Factors Affecting Online Buying Behavior with Technology Adapting Curve using Analytic Hierarchy Process (AHP) (Longitudinal study)

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ABSTRACT

Purpose:
Many factors influence customer's online buying behavior. The need to identify these factors and their priorities in the mind of the customer when they are purchasing online is crucial for a marketer. This paper exemplifies the priorities of these factors under the technology adaptive curve (TAC). A comparative analysis of adaptation technology in between the first two stages of TAC place in this study.

Methodology:
The Analytic Hierarchy Process (AHP) used to know consumer priorities under MCDM (Multi-CriteriaDecision Making). To get the saturated factors data total of fifty-seven studies were analyzed. To assign the weight to selected factors, a bipolar questionnaire survey was conducted. For further analysis of AHP, the expert choice software used to know the relative importance of selected factors.

Findings:
Results of AHP show that the priorities of factors that influence online shopping behavior change with respect to TAC phases. The findings of this study are helpful to managers in the case of technology adoption in the consumer market, and many others can get benefit from this.

Conclusion:
A specific segment of customers has the same behavior to adopt the technology. This study must be considered before introducing and the second phase of TAC especially in Pakistan.

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1. Introduction

In the current era, technology (e.g, virtual reality, digital, social media, and Neuroimaging technologies) plays a significantrole in all segment of human life, like it has dramatically affected the communication, customer satisfaction: two-way communication with customers and clients(Ghayas & Khan, 2019; Petit, Cheok, Spence, Velasco, & Karunanayaka, 2015; Ghayas & Hussain, 2015), multi-sensory marketing (Velasco, Obrist, Petit, & Spence, 2018),to change the cultural and eating habits (Takeuchi et al., 2014). Also,it hasa significant influence on the professionallives of individuals. In the shape of more sophisticatedsoftwares enable the researchers and practitioners to deal with the data more efficiently(Woods, Velasco, Levitan, Wan, & Spence, 2015). Ban, Kajinami, Narumi, Tanikawa, & Hirose, (2015)stated that Inthe 21st century, the challenges of the mechanism achieved with the help of technology;therefore, technology has been considered as the most essential element in the world due to its role in the reduction of human efforts.In this way, technology and,more specifically, theInternet (net) technology play the most important role in businessandmarketing. Shortly number ofonline buyers will increase furtherby introducing sensory interfaces in virtual and augmented technology(Petit, Velasco, & Spence, 2019). Net technology is the ideal medium for business. Via net, many businesses access to consumers. They communicate locally, nationally and internationally, in the form of text like mail ande-messages or voice call (Ngai, 2003). They also have their official as well other retailer sites like Alibaba(www.alibaba.com), amazon.com to sell their product and services online.It is that we live in technology, not that we use technology("Godfrey Reggio").

The history of human endeavor in the history of the search for comfort life. The search for comfort takes human from its early stone age to the current knowledge era. The journey in search ofcomfort life has always been guided by theidea, while the practical implementation followed later. Currently, humanity is at a point where its technological capabilities are far more advanced as it has the fastest internet in the form of 3G and 4G, and some countries work at 5G. Internet technologies enable human beings to do what was previously impossible. The idea seems high, but it has a flip side attached to it. There is a rising quandary of whether customers will be in a position to absorb the possibilities offered by the technology.

Consumers are accepting the technology, whichresults in the ratio of the net-based consumers are increase day-by-day than to conventional shopping(Shahzad, Jamil, Gul, & Javed, 2019; Khan, Ghayas & Kashif, 2019). Online shopping or net-based shopping refers to shopping products and services from home, via wire or wireless technology (Woerndl, Papagiannidis, Bourlakis, & Li, 2008). Several tools used as a medium for online shopping, like WhatsApp franchise, Facebook, official web pages, google play stores app, etc(Prasad & Amal, 2018).

Pakistanis have become more familiars toweb technology at the end of 2014 after launching the advanced 3G technology. In the results internet users were increased by 344% at the end of the fiscal year 2015 (PTA, 2015),the number of internetusersis increasing rapidly as well as increasing the online buyers(Moshrefjavadi, Rezaie Dolatabadi, Nourbakhsh, Poursaeedi, & Asadollahi, 2012; Pandey & Parmar, 2019). The

modern world offers more opportune for net users to avail the virtual services like OLX, Alibaba.com, Uber, Cream, Daraz.pk, Telemart.pk, Vmart.pk,Yayvo.com, the warehouse.pk, (David Chritian, 2018).In Pakistan virtual buyers also buy services and products by other countries and transfer funds throughan online transition (Arsalan et al., 2012).

