

An Exploratory Study of Important Aspects of Egg market in Kolkata

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ABSTRACT

It is important for marketers of branded eggs to understand their customer needs and the existing value chain. This paper endeavors to make a study on the existing value chain and to map different kinds of eggs consumed and SEC of consumers. This study will try to explore relationship between kind of eggs consumed and pertinent independent variables.

Introduction

Eggs form an integral part of a non vegetarian diet. They add proteins to one's diet as well as other nutrients. They supply all essential amino acids for humans, and provide several vitamins and minerals, including vitamin A, riboflavin, folic acid, vitamin B6, vitamin B12, choline, iron, calcium, phosphorus and potassium. They are also an inexpensive single-food source of protein.

Egg production in India

Producing 4800 crores eggs in 2008-09 India is the 4th largest producer of eggs in the world. The total egg industry size was Rs. 11048 crores in 2008. The industry is highly fragmented with no national level player.

Zones	States
North	Haryana (Ambala, Barwala, Sonapat, Karnal) Punjab (Chandigarh)
West	Gujarat , Maharashtra
South	Andhra Pradesh (Vijayawada, Godavari, Tunku, Hyderabad, Chittoor, Vizag) Tamil Nadu (Namakkal), Karnataka , Kerala
East	Orissa West Bengal (Kolkata, Bankura) North Eastern States
Central	Madhya Pradesh

Table 1 : Major Production Belts and Centres

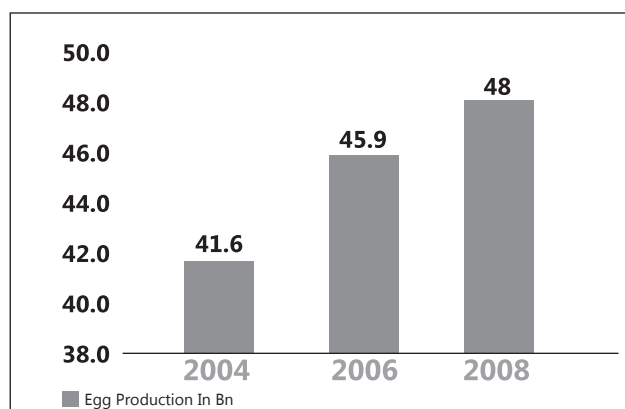


Figure 1 : Egg Production in India¹

Though India is the 4th largest egg producer in the world the annual per capita consumption of eggs stood at a paltry 47 eggs in comparison to 345 eggs in Mexico and 230 in USA.

As per NECC traders and industry experts, the market is slated to grow at 8%-10% per annum for the next 4-5 years. This growth would be driven by the expected increase in number of layers to 26 Crores by 2010. Rise of middle class, increase in urbanization and shift towards non-vegetarianism are the other factors. Urban areas, which accommodate 27% of the total population, account for 75% of the total egg consumption.

Players	Brand	Variants	Pack size	Price/pack(INR)
Suguna	Suguna	Pro, Active, Health (Omega 3), Shakti	6	40, 43, 46
Kegg Farms	Keggs	Near organic	6	45
S.K. Bajaj Poultry	Bajaj SK	Bajaj SK Gold, Bajaj SK Rs 3.5	10	36, 50
Agrocorpex India	Agrocorpex	Standard table eggs	6	25
Prabhat Poultry	Prabhat	Jumbo (sold by weight)	6	-
SKM EggProducts	SKM Best	Enriched eggs	4, 6	14, 21
Baramati Agro	N'rich	-	6	22, 28
Takve Poultry	Takve	-	6	20
Jaya Healthcare	SMART Eggs	Cholesterol free, Diabetic (Omega 3)	6	-
Palam Eggs	Mr. Farmer	Standard table, Near organic	6	24, 34
Egg Industries	FEGGS	Two (one for elders, other for youngsters)	6	-

Table 2 : Major Branded Egg Players

Branded eggs

The branded eggs segment with a total market size of Rs. 60 Crores accounts for 0.54% of the total eggs market. Though at a nascent stage, the branded eggs segment shows tremendous promise and potential with a growth rate of 20-25% per annum. Suguna Poultry was the first firm to venture into branded eggs category in the year 2003. Over the years it has developed four brands viz. Pro, Active, Health and Shakti. The table lists the prominent players in the branded eggs segment and their product offerings.

¹Source: Compound Feed Manufacturers Association

The major factors behind the growth of the branded eggs market are:

- Growing health consciousness
- Increasing levels of income
- Proliferation of modern retail formats
- Acceptance of packaged and processed foods by the Indian consumer

Although costlier than ordinary eggs, branded eggs are projected to become the next big market in the food and beverage segment. Marketers claim that these eggs are richer in proteins, contain less fat and are picked from bio-layer farms. With attractive packaging and promise of a healthier proposition these eggs command a premium over ordinary eggs. These protein-rich and low-fat branded eggs are slowly becoming the staple choice of many families as income levels and health consciousness rise. The market for branded eggs in India, compared to that of the normal eggs, could be said in an embryonic stage, but it is definitely growing. The poultry farms in India generate a production of around 110 million eggs daily, making India as one of the top egg-producing nations in the world. However, the per capita consumption is less than 40 eggs per year. The National Egg Co-ordination Committee aims to achieve a per capita consumption of 180 eggs by the year 2015.

Starting with Suguna Poultry in 2002, over the years a number of firms have started selling branded eggs in the country.

