Investigating the effect of tangible and virtual rewards on knowledge contribution in online communities

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Abstract

Crowdsourcing is an emerging trend and many Websites are dependent on user-generated content (UGC). This study examined the effect of rewards on users' proclivity to add content or acknowledge content on Websites that are based on UGC. The study focused on extrinsic factors that are controlled by the Website management. A survey compared a sample of 100 users of The Traveler (Lametayel.co.il, the Website of a leading Israeli brick-and-mortar chain of outdoor and travelling products) that offered tangible rewards, with a sample of 100 users of Waze (a community-based traffic and navigation application) that offered virtual ones. The main results indicated that tangible rewards were significantly more effective than virtual ones in encouraging users to add content, but virtual rewards had more influence on acknowledging content, although the particular reward mechanism might have affected user behavior. Many of the users were unaware of both the tangible or virtual rewards, and the foremost source of knowledge about the offered rewards was the Website, rather than social media or acquaintances. Implications for theory and practice are discussed.

Keywords: user-generated content (UGC), knowledge sharing, social capital, knowledge exchange, monetary incentives, attention economy, crowdsourcing.

Introduction

Ever since the opening of the world-wide-web for general public use in 1993 (Klotz, 2004), there has been a proliferation of innovative models that advance knowledge management. Crowdsourcing is one of these successful models, and it has many renowned manifestations, such as Wikipedia (van Dijck, 2009). Generally, crowdsourcing is based on user-generated content (UGC). The challenge that managements of Websites or applications that are UGC based, face is to draw up-to-date, relevant, and reliable content to their application. Hence, this task may be divided into two parts: adding content, by individuals and acknowledging content (or identifying inadequate/inappropriate content) by other individuals who are part of the community of users of the application. Usually, the amounts of data involved are too large to be managed by dedicated employees (Geri & Geri, 2011), and sometimes the breadth of the required knowledge is much beyond human capacity. Therefore, the application is dependent on UGC.

Although people usually share their knowledge without getting tangible incentives for their effort (Wasko & Faraj, 2005), one of the common methods for drawing UGC is to offer tangible or virtual rewards for adding or acknowledging content (Raban, 2008). The purpose of this study is to examine the effect of rewards on users' inclination to add content or acknowledge content on UGC-based Websites. There are intrinsic and extrinsic incentives for knowledge sharing, and

prior research dealt mainly with the intrinsic incentives (Tedjamulia, Dean, Olsen, & Albrecht, 2005). While the intrinsic incentives may be crucial for obtaining UGC, the extrinsic incentives are under the control of the Website management. Hence, this study concentrates on extrinsic incentives, and compares the effectiveness of tangible and virtual rewards, in order to gain theoretical and practical insights for managing UGC based websites.

Theoretical Background

There are many reasons why people share knowledge and contribute content on Websites (Barelka, Jeyaraj, & Walinski, 2013; Burke, Marlow, & Lento, 2009; van Dijck, 2009; Wasko & Faraj, 2005), however this study focuses on two extrinsic factors that are under the control of a Website management, and examines the following research questions:

RQ1: How does the awareness of a reward mechanism affect the willingness to add new user-generated content?

RQ2: How does the awareness of a reward mechanism affect the willingness to acknowledge user-generated content, which was reported by others?

RQ3: how does the type of the reward mechanism (i.e., tangible or virtual) affect the willingness to add new user-generated content?

RQ4: how does the type of the reward mechanism (i.e., tangible or virtual) affect the willingness to acknowledge user-generated content, which was reported by others?

Awareness of the rewards offered for adding or acknowledging content on a Website is a parameter under the control of its management. Actually, when the users are unaware of the rewards, from their perspective, there is no such reward. Thus, examining awareness as well as reward type, virtually enables us to relate to three types: no reward (if the users do not know that there is one); virtual reward; tangible reward (that has a monetary value).

We distinguish between adding content and acknowledging content because these two actions require different amounts of efforts, and thus may be differently influenced by different types of rewards.

