

A Case Study of Electronic Business Mall Selling Vegetables and Fruits in Taiwan

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Abstract

A particular electronic business mall trading the vegetables and fruits over the Internet has run for more than one year in Taiwan. To sell these products in the Web have more impediment than to sell some standardized goods such as books or PC. Extra obstacles derived from the features of fruits and vegetables are unstable quality, bulkiness, perishables, need to deliver promptly, diversified local retail market for auctioning the agricultural products and so on. Thus, it will be necessary to investigate the interior issues of this system in depth.

In this article, we proposed a research framework relating the adoption of the electronic business system containing four major factors. These factors include environmental variables, internal variables, information system variables and cost/benefits variables. Based on this framework, we designed an open-ended questionnaire containing a lot of issues relating to technical, social, legal, regulatory and business hurdles and benefits. Then, we conducted some face-to-face interviews to a few key personnel relating to this system. We found that a lot trading obstacles in the Web have been mitigated. However, a few serious problems such as low transaction volume, negative return on investment, intangible benefits orientation and no electronic funds transfer mechanism, still offset the merits of this system

Keywords

electronic business, electronic commerce, agricultural industry, IT adoption

INTRODUCTION

The production cost of vegetables and fruits in Taiwan is high for small agricultural scale. The middlemen get extra dollar share of consumer's dollar for the long distribution channel. It makes the hard-working farmers often gain the less profits and the consumers also need to endure the running high prices of vegetables and fruits. Some import trading barriers such as high tariff, trade control and subsidy payments are given on agricultural products to make them survive on the domestic market. However, most of the barriers will be relieved when Taiwan as a member of WTO (World Trade Organization) in the near future and will make the agricultural industry from bad to worse (Council for Agricultural Planning & Development of Executive Yuan 1998). In order to break through this dilemma, Taoyuan Hsien Farmers' Association created a brand-new distribution channel by establishing an e-biz (electronic business) mall to sell vegetables and fruits about one year ago (<http://www.ffnic.org.tw/>).

Doing business on the cyberspace is still a hot issue today. With the low price and mass

customization strategies, some American companies successfully selling books, CD, toys and PC on the Internet outmaneuvered their competitors in a short period (Kalakota and Robinson 1999). However, some scholars also identified six categories of technological impediments to Business to Consumer (B2C) including download delay, limitations in the interface, search problem, inadequate measurement of Web application success, security weakness and a lack of internet standards (Rose, et. al., 1999). Rose also mentioned that many obstacles relating to social, legal, regulatory and business hurdles also affect the adoption of e-Commerce. Nour and Fadlalla (2000) classified the products sale in the Web into four classes by product type (goods or services) and delivery mode (terrestrial or digital). Fruits and Vegetables belong to physical goods that cannot be transferred via the Internet to ultimate buyer, but must be shipped by terrestrial means. From a marketing perspective, there are two major disadvantages for using the Web to sell this type of products. First, the absence of the physical product makes it impossible for a prospective buyer to inspect, feel, and try out the product. Second, the infeasibility of delivering products of this market electronically represents a further limitation in using the Web to the fullest extent. Moreover, few scholars take a more conservative attitude toward trading agriculture products on the electronic network (Lee and Clark 1997). Obviously, there are some extra obstacles for trading the vegetables and fruits comparing to selling the standardize commodities such as books, CD and cellular phones on the Web. A few pitfalls such as unstable quality, bulkiness, perishables and need to deliver promptly are the properties when selling the agriculture products. Using six Web-based trading guidelines drawn by Kalakota (1997), we summarize the major drawbacks of e-biz mall trading vegetables and fruits in Taiwan on Table 1.

