

An Exploratory Research on the Improvement of Agricultural Food-related Public Organizations' Information Service : Based on the example of Okdab.kr's information service improvement strategy

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Abstract Development, availability and users' participation in the information service of agricultural food sector is slower than that of other sectors in Korea. This phenomenon comes from the lack of development strategies and comparative analyses with other sectors, as well as the agricultural food industry's own characteristics which is developed based on the offline market.

In this research, we will discuss about how to improve the public information service of agricultural food sector based on the example of establishing service improvement strategy by the most representative Okdab. In this research, we have drawn the following implications for development strategy of Okdab service based on three core keywords derived from benchmarking KOSIS.

Three core subjects for upgrading public information service are 'analysis information with expertise and differentiation,' 'user cooperation-oriented platform,' and 'intuitive and effective UX,' and to strength B.I. as an integrated information service of agricultural food sector, we need to identify the users' satisfaction and needs for the existing service, establish an optimized operating strategy on a short-term, mid-term and long term bases, and implement them in a positive way. Based on this positive action, it can become a trustworthy information service for the users, and we can expect the improvement of the users' recognition for its consistent usability and efficiency.

Keywords informatization of agricultural food, information service, informatization of public organizations, public service improvement, management information service for farm households

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1. Introduction

1.1 Background and purpose of the research

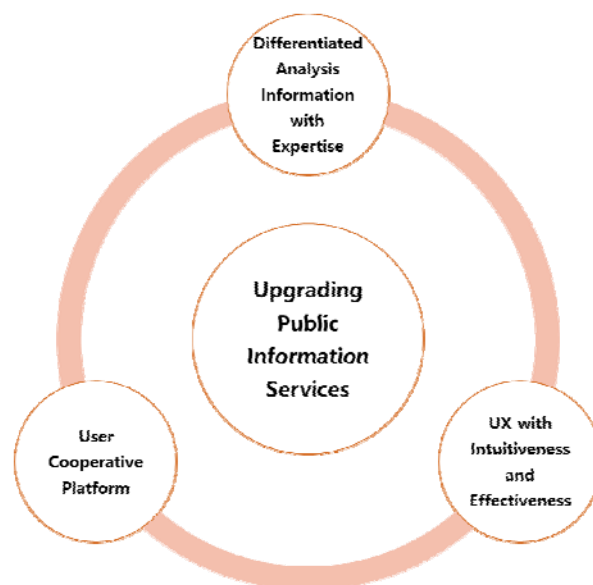


Figure 1 3 strategic elements for upgrading the public information service presented in KOSIS

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The development of technology in the contemporary society leads to a new industrial structure and changes (Gwon, O-jun, 2010). The 4th industrial revolution makes it possible to combine the agricultural area, which covers production, cultivation skills, breeding, distribution, facility and construction, with smart technology, machine learning-based AI, big data analysis and IoT. (Lim et al. 2015; Lee, 2017)

It may be the same viewpoint as that of the global trend that pursues a new industrialization through industrial convergence of ICT and IIT-based technology, and it is realized in diverse countries including EU, USA and China, as well as Korea (Institute for Information and Communications Technology Promotion, 2015). Together with this technical change, it is becoming important to establish and carry forward a next-generation informatization strategy for agricultural food in the public and private sectors related to the agricultural food industry. In other words, to increase the industrial efficiency of the agricultural food sector in the circumstance where a producing population is decreasing and aging, it is necessary to establish an IT-based convergent growth strategy for agricultural food, which was somewhat ignored in the past.

Despite this trend, the speed of IT convergence in the agricultural sector is slower than that of the other industries. Therefore, to improve this, it is important to understand the mega trend of future IT-based convergence technology, and to emphasize on the review of technological, social and industrial demands for industry-fostering strategy on a long term basis, and prompt actions. In relation to this, Moon & Kim (2008) explained that the information service of public organizations should reflect the demand which consistently present the direction of innovation.

In Korea, agricultural food information service was initiatively established by the public organizations including the Ministry of Agriculture, Food and Rural Affairs, the leading office of the industry, and the affiliated or related organizations including Korea Agency of Education, Promotion and Information Service in Food, Agriculture, Forestry and Fisheries and National Agricultural Cooperative Federation, and recently, the portals including NAVER and the communication service organizations including the Korea Economic Daily are participating in (Ministry of Agriculture, Food and Rural Affairs, 2014; Koo et al, 2015).

