharing community. This question is particularly unaddressed for those consumers who take the risks associated with piracy believing their acts to be taking from the haves (software producers) and giving to the have-nots. The paper aims to discuss this issue.

Design/methodology/approach – In this research, the authors propose a synergistic model that adopts the perspective of heroism and social exchange, and test it with the data collected from a virtual community. To test the proposed research model, the authors investigated 489 subjects and examined the hypotheses by applying the partial least squares method.

Findings – The findings show that the heroism construct has significant influence on sharing behavior in relation to cost factors, but not to benefit factors. Heroism stands out as the major construct in explaining sharing behavior. Thus, the research shows that the consumer software piracy present in the virtual knowledge-sharing community is a social behavior of exchange.

Originality/value – Methodologically, the study proposes a new model for researchers and practitioners to understand consumer software piracy in the virtual community. Managerially, software producers should take it into consideration when formulating their product-pricing strategy, to ensure that software producers and the young can both win in the "buy or steal" war.

Keywords Knowledge sharing, Software piracy, Virtual community

Paper type Research paper

1. Introduction

An internet-based forum provides a virtual space for consumers with similar interests to interact and share knowledge, generate innovative thoughts, and broaden their social connections (Wenger and Snyder, 2000). When a virtual community guarantees anonymity, its members are free to debate their beliefs, share their life experiences, and post or upload content they consider valuable to group members and to themselves with minimal concern about being scrutinized by third parties. However, through such activities, content such as instructions on how to circumvent the license keys of

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protected software, and the sharing of unauthorized intellectual property can implicate community members in acts of software piracy (Goode and Cruise, 2006; Zamoon and Curley, 2008). Previous research has addressed the challenge that software piracy in virtual communities is far from a rational act by users who are aware of the risks, gains, and losses of using pirate software (Larose *et al.*, 2005). Harrington (2000) and Kopczynski (2007) indicated consumer software piracy behavior in virtual communities is regarded as a form of heroism in engaging in risky behaviors that benefit other members (i.e. by providing free resources).

Additionally, software piracy is considered a growing economic movement for young consumers, whose social status and consumer power render copyrighted products prohibitively expensive (Strangelove, 2005; Cheng *et al.*, 1997). Young consumers act against software service providers' control of product pricing and the market economy, and they accept the risk of being reported for software piracy to retain their equal opportunity to use these technological innovations (Cheng *et al.*, 1997). This behavior can be perceived as a heroic act (akin to the acts of an archetypical Robin Hood character), where the actor chooses to take risks that are considered subversive by normal standards. However, the actor ultimately overcomes challenges and receives admiration and honor from other community members (Olberg, 1995). This honor received through heroic acts is not an economic concept, but a salient social reward given by community members in a social system (Olberg, 1995). In other words, these acts of heroism are interlinked with values such as freedom, pride, intellectual responsibility, and honor. From perspective, we argue that the user's software piracy behavior in a virtual community can be considered a heroic act, where the actor takes special risks in the face of copyright law, but provides benefits to the community members and consequently receives honor from them. If we postulate social exchange theory in explaining the members' reasoning for engaging in heroism, we must improve our understanding of the costs and benefits of software piracy behavior, as well as our understandings of what is at stake.

This study clarifies the unseen costs and benefits of software piracy behavior in a virtual community's knowledge-sharing practice based on the consumers' perspective of social exchange behavior. We focussed on the heroism that inspires people to act as a hero rather than apply the costs and benefits of rational economic choices as they engage in software piracy behavior in a virtual knowledge-sharing community. Investigating the underground virtual community enables us to address software piracy problems and to understand the behavior of virtual community members, some of whom are aware of the potentially illegality of their behavior. Our research findings can also assist in explaining the collective tacit and unspoken consensus that encourages virtual community members to engage in illicit sharing as an act of heroism based on social exchange behavior.

2. Theoretical framing

The core concept of the social exchange theory is the exchange relationship among specific actors as actions dependent on socially rewarding reactions from others (Blau, 1986). Social behavior is an exchange of goods that can be material such as money, and non-material such as the symbol of prestige or approval (Prasad and Mahajan, 2003).

Chen *et al.* (2013) propose that knowledge/resource sharing via the virtual community forum can be seen as a form of social exchange, in which many members participate and where reciprocal dependence is indirect, with the virtual community forum serving as the mediator between knowledge/resources contributors and seekers. While adopting the social exchange perspective, the costs of knowledge/resource sharing can be viewed as a form of opportunity cost and actual loss of knowledge/resources, while the benefits can

be seen as the free resources/knowledge or prestige received from others (Kankanhalli *et al.*, 2005; Molm *et al.*, 2007). Moreover, the time and effort required for knowledge/resource contributors to prepare the knowledge/ resources exclude them from accruing other rewards, which is the opportunity cost. The contributor's loss of power resulting from his giving of knowledge/resources is perceived as actual loss of knowledge/resources. The inducements in social exchange can serve to motivate participants to exchange knowledge/resources, including both extrinsic and intrinsic benefits (Molm *et al.*, 2007). For example, resource contributors may gain fulfillment from enhancing their ability to provide resources that help other members to solve problems. Knowledge/resources given away during social exchange can be seen as costs, while knowledge/resources received as a result of social exchange can be perceived as benefits.

