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# Every Little Helps: Understanding Donor Behavior in a Crowdfunding Platform for Non-profits

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**Abstract**

As crowdfunding platforms like Kickstarter have gained in popularity, many non-profits have begun to use 'crowdfunding for non-profits' to fundraise for their projects. However, many projects fail to achieve their goals. Understanding donor behavior is essential to make fundraising successful. In this paper, we analyze donor behavior by collecting large-scale data from HAPPYBEAN, the largest crowdfunding platform for non-profits in Korea. In this study, we classified donors into five groups and analyzed donor behavior based on the following criteria, i.e., activeness, self-expression, and topical interests. We found that donors who contribute small amount of money and only a few times are critical for the projects' success. Our findings produce insights about donor behavior in crowdfunding for non-profits.

**Author Keywords**

Crowdfunding; Non-profit organization; Donor behavior

**ACM Classification Keywords**

J.4. Social and Behavioral Sciences

**Introduction**

Crowdfunding is the practice of funding a project or venture by raising monetary contributions from a large

Function of crowdfunding platform
<b>F1</b> Recurring donations to a project
<b>F2</b> Writing comments
<b>F3</b> Anonymous donation
<b>F4</b> Having a choice of making public user profile
<b>F5</b> Having a choice of fundraising for profit projects

**Table 1.** Functions that show donor behavior in crowdfunding for non-profits

Crowdfunding for non-profits	F1	F2	F3	F4	F5
HAPPYBEAN	o	o	o	o	X
HEEMANGHAE	X	o	o	o	X
Crowdrise	X	o	o	o	X
Indiegogo	X	o	o	o	o

**Table 2.** Comparison of crowdfunding sites for non-profits

- 1)<https://www.crowdrise.com/>
- 2)<https://www.indiegogo.com/>
- 3)<http://happybean.naver.com/>
- 4)<http://hope.daum.net/>
- 5)<http://happybean.naver.com/introduction/DonationStatusGuide.nhn>
- 6)<http://www.entrepreneur.com/article/28524>, Which Type of Crowdfunding Is Best for You?, SALLY OUTLAW, CEO and Co-Founder of Peerbackers and Crowdcast Network
- 7)Kickstarter Stats, <http://www.kickstarter.com/help/stats>
- 8)Kickstarter School, <http://www.kickstarter.com/help/school>
- 9)[http://en.wikipedia.org/wiki/Crowdfunding#cite\\_note-1](http://en.wikipedia.org/wiki/Crowdfunding#cite_note-1)

number of people, typically via the internet<sup>9</sup>). As crowdfunding platforms like Kickstarter have gained popularity, many non-profits have begun to use 'crowdfunding for non-profits' to fundraise for their projects. In Korea, almost 6,000 non-profits have been successfully fundraised in HAPPYBEAN according to our crawled data, which is operated by NAVER as of 2005. Thus far, HAPPYBEAN raised more than 46 million dollars for non-profits<sup>5</sup>). Like these, 'crowdfunding for non-profits' attracted many non-profits and donors. However, many projects failed to achieve their goals<sup>7</sup>). As such, many researchers have keen interests in learning about the factors that lead to successful fundraising [3]. Existing studies were mainly about understanding non-profits and their projects, but there exists a lack of research on donors [3, 4]. Understanding donors will help these non-profit organizations to successfully fundraise their projects and the platform owners to improve their policies and user interfaces.

The goal of this work is to investigate donor behavior in a crowdfunding platform for non-profits. For this study, we crawled HAPPYBEAN, the largest crowdfunding platform for non-profits in Korea, and collected four-year dataset of past projects and corresponding donor activities. We first analyzed the projects for non-profits to understand crowdfunding for non-profits in general. We classified the donors into several groups based on two features of their activeness: i.e., the total frequency and the total amount of donations. We then analyzed the differences in characteristics and behaviors of these groups.

## Related Work

### *Factors of successful fundraising in crowdfunding*

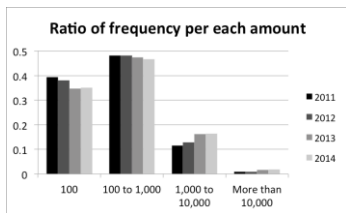
Prior work has found that the success of a project is related to the phrase used in the content of a project [6] and the textual content of the project page [5]. Mollick et al. found [7] that the success of a project is positively related to the number of project updates and this research recommends creators to update frequently<sup>8</sup>). However, prior studies were mainly focused on the behavior of creators, not donors, and we found that relatively few studies look at factors for successful fundraising from the donors' point of view. To make the project successful, a comprehensive study about donor behavior and donor motivation is important. There are a few studies about donor motivations [1, 2]. Gerber et al. studied donor motivation as well as creator motivation [4]. Akerlof et al. found that social identity in form of social norms such as gender and income is a powerful motivator of donors [1]. Social pressure and reward have been found to be a strong motivator of donors [2]. However, there is a few data-driven study of donor behavior in crowdfunding. Therefore, we investigate a large-scale donor activity dataset.