Assessment factors of web operation	Unfavorable factors about the web vegetables & fruits' operation in Taiwan
1.Product/content	<ul style="list-style-type: none"> - bulkiness - perishables - products need to be fresh - unstable quality
2.Software interface	- suppliers lack of computer ability
3.Process	<ul style="list-style-type: none"> - consumers lack of confidence toward unpredictable products - prompt delivery
4.Price	- the unit price is low
5.Payment	- the Internet security recognition still not be established thoroughly
6.Market penetration issues	<ul style="list-style-type: none"> - target customers are not the main population of Internet users - America has a vast territory with sparse population while Taiwan is populous with convenience store everywhere - no electronic commerce mall reach the economics of scale

Table 1: Some pitfalls of trading vegetables and fruits

After having surveyed the literature, we can get some advantages and disadvantages simultaneously when running a Web-based mall to sell vegetables and fruits. Since the first domestic one located in Taoyuan Hsien run on the cyberspace for more than one year. It will be interesting to investigate whether this modern sale style can replace the traditional one or not. In the same time, can this new-fashioned model overcome the drawbacks listed on Table

1 and can perform successfully like Amazon, Dell and Cisco. In this study, we will explore this particular system in depth and hope to provide the consequence for the government as well as the related agricultural organizations for reference.

SYSTEM NARRATION

After the Internet and World Wide Web having been adopted by the commercial section, it makes the transaction volume which consumers purchase over the Internet (B2C) and the transactions between business (B2B) increase continuously. Kalakota, et al. (1999) divided such electronic transactions into five categories. They included the EDI transaction with the leased line in early times, e-information for downloading and printing the information from the server, e-transaction for doing simple transactions on the network, e-commerce by combining the concept of marketing, and e-business by integrating Internet transaction with business process reengineering. Because the electronic business mall selling vegetables and fruits of Taoyuan Hsien Farmers' Association reconstructed the old distribution channels of vegetables and fruits radically, it was able to classify this innovation as the category of e-business.

Dr. Hsu (1997), an agricultural marketing scholar, classifies the distribution channels of domestic agricultural products in several types and the popular prototype can be drawn in. Figure 1. In this figure, the farmers' associations and agriculture cooperative associations are both agricultural groups that are supported by the government to assist the farmers in production and distribution. And Taoyuan Hsien Farmers' Association is just one of the hundreds organizations in Taiwan.

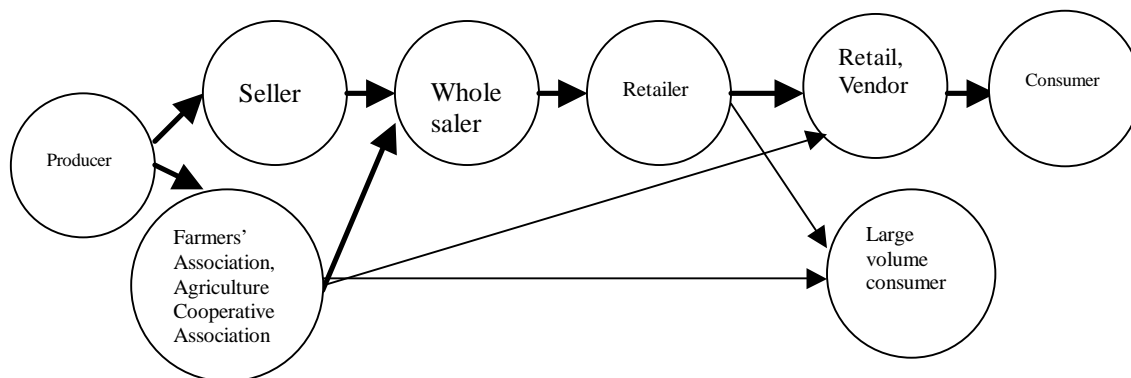


Figure 1: The channel of traditional vegetables and fruits distribution

For the long distribution channel in figure 1 makes the middlemen get more profits than the farmers' profits for each transaction. In order to mitigate this situation, a new distribution channel implemented on the Internet has been developed as shown in Figure 2. For the process flow has changed radically comparing to the flow of traditional channel in Figure 1, we can classify this system as an e-business model according to the Kalakota's five-stage evolution definition.

