

EEI-Final Project

A Solution to Food Waste – The Access Economy

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A Solution to Food Waste – Access Economy

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Abstract.

The study concentrates on the food waste problem and the booming topic- The access economy. The study starts with understanding how significant the food waste problem is in the world, especially in Taiwan. Through a rigorous method and a successful case study model, the study combines the food waste with the access economy, and develop an E-Commerce platform to solve the food waste problem that have existed for a long time. This platform is not only for people the hunger to have a good meal. More importantly, it could reduce food waste and pollution problem coming after. This study expects to provide effective food-share platform patterns, contributing to the access economy and the applications in the relevant field of food waste.

Keyword, food waste, the access economy, E-Commerce platform

1. Introduction

1.1. Background Information

Estimates suggest that by 2050 food production will need to have increased by 60% on 2005 levels to feed a growing global population. Reducing food waste would ease the burden on resources as the world attempts to meet future demand.

Each year 1.3bn tonnes of food, about a third of all that is produced, is wasted. Meanwhile, 795 million people suffer from severe hunger and malnutrition. Food waste is happening in countries where people can afford to throw away food. One statistic is that the amount of food wasted by consumers in industrialized countries (222m tonnes a year) is almost the same as the total net food production of sub-Saharan Africa (230m tonnes).

Compared to other East Asian Countries, Taiwan produces 20% more Waste Per Person. Approximately 2.75 million tonnes of food is wasted in Taiwan every year. According to the statics of the organization

of Foodbank-Taiwan, businesses and households produce around 3000 tonnes of food waste Everyday: 1500 tonnes are used as animal feed, 500 tonnes are used as fertilizers and more than 1000 tonnes are simply thrown away.

Nowadays, most people eat out because they do not have time to cook. At the same time, many people cook too much to eat. Therefore, the aim of this study is to establish a website platform, which could make people share their food to reduce food waste.

1.2. *term definition*

This section introduces the definition of food wastage and access economy.

1.2.1 *food waste*

Food waste is any removal of food from the food supply chain which is or was at some point fit for human consumption, or which has spoiled or expired, mainly caused by economic behavior, poor stock management or neglect.

Important components of this definition include:

- Food waste is a part of food loss, but the distinction between the two is not clearly defined
- Food redirected to non-food chains (including animal feed, compost or recovery to bioenergy) is counted as food loss or waste.
- Plants and animals produced for food contain 'non-food parts' which are not included in 'food loss and waste' (these inedible parts are sometimes referred to as 'unavoidable food waste).

1.2.2 *Access economy*

The access economy is a business model where goods and services are traded on the basis of access rather than ownership: it refers to renting things temporarily rather than selling them permanently. The term arose as a correction to the term sharing economy because major players in the sharing economy, such as Airbnb, Zipcar, and Uber, are commercial enterprises whose businesses do not involve any sharing.

2. **Methodology with Model Display**

The methodology of this research consists of four steps. First, the AS-IS behavior model is draw. Second, I transform the business model after BPR and the TO-BE behavior model is constructed. Third, I use the software of Anylogic to presents the effect of sharing one time. Finally, a trial run of the platform will begin from the campus of National Tsing Hua University.

2.1. *As-Is Behavior Model*

The original process of food flow is shown in Figure 1. Home and restaurant consumer will produce food waste every day. 50% are used as animal feed, 16% are used as fertilizers and 34% are simply thrown

away.

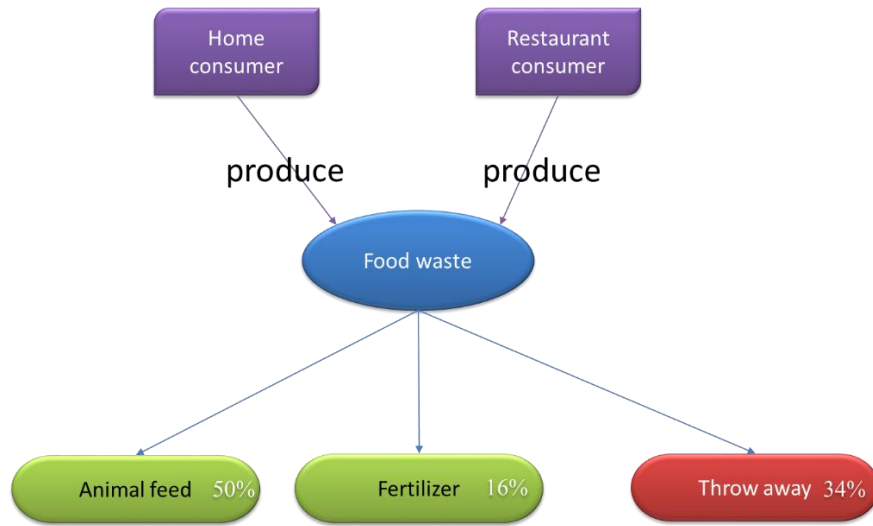


Figure 1. Behavior Model of AS-IS Model.

