

**A Study on Online Shopping Behavior:  
Issues and Prospects**

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**Abstract**

In the technical savvy era, online shopping is an emerging area of corporate dialogue in terms of survival and getting more market coverage. Every business house is giving special emphasis on online purchase rather than traditional retail store based purchase. Technological inventions all over the world have changed the perception of consumer behavior. Consumers are playing a significant function in online shopping. The present study empirically assessed the customer perception on online shopping behavior. This study attempted to examine to identify the effective factors and how these factors affecting and influencing the online behavior.

This study is a cross-sectional survey and primary data base. The data have been collected by stratified random sampling method. 120 responses have been considered for the analysis. Collected data has been analyzed by SPSS 21 using KMO and Bartlett's Test to identify which factor is more effective amongst different factors of online shopping. This study findings that identifying different pattern of online product purchase, online purchase frequency, age wise purchase pattern of online purchase. KMO and Bartlett's Test indicates that three influential factors are extracted i.e. technical factor, trust factor, online customer service factor. Study showed that technical factor is important concern in online shopping. Study also showed that consumers those who are tech savvy of the buying procedures online which they feel are very easy.

**Keywords:** Online Shopping, Customer Perceptions, Online Shopping Issues and Prospects, Online Shopping Behavior

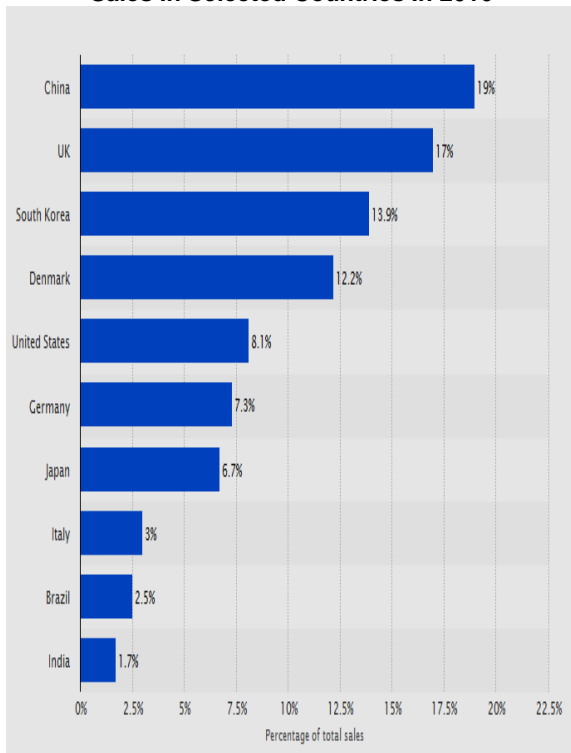
**Introduction**

Online shopping behavior (also called online buying behavior and Internet shopping/buying behavior) refers to the process of purchasing products or services via the Internet. The process consists of five steps similar to those associated with traditional shopping behavior (Liang and Lai, 2000). In the typical online shopping process, when potential consumers recognize a need for some merchandise or service, they go to the Internet and search for need-related information. However, rather than searching actively, at times potential consumers are attracted by information about products or services associated with the felt need. They then evaluate alternatives and choose the one that best fits their criteria for meeting the felt need. Finally, a transaction is conducted and post-sales services provided. Online shopping attitude refers to consumers' psychological state in terms of making purchases on the Internet (Li and Zhang, 2002). In some other countries, such as Iran, however business-to-consumer electronic commerce has been much below than anticipated proportion of total retail business due to its certain limitations (Sylke, Belanger, and Comunale, 2002). Also, E-commerce has become an irreplaceable marketing channel in business transactions.

Online stores and services are important sales channels in B2C transactions. Studying online shopping behavior of consumers has been one of the most important research agendas in e-commerce during the past decade (Chen, 2009). The research of online consumer behavior has been conducted in multiple disciplines including information systems, marketing, management science, psychology and social psychology, etc. (Hoffman and Novak, 1996; Koufaris, 2002; Gefen et al., 2003; Pavlou, 2003, 2006; Cheung et al. 2005; Zhou et al, 2007).

