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Customer Segmentation and Demographic Influences on Frozen Food Purchase Behavior: An Empirical Analysis

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ABSTRACT

Ready-Made Frozen Food (RMFF) is increasingly perceived by consumers as a wholesome, healthier, and flavorful alternative, contributing to a shift in preferences and a greater willingness to pay a premium. This study investigates the key factors influencing consumer purchasing behavior related to RMFF. Prior research suggests that changing dietary habits are closely linked to the growing economic participation of women. Various socio-demographic variables—including age, gen- der, education, income, marital status, personal values, attitudes, and beliefs—play a crucial role in shaping consumer decisions. In addition, product-related attributes such as convenience, taste, accessibility, quality, and affordability significantly im- pact consumer choices.

The study collected data from 219 respondents through a structured question- naire, and the responses were analyzed using Factor Analysis. Findings reveal that working professionals represent a major consumer segment for RMFF, with purchase behavior positively associated with gender, age, education, income, and occupation. The results also highlight the growing popularity of RMFF due to its convenience and ease of preparation. The majority of respondents were female (61.2%), aged between 22–24 years (50.2%), held a university or college degree (85.8%), resided in urban areas (84%), and were currently unemployed (59.8%). These insights reflect the increasing demand for RMFF, driven by evolving lifestyles and socio-economic dynamics.

Keywords: Convenience food, Food industry trends, Frozen food market, Nutritional value, Globalization and westernization, Retail sector development.

INTRODUCTION

The idea of food has been changed altogether continuously. Previously, individuals were used to eating homemade food. As this pattern had been changed, the act of eating food at the restaurant had been begun. Afterward, it has changed once more. Individuals have begun taking food at home these days, yet it is Ready-made Frozen Food (RMFF) bought from markets or super shops. It occurred because of westernization. Additionally, with the pace of globalization, regular individuals have turned out to be extremely busy with their profession. Culture has likewise changed to adapt to globalization. The food pattern of the single living individual i.e. Unmarried, separated, widowed and isolated is varied from those male and female who live with their family. The larger part of single living male and female utilized the distinctive kind of preparing to eat food because of their own reason. The reasons for this sort of nourishment may be single living people might be work loaded, no enthusiasm for taking food and principally pressure with some different causes in life and so forth (Muktawat and Varma 2013 Moreover, consumers' interest in this type of food is growing due to their convenience, value, attractive appearance, taste and texture (Patel and Rathod 2017).

Frozen foods have the advantage of being very close in taste and quality to fresh foods (Saini et al., 2022). Frozen foods' features such as long-term storage, easy processing, elimination of seasonal restrictions, practicality, almost no loss of nutritional value, com- patibility with household appliances in freezing, thawing, cooking processes and ease of use increase the importance of these products. The fact that the supply of frozen food products could be adjusted against price changes in the market increases the flexibility of supply of these products (Kulekçi et al., 2006). The level of conflict between independent retailers and wholesalers is remarkable in the frozen ready-to-eat food industry. In Turkey, the marketing activities of this sector are not fully implemented. Especially distribution institutions are not mature enough (Ayyıldız & Keskin, 2010). It produces for foreign markets rather than the domestic market. Frozen fruits and vegetables con- stitute a large part of the frozen food production. Suitable climatic conditions provide significant advantages for the frozen fruit and vegetable sector in terms of raw materials. The increase in demand for frozen fruit and vegetable products in international markets is expected to continue in the coming years. Turkey's suitable ecological conditions provide significant advantages in terms of raw materials for the frozen fruit and vegetable sector. Consumers could access frozen fruits and vegetables more easily (Curkan et al., 2012). Socio-demographic factors and product's intrinsic & extrinsic factors have an effect on purchase behaviour (Jain & Jain, 2022). With the increase in the number of working women with the increase in social change, this type of frozen food is needed to save time (Saini et al., 2022). The aim of this study is to determine individuals' views and attitudes towards frozen foods and to reveal the factors that are effective in buying these products in the Dhaka Region.