### *Crowdfunding sites for non-profit*

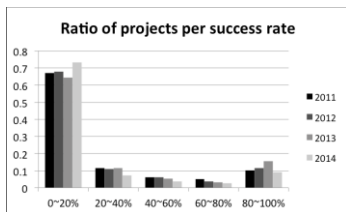
There are four types of crowdfunding: equity-based, donation-based, lending-based, and reward-based crowdfunding. The donation-based crowdfunding site enables donors to donate their money to projects. This approach is frequently used for charity and social causes, rather than for entrepreneurial endeavors<sup>6</sup>). Non-profit organizations may use such donation-based crowdfunding to raise money for their projects. Well-known donation-based crowdfunding sites are Crowdrise<sup>1</sup>) and Indiegogo<sup>2</sup>); a few very popular Korean donation-based crowdfunding sites include HAPPYBEAN<sup>3</sup>) by Naver and HEEMANGHAE<sup>4</sup>) by Daum (here, Naver

	Total donors (million)	Total projects	Total non-profits	Total amounts (\$million)
2011	1.85	11,041	4,541	4.34
2012	1.49	10,673	4,642	4.63
2013	1.20	11,202	4,606	5.33
2014	1.52	11,302	4,588	6.60
Sum	6.06	44,218	18,377	20.9
Avg	1.52	11,055	4,594	5.22

**Table 3.** The state of donations by year



**Figure 1.** Ratio of frequency per each amount of donation



**Figure 2.** Ratio of projects per success rate

and Daum are the two major Internet portals in Korea). Based on the list of functions in Table 1, we compared these four platforms to see how differently donation-based crowdfunding platforms work. According to Table 2, their main functions that show donor behavior are very similar. Among these, we collect donor activity data in HAPPYBEAN.

**HAPPYBEAN**

HAPPYBEAN is the first Korean domestic online donation portal site, connecting donors with public non-profit organization in need. We crawled HAPPYBEAN website, collected donation information from recent 4-year projects by 2014/12/19, removed duplicate data, and excluded data of the ‘bean bank’ so that we see only donating by oneself.

Donors contribute virtual currency called ‘bean’, which is worth \$0.1. A donor can donate by oneself or donate with others through a ‘bean bank’ in which donors gather beans. Donors can purchase beans, or get beans by participating Naver’s online activities, e.g., writing comments, posting on blogs and communities, and displaying a banner on their own blogs. There are six project themes in HAPPYBEAN. Donors can contribute to a theme or directly to an organization that does not fit into any themes. We regard this project as another theme.

Our preliminary data analysis showed that more than one million donors donate through HAPPYBEAN every year, and the total donation is more than \$4 million, as shown in Table 3. And we found that most fundraisings are achieved by people who donate small amounts of money (Figure 1) and most projects have the success rates under 20% (Figure 2). So, HAPPYBEAN needs to

analyze donor behavior to increase the success rates of projects.

**Donor Grouping**

We used k-means clustering algorithm with two features of activeness, i.e., the total frequency and total amount of donations. We found that significant number of donors contributed only once (67.55%). And we wanted to differentiate them from other few-time donors and study their behaviors. Thus, prior to clustering procedure, we first grouped one-time donors as Group1. Then, we classified the rest of users into groups and tried clustering several times while changing the number of clusters (i.e., k in k-means clustering) to determine the optimal number of clusters. And we decided to cluster users into four groups (k=4) because each group has more remarkable characteristic than when using the other features for clustering. Thus, we have a total of five groups.

For understanding their behaviors, we examine activeness, self-expression, and topical interests of each group. There are factors that we measure for understanding donor behavior in Table 4. In terms of activeness, we can see the frequency, the amount, and the duration of donors. Therefore we measure A1, A2, A3, A4, and A5. The *density of donation* (A5) means how often donors donate during in a certain duration. When donors give a donation to a project in HAPPYBEAN, they can select whether they would write comments or not and whether donate anonymously or not. Donors also can select whether they make their profiles public on their personal pages of HAPPYBEAN. From these, we can see the self-expression characteristic of donors. So we measure S1, S2, and S3. In terms of topical interests, we can measure the *ratio*

