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Socio-Economic Factors Influencing Consumers Online Purchase Behavior of Food Products in Bangalore City

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ABSTRACT

Background: Online purchase has a very important role to play in creating consistent demand for farmers' products and linking them directly to final consumers. Preferences of consumers are the most important driver of online purchases that prosper the linkage between farmers and the final consumers and these preferences are vastly influenced by consumers' socio-economic characteristics. The current study was conducted to analyse the influence of socio-economic factors on the online purchase of food products in Bangalore city.

Methods: Individual cross-sectional data were collected using a pre-tested questionnaire from 105 consumers of randomly selected areas of Bangalore city namely, Sahakarnagar, Judicial Layout, Yelahanka, Canara bank layout, Mahadevapura, Sanjaynagar and Jayanagar. Binary logistic regression was applied as the research method to examine the influence of socio-economic characteristics like gender, age, occupation, education, number of family members with income and income (as predictor variables) towards the online purchase of food products (as dependent variable).

Result: Results indicated that age (negatively), number of family members earning income and monthly income (positively) significantly influenced the online purchase of food products. Other variables like education, gender (in favour of men) and occupation also influenced (positively) the outcome variable but, statistically were not significant.

Key words: Binary logistic regression, Food products, Online purchase, Socio-economic factors.

INTRODUCTION

Online purchase is a form of electronic commerce that allows consumers to directly purchase goods or services online. It is a way of buying foods and household necessities using a websites and/or mobile applications (Banu *et al*., 2014).

There is a great opportunity for the growth of online grocery due to convenient shopping, generation with a large number of online users, broadband and media customization (*e.g*., product recommendations or promotions for combinations of offerings/kits) (Banerjee and Banerjee, 2018). The growth and success of the online purchase of food products is massively influenced by the consistent demand from potential consumers which indeed is massively affected by a set of socio-economic and other characteristics of the consumers. Bangalore city (also called Silicon city of India) has gained the attention of giant and multinational online companies. As a recent example, Amazon and Flipkart (Flipkart was acquired by Walmart in 2018) launched online grocery as Amazon pantry and Flipkart Supermart respectively in 2018. Currently, bigasket, Amazon pantry, Flipkart Supermart, Nature basket and Grofers respectively are the major players of online sellers in Bangalore city (written respectively on a customer-based survey and Fig is provided (Fig 1). The potential growth of online shopping has triggered the idea of conducting a study to examine effective socio-economic factors that influence online shoppers of food products in Bangalore city.

(Sivanesan and Monisha, 2017) indicated that females were more into online shopping than males in Tamilnadu and people from the age group of 35 years old and above were less likely to purchase online due to less awareness of the technology.

(Richa, 2012) revealed that income, education and marital status were among the significant variables that affected online shopping in India. Concerning gender, results exposed that females were shopping 3-4 times in a month compared to males.

(Javadi *et al*., 2012) identified that financial risks and non-delivery risks negatively affected attitudes toward online shopping in Iran. (Popovic, 2018) observed that low-income individuals approach online shopping cautiously and suspiciously due to lower tolerance for financial loss as

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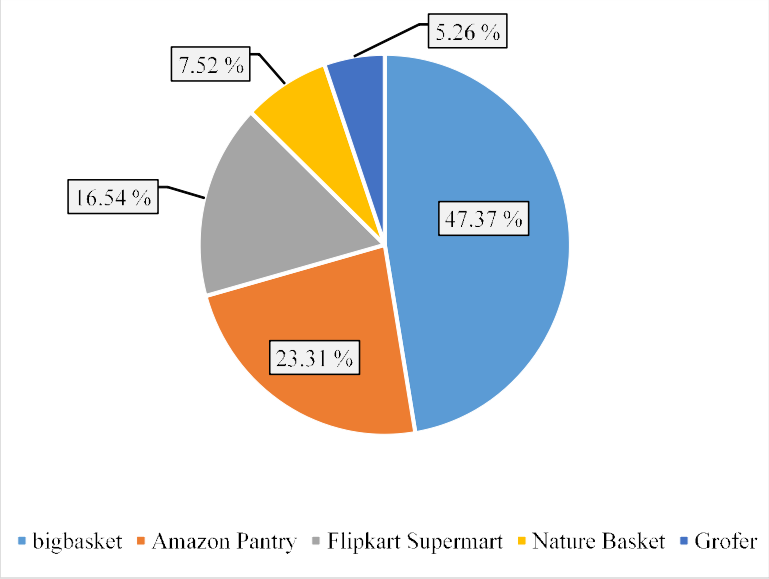

