
Post-production service of smart farming based on ICT network

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Abstracts

The post-production of smart farming defines the stage that the final products are delivered from producer to consumers via market on ICT network. It deals with the process of product packaging and distribution from producer to consumer with marketing strategy. This focus on reference model for post-production service including specialization, centralization of product delivery, and just-in-time delivery, and marketing system on the network. It defines a significant function component on post-production stage. The producer plays a significant role in economy being one of the main contributors to the many customers. This articles suggest the effective product distribution service which requires delivering the right product, in the right quantity, in the right condition, to the right place, at the right time, for the right cost, and encompassing global marketing based on ICT network, will be provided^[1].

Keyword

Post-production, Pre-production, distribution channel, Producer, ICT, Consumer, Producer,

I . Introduction

The post-production service is the delivering process of products with packaging and distribution based on ICT network after production from producer to consumer. Increased variety of products, the just-in-time delivery system, low load rate, specialization and centralization of production systems, globalization of marketing and seasonal variations are among the main challenges of post-production which may lead to the necessity of developing effective product flow control based on ICT technologies. Effective post-production service requires delivering the right product, in the right quantity, in the right condition, to the right place, at the right time, for the right cost at marketing place connecting with customer and it has a positive impact on the success of the new farm product supply by using ICT.

However, the linkage between producer to consumer in the new farming and product supply links is rather loose and fragmented. Even within individual firms, the vertical and internal integration as related

to product distribution flow is loose, and they are both economically and environmentally inefficient and not sustainable. In this regard, effective and efficient post-production service will be a critical success factor for producers, wholesalers, retailers, and customers.

II . Post-production stage

The post-production stage is required for delivering the products from producer to consumer. In the product delivery, producers, vendors/agents, wholesalers, rural retailers and suppliers and delivery flows on marketing function are involved. At all levels, information flow on ICT and management is essential to maintain the products quality throughout the product delivering flow (see Figure 2.1). The flow of input products from producer to consumer needs to be described in detail and the constraints in each sub-process needs to be identified to develop appropriate solutions for post-production stage^[2].

It is important to note that lack of packaging facilities may be one of the constraints in the product flow control during the transition from subsistence to commercial product. Significant post-harvest losses occur when especially vulnerable crops and products are subjected to mechanical damage.



Figure 2.1 Product delivering between producers and consumers

Therefore management of packaging and distribution is very important in the development of product flow control systems for post-production stage

2.1 Distribution flow^{[3][4]}

Integrated post-production networks are developed by forming clusters of producers and determining the optimum gathering centers linking goods producers, distributors and consumers/retailers enabling coordinated distribution of local good products and facilitating the integration of product distribution in the local products supply systems into product distribution channels (see Figures 2.2). A detailed gathering and distribution routes will be analyzed using product flow control function. It could be indicated that coordinating and integrating the product flow control activities of local product delivery system reduced the number of routes, the transport distance and transport time for the delivery system of local products on the ICT network. Such post-production network could have positive improvements towards potential market, product flow efficiency, environmental issue and traceability of product quality and product origin^[5].

The dot line (figure 2.2) indicates the case of direct delivery from producer to customers. Coordination and network integration in local product supply chain increases distribution efficiency, potential market, access to information and reduces environmental impact. Forming the best gathering and distribution centers for locally produced product is very important. Such location decisions should be supported technically since the location decisions by information system on ICT have the dynamic result over time.

Therefore, in the process of developing improved post-production stage in the local product supply chain, detailed location analysis which is mapping and clustering producers and determining optimum

location of gathering and distribution centers, and route analysis which is creating optimized routes for product gathering and distribution, and simulating route distance and delivery time are very essential^[6].

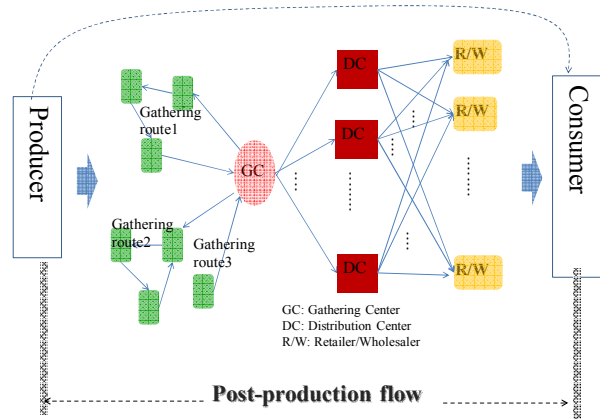


Figure 2.2 product distribution flow

2.2 Distribution flow control

Generally, the components of product flow control function of post-production stage consist of the following figures (Figure 2.3), work collaboratively to meet the consumers' demand. The utilization of product flow control function on post-production stage shall provide a meeting point among availability, ease factors which can be realized through products delivery.

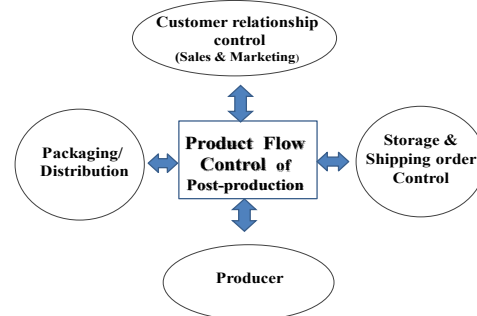


Figure 2.3 Conceptual product flow control

Coordination, cooperation and collaboration among business actors must be positioned as partners that are realized in the cooperation with a common goal through mutual trust and open attitude to meet long term development. In arranging product flow control function, all factors involved in supply chain process of farming business must be used as a reference. Policies on product flow control system utilization of post-production state are expected to

provide benefits in the farming management commodity supply chain starting from production, storage, distribution, until wholesaler and final consumer level on market. In principle, the structure of production flow control system at post-production stage should be able to accommodate two important decisions both from the producer's and the consumer's point of view. From the producer's side, it is important to consider how products can be available and well distributed, and from the consumer's side, how they can obtain a good quality product, on what location, and at what exact time becomes the main concern[7].

