Study on Estimation of the Product Category Shopped Online by the Indian Consumers: a Modelling Approach through Demographics, **Product's Pre**-Exposure and On-Line

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Abstract - *The year on year statistics about buying on-line clearly indicates a positive trend both in terms of value and volume. The marketers are expected to look at the scenario with a new approach to understand the consumer need as it is a new medium. This paper attempts to estimate category of product purchased specifically through on-line mode. 'On-line' as a platform has provided a unique set of opportunities by making the market a seamless place eliminating the hurdle of geographic boundaries, at the same time the marketing solutions can not be uniform. Since demographic factors are universal they are generally used for predicting market opportunities. This paper attempts to designs a predictive modeling frame work by incorporating demographics, pre- exposure of products through social sites and motivating factors specifically active in on-line of shopping. The aim is to estimate type of product purchased by Indian customers on-line.*

The study also addresses if marketers can design specific products suitable to the demographics and fine tune the shopping motivators to address the on-line shopping needs.

Key Words: on-line shopping, demographic factors, polytomous variable, pseudo- R, internet exposure.

1. INTRODUCTION:

The size of the Indian online retail business is INR 2000 crore and the industry is projected to grow at a steady annual growth rate of 35 per cent to reach INR 7000 crore by 2015, (Thamizhvanan, and Xavier, 2013). Affordable subscription charges and increasing efficiency of the 3G net-work has helped to **penetrate the number of internet users'** (Khan,2014), it is estimated to touch a mark of 38 millions till year 2050 in India (Sheth, 2013). It has significantly absorbed in all the socio-segments in the Indian society. Specifically in the SEC-A, class

alone the penetration is up to 18%; indicating that it is no more used for calling and entertainment only, besides the mobile phones are used for shopping activity. Emergence of the internet as a facilitator catalysed decision making process of the consumers to an extent that it has changed the way consumers used to buy and sell products (Alba, J., Weitz, Janiszewski, Lutz, Sawyer, Wood, 1997).

Online purchase is not merely a function of availability of internet facility; there are various factors such as online engagement of brands through social sites, indicated as social connectedness of the consumer and motivators such as free shipping, cash on delivery, facility to return etc were provided in online shopping, to name a few. These factors influence the choice and type of product (Fox and Zinkhan. 2002), purchased specifically through online mode. This influence were studied by incorporating those factors as sarogative variable (Naseri, and Elliott, 2011), to estimate their exact impact in the online purchases.

2. STATEMENT OF PROBLEM:

Demographic factors were influencing online shopper behaviour (Kim and Kim, 2004), these demographic factors are adopted in marketing research with a limited role typically either as moderator or control variable only. Demographics such as language skills, occupation, marital status, household size and country of birth have seldom been investigated in past studies (Chang, Cheung and Lia, 2005).

This research utilizes seven demographic variables for estimating the type of products shopped by Indian consumers through on-line channel by designing a predictive model. This research extends the scope by incorporating specific motivating factors offered to the buyers for engagement in the

on-line marketing activity. It further explores the impact of pre-exposure of the product on any of the online platform. This research aims to estimate the predictive accuracy of all these three groups of predictive variables separately and ultimately attempts to design a full model with respect to specific products purchased by the Indian consumers. Since it is an ignored area of research in the Indian context, the predictive model would be estimating the type of product purchased by the Indian consumers.

3. OBJECTIVES OF STUDY:

1) To establish a correlation in demographic factors and the type of product purchased online,
2) To estimate the predictability based on demographic factors according to the type of product purchased online,
3) To design a predictive model to estimate type of product purchased online

4. LITERATURE SEARCH:

Earlier studies had identified various factors in the context of online shopping, such as availability of detailed and additional information, possibility of comparison of prices, choice & convenience are studied (Kumar, Lang & Peng, 2005, Zhou, Dai & Zhang, 2007), these were studied as possible motivators for consumers to prefer online shopping, over conventional brick and mortar mechanism. Earlier studies had focused mainly on locating qualifying reference groups, peers, family members and their recommendations (Foucault & Scheufele, 2002) as determining factors (Alba et al., 1997), in online shopping. During the initial evolutionary phases of the coexisting of the traditional shopping and online shopping it is revealed that the shopping motivators are just goal specific or mere urge of experiential or instrumental reasons only (Wolfinbarger and Gilly, 2003).

