

KNOWLEDGE MANAGEMENT SYSTEM MODEL IN DKI JAKARTA RICE SUPPLY CHAIN

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ABSTRACT

This paper was about designing knowledge management system model for DKI Jakarta rice supply chain that can be used for increasing value of revenue to cost ratio among entities involved in the chain. The methodology consists of supply chain system analysis (supply chain structure and knowledge domain), system need analysis, knowledge portal design and verification. A customized knowledge portal is developed based on Drupal CMS. Available features are document management, discussion forum, and knowledge base searching. User of this portal can connect to other users to share their knowledge about their experience and best practices in rice supply chain. The portal also provides easy interaction with other stakeholders such as governments, experts, and industries.

Key words: *knowledge management, rice supply chain, added value*

1. INTRODUCTION

Empirical studies prove that the linkage of agricultural production prices at the consumer level and at the farm level is asymmetry (Khudori, 2008). The increase in rice prices at the consumer level transmitted imperfectly and slow to the price of grain at the farm level, while the decline in rice prices at the consumer level perfectly and quickly transmitted to the price of grain at the farm level. This also applies conversely versa so that fluctuations in the price of rice or grain prices tend to be detrimental to farmers and consumers. Asymmetric information refers to different players in a supply chain having different states of private information about resources. As a result, the supply chain suffers from (i) misunderstanding concerning the mutual efforts of collaboration, (ii) difficulty in dealing with market uncertainty, (iii) suboptimal decisions, and (iv) opportunistic behaviour. (Simatupang and Sridharan, 2001). Cases like this also applies to the various rice supply chain network which supplies rice to Jakarta via Cipinang Rice Market Center/ Pasar Induk Beras Cipinang (PIBC) that managed by FSTJ (Food Station Tjipinang Jaya)

The purpose of this research is to design a model of knowledge management in the

form of a knowledge management portal based on Drupal Content Management System. Portal is able to provide a facility to share information and best practices knowledge of the supply chain of rice that goes to Jakarta via PIBC in the framework of decision-making related to supply chain performance improvement.

The facilities available to the supply chain actors such as discussion forums, access to rice literature. The knowledge presented in the form of mind maps and links to the websites of rice. Online discussion forums are expected to facilitate the entrepreneurs so that this forum can be used to establish a partnership. Media also facilitate the businesses with easy access to related websites such as agriculture department, Indonesian rice millers and rice traders association/ persatuan penggilingan padi dan pengusaha beras Indonesia (PERPADI), Indonesian society of agriculture informatics/himpunan informatika pertanian Indonesia (HIPI) and Bogor Agricultural University (IPB).

Illustration of sharing information and knowledge between actors in the supply chain of rice heading to Jakarta can be seen in Figure 1 at the end of this paper.

2. THEORETICAL BACKGROUND

Several previous studies (Poh and Wee, 2004; Fawcett, et al., 2007; Done, A., 2011) showed that co-operation in the form of sharing of information and knowledge is an important factor for achieving effective coordination in a supply chain to improve supply chain performance. Through information and knowledge sharing, every actor in the supply chain can get what they want, how to improve the operations and increase value added and profit margins. According to Fawcett, et al. (2007), information technology (IT) is used to improve supply chain performance. There are two dimensions that affect operating performance. They are connectivity and willingness. Both dimensions are also important for the development of real time information sharing capabilities.

According to Choi (2010) information sharing in a supply chain management is divided into two parts, the 'downstream information sharing', and 'upstream information sharing'. A common example of sharing downstream information can be found in Vendor Managed Inventory (VMI) relationships where grocery retailers (downstream members) share end customer point of sale (POS) demand of data with their suppliers (upstream members). An example of upstream information sharing can be found in the Advanced Shipping Notices (ASNs) roommates specify how much of the order is being shipped by an upstream member and when the order will arrive at the downstream member's facility.

Turban (2005) states that knowledge management is designed to manage the creation of knowledge through learning, knowledge capture, knowledge sharing and communication through collaboration, knowledge access, knowledge utilization, and storage of knowledge. According to Hafeez, et al. (2000), two basic stages in knowledge management is knowledge creation and knowledge embodiment and knowledge management can be implemented at three levels in a supply chain, namely at the level of the individual, the business unit level and at the level of the supply chain, meanwhile according to Poh

and Wee (2004) and Faucett, *et.al.* (2007), the use of knowledge management is very useful for improving supply chain performance. The increase in performance is caused by knowledge sharing and exchange, and has been proven by various companies such as The Dow Chemical Company, Chevron Texaco, Dell and Wal-Mart.

