



## Consumer Satisfaction towards Smart Ration Cards: A Study on Tirupur District, India

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### **ABSTRACT**

Public distribution system has been implementing various initiatives to ensure the proper supply of ration items to the consumers. There have been complaints towards the lack of transparency in the supply of ration items. The stocks are not properly showed and unauthenticated billing of goods is made by the employees and at the same time, consumers are also misusing the ration cards. The paper ration cards already issued have their own challenges. Introduction of smart ration cards has been the only solution for all these challenges. The government has introduced the smart ration cards in the year 2017. Since then, there have been a lot of changes made in the public distribution system. The present study has analyzed the satisfaction of consumers in Tirupur District towards the smart ration cards. The factors influencing satisfaction of consumers towards smart ration cards have been analyzed and the relationship between demographic variables and the factors influencing satisfaction has been discussed in this paper. It was found that the consumers were satisfied with the selected factors influencing satisfaction except the confidentiality of financial transaction of the consumers. Suggestions have been offered for the effective use of smart ration cards as a part of the initiatives of e-governance practices.

**Keywords:** *Consumer Satisfaction, Public Distribution System, Smart Ration Cards*

## **1. INTRODUCTION:**

E-Governance practices have been implemented by the Government of Tamil Nadu for delivery of services in all the departments. Public Distribution System (PDS) is one of the major services provided by the Government to the citizens. For this purpose, consumers were issued paper ration cards earlier. However, due to the advanced technology, Government has brought the PDS into e-governance practices. Accordingly, paper family cards already issued have been converted into smart ration cards. All the details of members of every family have been stored in the smart ration cards which cannot be read or accessed without authentication. These cards avoid papers and save the forest. Smart ration cards can be easily carried and kept in wallets safely. It helps the family members to carry cards safely for the purpose of ration items hassle free. The consumers enjoy a lot of benefits by using smart ration cards. The Government believes that the bogus cards and duplication of cards could be avoided by issuing smart ration cards. The transformation from the paper ration cards to smart ration cards yields a lot of benefits to the consumers. However, since they were accustomed with the paper ration cards. It will take a lot of time to convince them with the benefits of smart ration cards. In this context, the policyholders have to understand whether the introduction of smart ration cards has served the purpose. If the consumers are satisfied with the features or benefits available from the smart ration cards, they will be utilizing the cards. Therefore, it is deemed necessary to examine the consumer satisfaction towards smart ration cards.

## **2. REVIEW OF LITERATURE:**

Kontam, P, et al. (2017) made an attempt to explore the technology used in smart ration cards and its benefits for the consumers. The main benefit of the smart ration card is that immediately after purchase of goods is made; it is informed by SMS sent to the registered mobile of the head of the family immediately about the ration items purchased from the fair price shops. The difference between the existing system and smart ration card system has been discussed in this paper. They have concluded that since the human interaction is not there in the smart ration cards, it reduces the fraud and enhances the transparency.

Mane, V, et al. (2017) detailed the issues in the ration system and the innovative solution for addressing these issues. As per their view, corruption could be eliminated in the public distribution system through smart ration cards. They have highlighted that there was a difference in the opinion of rural and urban consumers towards the ration items supplied in the

fair price shops through public distribution system. Rural consumers have expressed dissatisfaction towards the supply of kerosene, sugar, rice, etc in the fair price shops, they have further briefed.

Shinde, S, et al. (2019) discussed the features of Aadhar based ration distribution system and the benefits available to the consumers. They have expressed their concern about the issues in the existing system for the distribution of ration items to the consumers and the design in which the proposed card is to be designed in order to provide transparency in the public distribution system.

Sonaware, P, et al. (2020) have briefed the mechanism and structure of smart ration cards. The hardware required and the components of smart ration cards have been enumerated by the authors. According to them, the advantages of smart ration cards included transparency for the government as well as customers, reduction of paper work, user-friendliness, restriction to unauthenticated persons for access and initiative towards digital India.