Fig 1: Share of leading online sellers based on the analysed sample in Bangalore city.
Source: The author.

compared to high-income individuals. (Padmavathi and Priyanka, 2016) analysed the role of demographics in online shopping behaviour in the Tamil Nadu state of India. The results illustrated that all demographic factors except gender and occupation had a significant bearing on the amount spent on online shopping.

(Jayasree, 2017) explained that online grocery shopping will reach maturity and saturation in near future, but it is hard to see a rise in online purchases of food products and groceries in India. The study also analysed various online portals (such as big basket.com, amazon groceries (Amazon pantry), Zop Now, Reliance fresh, Aaram shop, bazaar cart, naturally yours) that had emerged in the grocery sector paving the way to change the consumption pattern of household in the present digital scenario.

The study of factors influencing the online purchase of goods and services is not new since many researchers have conducted studies in this field. The uniqueness of this work in comparison to other studies is that very few studies focused on the effects of socio-economic factors on the online purchase of food products using a stronger statistical model. Additionally, the study is based on the Bangalore city context that would provide valuable information to readers and online sellers.

MATERIALS AND METHODS

The study was carried out in Bangalore city of Karnataka from March to July of 2019. Data were based on individual cross-sectional and convenience sampling was adopted to collect data from consumers of different localities of Bangalore city namely Sahakarnagar, Judicial Layout, Yelahanka, Canara bank layout, Mahadevapura, Sanjaynagar and Jayanagar using a pre-tested questionnaire and these areas were selected randomly to have fair demonstration of different socio-economic strata. The statistical population included all citizens who consumed food products and had an independent income. The sample size was determined using formula (n=10*k/p) suggested by Peduzzi, Concato, Kemper, Holford and Feinstein. In the formula, k is the number of independent variables while p denotes the smallest proportions of negative or positive cases in the population (Park, 2013; Gujarati, 2009 and Peng *et al*., 2002). The value for p (0.5) was suggested by subject-matter experts and finally, 105 consumers were interviewed (15 respondents from each studied area). In the questionnaire, consumers answered (Yes/No) on the question of whether they purchased food products online? and provided their socio-economic information on age, gender, family size, number of family members with income, years of schooling, occupation and, monthly income.

Logistic regression model

Multivariable logistic regression with backward elimination was applied to study the association between binary variable and socio-economic factors of consumers to determine whether these factors regress toward the decision of consumers to purchase food products online? In logistic regression, a mathematical model of a set of explanatory variables are used to predict a logit transformation of the dependent variable (Gujarati, 2009) and an outcome variable is usually a binary event, such as alive versus dead, case versus control, or online purchase of food products versus not purchasing food products online (in the current study) (Park, 2013).

In this work, the dependent variable was whether a consumer purchases food products online? which had a binary outcome, 1 considered if a consumer purchased food products online and 0 otherwise. The binary logit model was

used to determine effective socio-economic factors influencing the online purchase of food products in Bangalore city.

