

INTEGRATED KNOWLEDGE MANAGEMENT MODEL FOR TRANSPORTATION OF SUGARCANE TO SUGAR INDUSTRY

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Abstract: Knowledge Management (KM) is an integrated approach used universally in knowledge intensive corporations, which maintains the competitive advantage for an organization in today's fast changing environment. Many organizations are able to get expected results when they introduce knowledge management into their organizational business processes.

Agricultural food processing industries are growing at faster rate in India. In that sugar industry is the main food processing unit which contributes more than 50 % in terms of revenue. There is a lot of scope to improve the revenue and yield of sugar industry by application of appropriate knowledge management model.

This paper contains the KM model for supplying sugarcane from remote & scattered locations to sugar industry. This paper also suggests a dynamic model of knowledge management, based on the analysis of many case studies of knowledge management in knowledge intensive organizations. The purpose of this model is to increase knowledge usability, discovery and innovation of new techniques, which differentiates an organization from its competitors.

In all the paper proposes that KM is not only the advantage of technology, intranet and internet, but includes organizational issues, assumes information resource management by taking into account cultural changes which are important in the KM implementation process.

Keywords: Knowledge Management (KM), KM model, Sugar Industry.

1. INTRODUCTION

Globalization that is economic world without borders is here to stay. No activity whether it is social, economical or cultural cannot do without the impact of globalization. This globalization has created an inevitable and essential requirement for any economic activity to get success to have technology-enabled systems. Co-operative sugar industries are not exception to the aforesaid fact. It means that for the sustainable perpetual development of co-operative sugar industries implementation of the latest development in IT field i.e. IT enabled technology is a must. Keeping in view the fostering growth of IT enabled technologies and its successful implementation in sugar industries has created an earnest and immense need in the mind of researchers to conduct an empirical and exhaustive study in co-operative sugar industries.

With the help of IKM approach knowledge required in sugar manufacturing can be integrated and enriched for increasing overall profit of sugar industries.

2. COOPERATIVE SUGAR INDUSTRY IN MAHARASHTRA (INDIA)

Cooperation and coordination is the real base of human society. The co-operative movement is well flourished in

Maharashtra by efforts and philosophy of Rajarshi Shahu Maharaj and Mahatma Phule [1]. 'The way of cooperation is the only way to the prosperity' was well understood by Mahatma Gandhi. The co-operative sugar factories and dairies are the examples of eloquent well-flourished cooperatives in Maharashtra. These co-operatives have changed the lives of millions of people from villages. The first co-operative sugar factory was established by late Padmashree Vithalrao Vikhe Patil inspired and supported by late Vikunth Mehta and Prof. Dhananjayrao Gadgil. The beauty of the rural co-operative movement is these big establishments of hundreds of crores of rupees are owned by semiliterate and poor farmers. Democratic system is adopted to run their business functions. Boards of Directors are elected every five years from their General Body members to keep control over the functioning. But now a day, the co-operative industries are suffering from many problems and most of the problems are related to management. The ignorance of the farmers, lack of transparency in the management and slow rate of information processing, leads to losses, corruption and misappropriation of funds. The co-operative sugar factories are not only income generating or sugar producing establishment, but they are amongst the biggest employers. At present 175 sugar factories are registered in Maharashtra state out of which more than 95% factories are co-operative sugar factories situated in Western Maharashtra, Marathwada and Vidharbha. These factories are directly related to livelihood of 30 million farmers, 1.7 million employees and 5 million laborers in Maharashtra. The co-operative dairy industry is related to sugar industry, as the green fodder is mainly generated from sugarcane leaves and residues. Even the