2.2. *To-Be Behavior Model*

The improved process of food flow is shown in Figures 2. Household and restaurant consumer will supply food on the platform, and meanwhile the people who need food can retrieve food from the platform.

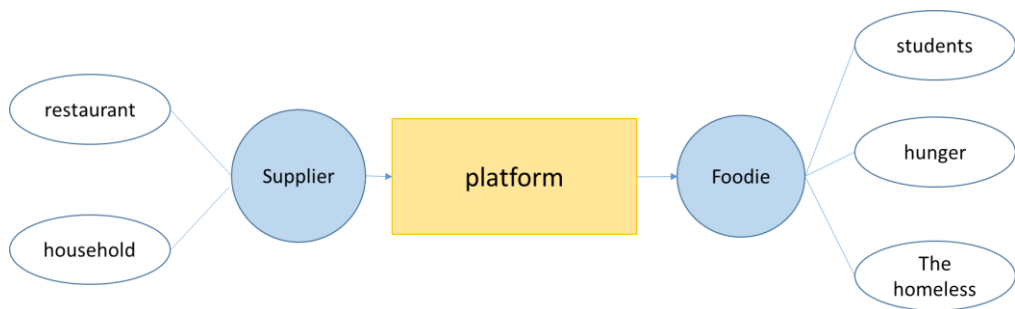


Figure 5. Behavior Model of TO-BE Model

2.3. *Anylogic Model*

The study use Anylogic to simulate the effect of reusing. The whole process is shown in Figure 3. There are 100 amounts of food. If we share 1 times, there will be 10 amounts of food back to Using State. While food is in Using state, food will be eaten and then will be wasted. If we cannot reuse, food will be thrown away. However, we share the extra food with others, the extra food will be reused and back to Using state.

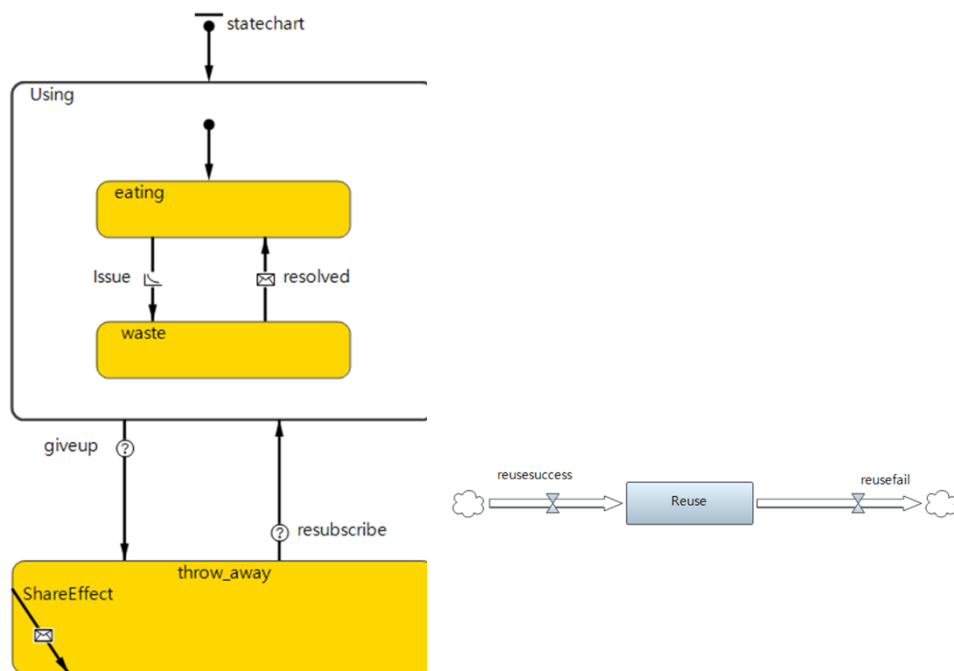


Figure 3. State chart of Anylogic

3. Case Study

The idea of the platform is based on some cases in America.

Here is one example of turning waste into a resource.

Situated on the western edge of Iowa, the Food Bank of Siouxland is able to serve 11 counties in two states – Iowa and Nebraska. More than 100 agencies, such as food pantries, soup kitchens, emergency relief centers, shelters, and daycares, get their food from the food bank. This organization definitely plays a role in reducing the amount of food making it to Iowa landfills. Rather than throwing out day-old bread or canned food just at the expiration date, the Food Bank of Siouxland can take this food and distribute it to feed families in need of nutritious food.

