A STUDY IN ANALYSING THE CRITICAL DETERMINANTS OF SUPPLY CHAIN MANAGEMENT IN RICE MILL INDUSTRY FOR BETTER FOOD ENDURANCE IN INDIA USING MULTIPLE REGRESSION ANALYSIS

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Abstract

In India, Rice is considered as the main staple food hence the consumption pattern of the product is always increasing. There is a growing need of implementing better supply chain management by the rice mill industry so as to support in better food endurance in the country. The traditional model of supply chain management lacks efficiencies and it does not provide adequate data and information in understanding the demand of the goods and ensure that the products are available to the customers at competitive prices. It has been regarded that the rice mill owners, distributors and retailers enable in sharing more data and information which supports in better supply chain management. The collaborative model of the supply chain supports in measuring the customer demand, uses digital technologies like RFID and other novel cloud computing methods so as to enhance efficiencies.

The implementation of these tools supports the rice processing companies enable in adopting to the consolidating the overall demand approach for the stated produces. The study enables in measuring the critical factors influencing the supply chain management towards food endurance in the country. The researcher uses descriptive study in order to perform the study, both primary sources and secondary sources of the data are collated in order to perform the study. The researcher uses critical statistical tools using SPSS statistical package so as to perform the analysis effectively.

Keywords: Supply chain management, Rice mill, Food endurance, Regression analysis, Chi square test.

INTRODUCTION

Food is considered as the main human need which has to be fulfilled, the overall right to obtain food for self and for one's own family is considered as the basic human right as per Indian constitution. Hence food has a pivotal role to play in individual, society and national level. Shortage and scarcity of food may create economic instability and will impact the overall progress of the nation. Many political, economical and social turmoil may raise if there is food scarcity and hence the government need to take adequate steps in enhancing the food security and support in delivering better products to the citizens (Perdana, 2020).

In India, rice is considered as the key staple food and are being consumed by many individuals in the country, hence it is highly important to maintain a good level of output in order to meet the needs of the individuals effectively. It as also been regarded that the country is not only a major producer of rice but also a larger consumer in the world based on the data gathered from secondary source, it has been

noted that the domestic consumption of rice was nearly at 35400 MT in 1960 and has grown to more than 1,03,500 MT in 2021. The growth rate of the consumption has been staggering due to increase in population of the country and the government is taking more steps in order to ensure food security in the country, hence there must be effective supply chain management system to be implemented in the country so that the farmers, producers and consumers are greatly benefited (Yildiz, 2020).