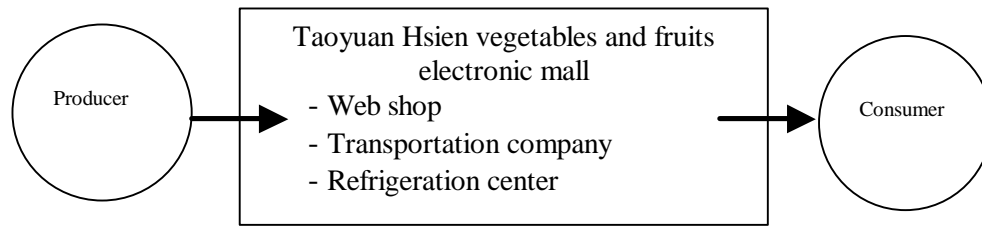


Figure 2: New channel of vegetables and fruits distribution

In usual, when customers try to buy some vegetables or fruits in the traditional markets, they usually compare the quality and prices among different products (this stage can be called as pre-purchase interaction). Then, the customer may make a bargain with the storekeeper and complete this transaction (this stage can be called as purchase completion). When completing the transaction, it is usually not permit the customer to exchange or to return the purchased products in the old traditional market (this stage can be called post-purchase interaction). The similar procurement stages pre-purchase interaction, purchase completion and post-purchase can be simulated in the electronic business mall as shown in Figure 3. Basically, the processes of the first two steps on the Web are similar to the traditional purchasing pattern while the third step can give customers the chances of regretting and exchanging their products.