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industries producing chemical fertilizers are depending upon sugarcane growers. Therefore the progress of rural Maharashtra depends upon progress of sugar co-operatives. In the era of globalization and liberalization, all industries in private sector have improved their management system through Information Technology and they have improved their performance as well. But the co-operative sector is lagging behind in this regard. Hence it is a national and social need that the management of these co-operatives should be improved through Information Technology. Of course, many suggestions and solutions have come forward for the automation of the sugar industry, but due to lack of requisite research and investigation, no solution could solve many problems which remain as it is in the cooperative sugar industry. Therefore, the best-suited system to these industries should be consistent to salient features of sugar industry, which are as under:

1. The management of sugar industry encompasses illiterate, politically motivated persons having their vested interest.
2. Instead of having pure democracy, there exists 'autocratic democracy' in cooperative sugar industry as the control of the industries lies in few hands only. The persons who are dominating and having great influence over the farmers run the show hence centralization of power takes place, which creates discrepancies and discrimination in the organization.
3. In addition to above management related features, another special feature relating to operations of cooperative sugar industry is that, perhaps sugar cooperatives are the only industries where the purchase price of raw material is fixed after sale of the final product *i.e.* Sugar. This particular feature creates a suspicion and confusion in the minds of poor sugarcane growers about the rightness of the price of their agricultural produce.

Presently some of sugar factories have adopted modular approach for computerization, which does not fulfill competitive requirement of the industry. Information Technology is revolutionizing the way in which we live and work. It is changing all aspects of our life. The digital revolution has given to the mankind, the ability to treat information with mathematical precision to transmit it with very high accuracy and to manipulate it at will. Computers and Communication are becoming integral part of each and every industry. One of the latest developments in the field of KM approach IT enabled system, which is gaining success in many facets of corporate world.

3. REVIEW OF LITERATURE

3.1 Knowledge

This is, as the word implies, the ability to manage "knowledge". We are all familiar with the term Information

Management. This term came about when people realized that information is a resource that can and needs to be managed to be useful in an organization. From this, the ideas of Information Analysis and Information Planning came about. Knowledge Management is the collection of processes that govern the creation, dissemination, and utilization of knowledge. In one form or another, knowledge management has been around for a very long time. Practitioners have included philosophers, priests, teachers, politicians, scribes, Liberians, etc. [2].

Organizations are now starting to look at "knowledge" as a resource as well. This means that we need ways for managing the knowledge in an organization. The main part of this process is "knowledge". This knowledge is with all the experienced and senior people. They have the vast storage of knowledge within themselves. The most disappointing thing is that this knowledge is not documented anywhere. It is kept with the owner itself. When people grow rich in experiences, these experiences then transform into knowledge. Now it's the real time to use all these knowledge from the experts to make the things better.

3.2 Knowledge Management (KM)

Truthfully, KM doesn't have one meaning. Everyone defines it differently. But all the varied opinions seem to agree on one thing-KM is capturing what everyone in your department knows. And capturing what everyone in a legal department knows can make the difference between winning and losing a case, or at the very least between spending thousands of dollars and spending millions.

What KM boils down to is finding ways to minimize redundancy, in turn saving time and cutting costs. How a legal department decides to follow through with this initiative depends on a number of factors. But there are some clear steps you must execute well to build a successful process.

By Keith Ecker, Defining the concept of KM is difficult, since different perspectives of KM can yield different dimensions and meaning. A good KM definition is given by Swan, Scarborough & Preston (1999), who defined it as "any process or practices of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and Performance in organization".

There are two types of KM 1. Explicit and 2. Implicit

Explicit: Also referred to as information, this is tangible knowledge.

Example: E-Mails, Status and case updates, Contract and policy templates, Audio content.

Implicit: Also referred to as tacit knowledge, this is information stored inside people's heads.

Example: Expertise in a certain practice area, knowledge about a specific law, knowledge about a specific case.