The traditional model of supply chain management intends to allow the muti stage where the farers are the basic suppliers of the paddy, there are middlemen and agents, rice mill which process the crop effectively, distributions and retailers who are mainly involved in the process until the final product reaches the hands of the end consumers (Rehman, 2019). It has been stated they the traditional supply chain management process is more cumbersome and there is always more time taken from the time of harvest till the produce reaches the consumers. Many researchers have noted that the traditional supply chain system tend to lack in overall efficiency and possess more intermediaries which result in increase in price of goods and services (Qi, 2017).
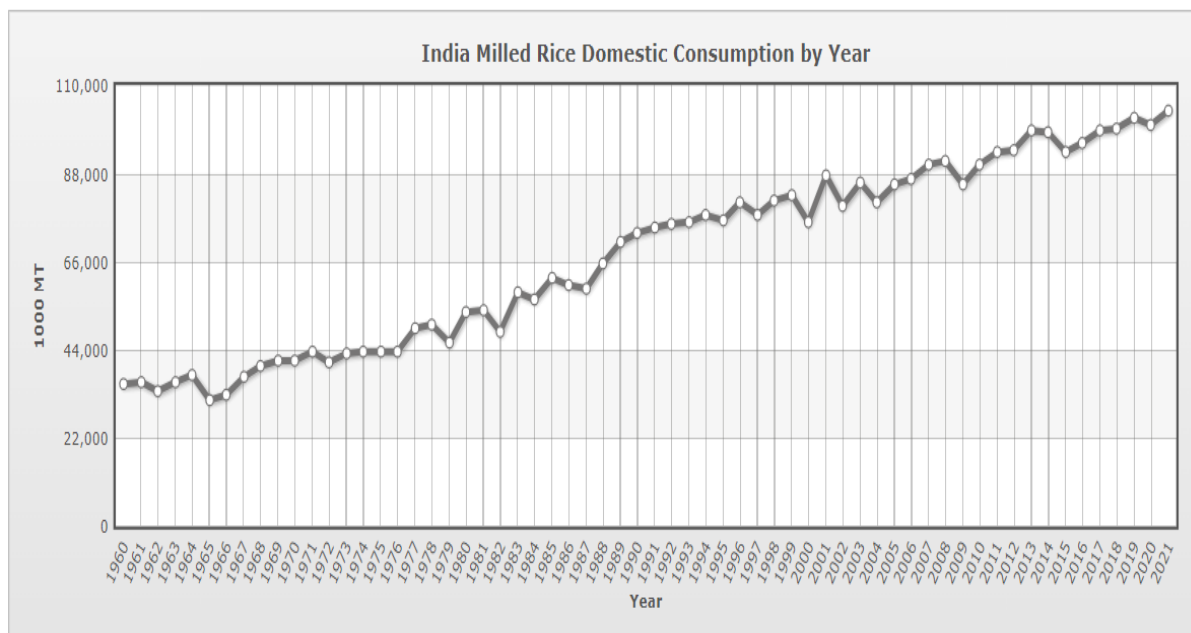
Furthermore, it has been widely stated that the proper implementation for the rice sector in the industry is required in order to regain better production and supply of the crop, also it enables in addressing the supply chain related problems and thereby reengineer the society and country effectively. It has been stated that the implementation supply chain management system is highly essential in order to possess efficient sourcing, processing and retailing of the rice and related food crops (Suryono, 2020). The collaborative framework of implementing better supply chain management through innovative technologies like cloud computing, big data processing and others has support in enhancing efficiency in the rice sector. Also, the SCM framework enable in creating better communication between the rice mill companies, distributors, retailers and consumers (Dzulfikar, 2017). Hence, enable in smoother flow of goods and services, furthermore, it enables in tracking the demand and supply, hence monitor the price movements effectively.

The application of collaborative supply chain management will enable the rice mill industries to support in food endurance in the country, the rice processing unit like rice mill industries need to collate and share data related to the collaboratively plan for the inventory (Pratiwi, 2019). The information systems enable the rice mill industries to analyse the customer demand, enable in collating the data for effective analysis through the use of RFID and other digital technologies (Lima-Junior, 2019).

The critical purpose of the study is to analyse the critical determinants of supply chain management in rice mill industry for better food endurance. The major determinants include better inventory management, supportive

distribution centres and enhancing efficiencies which will result in better food endurance in the country.

Review of Literature

Inventory management is an important issue in the management system for the rice supply chain. The traditional supply chain for the Indian rice sector has always faced the challenge of having sufficient supplies available. Managing inventories in the rice supply chain requires accurate demand forecasts, inventory planning and the purchase of inventory at the right time. Buyers' demand for different types of rice should be forecast in advance for the whole season or year, taking into account differences caused by festivals, social and cultural events (Liu, 2018).

However, it may not be necessary to keep an inventory of all planned rice varieties as they can take up the storage capacity in the risk warning and make room for a more demanding variety. In practice, it turned out that many risk alarms are loaded with high stocks, which is due to the fact that there are many varieties regardless of demand, which results in oversupply and a shortage of less demanding varieties. need.

Providing rice fields by a rice processing company requires a differentiated approach as rice field varieties are seasonal in some parts of the country and grown three times in some parts of the country. (Steup, 2018) The rice milling company must, together with the retailer, anticipate the optimal demand for rice to be consumed during the year and provide the expected rice field in each country during the rice season. The reason for this is that during this period, paddy rice produced throughout the country will be available at the lowest prices throughout the year. If demand fluctuates and the quantity ordered is higher than expected, the rice processing company can buy rice from areas where the rice harvest is still in progress (Almadani, 2021).