Nevertheless, useful information service in terms of industrial interests and expertise, not simply the information service for fun, is still based on that provided

by the public organizations (Kim, 2001). Therefore, we can say that the service management strategy of public organizations is playing the key role.

A representative information service of the agricultural industry-related public organizations is that of Okdab established by EPIS (Korea Agency of Education, Promotion and Information Service in Food, Agriculture, Forestry and Fisheries).

Okdab is a public information service for diverse agricultural food sectors for more than 20 years since the end of 1990s, and it is known to have accomplished its expected results in terms of quantity such as its scale and target area. In reality, the public data related to agricultural food, which is provided by Okdab, is more than 350 kinds as of 2017, and the number is rapidly increasing.

However, comparing to this quantitative growth, the public agricultural food information service operated by Korea Agency of Education, Promotion and Information Service in Food, Agriculture, Forestry and Fisheries (EPIS hereafter) is known to be lack of quality, internally and externally. To solve this problem, this research aims to propose what strategy this public information service can provide.

1.2 Performance system of research and research model

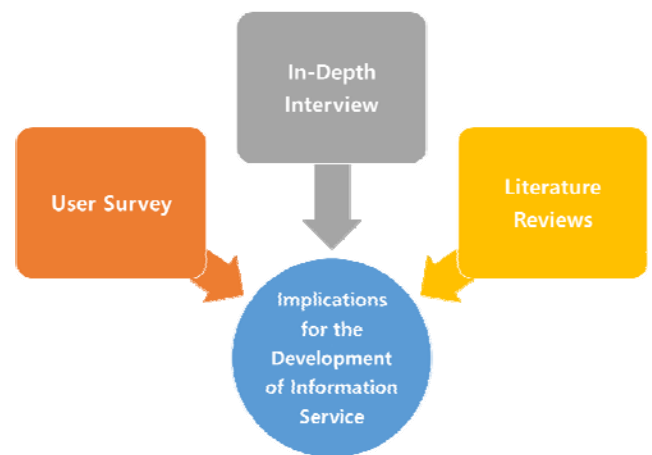


Figure 2 Analysis system for the representative information service availability (NIPA, 2012)

Generally, the applicability of information service can be realized by developing an evaluation model first, and analyzing the results to which that evaluation model is applied, thus this research as well be performed accordingly.

Therefore, we will analyze the internal and external

environments and draw implications by comparing with the existing researches and Role Model, and utilizing FGI-based information assessment for the experts and users about the results of that comparison, and related previous researches. Since we are aiming to utilize the exploratory methodology, we will exempt the method of conducting a survey for unspecific users and a follow-up statistical analysis utilizing its results.

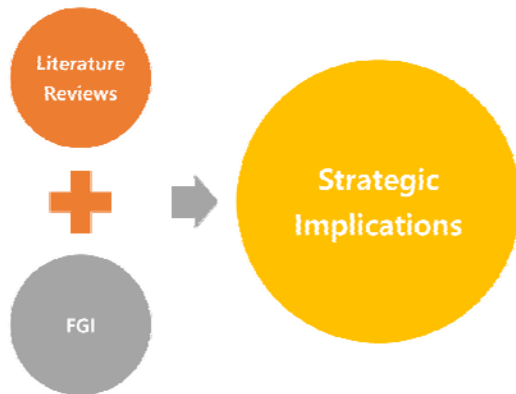


Figure 3 Promotion system of this research

The detailed promotion system is as follows. First, we will compare and analyze the previous research materials about the direction of information service development. To be more specific, we will analyze the previous researches to draw items for conducting a survey for the information service users and expected results, and use the results to analyze the previous research papers, publications, and government/private policy reports related to the strategy for improving the recognized usefulness and value of information services. Second, to make the drawn direction can propose a meaningful implication for the development strategy of the integrated information service for agricultural food, we will perform FGI for the users who are highly interested in, and loyal to, Okdab information service.

