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Role of Information Technology in the Management of Farmers Market Karari at Ehime Prefecture, Japan

Masayuki Shiraishi and Abdul Razaq
The United Graduate School of Agricultural Sciences,
Ehime University, 3-5-7 Tarumi, Matsuyama 790-8566, Japan

Abstract: This study discusses about the management of Uchiko fresh park Karari in Ehime prefecture using Information Technology (IT). The pioneering efforts undertaken were studied paying particular attention to the recent development of IT systems in marketing. The background of the management in Karari using IT, it regulates the demand and supply, as well as the current state of Karari was also analyzed. It was found that IT helped in setting up a marketing system, which is convenient for both producers and consumers. Displayed product information made possible for consumers to access information about the product and their origin. Consumer confidence and security has been significantly improved. Producer can well monitor the seasonal demands analyzing the available supply and sales data. Consumer demand for information will also be a challenge because the IT system will have to adapt all the time. Most of the producers are old citizens and they require fresh training systematically. This study recommends improvements in the bar code system to address the consumer needs including traceability. Promotion and advertisement using IT would help to boost sales in the Karari.

Key words: IT, farmers market, point of sales, bar-code seal, description labels, regulations

INTRODUCTION

Farmer markets in Japan are generally classified into two types, standard and unique. The standard can be further divided into three subtypes, farmers group, Nokyo female initiated and third-sector company, which is also known as an administration initiation. Karari is a third-sector company (administration initiation type) and has the benefit of being easily patronized by IT maintenance businesses due to the involvement of large amount of subsidy^[1].

Information technology became important concerned with the development of recent marketing system. IT was introduced into the farmers market of Uchiko town of Japan in 1995 and when the Karari was introduced, the IT management system was already established in this area. The networks developed, connected the interactive agricultural communication systems and sales management systems (point of sale terminals), thus solving bar coding, sales monitoring and sales management problems. As a result, farmers were able to regulate demand and supply using IT. This system was developed to such an extent that it is now possible to access Karari market information through cell phones, fax and personal computers. Consequently, farmers know

when to ship more products and how much to ship. In addition, farmers are able to display their products with bar codes thus bringing a sense of security to the consumers applying information technology.

The volume of information displayed on Karari products is less compared with supermarkets because sales are achieved through direct contact in Karari. They also need of an alternative system, which enables consumers to obtain information on the Karari products without direct contact with the farmers.

The objectives of the study were to use IT in farmers market and to find out benefits of utilizing IT in these markets as well as improving the system in marketing of agricultural production.

Location: Uchiko town is located at 132°39' 15" E and 33°32' 46" N, 34 km southwest of Matsuyama City, Ehime Prefecture, in a predominantly hilly and mountainous area of Japan. It has a population of 11,500 people living on 121.17 km² of land. Farmers account for 36% of the total households; 1,326 of the town's 3,688 households and farmland comprises 1,139 ha of the total land area, with an average cultivated area of 86a. Agriculture practices centered on leaf tobacco and deciduous fruit trees and are practiced on sloping land and terraces.

IT management in Uchiko town: Uchinoko market was established in 1994 in Uchiko town as a farmers market for selling local produce, training farmers and collecting data. Information management was commenced to encounter various shipment, receiving and adjustment problems and the need for IT was recognized. An IT maintenance system was initiated during 1995-96 and Karari, a farmers' market for special products, was opened. The maintenance system developed provides a simple scheme, which allows even those unfamiliar with IT like senior citizens to quickly access sales information.

Development of an IT maintenance and management system for a farmers' market: Before 1995, the Karari used to keep its records of sales in books. Therefore, it took time to analyze data from the sales and even the producers and consumers had no full information about the market situation when conducting their business.

During 1995, 268 million Japanese yen was injected into the Karari project and an agricultural information center was developed. The local residents of Uchiko town were expected to maintain the integrated management facilities, the farm village itself and the tourism resources. General IT information desks, a server (one game in the host bureau) and 140 fax information terminals were installed (Fig. 1). These networks connected the interactive agricultural communication systems and sales management systems (POS: Point-Of-Sale-Terminal). The system was adopted in Karari to solve the problems faced in Uchinoko market, like bar code seal making, sales monitoring and sales adjustment. Four points of sale and cash registers were set up in the 140 agricultural information terminals (multifunctional fax). Line and Local Area Network (LAN) connected Karari, the cash registers and the farmers. The IT system opened in Karari in 1996 and was operated to analyze supply and demand.