### **3. STATEMENT OF THE PROBLEM:**

It is understood from the existing literature reviewed that previous studies have focused on the architecture of smart ration cards, technology and mechanism used in the smart ration cards and the features of smart ration cards. The difference between the existing system and smart ration card system has been discussed in many papers. However, the satisfaction of consumers towards the smart ration cards has not been analyzed in these studies. Once a new system has been introduced, it is required to examine the effectiveness of such new system. If the customers are not satisfied with the smart ration cards, it means that the smart ration card needs to be modified. In order to understand the effectiveness of the smart ration card, it is deemed necessary to examine the satisfaction of the consumers as the previous studies have failed to focus on this issue.

### **4. IMPORTANCE OF THE STUDY:**

The major issues in the existing public distribution system are lack of transparency, smuggling of ration goods, duplication of cards and bogus cards. Smart ration cards have been introduced to rectify the drawbacks in the existing system and to enhance the efficiency of e-governance practices in the public distribution system. Smart ration cards have been introduced during the year 2017 to ensure transparency in the public distribution. The effectiveness of such e-

governance practices could be examined by assessing the satisfaction of the consumers. The present study makes an attempt to analyze the satisfaction of the consumers towards smart ration cards in Tirupur District.

## 5. OBJECTIVES OF THE STUDY:

The present study is undertaken with a view to fulfill the following objectives:

- To examine the factors influencing satisfaction of consumers towards smart ration cards in Tirupur District and
- To analyze whether demographic variables of the consumers have made any influence on their satisfaction towards smart ration cards in Tirupur District.

## 6. RESEARCH METHODOLOGY:

The current study is designed as an exploratory study through survey method. The data required for the study have been collected from the primary sources, i.e., by administering the structured questionnaire among the sample respondents. The respondents were selected from the smart ration card holders in Tirupur District under convenient sampling method. For this purpose, 200 card holders have been selected and data have been collected from these respondents. These data have been analyzed using percentage analysis, ANOVA and independent samples t test.

## 7. ANALYSIS AND INTERPRETATION:

The demographic profile the respondents has been analyzed using percentage analysis. The demographic profile includes the variables such as age, gender, area of residence and monthly income of the respondents. Taking the age as a base the other demographic variables have been compared and presented using percentage analysis.

*Table 1: Demographic Profile of the Respondents:*

Age	Gender		Area of residence		Monthly Income				Total
	Male	Female	Rural	Urban	Up to Rs.10000	Rs.10001 to Rs.20000	Rs.20001 to Rs.30000	More than Rs.30000	
Below 25 years	22 (91.70)	2 (8.30)	9 (37.50)	15 (62.50)	4 (16.70)	11 (45.80)	5 (20.80)	4 (16.70)	24 (100.00)
25 to 35 Years	13 (46.40)	15 (53.60)	7 (25.00)	21 (75.00)	6 (21.40)	17 (60.70)	0 (0.00)	5 (17.90)	28 (100.00)
35 to 45 Years	50 (54.90)	41 (45.10)	22 (24.20)	69 (75.80)	12 (13.20)	42 (46.20)	13 (14.30)	24 (26.40)	91 (100.00)

45 to 55 Years	24 (77.40)	7 (22.60)	18 (58.10)	13 (41.90)	6 (19.40)	13 (41.90)	11 (35.50)	1 (3.20)	31 (100.00)
Above 55 years	14 (53.80)	12 (46.20)	2 (7.70)	24 (92.30)	2 (7.70)	16 (61.50)	4 (15.40)	4 (15.40)	26 (100.00)
<b>Total</b>	<b>123</b>	<b>77</b>	<b>58</b>	<b>142</b>	<b>30</b>	<b>99</b>	<b>33</b>	<b>38</b>	<b>200</b>

It could be observed from the Table 1 that out of 24 respondents pertaining to the age group of below 25 years, 91.7 per cent of them were male consumers and 8.3 per cent of them were female consumers; 37.5 per cent of them were residing in rural areas and 62.5 per cent of them were residing in urban areas; 16.7 per cent of them were earning a monthly income of up to Rs.10000 and 45.8 per cent of them were earning a monthly income of Rs.10001 to Rs.20000; 20.8 per cent of them have stated that their monthly income was Rs.20001 to Rs.30000 and 16.7 per cent of them have reported a monthly income of more than Rs.30000.