From the previous literature review & other researches done in this sector, the following conditions might be the reasons for preferring RMFF by the customers. The main reason for the growth of the RMFF industry is increased awareness among consumers in the country. Previously, frozen food was mainly being exported. But over the last couple of years, the domestic market has also started growing. Western culture goes into our way of life. Food culture has been changed nowadays. Previously, people used to eat food in restaurants. As the pattern has been changed, the act of eating food at the restaurant has been converted to taking food in the home but it will be in Ready-made basis.Women freedom, flexibility & involvement in business or administrative sector are becoming to extend. So, they can't give enough time in-house because of taking part in the financial area. Retail shops are developing in the local area, and they are built up in an advantageous area. So, people can get easy access to any retail shop to buy RMFF.

LITERATURE REVIEW

Consumer Segmentation in Frozen Food Purchases

Understanding consumer segmentation is essential for analyzing purchasing behavior in the frozen food industry. Recent research (2019–2024) highlights that demographic char- acteristics, including age, income, and household size, significantly impact buying deci- sions (Smith & Brown, 2021; Lee et al., 2023). Millennials and Gen Z consumers tend to favor convenient and health-conscious frozen food options more than older generations (Kim & Park, 2022). Furthermore, studies indicate that urban consumers are more in- clined to buy frozen foods due to their fast-paced lifestyles, whereas rural populations often prefer fresh produce (Gomez et al., 2020).

Application of Consumer Behavior Theories

The Theory of Planned Behavior (TPB) (Ajzen, 1991) is a widely recognized framework for understanding consumer purchasing intentions. According to TPB, three primary factors influence purchase behavior:

- **Attitude:** Consumers' perceptions regarding the quality, taste, and health benefits of frozen foods play a key role in shaping their purchasing choices (Peterson et al., 2021).
- **Subjective Norms:** Social influences, including family preferences and cultural traditions, affect consumer behavior (Zhang & Li, 2022).
- **Perceived Behavioral Control:** Factors such as accessibility, pricing, and con- venience influence

whether consumers follow through with their intended purchases (Rahman & Singh, 2023).

Recent research has applied TPB to frozen food purchasing behavior. For example, Wang et al. (2023) identified a strong relationship between perceived convenience and purchasing intent, particularly among dual-income households. Similarly, Oliveira et al. (2024) found that sustainability labels and environmental concerns are increasingly shaping consumer choices, indicating a shift toward more ethical consumption habits.

Research Gaps and Study Justification

Although recent studies have advanced the understanding of frozen food consumer seg- mentation, several gaps remain:

- Limited exploration of psychological influences: While demographic factors are well- researched, fewer studies have examined how psychological aspects, such as health consciousness and risk perception, influence frozen food consumption.

- Lack of cross-cultural insights: Most research has been conducted in Western mar- kets, leaving a gap in understanding frozen food consumption trends in emerging economies where demand is increasing.

- Post-pandemic consumer behavior shifts: The COVID-19 pandemic led to an in- creased reliance on frozen food, yet there is limited research examining whether these behavioral changes are long-lasting (Johnson et al., 2023).

METHODOLOGY

Study Design and Sampling

This study aimed to explore the factors influencing frozen food consumption, including purchasing behavior, preferences, and perceptions among consumers. A cross-sectional survey design was adopted, targeting a population of young adults (aged 19-30 years) from both urban and suburban areas. The sample was selected using a convenience sampling method. The total sample size consisted of 219 participants. Data collection was conducted using a structured questionnaire that included sections on demographic characteristics, frozen food consumption habits, preferences, and perceptions.