In fiscal year 1999, an additional 43 million yen was injected into the Karari IT business enabling the installation of a meteorological observation robot and data analysis computer. An additional 80 agricultural information terminals (multifunctional fax) were also procured as data reception observation devices. As a result, the consumers' tastes and needs could be analyzed whilst taking into account the climate and season. Using the new system, an attempt was made to predict seasonal demand from the previous year's sales data.

In the year 2002, a further 12 million yen was invested into Karari and advanced information base facilities system equipment was introduced allowing expansion of the sales information dissemination system via audio-video aids. This IT system allows farmers to access market information via cell phone, fax or personal



Fig. 1: Karari server

computer without having to leave their places of work and enables them to know when to ship additional products to the Karari (Incorporate company INPUT^[2]; Fig. 2).

This study analyzed the total sales for the past 14 years including the transition to the IT system. As shown in Table 1, total sales and commission have been increasing annually^[3,4]. This increase coincided with the increasing sizes of the farms selling their products at Karari. The commission rate ratio at Karari is 14.2%. Total sales have increased significantly in the past 14 years, especially from 1996 to 1998, while in 1995, it was possible to see a correlation between capitals in IT investment and increased sales. The sales increased from 1996 to 1998 because the producers were able to access the demand of the consumers, produced what the consumers demanded and provided it when needed. As a result of addressing the needs of the consumers, the sales increased substantially. The sales did not increase significantly in 1999 because the investment in IT during 1999 and 2002 had aimed at "Renewal and function expansion of an existing IT system" and "Assistance in the cultivation of crops by accessing specific weather information for Uchiko using the IT system". But they did not contribute to the growth rate of the total sales seen in the previous years. However, it can be said that the three investments in IT have been successful because the total sales have increased by about 50 million yen a year since the investments were made.

The central governmental and prefectural subsidies were put towards this IT business investment and without these such increments would not have been possible. However, how the Karari invests in IT in future, corresponding to the rapid progress in IT with irregular