The major players in the branded eggs category are

- | | |
|----------------------|--------------------|
| • Suguna | • Kegg Farms |
| • S.K. Bajaj Poultry | • Agrocorpex India |
| • Prabhat Poultry | • SKM Egg Products |
| • Baramati Agro | • Takve Poultry |
| • Jaya Healthcare | • Palam Eggs |
| • Egg Industries | • Maity Poultries |

Any company which intends to supply branded eggs in Kolkata. It has two variants as a part of their product mix:

1. Normal Eggs : Priced at Rs. 3.50, these eggs are pitted against the ordinary eggs found in the Kolkata market, the value differential being scientific and healthier processes for egg production, cleaning, sorting and grading of the eggs and robust, impact resistant packaging.
2. Specialty Eggs : Priced at Rs. 5.50, these eggs are significantly larger than the normal eggs and are enriched with Omega 3 fatty acids, ensuring that the consumer enjoys a healthier product.

Objectives of the Research

- a. To study the existing value chain.

- b. To map different kinds of eggs consumed and SEC of consumers.
- c. To study relationship between 'Kind of eggs consumed' as the dependant variable and size, price, freshness, appearance, assurance against ailments, nutritious, and versatile as the independent variables.

Methodology

Primary research:

- a. Interviewing retailers, wholesalers, traders to determine existing supply chain and devise supply chain strategy.
- b. Interviewing consumers to identify need gap of ordinary eggs vis-à-vis branded eggs.
- c. Visiting various residential complexes, hotels, gymnasiums, health clubs and primary schools to ascertain costs and benefits of branded eggs distribution and associated communication.

Sample Size and Sampling Method

- a. Commission agents supplying eggs in urban Kolkata. Sample size: 10.
Sampling Method: Convenience sampling
- b. Egg wholesalers at prominent markets of Kolkata. Sample size: 8. Sampling Method: Convenience Sampling
- c. Retailers of eggs at local grocery shops. Sample size: 40. Sampling Method: Convenience Sampling.
- d. Consumers of eggs in Kolkata. Sample size: 160 Sampling Method: Convenience sampling.

Secondary research

- a. Kolkata Municipal Corporation (KMC) Kolkata Metropolitan Development Authority (KMDA) data on housing complexes in Kolkata.
- b. National Council of Applied Economic Research (NCAER) data on consumer demographics.
- c. Secondary data from other sources like National Egg Coordination Committee, Compound Feed Manufacturers Association etc.

Limitations

- a. Survey for key buying factors limited to urban Kolkata.
- b. Few firms offering branded eggs in Kolkata and concept of branded eggs not well entrenched in the consumer's mind.
- c. Due to paucity of time sample size collected was relatively small.

Findings

Primary research conducted involved four phases.

1. Phase I: Interviewing commission agents.
2. Phase II: Interviewing wholesalers.
3. Phase III: Interviewing retailers of eggs (i.e. local grocery shops) and visits to modern retail formats.
4. Phase IV: Interviewing consumers.

Phase I : Interviewing commission agents using a discussion guide and not a structured questionnaire.

Sample Size: 10

Location: Sealdah Wholesale Market.
New Market (Hogg Market), Esplanade

Major Findings :

- About 90% of the eggs consumed in Kolkata are hen eggs, produced in poultry farms in Andhra Pradesh.
- The other 10% consists of duck eggs and hen eggs produced by local farmers (Deshi Murgi)
- The hatchery owner popularly known as the Mahajan transports the eggs from Andhra Pradesh.
- The eggs are purchased by the commission agents in Kolkata.
- There are about 25-30 commission agents that cover urban Kolkata.
- Costs to the commission agents (CA):
 - o Inventory carrying cost.
 - o Transportation cost (minimal about 20p for a standard carton of 210 eggs).
 - o Losses due to damaged eggs (On an average in a carton of eggs 10-15 eggs are damaged. If damaged eggs exceed 25% then a refund is made by the Mahajan)
- Margins for the CA is 2 paisa per egg.
- There is no variation in terms of margins.
- No other incentives are provided to the commission agents by the Mahajans.
- Egg consumption increases by about 20% in winter months relative to summer months.

Phase II : Interviewing wholesalers at prominent markets of Kolkata using a discussion guide.

Sample Size: 8

Location: Lake Market
Bansdroni Bazaar
Gariahaat Market
Market near Ruby Hospital,
Kasba Gold Park, Jagu Babur Bazaar, Bhawanipore

Findings:

- The price offered by the egg wholesaler is Rs. 3.00.
- At all locations eggs were procured from hatcheries in Andhra Pradesh (A.P.).
- Eggs were first packed into cardboard boxes with cardboard packaging and loaded on to trucks by hatchery owners in A.P.
- These were received by commission agents/wholesalers in Kolkata and then sent out to retailers via vans/matadors.
- Commission agents in Kolkata mainly located at New Market, Sealdah (near Sabji Patti).
- Margins for the wholesaler varied between 12 paisa to 25 paisa.
- End customers making bulk purchases (restaurants etc.) purchased from the egg retailers at a discount(mentioned earlier).
- In case of bulk purchases eggs(in excess of 200 eggs) were sold at Rs. 2.70 to Rs. 2.80.
- The egg that is sold in Kolkata is laid 10 to 12 days earlier.
- Stays fresh for another 10 days in summer months and upto a month in winter, without refrigeration.
- Sale of eggs through modern retail formats have not had much of an effect on sales through traditional formats.
- The perception among the egg sellers was that customers preferred to buy from them rather than modern retail formats due to lower prices and freshness of eggs.

