CONSTRUCTING THE E-COMMERCE CLUSTERING PLATFORM AND INNOVATIVE BUSINESS MODEL – A CASE STUDY FOR CHINESE HERBAL MEDICINE INDUSTRY

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ABSTRACT

Chinese Herbal Medicine Industry (CHMI) is a historical, cultural and distinctive industry in Taiwan. In fact, the major customers and consuming groups of this industry are elders or people who live around neighborhood. Unfortunately, the existing customers lose gradually since the young customers or new consuming groups have not been developed or introduced to try the Chinese Herbal Medicine. Subject to the massive item amounts and limited expiration date, the companies stay at this industry still trade by following the traditional way such as receiving the orders by phone or fax then delivering the goods personally. The customers seldom combine or integrate the same requirement to place the orders on website not to mention trade on the innovative business platform. In this study, we will construct clustering industry e-commerce platform and innovative business management model to improve the efficiency and enhance the competitiveness of the CHMI.

(1) Clustering industry e-commerce platform
    Establishing the uniform item name and prescription content will be assist in smoothing the inventory adjusted procedure and delivery schedule. This platform focuses on the process flow, inventory management system of the raw material, semi-product and finished –product. The inventory management is more reasonable and effective by implementing the demand forecasting function, besides, the material requirement planning (MRP) of the Chinese medicine will also be implemented and contributes benefits for establishing the safe stock and re-order point.

(2) Innovative business management model
    Establishing customer relationship management (CRM) database will strength the relationship not only for Business to Business (B2B) but also for Business to Customer (B2C). This database will be a benefit for providing more individual service to specified customer by analyzing the historical trading records. This integrated model will decrease the inventory for the trader, manufacturer, wholesaler and retailer. Besides, the bullwhip effect and stock level in the supply chain will be alleviated remarkably.

This study institutes six key performance indices to evaluate the performance and achievement of Chinese herbal medicine industry after establishing the e-commerce and clustering industry website. These KPIs are average turnover rate, medicine wasting rate, purchasing operation efficiency, data error rate, processing automation level and inventory level.

Keywords: Clustering Industry, Innovative Business Model, Chinese Herbal Medicine Industry (CHMI), Key Performance Indices (KPIs)

1. INTRODUCTION

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Chinese herbal medicine industry (CHMI) has been developed for thousands years in China and applied for diversified purpose such as nourishment, medical treatment and health care/keeping. Due to the
rising customer conscious for natural health care, not only Chinese but also the European, American, Japanese, Korean or people at the worldwide all pay a lot of attention to the traditional herbal medicine. Recent year, the curative effect of Chinese herbal medicine has been recognized generally.

The growth of Chinese medicinal herbs in the other country such as United States market is obviously. The use of complementary and alternative medicine (CAM) by US consumers has grown in recent years. CAM therapies often utilize medicinal herbs as part of the treatment process, despite growing concern surrounding the sustainability of wild-harvested medicinal herbs. In order better to understand consumer preferences for this emerging market, a mail survey of US practitioners (licensed acupuncturists) was conducted to examine the importance of five herb attributes in practitioners’ herb selection decisions: (1) country of origin, (2) freshness, (3) production method, (4) price, and (5) traceability [7].

According to the statistical data, there are more than ten thousands of small and medium enterprises of Chinese herbal supply chain in Taiwan. Most of them locate at the south of Taiwan by 70% of all Chinese herbal company. Collect data from the members of the Chinese herbs supply chain, the survey found that the herbal industry is much more conservative than other industries like electronic industry, information technology industry and retails industry. It is not easy to integrate such traditional industry by constructing information system or commercial platform to increases efficiency between the buyer and seller.