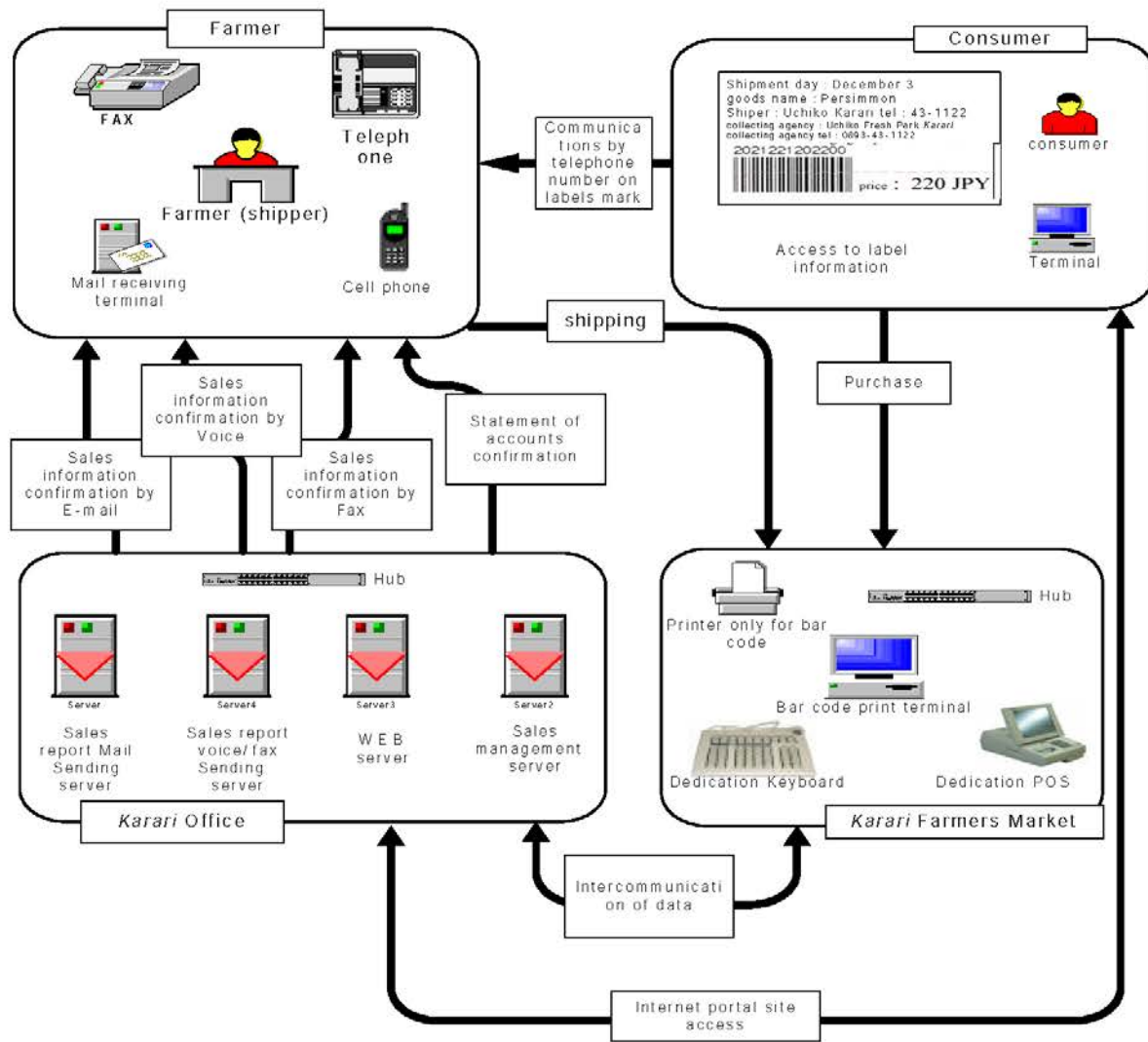


Fig. 2: Concept chart showing IT system in Karari

Source: Incorporate Company INPUT^[2]

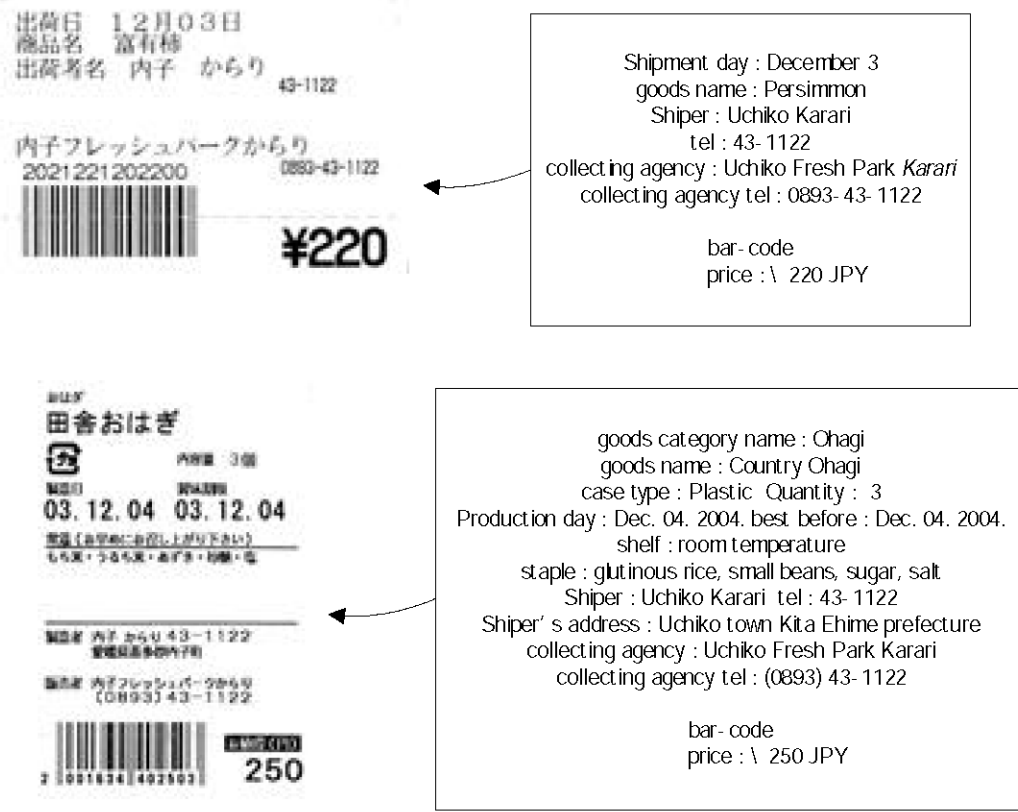
Table 1: Transition of numerical value related to Karari (farmer's market)

