Research on Service Blueprint of Food Banks

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Abstract: With issues on food waste and unbalanced food distribution drawing increasing attention, food banks have begun to emerge around the world. Due to the differing demands of populations, individual food banks have adopted disparate practices. In this study, we use case analysis and affinity diagrams. First exploring and understanding Taiwan’s food bank service system and food supply chain, and then using case analysis and affinity diagram analysis to aggregate the data. This study is of the opinion that due to the urgency of issues on food waste and distribution, we should pursue the development and popularization of food banks, in order to elicit increasing awareness of food distribution issues. Food banks should act as the provider of both education and practical functions, thus attracting the attention and involvement of the whole society, and integrating the concept of respecting food into their lives.

Keywords: Food Waste, Food Bank, Service Design, Service Blueprint

1. Introduction

In recent years, an increasing number of people have become aware of the problem of food waste. The emergence of food banks has resulted in many discarded food items returning to the food supply chain, allowing the public to access these foods cheaply or for free. In the past, Taiwan conducted relatively little academic research on food banks, and currently lacks an exact food bank definition or action plan. It may be that because food banks have no method of reaching equilibrium between food waste and social welfare, it is not difficult to put the food bank concept into action in Taiwan. It may also be that because the public does not understand the food bank, they cannot access this service system. In this study, it is hoped that the service experience of Taiwan’s unique food bank service system can be improved by applying a service design perspective to better understand the problems and unique characteristics of the country’s different types of food bank service systems. In doing so, it is hoped that food bank service systems will be explored with a dual focus on food waste and social welfare, which are both areas that are simple for the public to participate in, and easy to implement.

In their 2011 study, “Global Food Losses and Food Waste,” the Food and Agriculture Organization (FAO) revealed that of all the global food production for human consumption, about one-third is either discarded or wasted, about 1.3 billion tons annually. Food waste is created throughout the entire supply chain: at the beginning from production sources, in its processing, when it is packaged and transported, and in home consumption at the end of the supply chain. This wasted food is not
eaten for a variety of reasons. Many paths for improving the food waste situation have been proposed all around the world. Since 1996, local groups in Taiwan and non-profit organizations have focused on the complementary relationship between “leftovers and hunger,” and have incorporated the international food bank concept and experience (Hsu, 2015), putting food that would otherwise be discarded in the hands of the needy. With the multifaceted development of food banks, they now extend into different areas of organizational operation and social benefit. In their 2013 piece, “A Tour of Taiwan’s Leftovers,” CommonWealth Magazine points out that an elementary school will generally produce 10% extra food during its lunch operation, enough to feed about 40 children. One can see from these examples that there is not a food shortage in Taiwan, and if we can equalize food distribution and reduce food waste, it is possible to provide for more citizens.

Based on the above reasons, the primary goals of this study are as follows:

1. To explore the current participation situation and social benefits of Taiwan’s food banks, by analyzing the direction of food flow in their supply chains, and thereby understand variation among different food bank service systems.
2. To identify a food bank service system that is easy to implement, and in which the public can easily participate in, from a service design perspective, and to propose recommendations for the future development of food banks.

For our research framework, we first explore the conditions of waste in the food supply chain, the current status of the food bank service system, and the improvement of the service experience through service design. With Taiwan’s food bank service system as our research focus, we examine three different types of food delivery method and four food bank service system organizations, in addition to identifying issues and proposing hypotheses related to the current situation. Our research methods can be viewed primarily as two steps. The first step is case analysis, where we seek to understand the variation between and unique characteristics of different food bank service systems. The second step combines the results of case analysis and explores the current conditions of Taiwan’s food supply chain from a service design perspective, in addition to proposing recommendations for the future development of food banks according to affinity diagram analysis results. The framework for this study can be viewed in Figure 1.

2. Literature Review

In the literature review of this study, we first come to understand waste in the food supply chain and the current conditions within the overall food bank service system, in addition to referencing the unique qualities of improved service experience through service design. We then summarize the design methods of service blueprints, forming the basis of our research results and conclusions.
2.1 Waste in the Food Supply Chain

