

# Interactive Information Service Technology of Tea Industry Based on Demand-Driven

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**Abstract.** Information service technology is a bridge between user and information resource, also is the critical factor to weight the quality of information service. Focusing on the information service features of tea industry, the demand-driven and interaction of information service were emphasized in this paper. User and market as the major criterion for testing the quality of information service, the interactive information service mode based on the demand-driven was proposed to realize the maximum of information service value. Demands of users as the driving factor in the mode, introducing the interactive ideas of loop optimization on information demand and combining the push and feedback mechanism of information, the information service mechanism was further optimized to meet the actual demands of users.

**Keywords:** tea industry, demand-driven, interactive mode, information service.

## 1 Introduction

The main countries for tea production are in Asia, Africa and Oceania, but the most countries that have relative mature development in the field of agricultural informationization are mostly in Europe and America, and tea industry has lots of traditional factors, which lead to tea industry information service haven't got the real development, the research status of tea industry information service are almost blank around the world.

As we all know, China is the No.1 for tea tree acreage and No.2 for tea production, tea industry is always the traditional advantage industry[1]. However, comparing with our strong growth of tea industry, its information service is not suitable for meeting the actual demand. The existing tea industry information websites are almost lack of practicability, timeliness, traceability, predictability and sustainability, these actual issues made the information resource of tea industry difficult to be used constantly. But what are the basic reasons? Firstly, because of these characteristics such as regional difference, time difference, industry difference and user group difference of tea industry, the information cannot be found, selected and absorbed effectively if the information is not timely adjusted by information service provider; secondly, the professional and unified information service platform of tea industry has not formed,

which lead to the duplicated construction in information service websites of tea industry, one-sided information service content, lack of service characteristics and low service effectiveness.

In this paper, focusing on the issues existing in the information service of tea industry, based on analysis of information demand, combining the available and mature information service technologies, and introducing the interactive idea of loop optimization, the interactive information service mode of tea industry based on demand-driven has been presented for carrying out individualization service theory of tea industry.

## **2 Characteristics of Tea Industry Information Service**

### **(1) Regionality**

Agriculture influenced by climate, soil, humanity and surrounding is different from industry. There are two reasons lead to the regional differences: on the one hand, the differences between zonality and azonality of natural situation determine the fitness and range for agricultural biology to grow; one the other hand, social and economic condition determine the layout, structure, management mode of farming, forestry and animal husbandry, the direction of resource using, level of production and development. Tea industry as a part of agriculture, also has an obvious regionality. The differences in different tea production areas obviously present different tea varies, tea processing technologies, production and sales structure, tea-drink cultural, so the regionality of different tea production areas should be adequately considered.

### **(2) Seasonality**

Tea tree is perennial woody, which has a total development cycle in whole life as well as yearly development cycle in one year. Tea tree's yearly development cycle refers to its growth and development progress in one year. Tea tree is both influenced by its growth characteristics and external environment situation, represents different growth characteristics in four seasons, such as bud's sprouting and pause, leaf's stretch and maturity, root's growth and death, blossom and fruiting. Tea information service must to provide timely information service in different period to ensure the commercial value of tea product.

### **(3) Comprehensiveness**

Tea, which is a kind of economic crop with a high commodity, tea industry's information has obvious relevance. The comprehensiveness of information presents a piece of information may directly or indirectly have correlation and interaction with several pieces of information, so a piece of information usually is the synthesis of several kinds of information. High or low yield and high or low quality in elemental area determine the bud's quantity and raw material' quality, which also is determined by the development status of tea's shoots and having the reasonable tea tree's

cultivation and picking or not, and so on. It indicates that these related factors should be considered, providing reliable information service.

#### (4) Complexity

The tea industry's characteristic of being related with agriculture, industry and commerce lead to the close relationships which are constructed between rural and town, tea farmers and tea companies, links and links in tea industry chain. So that the "digital gap between urban and rural areas", the differences in the subjects of tea industry information service and information demands in every industry links must to be considered in tea industry information service. If information service is lack of pertinence, users will not find the information they are interested in and they need, which will seriously influence the quality of tea industry information service.