Phase III : Interviewing retailers and wholesalers and subjecting them to a structured questionnaire.

Location: Local grocery stores, wholesalers across urban Kolkata

Sample size: 40

Findings:

- The modal price point is Rs. 3.00 per egg, with only three egg sellers selling at higher prices
- 9 respondents purchased directly from commission agents (CA)
- 31 respondents had eggs delivered at their store by carrying and forwarding agents (CFA)
- The average daily egg sales for those who purchased from CAs (2170 eggs) directly were significantly higher than those who purchased from CFAs(275 eggs)
- Average margins for those who purchased from CFAs was 27.4 paisa with a sample standard deviation of 9.08 paisa
- Average margins for those who purchased directly from CAs was 41.6 paisa with a sample standard deviation of 7.19 paisa
- 21 respondents purchased on cash while 19 on credit

- For those purchasing on credit the mean credit period was 7.23 days and mean daily sales was 1186 eggs significantly larger than those who purchased on cash, 263 eggs
- The mean rotation period for all respondents was 1.67 days

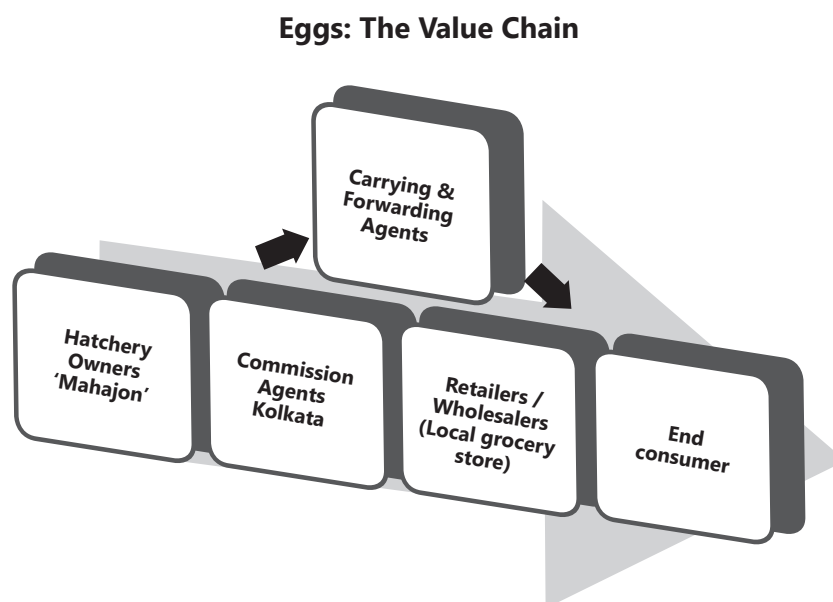


Figure 2 : The Value Chain

Player	Hatchery Owners	Commission Agents	Carrying & Forwarding Agents	Retailers / Wholesalers
Volume	Dependent on farm size	150,000 -300,000 eggs / day	5,000 - 10,000 eggs / day	100 - 2000 eggs / day
Margin	9%	0.67%	5.7%	8.13%
Total Margin : 26% (appx.)				

Figure 3 : The Value Chain Continued

The eggs consumed in urban Kolkata are mainly produced at hatcheries located in Andhra Pradesh. The hatchery owner popularly known as the Mahajan enjoys a margin of 9% approximately. The eggs are packed into cardboard cartons with paper pulp packaging, loaded onto trucks and transported to Kolkata. There are 7 to 8 such Mahajans that serve the urban Kolkata market. A standard crate has 30 eggs and there are 7 such crates in a carton. Thus a standard carton of eggs has 210 eggs.

Once these eggs arrive in Kolkata, they are purchased by commission agents in Kolkata. Commission agents are located at the wholesale market in Sealdah and New Market, Esplanade. When the primary research was conducted (March 2010), the commission agents enjoyed a margin of 2 paisa per egg, which works out to 0.67% of the retail price. There was absolute homogeneity in terms of margins enjoyed amongst the various commission agents.

Carrying and forwarding agents (CFA) and retailers/wholesalers purchased eggs from the commission agents. Smaller trucks (tempos or Matadors) or cycles were used by the CFAs to

ferry the eggs to the wholesaler and retailers. It must be noted that some of the wholesalers and retailers purchased eggs directly from the commission agents while others purchased from the CFAs. It is also interesting to note that those wholesalers/retailers who purchased directly from the commission agents traded in significantly larger volumes than those purchasing from CFAs. The CFAs enjoyed a 5-7% margin. The wholesalers/retailers had a margin of 8-13% while purchasing from the CFAs and a margin of 15-20% while purchasing from the commission agents directly.

The end consumer, both institutional and individual, purchased eggs from the wholesaler or the retailer. At the time the research was conducted the retail price of eggs was Rs. 3.00, with minor variations. Discounts of 20-25 paise were offered for bulk purchases (excess of 200 eggs).

Phase IV: Interviewing of egg consumers was divided into two sub-phases.

Sub Phase A: Initially consumers were interviewed to determine the prominent factors likely to influence decision making process for buying eggs.

Sample size: 12

Findings:

The prominent factors that emerged were:

- a. Price
- b. Freshness
- c. Appearance
- d. Size
- e. Assurance against ailment resulting from viruses present in eggs like Salmonella, Avian Flu etc.

Sub Phase B²: Interviewing consumers of eggs in Kolkata using a structured questionnaire.

Locations: Intercepts at grocery stores selling eggs, modern retail formats like Spencers, Reliance Fresh and bazaars across Kolkata.