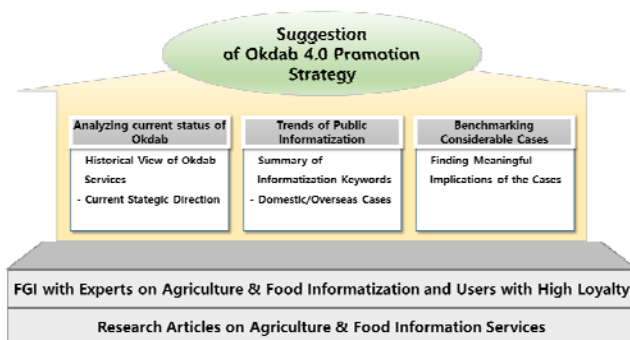


Figure 4 Conceptual Framework of research

2. Main subjects

2.1 Overview of Okdab.kr

EPIS has been taking full charge of planning, developing and operating the public information service for agricultural food over 20 years since the 1990s when it was Korea Information Center for Agriculture, Forestry & Fisheries (Affis.net), a juridical foundation. Followings are the analyses of Okdab’s planning, development and operation of public information service in each period. The first period was the time when the center was operating ‘Information for Agriculture, Forestry & Fisheries (AFFIS)’ service in the 1990s, and it promoted for the purpose of operating the high-value information service comprehensively by collecting and processing the agriculture-related information which is scattered around the related organizations. At this time, the service was relying on a limited measure by using private PC communication channels such as Chollian and Hitel. The second period was the time when the center changed its service from that of PC communication to internet-based one to strength the internet-based comprehensive information service in the 2000s, and it integrated the shipment information and Greennet into AFFIS.net domain.

At this time, the way of Okdab service was changing from unidirectional to bidirectional so that it could deliver information while aiming to provide more integrated service through this. The center also promoted the portal-type comprehensive service which covers OkdabCEO, community and email.

The fourth period is that of the present day Okdab 4.0 which is aiming to promote the realization of cloud-based comprehensive information service, to integrate the agricultural food-related public information services which used to be operated by the organizations affiliated or related to the Ministry of Agriculture, Food and Rural Affairs (MAFRA hereafter), and to strengthen the big data analysis and provision of public data, and restructure the system into a mobile-friendly one.

Comparing to the 1st and 2nd periods, where it was important to simply deliver the information, the way of providing service in the 3rd and 4th periods has changed to emphasize on the direction of delivering information which is faster and can be provided in real time.

In addition, the period between the 3rd and 4th was the time when emphasizing on the selection of its direction between integration and specialization. Through trial and error, Okdab is realizing and providing specialized

information of diverse agricultural food sectors at present, however, we still do not know if this service provided the people related to agricultural food with positive influence, and further internal and external reviews will be necessary.

To solve this problem, it is necessary to analyze how the organizations in overseas, or those with similar functions, are changing.

With regard to this, MAFRA set up the goal for 'Promoting direction of national information in 2018' as 'Accelerating the diffusion of ICT convergence in rural area' and 'Promoting data-based smart agricultural administration', and to realize this, it established and proposed 4 promotion strategies including 'Diffusion of ICT convergence,' 'Data-based intelligence information system,' 'Safe and convenient administrative service,' and 'Strengthening of the cooperation system between the government and private sectors.'

2.2 Review of the previous researches and examples

As mentioned in the beginning, we will first review the similar researches in Korea and overseas to find out the possibility of development and related factors of Okdab public information service.

Among these previous researches, it is necessary to analyze the public information service of the major foreign countries, first. The important thing in the policy direction for public information service is that we have to consider the type, contents and delivery method of the information which is demanded from the industrial standpoint (National Information Society Agency, 2011).

It is known that the performance of Korea's public information service has been relatively inadequate, and to compensate this inadequacy, it is necessary to emphasize on the management of the overall cycle of information system, and strengthen the expertise (Jeong et al, 2008, Jeong et al, 2011).

As we have reviewed the directions promoted throughout 4 periods of Okdab service, we realized that MAFRA should strengthen the information capacity and establish a foundation for ICT convergence to realize the expertise of farmers that MAFRA has been emphasizing on, and strengthen the competitiveness of Korea's agricultural food industry based on that.

To strengthen the competitiveness, it is important to analyze if the service system has a capacity to provide the users with data and information correctly and promptly while fulfilling their needs, and to understand the changes of internal and external environments related to Okdab

while researching on the similar examples.

With regard to the trend of the major foreign countries' public information service, we can find out that public information service of the advanced countries, such as USA and UK, is concentrating on providing data and analysis service tailored for the users by processing and reflecting this public data into the policy through cooperation with the private sector, rather than delivering the original data.

It is possible to summarize the operation of the major countries' public information service with 3 keywords such as strengthening of data analysis function, strengthening of cooperation between the public and private sectors for information service, and promotion of open platform-based data analysis and utilization.