Among 28 respondents in the age group of 25 to 35 years, the proportion of male respondents was 46.4 per cent and that of female respondents was 53.6 per cent; rural respondents represented 25 per cent of the sample and urban respondents represented 75 per cent of the sample; the monthly income earned by 21.4 per cent of them was up to Rs.10000 and that of 60.7 per cent of them was Rs.10001 to Rs.20000; none of them was found to earn a monthly income of Rs.20001 to Rs.30000 and 17.9 per cent of them were found to earn more than Rs.3000 per month.

In the case of 91 respondents belonging to the age group of 35 to 45 years, 54.9 per cent of them were male and 45.1 per cent of them were female respondents; 24.2 per cent of them were rural and 75.8 per cent of them were urban respondents; 13.2 per cent of them earned a monthly income of up to Rs.10000 and 46.2 per cent of them earned Rs.10001 to Rs.20000 as monthly income; 14.3 per cent of them reported a monthly income of Rs.20001 to Rs.30000 and 26.4 per cent of them have stated that they have earned a monthly income of more than Rs.30000.

With regard to 31 respondents pertaining to the age group of 45 to 55 years, the proportions of male and female respondents were 77.4 per cent and 22.6 per cent respectively; rural and urban respondents represented 58.1 per cent and 41.9 per cent of the sample respondents respectively; monthly income earned by 19.4 per cent of them was up to Rs.10000 and that of 41.9 per cent of them was Rs.10001 to Rs.20000; 35.5 per cent of these respondents reported a monthly income of Rs.20001 to Rs.30000 and the monthly income reported by 3.2 per cent of them was more than Rs.30000.

The results showed that 53.8 per cent of the respondents belonging to the age group of above 55 years were male and 46.2 per cent of them were female respondents. It could be understood that 7.7 per cent of them were residing in rural areas while 92.3 per cent of them were residing in urban areas. Monthly income up to Rs.10000 was earned by 7.7 per cent of them and an income of Rs.10001 to Rs.20000 was earned per month by 61.5 per cent of them; Rs.20001 to Rs.30000 income was reported to be earned by 15.4 per cent of these respondents and more than Rs.30000 income was earned by 15.4 per cent of such respondents.

The majority of respondents in all the five age groups except the age group of 25 to 35 years were male respondents. In the case of all the age groups considered for the study except 45 to 55 years, the proportions of urban respondents were greater than the rural respondents. Monthly income earned by the highest proportions of the respondents in all the selected age groups was found to be Rs.10001 to Rs.20000.

### **7.1. Factors Influencing Satisfaction on Smart Ration Cards:**

Smart ration cards are with certain features. For the purpose of the present study, the following factors have been identified as factors influencing satisfaction of consumers on smart cards:

- Privacy of Personal Data [Sonaware, P, et al. (2020)]
- Confidential of Financial transactions [Sonaware, P, et al. (2020)]
- Entry Authentication [Sonaware, P, et al. (2020)]
- Hassle free supply of ration items [Mane, V, et al. (2017)]
- Prevention of smuggling [Mane, V, et al. (2017)]
- Avoidance of duplication [Kontam, P, et al. (2017)]
- Avoidance of bogus cards [Kontam, P, et al. (2017)]

The respondents were asked to give their responses towards these factors in a five-point rating scale. Accordingly, the choices were assigned scores such as 5 for highly satisfied and 1 for highly dissatisfied and so on. Total satisfaction scores have been computed by summing up the scores for each of these factors. The relationship between demographic variables and satisfaction on smart ration cards has been analyzed using ANOVA and t test based on the total satisfaction score.

