A Study of Social Media Driven Value-transformation: Case of Home Planting Service

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Abstract

The value of service usually focuses on its economic viewpoint. The service value we mentioned in this study extends from the traditional financial perspective to the combination of symbolic meaning value as well as the experience value. In this paper, a home planting service is proposed and facilitated by social media to enable the possibility for social collaboration. The iPlant service driven by public welfare concept on social media for social cooperation. The proposed iPlant service for home planting that enables users to grow their desired vegetables on their balcony even they live in the urban city. The iPlant service inspires the possibilities for a user to maximize the value of their crops by exchange and collaboration. The social media improves the planting participation of special interest groups and promote the concept of healthy living through the experience spread of social media.

Keywords

Social platform innovation, value-transformation, planting collaboration.

Introduction

In recent years, news about food safety has emerged one after another. Under the propagation of the community platform, people began to terrify the essential eating needs. The food safety concern that uses various additives and medicines in food production make people worry about their health every day. In addition to pollution and poisoning problems, there are also problems of intentional illegal use of additives, misrepresentation of ingredients, and counterfeiting events on food happened every day. For example, pesticide residues in vegetables exceed safety standards, not only without testing but even deal with fake data. Evil merchants use industrial bleach to bleach bean sprouts to make them look better and sell unsafe food to their customer. While the food safety storm continues, people who are eating out are worried about whether the food they eat every day is safe and whether the vegetables they eat have excessive pesticide residues. Homemakers have also begun to pay attention to whether the plants bought are non-toxic and chemical-free. The public also maintains a vigilant attitude toward the food sold in the store. People even do not trust government-certified safe food.

In this context, emerging home-grown activities have begun to rise. People are willing to believe that the food they grow personally is safe and healthy. Compared to the crops sold outside the store, there may be a variety of food safety risks, and people tend to grow crops such as vegetables at home. If you have farmland in the country, planting techniques and land are usually not a problem. But if we live in a modern metropolitan area, how do we use limited living space to grow crops for our own consumption?

Because the living space in the metropolitan area is small, home-based farming has begun to have innovative changes. The use of technology-assisted planting methods has gradually become an emerging activity in the metropolitan area. People are happy to share their planting results in social media. Moreover, they are more willing to cook their own fresh crops into food and share them with friends and family on social media. Through social media, simple planting extends the meaning of value. The value here refers not to the value of the economic point of view, but to the meaning value and the experience value. The

process of planting can enhance the participation of special interest groups, emphasize healthy living in a sustainable environment, and promote the concept of healthy eating through the spread of social media.

In this paper, we proposed the iPlant service design to facilitate home planting that enables users to grow their desired vegetables on their balcony even they live in the urban city. Not only providing convenient planting environment but the iPlant service also could help people who do not have the growing experience to take care of their crops properly. Moreover, the iPlant service enables the collaborative possibilities for a user to maximize the value of their plants by providing their extra crops to others for service value transformation. The iPlant service concept and its service design are illustrated in the next section, followed by its social media enabled collaborative architecture. The service performance, as well as the user's feedback, are explored in the following sections. Finally, a conclusion remark and future research direction are discussed in the final section.

The iPlant Service Design

This research combines the perspectives of information technology and farmer experts to innovate services to solve the problem that people cannot believe that the food outside is safe. People want to participate in planting to reduce food safety risks, but there is no land cultivation and lack of planting related knowledge. This study hopes to promote the planting mode that can be implemented in a balcony or a small space at home. Systematic use of IoT (Internet of Things) data feedback to help users understand the current state of the planting system and give appropriate advice. More importantly, through the promotion of the community, the network of interactive assistance between the participants can not only exchange ideas on planting experience, but also share the rich crops with friends in the social community. Under this framework, this study hopes to promote emerging value exchange services through social media platforms. Before we illustrate our iPlant service design, we will first analysis the current solution for planting in urban city.

