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Factors influencing buying decision of suboptimal fruits and vegetables by HoReCa players in Hyderabad city of Telangana: Exploratory factor analysis

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Abstract

India is the second largest producer of fruits and vegetables in the world, but faces the problem of post-harvest losses. One of the main reasons for this is the high aesthetic standards demanded by consumers and retailers. As a result, large quantities of suboptimal fruits and vegetables are wasted. To reduce the food waste this study was done to understand the buying expectations and perception on suboptimal fruits and vegetables by HoReCa (Hotels, Restaurants and Cafes/Catering) members. For this a total of 90 respondents from six zones of Hyderabad city who are HoReCa members were selected to answer a questionnaire and EFA (Exploratory factor analysis) was used to analyze the data and identify the key factors that influence HoReCa members' buying decisions for suboptimal fruits and vegetables. A total of three factors were identified on perception on suboptimal produce by HoReCa members.

Keywords: Factor analysis, identify, understand

Introduction

Agriculture is a major sector of the Indian economy, contributing 20.3 per cent of GDP and is the world's second largest producer of fruits and vegetables, with a 9.3 per cent share of global production. With a total horticultural produce is 3471.8 Lakh tons produced in 280.4 Lakh hectares with production of fruits and vegetables as 1075.1 lakh tons and 2091.4 lakh tons in an area of 70.6 and 113.7 Lakh hectares respectively. (DoA and FW, 2022).

When it comes to food losses, developed countries experience significant food loss due to overproduction, consumers' preference for cosmetically perfect food, and fluctuating market prices. Developing countries experience the highest food losses in the primary production stage, with over 40 per cent of total food loss and waste occurring post-harvest or during processing. This is due to the use of inefficient machinery and techniques for harvesting and storing food commodities. (FAO, 2011) ^[6].

India loses about INR 1,52,790 crore every year in post-harvest losses. Livestock products have the highest losses, at 21.7 per cent, followed by fruits and vegetables, at 19.34 per cent and 17.97 per cent respectively. (MOFPI and NABCONS, 2022) ^[12]. The main causes of post-harvest losses in fruits and vegetables are due to lack of proper infrastructure, packaging, and storage facilities. (Gardas *et al.*, 2018) ^[7].

Suboptimal foods are food products that are slightly different from normal or optimal products. This difference may be in their appearance, such as irregular shape, size, or weight, or in their labeled expiration date. In some cases, it may also be in their packaging. Suboptimal foods are not different in terms of their intrinsic quality or safety. (Aschemann-Witzel *et al.*, 2015) ^[2].

Most of India's retail sector is made up of small, independent retailers, which account for over 80 per cent of the market. Large, organized retailers and online retailers account for the remaining 20 per cent of the market. The total Indian retail sector is worth about 836 billion USD, and food and grocery accounts for over 60 per cent of that. (Wazir Analysis, 2022) ^[20].

In retail stores, suboptimal produce, such as fruits and vegetables that are slightly misshapen or have minor blemishes, is often discarded, which contributes to food waste.

The Indian food service industry is worth approximately INR 4.9 lakh crores (USD 65 billion). The organized restaurant market in Hyderabad is worth approximately INR 6,037 crore (USD 8.1 billion), with standalone restaurants accounting for INR 4,657 crores (USD 6.2 billion) and chain restaurants accounting for INR 1,380 crores (USD 1.8 billion). (NRAI India Food Services Report 2019) [14].

The food service sector is expected to grow due to increased urbanization, rising living standards, and higher disposable incomes in metropolitan cities. However, there is a lack of research on the acceptance of suboptimal produce by HoReCa members, despite there being many studies on the acceptance of suboptimal produce by retail consumers. Therefore, the objective of this study is to understand the factors that

influence the acceptance of suboptimal produce by HoReCa members.

Research Methodology

The city of Hyderabad was chosen for this study purposively because it is a major trading center for fruits and vegetables. Within the six zones of Hyderabad, from each zone 15 Hotels/Restaurants/Cafes were selected by purposive sampling. This resulted in a total sample size of 90 for the HoReCa segment.

This study aims to understand the expectations and perceptions of HoReCa members towards suboptimal fruits and vegetables. To do this, a five-point Likert scale was used, with 5 representing "Strongly Agree" and 1 representing "Strongly Disagree". The questionnaire was developed based on 11 attributes identified from previous studies, as shown in table 1.

Table 1: Attributes considered for making the questionnaire

Attributes	References
1) Taste and Texture	Jaeger <i>et al.</i> (2018) [10]
2) Appearance	Makhal <i>et al.</i> (2021) [11], Aschemann-Witzel <i>et al.</i> (2015) [2]
3) Wide variety	Aschemann-Witzel <i>et al.</i> (2018) [11]
4) Nutritional concerns	Aschemann-Witzel <i>et al.</i> (2017) [4]
5) Convenience	Giménez <i>et al.</i> (2021) [8]
6) Quality Concerns	Cao and Miao (2021) [3]
7) Health and safety Concerns	Qi and Roe (2016) [15], Neubig <i>et al.</i> (2022) [13]
8) Sustainability	Van Giesen and Leenheer (2019) [18]
9) Prior Knowledge	Gurbuz and Macabangin (2019) [9]
10) Price Discounts	De Hooge <i>et al.</i> (2017) [4]
11) Ease of availability	Steinhart, Mazursky and Kamins (2013) [17]

Source: Prepared based on the authors cited

Exploratory factor analysis (EFA) was used to analyze the data and group the attributes into a small number of factors. EFA was performed using IBM SPSS version 22 software.