*Table 2: Factors Influencing Satisfaction On Smart Ration Cards*

<b>Factors</b>	<b>HS</b>	<b>S</b>	<b>N</b>	<b>DS</b>	<b>HDS</b>	<b>Total</b>
Privacy of Personal Data	44 (22)	78 (39)	15 (7.5)	35 (17.5)	28 (14)	200 (100)
Confidential of Financial transactions	29 (14.5)	27 (13.5)	26 (13)	65 (32.5)	53 (26.5)	200 (100)
Entry Authentication	92 (46)	87 (43.5)	14 (7)	5 (2.5)	2 (1)	200 (100)
Hassle free supply of ration items	65 (32.5)	52 (26)	11 (5.5)	39 (19.5)	33 (16.5)	200 (100)
Prevention of Smuggling	39 (19.5)	55 (27.5)	27 (13.5)	48 (24)	31 (15.5)	200 (100)
Avoidance of Duplication	106 (53)	46 (23)	12 (6)	20 (10)	16 (8)	200 (100)
Avoidance of bogus cards	37 (18.5)	41 (20.5)	49 (24.5)	41 (20.5)	32 (16)	200 (100)

According to the Table 2, the respondents expressed satisfaction (22 per cent – highly satisfied and 39 per cent satisfied) more than dissatisfaction (17.5 per cent dissatisfied and 14 per cent highly dissatisfied) towards privacy of personal data. On the other hand, the satisfaction stated by the respondents in respect of confidential of financial transactions was less (14.5 per cent highly satisfied and 13.5 per cent satisfied) and dissatisfaction was found to be more (32.5 per cent dissatisfied and 26.5 per cent highly dissatisfied). Greater proportions of respondents felt that they were satisfied with entry authentication (46 per cent highly satisfied and 43.5 per cent satisfied) and hassle free supply of ration items (32.5 per cent highly satisfied and 26 per cent satisfied). Prevention of smuggling has given satisfaction (19.5 per cent highly satisfied and 27.5 per cent satisfied) to the consumers more than dissatisfaction (24 per cent dissatisfied and 15.5 per cent highly dissatisfied). Higher proportions of the respondents reported that they were satisfied with avoidance of duplication (53 per cent highly satisfied and 23 per cent satisfied) and avoidance of bogus cards (18.5 per cent highly satisfied and 20.5 per cent satisfied). It implies that the consumers were satisfied with the factors influencing satisfaction except confidential of financial transactions.

The significance of relationship between age of the respondents and their level of satisfaction on smart ration cards was examined by testing the following hypotheses:

- **Null Hypothesis H<sub>0</sub>:** There exists no significant association between age of the respondents and their level of satisfaction on smart cards.
- **Alternative Hypothesis H<sub>1</sub>:** There exists a significant association between age of the respondents and their level of satisfaction on smart cards.

Table 3: Age and Satisfaction on Smart Ration Cards

Source of variation	Sum of Squares	DF	Mean Square	F value	p value	Result
Between Groups	571.817	4	142.954	10.649	0.000	Significant @ 1%
Within Groups	2617.738	195	13.424			
<b>Total</b>	<b>3189.555</b>	<b>199</b>				

According to the results presented in the Table 3 (F value = 10.649 and p value = 0.000 <0.01), the null hypothesis is considered to be invalid and the alternative hypothesis is retained. Therefore, it is proclaimed that the relationship between age of the respondents and satisfaction on smart ration cards is significant at 1 per cent level of significance. It implies that the level of satisfaction of consumers on smart ration cards with reference to the selected factors varied in accordance with their age.

The significance of relationship between gender of the respondents and their level of satisfaction on smart ration cards was examined by testing the following hypotheses:

- **Null Hypothesis H<sub>0</sub>**: There exists no significant association between gender of the respondents and their level of satisfaction on smart cards.
- **Alternative Hypothesis H<sub>1</sub>**: There exists a significant association between gender of the respondents and their level of satisfaction on smart cards.

Table 4: Gender and Satisfaction on Smart Ration Cards

Gender	N	Mean	Std. Deviation	t value	p value	Result
Male	123	23.67	3.987	-0.712	0.477	Not Significant
Female	77	24.09	4.043			

From the Table 4, it is divulged that the mean satisfaction of score of male respondents on smart ration cards was 23.67 with the standard deviation of 3.987 while the mean satisfaction score and the standard deviation of female respondents were 24.09 and 4.043 respectively. The t value indicating the relationship between gender and satisfaction on smart ration cards was computed to be -0.712 and the p value was found to be 0.477. Since the p value is greater than 0.05, it falls in the acceptance region. Hence, the null hypothesis is accepted and it is inferred that the relationship between gender and satisfaction on smart cards was not significant.