This study will endeavor to integrate the information flow by investigating the members in the herbal supply chain including importers, manufacturers, wholesalers and retailers and establish two information systems as vertical information system and horizontal information system to strengthen the competitiveness of the Chinese herbal medicine industry. The vertical information system focuses on deepening the vertical interaction of the herbal supply chain management and the horizontal information focuses on expanding the horizontal interaction by constructing the web-based trading platform. The purpose of the vertical information system is to strengthen the relationship of the members and reduce the procurement cost by consortium purchasing. Besides, the purpose of the horizontal information system is to achieve collaborative synergy and marketing promotion by constructing the commercial business platform of clustering industry.

2. LITERATURE REVIEW

The whole Chinese herbal medicine industry in Taiwan can divide as three roles:
1. Suppliers at the upstream: Purchase the raw material from the farmer by contract. Refine or decoct the herbal medicine from the herbal plant.
2. Suppliers at the midstream: Process or re-produce the raw material to the semi-finished goods.
3. Suppliers at the downstream: Chinese herbal medicine hospital, medicine shop and pharmaceutical factories include traditional or modern Chinese herbal medicine factory provide the goods and service for end-user.

Fig. 1 illustrates that the Chinese herbal medicine industry (CHMI) is a so closed and inseparable industry chain. Each member in such supply chain is connected and hard to separate or survive individually. The midstream or downstream members have to purchase the material or semi-finished goods from the upstream. In the same time, the upstream members acquire the orders from the suppliers at the midstream or downstream. In such competitive environment, the whole industry has to become a more valuable chain of CHMI. The value chain for a factory in a particular industry is embedded in a larger stream of activities that we term the “value system”. The value system includes the value chains of suppliers, who provide inputs (such as materials, components and purchased services) to the company’s value. The company’s product often passes through its channels ‘value chains on its way to the ultimate buyer. Finally, the product becomes a purchased input to the value chains of its buyers, who use it to perform one or more buyer activities [8].

Figure 1: Different roles of the Chinese herbal medicine industry

At present, over 90% of the Chinese herbal medicine materials in the Taiwan material market are imported from the mainland. It’s an issue to design a platform of realizing the electrification of the medicinal value chain to make the information public.

Lyu et al. [9] tries to plan a medicinal material security inspection information platform, by which the quality can be guaranteed and the delivery time will be reduced, to make the consumers buy and eat the medicines securely and further build the brand of Taiwan excellent medicinal materials.
“Industry cluster” is a current concept in economic development, also popularized by Porter. As a recognized expert in global economic strategies, he discusses the power of industry clusters to advance regional economies. The concept of “clusters,” or groups of interconnected firms, suppliers, related industries, and institutions that arise in particular locations, has become a new way for companies and governments to think about economies, assess the competitive advantage of locations, and set public policy [9].

Hence, we can identify industrial clustering by the following relationship:

1. The relationship of buyer and supplier.
The demand and supply relationship of the buyer and supplier is the typical clustering forms. For example, the upstream member offers the raw materials to the member at midstream and downstream.

2. The relationship of the competitor and collaborator.
This kind of the clustering industry gathers by geography factors and offers the similar or dependent product or service to the same customers.

3. The relationship of sharing the resource.
This kind of the clustering industry relies and shares the same resources such as raw materials, technologies, professional technicians, markets or information. They use the above resources to produce the diverse goods to enter different markets.

In order to establish an effective industry clustering, suppliers, customers and competitors and infrastructure must be integrated and tied as a specific cooperative relationship beyond the traditional competitive relationship.

With global economic development and growing international competition, supply chain collaboration (SCC) has become both an important strategic and operational issue. The organization therefore must rethink both its electronic business (e-business) and global supply chain management (SCM) strategies. Chang and Graham [1] investigates electronic supply chain (e-supply chain) integration through business-to-business (B2B) electronic commerce (e-commerce) application in Taiwan’s information technology (IT) industry. The purpose of this study is to explore the critical success factors (CSFs) of e-business strategy impacting on SCC. The findings present CSFs from the cross-case analysis that are categorized and discussed in term of key collaboration issues to impact the successful implementation of B2B e-commerce project by the firms. This provides academic and practical insights into e-business strategy for SCC.