The product evaluation and product judgment in the on-line purchase had influenced by the method of its information presentation on the web page (Hong & Thong & Tam 2004a, Tam & Ho 2005).

Products were classified into two groups such as search and experience products when they were transacted through internet as a platform rather than traditional classification of product grouping

(Peterson et.al., 1997). It had been identified that **there was a difference in the tendency of consumer's** on-line shopping according to their being goal orientated or experience oriented (Klein, 1998), the consumers prefer products of high search quality when they were goal oriented.

Shopping satisfies two basic consumer motivations: it served the goal of buying a specific product, and it extended a fun through it, (Babin, Darden and Griffen, 1994).
Every purchasing through on-line is governed by transaction difficulty specifically associated with risk **due to product's nature, e.g. manufacturing difficulty** and related to color, style and fragility related to fabric items. This was assessed as one of the prominent reason of young buyers to under go for shopping these items by the younger age group than their elder colleagues. (Fram, E., H. and Grady, D., B., 1995). The category purchased more in comparison with other products was Electronics and Appealers and Accessories; they were 29.30% and 27.30% respectively.

Some studies were focused on the impact of typical and unique on-line situations, such as shopping without purchase (Bloch, and Richens, 1983). **Identifying, "Who is buying on internet?" to address** the characteristics of customers, (Chengappa, 2014), some specific studies were based on the analysis of shopping cart (Close and Kinney, 2010).

A few studies Ganguly et al. (2009), and Dash and Saji (2007) were conducted with reference to the Indian context, **revealed consumer's shopping orientation,** contribution of online trust, demographics and prior online purchase experience on the customer online purchase intention in the Indian context, with reference to web site characteristics.

Fram and Grady (1995), had conducted a research to identify the type of products among 17 different types and services, specifically purchased by customers on internet. But that had just calculated on the basis of earlier purchases, and it had calculated the percentage of each product type purchased and its percentage to total share of purchase. But there were no structured attempt for estimating type of product purchased on-line by the customers.

To the best of our knowledge, there was no specific scholarly research attempted to study the role of **different demographic factors on Indians' online** purchase behaviour. Therefore, this paper attempts **to examine the influence of demographical factors for** predicting type of product purchased through on-line purchase the Indian consumers.

5. RESEARCH METHODOLOGY:

For the study the researcher contacted the respondents personally with a well–prepared sequentially arranged questionnaire. All questions were designed to cover the three components viz. demographic factors, pre-exposure of product on social sites and motivators for preferring online mode of product purchase. The questionnaire was divided into three parts. The first Part was designed **for capturing the respondent's profile the second to** capture interaction with social sites and the third part addresses the motivators for preferring online mode of product purchase.

Seven demographic factors viz. age, gender, income, education, location of residence, marital status and family size were studied for this research

Both the additional components of this research model were adopted as independent variables the **first group as consumer's prior (before actual** processing the transaction online) interaction with the product through a social sites and second group as specific motivators influencing the consumers to opt for online buying option, were specifically **identified by the 'Walker stands', future retail s**tudy report, 2014.

This frame work is adopted from the research work conducted by Naseri, and Elliott, (2011), for estimating the role of demographics, motivators for online shopping and prior exposure of products through online sites through quantitative analysis, by estimating a multinomial logistic regression equation. To bring the fitment in the scale for quantitative study and making it easy to understand and respond, the social interaction parameters selected were; context of social site interactions specifically through face book, twitter and YouTube, and popular motivators such as reduction in shopping time, timing of flexibility, saving of physical effort, saving of aggravation, the opportunity to engage in impulse buying or directly responding to an advertisement, online bidding/haggling, keeping

with new and latest trends and easiness of payment option (Darien ,1987; Jayshankar et.al, (2010), were adopted as predicating variables.

Use of on-line mode for buying a product was defined as purchase of any product irrespective of its type, shape or size on the basis of its tangibility, nature and needs, and unit price, to encompass the latest **product 's classification (Kiang et.al.,2000) inclusive** of all digital and physical classification of products. Exhibit Table A-I shows the description and the coding scheme of the variables.

5.1 Research Hypothesis:

H_{0d}: Demographic factors have no influence on the type of product purchased online.

