
Achieving Sustainable Society through Micro-level Crowdfunding

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Abstract

This paper proposes a new approach for motivating people to participate in achieving a sustainable society. The method is called *Micro-Crowdfunding*, and encourages people living in urban cities to support and contribute to the sustainability of small common resources, such as public sinks, toilets, shelves, office areas and so on. *Micro-Crowdfunding* is based on the *crowdfunding* concept and uses the *local currency* idea, as tools of the social mechanism, to increase people's awareness of how they participate in keeping the sustainability of common resources. Our approach aims to maintain the sustainability of common resources with people's small efforts. In this approach, an organizer introduces a new mission for keeping the sustainability of a resource, and investors fund it. Finally, a performer executes the mission, and completes it with minimal efforts achieving the resource's sustainability.

Author Keywords

Crowdfunding; Local Currency; Micro-community

ACM Classification Keywords

K.4.4 [Computers and Society]: Electronic Commerce

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Introduction

Free resources shared by a number of people, such as public toilets or the natural environment tend to be overused in a process called the *tragedy of the commons* [2]. This happens because each individual derives a personal benefit from using the resource, while any costs are shared among all the users, leading to inconsiderate use. An example of such behavior is the wasteful use of free plastic shopping bags that are filling landfills. A common strategy to dealing with the tragedy of commons is to impose a tax on the use of the resource. An environmental tax is widely adopted for covering the cost to maintain the resources. However, for taxpayers it is not clear how the tax is used for maintaining each common resource shared by the people in a community. People need to keep a feeling of contribution to the sustainability of the resource to be motivated to pay the necessary cost.

A community-based approach overcomes the issue. In such approach a community member is able to propose a mission for maintaining a common resource and then other members of the community could complete the mission. However, members usually may not have enough time to contribute to a mission. Especially, people who live in urban cities are very busy, and have a lot of things to do. Therefore, they usually forget the importance of the sustainability of common resources. In our surrounding environment, we have a lot of small common resources requiring high cost for keeping their sustainability if government, nonprofit organizations and individual companies take care of them. However, maintaining these resources typically requires missions that can be achieved with small efforts within a person's spare time. In our urban life, we usually have plenty of chances to exploit short spare times.

This paper proposes a new approach, named *Micro-Crowdfunding*, for motivating people in urban cities to participate in achieving sustainable environments.

The main characteristics of the approach are as follows.

- The *crowdfunding* concept is adopted to allow people to choose which small common resource they would like to contribute to keep the sustainability of.
- The currency used in the proposed approach is based on the *aging money* concept [4], which encourages people to participate to the *Micro-Crowdfunding* before the money's value is degraded.
- The interaction in *Micro-Crowdfunding* is very light-weighted. People in a community can easily propose new missions and fund it from their smart phones with a simple interaction.

The mission in *Micro-Crowdfunding* can be achieved with people's minimal efforts in their spare time.

Micro-Crowdfunding

(i) Basic Concept

Crowdfunding is a new and emerging way of funding new ideas or projects by borrowing funding from the crowds [1]. In this concept, a person proposes a new project, explains the importance and the target amount of money, and shows what people who fund the project will receive when the mission is completed successfully. When the total amount of funds from people who would like to contribute to the project exceeds the target amount, the project can be started. After the success of the project, each contributor receives some benefits according to his/her fund. The approach is different from the donation idea because contributors will expect some benefits when the supported project succeeds,

while the donation idea does not include any return considerations in general. If the benefit offers high scarcity value, it becomes a very high incentive for the contributors. In *Micro-Crowdfunding*, the project is called a *mission* because it requires only small amount of time to be completed, and that mission tries to achieve the sustainability of a small common resource within a person's spare time with his/her minimum efforts.

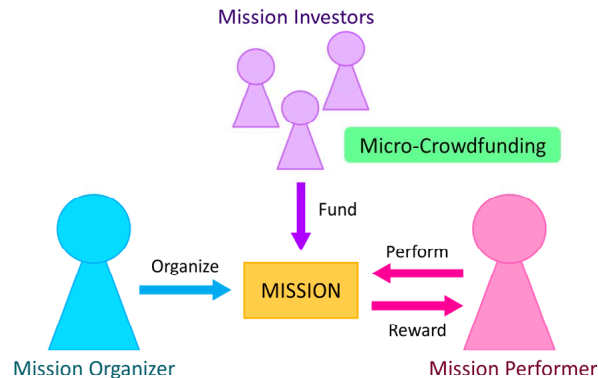


Figure 1. The Overview of Micro-Crowdfunding

A *local currency* is a currency not backed by a national government, and intended to trade only in a small regional area. As a tool of fiscal localism, local money can raise the awareness in the local economy. One of the most important aspects of the local currency is the possibility to adopt different money models, which cannot be adopted by the legal tender. For example, the *aging money* model has been a popular example of local currency idea. In the aging money concept, the value of the money gradually decreases with the time. Defining a suitable money model is desirable if encouraging people to spend more money is essential.