Online marketing scattering worldwide (Bertea, 2010), nationally and globally people have tendency for online shopping and marketing (Forsythe et al., 2006; Kukar Kinney 2010), but still some factors do not have positive impact at on net-based buying behavior, for example thecyber-attack,customer information privacy, privacy ofcredit card, transaction risk and, delivery risk, products risk, etc(M Hossein e*t al.*, 2012; Sajjad et al., 2012; Jayendra, 2012), while many others factors attract online consumer-like, time-saving, distance convenience, attitudes, intentions, purchasing behavior, domain-specific innovation, website quality, personal characteristics, product characteristics and net service (Ngai, 2003; Bhatnagar et al., 2000; Kotler, 1997;Cao, Ajjan, & Hong, 2018; Sajjad et al., 2012;M Hossein e*t al.*, 2012; JayendraSinha, 2012; Kim, 2003). These variables behave differently with different consumer purchase intention and awareness of technology(Ngai, 2003;Cao et al., 2018).

Whenever some new technology introduced, consumer adopts it by technology adoption cure. It dependsonthe consumer adoption rate. This curve has five stages from innovators (2.5%)who put themselves in dangerous, tothe late majority (34%) and laggard (16%) who use technology as a servant. No doubt, technology is a dangerous master but also a useful servant. People behave the same way withall kinds of technology because different factors influence differently at innovators and laggards. In business and other fields, understanding these factors is very important for policymakers anddecision-makers. Adding more these factors have different weight for internet technology base shopping and this weights cannot be concluded by second-generation techniques as, second generations' techniques shows the significant impact with dependent variable not important of a different variable. With the passage of time and age of technology, consumer changes their priorities.There is still a gap between understandinghow different factors are important for online consumers. What are their priorities?While they have technology-basedshopping. Thispaper discusses the weight (Eigenvalues) of factors; the higher weighted factors reveals the importance of web technology-based shopping. Longitudinaldata were collected to compare the priorities of innovators and the early majority by using the AHP technique. This paper is beneficial for Pakistani web base shopping and the rest of the World. Notably, the countries who are at the same stage or will adopt the fastest internet technology later. This paper will lead to top management to make an authentic and evidence-baseddecision. The technology adaption process in all fields is the same so this paper can be helpful in other technological fields too. It also discusses which factors need to understand and play the rules of huddles in the adaption of technology.

2. Literature review

Literature shows that the vitalessential factors for net-based shopping are risk and trust. Most studies found that perceived risk was negatively associated with net-based purchase behavior. However, some studies found that there is no statistically significant

relationship, and others found a positive relationship with net-based consumer behaviors (Pelaez, Chen, & Chen, 2019).Financial and product risk, trust, attitude, customer satisfaction, product risk, individual internet skills, brand association, non-delivery risk, return policy, income, brand identity (Moshrefjavadi et al., 2012). Brand loyalty and trust overcome the negative influence of perceived risk and positively associated with attitude (Shay & Van Der Horst, 2019). More satisfied net-based individuals show a statistically positive association with net-based buying behavior(cao et al., 2018; Qalati, Yuan, Iqbal, Hussain, & Ali, 2019). Individualnet-based buying behavior can determine with attitude, subjective norms, and perceived behavioral control. These variables are positive and significantly associated with net-based consumer buying intention(Gupta & Shukla, 2019; Pandey & Parmar, 2019.

domain-specific innovativeness(Rogers and Shoemaker, 1971)perceived behavior control (Ajzen & Madden, 1986) risk, trust, attitude customer satisfaction, perceived technology, brand awareness, demographic factors have significant impact on net-based buying behavior (Sajjad et al., 2012; Yang et al., 2007; Jayendra, 2012, George, 2004)., internet speed, education, user friendly software, brand personality, web design, transection process, convenience risk, social class (Orapin 2009; Zhou, 2007; Lu 2012;Moshrefjavadi et al., 2012) , search infrastructure, competence and benefit, age, gender (Singh, 2014), service and infrastructural variable, brand behavior and attitude, occupation, marital status and ethnicity (Kearney et al., 2001; Kim 2003; Khalifa 2003; Li & Zhang 2002; Jadhav and Khanna,. 2016); these all are those factors which which are significantly associated with net-based buying behavior.