3. RESEARCH METHOD

Research methodology can be seen in Figure 2. Stages of the research carried out by using a system approach that starts with an analysis of the supply chain system on rice production centers (Karawang, Cirebon, Indramayu, Grobogan - Central Java and Bandung). From each of the supply chain, it can be identified businesses that supply rice to Jakarta. In general, businesses in the rice supply chain are began from farmers, collectors who often act as informants, rice miller and rice traders who supply rice to PIBC.

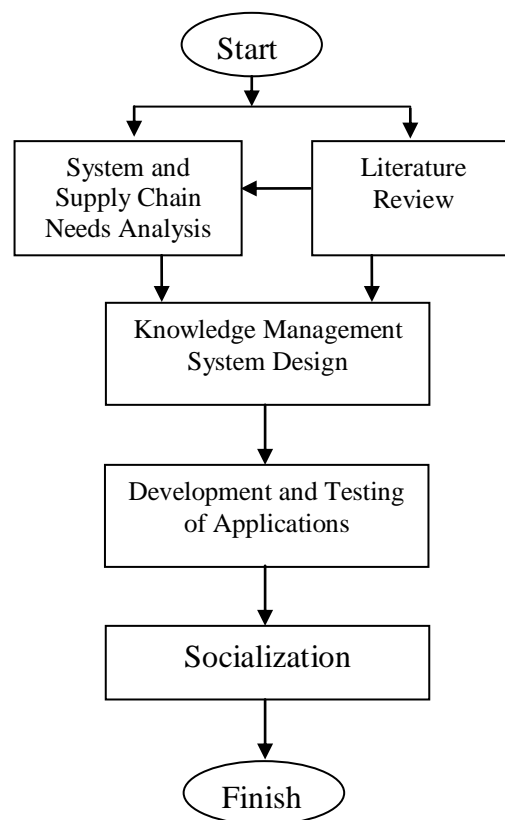


Figure 2. Steps of Research

In many cases, rice trader are supplying rice to PIBC, also acts as rice miller. From these businesses, it can be identified what data to support value-added information of each rice businesses. In general, the need analysis is intended to define the system requirements to be fulfilled by the knowledge management system. The necessary functional requirements such as commodity prices and the supply of each of the supply chain.

Information and literature studies used to support this research is knowledge management, supply chain management, value added and profit margins of the rice business actors. The design of the system is done by describing the model of the system to be developed using a unified model of language (UML). The system design is made for the knowledge management system of the rice supply chain leading to DKI Jakarta.

Knowledge Management System consists of two main modules, namely Module Content Management System (CMS) and Module Data Base Management System (DBMS). CMS serves as a medium for the dissemination of knowledge and interaction between experts and the public. DBMS serves to provide information about the availability of supply and price of rice for the Jakarta area. The next step is to test each module and make improvements. Testing the system carried out to verify and validate. Testing to ensure all functional requirements can be fulfilled. At this stage made instrument testing. At this stage the system documentation was created. Documentation is then distributed to stakeholders for service as a whole and for the development of related fields that have not been developed in this study. At socialization step, training is conducted on how to use the knowledge portal for stakeholders. The first step is preparation of user manuals for socialization and training materials applications. Further training workshops and dissemination of applications to users and concludes with the final stages of writing.

Technical knowledge of supply chain actors are mostly rice field experience that is not accounted for. The results of the identification of sources of knowledge, types of knowledge and forms of knowledge that

exist in the rice supply chain can be seen in Table 1 and a complete knowledge shared among the actors can be seen in Figure 3 and detailed in Table 2 (at the end of this paper).

Knowledge management system (KMS) of rice supply chain includes four main functions, namely functions to capture, create, share and distribute knowledge. In the implementation phase, the function can be facilitated through the application for discussion, value added simulation, and document management. Data of knowledge and discussion managed through a service that can be facilitated by the DBMS. Aspects that need to be taken into account in the data management process is the security aspect, both from threats posed by unauthorized users or from people who deliberately commit crimes of theft of information. From the analysis system, problems can be identified, it can also be identified the need for KMS and technological support to facilitate the sharing of knowledge. This can be seen in Table 2.

4. RESULT AND DISCUSSION

Knowledge management system (KMS) for rice supply chain can be categorized as collaborative KMS (Hernandez, et al., 2008). In collaborative KMS, actors are independent in decision-making for sustainability efforts.

The process of collaboration in these conditions can only take place if there is trust and mutually beneficial cooperation between actors. However, such collaboration does not apply to information collaboration that only benefit one party. An example in this case, rice mill will share knowledge to farmers on how to treat dry grain harvest in order to obtain good quality rice, but the rice mill will object to provide actual information about the rice market price to farmers because the information can eliminate the chance of rice miller to obtain lower prices from farmers. It's one of the causes of price increases can not be enjoyed by all actors in the supply chain. Actors who do not have direct access to price market information can not enjoy the advantage of rising prices.