# Asian Resonance

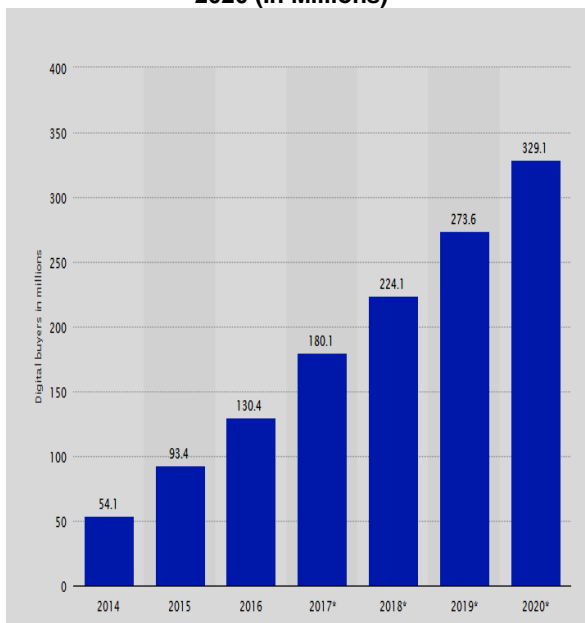
**E-Commerce Sales as Percentage Of Total Retail Sales In Selected Countries In 2016**



Source: www.statista.com

Above figure depicts that, percentage of online sales as share of total retail sales in select countries in 2016. According to the source, online sales China occupied highest percentage 19% followed by UK (17%), Korea (13%), United States accounted for 8.1 percent of total retail sales during 2016. Whereas India occupied lowest 1.7%.

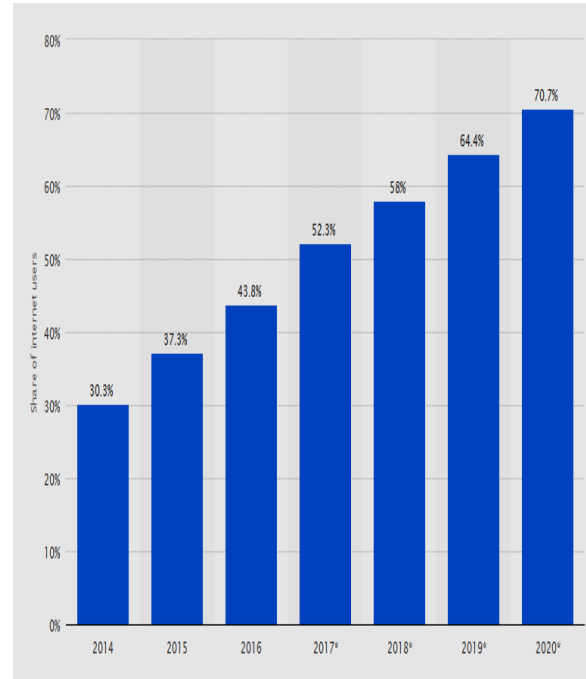
**Number of Digital Buyers In India From 2014 To 2020 (In Millions)**



Source: www.statista.com

Above figure depicts that forecast of the number of online/ digital buyers in India up to 2020, based on the numbers from 2014 to 2016. In 2020, over 329 million people in India are expected to buy goods and services online, up from 130.4 million in 2016.

**Digital Buyer Penetration In India From 2014 To 2020**



Source: www.statista.com

Above figure depicts on the digital buyer penetration in India from 2014 to 2020. In 2016, 43.8 percent of internet users in India had purchased products online. In 2019, this figure is expected to grow to 64.4 percent.

## Review of Literature

Edwards, et al., (1998) revealed that Internet marketing can be associated with direct marketing, as online marketers have shortened the supply chain and reduced operating costs and commission charges. Social networks play an important role in driving consumers online and getting them to engage with brands (Forrester).

This would gain specific significance in light of facts such as India being ranked as Facebook's second largest audience after the US. PwC research of 2015 reported that an increase in e-commerce has slowed in U.S. retail foot traffic. In 2009 there were 35 billion visits, plus or minus. But by 2010, that figure had fallen to about 25 billion visits. By 2012, that number was even lower, to the low 20s billions of visits. In 2013, it had fallen to 17 billion. Digital natives shopped via phone more than the rest of sample in every category: daily, weekly, monthly, a few times a year, and once a year. Moreover, just 39% of digital natives said they never shop via their smart phone, while 56% of other age groups said they never shop via their smart phone. Credit cards (40%), debit cards (28%), cash (20%), and even payment by invoice

(6%) all beat out mobile phones (3%) as the preferred method of payment to conclude a purchase.