With the linkage of the global food supply chain, its changes are becoming increasingly complicated and it is no longer only a food topic, but also relates to issues such as global population, energy, climate, agricultural production technologies, and environmental protection. The food supply chain will also undergo different transformations as nations’ economies develop. Tian (2010) believes that grain shortages will affect global economic stability. While global grain production increases, unfair resource distribution and trade system problems have resulted in the continuing increase of starving populations. In order to address the grain shortage issue, it is necessary for the world to reduce the loss of food within the supply chain, in addition to increasing food production. The upstream production and downstream consumption ends of the food supply chain determine the flow of food, and there is an immense amount of food waste produced throughout the process. In their 2013 report on the new “good food” movement, CommonWealth Magazine used the “cabbage revolution” as an example, where a head of cabbage is often only half of its original size by the time it reaches the consumer. Due to their appearance or for climate related reasons, cabbages may be unable to enter the market at their place of production, while vegetable markets and supermarkets may throw away extra leafy vegetables because of product standardization and regulation. Furthermore, impact and bruising of the skin during transportation can be reasons for discardment (Lin, 2013). On the consumer end, changes in eating habits have resulted in people beginning to purchase too much, cook too much, and store food for too long, creating waste. Consumers should avoid consumption behaviors based on the appearance of food. By reusing food in various ways, we can create environmentally friendly conditions (Hsu, 2016).

With regard to the seriousness of grain shortages, the world should cherish its natural resources and the environment, thereby improving the waste situation in the food supply chain and allowing more people to enjoy access to food resources.

2.2 Current Status of the Food Bank Service System

A great deal of wasted food resources are being provided to those in need, due to an increasing number of people focusing on the issue and proposing methods of responding to the problem, and food banks using the redistribution of food as a method to respond to food waste. In recent years, many non-profit organizations in Taiwan have established food banks, with the majority of service recipients being vulnerable groups. Currently, social assistance in Taiwan emphasizes the cash assistance model; food banks, not only provide immediate aid to vulnerable and impoverished households, but also supplement the shortcomings of the social assistance system (Hsu, 2015). The national social welfare systems of different countries and the needs of different groups influence the development of food banks, resulting in food banks lacking a definite service system model. Hsu (2015) believes that the food bank service system is divided into warehouse and front line models. The warehouse model allocates food to other non-profit organizations or government departments, and does not give food directly to needy people. The front line model distributes collected food directly to needy people. As service recipients often have a variety of needs, the food bank service system is increasingly diverse, providing increasingly varied services.

Currently, food banks lack a model to reach equilibrium between food waste and social welfare. We should develop our understanding of different food bank service systems and implement those that allow them to distribute foodstuffs more equally.
2.3 Improving Service Experience through Service Design

Times have changed, from the agricultural economy of the past, to the industrial economy, to the service economy, and finally, the modern experience economy. We now face the question of how firms can use interdisciplinary methods of integrating all variety of information as the service experience industry emerges, and thereby spur on the development of innovative services. Service design belongs to the “people-oriented” design concept and the “sustainable development” service innovation concept, generating increased variety and complexity in corporate services (Song, 2014). It emphasizes the service recipient’s entire service experience. Service design not only provides the service recipient with usable, useful, and desirable products and services, but also makes firms more efficient and effective (Mager & Sung, 2011). From this, we can see that service design begins with the needs of service recipients, while effectively aiding organizations in reaching their goals, and implementing design plans where both parties benefit. We can understand the processes of food banks using service design, from their receipt of food through to distribution to service recipients. In Taiwan, food banks currently lack fixed service methods, but the study of different food bank service systems and the resulting analytical conclusions can be used to improve or innovate the existing service system.

In summary, there are many edible foods, which are removed from the supply chain. The food bank service system can help these foods to reenter the supply chain, providing them to service recipients and meeting their different needs. The questions of how to increase waste reduction, address both food waste and social welfare, and provide more effective and complete service experiences for service recipients are important for the future development of food banks.

3. Research Methods

In this study, we use case analysis and affinity diagrams. These two steps use divergent thinking and idea convergence, respectively, first exploring and understanding Taiwan’s food bank service system and food supply chain, and then using case analysis and affinity diagram analysis to aggregate the data. Our research methods are shown in Figure 2.

![Research Methods Diagram]

*Figure 2. Research Methods.*

The first step of our method involves developing a deep understanding of food banks, and using case analysis to find variation and unique qualities in different service systems. The Taiwanese food bank cases within this study utilize different food distribution methods. We selected three food bank organizations: the Taiwan People’s Food Bank, using the warehouse model; the Andrew Food Bank, using the front line model; and the Love Food Bank Lü-Chuan Store in Taichung, using the
supermarket model. In addition, this study analyzes Do.you.a.flavor, an organization addressing food waste, but which is not a food bank service system.

In the second step, this study uses brainstorming to list phenomena related to the food supply chain. After this brainstorming process was completed, the researchers once again browsed the notes to find relationships between topics and then arranged them in an affinity diagram.

In the third step, the case analysis was integrated with the first affinity diagram, forming the second affinity diagram. The affinity diagram lists the phenomena produced at each step taken by food from its origin to the household. These phenomena are organized around three main horizontal axes: methods of easy consumption, elimination, and salvage of food. Finally, we invite experts to discuss our affinity diagram, and increase its breadth and depth.