Taiwan has been constructed a complete supply chain systems for years. But in response to the latest trend of customer oriented, IT-based, and global operations, the government of Taiwan has been promoting through public policy resources various e-Business applications and B2B e-commerce projects across the manufacturing industries, thus accomplishing a well-laid, solid e-Business infrastructure. The status of e-Business in information technology industry is summarized as Figure 2 shown [2].

Figure 2 and the numbers of approved projects including DoIT and IDB in each sub-industry were shown as Table 1. Since information technology, textile, and mental & machinery industry are e-Business intensive industries (as shown on Table 1), this article takes them as examples to study for the current status and trend of Taiwan’s e-Business IT application [2, 12].

Table 1: Numbers of e-business projects for manufacturing in Taiwan

<table>
<thead>
<tr>
<th>Industry</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>63</td>
</tr>
<tr>
<td>Textile</td>
<td>15</td>
</tr>
<tr>
<td>Machinery</td>
<td>31</td>
</tr>
<tr>
<td>Vehicle</td>
<td>10</td>
</tr>
<tr>
<td>Channel</td>
<td>8</td>
</tr>
<tr>
<td>IT Services</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
</tr>
</tbody>
</table>

The supply chain logistics operational process reengineering and e-business solution implementation of a chain store business will improve the effectiveness of the industry and provide quick response to the stores. The planning of supply chain logistics operational mechanism has become the critical success factor for the reduction of total supply chain operational costs. This mechanism can also reduce the complexity and cycle time of supply chain operational processes, such as the supply chain management of logistics center, integrated payment process among stores, logistics companies, and product suppliers [8].

Actually, there are many industry cluster development models in countries around the world. For example, in the U.S., Silicon Valley (California) and Route 128 (Massachusetts) are well-known industry clusters. The former is famous for microelectronics, biotechnology, and venture capital markets while the latter is well known for its software, computer, and communications hardware [4]. The reasons why software firms tend to cluster were analyzed, with a special focus on the transfer of information and knowledge [5]. In fact, although research about industry clusters has been examined from the perspectives of economic development, strategic management, knowledge sharing, and...
technology spillover, there is little research that addresses the competitive advantage offered by industry clusters that are based on institutional systems.

Figure 2: Roadmap and promoting strategy for Taiwan manufacturing e-business development

As introduced by [6], industry clusters can be classified into two types: vertically integrated clusters and horizontally integrated clusters. The first type of cluster is “made up of industries that are linked through buyer-seller relationships”; the second one “includes industries which might share a common market for the end products, use a common technology or labor force skills, or require similar natural resources”.

Another famous case is bicycle industry. The clustering in the bicycle industry not only decreases transaction costs among the firms in the cluster but also increases cooperation and efficiency between the bicycle manufacturers and their partners as a result of standardization and modularization of bicycle components. Following a patent analysis, two systems—the wheel system and the bicycle frame system—are the strengths of Taiwanese bicycle and component manufacturers. Conversely, the transmission (i.e., gears) and brake systems are their weaknesses. Moreover, industry clustering increases the efficiency of information exchange such that the spillover effect of technological innovation is significant [3].

These industry clusters provide competitive advantage because they are rooted in local institutional systems. Taking the case of Dalian Software Park in China, this analysis is conducted qualitatively based on Porter’s “diamond” model, SWOT framework and interview results. Industry clusters, which encompass a series of interconnected firms in designated geographic concentrations, show competitive advantages for industrial development with substantial resources rooted in local institutional systems including government, industry and academia aspects. In order to successfully navigate the economic paradigm shift from mass manufacturing production to innovative new product development in China, it is essential that the competitive advantages of industry clusters are strengthened and sustained in order to enhance industrial development, generate innovation and increase regional economic growth [13].

