How to become a system integrator streamlining vegetable supply chains: the case of Songxiaocai Company

CASE STUDY

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Abstract

The traditional vegetable supply chain in China has many weaknesses, both in the upstream and downstream parts. To change this situation, Songxiaocai Company, a B2B trading platform for vegetables, innovatively solved the problems in the traditional vegetable supply chain by designing an ICT-enabled, demand-driven supply chain underpinned by an advanced ICT architecture design. However, with the expansion of business, Songxiaocai is also facing some difficult challenges. This teaching case shows the supply chain and business model innovations of Songxiaocai, provides a vivid example of how a platform company provides end-to-end supply chain service and can be used to teach graduate/postgraduate students specializing in agricultural economics, agricultural e-commerce and vegetable supply chain management.

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1. Introduction

Songxiaocai Company (Songxiaocai hereafter), a provider of a business to business (B2B) trading platform for connecting and aggregating producers and buyers of fresh vegetables in China, has recently been recognized as a top ten agricultural enterprise pioneering in e-commerce by the China Electronic Commerce Association (CECA). By utilizing the information and communication technologies (ICT), this company has innovatively designed a demand-driven digital supply chain providing efficient agricultural online to offline (O2O) solutions for both vegetable vendors and producers with diversified services, including agricultural product information searching, online purchasing and trading services, offline distribution, and other derivative services.

Headquartered in Hangzhou, Zhejiang Province of China, Songxiaocai was established by CEO Mr. Yu Lingbing and his ex-colleagues working in Alibaba in the winter of 2014. Only four years after its inception, the company has scaled up, serving vegetable vendors in nearly fifty cities in China, and expanded to six branch companies rapidly located in Wuhan, Beijing, Shanghai, Changzhou, Nanjing and Hefei. However, this rapid growth has also caused a series of challenges. In a regular meeting in July, CEO and founder Mr. Yu Lingbing and his managers had a heated discussion about the ongoing challenges that the company was facing. Mr. Xie Jinyu, the manager of the purchasing department, said:

> 'Different vendors have different requirements (e.g. origin, variety, grade and category) for vegetables. Although we are making every effort to seek the best-qualified suppliers in China, it's difficult for our company to find suppliers who can always provide stable and diversified vegetables as required by our vendor users.'

Mr. Shi Feng, the manager of the sales department added:

> 'Marketers in my department responded that it has become increasingly difficult to develop new vendor users in the vegetable market. Unless we can give a more stable vegetable supply and a lower price, many vendors would rather purchase goods from their traditional distributor suppliers, although they know these suppliers provide inferior services and quality…'

How to find more qualified suppliers? How to attract more vendor users? How to develop into one of the largest agricultural service platforms as it looks forward? Mr. Yu Lingbing, CEO, and his senior management team have been thrown into these questions and problems.

This teaching case is to stimulate readers to think strategically and come up with innovative solutions to the challenges that Songxiaocai faces. The materials used to write this case is drawn from the sources including the semi-structured interviews with managers within Songxiaocai Company, online information, and materials provided by the company. Section 2 presents the weaknesses of the traditional vegetable supply chain in China. Section 3 illustrates the innovation of Songxiaocai's demand-driven supply chain. Section 4 elaborates the ICT architecture of Songxiaocai. Section 5 shows the functions of the main departments of the company, and Section 6 presents the business outlook and the challenges of Songxiaocai. Several important questions are listed in the last closing section for readers to study and discuss.

2. The weaknesses of the vegetable supply chain in China

The traditional vegetable supply chain in China has many weaknesses, such as the high transaction costs caused by too many intermediate links and the information asymmetry between supply and demand. Figure 1 shows the intermediate links of a traditional vegetable supply chain. Considering a potato supply chain, for example, we can see how the potatoes go through these intermediaries. First, the producers (farmers) harvest potatoes in the field. Next, as most farmers lack marketing ability, the potatoes are collected and purchased by farmers' brokers. Later, these potatoes are sold to wholesalers in production areas and then in
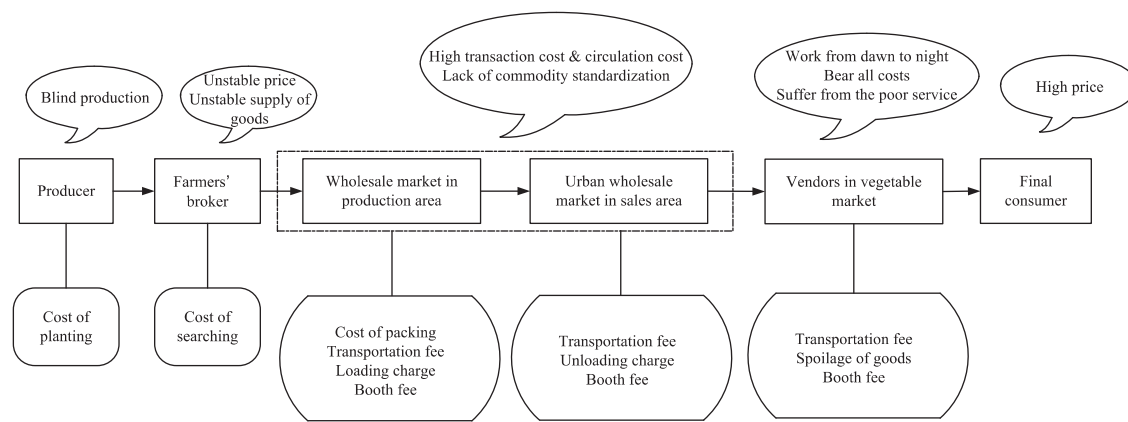
Figure 1. The intermediate links of the traditional vegetable supply chain in China and the weaknesses of each link.

sales areas. Finally, vendors in vegetable markets obtain the potatoes in the wholesale market and sell them to final consumers. The weaknesses of such a traditional supply chain are presented as follows.

