Leveraging technology to mitigate hunger

Aradhana Porwal

GVN School, BHEL Area, Bhopal, MP, 462016, India

aradhana.vivek.porwal@gmail.com

ABSTRACT: The co-existence of hunger and wastage of food is a social crime. Efforts of non-profits, though serious, have not yielded sustainable results due to inherent limitation of charity and costs in their models. This paper presents a sustainable and scalable model to mitigate hunger. It is based on an efficient, electronic platform which allows people to donate food in a hassle-free and cost-neutral manner while maintaining the quality of donated food. The platform can be used to tackle all kinds of food wastage; however, the focus of pilot for this paper has been kept on the 'paid' variety of food wastage – the food for which an individual has actually paid themselves. In April 2019, the system was made available to users of VH Spice Box, a food start-up in Bhopal. The results were very encouraging and have validated the whole model. It is found that not only are more people donating food, but each person is donating more. Two satisfaction surveys have established the basic parameters related to the quality of donated food have been maintained. The model has not added any cost to the participating company, thereby not adversely affecting its price competitiveness. This paper details the possible future course of actions to scale up the model.

KEYWORDS: Hunger; Food Wastage; Information Technology; Hunger Mitigation; Sustainable Model

Introduction. Food is one of the basic human needs. Unfortunately, despite becoming a richer country, India is still home to the largest number of hungry people. The country is home to more than 200 million hungry people, the highest in the world. India stands at 103rd out of 119 countries ranked in the Global Hunger Index (2018).[1] Madhya Pradesh (MP) is among the worst affected among Indian states.[2] Although the exact number of hungry people in city of Bhopal is not available, it may well be more than a million.[3]

Ironically, the shortage of food grain is no longer a root of the hunger problem. In fact, the state of MP saw over a nine percent annual increase in food production between 2005 and 2015.[4] Food grain production in MP has crossed 100 million metric tons. The power to purchase food continues to be a major constraint, yet the issue of food wastage should not be overlooked. According to the United Nations Development Programme, up to 40% of the food produced in India is wasted.[5] Even the ability to make a small dent would help alleviate the hunger epidemic.

There are two types of food wastage: paid and unpaid. Unpaid food wastage involves payment by third parties such as food wastage at weddings and other social gatherings. Here, the person wasting food has little incentive not to waste food as he does not pay for it. Paid food wastage involves payment by the person wasting food. Paid food wastage lacks economic logic and, thus, should be self-regulated.

However, the nature of the online food ordering industry is such that it can sometimes force the wastage of even paid food. Companies allow order cancellations up until the food is packed and ready. After that point all orders are delivered to recipients. If the recipient does not consume their order that food goes to waste. This appears to be a social crime given the fact that there are so many hungry people on the streets. This represents a lose-lose situation to all stakeholders. The individual loses money while society loses food. Ironically, this waste should be easiest to control as there are no perverse incentives behind it.

I feel that such situations can be corrected. I do not see any reason why somebody, having paid for the food, would want to waste it. Given the chance, a person will be more inclined to let someone else consume this food. However, they cannot be expected to devote time and energy to finding a new recipient and executing the delivery. If that can be done effortlessly, the chances are that they would donate it would increase.

This project is designed to enable a willing food donor to donate it with minimum effort.

This paper analyses the conception, evolution, and result of this project in City of Bhopal, India. The robustness of this project has been checked though customer feedback surveys.
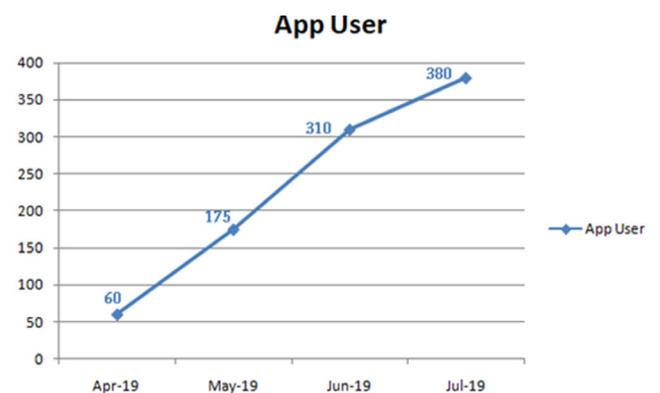

Figure 1. Cumulative counts of APP Users

Results and Analysis.

The 'donate food' platform has been well received by customers. The company's mobile app has witnessed an increased traction with users once the capability to donate was launched (Fig.1). In the month of April, 12.5% users downloaded VH Spice Box App. By the end of July 2019, this percentage had risen to 48.16%.