A multivariable logistic regression equation was constructed in the current study which is illustrated in equation 1:

$$\text{Logity (y)} = \ln\left[\frac{Pi}{1\text{-}Pi}\right] \beta_0 + \beta_1 (\text{Age}) + \beta_2 (\text{Gender}) + \beta_3 (\text{Years of Schooling}) + \beta_4 (\text{Number of Family Members Earning Income}) + \beta_5 (\text{Monthly Income}) + u^3 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Age, years of schooling and the number of family members with income are continuous variables while gender and income were qualitative and were coded (1 if the observation is male and 0 otherwise). Monthly income however was categorized into low income (less than Rs[1].10, 000 ≈ $145.75), low middle income (Rs. 10,000 - 30,000), middle income (Rs. 30,000 - 60,000), upper middle income (Rs. 60,000 - 100,000) and high income (more than Rs. 100,000) which was coded as 0, 1, 2, 3, 4 respectively. Additionally, receiver operator characteristics was also performed to estimate the predictive ability of significant factors as estimated by the area under the curve (AUC). P-values of <0.05 were considered as statically significant in all study and data were analysed using IBM® SPSS software version 25.0.

RESULTS AND DISCUSSION

The demographic characteristics of 105 samples under study are illustrated in (Table 1). In summary, it consisted of 71 per cent male and 29 per cent female, age ranged from 20 to 50 years old and the majority of respondents were less than 35 years old. Concerning occupation 26 per cent were professional and 74 per cent other than professional, 75 per cent of respondents reported a family size of fewer than 4 members and the remaining 24 per cent with more than 5 members, 50 per cent of respondents were with one member earning income and 50 per cent with more than two members earning income, 35.6 per cent of the sample size had at least a bachelor degree and remaining 64.4 per cent with master or above (no respondent was illiterate). Additionally, the monthly income of respondents was calculated on 5 categories of low income (14 %), low middle income and middle income (27%) each, upper middle income (19%) and high income (13%).

The statistical significance of regression coefficients (βs) tested using the Wald Chi-square statistic (illustrated in Table 2). The reference variables for categorical predictors were as; female for gender predictor, other than professional for occupation predictor and low-income group for monthly income predictor). Based on Table 2, age, the number of family members with income along with “monthly income group of 1 and 3” were statistically significant at 5 per cent level ($p<.05$) while variables such as; gender, occupation, years of education and “income group of 2 and 4”, were not statistically significant at 5 per cent.

The coefficient represents the change in the log odds for a one unit increase in the probability of online purchase of food products. The odds ratio (calculated as Exp^{β}) indicates the odds for online purchase of food products in terms of times when the value of a coefficient is increased by 1 unit.

The gender variable indicated a positive influence on the online purchase of food products. Since the reference variable is male (coded 1), it is interpreted that, men are more into the online purchase of food products by 13 times than females but the probability value is not significant at a 5 per cent level of confidence. This finding is in contradiction

Table 1: Descriptive statistics of explanatory variables.

Variables		Total n=105 (%)	SD ± Mean
Gender	Male	75 (71.4)	0.4561±0.71
	Female	30 (28.6)	
Age	35<	64 (60.92)	7.7984±32.82
	36>	41 (39.05)	
Occupation	Professional	27 (25.71)	0.4924±0.40
	Others	78 (74.29)	
Family size	4<	79 (75.2)	1.37±3.78
	5>	26 (24.8)	
Number of family members with income	1	53 (50.5)	0.8787±1.66
	2>	52 (49.5)	
Years of schooling	Bachelor and below	37 (35.6)	1.5860±17.36
	Masters and above	68 (64.4)	
Income	0= Low income (< 10k)	15 (14.3)	1.2431±1.90
	1= Low middle (10k to 30k)	27 (25.7)	1.23±1.89
	2= Middle income (30k to 60k)	31 (29.5)	
	3= Upper middle income (60k to 1Lkh)	19 (18.1)	
	4= High Income (> 1Lkh)	13 (12.4)	

Note: The variable “family size” were not included in regression analysis for being multicollinear with family members with income.

with (Sivanesan and Monisha, 2017) and the reason might be that men are responsible for the purchase of food products.