From the perspective of the whole supply chain, the higher cost caused by too many intermediary links is one of the greatest weaknesses of the traditional vegetable supply chain. As shown in Figure 1, every intermediary link, such as producers, farmers' brokers, wholesale markets in production areas, wholesale markets in sales areas, and vendors in the vegetable market, incurs costs that eventually increase the prices of final products. In the process of production, producers must pay the cost of planting, for example, seed fees, construction costs of vegetable greenhouses and costs of fertilizer. Farmers' brokers bear the search costs. In addition, when the vegetables are transported from the production area to the sales area, the wholesalers and vegetable vendors bear the logistics expenses, such as the truck costs, loading and unloading charges, and other labor costs involved. Moreover, the wholesalers and vendors will also pay the booth (entry) fee as they trade in the market. The traditional supply chain involves many intermediate links, and the longer that the supply chain is, the higher that the cost will be.

Producers (farmers) are always forced into blind production because they cannot effectively capture downstream demand information, mainly because of information asymmetry between producers and consumers in the traditional vegetable supply chain. Without any definite demand information, the traditional way of farming is to use production as the source and then sell vegetables through whatever channels, formal and informal, they can access. This type of production is based on farmers' experience, which always causes high risks. There are two extreme scenarios for these farmers. One is that they do not have a sufficient supply of goods to meet the increasing demand of consumers, and the other is that their vegetables are rotting in the field when there is a huge drop in market demand. At this point, neither of them is favorable to farmers.

Regarding farmers' brokers, they suffer from the unstable supply of vegetables caused by the blind production of producers and the fluctuating purchasing prices set by wholesalers. These brokers cope passively with the mismatched situation between the upstream and downstream links constantly while striving for their own survival and well-being.

In regard to the wholesalers in the production area and sales area (mostly in urban districts), the costs will be further increased mainly by the transportation and handling costs. This increase in cost accounts for the major increase in the price of final products, compared to other intermediary links. Important as it is, these two links (the link with wholesalers in the production area and sales area) do not work as efficiently and effectively as they should. On many occasions, energy and money are wasted during these steps. Besides, the wholesalers are also confronted by the lack of commodity standardization and commercialization in the

traditional vegetable supply chain, increasing the costs of packing and sorting of vegetables for wholesalers, especially those in the production area.

For traditional small and medium vendors in the vegetable market, the problem is that they spend plenty of time and money purchasing products that do not meet the requirements, with which they have trouble judging in the first place. There is a common situation of traditional vendors in China: (1) vendors work from dawn to night and wake in the early morning, taking hours to obtain products in the first-tier wholesale market; (2) they bear all types of taxes, labor costs and entry fees in the trading market; and (3) they suffer greatly from the implicit rules of this industry: no guarantees of product quality, unstable sources of goods, no aftersales service, and opaque prices, to name a few.

3. Songxiaocai: demand-driven supply chain

To resolve these problems or weaknesses of traditional vegetable supply chains, Songxiaocai provides a solution by replacing the traditional vegetable supply chain with a demand-driven supply chain, basing production on sales prospects. *'By our demand-driven chain, we can meet the needs from our users (vendors) to guide the production of suppliers,'* said Mr. Yu Lingbing, CEO of Songxiaocai.

As shown in Figure 2, starting from the producers to the final consumers, Songxiaocai has positioned itself as a one-stop intermediary, eliminating some of the middlemen in the traditional case. In the past, vegetables were simply passed from the supply side to the demand side through the goods flow without any demand information. Producers often face the unstable market demand and vendors cannot purchase the exact products they need. However, in the current demand-driven supply chain of Songxiaocai, the supply side is able to prepare the vegetable products in advance since the information flow and goods flow now have been integrated. This is how it works. Small vendors and wholesalers are allowed to place orders through one of the mobile applications maintained by Songxiaocai according to the requirements (including the variety, category, grade, price, quantity, and origin of production) of their final customers. Later, this order information collected by Songxiaocai is passed on to producers on the supply side. After receiving the specific orders from vendors and wholesalers, producers are able to prepare the accurate deliverables to meet the demand. Therefore, compared to the traditional supply chain, there are several advantages of Songxiaocai's demand-driven supply chain.
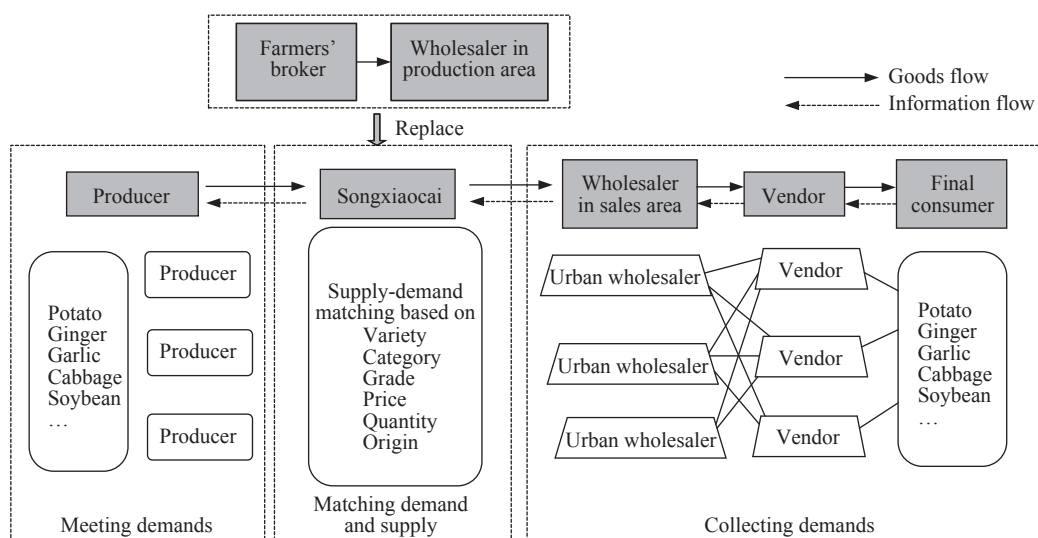

Figure 2. The operation and structure of the demand-driven supply chain of Songxiaocai.