H_{1d}: Demographic factors have influence on the type of product purchased online.

H_{0e}: Pre-exposure of products on social sites has no influence on the type of product purchased online.

H_{1e}: Pre-exposure of products on social site has an influence on the type of product purchased online.

H_{0m}: Buying motivators has no influence on the type of product purchased online.

H_{1m}: Buying motivators has an influence on the type of product purchased online.

5.2 Primary Data

Primary data was collected through the administration of the structured questionnaire in Mumbai, Thiruvananthapuram & Jaipur. Since, these places are the metro cities and they are considered more commercially developed than any other Indian cities, allowing consumers to behave in a typical manner, using convenience based random sampling. The retail outlet and mall intervention method was used where the sample was contacted, at various retail outlets and malls. This sampling method is the least expensive and least time consuming of all sampling techniques.   The questionnaire was administered in face – to – face manner. The sample details are as shown in the Table 1.

5.3 Sample Size

The sample size was determined by the standard formula for 95% confidence level and 0.1 as standard deviation keeping +/- 5% as margin of error at 450 numbers. This study it has been kept at 451 samples. The samples were limited to those participants who willingly accepted to respond to the instruments in its entirety.

5.4 Sample Design

The researcher relied upon convenience based random sampling technique, for the research methodology and research type as per guidelines. A caution was exercised during the study that the respondents who did not show an inclination to be a part of the study were not insisted upon.

Table 1- Sample Details

Variables	Attributes	Frequency	Percent
Location of Residence	Mumbai	147	32.6
	Thiruvananthapuram	177	39.2
	Jaipur	127	28.2
Gender	Male	135	29.9
	Female	316	70.1
Age Group	18 to 25	202	44.8
	26 to 30 Years	146	32.4
	31 to 50	65	14.4
	51 on wards	38	08.4
Income Level	Up to Rs.15,000	253	56.1
	Rs.15,001-30,000	133	29.5
	Rs.30,001 & Above	65	14.4
Education Level	Below Graduation	173	38.4
	Graduation	129	28.6
	Above Graduation	149	33.0
Marriage Status	Married	358	79.4
	Single	93	20.6
Family Size	Two	166	36.8
	Three	168	37.3
	3 & More	117	25.9

(Source: Primary research)

6. SECONDARY DATA

The secondary information or data was collected from published sources such as journals, magazines, newspapers, Industry reports, internet and other sources.

7. STATISTICAL ANALYSIS

Efficient and effective data analysis is the result of effective data preparation. This was found to be very crucial between the completion of the field work and the statistical processing of the collected data. Data preparation involved transferring the questionnaire into an electronic format which allowed and facilitated subsequent data processing. Data sheet was prepared directly at Statistical Program for Social Sciences (SPSS) 19.00 software for further analysis. Codes were assigned to each response for data entry and data record. Transcribed data sheet was prepared for data analysis. On the basis of data sheet, tables and graphs were prepared for the analysis.

A product shopped on-line (dependent variable), was classified in-to seven different response categories, namely health care, electronics, books, beauty and personal care, home and furnishing, apparel and **accessories and baby products. Consumer's product** choice was treated as a polytomous nominal variable. A multi nominal regression model was designed for predicting the product type purchased on-line based on three sets of predicator variables, such as demographic factors, specific factors of motivation of **'on-line' as a mode and pre exposure of products on** social media.

Likelihood ratio test was conducted for establishing significant predicating factors through their chi square scores and association at a significance level at 0.05.

Pseudo R^2 values viz. Cox and Snell, Nagelkerke and McFadden were calculated to find the model fitment.

Classification table showing the prediction of the type of product purchased by the consumers based on the three groups of predicting variables was established in three separate steps to estimate the predictive utility of the most efficient group of predicting variable.

Chi square test of association was conducted for **testing of hypothesis further Cramer's V value was**

calculated to establish the quality of association. Logistic regression was calculated to establish impact of each group of factors adopted for this study.

Table 2 presents the result of product category wise response analysis; electronics was the largest (29.3%) preferred product category. Electronics as a type of goods was adopted as a reference category for further analysis. Health care was the least shopped (3.30%) product category by the respondents.