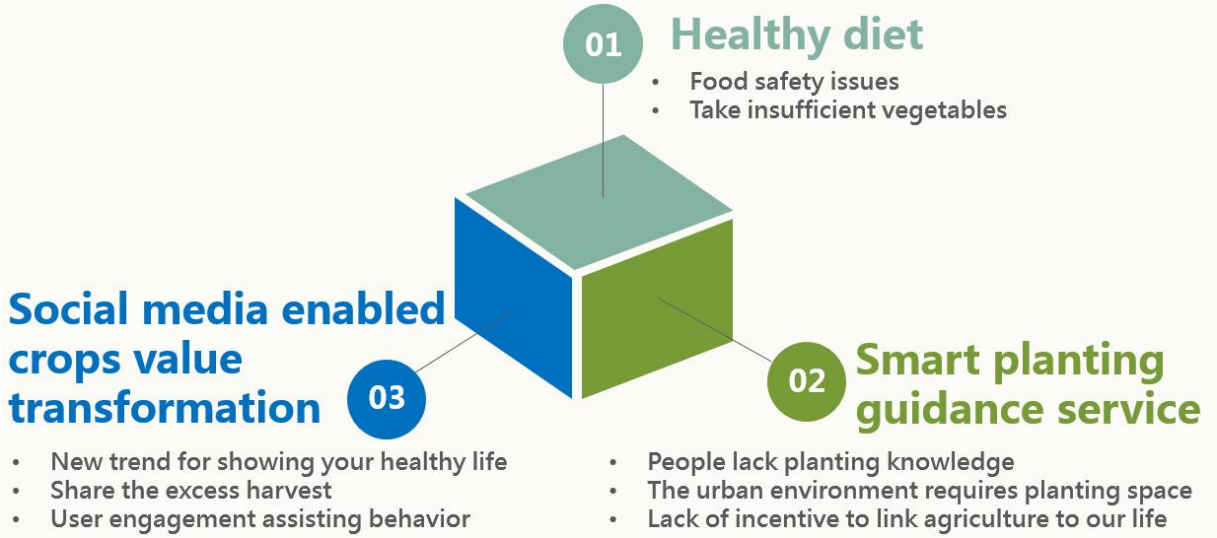


Figure 1. The iPlant service concept

Existing Solution Analysis

At present, the common urban planting patterns can be mainly divided into two types, noted as "Aquaponics system" and "roof garden" planting mode. The two planting modes have their supporters, but they have a certain degree of difficulty for the general public to adopt.

Roof Garden

The green roof is a basic greening project that artificially constructs the roof, exterior walls and balconies of buildings. It is an alternative to finding the lost green land on the roof and walls in the metropolitan area (Sievers, 2016). Because the green roof also blocks the sun's heat source, lowers the floor temperature, and achieves the effect of energy saving and carbon reduction. It is one of the current popular urban planting modes.

- Pros: The roof garden utilize the idle roof space efficiently. As the roof garden is one type of green building, it can saves energy use in air-condition.
- Cons: The roof is not available for everyone especially when people living in the metropolitan area. Users need to have ownership of the roof space to build their own roof garden. It is relatively high cost than traditional planting method and requires to build additional safety protection facilities for the original building.

Aquaponics System

Aquaponics system is an integrated production system of agricultural fish combined with recirculating aquaculture and hydroponic cultivation (Lennard & Leonard, 2006). The use of nitrifying bacteria to convert fish waste by nitrification into nutrients available to plants, can reduce the metabolic waste that is toxic to fish in the water, and also provide the nutrients needed for plant growth. Therefore, the plant and the nitrifying bacteria are similar to the filter, which can not only remove the waste discharged from the fish, but also purify the water to recycle the culture water.