3. Methodology

3.1. Measurement Procedure For Net-Based Buying Behavior

The method for measuring net-based buying behavior organize in three stages as show in Figure 1. These stages are asidentification, selection,and prioritization, respectively. AHP use to manage the factors, evaluation ofthe factors and set them at the base of priority. It evaluates at the base of pair-wise matrix comparison (Sun, 2001; Render and stair, 2000). These factors were identified in 2017. The questionnaire was filled two timesin July 2016 andJuly 2019. In 2016,the online platform was not so much popular in Pakistan. That's why only innovators use them. While,the Pakistani market was almost saturated in 2019, as the marginal net user is decreasingthere for, customer priorities are changing. Itis a longitudinal based study. In this study data was collected in 2017 and 2019, that's why, so we keep the same variables which we drew from literature in 2017

3.2. Stage 1: Identification

Several variablesinfluencenet-based buying behavior. In order to know these factors,the authors search different journal which must have an impact factor with the keyword, net-based buying behavior, online shopping, and online purchase intention. To get saturated variable list author studies 57 papers. Then categories these variables into three levels, the net-based buying behavior as theprimary goal keep at the top. Foremost dimensions and their sub-dimension. Further authors select those variables which are the most repeated in different papers literature. In this stage, the author identifies 33 potential dimensions and sub-dimensions of net-based buying behavior (Ajzen 1991; Orapin 2009;

Zhou, 2011; Lu 2012; Moshrefjavadi et al., 2012; Kearney et al., 2001; Kim 2003; Khalifa 2003; Li & Zhang 2002). These dimensions of net-based buying behavior and sub-dimension are reported in Table 1, respectively.

3.3. Stage 2: Selection of Dimensions and Sub-dimensions

By using the dimensions and sub-dimensions which were collected in stage 1 as exhibited in Table 1, the authordeveloped a bipolar questionnaire to select the most relevant factors for parents' variable among dimension as well as sub-dimensions.A nine-point bipolar questionnaire used to collect data. these nine points used to favor one variable between two variable under attraction of parents variable. This questionnaire is further categories into two-part. The dimension of net-based shopping behavior are discussed in 1st part. while the second part discussed the sub-dimension of net based shopping behavior.The total of 104 questions were designed to cover the both parts. The 1st part consist on 36 questions as fordimension and second consist on 68 questions as for ub-dimension of net-based buying behavior.