Women may seem to be more rational shoppers than men (Eastlick and Feinberg, 1994) because the purchase decisions they more frequently make are better served by an optimizing rather than a minimizing strategy (Alreck & Settle, 2002). Sex differences in online behavior may depend on the kinds of products purchased as they do on contrasting information processing styles (Bhatnagar et al., 2000; Rodgers & Harris, 2003; Van Slyke et al., 2002)

Again, Lamoureux (1997) observed that Online marketing offers more choices and flexibility and, at the same time, eliminates huge inventories, storage costs, utilities, space rental, etc. Together, rich data and wide product assortments would likely lead to consumer Satisfaction with online retailing (Szymanski and Hise, 2000; Bauer et al., 2002).

The lower search costs traditionally associated with online shopping are thought to result in consumers buying better quality items. Top motivators for shopping online which include cash back guarantee, cash on delivery, fast delivery, substantial discounts compared to retail, and access to branded products, while barriers include inability to touch and try products before purchase, fear of faulty products, apprehension of posting personal and financial details online and inability to bargain (TOI, 2013).

Kodandarama Setty (2013) stated that "We are facing some threat from online stores in these electronics categories; however, in the big market of consumer durables we are safe for now". K.Vaitheeswaran (2013) examined the convenience of online shopping "With product getting standardized, specifications getting fixed and the concept of service getting eroded, the post sale responsibility of the retailer has come down drastically. Hence customers go to stores to explore the product physically detail but by online at a cheaper rate. Heavy discounts of e-commerce firms are possible because of their no warehouse model."

Peterson et al. (1997) commented that it is an early stage in Internet development in terms of building an appropriate dedicated model of consumer buying behavior. Decision sequences will be influenced by the starting point of the consumer, the relevant market structures and the characteristics of the product in question. Consumers' attitude towards online shopping is a prominent factor affecting actual buying behavior.

Kim and Benbasat (2003), identified four categories of trust: personal information, product quality and price, customer service, and store presence. Perceived risk has negative influence transaction intentions with Web retailers (Featherman et al, Pavlou, 2002). It has been observed that women view the chance to communicate with others to be among the greatest benefits of the Internet (Brunner and Bennett, 1997).

Jarvenpaa et al. (1999) suggested that reducing the risk associated with buying from an Internet store would increase the probability of a

consumer purchasing from it. Bobbitt et al (2001) revealed that perceptions toward online shopping are not only affected by ease of use, usefulness, and enjoyment, but also by external factors like consumer traits, situational factors, product characteristics, previous online shopping experiences, and trust in online shopping.

Benedict et al (2001) study reveals that perceptions toward online shopping and intention to shop online are not only affected by ease of use, usefulness, and enjoyment, but also by exogenous factors like consumer traits, situational factors, product characteristics, previous online shopping experiences, and trust in online shopping. A Commerce Net/Nielson Media Research Survey found out that 73% users used the Net to window shop, 53% used the Net to make purchase decision, but only 15% bought online. According to a NFO Interactive (1999) study released in May 1999 by online market research firm NFO Interactive, 24.1% of online consumers believe that their internet/online shopping use will decrease the amount they spend on products and services at walk-in type neighborhood or regional retail stores, by the end of 1999. The survey also found that 23.8 % of online shoppers said their internet/online purchasing has increased to the total amount of money they have typically spent in a year or products & services. An OFT Market Study (2007) study establishes the scale and growth of internet shopping is impressive. In 2005, the most recent year for which reliable figures are available, sales to households were over £21bn – a fourfold increase during the previous three years. It is benefiting millions of people and thousands of businesses. Susan Rose et al. (2011) identified online purchase in particular continues to rise, as adoption and penetration levels of Internet technology continuously increase.

Haver (2008) identified Today's younger, more 'green' shoppers aren't going to waste precious money and gas going from store to store looking for just the right item. They shop online whenever they can, narrowing their choices to one or two items then go to the store to touch, feel bounce and check out the actual product to see if it looks the way it was represented online.