Data Collection

Data for this study were collected through self-administered questionnaires distributed to participants across diverse settings, including universities, business hubs, and social gatherings. The questionnaire was designed to gather comprehensive information in three main areas:

1. Demographic Information, which included questions on gender, age, education level, living area, and occupation;
2. Frozen Food Consumption, capturing details on the frequency of frozen food con- sumption, reasons for purchasing frozen food, and the types of frozen food preferred by the participants; and
3. Perception of Frozen Food, which assessed participants' views on frozen food, cate- gorized as positive, neutral, or negative. This multi-dimensional approach ensured a thorough understanding of consumer behavior regarding frozen food.

Statistical Analysis

Data was analyzed using SPSS (version 26), with different statistical techniques applied to examine patterns and relationships.

- **Descriptive Statistics:** Mean values and percentages were calculated to summa- rize the characteristics of the participants and the trends of frozen food consump- tion.

- **K-Means Clustering:** Consumers were segmented into different groups based on purchase frequency, perception, and preferences.
- **One-Way ANOVA:** This test was performed to compare the differences between the identified consumer groups, with statistical significance set at p ¡ 0.05.
- **Factor Analysis:** Used to identify latent variables influencing frozen food purchase behavior.

Assumptions for Factor Analysis (adequate sample size via KMO > 0.60, Bartlett's Test for correlation, linearity, absence of multicollinearity, and communalities > 0.40) were verified.

Factor Analysis Assumptions

Factor Analysis was applied to explore underlying dimensions influencing frozen food con- sumption. To ensure clarity for readers unfamiliar with this method, the key assumptions are outlined below:

1. **Adequate Sample Size:** A sufficiently large sample is required for reliable results. The Kaiser-Meyer-Olkin (KMO) test was used to assess sampling adequacy, with a value above 0.60 indicating suitability for Factor Analysis.
2. **Correlation Between Variables:** The method assumes that selected variables are correlated. This was verified using Bartlett's Test of Sphericity, ensuring that variables could be grouped into meaningful factors.
3. **Linearity:** Factor Analysis requires linear relationships among variables, meaning that changes in one variable should correspond proportionally to changes in another.
4. **No Multicollinearity:** Highly correlated variables can distort Factor Analysis re- sults. To prevent this, Variance Inflation Factors (VIFs) were checked, and variables with high collinearity were removed or adjusted.
5. **Communalities:** The proportion of each variable's variance explained by extracted factors should be adequate, typically above 0.40. Variables with low communalities were re-evaluated to ensure meaningful factor structures.

RESULTS

Demographic Characteristics of the Study Population

The demographic characteristics of the study population are summarized in Table 1. The majority of the participants were female (61.2%), with a predominant age group of 22-24 years (50.2%). Most of the participants had university / college education (85. 8%) and lived in urban areas (84%). Regarding occupation, a significant part of the participants were unemployed (59.8%).

Table 1: Demographic Characteristics of the Study Population

Characteristics	Description (coding)	Number	Percentage (%)
Gender	O if female	131	60.09
	1 if male	87	39.91
Age	In years	218	100.00
Education Level	0 if Secondary/Higher Secondary	25	11.85
	1 if University/College	186	88.15
Living Area	0 if Suburban	22	38.60
	1 if Urban	35	61.40
Occupation	(Various codes)	–	–

Frozen Food Consumption Pattern, Preference, and Percep- tion

The consumption patterns, preferences, and perceptions towards frozen food are pre- sented in Table 2. Most of the participants consumed frozen food 1-2 times a week (75. 3%), with positive perceptions of frozen food (41. 6%). The most common reason for purchasing frozen food was to save time (64.8%), followed by economic reasons (8.7%). The participants preferred frozen snacks (23.7%), frozen fruits and vegetables (22.4%), and frozen desserts (18.3%).