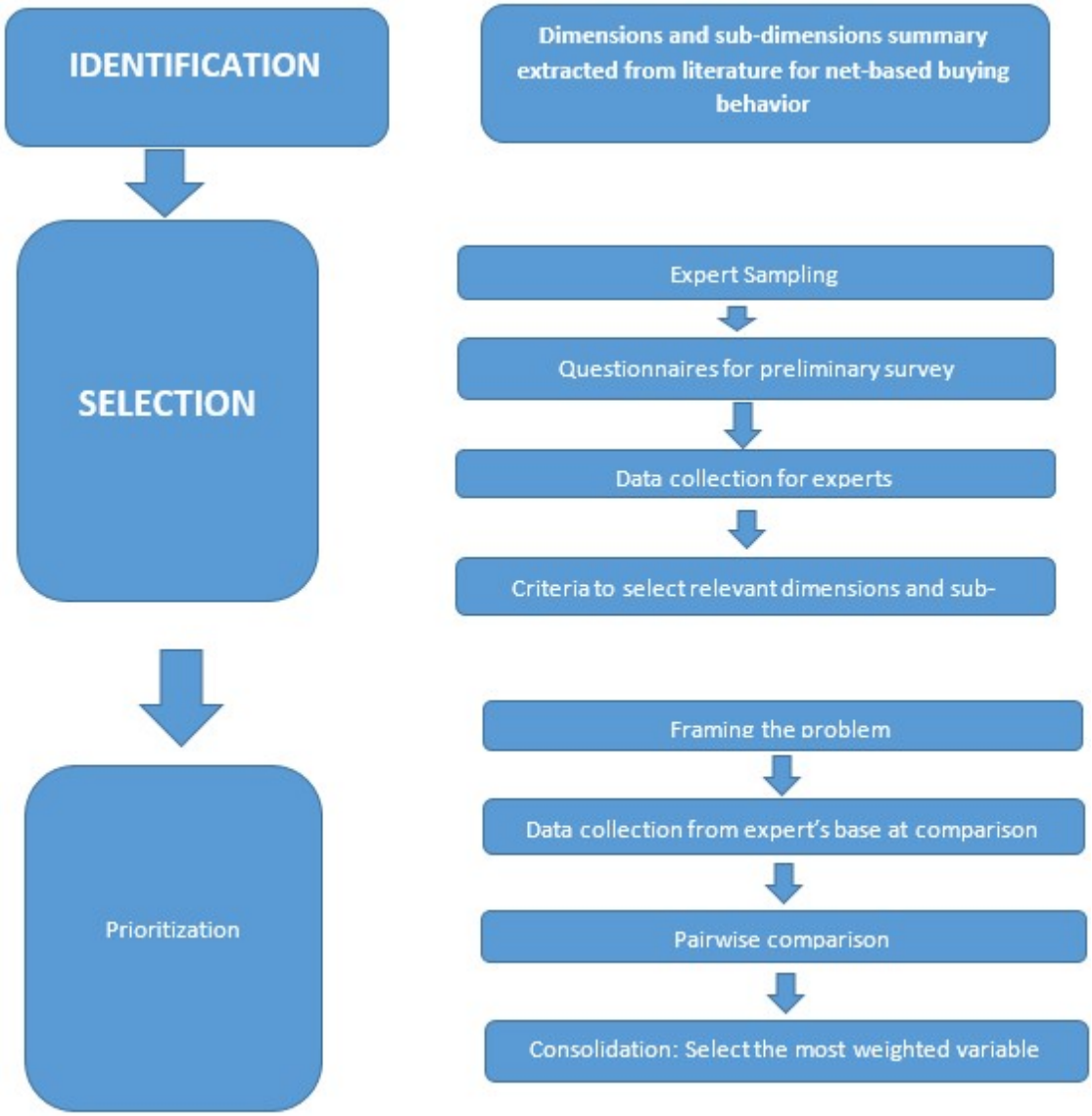

Figure.1. Stages in measuring consumer net-based

This study focus to find and identified the relevant variables with net-basedbuying behavior in Pakistan. Tri groups of experts: industrial experts, factuality members, and consumers, were use to set priorities of differents factors which based on net-based buying behavior. The industrial experts was consist on operational managers in different organizations, andthey deal online customer and complines departs.Selectedmanagers have more than 5year's experienceto manage online customers.These organizations are Draz.pk, Homeshopping.pk, iShopping.pk, telemart.pk and pk.oriflame.com, two faculty members: marketing lecturers have more than 7 years' research experience,final group of consumers was selected. The three consumers who have more than RS 300k amount shopping in last years and also concern with net-based buying behavior more than 3 years. Table 2 shows the details of the experts, for the current study.

Table.1. Potential dimensions and sub-dimensions of net-based buying behavior in Pakistan

Part A: Potential dimensions	
Risk	Perceived Technology
Trust	Brand awareness
Customer satisfaction	Demographic
Domain-Specific innovativeness	Perceived behavior control
Attitude	
Part B: Potential Sub-dimensions	
Financial Risk	Individual internet skills
Product Risk	Internet speed
Convenience Risk	User-friendly software
Nondelivery risk	Web design
Return policy	Search (product) infrastructural
Transaction process	Competence and benefits
Brand identity	Brand personality
Brand behavior and attitude	Brand association
Age	Gender
Income	Marital status
Education	Social class
Occupation	Ethnicity

Table.2.Experts sampled

Expert group	**Stakeholders**	**Number sampled**	**Cumulative number**
Industry professionals	Draz.pk, Homeshopping.pk, iShopping.pk, telemart.pk and pk.oriflame.com	5	5
Faculty members	Universities	2	7
Consumers	Online market	3	10
Total numbers of experts		10	10

Industrial experts have more than 5 years' experience in a managerial post in concern organization and dealing with issues related to net-based buying behavior in Pakistan.

All selected variables was aling with respect of hierarchy of goal, for example, dimensions of net-based buying behavior and the sub-dimension. The importantobjective

was to design an index that can clarifywidely the levels of net-based buying behavior. Figure 2 shows how the AHP order can be established to measure net-based buying behavior by single varuable, hypothetically. The second and third levels of the hierarchy portray the dimensions and sub-dimensions of net-based buying behavior.

3.4. Stage 3: Prioritization

Previous two-stage identified the dimension of net-based buying behavior and sub-dimension and also develop the AHP hierarchy on the base of 10 selected experts. In this stage,the authors calculate the weight to the selected sub-dimension and dimension of net-based buying behavior concerning their importance by using the AHP hierarchy. Once the hierarchy established a questionnaire of bi-polar question Saaty's (1980) scale (Table 3) use to select the priority of dimension and sub-dimension of net-based buying behavior. The bi-polar questionnaire was designed to collect the pairwise comparison judgments from the same 10 experts. The experts were required to compare the importance across and within dimensions.