Beyond social exchange processes, participants may sacrifice their own welfare for the sake of other community members although a third party may well view such welfare as being no less important than that of any other. For example, consumers may perceive as a challenge the breaking of the key protection of copyrighted software and post it on the virtual forum for the benefit of other community members. In this situation, they run the risk of formal legal sanctions. Their intention is to take from the "rich" (software companies) to benefit "poor" others (akin to the acts of the classical "Robin Hood" character) (Shoham *et al.*, 2008). Their behavior may be perceived as a "heroic act" by those who receive the benefit, and at the same time, as piracy behavior in the eyes of convention (Olberg, 1995; Harrington, 2000; Shoham *et al.*, 2008).

The heroism ideology suggests that participants are driven to make their sacrifice based upon an ideal in which aiding their community members in need takes precedence over the rules governing software acquisition and use. Their enactments are motivated by their ideology and committing of the "offending act" - a violation of recognized and accepted social norms of Intellectual Property Rights (IPR) protection - is based on a rational decision (Zamoon and Curley, 2008). The act is committed on the basis of their belief that harming a large software producer/organization for the benefit of a "poor" consumer who has little power against software pricing is the right action to take (Shoham *et al.*, 2008). The members who commit to a "heroic" identity or have positive experiences of unauthorized software sharing will influence consumers' attitudes toward software piracy. Indeed, social pressure can influence individuals to follow as well as break rules. They may be conscious of the image they project to their friends or family members, or they may wish to identify themselves with certain groups of people (Chen *et al.*, 2013). Moreover, the "heroic" perspective also allows individuals to neutralize their ethical judgments about software piracy and choose to copy software offered for sale by large organizations (Harrington, 2000).

Through unauthorized software sharing, virtual members are able to establish and maintain contact with other people as well as obtain software services of the same quality as the original product at either a low price or no cost. In addition, they can enjoy social support, friendship, and intimacy in their group. However, the members who share software in the virtual communities are not only at risk of prosecution, but also may acquire software services that are unsafe or harmful. Thus, gains and losses play a role in the decision to use pirated software.

3. Conceptual framework and hypotheses development

We adopt the social exchange theory as our conceptual framework and identify the cost and benefit factors by two means: by reviewing the literature on knowledge/resources sharing and social exchange; and by conducting context-specific interviews with key

participants in "GoodShare," a pseudonym for a virtual community, to validate and supplement the extant literature findings. The survey of "GoodShare" community member provides ecological validity that is helpful to software industry professionals seeking to understand consumers in their market.

3.1 Costs

3.1.1 Codification effort. Codification refers to the process of transforming tacit knowledge into a format that makes it possible to be stored and distributed as explicit knowledge (Kankanhalli *et al.*, 2005). The enactment of knowledge and resource contribution to the virtual community requires of a consumer time and mental effort in explicating and codifying her/his lived experiences, such as skills in resolving software viruses, know-how in using particular software, and thoughts resulting from watching movies, listening to music, and playing games. The expense of time and effort in codifying these experiences is a cost to the consumer which can hinder her/him from sharing in the virtual community (Markus, 2001; Kankanhalli *et al.*, 2005). *H1*, can be formulated as follows:

H1. Codification effort is negatively related to an individual's propensity to share knowledge/resources.

3.1.2 Loss of knowledge power. Knowledge is perceived as a source of power, knowledge contributors may fear losing their power or value if others know what they know (Gray, 2001; Chen *et al.*, 2013; Chennamaneni, 2006). Potential knowledge contributors may keep themselves out of a knowledge exchange if they feel they can benefit more by hoarding their knowledge rather than by sharing it (Chennamaneni, 2006). Thus, the following hypothesis can be formulated:

H2. Loss of knowledge power is negatively related to an individual's propensity to share knowledge/ resources.

3.1.3 Risk. Risk is an uncertain consequence of an event or an activity with respect to something of human value (Phau and Ng, 2010). Risk arises when an individual is engaged in situations where the outcomes are never totally certain and is concerned about the consequences of a poor or wrong decision (Phau and Ng, 2010). To include risk in the research, we postulate that knowledge/resources sharing may result in the sharing of pirated software. This is an act of copyright law infringement and those members of the virtual community participating in such behavior run the risk of a civil action by the copyright owner.

To develop an integrative understanding of the perceived risks influencing consumers' enactments in the virtual community, we conducted a context-specific interview with the key members of "GoodShare." In Chen *et al.* (2005) investigation of consumer involvement in illicit behavior, an inverse relationship between perceived severity of punishment and criminal conduct is demonstrated. Therefore, the following hypothesis can be formulated:

H3. The risks associated with pirate copying of intellectual property or software is negatively related to an individual's propensity to share knowledge/ resources.

3.2 Benefits

3.2.1 Forum rewards. Rewards are stimuli that are presumed to be positive events. The more positive the outcomes/rewards perceived by an individual to be related to a given action, the more inclined the individual will be to perform that action (Kankanhalli *et al.*, 2005). In knowledge-sharing practice, the literature indicates that

individuals expect to receive rewards from their organizations in return for their knowledge contribution (Beer and Nohria, 2000). At the same time, organizations provide various forms of incentive (e.g. salary increase, bonus, or promotion) to motivate their subordinates to participate in knowledge sharing (Ba *et al.*, 2001; Beer and Nohria, 2000). In terms of knowledge/resources-sharing practices in virtual communities, the managers of such communities also establish various incentive mechanisms to reward members who actively share.