To solve this problem, the rice processing company must keep the number of intermediaries to a minimum. It would have to accept direct deliveries from the large farmers to whom it would deliver the rice in bulk. On the other hand, it must create its own supply centres where the rice producer directly sells his rice field without the intervention of any agent or intermediary. The same procedure must be adapted for the supply chain in the downstream chain, where large quantities of rice are distributed directly between large retailers and institutional customers.

Aim and Objectives

The purpose of the article is to understand the main determinants of the supply chain management in rice mill industry for better food endurance in India

The critical goals can be mentioned as under:

To understand the application of digital technology driven inventory management for better food endurance

To analyse the role of supportive distribution centres by the rice mill industry for supporting the government in food endurance.

To apprehend the nature of using collaborative supply chain model for enhancing efficiencies which will lead to better food endurance in India.

Research Methodology

The authors intend to apply descriptive design for the paper, the main purpose of using descriptive design is that it enables the researchers to observe the stated phenomenon in a natural manner without altering the environment, the study is intended to analyse the determinants of supply chain management in supporting food endurance in the country. Since, the product is a staple food and the consumption is increasing due to demand, there is a need to enhance the traditional supply chain model for better processing of the product in the rice mill and send to distributors and retailers for selling. The researchers uses both primary and secondary source for the study, the primary source is collated using questionnaire method, 5-point Likert scale is used in order to collect the data and they are converted quantitively so as to perform the analysis, furthermore, the researchers use various online library like EBSCO, Google scholar for gathering information related to the area of study and critically present the past reviews. The data is

analysed using SPSS statistical package which enable in presenting the data in a comprehensive manner.

Data Analysis

This part of the study is confined in presenting the analysis of the data sourced by the researcher the major analysis applied are percentage rate analysis, regression analysis and chi square test analysis.

Percentage rate analysis

Table 1: *Percentage rate analysis*

Demographics	Stated Variables	Freq.	Percent
Gender	Male	101	57.4
	Female	75	42.6
Age	Less than 30 years	57	32.4
	31 - 40 years	47	26.7
	41 - 50 years	25	14.2
	Above 50 years	47	26.7
Type of Family	Nuclear Family	108	61.4
	Joint Family	68	38.6
Level of Management	Lower-Level Management	74	42
	Middle Level Management	51	29
	Top Level Management	27	15.3
	Entrepreneur / Business Owner	24	13.6
Years of service	Less than 5 years	50	28.4
	5 - 10 years	38	21.6
	10 - 15 years	31	17.6
	15 - 20 years	41	23.3
	Above 20 years	16	9.1
	Total	176	100

Table 1 shows the percentage analysis of the demographic variables, it has been noted that 57.4% were male and remaining were female, 32.4% were in the age group of Less than 30

years, 26.7% were in the age group between 31 - 40 years, another 26.7% of the respondents were above 50 years, 14.2% were in the age group between 41 - 50 years. 61.4% were living in a nuclear family and remaining were living in a joint family. 28.4% were possessing experience of less than 5 years, 23.3% possess experience between 15 - 20 years, 21.6% possess experience between 5 - 10 years and 9.1% were possessing experience of Above 20 years

Regression analysis

The second step is to perform regression analysis as it supports the researcher to measure the overall association between the variables, the researchers also intend to understand the whether the model is a best fit or not.

Table 2: *Summary*

Summary				
Regression Model	R	R Square	Adjusted R Square	SE
Values	.889a	0.79	0.786	0.56

The table 2 of the data analysis states that the adjusted R squared is 0.786, which is greater that the 0.60, hence the model is a best fit. It can also be stated that model fits well with the 78.6% of the variables and only less than 11% are not fitting into the model.