### Objectives of the study

This study can be ascertained by the following Research objectives:

1. To identify pattern of products purchased by online consumers through online shopping.
2. To figure out the influencing factors of online shopping

### Methodology

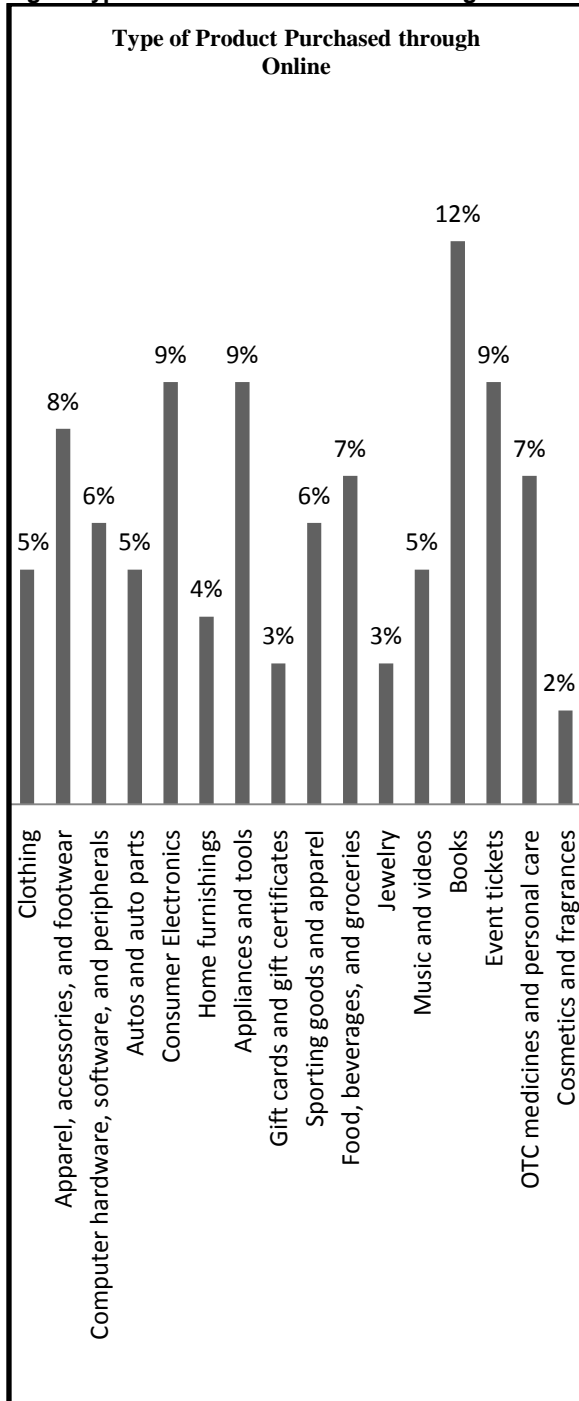
Data for the study undertaken has been collected from the primary source, which is again collected through pre-structured questionnaire. The questionnaires include information on their name, sex, age, country and occupation. Based on SERVQUAL's five dimensions sample size was restricted to 120 respondents. Primary data were collected using a predetermined personally administered questionnaire. The questionnaire was designed to capture sample

# Asian Resonance

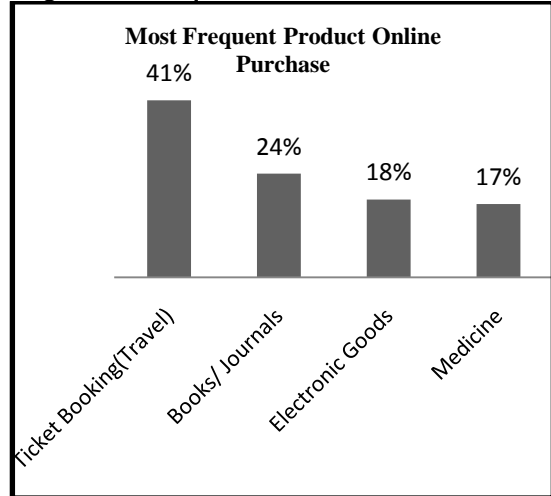
characteristics and the objectives. It has a mix of quantitative and qualitative feedbacks. For quantitative analysis, a five point Likert scale from 1 to 5 was used, where 1 was for the lowest satisfaction level and 5 was for the highest satisfaction level. Collected data has been analyzed by SPSS 21 using KMO and Bartlett's Test to identify effective factors of online shopping. On the basis of factor analysis, researchers identified 3 Dimensions of service quality.