3. THE ANALYSIS OF THE ELECTRONIC VALUE CHAIN IN CHINESE HERBAL MEDICINE INDUSTRY

The member at the upstream usually imports the herbals and participates in planting the herbals as raw material. In fact, over 90% of the Chinese herbal medicine materials in the Taiwan material market are imported from the mainland. People always concern the quality issue about pesticide and heavy metal residue. Furthermore, each upstream trader not only focuses on a specific and limited area of the CHMI but also engaged in the manufacturing process and selling the finished-goods to the end-user directly. The boundary of the Chinese herbal supply chain is not so clear that causes server competition and decreases the profit so much. The CHMI supply chain is showed as Figure 3.
The CHMI supply chain includes several steps and roles. The member at the midstream usually devotes to the manufacturing technology, studying biotechnology and process improvement of the Chinese herbal medicine. The member at the downstream is responsible for manufacturing the finished goods, quality control, studying the diverse purpose of the Chinese herbal medicine and promoting the product to the customers. The wholesalers at the distribution channel mainly divide, sell and distribute the product to the customers such as the hospital, shop or retailer of Chinese herbal medicine. The retailers face the end-users directly and provide the usage suggestion or after sale service for the customers.

Regarding to the survey, the retailer members in CHMI is the majority. They serve the elder customers and used to operate the business by the traditional way. Due to the incomplete and delay information exchange, each member in such supply chain confronts the “bullwhip effect” quite often and does not has an effective solution to solve the problem. The trader at the upstream cannot realize the consumption of the midstream and downstream, let alone to monitor the stock level of the chain. Most retailers are in a continuous effort for increasing profits and reducing their cost. An information-sharing platform plays more and more important role in achieving the aforementioned goals and leading to improve the customers’ satisfaction, reducing destruction of products, increasing sales revenue and making production plan efficiently. Hence, construct the information exchanging framework will alleviate or prevent the “bullwhip effect” in such CHMI supply chain.

Figure 3: CHMI supply chain

Figure 4 shows the synergy and benefit of e-commerce at CHMI. From the raw material, semi-product, finished product to prepared product, the implementation of the information system will increase the value of the chain. In raw material portion, the more accurate demand forecasting will well manage the inventory of raw material and reduce the lead time of purchasing schedule. In semi-product portion, e-commerce and information system will help monitoring the procedure of manufacturing and reducing the wasting cost while producing. In finished product portion, the prescription database will assist in analyzing the production cost of the Chinese medicine and planning the schedule of preparing materials. In the final portion, well know the customer requirement and inventory situation will assist in managing the packing material of the product, predicting the replenishment schedule and reducing the inventory room.

The following section will introduce the e-commerce clustering platform and innovative business mode for CHMI. The purpose information system will strengthen the competitiveness of the CHMI and encourage this industry to develop a unique and innovative business operating model by applying and implementing the e-commerce.
4. E-COMMERCE OF CHINESE MEDICINE INDUSTRY AND CLUSTERING WEBSITE CONSTRUCTION

In order to improve the efficiency of CHMI, it is necessary to implement a connected and collaborative sub-system for integrating the clustering industry platform. Each member in this supply chain can exchange and share important business information such as business information, sale situation, stock level, marketing plan and prediction of demand. Besides, buyer can place and trace the purchasing order on-line and seller can confirm the order and accounts receivable simultaneously. As expect, this e-commerce platform includes seven sub-systems which will achieve objectives for improving the trading efficiency and reducing the transaction cost and describes as below.

1. Collaborative inventory and accounting sub-system: Wholesalers and factories in CHMI are easier and more convenient to acquire the requirement, place the order and adjust the inventory.

2. Collaborative management sub-system: Members can enter the clustering industry website and search the inquiry from the customer.

3. Establish the identical catalog sub-system: Each member can inquire the product in this system which simplifies the data exchange.

4. Pre-establish the prescription management database sub-system: Each member can use the same prescription to produce the herbal medicine.