Since our approach relies on the aging money concept, it is natural that people would like to contribute to more missions before the value of the money is degraded and thus fund missions as quick as possible. The proposed *Micro-Crowdfunding* concept uses virtual money, and all transactions occur electronically.

The environmental tax is the most typical solution to achieving the sustainability of common resources. The money collected as tax can be used to keep the resource's sustainability. However, taxpayers are not aware how the money is spent to contribute to the sustainability. In *Micro-Crowdfunding*, people can explicitly choose which common resource they would like to contribute to. This approach increases the awareness of their contribution since the effect of their contribution can be easily monitored. After the mission that participants are contributing to has been completed, each participant who has funded it receives a completion notification as a feedback. The awareness of their contribution becomes a strong incentive for people to contribute to the sustainability of the common resource.

In *Micro-Crowdfunding* as shown in Figure 1, a member of a community related to a small common resource, called a *mission organizer*, proposes a new mission when he/she is aware an activity to keep the sustainability of the resource has to be done. Typical examples of such common resources are a public sink at a floor of a building or a public shelf used by a university laboratory. The proposal includes the mission's summary specifying the necessary activities and the total amount of money required to achieve the mission. The mission proposal is simply done by touching the common resource with the *mission organizer's* smart phone, and sending a photo showing

the resource's current status. In the next step, when some other members, called *mission investors*, receive requests to fund the mission, they decide whether they want to fund the mission or not based on the delivered photo. If some of them would like to fund the mission, then they just click on the requests on their phones to notify that they want to fund the mission. When the total submitted funds exceed the target amount, the mission can be executed by any member, who can access the resource, in his/her spare time. Such member is called a *mission performer*. The mission is usually a very simple task like cleaning up a public sink or putting in order a shelf. After the completion, the *mission performer* takes a photo of the resource to show the mission's completed status, and sends it to the *mission organizer*. Finally, the *mission organizer* verifies the quality of the achievement, and a completion notification of the mission containing a photo of the resource is delivered to all members who have fund the mission.

(ii) User Centered Scenario based Design

This section presents how each stakeholder in *Micro-Crowdfunding* feels his/her participation and contribution to a mission from a user's point of view through an example scenario shown in the storyboards in Figure 2.

(1) Jun is a university student, who is currently very busy for his research, and needs to come to his laboratory everyday. He is worried about the usage of some small common resources in his laboratory. Especially, he is in a trouble with the messy table there. There is a "mountain" of papers, trashes, and gadgets on the table. He wants to use the table but currently he

has no time to clean it up because of his busy schedule. "It will be great if someone can help me ...", he thinks.

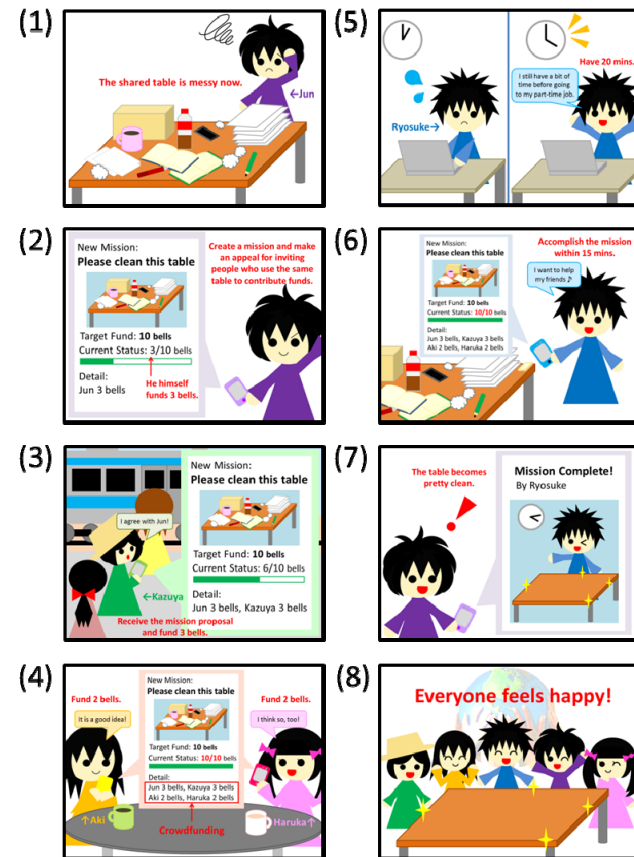


Figure 2. Storyboards in Our Scenario

(2) Now, he decides to create a mission with a title "Please clean this table" and makes an appeal for collecting funds from people who use the same table. He takes a picture of the dirty table with his smart

phone to inform its status. A little later, when he has a spare time, he sets the requisite amount of money to 10 bells, where bell is the unit of the virtual currency used in the Micro-Crowdfunding service, and he himself funds 3 bells as an initial fund of the mission by using his smart phone.