There are studies that explain why people would be willing to share knowledge when they do not get a reward, and such studies may explain adding knowledge by those who are unaware of the rewards. For example, Wasko and Faraj (2005) suggest that social capital theory (Bourdieu, 1986; Coleman, 1988) is relevant for explaining individual-level knowledge contribution in electronic networks of practice. However, since our focus in this study is on external rewards that are controllable by a Website management, the question that interests us is whether awareness of a reward would increase users' tendency to add content. Raban (2008) suggests that economic and social activities are complementary, and coexist in information exchange environments. Her empirical findings showed that both tangible and social incentives increased knowledge sharing. Hence, our first hypothesis is as follows:

H1: *Awareness of a reward will positively affect the willingness to add content.*

Similarly, those who are aware of a tangible or virtual award should be more inclined to acknowledge content, even if the rewards are just badges (Anderson, Huttenlocher, Kleinberg, & Leskovec, 2013; Grant & Betts, 2013) or relative ranking (Cuel et al., 2012). Therefore, the second hypothesis is:

> H2: *Awareness of a reward will positively affect the willingness to acknowledge content.*

Although Raban (2008) proposed that both tangible and social incentives are effective in information exchange environments, her findings indicated the dominant role of tangible monetary rewards, as they are generally perceived as effective. Accordingly, we hypothesize:

> H3: *Tangible rewards will have a stronger effect on the willingness to add content than virtual rewards.*

Heyman and Ariely (2004) build on Fiske's relational theory (Fiske, 1992), and from the lens of labor, they divide Fiske's four types of social relationships (i.e., communal sharing; authority ranking; equally matching; market pricing) into two broad categories: money market (based on economic exchange), and social market (based on social exchange). Heyman and Ariely (2004) empirically demonstrate that effort in exchange for no payment can be higher than effort in exchange for low monetary payment. Their findings can help us explain user behavior in the context of small tangible rewards, such as those offered for acknowledging content. Thus, we hypothesize:

> H4: *Small tangible rewards will not have a stronger effect on the willingness to acknowledge content than virtual rewards.*

Methodology

The methodology of this study is based on quantitative methods, and uses an online survey for comparing the inclination of users to add or acknowledge content on two Websites/applications: the first one offers tangible rewards, and the second offers virtual ones. Since knowledge sharing and online participation may be influenced by culture (Bock, Zmud, Kim, & Lee, 2005), this initial study examined two Israeli Websites. However, the selected Websites/applications are similar to those offered globally, and one of them, Waze, is widely used in other countries.

"Lametayel", which means in Hebrew "for the traveler" and we call in this paper "The Traveler", is a leading Israeli brick-and-mortar chain of outdoor and travelling products. Its Website, Lametayel.co.il, which was inaugurated in December 1999, contains at least 350,000 information pages, and had an average monthly 500,000 pageviews according to formal data published on the website, and dated as relevant for April 2009. The content is in Hebrew, and includes information items about travel destinations all over the world, among them over two million user recommendations. Currently, access to the information is free. However, access to some of the content requires registration. The rewards plan that was in effect toward the end of 2013 and the beginning of 2014, offered tangible monetary rewards for adding content or acknowledging content on The Traveler's Website. In order to redeem the reward points, the users had to accumulate at least 10,000 points, which were worth about 5 Euros, and use them for paying up to 75% of the value of a product of their choice in a brick-and-mortar store of the chain. Posting

a tip (i.e., adding content), was worth an initial sum of about 25 cents, but each time that someone viewed the tip, its contributor earned 25 points (equals about 1.5 cents).

Waze is a community-based traffic and navigation application for smartphones. The use of Waze is free of charge; however, the data passively provided by the users about their traveling is used by Waze for current updates and prediction of arrival time. By the end of 2012, Waze had 36 million users in 110 countries all over the world. Waze was acquired by Google toward the end of 2013 for a sum of one billion USD. At the time of this study, December 2013, Waze employed a virtual reward system that enabled its users to gain points for diverse sorts of reporting, or actions. The points had no monetary value.