	Total sales	Total sales rate of increase (%)	Total capital	IT business capital investment	IT capital investment proportion (%)	IT businesses' central government prefectural government subsidiary rate (%)	Farmers' market Year commission
1994	41768						
1995	70801	169.51	583596	268003	45.92	50.00	
1996	92283	130.34	623075	0	0.00	0.00	
1997	144085	156.13	145510	0	0.00	0.00	22221
1998	214150	148.63	39600	0	0.00	0.00	31131
1999	252160	117.75	43000	43000	100.00	50.00	36326
2000	303644	120.42	192205	0	0.00	0.00	41999
2001	339600	111.84	8494	0	0.00	0.00	46013
2002	388274	114.33	18300	12000	65.57	50.00	47979

Source: The Uchiko town^[3,4]

and decreased subsidy will continue to be a problem in future^[3,4]. The subsidy from central and prefectural government for IT business capital investment has gradually decreased since 1999.

A Point of Sales (POS) was set up in the farmers market to manage what the clients wanted; that is, data according to the seasons and previous sales data. The producers were able to analyze this data using the



Up. Processed food Down. Fresh Food

Fig. 3:Uchiko fresh park Karari farmers 'markets' Label

information terminal. Furthermore, Karari introduced a bar code system as well as a system that enabled Direct Deals (DD). With these systems, the producers' names and telephone numbers were indicated on the products required. This in turn gave the consumers a sense of security and the producers a sense of responsibility. Consequently, the farmers are able to know the supply and demand by referring to the IT data of Karari and by equating supply and demand a balanced market is thereby achieved and oversupply is suppressed.

It has been noticed that the introduction of IT system has brought a social behavioral change to both producers and consumers. The old citizens now taking interest in IT and this have changed their life. They can now search information on the web by the use of IT.

Regulation of demand and supply at the farmer level: The following explains how farmers use the IT system introduced in Karari to coordinate supply and demand. The introduction of IT has enabled sales data to be printed daily, allowing the construction of a sales database^[5]. After receiving this information, farmers can

take countermeasures in marketing their produce. The process of supply and demand regulation using IT can be summarized as follows:

1. Market information is obtained from Karari via a cell phone or personal computer.
2. A bar code seal is made in Karari and attached to the shipment goods (Fig. 3).
3. The products are shipped to Karari.
4. Any surplus (unsold goods) is returned to the producer.
5. If shortages occur, more produce is supplied.
6. The sales information is analyzed.

Additionally, the consumers can request specific commodities thus expanding the variety of produce. Moreover, the Karari's aim is not to compete with supermarkets, rather its aim is to buy small amounts of a variety of products while supermarkets tend to buy large amounts of a few products.

The Karari scheme also tries to raise awareness among the various producers. This is achieved through meetings, which encourage cooperation and competition.

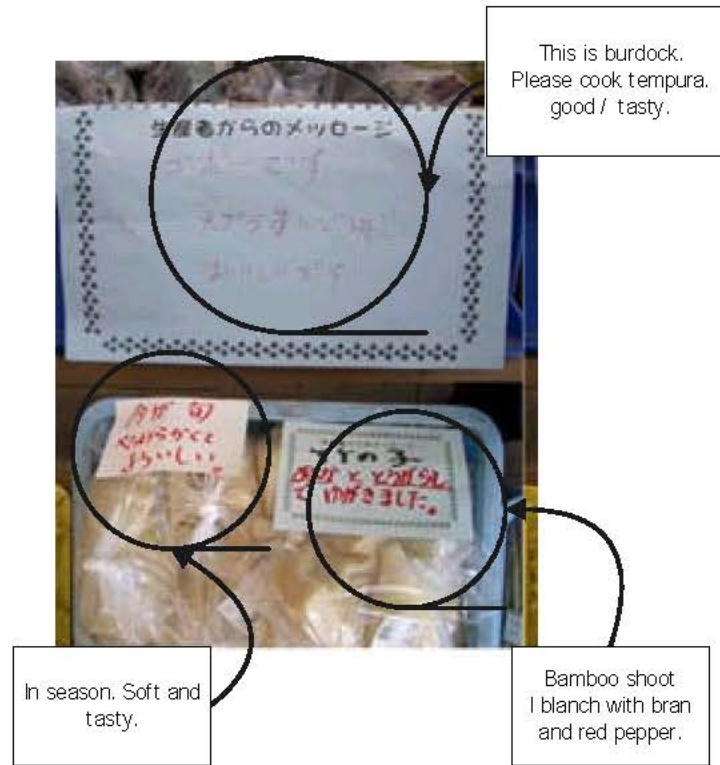


Fig. 4:Producers' POP

The Karari also receives sales assessments from the consumers outside the Karari. The aim of the Karari and producers is to offer a place for selling local products and maximizing profits. The Karari is also a focal point for community development in Uchiko.