### Data Analysis

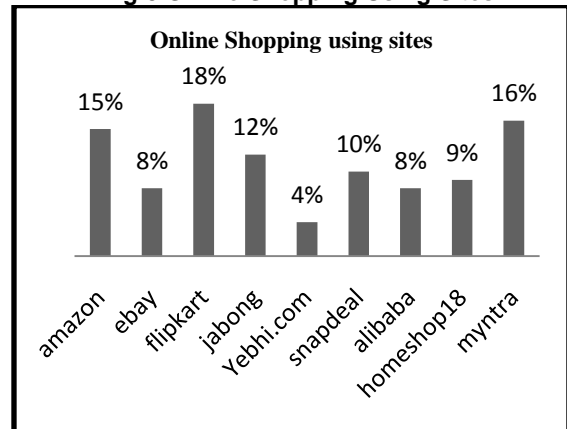
**Fig: 1 Type of Product Purchased Through Online**



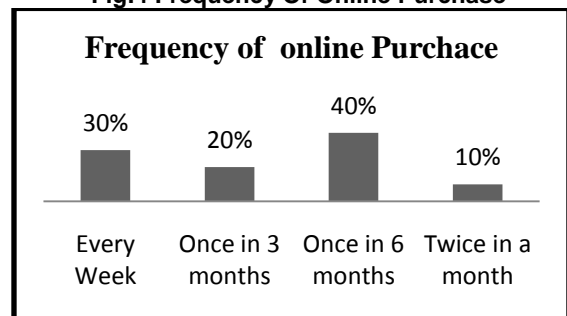
**Fig:2 Most Frequent Product Online Purchase**



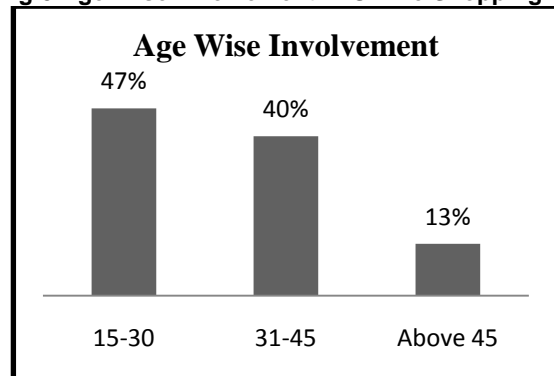
**Fig:3 Online Shopping Using Sites**



**Fig:4 Frequency Of Online Purchase**



**Fig:5 Age Wise Involvement In Online Shopping**



**KMO and Bartlett's Test****Table: 1 Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.975	.975	21

**Table : 2 KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.816
Bartlett's Test of Sphericity	Approx. Chi-Square	4120.672
	df	210
	Sig.	.000

To test the internal consistency and reliability, researchers applied Cronbach Alfa. Here, Cronbach Alfa is 0.975 (See Table 1). This value is above the recommended 0.70. Therefore, the items on the measurement scale are considered to possess

high-internal consistency and reliability. Exploratory Factor Analysis followed by Principal Component Analysis and Varimax with Kaiser Normalization processes were performed to reduce data and to observe whether the different items were properly loaded under several components or not. Close observation did take place on Rotated Component Matrix where factor loading has taken place in order to take a decision about whether regrouping of several items was possible or not. The eigenvalues, the percentage of variance, cumulative percentages, Cronbach's test, Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy and Bartlett's test of sphericity were also conducted for the purpose of this study. According to Kaiser and Cerny (1979), the high shared variance and relatively low uniqueness in variance are indicated by the KMO measure for sampling adequacy (0.816). The Bartlett's Sphericity Test where Chi-square value is 4120.672 ( $p < 0.0001$ ) established that distribution is ellipsoid and amenable to data reduction (See Table 2).

**Table: 3 Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.307	68.130	68.130	14.307	68.130	68.130	6.885	32.787	32.787
2	1.324	6.304	74.434	1.324	6.304	74.434	5.281	25.148	57.935
3	1.183	5.634	80.067	1.183	5.634	80.067	4.648	22.133	80.067
4	.859	4.092	84.159						
5	.751	3.578	87.737						
6	.586	2.792	90.530						
7	.425	2.023	92.553						
8	.318	1.515	94.067						
9	.245	1.169	95.236						
10	.200	.954	96.190						
11	.191	.907	97.098						
12	.162	.773	97.871						
13	.132	.627	98.498						
14	.097	.460	98.959						
15	.068	.323	99.282						
16	.062	.294	99.575						
17	.033	.157	99.733						
18	.024	.115	99.848						
19	.015	.070	99.917						
20	.010	.047	99.965						
21	.007	.035	100.000						

Extraction Method: Principal Component Analysis.