Here’s how it works. The Food Bank of Siouxland purchases food items at an exceptional rate in bulk or they receive donations of food from grocery stores, manufacturers, or individuals. They store the food in a warehouse and then agencies can shop and acquire food from the food bank for just \$0.16 per pound, which is actually a shared maintenance fee. The relationship between the Food Bank of Siouxland and these agencies is very important in making sure people in need receive food.

In 2012, 1.5 million pounds of food was delivered to the Food Bank of Siouxland. The Food Bank of Siouxland is definitely able to turn waste into a resource.

The food bank also receives donations through canned food drives which create sizeable dents in food needs. Two such examples are those held at local schools and Scouting for Food. Scouting for Food is a non-perishable collection program held by the Boy Scouts of America. The mother-load of all food drives though is the National Association of

Letter Carriers' Stamp Out Hunger Food Drive. Thanks to the hard work and dedication of the United States Postal Service letter carriers, every second Saturday in May in over 10,000 cities and towns across the United States, generous postal service customers leave non-perishable foods in their mailboxes. This food drive alone delivers over 15,000 pounds of food to the Food Bank of Siouxland in just one day.

In America, the food bank is really a successful and thriving food bank. This goodwill can also be recognized through the many volunteers that work to help the food bank by picking up products, putting together food sacks, unloading trucks, sorting food, and distributing food at each Mobile Pantry Program: Food to You event. It is through the generosity, thoughtfulness, and time of these people that the food bank is able to recognize a successful and thriving non-profit organization that feeds so many people.

The Food Bank of Siouxland is a special place. Not only are they providing a valuable service by feeding people in need, and diverting usable and edible food from Iowa landfills, but they are also showcasing waste reduction efforts. Any food that is not usable or edible is taken by a local hog farmer to feed pigs. These types of food include any meat not USDA certified, home canned foods, or any food too far past expiration date. The food bank otherwise, provides a service to 11 counties that is essential to the health and well-being of many people.

4. Online System Implementation

The online platform is established based on the above discussed. This system integrated lots of information about food supplier and foodies in National Tsing Hua University. It offers an opportunity for people to make use of food.

In below, the functions of website will be introduced in the following. An online system's homepage is shown in Figure 4. People can get an opportunity to have a meal for free in homepage, shown in Figure 5.



Figure 4. The homepage of platform



Figure 5. The homepage of platform

Everyone can be a supplier and a customer on the platform after they log in this system. When people first come into the system, they have to register first. The page of login is shown in Figure 6.



Figure 6. The page of login

After I login in, the platform will show your name. The homepage of member is shown in Figure 7.

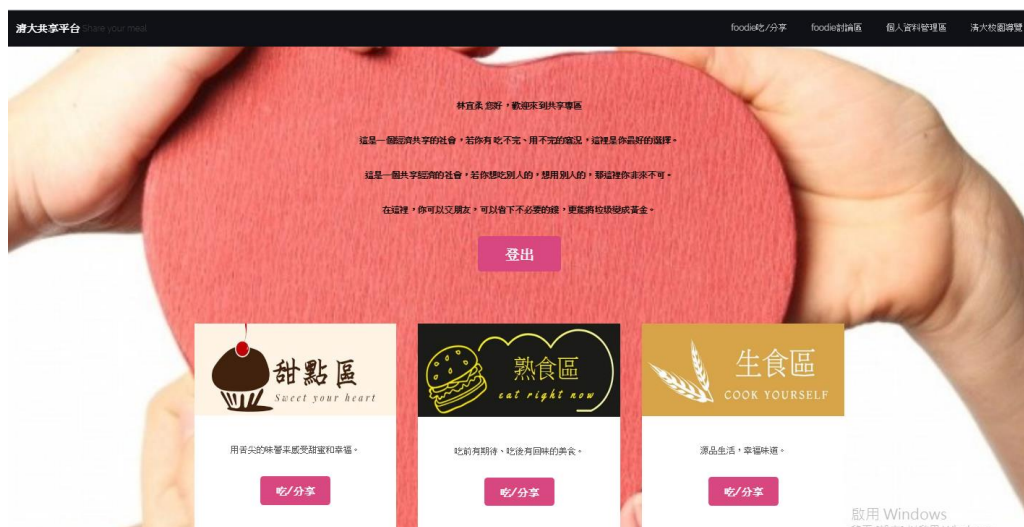


Figure 7. The homepage of member

If I want to join the dessert area, I click the button of 吃/分享 . The page of dessert information is shown in Figure 8.



Figure 8. The page of dessert information

The page of sharing dessert is shown in Figure 9.



Figure 9. The page of sharing dessert

There is an area for foodies to discuss the new topic or hold a wonderful activity. The page of discussion is shown in Figure 10.