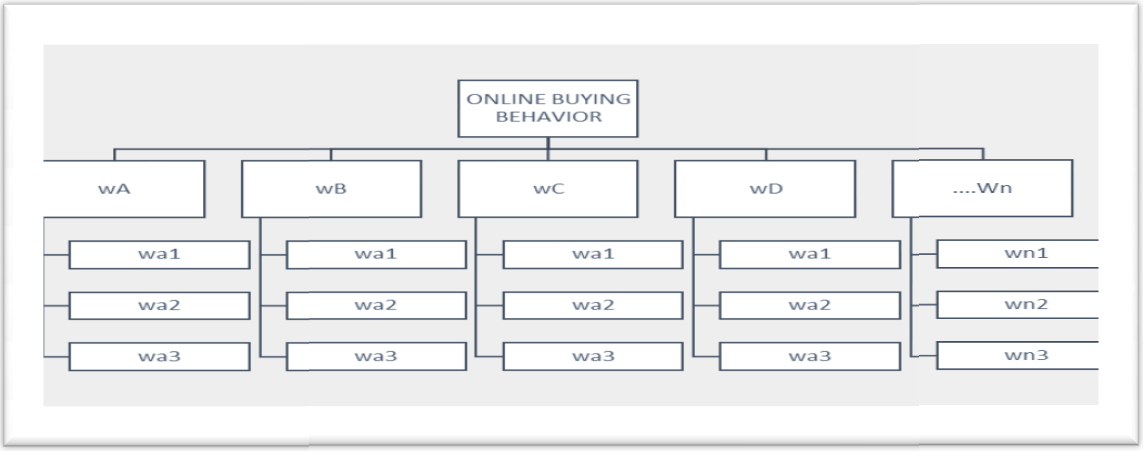

Figure.2. AHP hierarchy

In AHP dimension and sub-dimension are measured by pairwise comparisons, and relies on the judgments of experts to derive priority scales. However, the consistency of judgment is the main rolein AHP of experts, use to judge the reliabilities of data. A questionnaire was used for data collection. The collected data further processed to build the corresponding pairwise comparison judgment matrices (PCJM), to establish the normalized weights. These matrices of responses converted into the most massive eigenvalue problem and solved to select the normalized and unique significant weights for individual criterion. At this stage, the consistency ratio(CR) of each PCJM was also computed to confirm the behavior consistency of experts/evaluators. According to Saaty (1980), if the CR ratio exceeds 0.1, the experts or evaluators will be inconsistent to answer. The inconsistent respondent was ask again to answer the question.In current study author face same prictace two time to reduce the CR value. On otherhand,the zero value of CR show that the respondent isentirely consistent, while at 0.05 show that CR is trustable for PCJM. The Expert choice software was used to confirm the eigenvalue and consistency ratio.Once the eigenvalue of dimension and sub-dimension was calculated

individually then it was consolidate of all respondents, next was to set variables as per priority or eigenvalues for further process.

Numeric value	Verbal judgment
1	Both dimensions are equally important
2, 3	Moderately more important
4, 5	Strongly more important
6, 7	Very strongly more important
8, 9	Extremely important
2, 4, 6, 8	Intermediate values

AHP measurement scale. (Saaty, 1980)

4. Results

The weighted result of dimension and sub-dimension shows in figure 3 and figure 4 respectively. These results arrange Concerninghigh weight to low weight, respectively. These weight assign with the help of expert choice by pairwise comparison as per assigns priority. It reports the PCJM of net-based buying behavior.

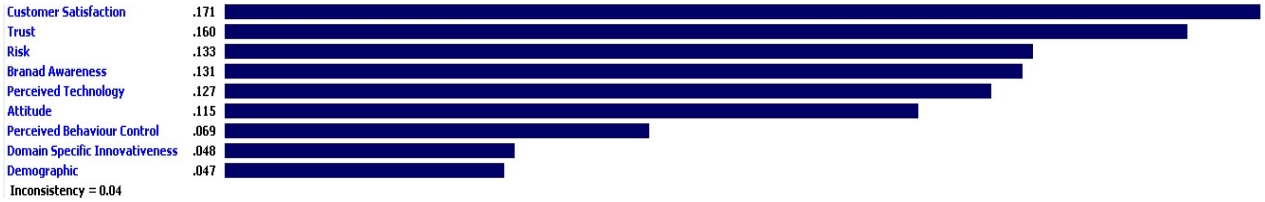

Figure.3. weighted result of dimension and sub-dimension

AHP Hierarchy: the selected dimension of net-based buying behavior in July 2019 Figure 4