Conceptual product flow describes the function of post-production stage and how it works. Efficient management in product flow is required for the production planning, physical gathering of primary product from fields, processing and storage at various levels, handling, packaging, and distributions of final product. In the product distribution flow, many customers such as producers, vendor/agents, wholesalers, rural retailers and suppliers and transporters are involved.

Functional infrastructure of product flow control function consists of a series of diagrams as specifications that describe the function or process required to meet the users' needs. Functional architecture is divided into four part, those are producer function activity for production quality, market function activity for sales and marketing, customer function activity for purchasing, and product flow control function activity. Physical infrastructure consists of a series of ICT network infrastructures to connect each location that is producer, wholesaler, retailer, and consumer on market. Network connects central offices with geographically separated branch offices of customers or markets. From effective product flow control point of view, an integrated approach from farming is required for effective control of product hazards which is a shared responsibility of producers, packers, processors, distributors, retailers, product service operators and consumers. Therefore, tracking products distribution by ICT are becoming area of focus in smart farming.

III. Generalized Marketing Process based on ICT

3.1 Distribution function of post-production stage

Distribution function on post-production effectively should be connected with marketing system (figure 3.1) on the ICT. Direct sales make short of distance between producers and consumers. Direct transactions between the two groups can take place.

In the case of industrial markets, direct transactions are common where there are a relatively small number of customers.

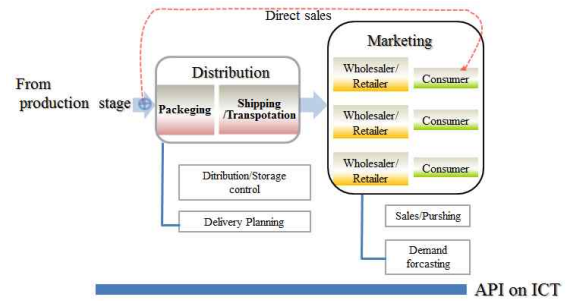


Figure 3.1 Interconnection between distribution and marketing system based on ICT

Distribution function processes the marketing information related to direct sales, retailers, wholesalers, and sales agents and broker (Figure 3.2). Retail institutions includes a wide range of retail outlets store such as merchants, department stores, supermarkets and smaller grocery stores. Their information stored in database is characterized by their dealing with the end user of the product or service based on ICT.

Wholesalers make marketing more efficient by buying a variety of products, in fairly large quantities, and selling these items on other businesses. Wholesalers may service consumer or industrial retail outlets store. Sales agents and brokers are distinguished from the other types of channel member already described. The role of agents and brokers is to facilitate distribution by bringing buyers and sellers together[8].

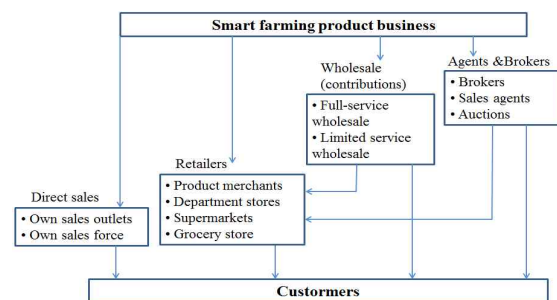


Figure 3.2 Distribution function on marketing based on ICT

3.2 Marketing functions[9]

A little earlier it was said that a marketing system has two distinct dimensions. One of those dimensions is the organizations and enterprises which participate in a market and the second is the functions that those participants perform. It has

classified the functions involved in product marketing processes as three sets of a marketing functions. They consists of exchange functions, physical functions, and facilitating functions base on ICT.

3.2.1 Exchange functions

1) Buying interaction: A producer have adopted a market orientation when production is purposely planned to meet specific demands or market opportunities. The buyer's motive is the opportunity to maintain or even increase profits

2) Selling interaction is part of marketing in the same way that promotion, advertising and merchandising are components of the marketing. These all directed towards persuasion and are collectively known as marketing communications.

3.2.2 Physical functions

1) Storage function: An inherent characteristic of farming production is that it is seasonal while demand is generally continuous throughout the year. Hence the storage performs the buffering function to allow a smooth, and as far as possible, uninterrupted flow of product into the market.

2) Transportation function: This is one of making the product available where it is needed. Adequate performance of this function requires delivering the right product, in the right quantity, in the right condition, to the right place, at the right time, for the right cost based on ICT^[10].

3) Facilitating functions are to include product standardization, financing, risk bearing and market intelligence.

IV. Conclusion

The the characteristics of the post-production stage based on ICT network provides the reference model to include marketing system which manages the overall information(e.g. delivery schedule, stock control, invoicing, sales analysis, etc.). It is related to aligning a supply chain that is distribution channel with marketing strategy. The goal of post-production is to ensure that information system based on ICT is being fed with the right product in the right quantity and quality at the right point in time with marketing strategy. Marketing should process of collecting information by utilizing ICT about customer trends, preference, and competitor products for determining customer demographics, and buying habits. And marketing statistic data is given to feedback it to support the production plan of pre- production stage. Moreover successful marketing information to predict consumer demand and estimate the right quantities of merchandise will be provided on post-production stage.

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