Sample Size: 160

Key Buying Factors for an Egg

Traditionally eggs in India have been perceived as commodity products, with little or no differentiation in terms of quality. Eggs have been purchased from the bazaar or the neighborhood grocery store, with no packaging that ensures that the egg reaches the destination of the end consumer undamaged. However with an increase in household incomes and changing lifestyles, branded eggs have arrived in India and by all indications are here to stay. Despite its higher price tag, many firms that produce branded eggs have seen a rise in demand and feel there is still a huge untapped market for the product.

Sample collected for research consisted of egg consumers from socio-economic classes A1, A2, B1 and B2 with an annual household income greater than Rs. 3.00 lacs per annum. Respondents consumed three types of chicken eggs viz. poultry eggs, country eggs (Deshi Murgi) and branded eggs.

²Refer Appendix I for questionnaire.

Variables**Demographics**

- a. Age
- b. Gender
- c. Occupation
- d. Education
- e. Annual Household Income
- f. Household size

Purchase and consumption habits

- g. Kind of eggs consumed
- h. Weekly Consumption
- i. Place of purchase

Key buying factors

- j. Price
- k. Freshness
- l. Appearance
- m. Size
- n. Assurance of protection from viruses like Salmonella, Avian Flu etc.

Perception of eggs

- o. Healthy and nutritious food
- p. Versatile, suits all occasions- breakfast, major meal or quick snack

Key buying factors and perception of eggs were recorded on five point Likert Scale. Sample Summary

Sample Size: 160

Composition:

Socio Economic Class(SEC) ^{3*}	Frequency	Percentage
A1	60	37.50
A2	37	23.12
B1	34	21.25
B2	29	18.13

Table 3: Socio-economic Class

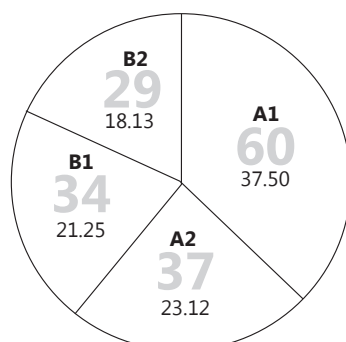


Figure 4: Socio-economic Class

Annual Household Income : Mean: Rs. 5.69 lacs per annum

³Socio Economic Classes were derived from education level and occupation. Socio-economic grid provided in Appendix II

Annual Household Income (INR lacs/annum)	Frequency
3.0 to 4.4	50
4.5 to 5.9	46
6.0 to 7.4	38
7.5 to 8.9	6
9.0 to 10.4	10
10.4 to 12	10

Table 4: Annual Household Income

Kind of eggs purchased

Kind of Eggs	Frequency
Poultry Eggs	99
Country Eggs	34
Branded Eggs	27

Table 5 : Egg Choice

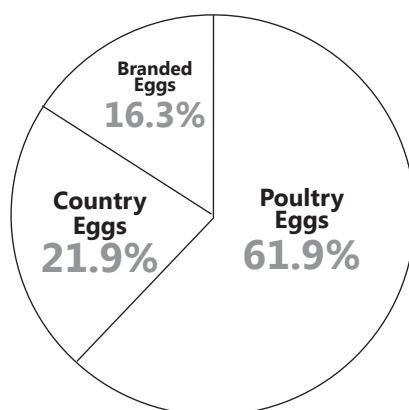


Figure 5 : Egg Choice

Considering the nature of the variables we conduct:

- a. Correspondence Analysis in order to map Kind of eggs consumed and SEC classification
- b. Discriminant Analysis with 'Kind of eggs consumed' as the dependant variable and size, price, freshness, appearance, assurance against ailments, nutritious, and versatile as the independent variables.

Correspondence Analysis

It is expected that the analysis will provide a spatial map that allows us to study the relative proximities between the socio-economic classes and choice of eggs, thereby enabling us to arrive at a conclusion whether SEC and choice of eggs are related to each other.

Egg Choice	Socio-Economic Class				
	A1	A2	B1	B2	Total
Poultry Eggs	31	23	23	22	99
Country Eggs	13	6	9	6	34
Branded Eggs	16	8	2	1	27
Total	0	37	34	29	160

Table 6: Contingency Table

Dimension				Proportion of Inertia			Confidence Singular Value	
	Singular Value	Inertia	Chi Square	Sig.	Accounted for	Cumulative	Standard Deviation	Correlation
1	.186	.035			.885	.885	.069	-.018
2	.067	.004			.115	1.000	.074	
Total		.039	6.286	.392 ^a	1.000	1.000		

a. 6 degrees of freedom

Table 7 : Summary of Correspondence Analysis

The inertia measure from Table 7 is used to assess the degree of explained variance. The 'Dimension 1' explains 88.5% of the variance and the remnant 11.5% of variance is explained by 'Dimension 2'.