More importantly, the number of donors has shown a healthy growth rate over the period (Fig.2). In the beginning there were hardly 20 users during April 2019 who used the 'donate' facility. However, by end of June 2019, this number had increased to 186. Additionally, the adoption of the donate capability has surpassed the addition rate of new users. This facility has become an added attraction for new customers. Furthermore, during April 2019 only 4.16% of users donated their meals but in July 2019 nearly 23.44% of users donated meals. This validates our basic premise that, given a chance, people want to avoid food wastage.

Figure 4 shows the consistent increase in total number of meals donated. There were only 25 donations in the month of April 2019, but this number increased to 236 in July 2019. More importantly, the average number of meals donated per user has increased from 1.05 to 1.29. This indicates that not only are more people willing to donate food but that each person is also willing to donate more.
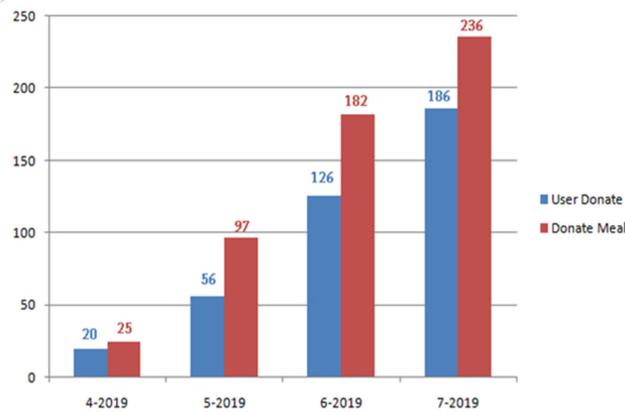

Figure 2. Number of donors and donated meals

To test the performance and robustness of the process, two recipient surveys were conducted. Results of surveys are shown in figures 3 & 4.
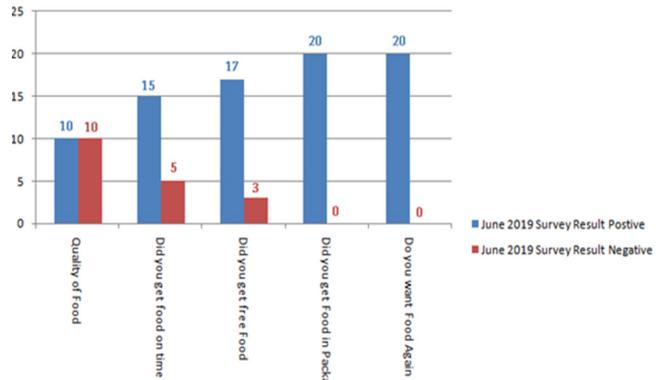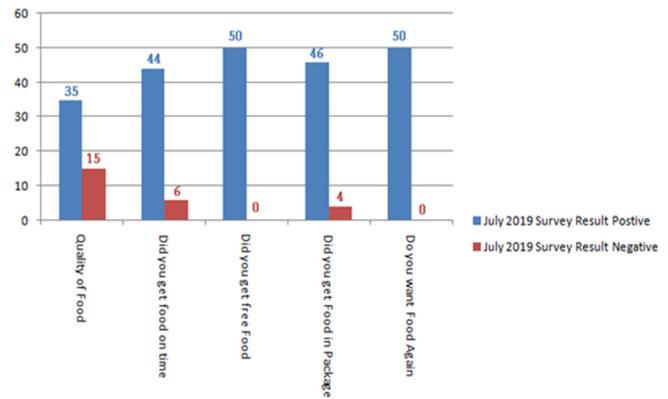

Figure 3. June Survey Result

Figure 4. July Survey Result

Observation of the two figures indicates that:

1. The quality of the delivered, donated food continues to be a challenge. While the percentage of recipients answering favourably regarding quality has increased to 50% from 70% it is a matter of concern that the donated meals are exactly the same as non-donated meals.

2. Issues regarding delivery time have shown definite improvement.

3. Free delivery has been established for recipients of donated food. In the July survey everyone said they are getting the food for free.

4. The food is getting delivered in packed conditions. In the July survey, the problems of unpacking related to a singular delivery boy who was replaced immediately.

5. Demand for donated food continues to be high in both surveys. This shows the utility of the platform from a user's perspective.