In "GoodShare," members' resource accessibility is commensurate with their authority level; the higher the user's level of authority, the greater their resource accessibility. For example, the administrator enjoys the greatest authority, followed by forum leaders, with novices enjoying the lowest level among community members. Those who share the most will be promoted as forum leaders. When there is a change of forum leadership, the new leader is given the authority to review and evaluate all of the postings on the forum. As a promotion incentive, in "GoodShare," when an individual enrolls as a member, the status of his/her ID is open. Their status will change according to the amount and importance of the individual's contribution to the community. Thus, as the individual progresses up the hierarchy, s/he will accumulate prestige from the others in the virtual community. Public reward is an additional incentive mechanism, where an individual's contributions are aggregated once a week and compared with those of other members. The top 20 contributions are displayed on the "Honors Board" of "GoodShare." Virtual money earning is another incentive method used by "GoodShare" to reward a knowledge/resources contributor's sharing. The community member is able to save the virtual money and use it to play games on the forum. *H4*, can be formulated as follows:

H4. Forum reward is positively related to an individual's propensity to share knowledge/ resources.

3.2.2 Image. Self-image is important in social interactions which an individual wishes to claim for himself (Blau, 1986). From the self-impression management perspective, individuals aim to avoid generating an unfavorable image, seeking instead to convey a favorable public image. The social exchange theory hypothesizes that people engage in social interaction based on an expectation that it will, in some way, lead to social rewards such as favorable image, approval, status, and respect (Blau, 1986). Therefore, as individuals actively participate in social interaction such as knowledge and resources sharing, it is possible for them to acquire a favorable image from their social network (Constant *et al.*, 1997; Wasko and Faraj, 2005). Favorable self-image is vitally important in influencing the individual's position within a group. Constant *et al.* (1997) find that an individual wishing to improve his/her image in the community will be strongly motivated to participate in collective action. Accordingly, *H5* is:

H5. Image is positively related to an individual's propensity to share knowledge/ resources.

3.2.3 Reciprocity. From the perspective of social exchange theory, reciprocity is beneficial for individuals who engage in acts of social exchange (Blau, 1986; Molm *et al.*, 2007). Knowledge-sharing literature reviews also show that individuals who participate in knowledge sharing in online communities believe in reciprocity (Wasko and Faraj, 2005; Kankanhalli *et al.*, 2005). As individuals contribute their knowledge/resources to

the virtual community, they expect future returns from the other members in response to their giving. *H6*, therefore, is formulated as follows:

H6. Reciprocity is positively related to an individual's propensity to share knowledge/resources.

3.2.4 Receiving of free resources. The receiving of free resources and pirated software are identified from the context-specific interviews of "GoodShare" members. These free resources include trial versions of movies, MP3s, cartoons, games, e-books, and software. In general, the "GoodShare" community members regard these free resources as the most important benefit of sharing. *H7* is formulated as follows:

H7. Receiving of free resources is positively related to an individual's propensity to share knowledge/resources.

3.3 Heroism

Heroism is a conscious, voluntary decision (Kohen, 2013). Goode and Cruise (2006) indicate that heroism hinges on the relationship between the individual and group that symbolizes strong conformity to the ideal of putting group interests above one's own. Heroism has generally been combined with courage, risk taking, gallantry, and self-sacrifice, and is seen as emerging within a set of conditions that are potentially dangerous. Where, in the dangerous situations, the actor takes special risks and acts on behalf of others, such action may be perceived as heroic by his community (Olberg, 1995).

The belief of the heroic actor that "harming a large organization to the benefit of an individual is right" is called Robin Hood syndrome (Harrington, 2000, p. 180). Harrington (2000) found that those demonstrating a high degree of Robin Hood syndrome are more likely to pirate software as the syndrome allows an "individual to neutralize ethical judgments about software piracy and copy software offered for sale by large organizations" (p. 181). Moreover, individuals with Robin Hood syndrome who take from the "rich" (software companies) to benefit the "poor" can be perceived as performing a "heroic act" for those who receive the benefit (Shoham *et al.*, 2008). Kopczynski (2007) finds that the Robin Hood mentality of stealing from the rich to help the poor explains the act of consumer software piracy in developing countries. It shows that the software piracy is justified on the grounds that it is unfair to charge prices in low income countries that are comparable to those in the higher income countries and thus virtually unaffordable by most consumers and many businesses in developing countries.

On the basis of this line of thought, we postulate that the heroic act supported by the Robin Hood mentality, namely that taking from a large software producer for the benefit of an individual who has low economic power in terms of software consumption, could be applied in the context of social exchange behavior in the virtual community.

H8, therefore, is formulated as follows:

H8. Heroism is positively related to an individual's propensity to share knowledge/ resources.

Figure 1 depicts our social exchange-based research model in combination with the heroism perspective.