The age variable (with a -0.098 coefficient value) is among the effective variables toward the online purchase of food products. Since the coefficient value is negative and the odds ratio <1 indicating a negative association between age and online purchase of food products. So, as age increases by 1 year, the odds for a person/respondent to purchase food products online decrease by 8.8 times (1-0.912*100) keeping other variables constant. The values of the odds ratio could also be presented in terms of percentage. This is because older consumers are less aware of technology and risk perception is different compared to youngers. Since young-age consumers are involved more in social networking and hence more exposed to the marketing efforts of online sellers. These findings are similar to the findings of (Sivanesan and Monisha, 2017), (Padmavathi and Priyanka, 2016) and (Agyapong, 2017).

Occupation and years of education variables follow the same pattern as the gender variable do.

The number of family members with income also influenced the online purchase of food products. Since the coefficient value is positive with an odds ratio greater than 1, indicates, as the number of a family member with income increases by one person, the odds (or the probability) to purchase food products increases 5 times or, families with 2 members earning income are 37.9 per cent more likely to purchase food products online than families with 1 earning member. The probability of the variable is significant at a 5 per cent level. This is maybe due to the limited time to purchase from brick-and-mortar stores. For instance, a family of 3 members (husband, wife and a kid) who both husband and wife are employed would not prefer to accept

Table 2: Results of the binary logit model estimation.

Predictors	β	Standard error	Wald	Df	Probability	Exp(β)	95% C. I. for Exp(B)	
							Lower	Upper
Gender (1)	0.126	0.627	0.042	1	0.989	1.134	0.290	3.387
Age	-0.098**	0.036	6.534	1	0.007	0.907	0.849	0.979
Occupations (1)	0.416	0.559	0.554	1	0.457	1.516	0.507	4.537
Years of education	0.047	0.180	0.010	1	0.794	1.048	0.693	1.394
Number of family mem -ber with income	1.682**	0.536	9.690	1	0.002	5.379	1.882	15.371
Income categories				4				
Low-income (0)			10.756		0.029			
Low-middle (1)	2.166**	0.998	7.902		0.005	8.720	0.004	0.376
Middle income (2)	2.312	0.992	2.250		0.134	10.096	0.044	1.516
Upper middle (3)	3.130**	1.051	1.764		0.043	22.881	0.054	1.755
High income (4)	3.432	1.176	0.043		0.835	30.939	0.113	5.844
Constant	2.398	3.762	0.514	1	0.041	0.112		

*Significant at 10 per cent.

**Significant at 5 per cent.

Table 3: Overall model evaluation and goodness-of-Fit.

Tests	Categories	χ^2	df	p
Overall model evaluation	Likelihood ratio test	43.398	6	0.000
Goodness-of-fit test	Hosmer and lemeshow test	5.966	8	0.651

Table 4: Classification table of the goodness of fit for the binary logistic regression model.

Observed		Predicted		
		Do you purchase food products online?		Percentage correct
		No	Yes	
Do you purchase food products online?	No	29	13	69.00
	Yes	8	50	86.2
Overall percentage		**79.00**		

Note: Sensitivity = 82.8 per cent; Specificity = 69.0 per cent; Positive predictive value = 78.7 per cent; Negative predictive value = 74.4 per cent.

Note: Cox and Snell R^2 = 0.364; Nagelkerke R^2 = 0.490.