In order to examine the effect of reward type on user generated content, we compared a sample of 100 users of The Traveler, which offered monetary tangible rewards, with a sample of 100 users of Waze that offered virtual rewards. The surveys were identical for both applications, except for the request of the participants to answer specifically about the particular application. The surveys were administered online, and were distributed mainly via the discussion boards (forums) of the examined Websites/applications, but also by social network sites, and other forums that relate to the same users, e.g., general tourism Websites for obtaining participants in The Traveler's survey. About 210 responses were received for both applications. After screening the responses and excluding outliers, there was a sample of 100 usable responses for each one of the two applications. Table 2 presents validity and reliability of the survey items measurements, and shows that the data is reliable and valid.

Results

Table 1 summarizes the descriptive statistics of the 200 survey participants. No gender differences were found regarding adding content, acknowledging content, and awareness of the rewards (either tangible or virtual). However, significant (2-tailed) Pearson correlations were found between *age* and *adding content*, as detailed in Table 1, older participants were more inclined to add content than the younger ones.

Table 1: Demographics of the survey participants			
	Tangible rewards The Traveler	**Virtual rewards Waze**	**Total**
n	100*	100*	200
Gender	44 men; 56 women	66 men; 34 women	110 men (55%); 90 women (45%)
Average age	38.54 (SD 13.22)	29.21 (SD 6.99)	33.88 (SD 11.54)
Pearson correlation: Age and adding content	.457 P<.000, n=100	.358 P<.000, n=100	.539 P<.000, n=200

*Since n=100 in both of the samples, the numerical frequencies and cumulative frequencies are equal to the percent data.

Table 2 presents the survey items, their mean and standard deviation, the reliability, and the constructs' discriminant validity. Reliability was measured by Cronbach's alpha, with values ranging from .745 to .878, indicating that the construct measurement is reliable. Principal component factor analysis with Varimax rotation was used to examine construct discriminant validity. As Table 2 shows, the items loaded high (.573-.852) on their designated constructs, and

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low (|.017|-|.421|), on the other constructs, hence, demonstrating a satisfactory level of construct discriminant validity.

Table 2: Validity and reliability of the survey items					
		Rotated Component Matrix [a]			
Item	**Mean (SD) n=200**	**AddContent**	**AckContent**	**Awareness**	**Cronbach's alpha**
ADD1: Information sharing within this site – adding a comment	2.33 (1.311)	**.852**	.186	.228	**.878**
ADD2: Information sharing within this site – beginning a conversation (forum, chat)	1.89 (1.142)	**.822**	.230	.120	
ADD3: Information sharing within this site – adding media (photo/video)	2.33 (1.311)	**.817**	.158	.215	
ADD4: Information sharing within this site – adding content	2.76 (1.308)	**.709**	.441	.055	
ACK1: Information sharing within this site – reporting irrelevant or offensive content	1.94 (1.156)	.022	**.782**	.238	**.745**
ACK2: Information sharing within this site – editing existing content	2.14 (1.228)	.284	**.759**	-.055	
ACK3: Information sharing within this site – sharing existing content	2.11 (1.105)	.272	**.757**	.120	
ACK4: Information sharing within this site – clicking "Like"	1.90 (1.140)	.200	**.573**	-.017	
AWARE1: Are you aware of the credit program for those who share information on this site?	2.40 (1.588)	.248	.180	**.839**	**.803**
AWARE2: How did you find out about the credit program on this site?	2.23 (1.286)	.020	.069	**.822**	
AWARE3: The sort of credit provided by this site is...	2.92 (1.146)	.236	-.027	**.820**	

[a] Extraction Method: Principal Component Analysis.
   Rotation Method: Varimax with Kaiser Normalization.