4. Research methodology and analysis

"GoodShare" had 300,000 registered members in total up to 2007, the majority of whom mainly communicated in Mandarin. In 2007, the community had an average of 5,000

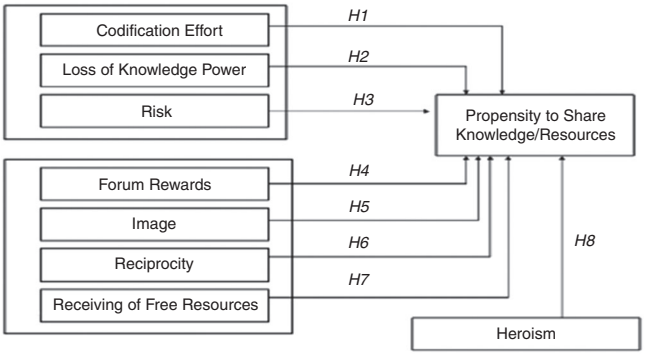

Figure 1.
Research model

members online every hour, with more than 30,000 members visiting it daily and generating over 10,000 new postings per day. The "GoodShare" members used this platform to share knowledge and lived experiences of software virus solutions, articles, pictures, music, DVD movies, computer games, and software packages. In the "GoodShare" context-specific interviews, a total of 30 participants, consisting of seven workshop owners and 23 community members, were interviewed via e-mail and MSN messenger.

In this study, a Likert-type seven-point scale questionnaire was used by subjects to respond to the questionnaire, where 1 represented "totally disagree" and 7 represented "totally agree" for each item. The codification variable was measured using a questionnaire developed by Ba *et al.* (2001) and Markus (2001) that measures the cost of time and labor in codification. The loss of the knowledge power variable was adopted from Gray's (2001) research. We applied the measurement developed by Wasko and Faraj (2005) for the reciprocity variable. The risk variable was developed based on Tan's (2002) ideal of prosecution risk, which highlights the analyzing the probability legal prosecution resulting from the use of pirated software. Tan's (2002) prosecution risk ideal was supplemented with the risk variable found from the context-specific interviews of "GoodShare" members.

The forum rewards, receiving of free resources, and heroism measurements were developed from the context-specific interviews. The forum rewards included: higher social position in the virtual community, opportunities to be forum leader, and the obtaining of virtual money. The free resources consisted of free movies, MP3s, software, games, or electronic books. The construct "heroism" was measured from the standpoint of the knowledge/resource providers, for example, those sharing the key unprotected, pirated software/resources perceived themselves as idols, champions, and authorities in controlling resources and helping other members. Finally, we applied the measurement developed by Igbaria *et al.* (1996) for the propensity to share knowledge, resources, and pirated software. All the measurements belonging to the cost constructs were reverse coded during the course of data analysis.

A total of 623 individuals responded to the questionnaire, with 134 questionnaires were incomplete and considered invalid. 84.3 percent of the subjects were male, and 15.7 percent were female. A total of 74.6 percent of the subjects were students, while 7.2 percent were employed in the information technology industry, and 3.7 percent in manufacturing. Most of the subjects were well educated: 80.4 percent were college

students and 10.6 percent were undergraduate students. Most of the subjects were between the ages of 21 and 25. Table I shows detailed demographics of the study subjects.

4.1 Analysis methods

4.1.1 Measurement model. We follow Hair *et al.* (2009) recommended two-stage analytical procedures. First, we conducted confirmatory factor analysis to access the measurement model (see Tables II and III) and examined the structural relationships later. To validate our measurement model, three types of validity are assessed: content validity, convergent validity, and discriminant validity. Content validity is established by ensuring consistency between the measurement items and the extant literature. This is done through interviews with experts and the pilot test of the instrument. We assess convergent validity by examining composite reliability and average variance extracted (AVE) from the measures (Hair *et al.*, 2009).

As shown in Tables IV and V, our composite reliability values range from 0.910 to 0.970 (without the heroism construct) and from 0.805 to 0.970 (with the heroism construct). They are all above the recommended value 0.7, which indicates our constructs are reliable (Hair *et al.*, 2009). Tables IV and V show the average variances extracted by our measures range from 0.770 to 0.941 (without the heroism construct) and 0.580 to 0.970 (with the heroism construct), which are above the acceptability value 0.5.

The result in Tables IV and V confirms the discriminant validity: the square root of the AVE for each construct is greater than the levels of correlations involving the construct. The results of the inter-construct correlations also show that each construct shares larger variance with its own measures than with other measures. In addition to validity assessment, we check for multicollinearity due to the relatively high correlations among some independent variables (e.g. a correlation of −0.554 between reciprocity and forum rewards, and −0.520 between receiving of free resources and forum rewards). The resultant variance inflation factor values for all of the constructs are between 1.024 and 1.772, which are less than 10 and acceptable.