(3) Kazuya, Aki and Haruka are Jun's colleagues in the laboratory. They all receive the proposal about the mission through an email delivered due to Jun's mission registration. Kazuya agrees with Jun's opinion that the table needs to be cleaned. So, he funds 3 bells to the mission's fund with his smart phone. The total amount of money becomes 6 bells. Kazuya uses the desk a lot as well and he really wants the mission to be achieved.

(4) Aki and Haruka are together when they receive the proposal. As soon as they receive the email, Aki says "I feel like it is a good idea for our laboratory members. I want to join the mission." Haruka also thinks so, then each of them funds 2 bells with their smart phones. The total amount of money reaches 10 bells, which is the target amount Jun has decided. As a result, the mission "Please clean this table" becomes executable and all participants are informed about that.

(5) Next day, Ryosuke, who is also Jun's colleague, comes to the laboratory at 13:00 to prepare for his presentation. He concentrates on his tasks and finishes at 16:00.

(6) He has a part-time job from 17:00, so he currently has some spare time. He checks the available missions in the laboratory and finds Jun's mission. Kazuya says "Oh, I can do this mission before going to my part-time job. It is convenient for me!" and decides to do it.

(7) Fifteen minutes later he completes the mission. The table becomes pretty clean. He takes a picture of the clean table and reports the mission completion. Jun is impressed with the report and confirms the completion. After that, Ryosuke gets 10 bells as a reward of the mission.

(8) Jun is grateful to all who participated in the mission. He is able to comfortably use the table now. Kazuya, Aki and Haruka who have funded their money for the mission can use the table comfortably, too. Ryosuke also feels happy because not only he could get a reward but also every participant of the mission thanked him. Thus, all participants are satisfied with the service.

(iii) Prototype System

The prototype consists of three components. The first is an Android phone containing an NFC card. The second is an embedded computer connected to an NFC reader embedded in a small common resource as shown in Figure 3. The last component is a server that stores in a database all the information related to the activities in *Micro-Crowdfunding*.

The prototype system has been implemented as an HTML5 web application. The approach does not require participants to install specific Android applications. Thus, they can start to use the *Micro-Crowdfunding* service easily with a minimum effort.

When a *mission organizer* touches the NFC reader embedded in the small common resource with his Android phone, an event is delivered to the *Micro-Crowdfunding* server. Then, an email containing an URL is delivered to him. In the form that opens on a browser after clicking the URL, the *mission organizer*

can register a photo showing the resource's current status and the specifications of the mission. After that, *mission investors* receive emails containing URLs. In the retrieved forms, they specify the amount of the mission's funds by controlling a seek bar on their phones. By touching his/her Android phone on the NFC reader, a *mission performer* knows the currently available missions. After completing a selected mission, the *mission performer* touches the NFC reader and registers a photo showing the completed status, which is also delivered to the *mission organizer* via an email. After the *mission organizer's* confirmation, *mission investors* can see the success of their investment by clicking the URLs in the received emails.

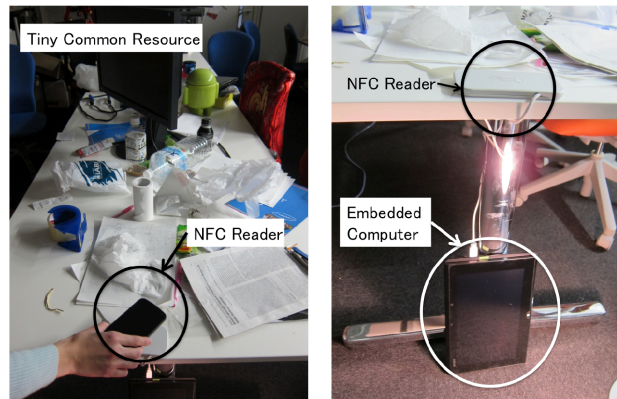


Figure 3. Prototype System

Future Directions

A problem of the current approach is the possibility that no one might be willing to maintain some common resources. Also, an infrastructure maintained by the tax-based approach is still necessary. For example, collecting and disposing garbage is not easy to be solved only by the community-based approach.

However, the insufficiency of tax comes from the cost to manage the sustainability of all common resources. It is an interesting problem to consider how to encourage people to contribute to the sustainability of unattractive common resources for complementing the tax-based approach with *Micro-Crowdfunding*.

The national deficit in many developed countries is a very serious problem. However, increasing the tax may not be a good solution to it because this may lead to a reduction of the economic activities. Our approach is a first step toward this issue, realized by increasing the awareness of people's contribution to the sustainability of each small common resource.

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