**Table: 4 Rotated Component Matrix<sup>a</sup>**

VARIABLES	Component		
	1	2	3
VAR00001	.676	.127	.535
VAR00002	.815	.292	.254
VAR00003	.720	.518	.260
VAR00004	.517	.591	.194
VAR00005	.250	.249	.903
VAR00006	.571	.119	.687
VAR00007	.270	.519	.660
VAR00008	.192	.776	.518
VAR00009	.383	.726	.361
VAR00010	.462	.804	.181
VAR00011	.440	.812	.180
VAR00012	.794	.457	.175
VAR00013	.729	.353	.291
VAR00014	.594	.391	.323
VAR00015	.545	.355	.652
VAR00016	.661	.347	.426
VAR00017	.742	.259	.462
VAR00018	.325	.528	.568
VAR00019	.550	.473	.496
VAR00020	.208	.591	.593

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 20 iterations.

**Table: 5 Variable Names**

Variable Name	Dimension Name	
VAR00001- Proper Network for smooth functioning of Online Transaction	Technical Factor	
VAR00002- Broad and strong software facilities		
VAR00003-IT specialist person		
VAR00012- Speed of accessing and using the website		
VAR00013- Site's promises about order delivery and item availability are fulfilled		
VAR00014- The Web site projects an image consistent with the organization's image.		
VAR00016- Web site is very little waiting time between my actions and the Web site's response		
VAR00017- Functioning of 24X7X365 basis service, Online assistance		
VAR00019- Continuous improvement on online systems		
VAR00004- Legal regulations for online transactions to protect my information privacy		Trust Factor
VAR00008- Privacy of customer's transaction		
VAR00009- Safe transactions		
VAR00010- Clear information, Degree of customer's belief that the organization's site is safe		
VAR00011- Web site to keep customer personal information		
VAR00005- Transparency		
VAR00006- Multiple / Single decision making centre	Online Customer Service Factor	
VAR00007- Intangible and indirect nature of electronic shopping		
VAR00015- Quality of CRM		
VAR00018- Follow-up		
VAR00020- Secured login process		

The Rotated Component Matrix shows that the values of all the 21 items are greater than 0.5 which strongly support the recommendation of Nunnally and Bernstein (1994) about the factor loading and cross-loading (See Table 4). So, Table 3 established that all the factors are properly loaded under three components.

**Discussions and Findings**

Fig.1 depicts that type of product purchase through online. It has been found that books purchase is highest (12%) followed by appliance and tools (9%), Consumer electronics (9%), Event ticket (9%), Apparel (8%), Medicine (7%) etc. In case of most frequent product online purchase data reveals that ticket booking (41%) is highest followed by Books/Journal purchase (24%), Electronic Goods (18%), Medicine (17%). (See Fig. 2). In case of online shopping using websites Fig.3 depicts that Flipkart is highest (18%) followed by Myntra (16%), Amazon

(15%), Jabong (12%), Snapdeal (10%), homeshop18 (9%), ebay and alibaba both are (8%), yebhi.com (4%). Figure 4 reveals that frequency of online purchase. It depicts that once in 6 months (40%) is highest, every week (30%), once in 3 months (20%) and twice in a month (10%). According to age wise online shopping involvement it has been found that youngsters are more involved in online shopping (47%) rather than elders. The results of the study revealed that amongst the three factors extracted, to first factor comprises of nine items which are related to the website. Hence, it is named as '**Technical Factors**' of internet shopping. It was analyzed that the consumers were satisfied from these services in terms of smooth functioning of the website, site's speed, quick confirmation of the payments, instant replies, round the year online support, etc. The second factor included five items that were related to safety and privacy elements of the service. Hence, the

second factor was renamed as 'Trust Factor'. The study indicates that in organizations need to pay personalized attention to its customers. Problem solving attitude should also prevail in online shopping, as this factor has an impact on assured service dimension. Again, should support service recovery process if any service failure occurs on the part of the organization itself. Empathetic attitude will bring the real difference. Customer satisfaction and trustworthy relationship, according to the study, suggests high customer satisfaction in online shopping and higher loyalty of the customers. The third factor extracted from the factor analysis comprises of six items related to overall strategy. Hence the factor is renamed as 'Online Customer Service Factor'. One of the most critical factors of survival and gaining strategic advantage is that of customer retention. Moreover, organizations those who are providing online shopping need to develop strategies that enhance loyalty of their customers.