### **3 Analysis of User's Demand**

The process of information consumption consists of information demand, information acquisition, information absorption and information creation, it indicates that the information consumption starts from information demand[2]. Along with the popularization of internet technologies, and expansion of scale and function of agricultural information system, user's demand presents dynamic characteristic and the price of demand's change presents nonlinear growth, so the analysis of information demand is more important. Whether the analysis of information demand is rational or not will decide the quality of information service.

#### **3.1 Analysis of Information Demand for Different Tea Production Areas**

In China, there are four areas of tea production in Jiangnan, Jiangbei, Huanan and Xinan respectively[3], because of obvious differences in geographical location, tea varieties, type of tea and soil environment (The brief introduction about four tea production areas of China was presented in table1). The existing differences, which contribute to form the individual information service for tea industry, are the basis for digging information demand. For example, some tea areas of Jiangbei usually not only are affected by late spring coldness between March to April but also autumn drought between August and September, which hinder the growth and development of tea tree and lead to protected tea became a better choice for tea planters in there. Obviously, users of tea production area of Jiangbei are more interested in information of cultivation and management related to protected tea, hence, the information service program that is suitable for tea production of Jiangbei must be established.

**Table 1.** Four tea production areas of china

Area of Tea production	Main type of tea	Main variety of tea	Temperature (°C)	Growth period (d)	Type of soil
Jiangnan	Green tea,	Shrub of	Annual	225 ~	Red soil is main part, yellow soil and yellow brown soil are small part
	Black tea,	middle-and-small-leaf	average 15~18.5	270	
	Oolong tea,	is main part,	The lowest — 5		
	White tea,	Arbor of	~ — 1		
	Dark tea,	middle-and-large-leaf	Extreme low —		
	Yellow tea	is small part	16~ — 8		
Jiangbei	Green tea	Shrub of middle-and-small-leaf	Annual average	180 ~	Yellow brown soil is main part, brown soil is small part
			15~16	225	
			The lowest — 7 ~ — 3		
			Extreme low — 20~ — 6		
Huanan	Broken black tea	Arbor of large-leaf, Semi-arbor of middle leaf	Annual average	> 300	Latosol or lateritic red soil is main soil, yellow soil is small part
	Oolong tea		20~29		
	Pu'er tea		The lowest 7~12		
	Liubao tea		Extreme low — 3~4		
Xinan	Black tea,	Shrub, small-arbor, arbor	Annual average	200 ~	Lateritic red soil, yellow soil, hilly led soil and brown soil
	Green tea,		14~18.5		
	Borde-selling tea,		The lowest 4 ~ 10		
	Scented-tea,		Extreme low —		
	Pu'er tea		3~4		

### 3.2 Analysis of Information Demand in Every Link of Industry Chain of Tea

Tea industry, which is one of agricultural industry, consists of cultivation, processing, storage, transportation and sale[4], forming a chain organization similarly. So the every link of industry chain of tea became the emphasis for analysis of information service demand. For example, in the link of tea cultivation, to obtain the tea variety information of multi-resistance and high-resistance is vital for tea cultivator to improve the quality of tea. It can be seen that the information about tea processing machine, tea logistics, tea import and export in the next three links is concerned by users, therefore, component elements and units of information demand of tea industry chain are the basis for searching information demand, and were analyzed primarily in figure 1.

Industry architecture unit		Information demand unit
Cultivation	Variety & propagation	Variety breeding, Variety match, Sexual multiplication, Vegetative Multiplication, etc.
	Construction of tea garden	Rejuvenation, Replanting, Soil improvement, etc.
	Soil management	Tillage, Water management, Fertilize, etc.
	Cultivation of tree crown	Pruning, Comprehensive maintenance for tree crown, etc.
	Safety prosdution	Meteorological disaster and service, SAfety production of non-pollution tea garden, etc.
	Picking tea	Picking standard, Storage of fresh leaf, Fresh-keeping of fresh leaf, etc.
Processing	Initial processing	Spreading, Withering, Rotating, Fermentation, etc.
	Precision processing	Dross elimination, Adjusting difference, Packaging, etc.
	Deep processing	Extraction of functional component, Tea liquid drink, Healthy tea, etc.
Storage & transportation	Storage & transportation of fresh leaf	Acceptance, Classification, etc.
	Storage and transportation of made tea	Storage device, Trnasportation, etc.
Sale	Domestic sale	Brand construction, Wholesale, Exhibition,etc.
	Exportation	International certification for quality safety, Ocean transport, etc.