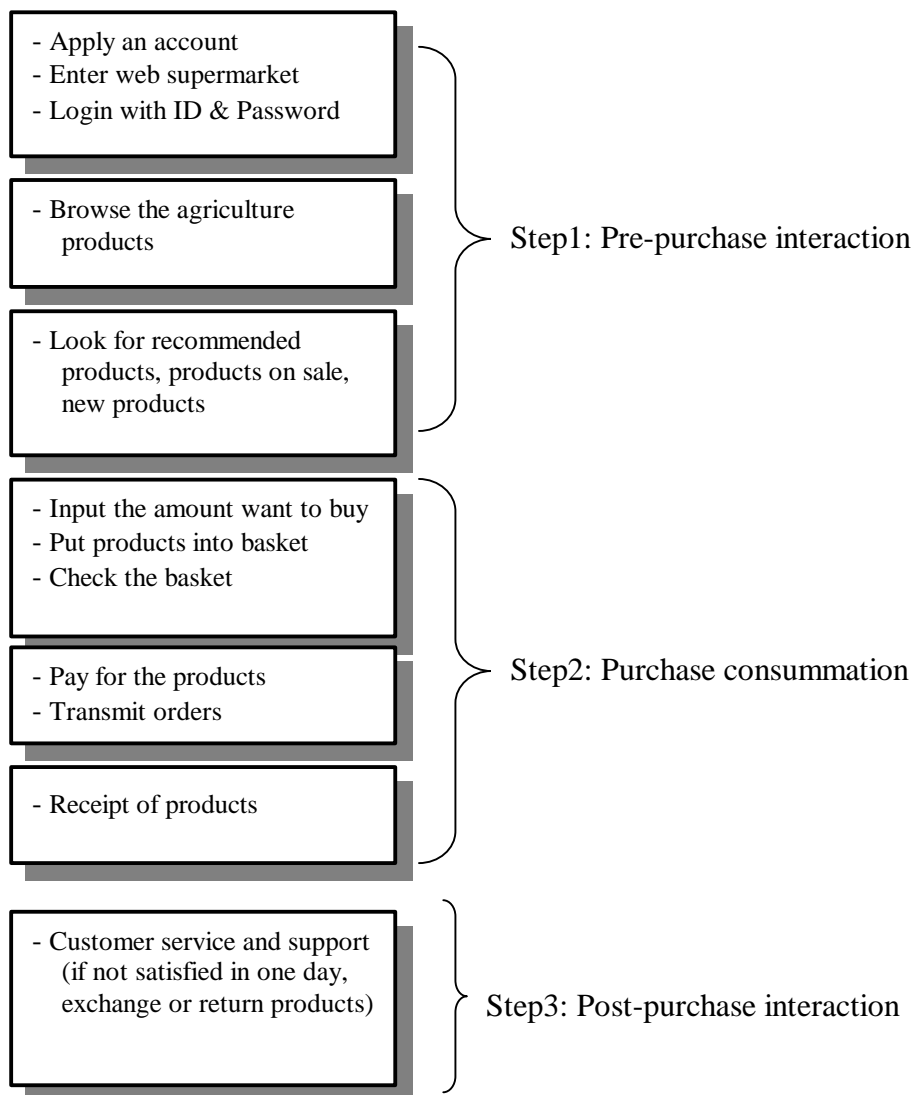


Figure 3: The process about e-business transaction of new system

The company often considers some factors such as information technology characteristics, internal and external environment of the business when they try to adopt a new information system. There are some research literatures discussing the IT adoption highly correlated with e-commerce, including open system by Chau and Tam (1997), the client-server framework by Indushobba and Duchessi (1999) and the stock trading via Internet by Loh and Ong (1998). In these literatures, many variables that may affect the use of certain information technology by the organization or the individual have been summarized. And it is possible to classify these variables into three constructs as information system, internal factor and environmental factor. It can be drawn the research framework in figure 4. The upper part of the framework covers these three factors and the correspondent variables for each one. Because the system has operated for more than one year, a benefit analysis variable (Mirani and Lederer 1999) integrated with system operational cost and transaction volumes for measuring this system has also included below the figure 4.

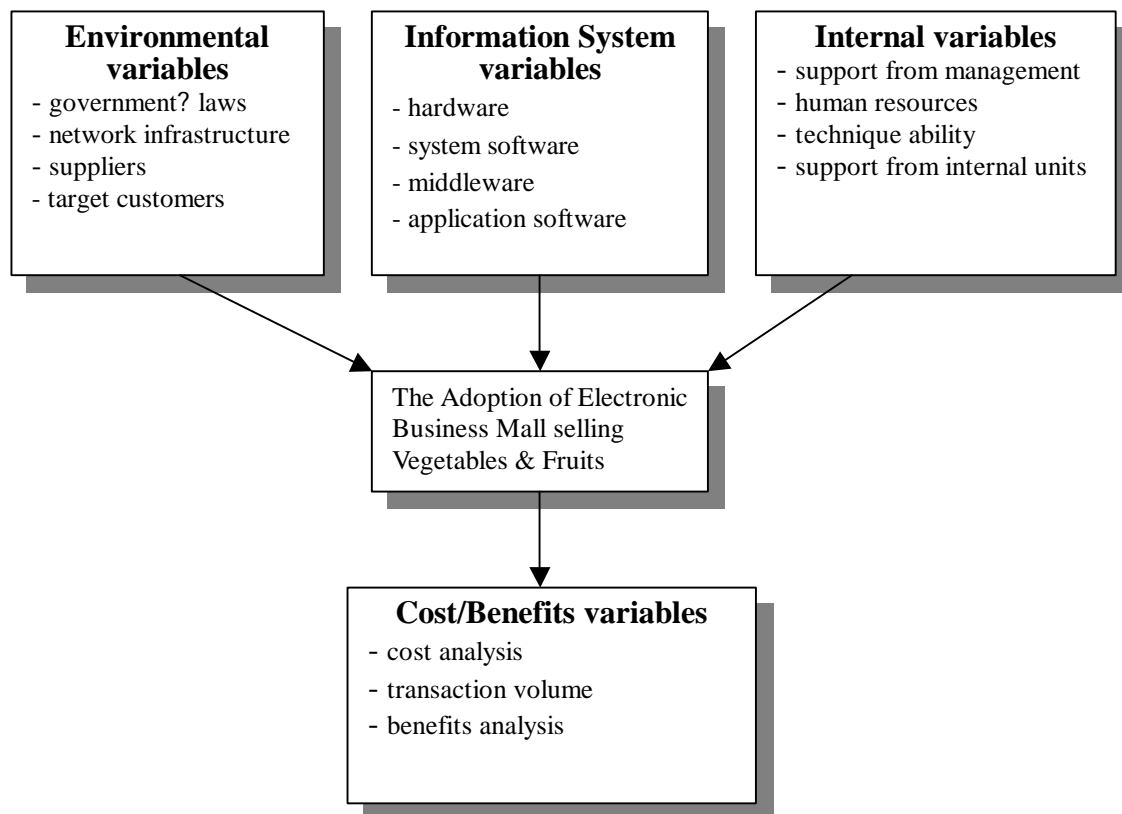


Figure 4: Research framework

With the variables of the research framework in figure 4, we made an open-ended questionnaire and also visited the Chief Information Officer (CIO) of this system face to face. Before the formal interview, we had faxed the questions to the CIO and got some information in written form related to this system. We made two appointments with the CIO and took about two hours for each visit. Besides, we also visited the farmers who provided products for vegetables and fruits and the officer who sponsored the budget for this plan.