Displaying Karari product information using IT: In Karari, the bar coding system has been used since 1997 (Fig. 3). The bar codes display shipment day, brand name, producers' name, producers' telephone number, shipment origin and Karari's telephone number.

Because of direct sales, the characteristics of the products are explained directly to the consumers. Moreover, the quality of the goods and suggested cooking methods are promoted on Point of Purchase (PoP) advertisements attached to the goods. Despite displaying a small volume of information, these PoP aim to increase the available produce information (Fig. 4). However, it is often difficult to adjust to the consumers' information needs. For example, many producers ship their products in the morning; therefore, in the afternoon the consumers might not be able to receive all the necessary information about the products. This problem could be addressed by using other markets such as supermarkets. Supermarkets are very sensitive towards consumers' needs, not only about price but also the products'

history. For example AEON supermarket is providing products' history to the consumers. Maruetsu Supermarket is experimentally displaying information using Integrated Circuit (IC) tags from which the consumers' can view access displayed information through computer terminal^[6]. But the disadvantage of the supermarket is that the marketing channel becomes long compared with the farmers market. Kameoka^[7] suggested that marketing channels that use 2 dimensional bar codes and IC tags allow traceability of a product to a specific area. However, the methods of traceability differ between farmers markets and supermarkets; the marketing channels in farmers markets are direct, therefore such traceability systems are often thought to be unnecessary.

As stated earlier, that the volume of information communicated in Karari is less than that generally displayed in supermarket. Since few farmers markets conduct self-promotion (sales promotion), the producers try to maintain direct contact with the consumers. However, despite the efforts being made by Karari, the modern consumers' needs are perhaps not being met. IC tags display information that both the producer wants to pass on and the consumer desires. In the future, all supermarkets hope to employ these IC tags to allow communication between the producers and consumers. Along with the PoP advertisements, such IC tags

might be beneficial in Karari in helping solve the above-mentioned problems. IC tag has a problem of low rate of withdraw. However persisting in the collection can solve it and farmers market can easily achieve this.

Limitations of the IT maintenance in Karari: Although the IT has been successful in creating an efficient marketing system yet it is facing some challenges at the moment. These include;

- Increased demand for information by consumers; the IT has to keep pace with the continued demand for market information by consumers. This requires continued upgrading of the IT system as the IT industry is always changing.
- Over-dependence on subsidy to investing in IT; the capital investment in IT has been made possible because of subsidy from both the central and local government. Of late this subsidy has been declining in amount and unless the Karari identifies other sources of funding it might not be possible to upgrade the IT system making impossible address the market needs.
- Capacity of the users; the users of the IT system are old citizens who might not be able to keep pace with the ever changing IT industry. As a result the cost of investment might not justify the way the technology is being used.
- Mistakes in bar code making; the bar-coding mistakes by farmers can occur. To improve the situation, the Karari management team should make the bar codes and subsequently sell them to the farmers thus minimizing bar-coding mistakes. There is need to minimize the human error in order for the people to have trust in IT.

CONCLUSIONS

The study revealed that IT has greatly assisted in the development of a better marketing system in Uchiko. Both producers and consumers are able to access market information easily through special fax, mobile phone or computer web. This has made it possible to provide desired products at the right time, which resulted in increased sales. It can be concluded that the IT has improved the marketing system in Karari, which has in turn experienced increased sales. With more income the living standard of the farmers has improved. The capacity of the farmers in using IT has improved. Therefore it can be said that IT has contributed to the development of Uchiko town as a whole.

In the future the farmers markets need to develop a system that enables consumers' to obtain more information without the need for face-to-face interactions. They can take advantage of the IT to create a database of the products sold and more safety information, which can be accessed by consumers. Consumers should have a choice of either going to the market or order products through internet.

Improvements in the bar code system and additional advertisements that disclose information requested by the consumers' and allow traceability of the produce would have help solve some of the problems associated with the Karari farmers market.

It can be suggested that IT systems will help answer the consumer needs accurately, while solving the problems of the farmers market. Such IT systems, however, should be used in such a manner that the face-to-face contact between producers and consumers, which is so important in local farmers markets, is not completely lost.

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