The significance of relationship between area of residence of the respondents and their level of satisfaction on smart ration cards was examined by testing the following hypotheses:



- **Null Hypothesis H<sub>0</sub>:** There exists no significant association between area of residence of the respondents and their level of satisfaction on smart cards.
- **Alternative Hypothesis H<sub>1</sub>:** There exists a significant association between area of residence of the respondents and their level of satisfaction on smart cards.

*Table 5: Area of Residence and Satisfaction on Smart Ration Cards*

Area of residence	N	Mean	Std. Deviation	t value	p value	Result
Rural	58	23.36	3.941	-1.078	0.284	Not Significant
Urban	142	24.03	4.026			

It is evident from the Table 5 that the mean satisfaction scores of rural and urban respondents towards smart ration cards were 23.36 and 24.03 respectively. The relative standard deviation of rural respondents was 3.941 and that of urban respondents was 24.03. The t value was ascertained to be -1.078 and the p value was found to be 0.284. The p value exceeding 0.05 leads to the acceptance of null hypothesis and the conclusion drawn from the result is that the relationship between area of residence and satisfaction on smart ration cards is insignificant.

The significance of relationship between monthly income of the respondents and their level of satisfaction on smart ration cards was examined by testing the following hypotheses:

- **Null Hypothesis H<sub>0</sub>:** There exists no significant association between monthly income of the respondents and their level of satisfaction on smart cards.
- **Alternative Hypothesis H<sub>1</sub>:** There exists a significant association between monthly income of the respondents and their level of satisfaction on smart cards.

*Table 6: Monthly Income and Satisfaction on Smart Ration Cards*

Source of variation	Sum of Squares	DF	Mean Square	F value	p value	Result
Between Groups	289.197	3	96.399	6.514	0.000	Significant @ 1%
Within Groups	2900.358	196	14.798			
<b>Total</b>	<b>3189.555</b>	<b>199</b>				

Table 6 divulges that the F value stating the relationship between monthly income of the respondents and their level of satisfaction on smart ration cards was found to be 6.514 and the p value was 0.000. The null hypothesis is to be rejected since the p value is less than 0.01. It is concluded that there exists a statistically significant relationship between monthly income of

the respondents and their satisfaction on smart ration cards. It denotes that the level of satisfaction on smart ration cards is different among the various groups of respondents distributed in accordance with their monthly income.

## **8. FINDINGS OF THE STUDY:**

From the analysis made in this study, the following key findings have been observed: It is found that the difference between the proportions of male and female respondents was the highest in the age group of below 25 years. The results proclaimed that the ratio of rural and urban respondents in the age group of above 55 years was the greatest (1:12). The greatest proportions of the respondents pertaining to all the age groups have reported that their monthly income was Rs.10001 to Rs.20000.

The highest proportions of the respondents have expressed satisfaction towards privacy of personal data; dissatisfaction towards confidentiality of financial transactions; high level satisfaction on entry authentication and hassle free supply of ration items. It could be understood that the greatest proportions of the respondents stated satisfaction on prevention smuggling; high level of satisfaction on avoidance of duplication and maintained neutrality towards avoidance of bogus cards.

The satisfaction of consumers on smart ration cards has been significantly influenced by their age and monthly income and no impact has been made by gender and area of residence on the satisfaction towards smart ration cards.

## **9. SUGGESTIONS:**

The major disrupting factor for the consumers was maintaining confidentiality of financial transactions. Therefore, it is recommended that biometric devices shall be kept in place for effective service delivery and protect the financial transactions of the consumers. Surveillance cameras shall be installed in the fair price shops to avoid smuggling of ration items. Alarming system shall be installed to indicate the unauthenticated use of smart ration cards. Digital display boards should be placed in the fair price shops to display the real time supply of goods and stock of ration materials in the shop so that the rural consumers could not be exploited.

## **10. CONCLUSION:**

According to the consumers of Tirupur District, the smart ration cards have been effective in keeping the privacy of personal data of the consumers and restriction of authenticated entry. They were satisfied with the hassle free supply of ration items and prevention of smuggling in the public distribution system. Avoidance of duplication and bogus cards has been made possible to the satisfaction of the consumers in Tirupur District by the smart ration cards.

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