First, the demand-driven supply chain of Songxiaocai has reduced the transaction costs (especially the information search costs and monitoring costs) and transportation costs, by means of shortening the traditional vegetable supply chain and solving the problems of asymmetric information in agricultural supply chains. On the one hand, with the information of products, prices, real-time trading orders, and after-sale services provided by Songxiaocai, the costs in the search for market information and the costs in monitoring the quality of product have been greatly reduced. On the other hand, with the direct delivery from producers to wholesalers or vendors, there has also been a reduction in the transportation costs along the supply chain.

Second, the effectiveness of the whole supply chain has been enhanced by Songxiaocai, which is reflected in two aspects. One is the achievement of product standardization in the demand-driven supply chain; the other is the enhancement of service quality for vegetable vendors. As the product information, such as the variety, category, quantity and grade, is specified by Songxiaocai, the product standardization has already been achieved on the supplier side. These standardized products are packaged and transported to the end customers directly, reducing the time for additional dismantling and sorting in the supply chain and resulting in an effectiveness enhancement in terms of lead time reduction and quality improvement. At the same time, the service quality perceived by vendors has also improved. Through Songxiaocai, vendors in the same area might order products from the same supplier. With the pooling of all of the orders, these vendors would enjoy advantages in price negotiation, products and quality stabilization.

Third, the innovation of Songxiaocai's supply chain also benefits the participants in the chain, improving working situation of vendors and increasing the sales of suppliers. Here are the interview materials about the supplier and vendor users of Songxiaocai drawn from an online video launched by Zhejiang TV in China. Wang Jianping, a vendor from an agricultural product market in Wuhan, told the interviewer:

> 'There are more than twenty kinds of products in my vegetable booth. In the past, my husband spent a lot of time purchasing products in the wholesale market at deep night. Now, with the help of Songxiaocai, we can place some orders online and it is really convenient.'

Hu Zonglong, the wholesaler in the Jiangqiao wholesale market in Shanghai, talked about his experience after becoming one of the potato suppliers of Songxiaocai:

> 'I cooperated with Songxiaocai since June 2016. Before then, it took me three or four days to sell one truck of potatoes. It was a time I worked in the early morning and barely had time for families. Now, I can sell three trucks in one day and also feel much easier because I can easily get the orders from Songxiaocai.'

4. The ICT architecture of Songxiaocai

To implement the demand-driven supply chain, Songxiaocai has developed a series of service products in the front office and has built strong information technology (IT) support systems in the back office. Figure 3 shows the multilayered ICT architecture of Songxiaocai, which includes an application (app) layer for interacting with internal and external users, a system layer for supporting the service products in the front office, and a data layer for storing all of the data collected from the service systems. The function of each service product and the relations among these three layers are elaborated as follows. There are six mobile apps connecting with users at the application level. By name, the applications[1] are the following: Songxiaocai (providing service for vendors), Songxiaocai Supplier (providing service for producers), Songxiaocai Driver (providing service for transportation drivers), Songxiaofu (providing service for the internal sales department), Caimi (providing service for the internal purchasing department), and Songxiaocang (providing service for the internal logistics department). The first three applications are used by authenticated outside users unaffiliated with Songxiaocai itself, while the latter three applications are for internal use, including by the sales, purchasing and logistics departments.

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[1] The details of the mobile applications issued by Songxiaocai Company are shown in Supplementary Material S4.
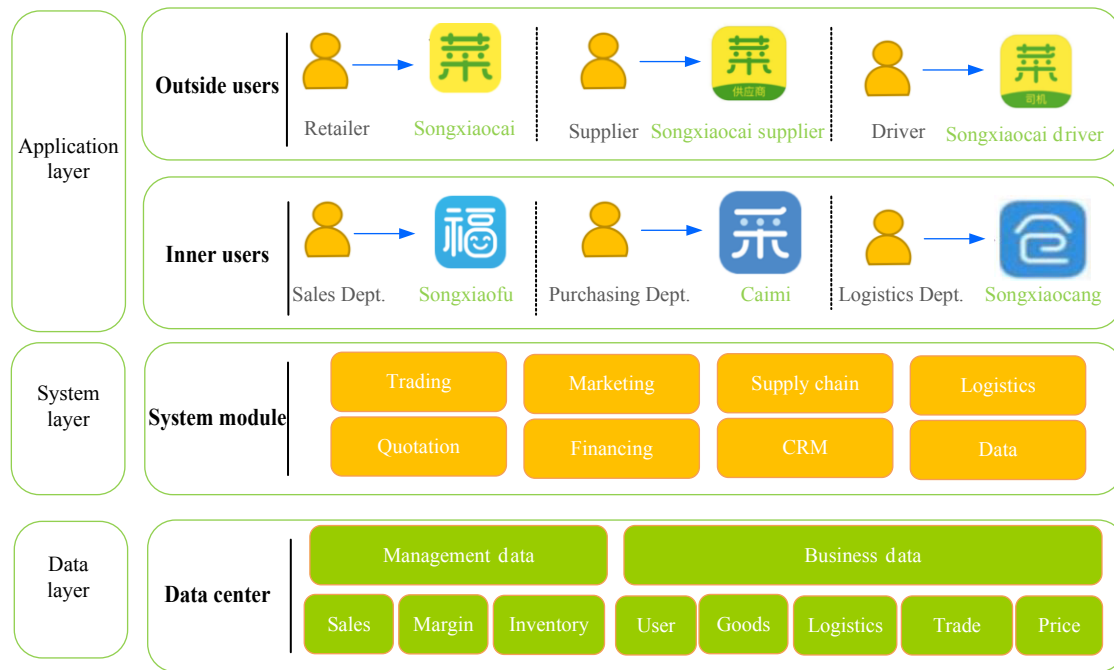
Figure 3. The multilayered ICT architecture of Songxiaocai.