5. Simple Point-of-Sale (POS) sub-system: Retailers will increase their willingness to exercise the e-commerce system by simplifying the operating procedure.

6. Batch number and storage position management sub-system: Recording the expiration date of the raw material or goods will assist in managing the scrap and waste.

7. Inventory management sub-system: Control the delivery schedule by following first in first out principle.

Construct the clustering e-commerce system that makes CHMI members exchange useful information fluently. The main purpose of this system focuses on the B2B in this supply chain and separates into internal and external parts as following.

1. Internal part of the e-commerce system: Importer, manufacturer, transporter, wholesaler and retailer at CHMI can operate on e-commerce clustering platform to inquire the request and run the business on-line.

2. External part of the e-commerce system: Chinese medicine hospital, supermarket and hyper-market are included in this system. On which customers can offer the inquiry, place purchasing order on-website rather than placing orders by phone or fax. It is obviously that this system can improve the effective of dealing with the received order and delivering goods fluently. Besides, this system not only increase the data accuracy but also reduce the manpower and communication cost.

Regarding the B2C, the end-user can inquire the product on-line and purchase herb-cooked material or herb health food in common use on this e-commerce website. Moreover, in order to attract the young consumers to understand the Chinese herbal medicine, the e-commerce website provides the history, curative effect, medicine knowledge, relative laws, educational cases and herb recipes of the Chinese medicine.

When CHMI clusters, this industry can motivate the growth, construction ability, flexible adjustment and core competitiveness to maturity by itself.

This study focuses on constructing e-commerce system and clustering platform of the CHMI. The above two systems transfer such traditional industry become a virtual company with agility and flexibility. Innovative technology encompasses the revolution of industry and encourages a different business model. Industry clustering brings completely new virtual competitiveness. Several remarkable advantages of clustering platform and e-commerce will be illustrated as below:

1. By establishing the commercial clustering platform, CHMI will distribute the correct concept, usage and knowledge for customer about how to use the herbal medicine properly.

2. The suppliers in China or abroad can purchase and sell the herbal medicine on the CHMI website through the virtual e-commerce platform. This greatly helps for the
completeness of clustering industry.

3. Each member in this group can purchase together and encourage different partners to join CHMI. Not only broaden the economic scope but also decrease the purchasing cost.

4. This integrated supply chain management system will decrease the inventory for the trader, manufacturer, wholesaler and retailer. Besides, the bullwhip effect and stock level in the supply chain will be alleviated or decreased.

5. INNOVATIVE BUSINESS MODEL OF THE CHINESE MEDICINE INDUSTRY

For a long time, the Chinese medicine industry seems a traditional, and lacks the relative research to discuss the influence of the e-commerce and reengineering at such industry. This is harmful to exchange the inventory information and customer’s requirement. This study focuses on implementing the e-commerce system, clustering industry system, and endeavoring to improve the traditional operation and fundamental infrastructure. The suppliers, wholesalers and retailers of Chinese medicine industry will re-think and re-design the business process and operational strategy through the construction of e-commerce and clustering industry system. The following will explain the innovative business model of the Chinese medicine industry:

1. Change of the trading model.
   Current trading model such as placing order by phone or visit customer personally will be changed after constructing and implementing the e-commerce and customer database. In this clustering website, the seller can easily understand the stock level of the customers and take care of their requirement on-line, oppositely, the buyers can offer the inquiry on the website, and all sellers can offer the best price and quality of the product to fulfill the request from the buyers. This different business model can reduce the trading cost, unnecessary expenditure and improve the operating efficiency substantially.

2. Change of the purchasing model.
   After integrating the system, the buyers have the same requirement can join the coordinated procurement and increase the advantageous position of negotiation to reduce the purchasing cost directly. Integrated information exchanges fluently will assist in alleviating the “bullwhip effect” and encourage the synergy of the supply chain.