In the fourth step, we summarize the views of experts to form our third affinity diagram. This affinity diagram displays the contours of Taiwan’s food supply chain, and draws four different affinity diagrams for the interactive relationship between each of the four types of service system and food. From this result, this study proposes several research findings and discusses their relevance to the future development direction of service design and solutions. The development of the affinity diagram is visualized in Figure 3.

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**Figure 3. The development of the affinity diagram.**
4. Research Conclusions

4.1 Case Analysis

Our case analysis research reveals the following points: (1) in order to provide fixed resources at fixed periods, food bank service systems will also use purchases to maintain their supply volumes. (2) Service recipients must apply or meet certain requirements in order to access food assistance. (3) Due to the fixed-time delivery of food, food banks and service recipients may have close relationships, meaning that food banks service systems not only distribute food, they also achieve care and education goals.

Table 1. Case Analysis.

| Name                              | Taiwan People’s Food Bank Association |
|-----------------------------------|---------------------------------------|
| Type                              | Warehouse model                       |
| Established                       | 2011                                  |
| Service recipient                 | Social welfare organizations           |
| Characteristics                   | The Taiwan People’s Food Bank Association is currently Taiwan’s only organization that has been approved by the internationally recognized Global Foodbanking Network, and is authorized to use its trademark. Food is sourced from a variety of sources and purchases are avoided. Distributes required resources according to different service group needs. |
| Goal                              | Adopts the principle: “No Waste, No Hunger” |

| Name                              | Andrew Food Bank                      |
|-----------------------------------|---------------------------------------|
| Type                              | Front line model                      |
| Established                       | 2011                                  |
| Service recipient                 | School children between the ages of 0-15 in vulnerable households |
| Characteristics                   | The Andrew Food Bank, primarily through its long-term care supplemented by food package assistance, assists children in vulnerable families with achieving healthy growth and avoiding hunger. They also help these families to overcome their difficulties, and to regain their strength. Collecting food package contents through online advertisements; filling food packages with convenient and nonperishable foods, attached with encouraging letters and inspiring books. The service recipient must apply; social workers will continue to track the condition of the children and determine whether or not to continue assistance. |
| Goal                              | To help disadvantaged children through tough times. |

| Name                              | Taichung Love Food Bank Lü-Chuan Store |
|-----------------------------------|---------------------------------------|
| Type                              | Supermarket model                     |
| Established                       | 2012                                  |
| Service recipient                 | Marginal and low-income households    |
| Characteristics                   | The Taichung Love Food Bank Lü-Chuan Store receives guidance from the Taichung City Government Bureau of Social Affairs and is contracted by the Taichung branch of the Red Cross. It is the first supermarket model food bank in Taiwan. Families receive different amounts of subsidy points based on their size. |

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allowing service recipient to freely select the resources they would like to exchange subsidy points for.

In addition to collecting resources, each year the government provides some of the budget, allowing the association to purchase a fixed amount of resources.

| Goal | To give food that would otherwise be thrown away to those in need |
|------|---------------------------------------------------------------|
| Name | Do.you.a.flavor                                               |
| Type | Non-food bank service system                                  |
| Established | 2014                                                          |
| Service recipient | Elderly, homeless, and interested persons within the community can all participate. |
| Characteristics | Do.you.a.flavor is an organization founded by a group of young people, which uses simple and engaging strategies to bring people together through community involvement, in addition to caring for vulnerable groups in the community. A monthly stone soup meal is planned by collecting resources and shared ingredients. A meal and a forum for interaction are provided to the elderly and homeless in the community. Regularly hosting guided tours and cooking classes |
| Goal | Apply collective force, light up the streets |

**4.2 Affinity Diagram**

This paper next draws four different affinity diagrams for the four types of service system and their interactive relationships with food, forming the basis of our research results and conclusions. In the warehouse model, food sources are concentrated in the retail phase; these foods were originally to be sold but are not being purchased and are discarded due to their age. As these are large and stable volumes of food, they are suitable for redistribution. In addition to preparing food packages, the warehouse model distributes food to other non-profit organizations, which convert it into meals provided to the service recipient. This method can also reduce the overhead cooking and management costs of the warehouse model. The warehouse model affinity diagram is shown in Figure 4.

![Figure 4. The warehouse model affinity diagram.](image-url)
In the front line model, food sources are similar to the warehouse model. They differ in that the frontline model has fixed food package contents. The front line model publishes its needed resources in each region on its public website, so that the public can donate foods according to the organization’s needs. Food banks using the front line model will send out volunteers at regular intervals to deliver food packages to service recipients, and invite members of the public to subscribe to fixed food package donations. This allows donors greater opportunity for interaction with service recipients, for whom their donations are used to purchase the contents of food packages. The front line model affinity diagram is shown in Figure 5.