2.1.1 [Keyword 1 - Strengthening of data analysis function and user availability]

USA and UK, which have been leading the development of public information service, tend to provide upgraded analysis results tailored for the users' needs and purposes by improving the public data service which used to be provided in the type of raw data or one-dimensional graph (Science & Technology Policy Institute, 2014). For example, to improve the convenience of using public data for the private sector, USA and UK are establishing a national data map and expanding the Map-based Data Search service. In USA, the government has established and is operating OpenStreetMap by applying map data to public information through cooperation with the private sector, and realizing a virtuous circle by providing that data to the USA public data portal (data.gov).

Therefore, USA is pursuing the strategy which would secure the source of diverse data while reducing the defects of public information service, which may not be good enough, in terms of updating speed or cycle, and qualitative improvement of contents, comparing to those of the private sector. The important thing here is that the government emphasizes on the theme, utilization type and message of diverse data in the process of providing analysis service, and the intuitive UI with which even the users who are visiting the site for the first time can easily understand how to use it.

2.1.2 [Keyword 2 - Strengthening of cooperation between the public and private sectors]

As mentioned above, the advanced foreign countries, such as USA, have established and are operating a

specially visualized channel (datausa.io) based on the analyzed data in cooperation with the companies of the private sector (MIT, Data Wheel, Deloitte), and most of all, they are promoting a strategy that provides service by clearly discriminating and defining what the private sector can process and the public sector can support with. datausa.io provides visualized basic demographic information (charts, maps etc.) of each state, such as population, economy, education and residence, together with Raw Data, and to secure diverse data sources while not delivering data uni-directionally, which was used in the past, the public and private sectors mutually provide visualized data through alliance/cooperation.

Similarly in Australia, the government selectively provides a specially visualized channel (National Map) which realizes LBS by visualizing public data, which is selected by the users, on a 3D map, and in Singapore as well, the government is operating a visualized service which automatically collects data in real time through the public data portal, in cooperation with private services. In addition, it is also operating a service which retransfers the visualized service so that the private services can use it.

By doing so, it is possible to establish an environment where the general users can access to the public information service while realizing good reliability, and this reliability is an important factor for raising the users' revisit rate and availability (Park, 2011).

In addition, it is also possible to identify the recent trend, which is called 'the emphasis on cooperation system that can compensate the mutually insufficient parts, while minimizing the possibility of unnecessary competition between the public and private information services(Korea Institute of Science and Technology Information, 2013).

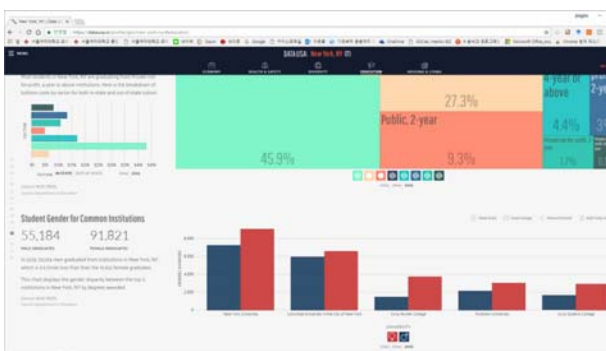


Figure 5 Screenshot of datausa.io

2.1.3 [Keyword 3 - Open platform-based data analysis

and utilization]

The third characteristic is the latest trend that supports the creation of diverse intelligence service and industrial initiative based on data, not providing simple information when producing and opening high quality or large quantity of data.

To cope with this trend, it is important to secure the open data platform technology that can support the opening, analysis and utilization of data, and establish a data ecosystem through the secured platform.

Major foreign countries are emphasizing on grafting the technology that can open, compensate, utilize, recycle and restructure the data based on web and mobile web, and we can identify that this service is evolving into an open type API base which can be directly restructured and reused by the service users, only when visualized service is provided.

To be more specific, it is emphasized that we have to improve the currency and accuracy of data, consistently discover and apply the keywords that the users want, and develop/realize AI, deep learning, new intelligent API by utilizing RPA, and embedded service.

Through realizing these three keywords, the major foreign countries are changing their policy direction for the standard of public data provision into 'Creating economic value' which emphasizes on the data-based industrial ecosystem, beyond 'Improving transparency.'

2.1.4 [Keyword 4 - Strengthening of Brand Identity]

The existing previous researches show that reliability and recognized usefulness are the factors predominantly influencing the possibility of the users' satisfaction and revisit, while emphasizing on the technical improvement of integrated information services.