Table 3 presents the frequencies of the answers to the three items that were used to measure the awareness of the survey participants to the rewards offered by the two examined Websites: the tangible rewards that The Traveler offered, and the virtual rewards of Waze. As evident from the data in Table 3, most of the participants were unaware of the rewards offered by both sites. Furthermore, a mere 11%-12% of the participants learned about the rewards from social networks or got a recommendation from friends or family.

Table 4 shows the results of independent samples t-tests that measured if awareness of rewards affected willingness to add content or acknowledge content. When the rewards were tangible (The Traveler), those that were aware of them were significantly more inclined to add content, but there was no significant difference in their inclination to acknowledge content. On the contrary, when the rewards were virtual (Waze), no significant difference was found between the tendency to add content of those that were aware of the rewards and those that were not aware of

them. However, those that were aware of the virtual rewards were significantly more inclined to acknowledge content. The results presented in Table 4 suggest that the reward type (i.e., tangible or virtual) affects the willingness to contribute content or to acknowledge it.

Table 3: Awareness of the survey participants to the rewards					
Questions and alternative answers		**Tangible rewards (The Traveler) n=100***		**Virtual rewards (Waze) n=100***	
Scale	AWARE1: Are you aware of the credit program for those who share information on this site?	**Frequency**	**Cumulative**	**Frequency**	**Cumulative**
1	I am not aware of the program	34	34	58	58
2	I have heard about it, but don't know details	15	49	19	77
3	I have heard about it, but I haven't shared information on this site	8	57	7	84
4	I have heard about it and shared information on this site a few times	12	69	9	93
5	I am aware of it and share information on this site regularly	31	100	7	100
Scale	AWARE2: How did you find out about the credit program on this site?	**Frequency**	**Cumulative**	**Frequency**	**Cumulative**
1	This questionnaire	31	31	63	63
2	The Internet	2	33	3	66
3	Ad on the application's site	55	88	23	89
4	Social networks	4	92	4	93
5	Recommendation of friends or family	8	100	7	100
Scale	AWARE3: The sort of credit provided by this site is...	**Frequency**	**Cumulative**	**Frequency**	**Cumulative**
1	There is no credit	2	2	6	6
2	I'm not aware of any credits	39	41	51	57
3	Prestige	1	42	38	95
4	Financial/tangible	37	79	0	95
5	Financial/tangible and reputation	21	100	5	100

*Since n=100 in both of the samples, the numerical frequencies and cumulative frequencies are equal to the percent data.

Table 5 presents the results of independent samples t-tests that measured the effect of reward type on adding or acknowledging content, as measured separately for those that were aware of the rewards and those that were unaware of them. Those that were aware of the tangible rewards significantly added more content than those that were aware of a virtual reward. Interestingly, a comparison between those that were unaware of the rewards also indicated that The Traveler users (who could get tangible rewards but declared that they do not know about it) added significantly more content than Waze users (who were unaware of the virtual rewards). However, no significant differences were observed in acknowledging content.

Table 4: independent samples t-tests of the effect of awareness of rewards on adding or acknowledging content

Reward type	Tangible rewards The Traveler		Virtual rewards Waze	
Awareness of rewards	**Aware**	**Unaware**	**Aware**	**Unaware**
n	59	41	43	57
Add content: Mean (SD)	2.95 (.93)	2.49 (1.05)	1.80 (.92)	1.60 (.66)
Levene's test for equality of variances	F=.627, p=.430		F=1.160, p=.284	
t-test (2-tailed)	**t=2.32, p=.022, df=98**		t=1.338, p=.184, df=98	
Cohen's d	.46 (small-medium effect size)		.25 (small effect size)	
Awareness of rewards	**Aware**	**Unaware**	**Aware**	**Unaware**
n	59	41	43	57
Acknowledge content: Mean (SD)	2.06 (.80)	1.87 (.81)	2.34 (1.07)	1.84 (.76)
Levene's test for equality of variances	F=1.029, p=.313		F=4.277, p=.041	
t-test (2-tailed)	t=1.17, p=.245, df=98		**t=2.604, p=.011, df=72.67**	
Cohen's d	.24 (small effect size)		.54 (medium effect size)	