Activeness	
<b>A1</b>	total frequency
<b>A2</b>	total amount
<b>A3</b>	amount per donation
<b>A4</b>	total duration
<b>A5</b>	density of donations (A1 divided by A4)
Self-expression	
<b>S1</b>	ratio of writing comments
<b>S2</b>	ratio of making their profiles public
<b>S3</b>	ratio of donating anonymously
Topical Interests	
<b>I1</b>	ratio of donating in projects donating non-profits itself
<b>I2</b>	# of themes which donors contributed
<b>I3</b>	entropy of themes where donors contributed

**Table 4.** Factors of donor behavior

	Num of donors	A1:Total frequency	A2:Total amount (\$)
		avg (std)	avg (std)
G1	3,037,499	1(0)	0.84 (15.07)
G2	1,458,428	4.67 (8.09)	5.86 (65.62)
G3	1,044	433 (258)	430.34 (3,436.14)
G4	21	3,917 (2,304)	2,597.11 (3,946.92)
G5	3	26,571 (3,643)	206,177.37 (278,618.18)

**Table 5.** The result of classifying donors into 5 groups

of donating to projects of a specific non-profit organization (I1) which does not fit into any themes. It shows whether donors donate to a project that funds a specific non-profit organization or donates to a project for a specific theme. Also, we measure the *number of themes of projects donors contributed* (I2) and entropy of themes *where donors contributed* (I3). They show whether donors donate to a specific theme or various themes. The high entropy value means that donor donates in various themes. We calculate the average value of each factor. After measuring all these factors, we analyze the characteristics of each group with the values of all the factors.

### Understanding Donor Behavior

The results of classifying donors into five groups are shown in Table 5. We named the five groups as 'One-time Donor' (Group1), 'Few times Donor' (Group2), 'Regular Donor' (Group3), 'Frequent Donor' (Group4), and 'Powerful Donor' (Group5) in order. Group1 donates only once with the smallest total amount among the five groups. Group2 donates a few times. The total frequency of Group3 is almost 92 times of the total frequency of Group2 so it shows that Group3 donates more regularly than Group1 and Group2. Group4 donates much more frequently than Group1, Group2, and Group3. Lastly, Group5 has only three members but it shows overwhelmingly higher total frequency and total amount of donation than the other groups so the members of this group are very powerful.

In Table 5, we see that 67.55% of donors donate only once and 99.97% of donors donate at most a few times. So, majority of donors are in Group1 and Group2. Besides, Table 6 shows that 51.60% of total donors are Group1 and 48.34% of total donors are Group2 and the

number of each group does not change much every year. So we observe that most of donors who donated in HAPPYBEAN left after one time donation but there were many new donors coming into HAPPYBEAN over time.

	The ratio of number of each group				
	G1	G2	G3	G4	G5
2011	0.523984	0.475554	0.0005	0.000009	0.000001
2012	0.478922	0.520397	0.0007	0.00001	0.000001
2013	0.484754	0.514372	0.0009	0.00002	0.000003
2014	0.576221	0.423202	0.0006	0.00001	0.000002
avg	0.51597	0.483381	0.0007	0.000012	0.000002

**Table 6.** The ratios of number of each group by year

We calculated the ratio of total amount of each group to total amount of all groups and the ratio of total frequency of each group to total frequency of all groups. Group2 has much larger fractions than others so it contributes much to succeed projects (Table 7).

	Group1	Group2	Group3	Group4	Group5
Ratio of total amount of each group to total amount of all groups	0.24	<b>0.66</b>	0.04	0.003	0.06
Ratio of total frequency of each group to total frequency of all groups	0.30	<b>0.66</b>	0.03	0.007	0.005

**Table 7.** The ratios of total amounts and total frequencies of each group

The results of 'Activeness', 'Self-expression', and 'Topical Interests' characteristics were presented in Table 8, Table 9, and Table 10, respectively. From these tables, we observe several remarkable behaviors of each group. Group1 donates only once in terms of activeness and doesn't make their personal information public when compared with the others in terms of self-

	A3: Amount per donation (\$)	A4: Total duration (day)	A5: Donation density
	avg (std)	avg (std)	avg (std)
G1	0.84 (15.07)	0(0)	N/A
G2	1.06 (8.98)	503 (407)	0.009 (0.02)
G3	1.63 (27.32)	1,085 (333)	0.47 (0.51)
G4	0.75 (1.12)	1,143 (397)	4.04 (2.63)
G5	6.85 (9.16)	1,174 (336)	26.1 (12.2)

