Implementation of Information Platform for Fresh Flower Supply Chain – Survey from Kunming International Flower Auction Market

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Abstract: Kunming International Flower Auction Market (KIFA) plays an important role on Yunnan flower industry Chain. This article discusses the information architecture of Yunnan flower industry Chain based on KIFA. Its focus is on the design of information platforms and its functions to the different stakeholders in (electronic) markets (growers, KIFA, buyers, and logistic stakeholders). Information technology can provide rich information services to buyers, KIFA, growers and logistic stakeholders. Its results in KIFA suggest that information technology improves its competitive advantage.

Key words: Flower Industry Chain; Information Architecture; Kunming International Flower Auction Market.

1 Instruction

The flower industry plays important role in Yunnan province both in terms of production and sales. Yunnan is the largest center of greenhouse horticulture in china. In Yunnan province there are approximately 16000 growers and almost 6000 wholesales companies and exporters. An important network of traders exists, distributing cultivated products to various domestic and foreign markets. The main link between producers and traders is the Kunming International Flower Auction Market (KIFA) and Dounan Flower Market (DFM) at which almost all flowers are sold. Because the DFM is the traditional firsthand market, so the KIFA was endowed the responsibility of information service center to the different stakeholders in electronic markets (growers, market maker, buyers and logistic stakeholders) by the government of Yunnan province. Kambil and Van Heck (1998) consider that the electronic market is real or virtual meeting places where buyers, growers and intermediaries meet to exchange or transfer property rights from one party to another. Kambil and Van Heck (2002) discuss several key insights about the role of Information Technology (IT) for business relationships in electronic markets. Koppius (2002) discuss inner information architecture of the electronic market. Heezen and Baets (1996) divide the information management of Dutch Flower Auction into five function units: business information systems, technical assistant systems, auction process production, information production and information center. "The aspect of IS development has to do with the rather fragmented approach of IT...how IT impacts the way business is undertaken...the way companies and groups get (re-)organized as legal entities.". Heezen and Baets (1996). According to Barnes, Mieczkowska and Hinton (2003), Businesses today operate in a fast-evolving environment where Internet-based technologies are not only ubiquitous but are having a fundamental impact on the way that businesses manage their growers, buyers, logistic stakeholders and themselves operations. This article sets out to build the information architecture for Yunnan flower industry Chain based on KIFA by using the Internet-based information and communications technologies (ICTs) on which the operations of e-businesses are based.

This article aims:
- To describe the functions of information platform to growers, buyers, logistic stakeholders and KIFA;
- To design the information architecture of Yunnan flower industry chain based on KIFA;
- To discuss the impact of Yunnan flower industry chain’s information platforms;

2 The structure and Information Requirements of Yunnan Flower Industry Chain
2.1 The Structure of Yunnan Flower Industry Chain

We will divide Yunnan flower industry chain into four participants and two networks according to the relationship with KIFA. Fig. 1 provides the structure of Yunnan flower industry chain. The two networks are the supply network and the distribution network. The supply network provides materials including seeds, plants, fertilizers, films, etc. to growers, while the distribution network transfers the flowers to the final consumers. The four participants are growers, buyers, logistic stakeholders and KIFA itself. In total there are 7500 growers-originating not only from Kunming but also from areas such as Yuxi, Honghe and Lijiang, 3500 buyers-not only from Chinese inner large-medium-scale cities but also from Hongkong, Russia, and Thailand, and 120 logistic stakeholders offering logistic services. Every day on average 850 thousand cut flowers-from 900 growers are traded in 6,000 transactions by 250 buyers and transported by 40 logistic stakeholders. We can find that the growers, buyers, logistic stakeholders are too small in Yunnan Province. This gives uncertainty and complexity for KIFA operations, including information services.

2.2 The requirements of Yunnan Flower Industry Chain’s Information Platforms

Because of the small-scale of participants, they have not the capacity of building their own information platforms. They must rely on the information platforms of KIFA which imported two AS/400 computers and two computerized auction clocks from Belgium in 2003. The auction clock system can provide transaction information-who supplies, who buys and the quantity of each transaction-to the AS/400 system (called Business Processing System, BPS). The BPS must export supply information and import transaction information to and from the auction clock system. We called these two systems the Auction Business System (ABS). To the growers, buyers and logistic stakeholders, we can find much useful information for them from the ABS. So the requirements of Yunnan flower industry chain’s information platforms is based on the ABS of KIFA. It exist two kinds of information requirement of participants: the information of the participants themselves and the interface information among the participants.

(1) The information of the participants themselves
Each participant needs deal with collection, development, management, and use of their own information. To the growers, the main information needed to manage is the planting information, supply information, financial information etc., while purchasing plan, consignment information, financial information, etc. to the buyers, and transaction information to both. The logistic stakeholders must obtain supply information and transaction information to schedule their transportation. The KIFA has five types of information. ‘Customer’ is responsible for the participants. ‘Commercial’ is responsible for the auction transactions. ‘Logistics’ co-ordinates the arrival, delivery and storage of flowers in the auction center. ‘Balancing’ deals with funds which need to pay to growers and gather from buyers.