Some of the potential pitfalls (Poh and Wee, 2004) can be summarised as follows: lack of budget or underbudgeted, lack of key resources, project manager and project team incompetence, different understanding of and plans for the knowledge management initiatives, ensuring continuous top management support, paradigm differences in knowledge management, ensuring the purpose and reason for knowledge, sharing is clear and understood by everyone, understanding the interrelationship between knowledge sharing, knowledge creation and organisational change needs and also clarifying different expectations of knowledge sought at different levels.

5. CONCLUSION

- a. Rice supply chain to DKI Jakarta has a variety of structures both through PIBC or directly to retailers and then distributed to consumers.
- b. Supply chain performance measurement rice is done either on the actors and supply chain networks. Indicators of the performance of supply chain actors is measured by the ratio of profits at the expense, whereas indicators of supply chain network is measured by the coefficient of variability on the supply and price stability.
- c. UPT (unit pelaksana teknis) and cooperatives act as those who manage knowledge in the field of rice cultivation and knowledge in the field of grinding (milling rice agriculture and knowledge), while FSTJ act as those who manage knowledge in marketing and knowledge of the rice itself (market and product knowledge).
- d. Facilities are provided in the form of knowledge sharing and knowledge management portal namely www.pasarindukberascipinang.org, www.berascilamaya.org and www.berasbandung.org

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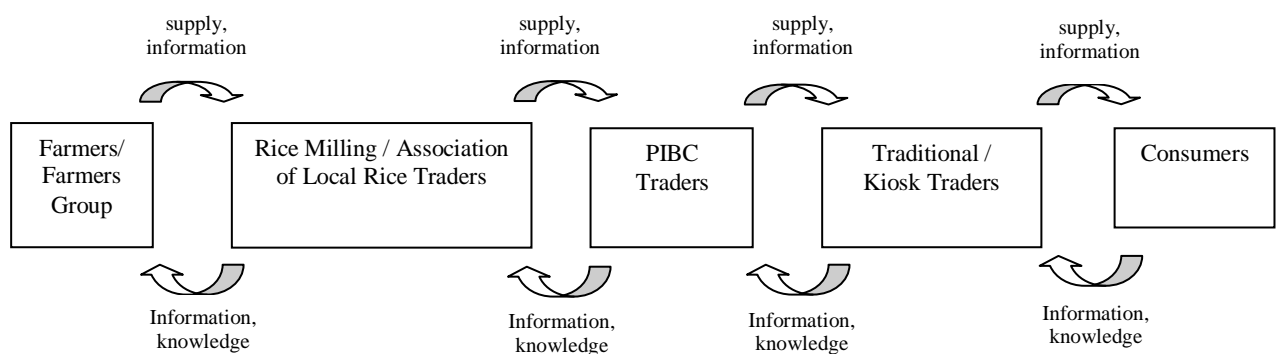


Figure 1. Knowledge exchange and Supply Chain Rice to Jakarta (Modified from Rusastra et al., 2004)

Table 1. Sources of knowledge, types of knowledge and forms of knowledge in rice supply chain.

Sources of knowledge	Types of Knowledge	Forms of Knowledge
Supply chain actors	Experience	<p>Practice in the field:</p> <p>1. Farmer : how to manage land: land preparation and planting seedlings, how to plant, cultivate and take care of the rice plant, rice harvesting techniques</p> <p>2. Milling 1: post-harvest handling (drying grain), assessing the quality of grain, milling machines modify, determine the quality of rice, rice varieties knowledge, rice mixing</p> <p>3. Milling 2 : Improving the quality of rice, assessing the quality of rice, identifying varieties of rice, rice mixing</p> <p>4. PIBC merchant : Measuring the quality of the rice, mix the rice to get the price and flavor composition, identify the varieties of rice.</p>
	Communication between supply chain actors	A phone call or short message via SMS in the form of local harvesting information , grain pricing information, pricing rice information
	Agriculture Supervisor	Guidance on fertilizing, pest control, planting techniques, harvesting techniques
Governance	Policy	Information about Bulog rice procurement, market operations.
Researcher	Research results	Research reports, scientific papers in journals or seminars
Industrial and store of SAPROTAN (sarana produk pertanian)	Knowledge of product support	Product specifications, agricultural infrastructure
Technician of roller machine	Rollers modification	Modification of rollers