The Songxiaocai app is the first service product developed in the whole service system. It was designed for the vegetable vendors to place their orders in advance, providing users with a customized experience with price quotations involving criteria, such as origin, price, weight, packaging, and other detailed specifications. As a result, the innovation of the Songxiaocai app has achieved commodity standardization and commercialization for the company. In the Songxiaocai app, vegetables, similar to other conventional commodities, can be categorized and standardized by the quotations (i.e. variety, category, grade, price, quantity and origin) stated in the pages of the app. Vendors are able to search and purchase the vegetables that they need. Integrated into this process is also a payment system through common Chinese payment processors, such as Alipay, WeChatPay, and UnionPay. '*It has a very precise and simple ordering procedure, with which even older, less tech-savvy users can learn how to purchase their products online. The Songxiaocai app also has a membership system[2], which grades the users in several levels according to the volume of their orders,*' said Mr. Yan Dehong, the co-founder and manager of the technology department.

With the increasing orders being received, the company found that it was also necessary to develop new apps for suppliers and producers so that the company could reduce order lead time. Therefore, the new service products Caimi app and Songxiaocai Supplier app were developed in succession. Caimi was designed to be a bridge between Songxiaocai and Songxiaocai Supplier for internal users in the purchasing department. Since the vendors are advised to order in advance, Caimi fills in the total order information and uploads it to the Songxiaocai Supplier app. The Songxiaocai Supplier app is designed for vegetable suppliers. With this app, suppliers are able to review all of the orders placed and respond in kind to vendors to meet their needs. In addition, the Songxiaocai Supplier app also involves a digital accounting system that is convenient for suppliers to achieve settle account management. Normally, different qualities and quantities of vegetable orders are sent to the suppliers who have adequate capacity of supply. Once they accept the orders, the suppliers are prompted to complete the packing requirements and send the vegetables on their way.

In the past, Songxiaocai had its own in-house logistics team with more than 200 truck drivers, but soon after, to reduce operating costs, the company changed its strategy and started using third-party logistics

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[2] Songxiaocai has a membership system according to the purchase quantities of different users.

providers (3PLs). To manage the 3PLs and drivers well, the Songxiaocang app and the Songxiaocai Driver app were developed. Similar in function to the Caimi app, Songxiaocang is a bridge between Songxiaocai Supplier and Songxiaocai Driver. Suppliers upload the logistics information, including loading places in the production regions and unloading places in the sales regions, and Songxiaocang, designed for internal users in the logistics department, gathers the logistics order and inventory information, which is later passed to Songxiaocai Driver (for 3PL driver users). There are clear loading and unloading lists shown in the Songxiaocai Driver app for drivers. With the information from these lists, Songxiaocai can also monitor and check the delivery situation of vegetables easily.

Customer relationship management (CRM) is a necessity for companies with many customers. Songxiaofu, an internal CRM service system, was therefore developed to solve the problem of the interaction with vendor users. Songxiaocai has at least one extension marketer[3] in different sales areas to provide services and to maintain the relationship with vendor users. Through Songxiaofu, these extension marketers can clearly know the order information of vendor users and offer them guidance.

Figure 4 presents a step-by-step illustration of how this application layer works to achieve demand-driven supply chain management. First, vendors place vegetable orders through the Songxiaocai app. Then, the Caimi app gathers the order information and uploads it to the Songxiaocai Supplier app. At this time, suppliers can obtain the notice of procurement and accept the orders in the Songxiaocai Supplier app. After suppliers prepare the products according to the orders, the Songxiaocang app is alerted of delivery by suppliers and uploads the delivery information to the Songxiaocai Driver app, in which the third-party drivers can receive the delivery order. During the process of delivery, all of the logistics information is also shown in the Songxiaocai app so that vendors can track the locations of their products. Immediately before the products are shipped out to vendors, there are inspections by Songxiaocai to control the quality of the products. If all of the products comply with the specifications, they are finally distributed to the places where vendors can pick them up conveniently.