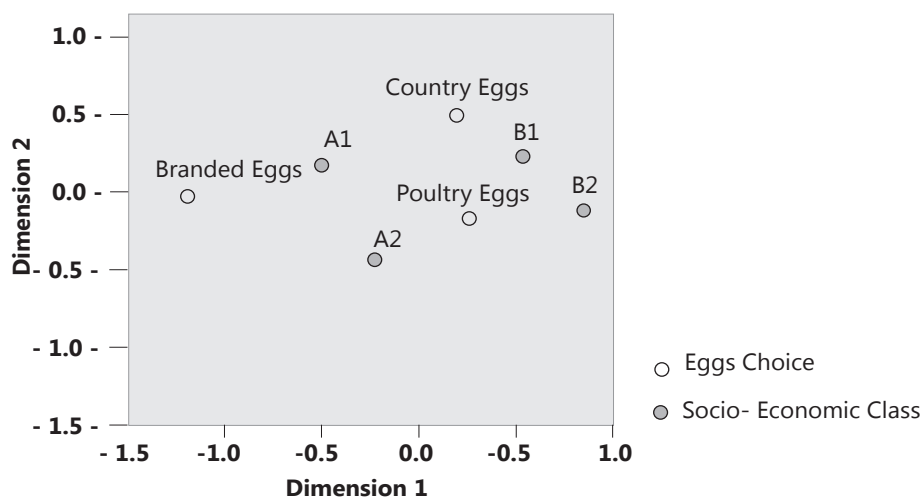


Figure 6 : Spatial Map

From the spatial map shown in Figure 6 it is evident that:

- For branded eggs proximity is highest for respondents from A1 socio-economic class, followed by A2, B1 and B2.
- For poultry eggs proximity is highest for respondents from B1 socio-economic class, same for A2 and B2, and least for A1 socio-economic class.
- For country eggs proximity is highest for respondents from B1 socio-economic class, followed by A1, B2 and A2.

Conversely focusing on SEC, we find that:

- a. The A1 socio-economic class prefers poultry, country and branded eggs equally.
- b. The A2 socio-economic class prefers poultry eggs, followed by country eggs and branded eggs are the last choice.
- c. The B1 socio-economic class gives almost equal preference to poultry and country eggs and branded eggs are least preferred.
- d. The B2 socio-economic class gives maximum preference to poultry eggs followed by country eggs and branded eggs are a distant third.

The major outcome of the correspondence analysis is that as a person moves up the socio-economic ladder propensity to consume branded eggs increases.

Discriminant Analysis

The discriminant analysis model involves linear combination in the following form:

$$D = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

Where

D = Discriminant Score

b_n = Discriminant coefficient or weight

X_n = Independent variable

The kinds of eggs that are purchased have been classified into three categories viz. 'Poultry Eggs', 'Country Eggs' and 'Branded Eggs'. The question of interest is whether the eggs choice can be differentiated in terms of, Price, Size, Appearance, Freshness, Healthy and Versatility.

Hypotheses Formulation:

H_0 : The centroids of all groups are equal.

H_1 : The centroids of all groups are not equal.

Egg Choice	Poultry Eggs		Country Eggs		Branded Eggs	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Price	4.0208	.91742	3.0000	1.01504	2.2308	.81524
Size	2.5833	1.21106	4.0000	1.10096	4.4231	.64331
Appearance	1.9688	.96740	3.7353	.96323	4.2692	.87442
Freshness	2.5417	1.07524	2.2353	.85489	3.8846	.95192
Ailment	2.4479	1.07478	2.1765	.83378	3.5000	1.02956
Healthy	3.3854	1.10853	3.1765	.99911	2.5769	.90213
Versatility	3.5625	1.11273	3.5294	1.26096	3.2308	.95111

Table 8 : Group Statistics, Means and Standard Deviations

An examination of the group means from Table 8 indicates that price and appearance appear to separate the groups more widely than any other variable.

Correlation	Price	Size	Appearance	Freshness	Ailment	Healthy	Versatility
Price	1.000						
Size	-.055	1.000					
Appearance	.026	-.131	1.000				
Freshness	-.024	-.047	.072	1.000			
Ailment	-.027	.002	.063	-.109	1.000		
Healthy	.032	-.078	-.028	-.035	-.037	1.000	
Versatility	-.155	-.037	-.081	-.039	-.036	.285	1.000

Table 9 : Pooled Within-Groups Correlation Matrix

For the discriminant analysis we have used the step-wise method, in which the independent variables are introduced one by one.

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1 through 2	.208	236.917	10	.000	2.474 ^a	86.6	86.6	.844
2	.724	48.865	4	.000	.382 ^a	13.4	100.0	.526

a. First 2 canonical discriminant functions were used in the analysis.

Table 10 : Wilks' Lambda and Eigenvalues

Determination of significance of the discriminant function: In order to test the null hypothesis of equal centroids, both the functions must be considered simultaneously. In Table 10 the value of Wilks' λ is 0.208 which transforms to a Chi-square of 236.917, with 10 degrees which is significant beyond the 0.05 level. Also, when the first function is removed, the Wilks' λ associated with the second function is 48.865, which is again significant at the 0.05 level. Therefore both the functions contribute significantly to group differences.

	Function	
	1	2
Price	-.467	-.028
Size	.528	-.156
Appearance	.719	-.329
Freshness	.189	.779
Ailment	.123	.661

Table 11 : Standardized Canonical Discriminant Function Coefficients

Interpretation of results: From Table 11, the standardized coefficients indicate relatively large coefficients for appearance and size on function 1, whereas function 2 has relatively larger coefficients for freshness and ailment.

An examination of the structure matrix also corroborates the same. Variables with large coefficients for a particular function are grouped together and are marked with asterisks. The variables healthy and versatility have low coefficients and therefore have not been used in the analysis. Thus, amongst the variables considered for the analysis, appearance, price and size have asterisks for function 1 and are primarily associated with function 1. On the other hand, freshness and ailment are predominantly associated with function 2 as indicated by the asterisks.

	Function	
	1	2
Appearance	.660*	-.211
Price	-.486*	-.064
Size	.451*	-.147
Healthy ^a	-.087*	-.032
Freshness	.213	.691*
Ailment	.162	.556*
Versatility ^a	-.017	-.018*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions.