Table 8. Activeness

	S1: Ratio of comments	S2: Ratio of profile	S3: Ratio of anonymous donation
	avg (std)	avg (std)	avg (std)
G1	0.22 (0.42)	0.06 (0.24)	0.03 (0.47)
G2	0.32 (0.36)	0.10 (0.23)	0.05 (0.37)
G3	0.12 (0.27)	0.12 (0.27)	0.05 (0.43)
G4	0.03 (0.11)	0.18 (0.31)	0.03 (0.25)
G5	0.0005 (0.0006)	0.33 (0.47)	0.17 (0.23)

Table 9. Self-expression

	I1: Ratio of theme7	I2: Num of kinds of themes	I3: Entropy of theme selection
	avg (std)	avg (std)	avg (std)
G1	0.07 (0.26)	1.0 (0.0)	0.0 (0.0)
G2	0.05 (0.17)	2.35 (1.11)	0.36 (0.22)
G3	0.32 (0.37)	4.36 (1.96)	0.41 (0.29)
G4	0.20 (0.31)	6.19 (1.44)	0.58 (0.28)
G5	0.37 (0.19)	6.0 (0.82)	0.74 (0.13)

Table 10. Topical Interests

expression; thus, Group1 is likely to be mere one-time visitor. For the factors related to themes, i.e., I2 and I3, we cannot compare Group1 and Group2 with the rest because their average frequencies are smaller than the number of themes. So, it is hard to see 'Topical Interests' of Group1 and Group2.

In terms of activeness, Group2 donates in a short duration for a few times so its frequency density is much lower than the others except Group1. By examining self-expression, we found that Group2 wrote comments more frequently after donation. By examining topical interests, Group2 donated to projects funding a specific non-profit organization less frequently than the others. Therefore, Group2 is a large contributor of crowdfunding but after a few times of donations this group just left the crowdfunding. Group3 does not have any specific behavior in comparison to the others; thus, they could be normal donors. In terms of activeness, Group4 donates many times with much smaller amount per each donation than the others, donates anonymously fewer times than the others in terms of self-expression, and in terms of topical interests has donated most of themes because the number of themes where donors donated is higher than the others, so this group focuses on donating itself and has tried the most of themes.

Group5 donated much larger amounts in a long time than the others, so its frequency density is much higher than the others. In terms of self-expression, while personal pages are publicly available, but have more frequent anonymous donations. Group5 donated the projects that fund a specific non-profit organization and contributed to various themes of projects since their entropy of themes is much higher than the others. To

summarize, the members are powerful individually, donate in various themes, and focus on funding a specific non-profits.

**Discussions**

We find that successful fundraising on crowdfunding platforms can be achieved by donors who donate small amount of money. And most of donors contribute once or a few times and they never come back. This issue is no surprise in donation society. In Sargeant's study [9], a typical nonprofit will lose between 70~80 % of its donors after a few times donations. The work introduces four reasons which could lead to donor dissatisfaction and lapse: attraction by competition, poor quality of service, poor relationship quality, and lost to market. Like this study, crowdfunding for non-profits also should try to find the reason why donors leave to make them donate regularly.

We find two interesting groups, 'Few times Donor' and 'Powerful Donor'. 'Few times Donor' is the most powerful group in terms of total money and total frequency of group, because the number of this group is very large although the amount of donation of each member is very small. Like this, every little helps in crowdfunding. Unlike this group, the donation of each member of 'Powerful Donor' is powerful in itself. But, this group has a few members so the group is not powerful than others overall. Another interesting group is 'Frequent donor'. It donates with their nickname and small amount and writes a comment rarely. They focused much on donating itself, other functions such as donating anonymously, writing comments are outside of their interests.

'Few times Donor' and 'Powerful Donor' shows an interesting result about writing comment. A group of donors with a few times has the highest rate of comments and a group of powerful donors has the lowest rate of comments. This means that the donors who contribute more frequently with more amounts tend to concentrate on donating itself. Meanwhile donors who donate with a few times tend to write a comment. Therefore, we recommend that the platform offers the function for linking with another participation through comments. Through this, donors with a few times can easily visit the platform again and donate.

### Conclusion and Future work

Crowdfunding for non-profits is mostly consisted of many donors who contribute only small amounts for a few times at most. Thus, we have to attract these people. There exist a few powerful donors. Each of them donates much so that their influence is great in project. We found that donors with a few times write comments while donating more than the others, and 'Frequent donors' focuses on donating itself. From these findings, we can get insights to understand donor behavior.

There are several directions for future work. HAPPYBEAN has another method for donation, i.e., 'bean bank'. So we can also analyze donors with 'bean bank' to see how donors use this. Also, it would be interesting if we analyze the influence of methods to gain beans in donor behavior because there are various ways to gain beans. Based on the result of donor behavior, we can do the survey to find out donor motivations and find out link between motivation and behavior of donors. Then, we can understand donors in crowdfunding more and derive design implications.

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