4.1.2 Structural model. The proposed hypotheses are tested with partial least square. We initially address the predictors of online software piracy behavior in the

Gender (%)		*Education (%)*	
Male	84.3	Senior high school	2.5
Female	15.7	Vocational school	6.5
		College	80.4
		Undergraduate	10.6
Industry (%)		*Age (%)*	
Students	74.6	Under 20 years old	12.9
Information technology industry	7.2	20-25 years old	59.7
Manufacturing	3.7	25-30 years old	22.9
Service industry	3.5	30-40 years old	4.1
Farming industry	1.6	Over 40 years old	0.4
Unemployed	1.6		
Public service	1.0		
Finance and insurance industry	0.8		
Other	5.9		

Table I.
Demographics of the subjects of this study

Scale items	Lokp	Risk	Foew	Imag	Recp	Fsrc	Ksb	Ceff
Lokp 2	*0.8928*	0.1158	0.3168	0.0409	0.4506	0.2785	0.0033	0.3197
Lokp 3	*1.0000*	0.1634	0.2929	0.0290	0.3738	0.1811	−0.0552	0.2880
Risk 2	0.1802	*0.9668*	−0.2137	0.0864	−0.2226	−0.1442	−0.2280	0.1449
Risk 3	0.1439	*0.9772*	−0.2470	0.0911	−0.2424	−0.1530	−0.2706	0.1852
Foew 2	0.3375	−0.1560	*0.9218*	0.0186	0.5878	0.5337	0.3011	0.1195
Foew 3	0.1853	−0.2852	*0.9078*	−0.0061	0.4191	0.4128	0.2788	0.0885
Imag 1	0.0059	0.0961	0.0170	*0.9685*	0.0258	0.0514	−0.0112	−0.0452
Imag 2	0.0516	0.0788	−0.0045	*0.9563*	0.0697	0.0749	−0.0096	−0.0222
Recp 1	0.3444	−0.1511	0.4788	0.0694	*0.9260*	0.3618	0.2356	0.2311
Recp 2	0.4006	−0.1703	0.4951	0.0577	*0.8761*	0.3010	0.1695	0.2304
Recp 3	0.3516	−0.2455	0.5267	0.0049	*0.9295*	0.3438	0.2408	0.2178
Recp 4	0.2765	−0.2814	0.5202	0.0470	*0.9189*	0.3915	0.2979	0.1980
Fsrc1	0.1429	−0.1441	0.5094	0.0455	0.3904	*0.8775*	0.2783	0.0862
Fsrc 2	0.2276	−0.1534	0.5280	0.0457	0.4228	*0.9384*	0.2785	0.0471
Fsrc 3	0.2603	−0.1050	0.5019	0.0699	0.3690	*0.8982*	0.3003	0.0352
Fsrc 4	0.1994	−0.0357	0.4191	0.0901	0.3415	*0.8914*	0.2586	0.0514
Fsrc 5	−0.0418	−0.2125	0.3306	0.0365	0.1983	*0.7830*	0.3295	−0.1073
Ksb1	−0.0612	−0.1902	0.2477	−0.0101	0.2077	0.2495	*0.7685*	−0.0837
Ksb 2	−0.0888	−0.2277	0.2935	−0.0149	0.2279	0.2938	*0.9215*	−0.1234
Ksb 3	−0.0249	−0.2503	0.2994	−0.0058	0.2729	0.3243	*0.9412*	−0.0978
Ceff1	0.2249	0.1038	0.0953	−0.0245	0.2200	−0.0048	−0.1147	*0.9572*
Ceff2	0.3171	0.2229	0.1234	−0.0440	0.2345	0.0427	−0.1191	*0.9606*

Notes: Ceff, codification effort; Lokp, loss of knowledge power; Risk, risk; Foew, forum rewards; Imag, Image; Recp, reciprocity; Fsrc, receiving of free resources; Ksb, propensity to share knowledge/resources

Table II.
Factor structure matrix of loadings and cross-loadings (*without heroism construct*)

virtual community by examining the effects of codification effort (*H1*), loss of knowledge power (*H2*), risk (*H3*), forum rewards (*H4*), image (*H5*), reciprocity (*H6*), and receiving of free resources (*H7*) on sharing behavior. The results of the model test are shown in Figure 2.

The effects of loss of knowledge power and risk on sharing behavior fails to reach statistical significance at the $p < 0.05$ level ($\beta = -0.144$, t-value $= -1.895$; $\beta = -0.105$, t-value $= -1.945$, respectively), yet are significant at the $p < 0.1$ level. In addition, the image construct fails to attain statistical significance either at the $p < 0.05$ or $p < 0.1$ levels, indicating that image has no influence on sharing behavior in the virtual community. Therefore, we reject *H5*. Interestingly, four independent variables (codification effort, forum rewards, reciprocity, and receiving of free resources) have significant effects on the degree of sharing behavior in the virtual community at the $p < 0.05$ level. Receiving of free resources is the most important factor in sharing behavior ($\beta = 0.204$, t-value $= 3.586$), while codification effort, forum rewards, and reciprocity also have significant effects on sharing behavior ($\beta = -0.124$, t-value $= -2.345$; $\beta = 0.153$, t-value $= 2.416$; $\beta = 0.161$, t-value $= 2.477$, respectively). These results suggest that participants are more likely to share their knowledge/resources when there is a lower codification effort and higher opportunity for forum rewards, reciprocity, and receiving of free resources. Therefore, *H1*, *H4*, *H6*, and *H7* are supported.