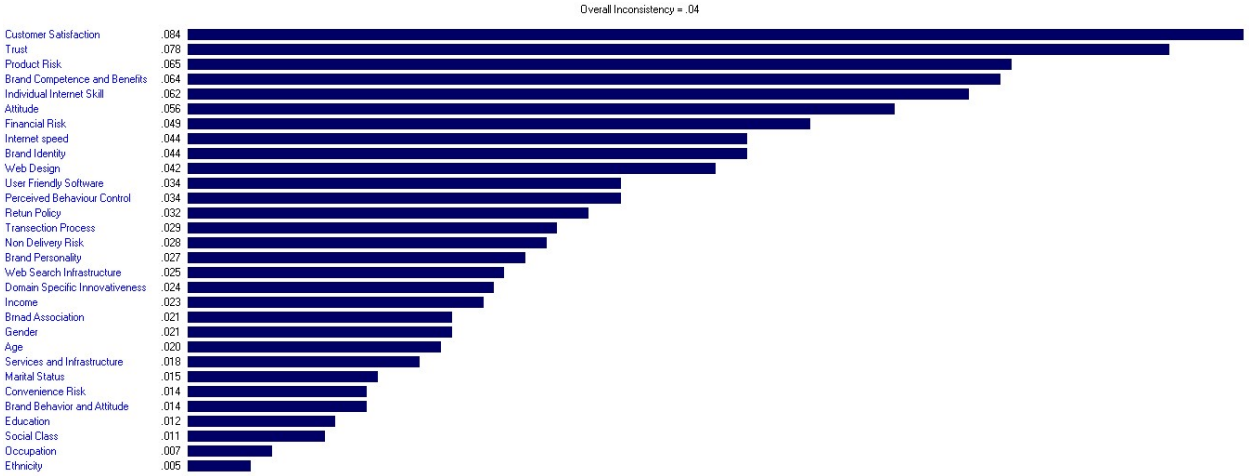

Fig 4: AHP Hierarchy: selected dimension and sub-dimension of net-based buying behavior in July 2019

Above calculation are found by using expert choice software. According to the above result,customer satisfaction, trust, risk, brand awareness, perceived technology, attitude, perceived behavior control, domain-specific innovativeness, and demographics have higher weighted, respectively. While in sub-variablesand variables, including customer satisfaction, trust. Product risk, brand competence and benefits, individualinternet skill, attitude, financial risk, internet speed brand identity, web design, user friendly software, perceived behavior control, return policy, transection process, non-delivery risk, brand personality, web search infrastructure, domain-specific innovativeness, income, brand association, gender, age, services and infrastructure, marital status, convenience risk, brand behavior and attitude, education, social class, occupation, and ethnicity have high weighted respectively. However,the author selectsthe top 6 dimensions, namely perceived risk, trust, attitude, customer satisfaction, perceived technology, and brand awareness for further graphical representation, and in sub-dimension author selectstop-weighted sub-dimension of each dimension to understandingquickly by graphical representation in Fig 5.

