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E-applications for Managing Trans-Logistics Activities in Sugar Supply Chain in North India

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ABSTRACT

This study identifies various issues in managing transportation logistics activities on the basis of literature review and expert panel discussions so that the facilitation of e-applications can be used for managing transportation logistics activities. A field survey was conducted for checking the relevance level on a five-point Likert scale. A total of 198 responses were obtained from taken from mill managers, distributors, IT companies and large-size sugar consuming companies (LSSCC) to check the scope of e-applications for the issues in both structured and unstructured ways. With these respondents, the suitability of e-applications was checked for the issues related to transportation management activities. The study results are statistically significant and correlated to each other which help in facilitating e-applications. The study also provides some suggestive e-solutions with respect to different transportation logistics management activities with certain implications.

KEYWORDS

CART, E-Applications, GIS, GPS, LIS, Regression Method, RFID, Sugar Mills, Supply Chain, Transportation Logistics

1. INTRODUCTION

The Indian sugar industry, from cradle to gate, transportation logistics plays an essential role throughout the supply chain system. Figure 1 presents a simple supply chain of the sugar industry in which the basic raw material for sugar production, i.e. sugarcane comes from farmers which sell it to the millers for producing sugar and ends at the consumers for using sugar in a variety of ways (Amu et al., 2013; Kadwa and Bezuidenhout, 2015; Kumar et al., 2015). Nowadays, the material flow in the sugar supply chain becomes complex by including various by-products from the cogeneration plant and chemical plant within the sugar mills as shown in Figure 2. This Figure shows that the farmers perform various farming activities like harvesting, irrigating, plowing and cultivating for producing and further transporting sugarcane to the sugar mills through two main routes allotted by the State Government - Gate Region and Centre Region. Government agencies also support sugarcane farming activities and provide knowledge through their 24x7 call centers in several states of India (as observed during the primary survey from sugar mills in Uttar Pradesh and Uttarakhand). Figure 2 shows that the sugar mills produce sugar from cane in four stages. These consists of, receiving of cane from farmers, crushing the cane, processing for sugar production, and finally packaging of sugar according

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Figure 1. Supply chain system of sugar industry

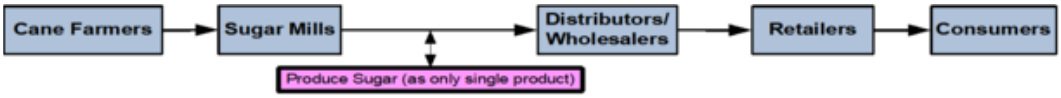
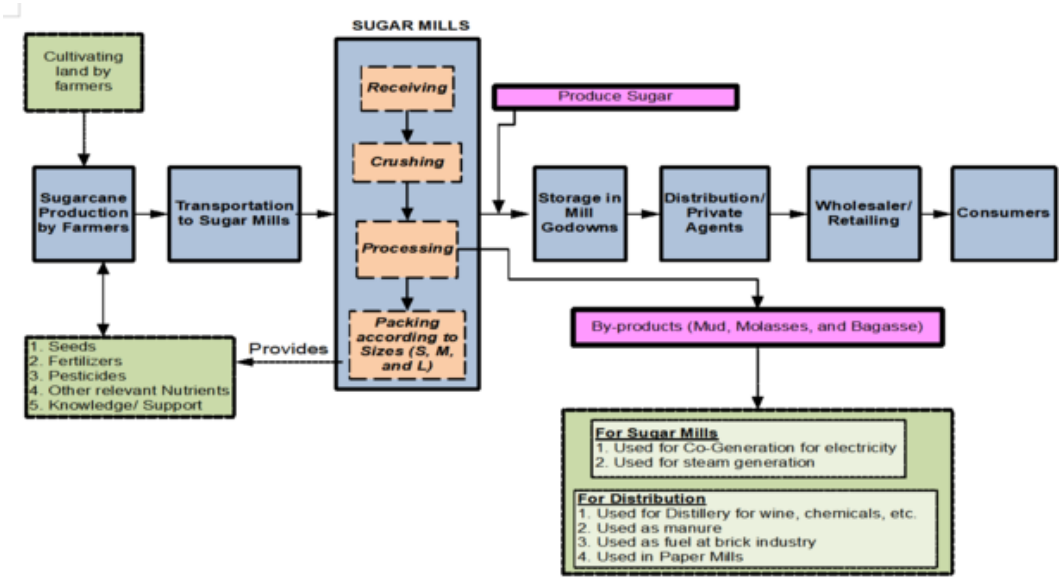


Figure 2. Material flows in supply chain system of sugar industry (Kumar et al., 2012)



to their sizes i.e. Small, Medium and Large. The packaged sugar is stored in their mill godowns and then distributed to the wholesalers, brokers, or private agents. The wholesalers store the ordered sugar for further distribution in their area retailers and finally sell to the consumers, as shown in Figure 2. From these stages, it can be easily observed that without transportation logistics services it is tough to link all these activities together. Thus, transportation and logistics services are essential for better and smooth process in the supply chain system of the sugar industry. When the sugarcane season starts, the millers issue two types of passes i.e. one for Gate and other for Centres. These passes are allotted to the farmers' for supplying their cane to the respective mills. The whole process of supplying cane can be operated either by centers (operated by mills) or by farmers to sugar mills throughout the season by different modes of transportation such as trucks, tractors, bullock carts, etc. In India, during the crushing season, the high level of traffics on road due to improper management of transportation modes can be easily seen. The public faces severe difficulty while traveling by road. Government and other higher authorities like mill managers are trying to resolve such problematic situation by distributing slips to respective suppliers i.e. farmers with allotted time. But still, the problem exists due to limited usage of e-applications, less awareness, traditional mindset, etc., which restricts the suppliers to adopt and follow it faithfully.

In developing Asian countries, sugar is a big industry, but they also have similar issues. In a study conducted by Khushk et al. (2011), they have explored the structure of sugar cane industry in Pakistan. The Pakistani sugar industry is also very similar to Indian Sugar sector. Khushk et al. (2011) have highlighted that Pakistani sugar industry also face issues such as high cost of transportation, insufficient cane available in the mill's periphery, outdated sugar production technology. Such issues are also common to the Indian sugar industry. Li and Yang (2015) have mentioned that the Chinese