3. Change of the managing model.
   After implementing the inventory management system, batch number management system and uniform prescription management system, each member at the supply chain reduces the wasting rate while manufacturing, improves the utilization, establish bill of material (BOM) and manufacturing requirement planning (MRP) of Chinese herbal medicine.

6. CONCLUSION

This study institutes several key performance indices for Chinese herbal medicine industry to evaluate the performance and achievement after establishing the e-commerce and clustering industry website.

1. The average turnover will increase by 10%.
   Each member at this supply chain can invite the partner to participate the clustering then strength the organization relationship and competiveness.

2. The waste of the Chinese medicine will reduce by 60%.
   For different Chinese medicine has different expiration date. The batch number and inventory management will make CHMI more visible and easier to control the waste of the goods. The purpose system will successfully decrease the waste by 60%.

3. The efficiency of purchasing operation will increase by 97%.
   In the past, the purchasing procedure operated by human will consume 3 or 7 days. After implementing the e-commerce, it only takes 5 hours for entire procedure.

4. The error rate of data will decrease by 75%.
   In the past, people key-in the date personally and the typing error is always unavoidable. At present, e-commerce platform exchanges information by electronic data rather than deliver data or message by labor.

5. The processing automation will improve by 80%.
   Integrating information assists enterprise in speeding up each process such as purchasing process, manufacturing process, quality inspection process, packing process and delivery process.

6. The inventory level will decrease by 25%.
   Because inventory information of stock level exchanging is more frequent and clearer, each member at this supply chain can decrease the inventory by 25%. This helps the members improving the competiveness and saving the cost directly.

Further researches can discuss the possibility that operate the Chinese herbal medicine industry as the chain store model such as 7-11. The chain store model maybe considerable and will greatly assist in integrating this industry to become a newly industry
model. Spread out the historically medical industry worldwide not only promote the value and usage of Chinese medicine but also can accumulate the professional knowledge to spread out the historically medical industry worldwide and become a cross-international industry.

REFERENCES


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建構群聚商務平台及創新商業模式-以中藥產業供應鍊為例

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摘要

中藥產業是為台灣極具歷史文化且特色濃厚的產業，由於目前的中藥產業上下游供應鍊所面對的消費族群大多是年齡較大或是街坊鄰居式的老顧客，對中藥業者而言，如無法有效地開發新族群或是吸引年輕族群，必將面臨客戶逐漸消失的情形，由於中藥材的品項眾多且保存期限不一，加上現行中藥產業同業間的採購，大都以傳統模式或業務拜訪的型態，自上游、下游來進行訂貨、補貨的作業，這對於產業整體供應鍊的整合來講，不僅顯為單薄，且無法將有同一需求的廠商進行聯合採購，造成供應鍊成本的增加，且無法整合並提供創新的商業模式，本研究運用流程整合的方法，應用系統協助該產業建構群聚產業e化商務平台，以協助該產業開創其創新商業管理模式：

(一)建構群聚產業e化商務平台：協助建立中藥產業產品品項之統一標籤，使得產業鍊調撥及進銷貨作業能夠更加順利，該平台將強化進銷貨及庫存管理系統，導入市場需求預測分析，使得中藥材的庫存管理能更加合理化，藥材調配需求計畫（MRP）的設置對於藥材安全存量再訂購點的估算及用藥量控管將更準確。

(二)創新商業管理模式：藉由顧客關係管理資料庫的建置，可強化客戶關係管理（B to B），運用受訂系統紀錄客戶交易歷史資料，方便進行客戶查詢及管理，並協助廠商建立客戶配方箋之用藥管理，以方便進行配方及藥材的使用管理

本研究將以營業額、中藥材報廢損失、中藥材訂購流程改善、中藥材品項與計量單位錯誤率客戶服務滿意度等項目作為系統建構前後效益改善的關鍵績效評估指標（KPI）

關鍵詞：群聚產業e化商務平台、創新商業管理模式、中醫藥產業、關鍵績效指標

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