CASE STUDY

System Framework

The Web-based system for selling the agricultural products was running by the IT department of the Taoyuan Hsien Farmers' Association in the first stage. The IT department now becomes an independent organization called "Juridical Person Agriculture and Fishing Association United Information Center". In early 90's, this institute was established in order that more than ten credit departments of Farmers' Associations in Taoyuan Hsien can share one banking on-line transaction processing system running on the NEC mainframe. A lot of banking application programs including deposit, loan and remittance have continuously developed and the ISO 9001 quality assurance has been delivered latterly.

In November 1998, a brand-new system trying to sell vegetables and fruits on the Internet was launched by the center. This new system running on IBM RS6000 had not any correlation with the old banking OPTP system. Major system software of this system included AIX operating system, DB2 database and Net.Commerce 3.02 middleware. Besides, five application subsystems including transactions on the Web, inventory management and others had been developed under such architecture by embedding the SET and SSL security mechanisms (See Figure 5).

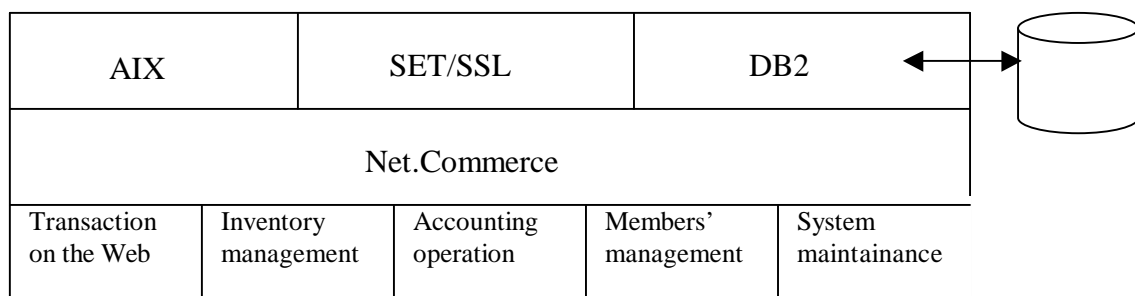


Figure 5: The software architecture of a commercial system

Although the staff of the information center had accumulated the operation experiences of mainframe for ten years, they still lacked the implementation experiences on electronic business mall system as well as the client/server architecture. Therefore, the development of the system was outsourced and the system maintenance was carried out in house. Most of the system features could be easily modified from the modules in Net. Commerce. However, the development team also used tools like Power Builder or Power Designer to developed a few functions when necessary.

Environmental variables

For the government fully supported the agricultural groups to invent the new distribution channel of products, the software and hardware expenses of this system had been subsidized by the experiment research budget of Council for Agricultural Planning & Development. Although the Internet website established by the organization is quite popular in Taiwan, the electronic funds transfer is not permitted for the electronic signature law as well as the institute for identification recognition are not ready. Thus, it is unable for the customer to purchase goods using security functions of SET and SSL as shown in Figure 5 by the credit card or e-wallet. The whole transaction process flow can be shown on Figure 6, the manual payment procedure and physical goods shipment need to be executed.