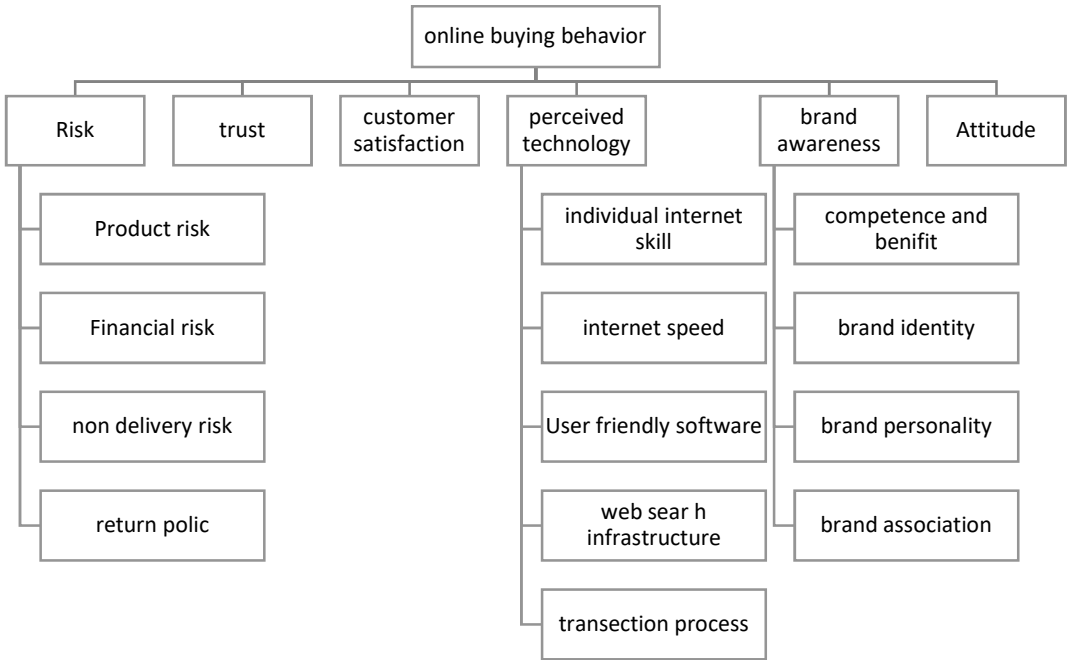

Figure. 5.AHP Hierarchy: top Eigenvalues dimension and sub-dimension of net-based buying behavior

Table 4: Pair-wise comparison judgment matrices (PCJM)-Main Dimensions

	Perceived technology (PC)	**Brand awarene ss (BA)**	**Demograp hic (D)**	**Perceived behavior control (PBC)**	**Trust (T)**	**Customer satisfactio n (CS)**	**Domain-specific innovati veness (DSI)**	**Attitude (A)**	**Risk (R)**
PC	1								
BA	-0.74907	1							
D	0.582184	0.422315	1						
PBC	0.447658	0.287992	-0.38446	1					
T	-0.65963	-0.60404	0.31824	-0.33223	1				

CS	0.696626	-0.74907	-0.33533	-0.30571	-0.57049	1			
DSI	0.355415	0.291092	-0.68518	0.33019	0.310026	0.294647	1		
A	-0.90934	-0.748	-0.36997	-0.44978	0.507808	0.447658	-0.45248	1	
R	-0.90495	0.839433	0.438172	0.515687	0.806387	0.881593	0.612569	0.827753	1

Table 5: Pair-wise comparison judgment matrices (PCJM)-Sub-Dimensions of risk (July 2019)

	Product risk (PR)	**Financial risk (FR)**	**Nondelivery risk (NDR)**	**Return policy (RP)**	**Services and infrastructure (SAI)**	**Convenience risk (CR)**
PR	1					
FR	0.464466	1				
NDR	0.431457	0.51325	1			
RP	0.51325	0.494675	0.777206	1		
SAI	0.273316	0.283578	0.729741	0.34585	1	
CR	0.34585	0.34585	0.494675	0.372309	0.489407	1

Inconsistency 0.03

Table 6: Pair-wise comparison judgment matrices (PCJM)-Sub-Dimensions of perceived technology (July 2019)

	Individual intent skill (IIS)	**Internet speed (IS)**	**User-friendly software (UFS)**	**Web design (WD)**	**Web search infrastructure (WSI)**	**Transactional process (TP)**
IIS	1					
IS	0.526848	1				
UFS	0.51325	0.532521	1			
WD	0.481904	0.881593	0.777206	1		
WSI	0.464466	0.481904	0.749075	0.400794	1	
TP	0.827753	0.881593	0.827753	0.438172	0.685176	1

Inconsistency 0.05

Table 7: Pair-wise comparison judgment matrices (PCJM)-Sub-Dimensions of perceived technology (July 2019)

	Competence and benefit (CAB)	**Brand identity (BI)**	**Brand personally (BP)**	**Brand association (BA)**	**Brand behavior and attitude(BBA)**
CAB	1				
BI	0.476774	1			
BP	0.358836	0.358836	1		
BA	0.372309	0.54663	0.54663	1	
BBA	0.310026	0.358836	0.386288	0.540809	1

Inconsistency 0.04

Table 8: Pair-wise comparison judgment matrices (PCJM)-Sub-Dimensions of Demographic

	Age (A)	Gender (G)	Income (I)	Marital status (MS)	Education (Edu)	Social class (SC)	Occupation (O)	Ethnicity (E)
A	1							
G	0.749075	1						
I	0.777206	0.881593	1					
MS	0.582184	0.827753	0.345133	1				
Edu	0.604043	0.403193	0.449782	0.604043	1			
SC	0.567157	0.34585	0.481904	0.481904	0.797798	1		
O	0.729741	0.358836	0.291092	0.396525	0.372309	0.382174	1	
E	0.273316	0.266261	0.256625	0.464466	0.297236	0.283578	0.428266	1