Results and Discussion

To assess the reliability of the data and the adequacy of the sample size, the attributes were analyzed using exploratory

factor analysis and Cronbach's alpha was calculated. The values of Cronbach's alpha (0.872) and KMO (0.825) are both above the acceptable limit, which indicates that the data is reliable and the sample size is adequate. The statistics are presented in Table 2.

Table 2: KMO and Bartlett's test of sphericity

Statistic	Value	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.825	
Bartlett's Test of Sphericity	Approx. Chi-Square	598.775
	df	55
	Sig.	.000

Notes: Cronbach's α is acceptable higher than 0.7 (Nunnally *et al.*, 1978) [21]; value of KMO above 0.6 being acceptable (Kim and Mueller, 1978) [22]; Bartlett's test of sphericity is significant, hence acceptable (Hair *et al.*, 2015) [23]

Table 3: Results of exploratory factor analysis on buying decision

Factor	Attributes	Com.	VE	FL	CA
F1-Buying Expectations	Taste and Texture of fruits and vegetables	0.788	45.14%	0.867	0.896
	Appearance is important	0.736		0.861	
	Wide variety of fruits and vegetables are available	0.712		0.860	
	Nutritional value concerns on suboptimal fruits and vegetables	0.705		0.783	
	Convenience to buy	0.604		0.770	
F2-Attitudes towards Suboptimal Produce	Quality concerns on the suboptimal produce	0.801	20.48%	0.884	0.891
	Health and safety concerns on suboptimal produce	0.757		0.865	
	Concerns on sustainability	0.754		0.860	
	Previous knowledge on suboptimal produce	0.796		0.836	
F3- Price and availability	Expecting price discounts	0.872	9.96%	0.943	0.795
	Ease of availability of suboptimal produce	0.789		0.796	

Note: Com =Communality; VE = Variance Explained; FL= Factor loading; CA = Cronbach's Alpha

After the reliability analysis, to evaluate the attributes that HoReCa consumers consider when making purchase decisions regarding suboptimal produce. Principal component analysis (PCA) and direct oblimin rotation were used to extract the factors, considering the possibility of relationships between them (Hair *et al.*, 2009) [24]. Three factors had Eigenvalues more than 1, with eigenvalues for Buying expectations (4.966), Attitude towards suboptimal produce (2.252) and Price and Acceptability (1.096) which are listed in Table 3.

The factor “F1- Buying Expectations” indicate HoReCa members, have high expectations for the fruits and vegetables they purchase. They need produce that is of high quality, has a good appearance, is convenient to buy, and is available in a variety of choices to meet the needs of their customers. Suboptimal produce is not visually appealing, which is a major factor in buying fresh produce (Raak *et al.*, 2017) [16].

The second factor “F2- Attitudes towards Suboptimal Produce” describes HoReCa Consumers have concerns about the quality, health and safety, and sustainability of suboptimal produce. However, suboptimal produce is just as safe and nutritious as normal produce (Witzel *et al.*, 2015) [2] and it is often a good value for your money. By purchasing suboptimal produce, consumers can help to reduce food waste and protect the environment. Consumers who are more knowledgeable about suboptimal produce are more likely to purchase it. Therefore, it is important to educate consumers about the benefits of suboptimal produce and to make it more accessible and affordable.

The third factor “F3- Price and Availability” shows that HoReCa consumers are more likely to buy suboptimal produce if it is priced significantly lower than normal produce. However, if suboptimal produce is not easily available, consumers may be less likely to buy it, even if it is priced lower. This suggests that price discounts and availability are contradictory in nature.

The three components buying expectations, attitude towards suboptimal produce, and price and availability are positively correlated, that they are related to each other. However, the correlations are moderate, ranging from 0.283 to 0.398, which suggests that the components are not identical.

The different components of the decision-making process interact to influence consumers' decisions about whether to purchase suboptimal produce. Buying expectations represent the general factors that consumers consider when deciding to buy any type of fresh produce, while attitudes towards suboptimal produce and price and availability represent the specific factors that consumers consider when deciding whether to buy suboptimal produce.

Conclusion

The study revealed that the buying expectations, attitudes towards suboptimal produce, and price and availability are the three key factors that influence HoReCa consumers' purchasing behaviour of suboptimal fruits and vegetables. The findings suggest that price discounts and availability are contradictory in nature. Based on the findings, to increase market for suboptimal fruits and vegetables focusing on improving accessibility and affordability, and educating consumers about the benefits of suboptimal produce. Additionally, the suppliers and retailers should consider offering price discounts and improving the availability of suboptimal produce to increase the purchase intention of HoReCa consumers.

Limitations of study and Suggestions for future research

The study was conducted in a single city (Hyderabad, India) with a relatively small sample size. This means that the findings may not be generalizable to other cities or countries. Additionally, a convenience sample was used, which means that the participants may not be representative of the entire population of HoReCa consumers. Finally, a self-report questionnaire was used to collect data, which means that the results may be biased by the participants' own perceptions and biases.

As suggestions to further research, identify other factors that can influence HoReCa members to purchase suboptimal produce. This research should also include educating and promoting suboptimal produce to change HoReCa members' purchasing behaviour. Additionally, identification of existing and novel supply chains to reduce food waste, as the suboptimal produce is generated at all stages of the supply chain, not just by a single.

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