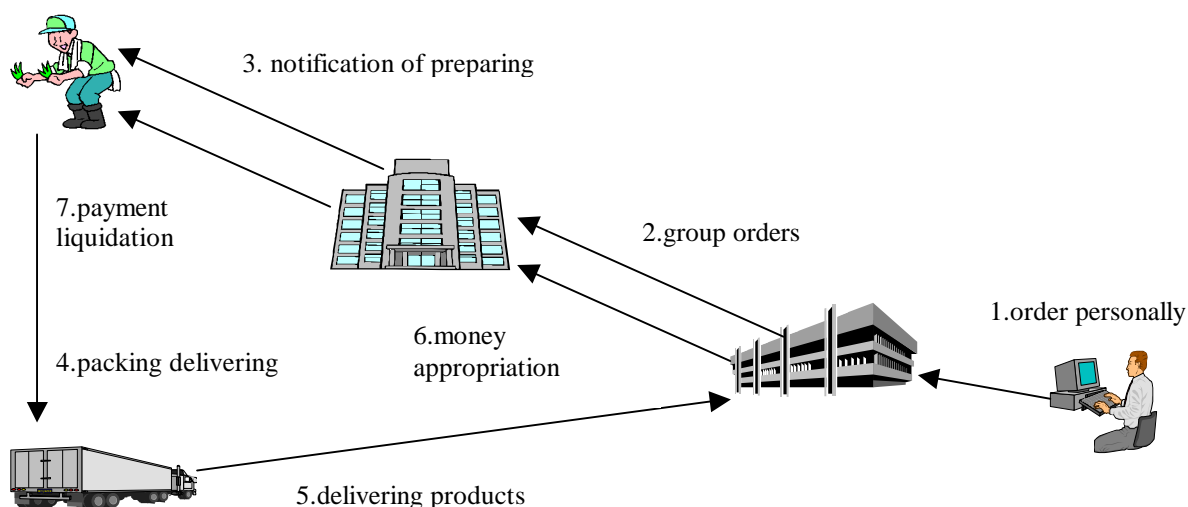


Figure 6: The transaction process of vegetables & fruits over the Internet

The farmers in the same area are encouraged to be an agricultural distribution team by the government. Members of the team can cultivate similar agricultural products, support each other, purchase materials jointly, use agricultural machines collectively, promote the competition, etc. Presently, there are sixty teams to supply vegetables and fruits to the electronic mall. They provide over 200 products. The quality control of these vegetables and fruits in the electronic business mall is quite strict because farmers have to show the GAP identification or the documents of the recognition about organic vegetables and fruits. They also need to receive the sampling inspection of the concerned guidance and assistance authority irregularly. The major customers are from large communities and institutions because the unit price of products is low and transportation charges are high. The customers' data are controlled by member system. At present, the members are about 1260 or so and there is no conflict between the way of marketing and the traditional channel.

Furthermore, there are farmers' personal data, photos, farm introductions, field environment, pictures, contact ways and planting records on the Web pages. The photos on the Web pages are correspondent with the physical presence of products in order that the people who see on the screen can feel the physical presence of vegetables and fruits. When a new batch of vegetables and fruits are provided in the market, there is need for updating the photos on the Web pages. So the farmers must be trained to use computers and take pictures of crops. In the futures, farmers also need to be disciplined to update the Web pages. In order to compensate the customers for not choosing the products personally, the customers have the right of free exchanging in a day after receiving products. However, farmer will be deprived of the right about providing products when there are three bad records of the customers' complaint about the products or using the insecticides improperly.

Internal variables

The authority concerned supports this system with great exertion and so does the board meeting of the organization. The whole human resources of the organization are allocated after the system starting to operate. Presently, twenty workers participate in the Web-site operation and they are separated into seven groups by job functions. Six of the workers are

full-time and fourteen of the workers are part-time.

For the system development experiences of IT personnel focus on the finance and banking not on marketing and Web system. Thus, the application software development of new system adopts outsourcing and has no relation with the old system. The business also obtains the human resources support from Taoyuan Hsien Farmers' Association and completes the establishment of the warehouse facilities favorably under the support of management.

Analysis of Cost and Benefits

The building and operation cost of whole mall includes the purchasing of software, hardware and middleware, outsourcing expense of application software and Web pages design, warehouses, the expenses of facilities, personnel and system maintenance, etc. The authority subsidizes part of expenses. Until now, the turnover of the system operation has 2.15 million dollars. And it is predicted that the turnover can be break-even when the turnover reach 50 million. This estimate is a little optimistic because the initial cost is not taken into consideration. In addition, when the transaction volume increases rapidly, it is possible to purchase IBM medium-size computer or mainframe (Shurety 1999) if there is need for using the Net. Commerce framework. Meanwhile, if quality control of vegetables and fruits needs to be maintained, the continuation about the supply of products also needs to be thought of.