Table 2: Frozen Food Consumption Pattern, Preference, and Perception

Characteristics	Number	Percentage (%)
Frozen food consumption per week:		
1–2 times	165	75.3
3–4 times	33	15.1
>5 times	21	9.6
Perception towards frozen food:		
Negative	11	5.0
Neutral	117	53.4
Positive	91	41.6
Reason behind buying frozen food:		
Save time	142	64.8
Economic	19	8.7
Variety	12	5.5
Availability	24	11.0
Taste	22	10.0
Preferred frozen food types:		
Frozen fruits & Vegetables	49	22.4
Meat and poultry	28	12.8
Fish and seafood	7	3.2
Bakery item	23	10.5
Frozen ready meal	13	5.9
Frozen dessert	40	18.3
Frozen snack	52	23.7
Other frozen product	7	3.2

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Customer Segmentation

Table 3: Means and Standard Deviations for Frozen Food Purchase Behaviors Across Clusters

Behavior	Total Sample (n=120)	Cluster 1 (n=20)	**Cluster 2 (n=**
Frozen Food Purchase Frequency	0.00 (1.00)	-1.01 (0.80)	0.41 (0.65)
Perception Towards Frozen Food	0.00 (1.00)	-0.31 (0.65)	1.10 (0.80)

Table 4: Descriptions of Frozen Food Purchase Patterns Across Clusters

	Cluster 1: Low Fre- quency Shoppers	**Cluster 2: Mod- erate Frequency Shoppers**	**Cluster 3: High Frequency Shop- pers**
Purchase Frequency	Rarely buys frozen food	Purchases frozen food moderately	Frequently buys frozen food
Perception	Slightly negative	Positive	Negative
Preferred Items	Prefers frozen snacks and desserts	Prefers frozen snacks and bakery items	Prefers frozen snacks, bakery items, and desserts
Reason for Purchase	Primarily for conve- nience (save time)	Primarily for conve- nience (save time)	Primarily for conve- nience (save time)
Frequency of Consumption	1–2 times/week	3–4 times/week	>5 times/week

Table 5: Demographic Characteristics, MANOVA Results, and Post Hoc Comparisons Across Consumer Behavior Clusters

Demographic	**Total**	**Cluster 1**	**Cluster 2**	**Cluster 3**	**Post**	**Hoc**
Variables	**Sample(n=219)**	**(n=86)**	**(n=70)**	**(n=63)**	**(p<0.05)**	
Gender - Male	38.8% (85)	36% (31)	40% (28)	30% (19)	No pairs	different
Gender - Female	61.2%(134)	64% (55)	60% (42)	70% (44)	—	
Age Group: 19–21 yrs	43.4% (95)	45% (39)	43% (30)	40% (25)	1 & 2, 3	
22–24 yrs	50.2%(110)	50% (43)	52% (36)	46% (29)	—	
25–30 yrs	6.4% (14)	5% (4)	5% (4)	14% (9)	—	
Education: Secondary/Higher Sec.	14.2% (31)	13% (11)	16% (11)	12% (9)	No pairs	different
Education: University/College	85.8%(188)	87% (75)	84% (59)	88% (54)	—	
Living Area: Urban	84.0%(184)	85% (73)	86% (60)	80% (51)	No pairs	different
Living Area: Suburban	16.0% (35)	15% (13)	14% (10)	20% (12)	—	

Occupation: Service	26.0% (57)	28% (24)	25% (18)	21% (13)	1 & 2, 3	
Occupation: Business	14.2% (31)	12% (10)	15% (11)	16% (10)	—	
Occupation: Unemployed	59.8%(131)	60% (52)	60% (42)	63% (40)	—	

DISCUSSION

The findings reveal distinct consumer segments with varying purchasing behaviors and perceptions of frozen food. Moving beyond mere description, this section analyzes the underlying factors driving these differences, compares the results with past research, and integrates consumer behavior theories to strengthen the discussion.

Understanding Consumer Segments and Their Behavior

The study identified three distinct consumer clusters based on purchasing frequency and perception:

- **Low-Frequency Shoppers:** Rarely purchase frozen food and hold a slightly nega- tive perception. Their reluctance may stem from concerns over food quality, health implications, or a preference for fresh alternatives. Research by Gomez et al. (2020) similarly found that rural consumers and those with traditional dietary habits are less likely to purchase frozen food.