Table III.
Factor structure matrix of loadings and cross-loadings (*with heroism construct*)

Scale items	Lokp	Risk	Foew	Imag	Recp	Fsrc	Ksb	Ceff	Hero
Lokp 2	*0.9778*	0.1162	0.3115	0.0410	0.4462	0.2738	−0.0428	0.3188	0.2962
Lokp3	*0.9764*	0.1639	0.2891	0.0291	0.3692	0.1777	−0.0716	0.2874	0.2444
Risk	0.1578	*0.9683*	−0.2168	0.0864	−0.2276	−0.1438	−0.2208	0.1441	−0.1396
Risk 3	0.1221	*0.9759*	−0.2502	0.0911	−0.2445	−0.1525	−0.2502	0.1845	−0.1782
Foew 2	0.3785	−0.1556	*0.9138*	0.0186	0.5883	0.5301	0.2796	0.1191	0.4772
Foew 3	0.1850	−0.2849	*0.9161*	−0.0061	0.4186	0.4117	0.2832	0.0886	0.3725
Imag 1	0.0132	0.0962	0.0165	*0.9682*	0.0249	0.0518	−0.0130	−0.0451	0.0667
Imag 2	0.0593	0.0786	−0.0051	*0.9566*	0.0693	0.0754	−0.0113	−0.0221	0.0688
Recp 1	0.3983	−0.1506	0.4760	0.0695	*0.9230*	0.3592	0.2160	0.2311	0.4411
Recp 2	0.4526	−0.1697	0.4917	0.0578	*0.8647*	0.2974	0.1312	0.2300	0.3323
Recp 3	0.3967	−0.2449	0.5225	0.0050	*0.9292*	0.3428	0.2266	0.2175	0.3518
Recp 4	0.3314	−0.2820	0.5160	0.0471	*0.9270*	0.3896	0.3016	0.1982	0.4603
Fsrc1	0.2009	−0.1442	0.5058	0.0456	0.3911	*0.8747*	0.2619	0.0858	0.4471
Fsrc 2	0.2976	−0.1533	0.5237	0.0457	0.4235	*0.9336*	0.2471	0.0470	0.4507
Fsrc 3	0.3367	−0.1048	0.4985	0.0699	0.3701	*0.8935*	0.2698	0.0350	0.4611
Fsrc 4	0.2415	−0.0355	0.4160	0.0902	0.3443	*0.8952*	0.2644	0.0510	0.4611
Fsrc 5	−0.0134	−0.2125	0.3317	0.0365	0.2023	*0.7903*	0.3245	−0.1075	0.3841
Ksb1	−0.0750	−0.1903	0.2483	−0.0101	0.2133	0.2515	*0.8945*	−0.0837	0.6079
Ksb 2	−0.0800	−0.2273	0.2941	−0.0149	0.2337	0.2955	*0.9814*	−0.1235	0.6558
Ksb 3	0.0093	−0.2500	0.2983	−0.0058	0.2750	0.3243	*0.8830*	−0.0977	0.6080
Ceff1	0.2405	0.1032	0.0956	−0.0245	0.2199	−0.0064	−0.1137	*0.9583*	−0.0632
Ceff2	0.3536	0.2226	0.1216	−0.0440	0.2318	0.0417	−0.1151	*0.9595*	−0.0122
Hero1	−0.0123	−0.1428	0.1737	0.0357	0.1984	0.2577	0.7043	−0.2061	*0.8144*
Hero 2	0.4859	−0.1471	0.5776	0.0765	0.5094	0.5494	0.3123	0.1624	*0.7173*
Hero 3	0.4306	−0.0810	0.5426	0.0732	0.4965	0.5142	0.3503	0.1508	*0.7551*

Notes: Ceff, codification effort; Lokp, loss of knowledge power; Risk, risk; Foew, forum rewards; Imag, image; Recp, reciprocity; Fsrc, receiving of free resources; Ksb, propensity to share knowledge/resources; Hero, heroism

Table IV.
Inter-construct correlation, composite reliability, and AVE (without heroism construct)

	Items	Composite reliability	AVE	Lokp	Risk	Foew	Imag	Recp	Fsrc	Ksb	Ceff
Lokp	2	0.945	0.900	0.949							
Risk	2	0.970	0.941	0.165	0.970						
Foew	2	0.909	0.834	0.289	−0.238	0.913					
Imag	2	0.960	0.922	0.028	0.091	−0.007	0.960				
Recp	2	0.951	0.830	0.366	−0.240	−0.554	−0.048	0.911			
Fsrc	4	0.944	0.770	0.173	−0.153	−0.520	−0.065	−0.388	0.878		
Ksb	5	0.910	0.772	−0.058	−0.258	−0.317	0.011	−0.267	0.333	0879	
Ceff	3	0.956	0.916	0.283	0.172	−0.114	0.036	−0.237	0.020	−0.122	0.957

Notes: AVE is average variance extracted. AVE should be larger than the squared correlation between any pair of constructs. The square root of AVEs is on the diagonal. The diagonal values should exceed the inter-construct correlations to show that the discriminant validity is acceptable. Ceff, codification effort; Lokp, loss of knowledge power; Risk, risk; Foew, forum rewards; Imag, image; Recp, reciprocity; Fsrc, receiving of free resources; Ksb, propensity to share knowledge/resources; CR, composite reliability