Park emphasized that the reliability to internet portal sites positively affects the possibility of the users' satisfaction and revisit, and explained that the factors for measuring this reliability are 'system quality, service quality, information quality and convenience' which are recognized by the users. In addition, he emphasized that it is necessary to develop Brand Identity to raise the users' desire for clearly recognizing and using the contents provided by the information service.

As we could find out the fact in the example of service renovation of Korean Food Promotion Institute, Brand Identity is not simply providing the name of the site, but it is a process that delivers what core service a portal

has.

From this point of view, Brand Identity is a process that consistently makes the users recognize its value, thus Brand Identity should have universality and distinction that can represent the value that such information service tries to provide. These universality and distinction were studied in diverse previous researches in terms of Brand Equity, and they are part of the strategy for clearly recognizing the differences that portals try to provide by delivering positive associated images for information service including reliability and usability that they want to make the target customers recognize.

In the previous researches including Upshaw and Aaker explained that diversity, delivery type, qualitative value and user convenience of the consistently developed contents, as well as the already developed logo, domain name or site brand, are all related to Brand Identity. These evaluation factors were created by borrowing the concept of SERVQUAL which has been discussed in diverse industrial fields since its first proposal in Parasuraman et al. (1988).

Through the results of these previous researches, we can identify that the consistent activities as follows, and diffusion of the users' recognition for this are important to secure Brand Identity of information services.

First, it is important to secure the diversity of contents to cope with multiple users effectively. We can identify this change in the examples of diverse-type visual materials, such as webzine and card news, which are provided by the public information services of Korean Food Promotion Institute and KOSIS. The reason why securing diversity is important is because the provided contents should show that the information is based on the time and actual field, as well as its currency realized by consistent updates (Open Data Strategy Council, 2012; Korea Information Society Development Institute, 2012; Open Data Strategy Council, 2016).

Second, it is necessary to make information service easily accessible to the users by realizing the system which can provide diverse accessible means.

Third, it is important to support the users so that they can access to the service through a variety of channels. In relation to this, the public information service, such as that of Korean Food Promotion Institute, KOSIS and ITSTAT, tends to make the users, who are eager to seek specialized information, such as specialists, business operators and hands-on workers, visit the sites more frequently by increasing the number of exposures in the search sites, including Naver, Google and Daum, the potential private competitors,

Fourth, it is important to create the identity by making an interactive UX so that the users can classify the purpose of visit and search according to the classified trend.

Fifth, with regard to the latest trend of public information service, it tends to make the users react and participate in the contents by posting modularized information multiply to create Brand Identity by leading the users so that they can positively receive this change and make it meaningful for themselves

2.1.5 Analysis of Role Model of data-based integrated information service – Research on the example of KOSIS

In the past, it was common that public information service provides diverse functions, including internet information, search in the site, electronic mail, diverse news, online shopping and café (community) due to its integrating strategy based on functions.

However, this strategy of public information service was not successful, and as it competed with the private portal sites, it became important to establish a framework evaluating the outcome on investment.

Traditionally, the outcome on investment has been measured and evaluated by using IT BSC methodology, which was established by utilizing BSC (Balanced Score Card), in terms of finance which was proposed by Kaplan & Norton (1992). However, this BSC-based evaluation methodology is known to be insufficient for the latest trend of information service as it is conducted based on the evaluation factors of 4 categories.

The latest trend of information service can be defined as realizing an integrated platform which provides diverse information at one place so that the users do not have to visit several sites to find information or functions for the purpose of providing a new information service. Since the platform-type public information service provides diverse functions complexly, it is necessary to review diverse factors, as well as the quantitative evaluation based on limited viewpoints. Therefore, it is important to find out how the existing successful public information service evaluated the outcome and raised the value of use, through examples.

Platform-type service provides all the contents at the same time, and in terms of its system, it applies the concept of a total site, and the representative service among those of the public organizations is KOSIS (National statistics portal, <http://kosis.kr>)

We have analyzed KOSIS in terms of system (technical) and contents, and first, we could find out that the system

is focusing on the provision of an analysis service with expertise and distinction which can create an industrial value, not one-off contents or those for fun, and attract diverse users. Second, it provides information according to the major users' taste and technical trend, and realizes a more intuitive UX that can reduce the number of potential errors.