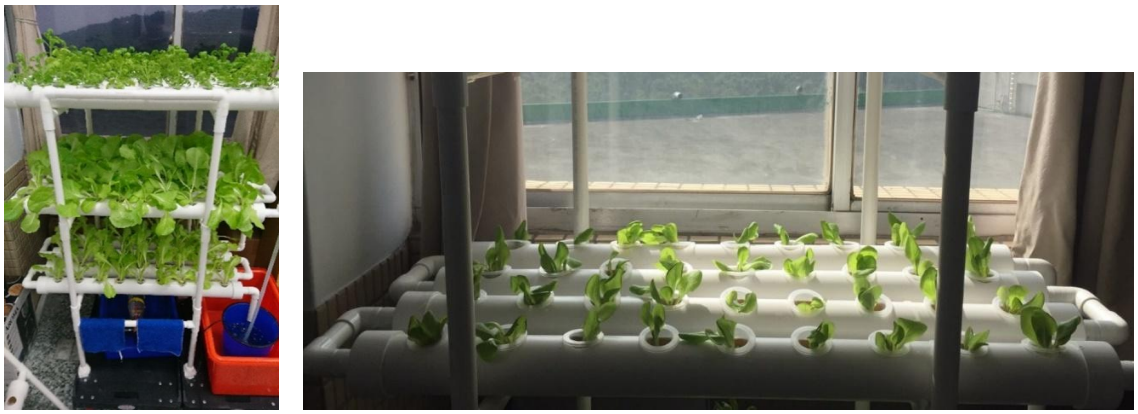
- Pros: This system does not require the use of plant fertilizers and is a relatively natural planting environment.
- Cons: It is more complicated to maintain such an ecosystem as it requires to balance the two kinds of ecology that need special expertise. There is a very practical problem. This system has obvious odor and is not suitable for indoors in the metropolitan area.

The iPlant System

After referring to various planting patterns and analyzing their advantages and disadvantages, this study decided to combine the home planter with the hydroponic system as a prototype to design a smart home planting service system iPlant based on Arduino and Android environment. The environment of the vegetable growth environment is monitored by several environmental sensors, and the data is transmitted to the back-end database via Wi-Fi connection. The system interprets useful information and notifies the user of the various planting operations.

The iPlant hydroponic planting system has the advantages of small demand space and easy planting and care. The system requires about 1 square meter and a height of about 1.5 meters, which is ideal for indoor areas such as classrooms and apartment balconies. Considering that the plant grows in need of sunlight, it may be necessary to move the position over time — the iPlant system equipped with a trolley on the bottom side. When the weather is not good, or the sun is insufficient, the user can quickly move to a sunny place. If the user needs to transfer the iPlant system, they can easily disassemble the parts of the system one by one and reassemble them at the destination. The iPlant is highly space-efficient and mobile, retaining the advantages of indoor planters and improving indoor sun demand.

In terms of planting and care, the iPlant hydroponic system equipped with a sensor module developed by Arduino, which includes sensors such as nutrition, temperature, illuminance and water level detection to monitor the environmental values of the entire system. The iPlant system uses Android-based applications as a platform for users to interact with the planting environment. Users can get information about the state of crop growth in the app, and provide information about the current state of growing vegetables, the necessary operation of the planting system, and the expected date of harvest. Through the design of virtual interactions, iPlant makes the process of growing vegetables more interesting, rather than just waiting for the crop. The iPlant system integrates the expertise required for planting and planting experience into the system, reducing the threshold for users to operate their knowledge and enhancing their sense of accomplishment. Due to page limitation, we will not illustrate the app screen shot, instead, we will elaborate its design and the major functions of the iPlant service system.



(2-A).iPlant hydroponic system (2-B). Platform-based planting design, allowing 36 crops per layer

Figure 2. The iPlant hydroponic system

The Interaction Design of iPlant

Smart Planting Guidance Service

Through the iPlant system environment sensor such as nutrient concentration, temperature, luminosity, etc., the system can monitor the current planting environment. When the environmental factors are abnormal, the program system will send a reminder notification. For example: the water level is too low, too much dirt and need to change water, lack of sunlight, etc.

Therefore, with the smart planting guidance service, you can grow vegetables and plants without worry, and grow healthy, pesticide-free vegetables. The App also designed a personified dialogue mode to attract users' willingness to use.