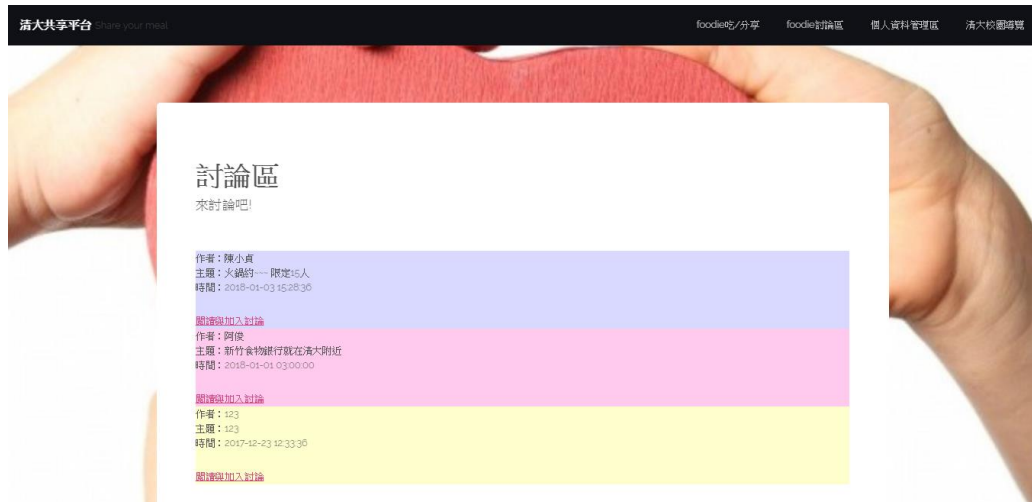


Figure 10. The page of discussion

There is a page for member managing their information. In this page, member can modify his personal information, get his order information, and respond his opinions to the manager of the platform. The page of member management is shown in Figure 11.

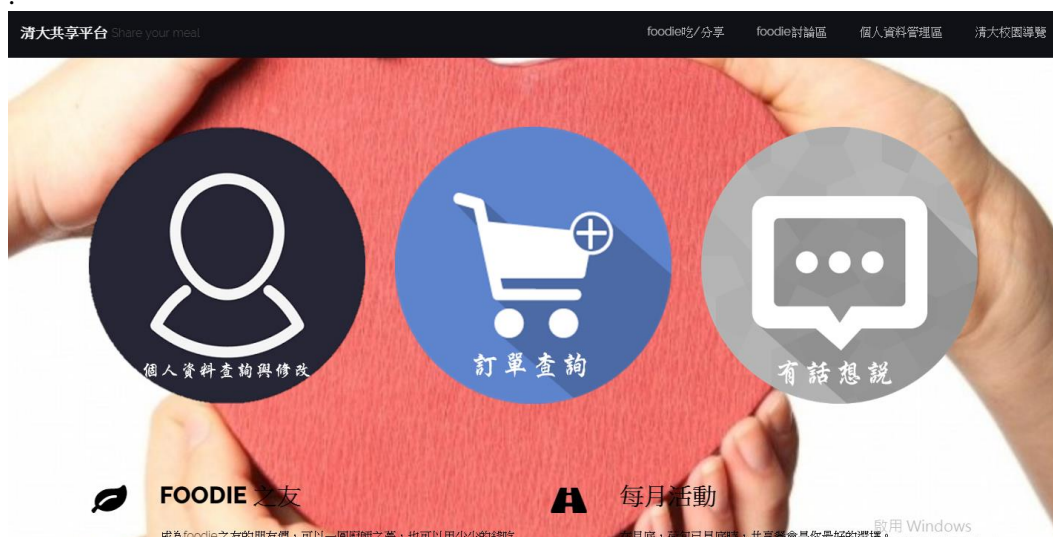


Figure 11. The page of member management

Finally, platform manager can get the information about member and transaction recording in the page of manager. After they login in, they can analyze the human behavior and habit by the information. The page of manager is shown in Figure 12.



Figure 12. The page of management

5. Conclusion

Nowadays, network application and the topic of food waste are significant. Through BPR method and the software of Anylogic, the study proposes a new process and tries to simulate the efficiency of the food flow. By a case study in America, a new platform comes up with the idea.

In conclusion, this improved process and E-Commerce platform has the following contributions. First, it helps restaurants and household suppliers have a better way to deal with the extra food. Second, the people who need food can get delicious food at a lower price. Third, because of the integrated information about supplier and customers, manager can easily get the detail information of the platform.

In the future, we hope to launch it to Hsinchu, even to all the Taiwan. Meanwhile, we are expected to shops, bakeries and restaurants are participating as well. Thorough giving food to the local community is not just good for the earth, it's good for those business to build neighborly relations. We hope to optimize our behavior process by using the big data from the platform, and we are also willing to share the big data with the suppliers to help them to make continuous progress and to promote the positive value cycle.

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