Table V.
Inter-construct correlation, composite reliability, and AVE (with heroism construct)

	Items	Composite reliability	AVE	Lokp	Risk	Foew	Imag	Recp	Fsrc	Ksb	Ceff	Hero
Lokp	2	0.830	0.907	0.952								
Risk	2	0.970	0.948	0.114	0.974							
Foew	2	0.910	0.938	0.251	−0.241	0.969						
Imag	2	0.960	0.800	0.006	0.091	−0.007	0.894					
Recp	2	0.950	0.916	0.322	−0.243	−0.550	−0.047	0.957				
Fsrc	4	0.943	0.933	0.186	−0.153	−0.514	−0.065	−0.388	0.970			
Ksb	5	0.942	0.925	−0.086	−0.243	−0.308	0.013	−0.257	0.316	0.960		
Ceff	3	0.956	0.920	0.291	0.170	−0.113	0.036	−0.236	0.019	−0.119	0.959	
Hero	3	0.805	0.704	0.220	−0.165	−0.464	−0.070	−0.445	0.502	0.674	−0.039	0.839

Notes: AVE is average variance extracted. AVE should be larger than the squared correlation between any pair of constructs. The square root of AVEs is on the diagonal. The diagonal values should exceed the inter-construct correlations to show that the discriminant validity is acceptable. Ceff, codification effort; Lokp, loss of knowledge power; Risk, risk; Foew, forum rewards; Imag, image; Recp, reciprocity; Fsrc, receiving of free resources; Hero, heroism; Ksb, Propensity to share knowledge/resources; CR, composite reliability

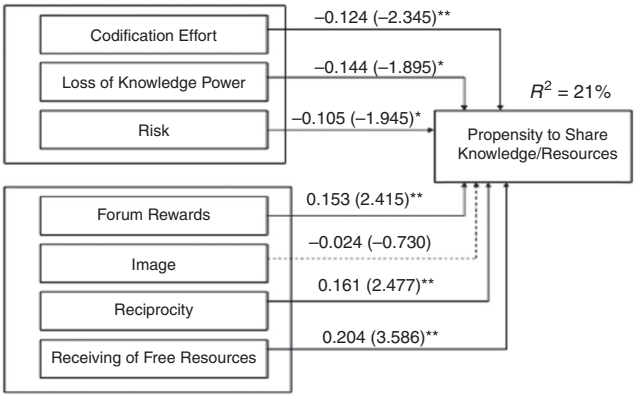

Figure 2.
Results of model test without heroism construct

In accord with previous studies (Olberg, 1995; Strangelove, 2005), heroism may be viewed as an important construct in explaining online software piracy behavior. To better understand sharing behavior in the virtual community, we introduce the heroism construct into the research model in the subsequent study. The test result is presented in Figure 3.

The effects of codification effort, forum rewards, image, reciprocity, and receiving of free resources on sharing behavior fail to reach statistical significance at $p < 0.05$ level ($\beta = -0.011$, t-value $= -0.412$; $\beta = 0.031$, t-value $= 0.931$; $\beta = -0.052$, t-value $= -1.661$; $\beta = -0.014$, t-value $= 0.380$; $\beta = -0.021$, t-value $= -0.521$, respectively). In addition, three of the independent variables have a significant effect on behavior (loss of knowledge power, risk, and heroism), which contribute directly to sharing behavior in the virtual community. Therefore, we reject *H1*, *H4*, *H5*, *H6,* and *H7*, and accept *H2*, *H3*, and *H8*.

Surprisingly, in the subsequent study, heroism along with the loss of knowledge power and risk constructs, provide satisfactory explanations of variance in propensity to share knowledge/resources ($R^2 = 0.526$). This large rise in variance, from 21 to 52.6 percent, mainly attributed to heroism ($\beta = 0.715$), shows that heroism is a critical construct in explaining the online software piracy behavior that is present in the virtual knowledge-sharing community.

Our research findings show that the heroism construct together with two cost constructs (loss of knowledge power and risk) explain 52.6 percent of the variance in

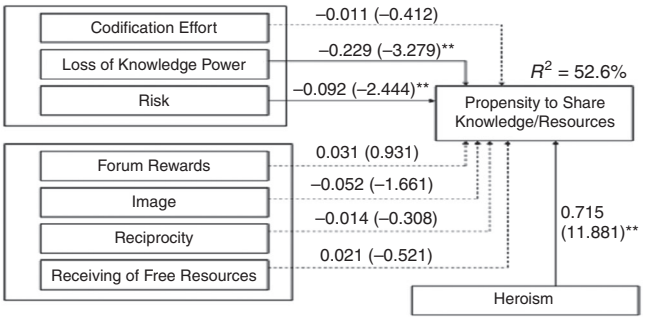

Figure 3.
Results of model test with heroism construct

propensity to share knowledge/resources in the virtual community (see Figure 3). However, when the heroism construct is introduced into the model, the impact of forum reward, reciprocity, and receiving of free resources, changes from significant to a non-significant on propensity to share knowledge/resources in the virtual community.