Table 3: *ANOVA*

ANOVA	SS	F	Sig.
Regression	202.596	215.689	.000b
Residual	53.853		

The above states that the F value is 215.68 and the significance value is 0.00, hence there is a statistical difference among the variables considered for the study

Table 4: *Regression equation*

Regression	B	t	P Va
(Constant)	0.489	2.334	0.02
Inventory management	0.08	-0.599	0.03
Distribution centres	0.051	-0.422	0.01
Collaborative model	0.95	25.358	0.00

The above table shows that the p value of the independent variables is less than 0.05, hence it can be stated that variables possess significant association towards the dependent variable food endurance, furthermore with the help of the coefficient, the regression equation can be stated as

Y (Food Endurance) = 0.489 + 0.08 x Inventory management + 0.051 x Distribution centres + 0.95 x Collaborative model.

Hypothesis testing

The last section of the analysis involves in testing the hypothesis of the study, for this purpose chi square test is used.

Hypothesis 1

H0: There is no statistical difference among the inventory management and food endurance

Table 5: *Chi square test between inventory management and food endurance*

Analysis	Inventory Management	Food Endurance
Chi-Square	36.364a	245.080b
df	1	4
P Vak	0.00	0.00

The analysis from table 5 shows that the p value is 0.00, hence it can be stated that there is a statistical difference among the inventory management and food endurance

chi square test is used.

Hypothesis 2

H0: There is no statistical difference among the Distribution centres and food endurance

Table 6: *Chi square test between Distribution centres and food endurance*

Analysis	Distribution centres	Food Endurance
Chi-Square	3.273a	245.080b
df	1	4
P Vak	0.00	0.00

The analysis from table 6 shows that the p value is 0.00, hence it can be stated that there is a statistical difference among the Distribution centres and food endurance.

Hypothesis 3

H0: There is no statistical difference among the Collaborative model and food endurance

Table 7: *Chi square test between Collaborative model and food endurance*

Analysis	Collaborative model	Food Endurance
Chi-Square	153.091a	245.080a
df	1	4
P Vak	0.00	0.00

The analysis from table 6 shows that the p value is 0.00, hence it can be stated that there is a statistical difference among the Collaborative model and food endurance.

In India, rice is considered a staple food, hence the consumption of the product. There is a growing need for a better supply chain in the mill industry in the country to support better nutritional resilience (Hiranphaet, 2019). The traditional supply chain management model is inefficient and does not provide enough data and information to understand the demand for goods and ensure that products are available to customers at a competitive price. It was considered that rice farm owners, distributors and retailers would allow the exchange of more data and information, which would help to better manage the supply chain (Pujadi, 2020). The collaborative supply chain model supports measuring customer needs, using digital technologies such as RFID and other new cloud computing methods to improve efficiency. Consumption growth is impressive due to the country's population growth and the government is taking other measures to ensure the country's food security. Therefore, there must be an efficient system for managing the supply chain in the country. that farmers, producers and consumers benefit greatly from it (Chen, 2021).

It was said that the introduction of a supply chain system is necessary for the efficient purchase, processing and resale of rice and related food crops. A collaborative framework that offers better management of the supply chain through innovative technologies such as cloud computing, big data processing and others will help improve the efficiency of the rice sector. In addition, the SCM framework facilitates better communication between rice farms, distributors, retailers and consumers. Enabling a more even

flow of goods and services therefore helps to track supply and demand, which effectively tracks price movements.

Conclusion

The traditional supply chain management model aims to allow multiple steps where farmers are the main rice suppliers, there are intermediaries and agents, risk alarms that process the crop efficiently, distributors and retailers who are mainly involved in the process until the end product is worth it. end consumers. It has been reported that the traditional supply chain management process is more complicated and always takes longer from harvest to delivery of the product to consumers. Many researchers have noted that the traditional supply chain often lacks overall efficiency and more intermediaries, leading to higher prices for goods and services. By using these tools, rice processing companies can participate in consolidating the global demand for advertising products. The study measures the critical factors that affect supply chain management that lead to food resistance in the country.

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