Conclusion and way forward. Though our achievements are modest, our design and direction of platform has shown great potential. We have been able to prove there can be a sustainable, non-charity-based model to mitigate food wastage. There are challenges in quality, but that is a basic challenge of the food delivery industry. Some of the issues raised by the surveys, including the quality of food and packaging, relate more to the training of the delivery boys than to program design flaws. I have communicated this matter to the management of VH Spice Box.

As there is effectively no extra cost to food companies for enabling this capability, we are working with other food platforms like Swiggy, UberEATS, Zomato, and Food Panda to begin providing this capability to their users. This model can easily be extended to the collection of waste food from homes, hotels, and parties. The only extra expenditure would be cost of collection. For that, I am using state government offices to persuade companies to take up this activity under their corporate social responsibilities. Recently, the Municipal Corporation of Bhopal has shown interest in using the platform to collect discarded food from households.

Methodology. It is not that efforts are not being made to save wasted food. Many non-governmental organisations are working in this field. However, their core model is based on charity. They mainly collect leftover food and distribute them. Even the state government started *Neki ki deewal* (wall of kindness). It is a place where people place items they no longer use. However, the scalability and sustainability of these efforts remain key concerns.

We set out to design a project which must fulfill some minimum criteria to make it worthwhile to all stakeholders. It must be sustainable. It may not earn money at the start, but it should have the potential to earn a profit. It should not cause any price increase for food items otherwise the food company would never deploy it. It should be very convenient for donors. It should be transparent, where donors are able to see if their food has been donated. There should be an easy way for needy recipient to register for receiving food.
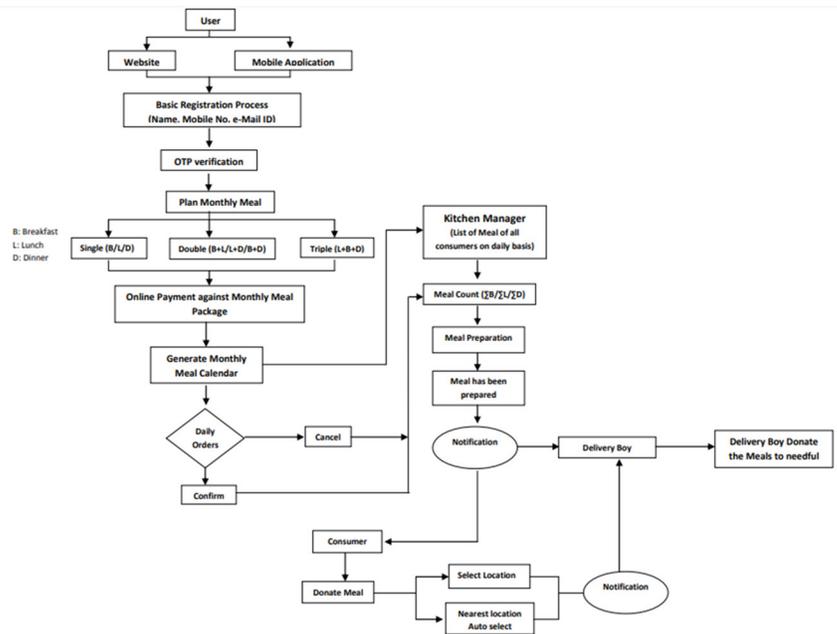

Figure 5. Basic flow diagram of the process

We have created an electronic platform for matchmaking between the donor and the recipient. The basic flow diagram of process is given in Figure 5. This platform enables a person who has ordered food from a food delivery company to choose the location where the order should be delivered if it is cancelled or unable to be eaten.

This platform is an additional patch for food delivery companies. A registered user can order and cancel the food. However, a user cannot cancel the order once the food has been cooked. From here, our platform takes over. It provides visual notification to the user the instant the order cannot be cancelled. During registration, the customer gives the choice about the place where the order should be donated. If they choose not to decide, the platform allocates such food items to the areas from where they were originally ordered. The City of Bhopal has some traditional spots like temples, bus terminals, and markets where hungry people often congregate. Moreover, the platform has the capability to add more such places.

Food packages of customers who have exercised the donate option are kept as they are. The delivery boy of the assigned area distributes them. As no special delivery mechanism is created for donated food, no extra cost is incurred to the food company. This approach also maintains a high quality of the donated food. Once the food is donated a message is sent to the donor.

I first launched my platform with the company VH Spice Box. It is a food company operating in Bhopal & other cities of Madhya Pradesh. VH Spice Box is a small size food ordering firm with its own kitchen. It is a start-up which began operation in January 2019. Currently its customer base is small but rising (Fig. 6). The donate food platform was made operational in April 2019 on the website as well the mobile version.