Table 9: Derivation of net-based buying behavior index

Goal	Dimensions	Local weight (2016)	Local weight (2019)	Sub-dimensions	Local weight (2016)	Local weight (2019)	Global weights (2016)	Global weights (2019)
OBB	Risk	.165	.133	Financial risk	.416	.236	.068	.031
				Product risk	.208	.315	.034	.042
				Convenience risk	.069	.069	.011	.009
				Non delivery risk	.138	.137	.023	.018
				Return policy	.110	.157	.018	.021
				Services and infrastructure variable	.060	.086	.010	.011
	Trust	.157	.160		.157	.160	.157	.160
	Perceived behavior control	.049	.069		.049	.069	.049	.069
	Perceived technology	.124	.127	Individual internet skills	.243	.262	.030	.033
				Internet speed	.215	.184	.027	.023
				User friendly software	.131	.143	.016	.018
				Web design	.076	.180	.009	.023
				Web Searching infrastructure	.179	.108	.022	.014
				Transection process	.157	.108	.019	.016
	Brand awareness	.095	.131	Competence and benefit	.101	.378	.010	.050
				Brand identity	.277	.258	.026	.034
				Brand personality	.196	.159	.019	.021
				Brand association	.343	.124	.033	.016
				Brand behavior and attitude	.082	.081	.008	.011
	Attitude	.143	.115		.143	.115	.143	.115
	Domain specific	.059	.048		.059	.048	.059	.048

innovativeness							
demographic	.078	.047	Age	.091	.177	.007	.008
			Gender	.140	.187	.011	.009
			Income	.269	.201	.021	.009
			Marital status	.064	.129	.005	.006
			Education	.207	.105	.016	.005
			Social class	.129	.097	.010	.005
			Occupation	.064	.064	.005	.003
			Ethnicity	.035	.040	.003	.002
Customer satisfaction	.131	.171		.131	.171	.131	.171
Total	**1.00**	1		**4.54**	**4.54**	**1**	**1**

Derivation of net-based buying behavior index

According to Professor Saaty, the sum of all global weight should be equal to1 as shown in table 9. Data was collected in 2016 and 2019 to comparison of selected variables' prioritiesfor the technology adaption curve. These variable priorities are set at the base of local and global weight, which was assigned at the base of the experts' response. In 2016 net user was at innovator, and they consider risk, trust, attitude, customer satisfaction, perceived technology, brand awareness, demographics, domain-specific innovativeness, and perceived behavior control are important respectively for net-based buying behavior. However, this order of importance was not the same for the early majority. Because innovators' experience was excellent so the early majority was satisfied with net technology adaption, so they change their priorities. According to early majorities, priorities are set as customer satisfaction, trust, risk, brand awareness, perceived technology, attitude, perceived behavior control, domain-specific innovativeness and demographic. The results show that for innovators risk, trust, attitude, and customer satisfaction had more important for technology adoption. However early majority focus more at their satisfaction in product or services, purchase from the trusted online domain, somewhere found, still a risk, and focus at branded items then they perceive technology. In 2016 customers were more concern with the individual personal related variable at the customer's hand while in 2019 they move toward the product like brand awareness.

According to sub-dimension, the financial risk was at the top in 2016 with global weight 0.082, while in 2019, this is going at 06 number with 0.049. Trust is still at second position with 0.078 and 0.078, respectively. The attitude variable was inthe 3rd position, now it goes to 6th position and now third position cove with product risk. Individual internet skillsare still held the same 5th position with .061 and .062 weight.

The variables with high weights are put in fig 5 with respect to high value. Futures researchers can apply PLS-SEM to these variable to know how much they have an impact on net base buying. Future research can take place with different techniques like fuzzy AHP, outranking a technique for order preference by similarity to the ideal solution for the prioritization of net-based buying behavior.The same variable can be considered for further longitudinal study for the late majority as well.

5. Conclusion

This is a longitudinal study, discussed the factors that are more important before understanding new technology,especially in marketing. For this purpose, nine dimensions and 25 sub-dimensions were selected. According to finding (table 9) customer

satisfaction, trust, perceived risk, brand awareness are beforean understanding before introducing new technology, while these priorities are changed for innovators as perceived risk, trust, attitude, and customer satisfaction.

This study mainly discusses the marketing variable, however, according to technology adaption curve all kinds of new technology almost have the same behavior for beneficiary and beneficiary have same attitudes and behavior with respect of curve, So these finding can apply to all type of technology which hasan impact at discussed variables in worldwide.

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