| Table 5: independent samples t-tests of the effect of the reward type on adding or acknowledging content				
Awareness of rewards	**Aware**		**Unaware**	
Reward type	**Tangible (The Traveler)**	**Virtual (Waze)**	**Tangible (The Traveler)**	**Virtual (Waze)**
n	59	43	41	57
Add content: Mean (SD)	2.95 (.93)	1.80 (.92)	2.49 (1.05)	1.60 (.66)
Levene's test for equality of variances	F=2.06, p=.154		F=13.09, p<.000	
t-test (2-tailed)	**t=6.156, p<.000, df=100**		**t=4.805, p<.000, df=62.54**	
Cohen's d	1.24 (large effect size)		1.01(large effect size)	
Reward type	**Tangible (The Traveler)**	**Virtual (Waze)**	**Tangible (The Traveler)**	**Virtual (Waze)**
n	59	43	41	57
Acknowledge content: Mean (SD)	2.06 (.80)	2.34 (1.07)	1.87 (.81)	1.84 (.76)
Levene's test for equality of variances	F=3.139, p=.079		F=2.000, p=.161	
t-test (2-tailed)	t= -1.479, p=.142, df=100		t=.213, p=.832, df=96	
Cohen's d	-.30 (small effect size)		.04 (small effect size)	

Figure 1 summarizes the results and demonstrates the tendency to add content or acknowledge content as a function of reward type, and awareness of the reward. As demonstrated in figure 1, those that were aware of the rewards added or acknowledged more content than those that were unaware of them, although only the differences of adding content in The Traveler Website and of acknowledging content in Waze were significant.

Discussion

Theoretical Implications

The first hypothesis, that awareness of a reward will positively affect the willingness to add content was supported for tangible rewards, but not for the virtual ones. While the results for tangible rewards are in line with prior research (e.g., Raban, 2008), the results regarding the virtual rewards imply that they are less important as an incentive, and therefore no significant differences were found between those that were aware of the virtual rewards and those that were
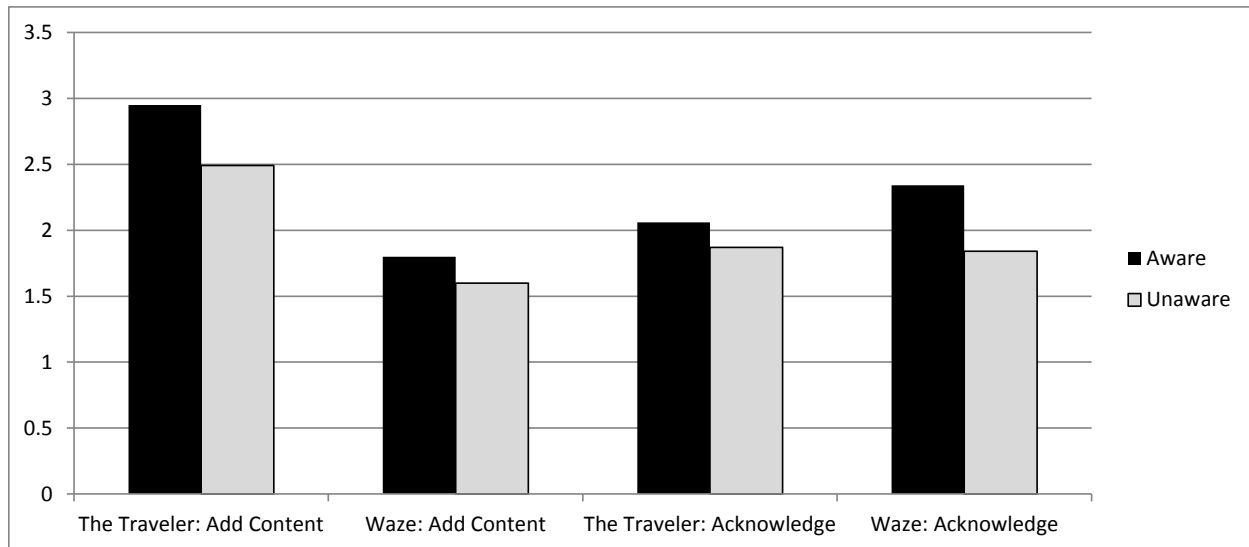
not aware of them.