To realize this system, KOSIS exposes an integrated search engine on the first screen to make the users can access to the desired contents and functions, and organized its UX where the users can easily and promptly access to the desired information through keyword search. In addition, the system increases the accessibility by adding the function of showing the whole menu at the place that can be easily found by the users.



Figure 6 Screen shot of integrated search and site map of KOSIS



Figure 7 Visualized contents of KOSIS' statistics/ Statistics webtoon of KOSIS (Left)



Figure 8 Information page of 100 KOSIS indexes

3. Conclusion

3.1 Summary and implications of research results

The purpose of this research is to propose a strategic direction for vitalizing the public information service. Especially, we tried to provide the direction of information service that the agricultural food industry needs, since the speed of vitalizing public information service is slower than that of the other sectors.

By establishing UX and contents which would make the users can clearly recognize BI (Brand Identity) through which the core service can be delivered implicitly, we can expect the strengthening effect for diversifying the information through user participation and securing diverse partners, and we can also expect the effect of strengthening Brand Identity of which the value can be intuitively understood by the users.

To realize this, KOSIS is diffusing the user recognition, which verifies the fact that the information is tailored for the users, through realizing the site fulfilling the users' needs by adding diverse functions and contents, and composing the menu including 'news, additional service, my page, member information and related sites.' In addition, by making the users possible to identify the renewed materials by indicating the contents' latest posting time, current updates and dates, KOSIS is making people believe that it provides the users with timely information.

Taking all these facts into account, KOSIS is being operated based on three strategies including the securement of the analysis information with expertise and distinction, realization of user cooperation-oriented platform, and realization of intuitive and effective UX (User eXperience). FGI result of Okdab's high-loyalty class for these strategies is as follows.

“Okdab should be searchable at Naver. Okdab cannot be easily exposed as the keyword, which can be found through search engine, is not properly used. In addition, it is necessary to find a measure of inducing more users to Okdab.”

“Although the actual information provided by Okdab CEO and knowledge On-Air is not directly related to the agricultural sector, it was helpful to operate agricultural business and to communicate with the experts in diverse sectors.”

Figure 9 Summary of FGI result of Okdab's high-loyalty class for these strategies

Most of the Okdab users used for the analysis are in their 30s and 40s, and most of them are in agricultural business. These users seem to have the similar tendency to that of the other industrial areas. They seem to have a tendency to judge the usefulness of service by closely measuring the possibility of acquiring the desired information, as well as the external characteristics such as menu and UI.

From this point of view, it is presumed that the information service for agricultural food will need a basic support system which supports the agricultural management process, including production, harvesting and sales, without difficulties, rather than demanding highly refined and analyzed data, and makes it possible to cope with the issues and assignments that can be occurred in the future.

The examples in Korea and other countries, including that of KOSIS, can be judged in the same context as this presumption. In addition, it is necessary to vitalize the community function between the members of agricultural food industry, which was preferred in the period of Affis.net and PC communication service, and establish Brand Identity as a management information service that can integrally manage the contents, which are produced and distributed directly by the users, and agricultural management information.

Especially, as we have seen in the examples of improving public information service in Korea and other countries including the case of KOSIS, it is necessary to have a realistic discussion about the analysis information with expertise and distinction, user cooperation-oriented platform, and intuitive and effective UX, to strengthen Brand Identity.

To strengthen BI as an integrated information service for the agricultural food industry, it is necessary to identify the users' satisfaction and needs for the existing service, and establish and implement an optimized operation strategy by reflecting the results on a short-term, mid-term and long-term basis. Based on this positive reaction, it can be a trustworthy information service that the users can rely on, and can improve its recognition covering the continuous usability and effectiveness.

3.2 Limitations of research and a proposal for further researches

This research aimed to propose a vitalizing strategy of public information service for the agricultural food sector, however, it has limitations as follows.

First, it lacks quantitative evidence which is the limitation of exploratory methodology. Therefore, we could only apply the analysis method based on the examples. To solve this problem, it is necessary to apply quantitative methodology including surveys.

Second, it may be controversial about its objectivity and representativeness as the number of targets for FGI is small.

Third, with regard to public information service of the agricultural food sector, strategies are applied according to the policy direction of the public organization or the government, as well as the simple technical necessity or validity. Therefore, it is not easy to verify the validity of the direction proposed by this research.

To overcome these limitations, it will be necessary to establish a detailed strategy for each period, in which Okdab will carry forward its service, in the follow-up researches, and a process of verifying the strategic validity for which the users can directly participate in.

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