There are different levels of benefits about the information system application. Mirani and Lederer (1998) had analyzed more than ten variables and divided them into three benefits: strategic benefits, information benefits and transactional benefits. According to this classification, it is able to gather the collective data and summarize in table 2. Obviously, a large number of these benefits belong to Intangible Benefits. Tangible Benefits traditionally estimated by the ROI, market share, and the transaction benefits can't be shown at present.

Type of Benefits	Benefits Content
Strategic advantage	? match the agriculture policy of brand, technology and information ? test and verify the feasibility about e-commerce and retailing of vegetables & fruits ? avoid the exploitation of middlemen ? improve the centripetal force of farmers toward guidance and assistance institution ? promote the external image of guidance and assistance institution ? inspire internal workers ? be the lead in electronic market

Informational Benefits	? list the price clearly ? publish the photos of vegetables & fruits sample ? provide the function of product reservation ? give customers the condition to query the products for purchasing ? production process of vegetables & fruits is transparent
Transactional Benefits	? shorten the delivery process of agriculture products

Table 2:Assessment of electronic mall benefits\

CONCLUSION

In order to explore the feasibility of running a retail e-business mall for selling vegetables and fruits in Taiwan, a lot of drawbacks of this system have been drawn in Table 1. After having explored this system in depth, we found only few obstacles had been overcome in this system. We also discovered that the transaction volume trading on this system was low as well as the tangible benefits were rare. Besides, the traditional financial analytical tools such as ROI, market share and break-even point were ignored. However, some intangible benefits especially on strategic planning has been recognized in this system.

REFERENCES

- Chau, P. Y. K., and Tam, K. Y. (1997) Factors Affecting the Adoption of Open Systems: An Exploratory Study, *MIS Quarterly*, 1-25.
- Council for Agricultural Planning & Development of Executive Yuan (1998) *An Overall Strategic reaction when Taiwan as a member of WTO, 2e*, Seven Stars Agricultural Development Foundation (Chinese Reference).
- Hsu, W. F. (1997) *Agricultural Marketing Management*, Cheng-Chung Co. Ltd.(Chinese Reference).
- InduShobha S. C. , and Peter D. (1999) The Initiation and Adoption of Client-Server Technology in Organizations, *Information & Management*, 35, 77-88.
- Kalakota, R. , and Robinson, M. (1999) *E-business Roadmap for Success*, Addison-Wesley.
- Kalakota, R., and Whinston, A.B. (1997) *Electronic Commerce: A Manager's Guide*, Addison-Wesley.
- Kalakota, R., Oliva, R. A., and Donath, B. (1999) Move Emerging Digital Marketplaces Over, Promise the Next Wave E-Commerce of Business Competition *Marketing Management*, 23-35.
- Loh, L., and Yee, S. O. (1998) The Adoption of Internet-based Stock Trading: a Conceptual Framework and Empirical Results, *Journal of Information Technology*, 13, 81-94.
- Lee, H. G., and Clark, T. M. (1997) Market Process Reengineering through Electronic Market System: Opportunities and Challenges, *Journal of Management Information Systems* (13:3), 113-136.

- Mirani, R., and Lederer A. L. (1999) An Instrument for Assessing the Organizational Benefits of IS Projects, *Decision Sciences*, (29:4), 803-839.
- Nour, M. A. and Fadlalla A. (2000) A Framework for Web Marketing Strategies , *Information Systems Management*, 41-50.
- Rose, G., Khoo, H. and Straub (1999) Current Technological Impediments to Business-to-Consumer Electronic Commerce, *Communications of the Association for Information Systems*, 1-73.
- Shaw, M. J., Gardner, D. M., and Thomas, M. (1997) Research Opportunities in Electronic Commerce, *Decision Support Systems*, 21, 149-156.
- Shurety, S., (1999) *E-business with Net.Commerce*, IBM.

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