Fig. 1. Information demand element partition of tea industry

### 3.3 Analysis of Information Demand of Service Subject in Tea Industry

Information service subject of tea industry consists of information supplier, information transportation carrier and information receptor, the latter two elements determine the diffusion of information and application of scientific and technological achievements for tea industry[5], which plays an important role in the system of information service. For example, information of tea cultivation has been paid more attention by the manager in planting base, large scale grower, scientific research institution and specialized cooperation organization respectively. In this study, there were four kinds of arrows, respectively pointing to four links of tea industry, which told us that different subjects had different information service demands in different links of industry chain of tea.

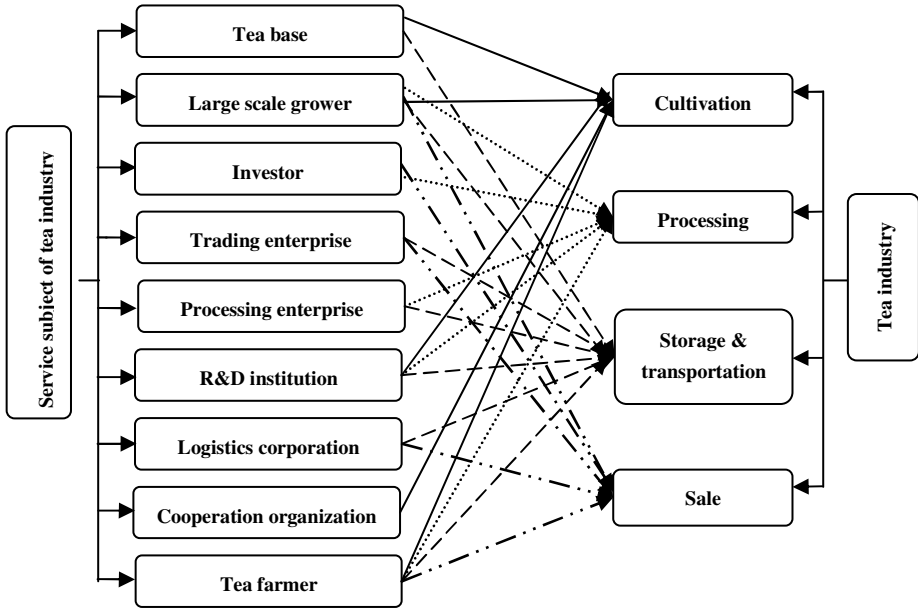


Fig. 2. Information demand matching between service subject and industry ring for tea industry

## 4 Interactive Information Service

Interactive information service is to realize personalized demand-oriented service through user platform interacting with user[6]. In this paper, based on some traditional technologies of information dissemination and acquisition, the interactive information service mode of tea industry has been established to emphasize the importance of demand-driven of user, close connection of push and feedback, loop optimization of demand and response, also carries out a guidance scheme of policy-making, directivity and strategy, and furthermore, manager will participate the system coordination when it is needed, to guarantee the complete mapping between demand layers and business layers, in that way, the personalized information demand of user can be meet and handle intelligently.

### 4.1 Key Technologies

#### (1) Information Pull technology

Information pull, a traditional way of information acquisition, means that user query information on the network with a purpose[7]. The process starts from sending a request to Web, then server will dealt with the received request and return the result needed by user, passively completing the task of data transport. Recently, search engine has become an important means of information acquisition in the process of information pull, and was praised as “information grasper”.

(2) Information push technology

Information push technology is a technology of information release and transportation, namely, through the corresponding technology standard and agreement, information can be obtained from information resource to meet the demand of user. In recent years, as a hotspot of network technology, push technology has become one of important means for agricultural information service[8].

(3) Information feedback mechanism

Information feedback is a portion of information returned to output side after all information starts from information resource and is passed to destination through channel. These characteristics of information feedback mechanism, such as pertinence, timeliness and continuity, directly represent the demand of user, also is real and effective basis for information provider to adjust the management decision, guaranteeing the quality of information. The newest results can be received by ways of online browse, mail subscription, SMS and so on.