(2) The interface information among the participants
It exists large quantities of interface information among the participants. The growers send supply information to KIFA and KIFA gives transaction and balancing information to the growers. The KIFA sends transaction and balancing information to the buyers and obtain consignment information from them. The logistic stakeholders gain supply information and transaction information from KIFA and send scheduling information to KIFA.

3 The Information Architecture of Yunnan Flower Industry Chain

3.1 The Function Structure of Information Development & Deployment Platforms of Yunnan Flower Industry Chain

In the Information Development & Deployment Platforms of Yunnan Flower Industry Chain, there are four information centers, see fig. 2. “Growers’ Information Center” is responsible for the operation information of the growers. “Buyers’ Information Center” is responsible for the operation information of the buyers. “Logistics’ Information Center” manages logistic scheduling information which co-ordinate the transportation of the growers and buyers. “Extended Transaction Center” is not only responsible for the bulletin of auction information, but also for offering extended transaction modes such as remote transaction, internet auctions, and so on.

![Fig. 2. The Structure of Information & Deployment Platforms of Yunnan Flower Industry Chain](image)

Each information center is based on the data center which mainly originates Auction Business System. All business process and data must be integrated together to the implementation of Yunnan Flower Industry Chain’s Information Platforms. We called this integration “Transverse Integration”. According to Kobayashi, Tamaki, Komoda (2003), the business process and data integration can take the business process modeling method and the workflow-based EAI architecture as a solution. We use the two key technologies to solve the “Transverse Integration”. Another key problem is “Longitudinal Extension” which indicates the extension of management function. For example, the management of buyers is called “Buyer Management” in KIFA’s inner management, which just gathers the registration information for the buyers. Then in the supply chain management level, we called customer relationship management (CRM) which includes the customer’s needs, wants, and behaviors in order to serve them better. Moreover, in the industry chain management level, we called “Buyers’ Information Center” which also includes the operation information of buyers (more details see in 2.2 Fig. 3).

3.2 The Information Architecture of Yunnan Flower Industry Chain

The information architecture of Yunnan Flower Industry Chain consists of three layers: system layer, middle layer, and application layer (see Fig. 3). The system layer, which provides environments for the development of systems, mainly includes system hardware (the infrastructure of network, server, and storage), system software (includes operation system, databases, and file systems), and middleware.
platforms (include web server, message middleware, and data middleware). The middle layer is adopted Browser/Server model, which is based on the Internet-based information technologies such as J2EE framework, .Net framework, etc. And the application layer deals with applications on the Yunnan Flower Industry Chain in practice.

The application layer is designed to multi-level business structure, which includes four information integrations: Transaction Information Integration for KIFA, Business Information Integration for KIFA, Supply Chain Information Integration for KIFA and Industry Chain Information Integration for Yunnan Flower Industry Chain. The four integrations satisfy on different need of management in different management level. According to 2.1, the technology of integration is mainly adopted the business process modeling method and the workflow-based EAI architecture. All information integrations are based on Auction Business System. Upper-level integration must be based on lower-level integration. That is, the industry chain information integration must be developed step by step.

![Fig. 3. The Information Architecture of Yunnan Flower Industry Chain](image)

4 The Impact of Yunnan Flower Industry Chain’s Information Platforms

We develop Yunnan Flower Industry Chain’s Information Platforms according to the rule of “unifying planning, implementation step by step”. The Transaction Information Integration system put into use in 2002 September, the Business Information Integration system in 2005 December, the Supply Chain Information Integration system in 2007 January, and the Industry Chain Information Integration system in 2007 November. The quantity and amount of transaction per day about KIFA in different phase is shown in Table. 1.
Table 1: Average Quantity and Amount per day for different phase

<table>
<thead>
<tr>
<th>Phase</th>
<th>Average Quantity(per day)</th>
<th>Average Amount(per day)</th>
<th>Increase(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003.1~2005.12</td>
<td>217382.9</td>
<td>79117.7</td>
<td>-</td>
</tr>
<tr>
<td>2006.1~2006.12</td>
<td>369835.8</td>
<td>180891.2</td>
<td>70.13%</td>
</tr>
<tr>
<td>2007.1~2007.10</td>
<td>517274.7</td>
<td>308611.4</td>
<td>39.87%</td>
</tr>
<tr>
<td>2007.11~2008.3</td>
<td>853708.7</td>
<td>547950.7</td>
<td>65.04%</td>
</tr>
</tbody>
</table>

From Table 1, we can find that the quantity and amount of transaction per day about KIFA is increasing tremendous. Although the increase is partly due to the improvement of operation capacity of KIFA, the use of information technology plays a crucial role in the increase of quantity and amount of transaction. Especially after completing the Yunnan Flower Industry Chain’s Information Platforms, the quantity of rose’s transaction in KIFA is more about 60% in Yunnan flower market.

5 Conclusions

Yunnan Flower Industry Chain’s Information Platforms is tremendous and complicated work. The implementation of industry chain’s information platforms can improve quality of customer service. Yunnan flower industry chain’s information platforms can not only provide rich information services to buyers, KIFA, growers and logistic stakeholders, but play the role of the common platform of the market. Its results in KIFA suggest that information technology improves its competitive advantage.

References