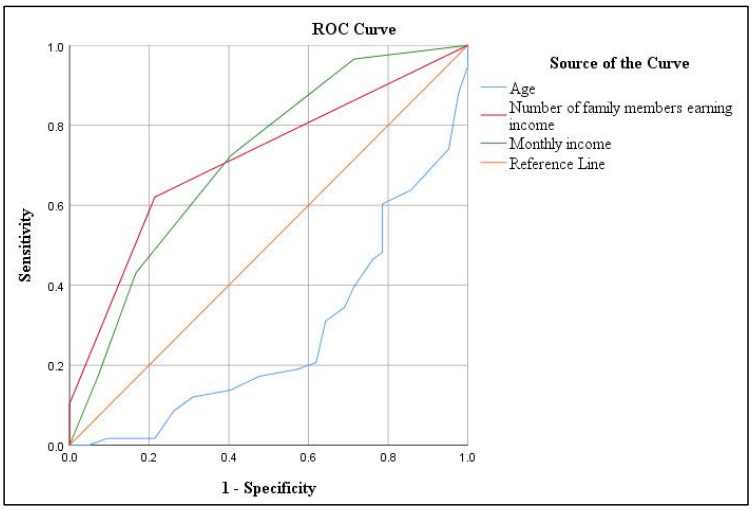

Fig 2: ROC curve of age, number of family members earning income and monthly income with AUC of 0.273, 0.714 and 0.715 respectively.

the burden of purchase of food products and order online to receive doorstep.

About income variable which was coded 0, 1, 2, 3 and 4 for low income, low middle income, middle income, upper middle income and high income respectively, exposed to be among the effective factor of the online purchase of food products in Bangalore city. Among the income variables, low-middle income and upper-middle-income were significant at a 5 per cent level. It is clear that, the odds of a person with a monthly income of INR. 10,000 - 30,000 (low-middle income) is 8 times more compared to the low-income group (considered as reference variable). Similarly, a person with a monthly income of INR. 60,000 to 100,000 (upper-middle-income) is 22 times more likely to purchase food products online compared to the reference group (low-income group). The delivery charge, bargaining ability, lower tolerance for financial losses and better quality and organic products (higher price) would be constraints low-income consumers to purchase online purchase of food products. This result is comparable to the results of (Agyapong, 2017) and (Popovic, 2018) but in contradiction to (Richa, 2012).

The overall evaluation of the model is tested and illustrated in Table 3 and Table 4 using different statistical measures including the likelihood ratio test, Hosmer and Lemeshow test, Cox and Snell R^2 and the classification table. The likelihood ratio test indicated that variables considered in the analysis contributed significantly to predict the online purchase of food products given the socio-demographic characteristics. The Hosmer-Lemeshow test (P=0.651) indicated that the numbers of actual observations were not significantly different from those predicted by the model hence, the overall model fit is satisfactory. The overall accuracy or classification table (Table 4) of the model (79.0%) is also satisfactory. Cox and Snell R^2 along with Nagelkerke R^2 were also acceptable with 0.364 and 0.490 respectively. Eventually, ROC (receiver operating characteristic) curve (Fig 2) was also calculated and the result was only fair since the values of AUC (Area under the curve) were 0.273 (95% C.I. 0.17 to 0.37), 0.714 (95% C.I. 0.61 to 0.81) and 0.715 (95% C.I. 0.61 to 0.82) for age, number of family members earning income and monthly income, respectively.

CONCLUSION

The current study examined socio-economic factors influencing the online purchase of food products in Bangalore city. Socio-economic factors influencing the online purchase behaviour of consumers are important information for all parties involved process of online sales. Additionally, personalization and customization of products and services are becoming vital in generating more sales and increasing the profitability of every business and indeed this is greatly relied on understanding the customers and their purchasing power. Results of this study revealed that socio-economic factors such as age, number of earning members and income significantly influenced the online purchase of food products. Henceforth, targeting young consumers with higher income and those with double or more earning members and preparing marketing strategies and efforts based on the requirement of such a segment would increase the probability of reputation in customers and sales. Online sellers are suggested to establish their distribution centres near places where families with double or more members with income and higher-income groups are located. However, these results cannot express the complicated process of online purchase of food products alone and further studies are needed to be carried out with a larger sample size if possible.

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Declaration of conflicting interests

The author declared no potential conflicts of interest concerning the research, authorship and/or publication of this article.

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