Number Of Customer
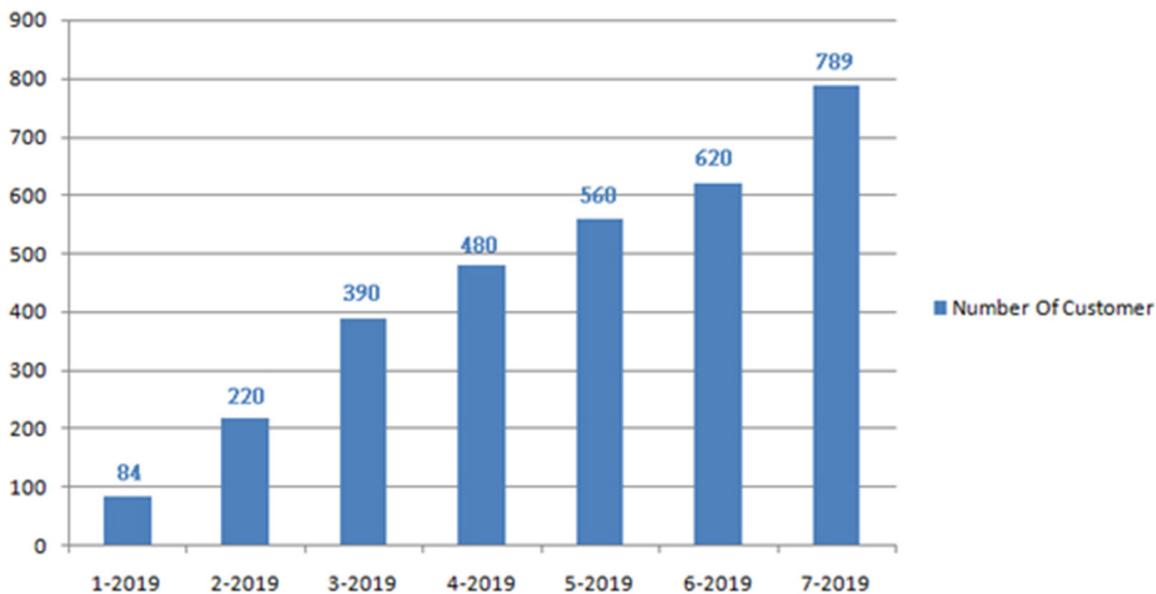
As noted above, we conducted two satisfaction surveys with recipients.[8] In the surveys, we collected feedback on following questions (original surveys were conducted in Hindi):

1. Was quality of food received satisfactory?
2. Did you get food on time?
3. Did you get food free?
4. Did you get food in package?
5. Do you want food again?

A team of two enumerators went to each location to record the feedback of recipients. These enumerators were specifically trained to explain the actual meaning of each question carefully as most of recipients were not expected to be literate. Furthermore, as most of recipients took long verbal routes to their answer, each enumerator was trained to be patient. Each enumerator separately recorded the answers from same recipient. If there was no difference in the recordings, they reported to the central team, then a second team would be sent. The answer recorded for the majority of the enumerators for the same recipient was taken as final answer. Answers to all these questions were recorded in 'yes' or 'no' format to avoid any subjectivity in interpretation

References.
(1)https://en.wikipedia.org/wiki/India_State_Hunger_Index
(2)http://www.ifpri.org/publication/comparisons-hunger-across-states
(3)https://reliefweb.int/sites/reliefweb.int/files/resources/HungePovertyClimate.pdf states that nearly 65% of population of MP is hungry. Being urban area Bhopal might have smaller percentage, yet, with population of around 3 million, one million is a safe approximation.
(4)https://icrier.org/pdf/Working_Paper_339.pdf
(5)https://thecsrjournal.in/food-wastage-in-india-a-serious-concern/
(6)Most of the needy people have no permanent address but they do tend to congregate around well- known places in city. While registering all recipients are required to record the preferred location.
(7)www.vhspicebox.com
(8)Details of satisfaction survey are available on www.vhspicebox.com/vhspicebox/donate_meal
(9)Food can be ordered in three categories namely breakfast, lunch, and dinner. We designed that there should not be any difference in delivery time between donated and non-donated meal, Thus, this enquiry is about whether donated food was received during designated time duration or not; For example, breakfast till 12 am, lunch till 2pm, and diner till 10pm.

Authors. Aradhana Porwal is grade 12 student at GVN School, Bhopal. She is majoring in science stream. Her area of interests include IT and its social application. She has been admitted to the stream of advanced computing at the University of Sydney, Australia.