Table-2 Product Type Wise Shopping Summary		N	Marginal %
Product Type	Health care	15	03.30%
	Electronics	132	29.30%
	Books	65	14.40%
	Beauty & Personal	47	10.40%
	Home & furnishing	27	06.00%
	Apparel & Accessories	123	27.30%
	Baby Products	42	09.30%
Valid		451	100.00%
Missing		0	
Total		451	

(Source: Primary research)

Table 3 presents the result of chi square statistics for association of demographic factors with type of product purchased through on-line mode. Among the seven demographic factors family size, marital status are the only two factors indicating no significant impact on the type of product purchased on-line as a mode of shopping. They are supporting the null hypothesis i.e. H_{0d}, under test, at 0.05% of significance. Rest all five demographic factors supports the alternative hypothesis i.e. H_{1d}.

The result of the overall model fitment of the multinomial logistic regression, where type of product shopped on-line as a mode; was a categorical dependent polytomous response variable with seven categories and seven demographic factors as independent variables, here the p-value 0.000 indicated that the overall model fitted significantly viz. The dependent variable significantly affected by the set of independent variables at the 0.05 significance level.

Table-3 Likelihood Ratio Tests				
	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	931.665 a	0.000	0	
age	942.856	11.191	6	0.083
income	935.041	3.376	6	0.760
family size	948.544	16.879	6	0.010
location	944.454	12.790	12	0.385
gender	943.846	12.181	6	0.058
education	947.227	15.562	12	0.212
marital status	1063.035	131.370	6	0.000
a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.				

(Source: Primary research)

This model significantly rejects the null hypothesis H_{0d}; hence the alternative hypothesis H_{1d} is accepted. The demographic factors can predict the type of product purchased by consumers on-line. The magnitude of predicting accuracy is established by the pseudo R^2 keeping the **McFadden's** R^2 value as reference, for maximization of predictability accuracy Cox and Snell and Nagelkerke R^2 values were calculated.

The improvised **McFadden's** R^2 value was 13.2% for the model Cox and Snell R^2 value measured of this model was at 38.6%. The difference between two R^2 measures, Cox and Snell and Nagelkerke (37.8%) was very marginal indicates the best fitment of the model, at accuracy level of 38.6%.

Table 4 presents summery of product type purchased and respective pre-exposure. Face Book is the highest used plat form scoring (56.10%) and the highest (29.27%) searched products belongs to electronics category.

The result of chi square statistics for association of **product's pre**-exposure factor with type of product purchased through on-line mode. The score (0.85) of chi-square test of association supported the alternate hypothesis $H_{1e,}$ at 0.05% of significance. But the pseudo R-square values indicate a poor percentage **ranging from 1.22% (with reference to McFadden's** R^2 value) to 4.29% (Nagelkerke) for the model, **(based on product's pre**-exposure) indicate very low predictability of type of product purchased only on the basis of pre-exposure on social medias.

Table-4. Product Type * Social Interaction Cross tabulation		Social Interaction Sites			Total Count	Total % Count
		Face Book	Twitter	You Tube		
Product Type	Health care	7	6	2	15	3.33
	Electronics	75	33	24	132	29.27
	Books	40	21	4	65	14.41
	Beauty & Personal	25	20	2	47	10.42
	Home & furnishing	11	9	7	27	5.99
	Apparel & Accessories	71	34	18	123	27.27
	Baby Products	24	10	8	42	9.31
Total- Count		253	133	65	451	
Total- Percentage		56.1	29.49	14.41		

(Source: Primary research)

Even though the pre-exposure had an impact; the predictability with respect to type of product purchased is limited to merely 4.29% only.

The result of chi square statistics for association of motivating factors of on-line product purchase as a shopping mode with type of product purchased through on-line mode. Among the nine motivating factors flexibility, timesaving, impulse and trendy are the only three factors indicating no significant impact on the type of product purchased on-line as a mode of shopping.

The overall model (on-line motivators to type of product purchased) fitted significantly, viz. The **model's p**-value stood at 0.000 indicated that viz. The dependent variable significantly affected by the set of independent variables at the 0.05 significance level, **and the improvised (with reference to McFadden's** R^2

value, which was 22.4% for the model) pseudo R-square (Nagelkerke) measured of this model was at 55.7%. The difference between two R^2 measures, Cox and Snell (54.0%) was very marginal indicates the best fitment of the model. The score (0.00) of chi-square test of association supported the alternate hypothesis $H_{1m,}$ at 0.05% of significance.