### Conclusion

Online shopping depends person to person and the online shopping perception is restricted to the availability of correct connectivity and the publicity to the online shopping. Pattern of the online consumer has similarities and difference based on their personal uniqueness.

This present study depicts that the youngsters are much more attached to the online shopping rather than elder people because elders are not too much tech savvy. The above study revealed that four important factors viz. perceived risk, perceived enjoyment, Perceived Usefulness and Perceived User friendliness to be affecting the online buying behavior in West Bengal. Perceived risk indicates the lack of trust among consumers and many other reasons like that of chance of being cheated, inferior quality of products, non returnable policy etc which influence usefulness of online shopping. According to respondents it has been found that as online shopping is user-friendly then it too some extent it influence enjoyment of shopping those who are teenagers.

Most of the preferred online shopping is online ticket booking. Online Shopping is time saving activity. The consumers those who are tech savvy of the buying procedures online which they feel are very easy. The only issue is trust factor for instance in some online shopping websites consumers have to put their credit card/ debit card details to shop. Also in some the online purchases take a longer delivery time in shipments.

### References

1. Alreck, P., Settle, R. B. (2002). *Gender effects on Internet, catalogue and store shopping. The Journal of Database Marketing*, 9(2), 150-162.
2. Bauer, H. H., Grether, M., Leach, M. (2002). *Building customer relations over the Internet. Industrial Marketing Management*, 31(2), 155-163.
3. Bhatnagar, A., Misra, S., Rao, H. R. (2000). *On risk, convenience, and Internet shopping*

*behavior. Communications of the ACM*, 43 (11), 98-105.

4. Bellman, S, Lohse, Gerald L. & Johnson, E. J. (1999). *Predictors of Online Buying Behavior, Communications of the ACM*, 42 (12), 32-38.
5. Bobbitt, L.M. and Dabholkar, P.A. (2001), "Integrating attitudinal theories to understand and predict use of technology based self-service: the internet as an illustration", *International Journal of Service Industry Management*, 12(5), 423- 50.
6. Boughton S.B. (2005), *Search engine Marketing, Perspective in Business*, 2(1), 29-33  
Brunner C, Bennett D. *Technology and gender: differences in masculine and feminine views. NAASP Bull* 1997;81 (592),46-52.
7. Edwards, N, S. Handcock, S., Mullen, J. (1997). "Electronic commerce: reality bytes", *Supply Management*, 3(8), 32-34.
8. Eastlick, M. A., & Feinberg, R. A. (1994). *Gender differences in mail catalog patronage motives. Journal of Direct Marketing*, 8(2), 37-44.
9. Featherman, M., and Pavlou P. (2002), *Predicting e-services adoption: A perceived risk facets perspective. In J. DeGross (ed.). Proceedings of the Eighth Americas Conference on Information Systems. New York: ACM*, 1034-1046.
10. Jarvenpaa, S.L., and Tractinsky, N. (1999), *Consumer trust in an Internet store: A cross-cultural validation, journal of Computer-Mediated Communication*, 5(2).
11. Kim, D. and Benbasat, I. (2003). *Trust-related arguments in internet stores: A framework for evaluations, Journal of Electronic Commerce Research*, 4(2), 49-64.
12. Lamoureux, T. (1997), *IS goes shopping on the web, Computerworld*, 31(46), 106.
13. Rodgers, S., & Harris, M. A. (2003). *Gender and e-commerce: an exploratory study. Journal of advertising research*, 43(03), 322-329.
14. Shim, J.P., Shin, Yong, B. & Nottingham, Linda (2002). *Retailer Web Site Influence on Customer Shopping: Exploratory Study on Key Factors of Customer Satisfaction, Journal of the Association of Information Systems*, 31 (3), 53-76.
15. Szymanski, D. M., & Hise, R. T. (2000). *E - Satisfaction: an initial examination. Journal of retailing*, 76 (3), 309-322.
16. Teo, Thompson S.H. (2002). *Attitude toward online shopping and the Internet, Behavior and Information Technology*, 21 (4), pp. 259-271.
17. Ali, Pervaiz; Sankaran, Sudha, (2011) "Online Shopping Customer Satisfaction and Loyalty in Norway", Published by LAP Lambert Academic Publishing
18. Chen, Q., Clifford, S.J. and Wells, W. (2000), "Attitude Toward the Site: New Information", *Journal of Advertising Research*, 42(2): 33-45.
19. Charlesworth, and Rita Esen, "Online marketing - a customer - led approach", Oxford University Press Inc, New York, 2007, pp. 16