To support the operation of the six service app products, Songxiaocai has developed eight IT support system modules for different functions: (1) a trading system in which date, price, order status, payment status are tracked for all goods; (2) a marketing system that supports customer segmentation, promotion mechanisms (e.g. coupons, red packets), and group purchasing; (3) a supply chain management system, including procurement, supplier orders, and financial settlement; (4) a logistics system, including the Warehouse Management System[4]

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[3] Extension marketers are the employees responsible for seeking potential users both in production and in sales areas.
[4] The Warehouse Management System can effectively control and track the whole process of logistics and cost management of warehouse businesses and realize or perfect the enterprise warehouse information management.
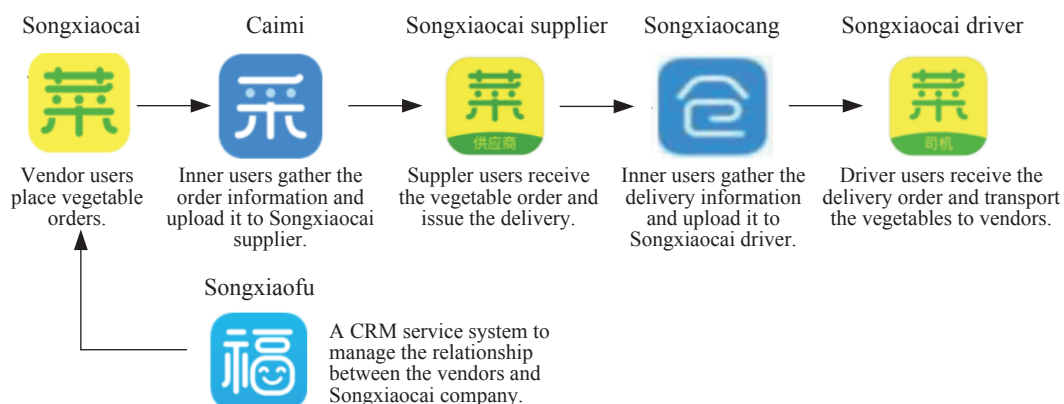

Figure 4. Workflow of the 6 apps of Songxiaocai.

(WMS) operating in the warehouse and the Transportation Management System[5] (TMS) for transportation scheduling; (5) a price quotation system supporting traders, financiers, and industry practitioners; (6) a CRM system for the company to maintain a good relationship with its users; (7) a financial system capable of credit risk management, loans, capital management and other financial products; and finally, (8) a data analysis system to improve micro-decision making for both Songxiaocai and app users.

Finally, with the data of the whole demand-driven supply chain collected from users through the six apps and eight systems, a data center has been formed as the data layer in the ICT architecture. Included in this center are management data and day-to-day business data. Management data can be used not only to conduct statistical analysis of the existing situation of Songxiaocai but also to provide opportunities for the future optimization and innovation of the company business. Business data are enhanced with user data (including from vendor and supplier users), logistics data, goods data, price data and trade data, which can be used to realize the efficient operation of information, logistics and cash flows in the demand-driven supply chain of Songxiaocai.

The service systems in Songxiaocai are not implemented all at once but step by step. With the expansion of business volume, the iteration innovation of Songxiaocai's technology continues, and a more comprehensive ICT architecture is expected.

5. Organizational structure: function and value co-creation

Songxiaocai designs an organizational structure around its main departments of sales, purchasing, logistics and technology. Among these departments, the technology department is the core of Songxiaocai's value propositions. This section goes into more detail about the responsibilities and goals of the respective departments. Additionally, this section also presents how the internal structure collaborates with external users to streamline the supply chain.

5.1 Departments

■ *Sales department*

The sales department is responsible for the development of vendor users in the sales area. Mr. Shi Feng, sales manager, mentioned:

'My job is to lead my team and ensure that the Songxiaocai app is used in each corner of the farmers' market. When promoting and selling the Songxiaocai app, we will pay special attention to the vendors who are unsatisfied with their current situations. For example, in a market, a vegetable vendor complained that he had to wake up early in the morning, rush to the big wholesale market far away and pick up vegetables in a time-consuming way. In this case, our marketer will persuade the vendor to purchase vegetable products through the Songxiaocai app and promise him that the vegetables he ordered will be well packaged and distributed to a place close to him. Once we arouse the interest of the vendor, our marketer will guide him in how to use our app and place orders online.'

Apart from attracting an increasing number of users, the sales department must also maintain the relationship with vendors who have already accepted the purchasing model of Songxiaocai. When the price of agricultural products fluctuates, the sales department will guide the users to order in advance or change the variety of their goods. The sales department contacts users directly, so it will also help the purchasing department to collect order information from users and grade the goods according to different specifications.

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[5] The Transportation Management System is used to manage the transportation links in the logistics process, including the management of vehicles and the management of goods in transit.

■ *Purchasing department*

The purchasing department develops the suppliers upstream, and there are three main ways for the department to find the appropriate suppliers. The first way is finding potential suppliers according to the information from the vendors in the vegetable market. That is, Songxiaocai will return to their vendor users' former suppliers and negotiate with them for cooperation. The second way to find suppliers is actively seeking them in production areas. The purchasing department has a dedicated team for finding and qualifying new suppliers. They visit vegetable bases in different provinces and identify the most competitive suppliers there. Once Songxiaocai finds the most appropriate suppliers in the vegetable base, they will communicate with them and ask for their cooperation. The third way for Songxiaocai to develop suppliers is, rather than actively seeking these suppliers out, the company waits for new suppliers to approach them. Now, many vegetable suppliers in China have realized the potential market of Songxiaocai. They come to Songxiaocai and bring their most competitive agricultural products to pursue opportunities for cooperation. However, in this case, Songxiaocai will perform a comprehensive evaluation of the products of these suppliers before making a decision regarding whether they are qualified or not. Of all the suppliers supplying Songxiaocai, there are two types: self-labeling (Songxiaocai) brand suppliers and self-branded suppliers. Suppliers who label the Songxiaocai brand always receive stable orders matching their production capacity. For self-branded suppliers, the orders are not as stable, and Songxiaocai will provide orders depending on their credit.