The cumulative impact of all models and the parameter of accuracy on the basis of the predictability of the models the highest level of predictability was 53.7% estimated by a model designed on the basis of demographic factors and on-line motivating factors. The lowest predictability was 29.5% out of pre-exposure of product via various on-line sites.

The full model accuracy and model with Demographic factors and on-line motivating factors were both same; indicate the contribution of pre-exposure of product has no significantly contributing for improvising the predictability of type of product purchased by consumers on-line.

Product type wise highest predictability consistency (in 3 models out of 7) was for the electronics as product category.

Apparel & Accessories and Electronics as a product type wise never lost its predictability under all seven model parameters.

Nagelkerke pseudo R^2 was the highest 0.715 for the model based on demographics and on-line motivator factors, where the accuracy of predictability estimated at the highest i.e. 53.7%.

8. LIMITATIONS

Although the results of this study clearly established the predictability of product type purchased by customers through on-line channel, by modeling it in the multinomial equation. The study clearly outlier **the effect of product's pre**-exposure on various on-line sites. But the experimentation with pre exposure only model (total predictability was limited to only 29.5%) had predicted the electronics product category at 70.5% which was the highest in comparison with both the accepted groups for prediction equations. The accuracy imprecision of all the predictive models were based on the pseudo R^2 value keeping McFadden R^2 as base.

This study had not specifically addressing a prominent area of impact due to transaction difficulty, associated with product types.

The contribution of a certain type of product with respect to total transactions done by a specific buyer was not studied. It would have focused respective inclination or value assigned for specific type of product with total products transacted.

The study considered only the buyers eliminating those who had not purchased on-line for any reason. It had eliminated the non users and their de-motivators for such out come. The % of non users in comparison with the size of on-line users for shopping purpose was missing. In absence of that a marketer could not focus on marketing activities for converting them for the usage of on-line for shopping.

The entire effort need to be analyzed further by incorporating parameter estimates of the predictor variables separately for developing accurate marketing mix to suit the response behaviour of the factors matching the needs of on-line channel of shopping.

9. CONCLUSION:

The objective of this study was to estimate the type of product purchased by customers through online, on the basis of their demographic variables, specific motivators of engaging in online transaction and **individual's pre**-exposure of the product communication through any of the popular social media platform. It was established that the predictive model based on demographic factors and motivators of on-line platform facilities together had estimated the type of product purchased up to 50.8%. The independent stand alone estimation model based on demographic factors was estimated up-to 43.5% while as the motivator factors could contributed the product type estimation up-to 41.5% only. It was indicated that the combine predictive model based **on the facilitating factors and the buyer's** demographic factors had the highest estimation (53.7%) on-line type of product purchase behaviour than their independent estimation.

Facilities provided to consumers as motivating factors during on-line transaction had better impact on consumer behaviour than pre-exposure of product through social Medias; the predictive model

independently estimated the product type by 41.5% and 29.5% respectively. The combine effectiveness of these two set of variables had shown estimation up-to 44.1% only. Demographic variable based product estimation was the highest successful (98.37%) in some specific type of Accessories only.

Product class of **'furniture' was the least estimable** among the seven classes of products under study. Predictive model based on demographic factors including, gender, education level, monthly income, marriage status, Internet skills, and access to internet at home.

The predictive relationship between pre-exposure of product on social sites was unable to fit in the estimating model, even though the chi square test of association was significant (it was 0.85 by likelihood parameter). The predictability based on pre-exposure was very poor ranged in 1.22% to 4.29 %; (pseudo R^2) indicated a need to incorporate more layers in this attribute. Marketers looking to derive additional benefits out of social sites need to take additional steps so that the efforts may be motivational leading in-to actual sales.

Further in-depth analysis of singularities revealed in the Hessian matrix associated to the factors of on-line motivating factors such as payment options, social interactions, less physical efforts, impulse purchase, indicate further possibility of merging these motivators in a group. Since their predictability is a like pointing the customer response may be homogeneous for these variables. It is for designing a marketing offer.

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BIOGRAPHIES

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