Figure 1: Tendency to add content or acknowledge content as a function of reward type (The Traveler: tangible, Waze: virtual), and awareness of the reward

On the contrary, concerning acknowledging content, H2 was not supported for tangible rewards, but was supported for the virtual ones. Regarding the tangible rewards, it may be due to the small tangible reward offered for acknowledging content (25 points as opposed to 400 points for adding content). As for the significant results regarding awareness of the virtual rewards, which were similar to those of Cuel et al., (2012), it seems that the effort required for acknowledging knowledge was compensated by the virtual reward.

H3, which suggested that tangible rewards would have a stronger effect on the willingness to add content than virtual rewards, was supported for those who were aware of the rewards, but there was also a significant difference for those who were unaware of them, as the tendency to add content to The Traveler was significantly higher than that of Waze. A possible explanation is higher intrinsic incentives for adding content on The Traveler Website, which were not examined in this study.

Finally, H4, which suggested that small tangible rewards would not have a stronger effect on the willingness to acknowledge content than virtual rewards, was supported, in accordance with Heyman and Ariely (2004).

Practical Implications

As evident from figure 1, those that were aware of the rewards were more inclined to add and acknowledge content, although not all the differences were statistically significant. Nevertheless, as observed in table 3, many users were unaware of both the tangible or virtual rewards. It was also interesting to learn that the foremost source of knowledge about the offered rewards was the Website, rather than social media or acquaintances. The implications for practice seem clear-cut: Websites that are based on user-generated content should display their reward program on the website in a manner that would get the attention of potential content contributors.

From an attention economy perspective (Geri & Geri, 2011) it is worthwhile to allocate space on main webpages of UGC-dependent Websites for informing users about the rewards program in an effort to increase their awareness of rewards. Although the space on the main webpages of a Website is scarce, it is crucial for such Websites to motivate users to add new content and confirm or update the existing content, because it is that content that draws people to the Website, and enables fulfilling its mission.

Furthermore, the display of the rewards program on the Website would also encourage those that are aware of the rewards to add or acknowledge content. As our findings show, social media had a minor role in informing users of the Website about the rewards. A plausible explanation for this finding, which requires corroboration in further research, is that people would prefer discussing with their friends their intrinsic motivations for contributing content to a Website, rather than their extrinsic incentives for doing so. The practical implication is that social media should serve mainly for drawing users to the Website, and once they visit the Website to inform them about the rewards program.

Limitations and Further Research

The findings of this study should be applied while considering its limitations. First, knowledge sharing is influenced by culture (Bock et al., 2005). On the one hand, this study used a somewhat homogeneous sample of users of two Israeli Websites; on the other hand, the findings should be corroborated by repeating the survey in other cultural environments.

Furthermore, the two types of UGC based Websites that were examined in the study may not represent other types. Hence, future research should examine other sorts of UGC based applications.

As our findings indicated low awareness of the rewards offered by Websites to users who add or acknowledge content, further studies may examine the effectiveness of various strategies for informing users about such rewards, and thus motivate them to deliver more content.

Conclusions

This survey demonstrated the importance of extrinsic incentives for Websites that are based on user-generated content. While the advantage of tangible rewards over virtual ones was expected, the unawareness of about half of the users of the rewards offered for contributing content, was unexpected. It was also revealing to find out about the negligent role of social media or acquaintances as a source that promotes awareness of reward programs. This initial study offers important insights, and implies that there is still much unfulfilled potential of knowledge sharing that UGC based Websites may exploit.

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