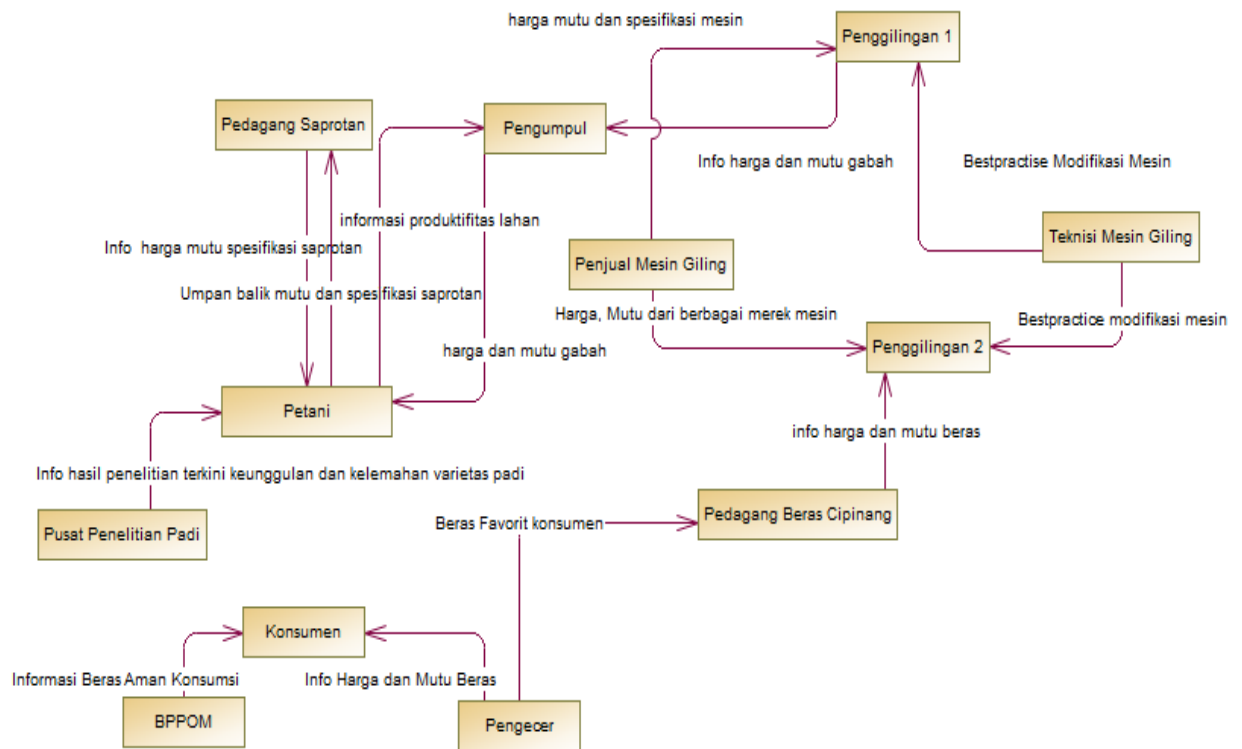


Figure 3. Complete Knowledge Shared Among the Actors

Table 2. Identify the problems, KMS needs, and support technology (web tool)

Problems	KMS needs	Web tool
The results of many studies have not been implemented so that it is only written as a student thesis or scholarly papers on the seminar and journal	It takes a variety of media that inform research remotely for easy access by the public.	Links to the websites of research institutes or universities Page management that can be used to write a short article on new findings
	It takes a medium that can be used to discuss with the community to reassure the public about better results on the findings of a new technology	Discussion forum
	It takes a medium that provides a repository to store the new knowledge in the upload by authorized users	Features attach files, DBMS support
Information about best practices in the supply chain are exclusively owned by the perpetrators of the supply chain in particular region	Online media to inform best practices in supply chain so that other supply chain actors can learn the best practices	Management page, module to simulate the value added

Table 2. Identify the problems, KMS needs, and support technology (web tool) (Cont.)

Problems	KMS needs	Web tool
Not all local merchants can find technicians who can modify the standard RMU machine into a machine that can produce good quality rice	Media that can be used to publish expert and searching of expert and media that connect to experts	Email, Link to PERPADI. application to record expert, featuring experts and searching of expert
Farmers are those who get the smallest value added Compared with the other actors. This is because they do not know the price of rice in the market.	Media that can provide up to date information about the price of rice. Media who can provide information on post-harvest handling so that quality of the farmer grain can be good	Link to web of BAPPEBTI (badan pengawas perdagangan berjangka komoditi/ commodity futures trading watch), document management.
Farmers working on the land narrowly so that efficiency is not achieved	Media to cooperate and communicate among farmers	Forum