■ *Logistics department*

The logistics department plays a vital role in moving vegetables from sellers to buyers. The logistics operation of Songxiaocai underwent significant changes from building in-house teams to outsourcing to third-party logistics (3PL). In addition, the distribution mode of Songxiaocai has also changed. In the past, there were urban distribution centers (DCs) and community stations (3 km from each vegetable retail market) in Songxiaocai's logistics system. The products were first transported to urban DCs, in which they were sorted. Subsequently, according to the different places of vendors, the products were transported to community stations, where vendors picked up the goods. The manager of the logistics department, Mr. Chen Lei said:

'These community stations (regional distribution centers) leave us the possibility of developing O2O agriproduct business; now we are dedicated to building more and more cold chain community stations to provide faster transportation to our current vendor customers but also someday to the small-scale customers in families or restaurants.'

However, things have since changed. Although the first distribution mode has the potential to provide the best services for vendors, it costs too much. Mr. Yan Dehong explained:

'Urban distribution centers and community stations require too many physical warehouses and cold chains, which are unnecessary in many small cities with small numbers of orders. Songxiaocai has had a presence in 45 cities in China, but there are only a few big cities, such as Shanghai and Hangzhou, which still keep urban distribution centers and community stations. For most cities, we are now conducting a new distribution mode, which is called direct distribution from producers to vendors.'

This new distribution mode requires that the vendors within the same vegetable market be able to order a sufficiently large volume of vegetables to entirely fill a full container load (FCL) truck. From this point, the vegetables ordered by these vendors are transported directly from the production area to the distribution station, which is not far from the vegetable market. However, there is also a situation in which the vendors of the same vegetable cannot fill a truck with the products that they need for themselves. In these cases, Songxiaocai consolidates the less-than-container load (LCL) shipments of the vegetables ordered from the vendors into two or more small markets, and drivers will then unload the products in a place convenient for both vendors.

■ *Technology department*

The technology department is tasked with maintaining the various service systems that Songxiaocai uses to manage all aspects of the business. Similar to any other technology department, the department is also responsible for the development of new functions, such as the Songxiaocai Wholesaler app (for wholesalers who stock the agricultural products in the production area) and the Songxiaocai Cold Storage Provider (for the cold storage service providers upstream), which are now under development for supply chain finance. The technology department of Songxiaocai maintains close working relationships with the other departments to improve user experiences and to work out any unforeseen bugs in the software. For example, when the sales department wants new promotions of vegetables in the Songxiaocai app, the technology department will design the digital coupons issued within the app to attract new vendor users.

5.2 Relationships among 6 apps, 8 systems and organizational departments

Each organizational department of Songxiaocai has different functions matching the different apps and systems of the company. Table 1 describes the relationships among the six apps, eight systems, and four organizational departments.

The six apps can be considered interactive interfaces between the company and its internal and external users. The eight systems are core ICT function modules for implementing the value propositions in Songxiaocai's business model and the underlying design (e.g. computer algorithms of operational processes) underpinning the six apps. The three organizational departments (sales, purchasing and logistics) are human resources, which manage the respective systems and apps. This ICT architecture and organizational design allow Songxiaocai to support the exchange of internal and external information between Songxiaocai and its customers and to make decisions.

First, the trading system and the marketing system are used to implement the basic 'B2B trading platform' function. They facilitate the systemization of trading processes and the product categories designed and operated by the sales and technology departments, and they enable efficient communication between vegetable vendors and internal sales staff through the Songxiaocai app and Songxiaofu app.

Second, the supply chain system is used to ensure the quality and a stable supply of vegetables. Supporting the Songxiaocai Supplier app and Caimi app, the supply chain system of Songxiaocai enables the purchasing department to not only acquire the most cost-effective goods but also to develop the production capacity and skills of these suppliers.

Table 1. Relationships among 6 apps, 8 systems and organizational departments of Songxiaocai.

6 apps		8 systems		Organizational dept. responsible	
For external customers	**For internal staff**	**Specific functions**	**General support**	**Functional departments**	**General support**
Songxiaocai	Songxiaofu	• Trading system • Marketing system	• Quotation system • Financing system • CRM[1] system	• Sales dept.	Technology dept.
Songxiaocai supplier	Caimi	• Supply chain system	• Data system	• Purchasing dept.	
Songxiaocai driver	Songxiaocang	• Logistics system		• Logistics dept.	

[1] Customer Relationship Management.

Third, the logistics system is used to provide vegetable delivery and warehousing services. With this system and the supporting Songxiaocang app and Songxiaocai Driver app, the logistics system can track every shipment (location and status) of vegetables in the distribution process.

5.6 Formation of a digital supply chain for value co-creation

After elaborating in detail on the function of Songxiaocai's structures, we further explain how these internal departments interact with external supply chain members to form an ICT-enabled digital supply chain for value co-creation.