Variables ordered by absolute size of correlation within function.

* Largest absolute correlation between each variable and any discriminant function.

a. This variable not used in the analysis.

Table 12 : Structure Matrix

Egg Choice	Function	
	1	2
Poultry Eggs	-1.179	.140
Country Eggs	1.254	-1.050
Branded Eggs	2.715	.858

Unstandardized canonical discriminant functions evaluated at group means

Table 13 : Functions at Group Centroids

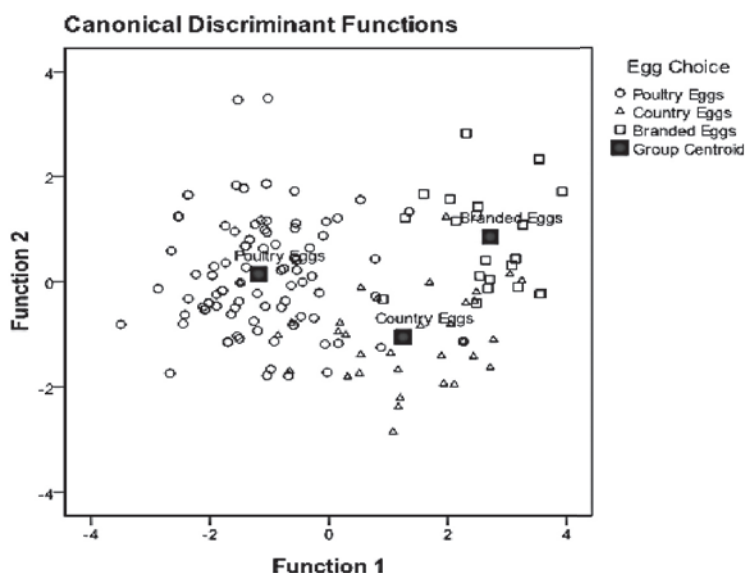


Figure 7 : All-Groups Scattergram Plot

Figure 7 is a scatter plot of all groups on function 1 and function 2. It can be seen that the group 'Poultry Eggs' has the lowest value on poultry eggs while 'Branded Eggs' have the highest value. Because function 1 is primarily associated with size, appearance and price, one would expect three groups to be ordered on these three variables. 'Branded Eggs' appear

much cleaner than 'Poultry Eggs' and are usually larger than them. However branded eggs available in the market have higher prices than poultry eggs, which explains the negative coefficient as observed in the structure matrix (Table 12).

Illustration 5.4 further indicates that function 2 tends to separate 'Branded Eggs', highest value and 'Country Eggs', lowest value. 'Country Eggs' are produced in an unorganized set-up with inadequate monitoring of the birds and their feed. Standardized scientific processes for sterilization of eggs are absent. Hence 'Country Eggs' score low on function 2, which is primarily associated with the variables ailment and freshness. On the contrary, 'Branded Eggs' are considered to be a healthy proposition.

Function 1 that is primarily determined by the variables appearance and size may be named as '*External Quality*'

Function 2 that is primarily determined by the variables freshness and ailments may be renamed as '*Health Appeal*'

Classification Results^{b,c}

		Egg Choice	Predicted Group Membership			
			Poultry Eggs	Country Eggs	Branded Eggs	Total
Original	Count	Poultry Eggs	88	7	1	96
		Country Eggs	4	25	5	34
		Branded Eggs	0	1	25	26
	%	Poultry Eggs	91.7	7.3	1.0	100.0
		Country Eggs	11.8	73.5	14.7	100.0
		Branded Eggs	.0	3.8	96.2	100.0
Cross-validated ^a	Count	Poultry Eggs	86	8	2	96
		Country Eggs	4	24	6	34
		Branded Eggs	0	2	24	26
	%	Poultry Eggs	89.6	8.3	2.1	100.0
		Country Eggs	11.8	70.6	17.6	100.0
		Branded Eggs	.0	7.7	92.3	100.0

- Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
- 88.5% of original grouped cases correctly classified.
- 85.9% of cross-validated grouped cases correctly classified.

Table 14 : Classification Results

Assessing validity: The classification results based on the analysis sample indicate that the hit ratio or the percentage of cases correctly classified is $(88 + 25 + 25) / 156 = 88.5\%$. Leave-one-out cross-validation correctly classifies $(86 + 24 + 24) / 156 = 85.9\%$ of cases correctly.

Evaluation on maximum chance criterion: The maximum chance criterion is the percentage correctly classified if all observations were placed in the group with the maximum probability of occurrence, which in our case is 'Poultry Eggs'. Therefore the maximum chance criterion is $96 / 156 = 60.76\%$. The suggested threshold value is 25% above the maximum chance criterion

i.e. $60.76 \times 1.25 = 75.9\%$

The levels of classification accuracy in both instances are significantly above the threshold value indicating an acceptable level of classification accuracy.

Evaluation on Press's Q: Press's Q is a statistically based measure comparing the classification accuracy to a random process.

$$\text{Press's Q} = [N - (n \times k)]^2 / N(k - 1)$$

Where, N = Total sample size

n = Number of cases correctly classified

k = Number of groups

Therefore,

$$\text{Press's Q for original cases} = (156 - 138 \times 3)^2 / 156(3-1) = 213.34$$

$$\text{Press's Q for cross-validated cases} = (156 - 134 \times 3)^2 / 156(3-1) = 193.96$$

The critical value of the Press's Q statistic for degrees of freedom = 2 is, 9.210.