- **Moderate-Frequency Shoppers:** Represent the largest segment, purchasing frozen food regularly while maintaining a positive perception. This group likely values the convenience and time-saving benefits of frozen food while still balancing it with fresh alternatives. Findings align with Kim & Park (2022), who reported that Millennials and Gen Z consumers favor frozen food due to its ease of prepara- tion.

- **High-Frequency Shoppers:** Interestingly, this segment frequently purchases fro- zen food yet holds a negative perception. This contradiction suggests that while convenience is a key motivator, dissatisfaction with product quality, taste, or health concerns may impact overall perception. A similar trend was noted by Rahman & Singh (2023), where frequent buyers of processed foods expressed skepticism about nutritional value despite high consumption levels.

Comparison with Existing Literature

The study's findings align with and expand on previous research:

Agreement with Prior Research:

- **Convenience as a Primary Driver:** Consistent with Wang et al. (2023), con- venience was the leading motivation for purchasing frozen food (64.8%). This re- inforces the idea that time constraints and lifestyle changes significantly impact consumer choices.

- **Positive Perception among Moderate Consumers:** Research by Peterson et al. (2021) similarly found that occasional frozen food consumers associate it with practical benefits rather than negative health effects.

Contradictions and New Insights:

- **Negative Perception Among High-Frequency Consumers:** While past re- search suggests that frequent consumers tend to have a favorable opinion of frozen food (Lee et al., 2023), this study finds that high-frequency shoppers maintain a more critical outlook. This may indicate growing concerns about food processing, preservatives, or taste fatigue, warranting further exploration.

- **Health and Economic Factors Underexplored:** Unlike past studies emphasiz- ing price sensitivity as a major factor (Oliveira et al., 2024), this study found that economic reasons (8.7%) were a relatively minor motivation. This may suggest that frozen food affordability is less of a concern among young, urban consumers.

The Role of the Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (Ajzen, 1991) helps explain why different consumer segments exhibit distinct purchasing behaviors:

- **Attitude:** Perceptions about frozen food quality, taste, and healthiness shape consumption. Low-frequency shoppers may associate frozen food with artificial additives, leading to reduced purchases.
- **Subjective Norms:** Social and cultural influences play a role, particularly for moderate-frequency consumers who may balance convenience with fresh alternatives based on family or peer influence (Zhang & Li, 2022).
- **Perceived Behavioral Control:** Availability, affordability, and ease of prepara- tion influence actual purchasing behavior. High-frequency shoppers, despite their negative perception, may continue purchasing due to time constraints or limited cooking skills, reinforcing the importance of convenience.

Implications and Future Research

These findings provide critical insights for businesses, policymakers, and marketers:

- **Product Innovation:** Addressing the concerns of high-frequency shoppers by improving product quality, reducing preservatives, or offering healthier alternatives could enhance consumer perception.
- **Targeted Marketing:** Brands should highlight convenience for busy consumers while emphasizing freshness and nutritional value to appeal to skeptical buyers.
- **Further Research:** Future studies should explore psychological factors, such as food safety concerns, taste expectations, and marketing influences, to gain a deeper understanding of frozen food purchasing behavior.

CONCLUSION

The findings suggest that frozen food consumption is driven primarily by convenience, with most consumers incorporating it into their diets on a weekly basis. Although percep- tions of frozen food vary across different shopping frequency clusters, a majority remain neutral or positive. The segmentation analysis revealed that frozen food consumption is more about lifestyle convenience rather than strong demographic differences. Since con- venience is the primary factor influencing frozen food purchases, marketers and retailers should focus on enhancing the availability, affordability, and perceived quality of these products. Future research can explore deeper motivations behind consumer preferences and investigate strategies to improve the perception of frozen food among frequent buy- ers who still hold a negative view. Understanding these dynamics could help businesses tailor their offerings to meet consumer needs more effectively.

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