The content of co-creation includes a series of activities between company departments and external participants. As shown in Figure 5, the vendors receive services from the efforts of the sales department, but in return, they provide sales information and customer feedback for the sales department, enabling the company to analyze the vegetable market with real-time information. Moreover, Songxiaocai, as an ICT-enabled platform company in essence, also obtains the personal information of these vendor users, which contributes to the company transforming into a real agricultural transaction and data service platform. The same logic can be applied in the interactions between the producers and purchasing department. The purchasing department gives the order information to producers and helps them to avoid blind production, while the purchasing department can also obtain the production data and the information about supplier users in this interaction process. Regarding drivers and the logistics department, there is also a value co-creation interaction. The logistics department dispatches the delivery orders to drivers, while drivers will upload delivery information to the logistics department, in return helping Songxiaocai to establish a real-time logistics monitoring system. The technology department does not interact with external members directly. However, the digital information collected by the other three departments is fed to the technology department, which oversees all operations.
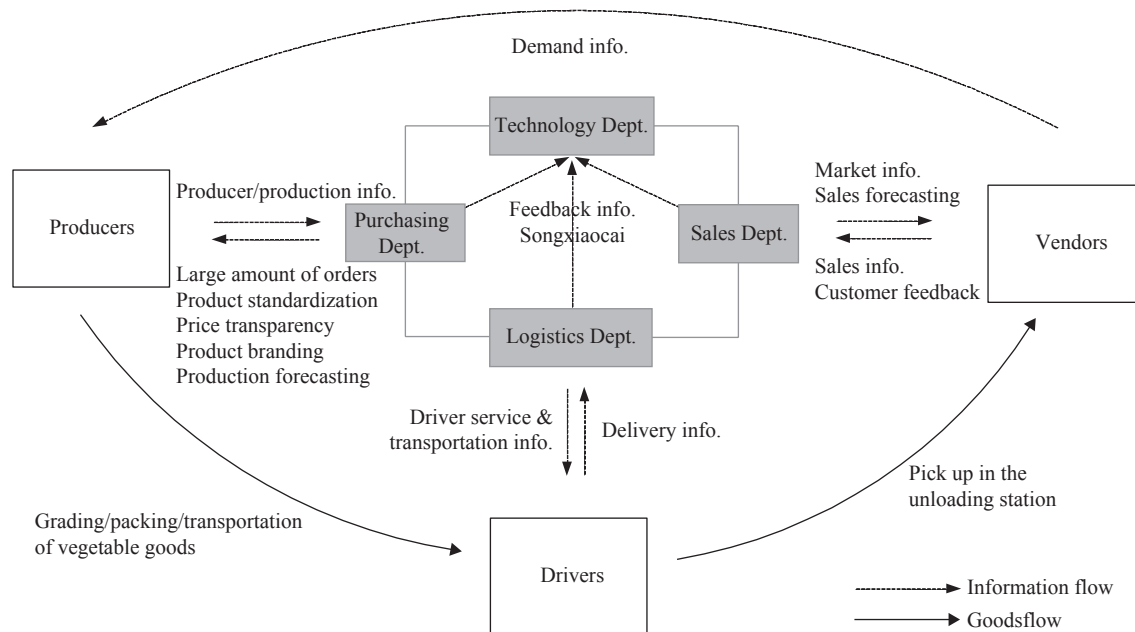

Figure 5. Information/goods flow and value co-creation in Songxiaocai.

6. The business outlook of Songxiaocai

6.1 Changing business trends

The demand-driven supply chain of Songxiaocai comprises a series of evolutions. In the beginning, from 2014 to 2016, Songxiaocai chose vegetable wholesalers in the sales area as its suppliers, such as the wholesalers in the Hangzhou Agri-food Distribution Center, the largest first-tier vegetable distribution market in Zhejiang, China. However, with the development and growth of Songxiaocai, the wholesalers in the sales area could not meet the demand of the company anymore. As a result, from 2017 onwards, the company changed its suppliers and started to purchase from the vegetable bases in the production area directly. As a result, the customer base of Songxiaocai has also changed. In the past, Songxiaocai's customers were only small vegetable vendors. However, since the company has obtained better prices by cooperating with the producers in the vegetable base, many wholesalers in the sales area have also become customers of Songxiaocai.

Apart from the changes of suppliers and customers, the company business of Songxiaocai has also changed. As more than a B2B trading e-commerce platform, Songxiaocai now involves supply chain finance. In the spring of 2018, Songxiaocai launched the All-in Upstream Program, which focuses on businesses such as supplier development, inventory management and financing support upstream. For example, there is a new business for Songxiaocai to serve cold storage service providers and wholesalers who want to stock agricultural products upstream. With the market information collected by Songxiaocai, the wholesalers in the production area are able to stock agricultural products accurately matching the demand of the market, while the cold storage service providers can prepare storage space that is exactly right for the stocking of agricultural products from wholesalers.

When the wholesalers need money to buy more agricultural products, they usually do not have credit to borrow sufficient money from banks. At this point, Songxiaocai will also play the role of the supply chain finance service provider, providing services such as risk management and asset evaluation for banks and helping the wholesalers to apply for loans from banks or other financial organizations successfully. There are benefits brought by the implementation of the All-in Upstream Program. On the one hand, Songxiaocai can generate revenue from service charges by acting as a third-party service provider. On the other hand, Songxiaocai can also collect the inventory information of agricultural products upstream to complement its agricultural database and better manage the whole vegetable supply chain.

6.2 Opportunities

As a B2B e-commerce company with competent core departments, Songxiaocai has opportunities and advantages. First, Songxiaocai has a large potential market. When other agribusiness firms moved to serve end customers, such as families or restaurants, Songxiaocai set its sights on the relationship between vendors and suppliers. It is estimated that 80% of agricultural products are distributed in wholesale and vegetable retail markets in China. Therefore, focusing on B2B (suppliers to vendors) turns out to be a smart business model for Songxiaocai to gain the market share in the vegetable industry. With nearly 13 million vegetable vendors in China still facing the drawbacks of the traditional supply chain, Songxiaocai is in a strong position to replicate its model elsewhere and to continue to expand. Second, Songxiaocai has a powerful information technology team endeavoring to innovate. Apart from the technology service products mentioned above, Songxiaocai has other service products, such as Dabiaoge, which provides an updating package for the six main apps applied in demand-driven supply chains; and Hangqingbao, which helps Songxiaocai to collect market information in production and sales areas. Recently, there has also been a new WeChat mini program[6] launched by Songxiaocai called 'Maidashu'[7], in which vegetable suppliers can release vegetable market information, including prices (similar to a price-comparing website). Songxiaocai can identify suppliers for

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[6] Mini program is a new function of WeChat launched in January 2017, which provides native app-like experiences for users, and it can be accessed without downloading.