20. Chuleeporn Changchit, "Consumer Perceptions Of Online Shopping", *Issues in Information Systems*, Volume VII, No. 2, 2006 pp.177-181.
21. Gurinder S Shergill, Zhaobin Chen, (2005) "Web based Shopping: Consumers' Attitudes towards online shopping in New Zealand", *Journal of Electronic Commerce Research*, 6(2), 80
22. Guo Jun, Noor Ismawati Jaafar, (2011) "A study on consumers Attitude towards Online Shopping in China", *International Journal Of Business and Social Science*, 2(22), 122-123
24. Kodandarama Setty (2013), *CMD of Vivek Ltd, Deccan Chronical*,
25. K. Vaitheeswaran, CEO of *Indiaplaza.com, Deccan Chronical*, 29 Jan, 2013  
Maximilian Teltzrow, Bertolt Meyer, Hans-Joachim Lenz, "Multi Channel Consumer Perceptions", *Journal of Electronic Commerce Research*, 8 (1), 2007, pp 19
27. Peterson, R.A., Balasubramanian, S. and Bronnenberg, B. J. (1997). "Exploring the implications of the Internet for consumer marketing", *Journal of the Academy of Marketing Science*, 25(4): 329-346,
28. Philip Kotler (2002) 'Winning on the Web', *Web Metrics paper*, Richard Gay, Allen
29. Ray N, Ghosh D (2014): "Internet Service Quality (I-SQ) Dimensions and their Impact on Consumer Satisfaction: Case from Banking Industry", *Asian Journal of Research In Banking and Finance*, 4(8), 212-221
30. Ray, N. , (2017) "Expectation and Perception of Internet Banking Service Quality of Select Indian Private and Public Sector Banks:." *Online Banking Security Measures and Data Protection*, 58-68
31. Ray, N. (2016) "Impact of Internet Service Quality (IS-QUAL) on Client Satisfaction:." *Handbook of Research on Promotional Strategies and Consumer Influence in the Service Sector*, 371-88
32. Ray, N, and Bhattacharya. A (2016) "Examination of Service Quality Gaps: Evidence from State Bank of India." *Management and Industrial Engineering Green and Lean Management*, , 139-48
33. Ray, N., Sen, K., & Ghosh T N (2016). *Examination Of Internet Banking Customer Perception Of Service Quality: Evidence From Banking Industry*, In Ray N (Ed) *Business Infrastructure for Sustainability in Developing Economies*, IGI-Global, USA
34. Ray, N. (2016). *Impact of Internet Service Quality (IS-QUAL) on Client Satisfaction : Case From Indian Banking Services*, In Singh, U., Kumar R., Ray, N. ( Eds) *Hand Book of Research on Promotional Strategies and Consumer Influence in The Service Sector*, IGI-Global, USA
35. Shim, S., Eastlick, M. E., Lotz, S. L., & Warrington, P. (2001). *An online pre-purchase intentions model: The role of intention to search*. *Journal of Retailing*, 77(3), 397-216. 1.
36. Tonita Perea y Monsuwe , Benedict G.C. Dellaert and Ko de Ruyter "What drives consumers to shop Online? A literature review", *International Journal of Service Industry Management*, Vol. 15 No.1, 2004, pp.102
37. Vaggelis Saprikis, Adamantia Chouliara and Maro Vlachopoulou, "Perceptions towards Online Shopping: Analyzing the Greek University Students' Attitude", *IBIMA Publishing Communications of the IBIMA*, Vol. 2010 (2010), Article ID 854516, pp. 2.