In both cases the calculated values exceed the critical value, and hence it can be safely concluded that the classification accuracy for the analysis exceeds at a statistically significant level, the classification accuracy expected by chance.

Managerial Implications and Recommendations

By performing correspondence analysis it was found that branded eggs were preferred most by A1 socio-economic class, followed by A2, B1 and B2 in that order. Hence it becomes imperative that companies selling branded eggs focuses on the A1 and A2 SECs initially and formulate a segment-by-segment invasion plan to target B1, B2 and C SECs gradually.

It may be noted that the average market price of branded eggs available in Kolkata at the time of performing this research, was Rs. 7.00, which is substantially higher than ordinary poultry eggs that sell at Rs. 3.00. However if any company enters the market at the price points Rs. 3.50 and Rs. 5.50, consumers from B1, B2 and C classes may react favorably and the product may gain greater acceptance. Information on pricing need to be communicated to the aforesaid SECs (B1, B2 and C) in order to alter popular perceptions

The two dimensions that emerged from discriminant analysis were:

- a. External Quality
- b. Heath Appeal

Hence such communication should be sent out to the target audience. Nutritional benefits, certification from food control agencies need to be displayed on packaging as well as actively advertized.

Companies may adopt the following Marketing Communications Initiatives:

The Health Platform

- Highlight the health benefits on packaging & advertising
- Product endorsement by leading health specialists
- Break the myth that eggs contribute to cholesterol which is the popular perception
- Certification of Omega 3 enrichment, production processes from food quality control organizations
- Same should be displayed on packaging and product information collaterals
- Displays at clinics highlighting the product benefits
- Product info fliers and other merchandise like egg shaped paper weights, pen stand or other suitable merchandise at clinics, hospitals
- Recommendation from doctors

For Homemakers/ Mothers

- Decision-makers for purchase of eggs
- Sponsored cooking shows on television with eggs, being the key ingredient for recipes
- Product benefits highlighted during cook shows in a subtle manner

For the Kids

Kids are important, they influence their parents' buying decisions and they are the adult consumers of the future.

Parents today are willing to buy more for their kids because trends such as smaller family size, dual incomes and postponing children until later in life mean that families have more disposable income. As well, guilt can play a role in spending decisions as time-stressed parents substitute material goods for time spent with their kids.

Today's kids have more autonomy and decision-making power within the family than in previous generations, so it follows that kids are vocal about what they want their parents to buy. 'Pester power', 'Kid-fluence' or 'Nag-Factor' refers to children's ability to nag their parents into purchasing items they may not otherwise buy. Objection of parents towards buying eggs at the child's behest is likely to be less compared to say a chocolate or a cartoon DVD if the parent is convinced that the egg presents a healthy proposition.

- Utilize Kid-fluence, the 'Nag Factor' or the 'Pester Power'
- Merchandise like egg-shaped balloons distributed at school, crèches etc for junior school children
- Product info fliers given to mothers/guardians accompanying kids

- Develop brand mascots that have an emotional connect with kids
- Characters, may be an embodiment of the brand attributes that serve to reinforce the brand personality, as well as, act as eye catchers for kids
- Free stickers of characters along with egg packs
- Redeem 10/20 'Dozen packs' for attractive merchandise like soft toys, masks etc.
- Sponsor school events
- Tunes or jingles as ringtones

Others

- Communication collaterals located at gymnasiums, swimming clubs, sports clubs
- Social media marketing: Use of social networking websites like Facebook, Youtube, Orkut, Twitter, MySpace
- Marketing through blogs on health
- Advertising on health related websites
- Promotions at the 'Alpha Family Health Mall' a speciality mall dedicated to healthcare
- Setting up canopies at malls on weekends for promotion and distribution of promotional packs of eggs

Apart from the existing distribution channel the following options may be considered:

a. Institutional Sales: For daily orders companies may consider supplying eggs to institutions. Revised discounted rates need to be offered for such bulk orders. Due to larger buyers, a steady and substantial demand for eggs can be ensured. In addition to the basic purpose that is to sell, these institutions can act as effective communication platforms, where a large size of relevant target audience may be accessed while the cost associated with such communication is low or negligible. Other costs such as transportation, inventory, servicing can be significantly reduced.

Institutional sales can be explored at:

- i. Premium Hotels and Restaurants
 - ii. Football Clubs
 - iii. Premium Hospitals and Nursing Homes
 - iv. Residential Schools
- b. Exclusive Retail outlets or Franchisee Establishments: In order to effectively cover the Kolkata urban metropolis and to bring the product and the brand closer to the target audience.

Conclusion

An egg is a quintessential food product that is available at an affordable price, and has myriad health benefits. There is a popular perception that eggs contribute heavily towards cholesterol. Hence it becomes imperative for marketers to bust the myth that eggs contribute to cholesterol and highlight the health benefits. Branded eggs are a novel concept for the Indian populace, and with changing consumer outlook branded eggs are gaining greater acceptance amongst the affluent sections of the society. However the branded eggs industry has been plagued by supply shortages, and the average price of a branded egg is nearly double than that of an ordinary egg which inhibits purchase by the common man. Any company selling branded eggs, with its price points Rs. 3.50 and Rs. 5.50, might be able to grab an appreciable market share in the branded eggs segment provided that benefits and costs associated are effectively communicated to relevant target groups. This study will help marketers to determine bases for positioning their product (branded eggs) and tailor communication, to carve niches for themselves and gradually expand their market share to become prominent players in the egg market.