Typhoon/vegetable Price Impact Warning

When the typhoon comes, the price of vegetables in the market tends to be significantly higher. From the release of typhoon warnings from weather forecasts to actual attacks, the impact on vegetable prices usually takes about two weeks. Therefore, the system integrates weather, typhoon, and market price information to provide innovative services. When the typhoon forecast is released, the user is notified to plant crops suitable for rapid harvesting, which reduces the high price of vegetable crops caused by typhoons. This impact warning and the corresponding operation suggestions is a very intimate service for homemakers.

Social media enabled collaboration

Collecting the latest information in the community has become the main communication channel for modern people. The various life concepts and ideologies extended through social media and increase its impacts. The value transformation of iPlant planting services focus on the promotion and value co-creation empowered by social media to highlight the experience value of the service. Followings are the collaborative activities of iPlant service.

Extra Crops for Sharing

If the product or service is combined with the user experience, the better the experience feels, the higher the customer thinks the service value (Cagan & Vogel, 2002). Through the iPlant smart planting system design, the user with no planting expertise can quickly grow their healthy vegetables in the balcony at home, without worrying about the pesticides or improper additives used in their food. In the iPlant system, most of the self-grown vegetables is for personal use, not for sale. If any excess vegetables can't be consumed, the user can donate them through the iPlant service system to others. Whether it is to a friend who lives nearby in the community or to give to a needy, vulnerable group, it is a way to increase the value of the crop. The value mentioned here does not refer to economic value, but the value of meaning generated through social

interaction. Let the social community help each other, and furthermore to form a social stability force based on charity.

With the extra crops sharing function, these vegetables that are about to be discarded will be transformed into resources that other users can make good use of. Vulnerable groups can also obtain food resources available nearby through this system. In addition to avoiding the waste of unnecessary food waste, growers can donate their vegetables to those in need. The concept value of this extra crops sharing will increase as the number of participants increases and the value created by the sharing of vegetables will be maximized.

Recipe Sharing

The iPlant service allows people without agricultural expertise to grow healthy, non-toxic and beautifully shaped vegetable crops. To drive stronger social media interactions, we must design ways to give users a gorgeous display of their results. The system provides simple recipe teaching, simple and clear steps to make vegetables a beautiful and delicious dish. Users can complete a meal with a few steps of cooking instructions. For recipe sharers, we encourage writers to present their cooking methods in a detailed and logical manner, with step-by-step guidelines. The goal is to allow community participants to learn and actively share photos of their results and let social media become the power to promote user interaction.

Measurement Design of iPlant Service

In order to measure the success of iPlant's service system design, this study was measured using experimental methods. We will adopted Delone & Mclean's information system success model for measurement. (Delone & Mclean, 2003) There are six major aspects of the information system success model including: System quality, Information quality, Service quality, Intention to use/Use, User satisfaction, and Benefits.

The experimental group is the iPlant system, and the control group is another popular plant planting app called "Flower Care." We recruited forty subjects for initial experiments. The subjects were characterized as young office workers or small families living in metropolitan areas. This group has a higher degree of dependence on social media and can be classified as social media heavy users. We also conducted a preliminary qualitative in-depth interview to understand the user's opinion on the iPlant system. User feedback indicates that such a combination of social media and planting behavior will give them a strong willingness to participate. Food safety concerns that users are concerned about can be resolved. But users will want the iPlant planting system to be cheaper or provide a DIY kit that allows them to modify or expand the number of plants.

Conclusion

Social media are getting popular in recent years. Not only huge user data accumulated for advanced analysis, but various interactions also occurred on social media that allows exploring the possible social behavior patterns. In this paper, we focus on a value transformation service that is driven by public welfare concept on social media for social collaboration. The iPlant service is designed for home planting that enables users to grow their desired vegetables on their balcony even they live in the urban city. The iPlant service enables the collaborative possibilities for a user to maximize the value of their crops.

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