Figure 5. The front line model affinity diagram.

In the supermarket model, food sources are the same as the above two models. Similarly, it is primarily composed of dried and canned foods, and these foods will once again become shelved items, allowing the service recipient to exchange points for their preferred foods. The delivery method is different than the other two models, where the service receiver does not passively await aid, but must go to the distribution point. This encourages service recipients to leave their homes and engage in social contact. The supermarket model affinity diagram is shown in Figure 6.

Figure 6. The supermarket model affinity diagram.

In the non-food bank service system, the sources of foods are broader. Fruits and vegetables or foods unused by families can also be reintroduced to the food supply chain, and less fixed delivery methods are used. Using the Do.you.a.flavor stone soup plan as an example, a variety of foods are collected and cooked as a meal, and are given to homeless members of the community at random.
This method helps to develop relationships with the homeless and it is helpful for a non-food bank system to contact different groups of people, indirectly promoting information that causes more people to understand issues related to their work. The non-food bank service system affinity diagram is shown in Figure 7.

![Figure 7. The non-food bank service system model affinity diagram.](image)

This study has revealed the following findings from these four types of affinity diagram: (1) the majority of food for food bank service systems is discarded product from the retail stage. In earlier societies, the purpose of food production was for nourishment, but with the commercialization of food, in order to provide consumers with more varied choices, food has become mass produced, and so there is a phenomenon of large scale food waste. This is highly related to the food consumption habits of consumers. Thus, if we desire to reduce food waste, it is insufficient to simply rely on food bank service systems; the public should collectively work to resolve this problem. (2) The service recipients in the food bank service system are generally disadvantaged groups. Although this system can help food to reenter the food supply chain, in addition to redistributing food, it should include education and promotional capabilities so that the public can not only use donations to improve these problems, but can learn together how to reduce food waste. (3) Due to time, manpower, transportation, and safety issues, food bank service systems face a variety of constraints in salvaging foods. The most stable sources of food are generally processed, bulk dry goods, or canned foods. Furthermore, non-food bank service systems have an opportunity to connect with a wider variety of food sources, but they yield a small and unstable volume. Thus, there are a many foods that are wasted when no one steps in to salvage them, for example, food that has already been prepared is more difficult to reintroduce to the food supply chain. (4) Social welfare organizations are connected to the flow of food in warehouse model food banks. For this model, food distribution areas are typically unrestricted, but because the service recipients are different than those of the front line model food bank, there are different area restrictions. If one does not meet the requirements of the food bank service system, it is relatively difficult to become a service recipient.

5. Conclusions and Recommendations

This study applies a service design research method to conduct data analysis of Taiwan’s food bank service system. The brainstorming of the conditions of the food supply chain was recorded, summarized, and organized into affinity diagrams, where the current conditions and issues surrounding Taiwan’s food supply chain were reexamined. Case analysis was then utilized to
understand Taiwan’s current food bank service system, and used to discuss the differences between and unique characteristics of different types of food bank service system. From this research, the following conclusions are proposed:

1. Service System Focused on Social Welfare
   Taiwan’s food bank service systems are primarily focused on social welfare and the core of their services involves helping struggling groups through challenging times. They will sometimes use cash payments to purchase resources in order to maintain a stable food supply, providing a service system, which can deliver these foods to those in need. Service recipients are mostly vulnerable groups.

2. Social Idea of Food Sharing
   The complicated problem of waste in the food supply chain has already been reduced by the social ideas of converting food waste into food sharing, and by food sharing centered service systems, which emphasize the redistribution of existing excess foodstuffs, and which actively promote the concepts of cherishing and sharing food.

3. Need for a Popular and Accessible Food Bank Service System
   Taiwan’s food bank service system primarily sources its food from large stable sources such as food retailers and food companies. While the public makes donations to support food safety through the food bank service system, it is relatively difficult to meet the needs of the service system with this small amount of household food. Most service recipients in the food bank service system are required to apply, or passively await assistance, while members of the public who are not in the service system find it more difficult to receive help.

4. Education for All on Respecting Food
   Food waste involves everyone. If we truly desire to reduce this problem, the public should collectively become involved. Furthermore, food bank service systems should also provide education and serve a practical function, thus introducing the concept of respecting food into people’s lives.

To summarize the above research conclusions, this study finds that the current food bank service system addresses the two distinct issues of social welfare and food waste. In promoting their development and normalization, food banks should, at the same time, engage in public education on respecting food and showing people how they are not only beneficiaries of food suppliers, but also of the entire food bank service system, and thereby truly contributing to the goal of reducing food waste.

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