[7] Maidashu, a mini program issued by Songxiaocai Company (details in Supplementary Material S5).

their own supply chains and collect market data for more accurate demand and supply forecasting. Third, through the existing trading business, Songxiaocai has already formed a comprehensive database, including the information from suppliers, vendors, goods, market quotations, etc. These trading data allow the company to find more business opportunities and to design more service systems in the vegetable industry in China by extending company business, such as the services of warehousing, logistics, and supply chain finance. Eventually, the consolidation of data might also help Songxiaocai become an agriculture data service platform and benefit the whole agricultural industry as a result.

6.3 Challenges

For any business attempting to scale up, there will be inevitable challenges on the horizon.

■ *Challenge to develop competent suppliers*

The first challenge that Songxiaocai is facing now is how to keep stable suppliers of vegetables. Songxiaocai has made every effort to develop the best suppliers and enter contracts with them; however, it cannot always ensure that these suppliers are able to provide the volume and quality of products required. Mr. Shi Feng, the sales manager, indicated:

> 'I think supplier is the most important member in the vegetable supply chain; no matter how strong our sales ability is, we will be constrained by the producing ability of suppliers. The sales department and purchasing department should cooperate with each other closely. When we collect orders and needs from customers, we should keep developing more and more competent suppliers upstream.'

Since Songxiaocai is not an agricultural company, it lacks expertise in agricultural extension service. In the future, an agricultural service team might be established for this purpose.

■ *Challenge to engage new vendor users*

Attracting and retaining new vendor users is also a challenge. Further penetration into other cities' markets is key to sustaining a competitive advantage. To enlarge the coverage and penetration of Songxiaocai in China, the marketers of Songxiaocai endeavor to find more vendor users in vegetable markets, but changing the purchasing habits and opinions of these vendors is not an easy task. Before Songxiaocai was established, vendors already had to have long-term relationships with their former suppliers. They would not easily change their buying habits, although Songxiaocai provides more advanced services. In addition, most vegetable vendors in farmers' markets in large cities in China are migrant workers. Songxiaocai has improved the situation of their users, providing them with more improved working conditions; however, do time-saving and energy saving truly count? Compared to their current suppliers, if Songxiaocai cannot maintain price and quality competitiveness, many vegetable vendors might prefer to return to the traditional mode.

■ *Dilemma in increasing product diversity*

In addition, the variety of vegetables of Songxiaocai cannot meet all the demand of vegetable vendor users. Songxiaocai provides two core vegetable categories: (1) tuberous vegetables, such as garlic, ginger, potatoes, onions, carrots, which are less perishable; and (2) leafy vegetables, such as cabbages and lettuces, which are easy to be standardized. For Songxiaocai, it is more effective to focus on core vegetable categories and to conduct regular business. However, for users, it is not. For example, the vendor user Wang Jianping (as mentioned in Section 3) has many kinds of vegetables in her booth. Even placing the orders online, she still has to purchase other vegetables in the local wholesale market because Songxiaocai cannot provide all the vegetables she demands. Should the company wish to attract more vendors, it might be wise to diversify into new vegetable categories.

■ *Challenge to human resources*

Any growing business is in need of human resources. Finding multiple-tasking employees can also be a challenge in this space. Heading upstream to serve cold storage service providers and wholesalers, supply chain finance has been added to the business of Songxiaocai. Mr. Xie Jinyu, the manager of the purchasing department worries, *'with the business' expansion, the requirement for employee competence is becoming higher and higher, such as our new All-in Upstream Program, involving allocation finance, which means that our employees must have greater business sensitivity and insight.'* Finding an employee with both knowledge of agriculture and finance is a problem. In this case, the company might establish special training courses periodically for its staff.

6.4 Looking forward

'Make agriculture easier and healthier' is the slogan of Songxiaocai. The company has indeed transformed the traditional vegetable supply chain and has brought benefits to vegetable vendors and producers in China. However, Songxiaocai should keep its vision in focus as it looks ahead to the future.

'*Songxiaocai now is an agricultural e-commerce platform, but our vision is far more than that,*' Mr. Yu Lingbing said with determination. There are three goals for which Songxiaocai is aiming: (1) to be the largest and most efficient internet agricultural transaction service platform; (2) to be the most valuable agricultural data service platform; and (3) to be the most open agricultural cooperation platform, providing a better experience for buyers and sellers alike. Establishing an agricultural e-commerce platform has been the first step, and Songxiaocai is on its way. We will see how Songxiaocai is performing with these ventures.

7. Closing

Five discussion questions are provided in the separate teaching note and here for readers:
1. What are the weaknesses of the traditional vegetable supply chain in China?
2. How does the demand-driven supply chain of Songxiaocai work and its advantages?
3. What does Songxiaocai's ICT architecture look like e.g. applications, systems and relationship between them?
4. How does Songxiaocai form a digital supply chain for value co-creation?
5. What should Songxiaocai do to deal with the challenges?

Acknowledgements

Supplementary material

Supplementary material can be found online at https://doi.org/10.22434/IFAMR2018.0115.

Teaching Note
S1. The development of Songxiaocai
S2. The operating locations (cities) of Songxiaocai Company
S3. Songxiaocai's garlic market share in Shanghai and Hangzhou
S4. Description of 6 apps of Songxiaocai
S5. Maidashu
S6. Company structure
S7. List of interviewed people