This explains two fundamental approaches to knowledge management. The tacit knowledge approach emphasizes understanding the kinds of knowledge that individuals in an organization have, moving people to transfer knowledge within an organization, and managing key individuals as knowledge creators and carriers. By contrast, the explicit knowledge approach emphasizes processes for articulating knowledge held by individuals, the design of organizational approaches for creating new knowledge, and the development of systems (including information systems) to disseminate articulated knowledge within an organization. The relative advantages and disadvantages of both approaches to knowledge management are summarized. A synthesis of tacit and knowledge management approaches is recommended to create a hybrid design for the knowledge management practices in a given organization.

Knowledge management brings to mind many things to many people. But in a business setting, a practical definition prevails. The effect of knowledge management, how knowledge management is different from information management, types of knowledge, the knowledge chain and its role in measuring the success of knowledge practice and the basic knowledge management applications.

4. PROBLEM DEFINITION

Current database management and communication systems used for scheduling dates of sugarcane ploughing, maturation and cutting are based on rule of thumb which are not followed appropriately. These dates and related database of sugarcane is documented manually with the help of a clerk. This large database related to sugarcane complicates decision making process such as selection of first sugarcane field and overall planning of sugarcane cutting. As a result, scheduling becomes improper giving rise to whims and fancies for the mediators. This leads to corrupt malpractices and exploitation of the farmers. Overlapping of cutting dates and improper scheduling gives rise to large inventory of sugarcane in sugar industry thereby generating loss of sugarcane juice due to evaporation and hence loss of sugar yield. This creates vicious cycle in which there is a financial loss to both the parties. Improper scheduling develops inefficient and non uniform transportation system giving rise to increased fuel consumption and financial loss, additionally creating pollution in the environment. It is found that there are some sick industries and some profit making but overloaded sugar industries. This overloading indirectly results into loss of sugarcane yield.

The aforesaid practices lead to following disadvantages to sugar industries, farmers and society at large.

1. Decrease in sugarcane yield/production.
2. Mismanagement in sugarcane field and sugar industries.
3. Large inventory of sugarcane in sugar industries leads to inefficient plant layout.
4. Inefficient utilization of labours and transport vehicles.

5. RESEARCH METHODOLOGY

Most of the sugar industries in India are as old as 30 to 40 years. Over the period of time lot of technological changes and diversification have taken place. Most of the players in the industry have not maintained, modernized or expanded their plants. But a few have changed with the times and have pursued an agenda for reform. They have realized that the by-products of sugarcane - such as molasses, bagasse and press-mud can yield profits too. New diversified technology and low cost plant and process techniques have been invented and required to be implemented in sugar industry [3].

But to adopt technological diversification old plants need to be modernized. Lack of modernization affects crushing capacity, recovery, molasses, losses of sugar in process, fuel efficiency, stoppage etc. Information Technology enabled systems have brought transparency and efficiency in the organization. This has been proved successfully by Indian Railway Online Reservation System. Similar to this an IT enabled system is required to be implemented in sugar industries. IT enabled system can be further enhanced by application of integrated knowledge management approach which will also act as a decision support system. To eliminate the disadvantages of current database management and communication systems in sugar industry, IKM model will be designed, which will act as an appropriate Decision Support System.

For IKM model one centralized computer system at sugar industry and number of SMS based computer systems at different villages are required. All SMS based computer systems are connected by internet with centralized computer system which is at sugar industry. These systems will be provided with full proof data transfer lines and uninterrupted power supply. To handle and integrate database, manpower with IT literacy is required. The data feeding system and its related technical details are required to be designed, developed and communicated to all the registered farmers. To handle records, analyze the database and deliver the result the well designed software is required which will work in real time dynamic situation.

For the proposed IKM model as shown in figure 1, following steps will be followed.