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Appendix I

Questionnaire for Key Buying Factors

Are eggs consumed in your household? (Y/N) : ____

Age: ____yrs. **Gender:** Male Female

Occupation:

- | | |
|---|--|
| <input type="checkbox"/> Entrepreneur (No Employees) | <input type="checkbox"/> Entrepreneur (Employees less than 10) |
| <input type="checkbox"/> Entrepreneur (Employees greater than 10) | <input type="checkbox"/> Self employed Professional |
| <input type="checkbox"/> Salaried: Clerical | <input type="checkbox"/> Salaried: Office Executive – Junior |
| <input type="checkbox"/> Salaried: Office Executive – Middle/Senior | |

Education (Tick appropriate box):

- | | |
|--|---|
| <input type="checkbox"/> SSC/HSC | <input type="checkbox"/> Diploma/ Institute but not graduate |
| <input type="checkbox"/> Graduate/ Post Graduate General | <input type="checkbox"/> Graduate/ Post Graduate Professional |

Annual Household income : Rs. _____ lacs per annum

How many members are there in your household? _____

What kind of eggs do you mostly consume?

- Poultry Eggs Country Eggs (Deshi Murgi) Branded/ Packaged Eggs

While purchasing eggs I am concerned about the price.

- | | | |
|--|---|---|
| <input type="checkbox"/> Strongly Disagree | <input type="checkbox"/> Disagree | <input type="checkbox"/> Neither Agree nor Disagree |
| <input type="checkbox"/> Agree | <input type="checkbox"/> Strongly Agree | |

While purchasing eggs I am concerned about the freshness.

- | | | |
|--|---|---|
| <input type="checkbox"/> Strongly Disagree | <input type="checkbox"/> Disagree | <input type="checkbox"/> Neither Agree nor Disagree |
| <input type="checkbox"/> Agree | <input type="checkbox"/> Strongly Agree | |

While purchasing eggs I am concerned about the appearance (color / presence of bird droppings).

- | | | |
|--|---|---|
| <input type="checkbox"/> Strongly Disagree | <input type="checkbox"/> Disagree | <input type="checkbox"/> Neither Agree nor Disagree |
| <input type="checkbox"/> Agree | <input type="checkbox"/> Strongly Agree | |

While purchasing eggs I am concerned about the size.

- | | | |
|--|---|---|
| <input type="checkbox"/> Strongly Disagree | <input type="checkbox"/> Disagree | <input type="checkbox"/> Neither Agree nor Disagree |
| <input type="checkbox"/> Agree | <input type="checkbox"/> Strongly Agree | |

While purchasing eggs I am concerned about salmonella, Avian flu and other viruses that may cause serious ailments

- Strongly Disagree Disagree Neither Agree nor Disagree
 Agree Strongly Agree

Eggs are good for health and nutritious.

- Strongly Disagree Disagree Neither Agree nor Disagree
 Agree Strongly Agree

Eggs are the ideal food for any occasion (major meal/ snack/ breakfast/quick meal)

- Strongly Disagree Disagree Neither Agree nor Disagree
 Agree Strongly Agree

My weekly household consumption of eggs is I usually purchase eggs from:

- Neighborhood grocery shop (Kirana Store/ Mudir Dokaan)
 Bazaar
 Modern Retail Format/ Departmental Store

Please complete the following sentence in less than 35 words.

An 'Ideal Egg' is

Appendix II

Data for Key Buying Factors

Variables list Age: Age of respondent **Sex:** Gender of Respondent

Occ: Occupation

- Entrepreneurs: Employees None Entrepreneurs: Employees < 10
 Entrepreneurs: Employees >10 Self Employed Professionals
 Clerical/Salesmen Office/ Executives: Junior Level
 Office/ Executives: Middle/ Senior Level

Edu: Education Levels

- SSC/HSC Some College but not Graduate
 Graduate/ Post Graduate: General Graduate/ Post Graduate: Professional

SEC: Socio Economic Class derived from Education levels and Occupation based on SEC Grid given below.

Education / Occupation	SSC/HSC	Some college but not graduate	Graduate / post Graduate general	Graduate/Post Graduate Professional
Entrepreneurs: Employees None	B1	A2	A2	A1
Entrepreneurs: Employees < 10	B1	A2	A1	A1
Entrepreneurs: Employees >10	A2	A1	A1	A1
Self Employed Professionals	B2	B1	A2	A1
Clerical/Salesmen	C	B2	B1	B1
Office/ Executives: Junior Level	B2	B1	A2	A2
Office/ Executives: Middle/ Senior Level	B1	A2	A1	A1

AHI: Annual Household Income in Rs. Lacs / annum

Hsz: Household size

Egch: Choice of Eggs

Poultry Eggs Country Eggs Branded Eggs

Price: Perception of price of eggs

Fresh: Perception of freshness of eggs
 Aprnc: Perception of appearance of eggs
 Size: Perception of size of eggs

Dis: Perception of assurance against disease causing viruses like Salmonella, Avian Flu etc.

Hlth: Perception of eggs as a healthy nutritious food option

Vrstl : Perception of eggs as a versatile food, suitable for all occasions like breakfast, major meal or a quick snack

Purloc : Place of purchase of eggs

Wcons : Average weekly household consumption of eggs

Footnotes

1. Source: Compound Feed Manufacturers Association
2. Refer Appendix I for questionnaire.
3. Socio Economic Classes were derived from education level and occupation. Socio-economic grid provided in Appendix II