(4) Information customization

Information customization is one of means for information acquisition, namely, the newest “dynamic” results can be “followed” through the customized network. In the process of information customization, first of all, information is provided for user after analysis, filter and integration which focus some characteristics of user, such as age, industry, level and interest and so on, the new demand of user will be fed back to center of service system to guarantee the pertinence of information service.

4.2 Mode of Interactive Information Service

After the study of information analysis of tea industry and key technologies of information service, the mode of interactive information service for tea industry has

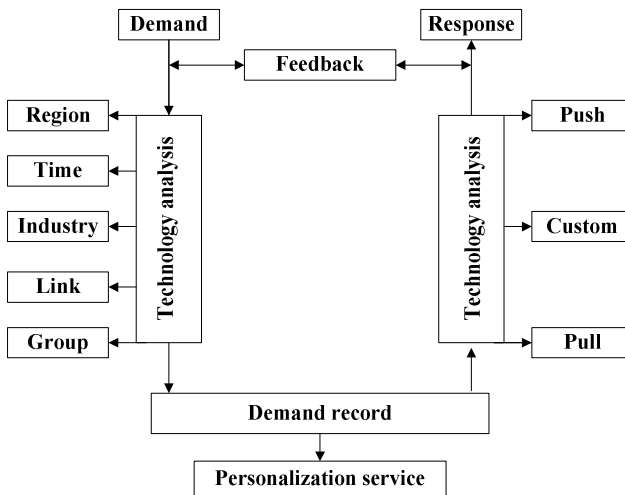


Fig. 3. Interactive information service mode for tea industry

been proposed to consider the characteristics of timeliness, accuracy, pertinent and availability in information service of tea industry.

(1) According to the features of region, time, industry, link and group, users have been classified by “static demand analysis” to formulate a primary scheme of information service. For example, where the user can be judged by the key information of registration, and which link of tea industry chain the user in also can be judged by the visit time of user.

(2) “Dynamic demand analysis” has been introduced based on the completed “static demand analysis”, namely, the contents of information service have been updated and integrated timely with the analysis of the visit record and feedback information, making users virtually participate the construction of information service system.

(3) Based on “static demand analysis” and “dynamic demand analysis”, information demand of user has constantly been responded by mature application of pull technology, push technology, customization technology and feedback technology. Information began with sending and ended with response, forming static information interaction loop mode, whether user is satisfied with the response to lead to stop or not.

## 5 Conclusions

In this paper, with the purpose of demand analysis of user, the differences in tea product areas, links of chain and service subject have gradually been carried out. Ultimately, interactive information service technology of tea industry based on demand-driven has been proposed, the main achievements and idea are represented as follow: (1) because of demand analysis was the basis for information construction in agriculture, the demand units involved in tea production areas, industry chain of tea and service subject of tea industry needed to be clearly presented; (2) interactive information service as one of personalized information service, which included pull, push and feedback of information, contributed to form the positive circle that established between users and constructors for tea industry information service; (3) the categorization in agricultural informationization construction showed professionalism and comprehensiveness, reflecting a significant trend for agricultural informationization construction. And the tea industry informationization construction meant that agricultural informationization construction works from the more general to the more specific, which will positively and vigorously promote information construction in other field of agriculture.

## 6 Discussion

(1) Shortage of information resource and disconnection of information service  
Tea industry as one of the advantage and economic industry in China, always maintains the relative traditional operation method. Recently, every main tea production area has become aware the significance of tea industry informationization, and gradually built relative websites for tea industry information service, but the shortage in information resource didn't meet the every-growing information demand, especially the serious



disconnection between information service and user's demand has been seriously restricting the development of tea industry informationization.

(2) Based on information demand and emphasis on personalized service

Taking the tea information demand characteristics as the breakthrough point, based on the demand analysis of tea information service, the interactive information service model for tea industry has been proposed, namely, endeavoring to seek a personalized information service scheme according to the actual situation, which can effectively avoid the reconstruction and overbuild and is favorable for improve the quality of information service, finally contribute to the transformation from traditional agriculture to modern agriculture.

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