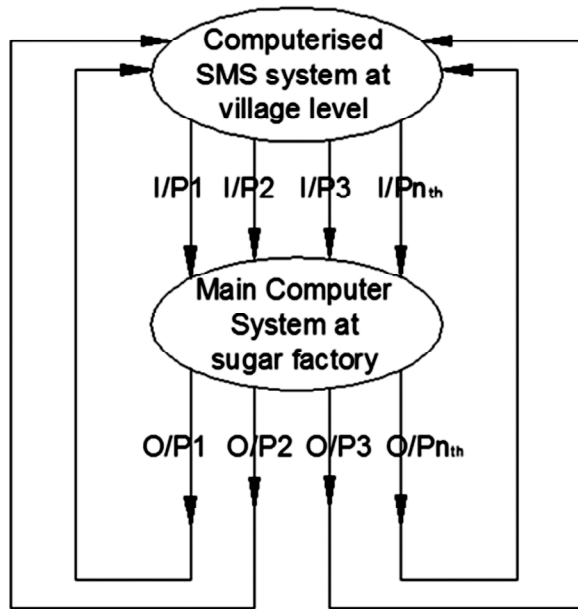


Figure 1: Input to and Output from Centralized Computerized System

5.1 Collection of Database

Following database will be collected by an authorized agent of industry or farmer may directly send this database by SMS to SMS based centralized computerized system.

1. Numbers of owners of sugarcane field of a particular sugar industry.
2. Sugarcane tonnage per hector.
3. Date of ploughing.
4. Proper date/week of maturation.
5. Geographical map related to geographical area under ambit of sugar industry.
6. Possible tonnage of sugarcane.
7. Man hour days working in sugarcane field / hector.
8. Daily crushing capacity.
9. Average speed of transportation means.
10. Inventory capacity.
11. Transportation means and types of availability.
12. Lead time from source to destination.
13. Waiting time in system for transportation means.

5.2 Analysis of Database at Central Server

Above database will act as an input to central computerized system. Inbuilt software in the computerized system will analyze the data and will give output. Output of system will be communicated to concerns like farmer, drivers, cutting team etc. This output will act as DSS for further action in

real time dynamic situation. The output of centralized main frame computer system will consists of the following results.

1. Location of sugarcane cutting zone.
2. Date on which sugarcane cutting will start.
3. Identification of vehicles for respective location.
4. Allocation of vehicles to sugarcane cutting zone by considering the possible constraints.

6. RESULT

By the implementation of proposed IKM model as DSS following advantages will be gained-

1. Sugarcane yield will be improved.
2. Idle time of vehicles and workers will be minimized.
3. Transportation time will be minimized.
4. By minimizing transportation time, fuel economy can be achieved.
5. Improved communication will increase the efficiency of sugar industry and will act as DSS.
6. Support system for farmers and sugar industry.
7. Increased transparency will reduce the corruption in allotment of sugarcane cutting dates.

7. CONCLUSION

In a growing competitive environment, all co-operative sugar industries are trying hard for increased profit, yield and smooth working system. An appropriate knowledge management approach in the form of IKM will improve the yield and minimize the transportation time, which will also act as DSS. IKM model will further be extended to all state co-operative sugar industries and gradually to entire nation. This IKM model will save fuel consumption and reduce carbon emission in the environment. This will not only by generate more revenue but in addition will result into the enhanced brand image of co-operative sugar industry in the agricultural sector.

REFERENCES

- [1] Rajendra D. Kumbhar, "ERP System for Effective Management of Co-Operative Sugar Industries - A Case Study of Sahyadri SSK Ltd, Shiravade Karad (M.S.)", *International Journal of Information Technology and Knowledge Management*, January-June 2011, **4(1)**, pp. 33-37.
- [2] A. Mani Maran, "A Study on the Usage of Knowledge Management Practice in Avasarala Technologies Limited (Atl)", *International Journal of Information Technology and Knowledge Management*, January-June 2012, **5(1)**, pp. 41-47.
- [3] Dr. Prakash M. Herekar, Prof Udaykumar R. Shinde, "Challenges Before Sugar Cooperatives in Maharashtra ", *International, Indian Streams Research Journal*, **1(7)** August 2011] : Commerce.