5. Discussion

Our research findings show that after introducing the heroism construct into the model, the variance in propensity to share knowledge/resources was 52.6 percent. This implies the members of GoodShare confirmed these heroic acts guided their software piracy behavior and determined their hero status directly when they participate in a high risk organization. Most GoodShare members are young, and they have weak consumer power to purchase copyrighted software. As a consequence of the domination of software prices set by large software producers who manipulate the market, young consumers have lost their ability to enjoy these products, a situation that prompts them to engage in software piracy (Keng *et al.*, 2011) and acts of heroism (Harrington, 2000). These actions include circumventing license keys that protect copyrighted software or sharing copyrighted software on a forum are perceived as heroic acts, both by the members with less consumer power in the community and by the actors themselves (Strangelove, 2005). Accordingly, members who are fearless of the consequences, disregard the consequences risk being reported for software piracy by providing free resources to other community members.

Second, several non-significant effects in the benefit construct (forum reward, reciprocity, and receiving free resources for sharing knowledge/resources in a virtual community) were observed when the heroism construct was introduced into the research model. This shows the members of GoodShare consider being a hero as a salient reward, because the knowledge-sharing among members is a product of the benefits and costs they provide for each other, and their behaviors were rational. The benefits of the community and acts of heroism reinforce the behavior of the members (i.e. heroic acts and subsequent benefits encourage members to continue sharing). Their behaviors are compensated with forum rewards, image, reciprocity, and receiving free resources, and individual heroic status. These exchanges can be understood based on interviews with the GoodShare members who participated in this study.

Regarding forum rewards, the reward mechanism is coupled with the hierarchical social structure of the virtual community. When a member joins GoodShare, (s)he is placed at the lowest position of the hierarchical social structure, where no virtual money is given, and the lowest level of resource access is granted. As the individual shares valuable knowledge and resources with other community members, her/his virtual money and resource accessibility gradually increase. Therefore, the more valuable the knowledge/resources (either legal or illegal) shared by a member, the higher their social position becomes. Moreover, the higher a member's social position, the greater the returns can be expected from the community. However, in the GoodShare reward system, much of the knowledge/resources the members perceive to be valuable is expensive software that they cannot afford. Whoever provides the free software and resources, regardless of the means that are employed to do so, is perceived as a community hero, and their actions are considered heroic. Consequently,

the social position of a hero in GoodShare is elevated. Furthermore, the reciprocity and receiving of free resources exerted a non-significant effect on knowledge/resources sharing that shows a member who commits a heroic act cares less about whether (s)he can receive free resources in return or if (s)he can benefit from reciprocity in the social exchange relationship.

Third, the best interests of the GoodShare community guide the members' behaviors. Heroism in the GoodShare community encourages members to focus on group goals, such as knowledge sharing by disseminating knowledge and by accepting copyrighted or public domain software shared among members. However, these members are not necessarily concerned with maximizing personal outcomes. They might weigh the potential cost and benefits of a heroic act and reflect upon the value of knowledge sharing. Thus, the members who perform a heroic act become the bearers of a prestigious identity, thereby achieving a group-affiliated status to make them appear as heroes to others.

Finally, in this research, we proposed an integrated model that draws upon the perspectives of heroism and social exchange theory to provide a fresh understanding of the components of consumers' online software piracy behaviors in a virtual community's knowledge-sharing practices. We systematically explained how people who commit acts of piracy (e.g. in relation to software and music CDs) consider their acts as taking from the haves and giving to the have-nots. Our explanation fills the evident gap in the literature regarding the understanding of consumers' online piracy behaviors.

6. Conclusions

This study addresses unanswered questions in consumer marketing literature about the components of consumers' online software piracy behaviors that are present in the virtual community's knowledge-sharing practices. Specifically, we explained why many members who engage in software piracy do so because they consider their acts to be taking from the haves (e.g. software producers) and giving to the have-nots (Kopczynski, 2007; Shoham *et al.*, 2008). This is particularly the case in the newly formed social life of virtual communities.

Theoretically, our research proposes an integrated model based on the perspectives of heroism and social exchange theory to study software piracy behavior exhibited by young members of a virtual community. The proposed research model emphasizes such online software piracy behavior is a social behavior where community members share their (legal and illegal) knowledge/resources through their social exchange relationships. Consequently, we introduced the heroism construct into the social exchange relationship, and showed heroism is the most crucial variable in explaining the variance of propensity to share knowledge/resources.

Managerially, our research has several implications. First, young community members were identified as the largest consumer group of software users and consumers of various media products (e.g. movies and music). However, their social status and consumer power renders them unable to afford expensive software and media products that are available on the market. Consequently, they prefer to risk being caught pirating software than lose their consumer rights to these products. Thus, because they have the opportunity to enjoy these products on a virtual forum, they make every effort to acquire these resources through exchange. This is a critical finding that software producers should consider when formulating their product

pricing strategy to ensure both software producers and young consumers can win in the buy or steal war. Second, various concepts have been proposed to prevent software piracy, such as enacting new laws to end software piracy, or introducing advanced technologies to protect file content. However, these proposed ideas represent a reactionary defense strategy against piracy, which gives producers an advantage in determining the direction of the market. Understanding the benefits and costs that consumers perceive when engaging in software piracy behavior during their knowledge-sharing activities is crucial in formulating a strategy that resolves the issue of internet-based software piracy without infringing on basic consumer rights.

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