Personalization and User Decision Making Model with cognitive and hedonic experience

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Abstract: Personalization is frequently used to reduce information overload, retain customers and leveraging business by online web portals in recent years. Though, less attention has been paid to design aspects of website personalization and its influence on users' decision making. To address this gap, the study draws model based on Stimulus-Organism-Response theory and propose a personalization model for users information processing and decision making. Different personalization aspects induce cognitive and hedonic user's experience during interaction with websites which in turn generates satisfaction and effects on users' decision making to revisit the personalized website. Research identifies personalization aspects used in e-commerce websites, proposes research model and validates it empirically. Exploratory Factor Analysis (EFA) identifies seven factors as information, navigation, presentation personalization, cognitive, hedonic experience, satisfaction and intention to revisit personalized website. Model is tested with 547 valid responses out of 600 data collected through convenience sampling using survey method from ecommerce website users were used for analysis. Confirmatory Factor Analysis(CFA) result shows interrelation of constructs information, presentation, navigation, cognitive, hedonic experience, satisfaction and intention to revisit. CFA result validates model with RMSEA, CFI, NFI value near .9 indicates good model fit for ecommerce websites. Structural Equation Modeling result indicates correlation between personalization aspects and users' satisfaction, intention to revisit through cognitive and hedonic experience. Research shows different design aspects of personalized website plays an important role in forming user's positive cognitive experience induce perceived ease of use, usefulness, enjoyment, hedonic experience of control leading higher satisfaction level and revisit of e-commerce website.

Keywords: *Web Personalization, Information Personalization, Navigation Personalization, Presentation Personalization, Cognitive experience, Hedonic experience, satisfaction, perceived ease of use, perceived usefulness, enjoyment, control.*

I.INTRODUCTION:

Website has invaluable source for information exchange for users and E-tailers. Today every part of business and social media worldwide are using the website as an integral part of business to interact with the customer, brand promotions, marketing, after sales services and support. Diversity of its users need and complexity of web application leads to information overload and one-size-fits-all issue. Cognitive limitation of user information processing lead to lost users in the world of information and result into inefficiency in decision making. Website personalization has emerged as an effective solution to overcome this problem of information overload in recent years. Personalized services are provided by E-tailers with online websites to attract the users, retain existing customers and to be competitive in the business environment. Ecommerce websites like amazon.in, flipkart.com, ebay.in etc provide personalization features, personalized offerings with categories of products and services to attract and retain users. Previous research shows significant effect of perceived usefulness of personalized e-services (Liang et al. 2012), users interest in personalized services (Kosba et al. 2007), and indicated that different personalized services have different effect on customer satisfaction (Alpert et al.2003). Web personalization has become a pervasive phenomenon in a wide range of web applications, e.g. Internet banking, e-commerce etc.Customers have become increasingly aware of these personalization features and have learned to demand them (Oulasvirta and Blom 2008). Accordingly, a boom in research on real-world implementation of personalization features has been witnessed recently, and typically focusing on the impact of isolated, one-dimensional personalization features on users. These studies have focussed on one or two dimensions of web personalization adopted in websites and its effect on user with respect to information processing and affective reaction with customer retention (Kwon et al. 2012, Liang et al. 2009, Wang et al. 2010). In general, it has been recognized that necessary and well designed personalization features facilitate the effectiveness, perceived usefulness, perceived ease of use and efficiency as well as the feeling of enjoyment, control and satisfaction while using a website. Such features have become increasingly diverse and multifaceted in Information System (IS) and Human Computer Interaction (HCI) Research. In light of this, and in view of a continuing gap in the contemporary literature, this research different personalization aspects, the role played by these aspects of personalization used in ecommerce website design and how they impact the user intention to revisit or reuse the website. We would also like to study personalization design aspects of e-commerce websites and its impact on user information processing and aspects related to it.

Kwon et al. 2012 studied personalization in dimensions of object(What should be personalized), subject(Who does) and (to what extent)level with respect to customer retention. (May Wang 2009) studied What to personalize, its cognitive effect and affective reaction on users. (Wu et al. 2003) scored level of personalization based on the breadth and depth of the personalization options on offer. The "what" to personalize represents objects to be personalized i.e. information/content, website interface, structure/functionality/navigation. (Bunt et al. 2004) also classified Personalization as static or dynamic based on when personalization can be enacted according to the object/objects for which personalization has been designed to individual or group.

Personalization can also be examined based on the degree to which personalization is automated and (implicit or explicit) user involvement (Bunt et al. 2007; Fan and Poole 2006).Among all the issues pertaining to personalization, "what" to personalize is the most fundamental problem researched for the effective personalized website design. Different design aspect of personalization may have different impact on users' information processing and decision making. Moreover, the different roles played by different personalization features in website design have not been comprehensively investigated. Effective personalized website design is an important issue to be researched to meet the expectation and dynamic need of the users. Different design aspects of personalization impact differently on user's perception, and fulfil different kinds of user requirements. However in previous literature, studies often have focussed on only one or more aspects of personalization, e.g. information personalization (Dabholkar and Sheng 2012, Kwon et al. 2012, May Wang 2009, Komiak and Benbasat 2006, Liang et al. 2006, Tam and Ho 2006) or visualization (Blom and Monk 2003, Nadkarni and Gupta 2007) but little is researched on effectiveness of the design aspects of personalization. Few studies investigate the roles played by multiple dimensions of personalization (May Wang 2010). In fact, the existing literature has serious deficit in actionable guidance on personalization design issues and effective personalized web design. To address these gaps in research, this study comprehensively reviews literature in personalization and develops methodologically constructed model for personalized website design and test the impact of different aspects of personalization. Based on environmental psychology theory and TAM, this paper investigates the different roles played by dimensions of personalization, i.e. information personalization, presentation personalization, and navigation personalization. This research is focusing on interdisciplinary nature of personalized website design and its effect on users intention to revisit the website from the field of IS and HCI. This paper is organized as follows: section II discusses previous studies on various personalization dimensions. Section III represent Research model derived from previous studies and corresponding hypotheses. Section IV describes research methodology, research design and data collection with analysis. Section V summarizes the results of the data analysis with EFA, CFA, and SEM. Results are discussed with major findings, theoretical and practical contributions, limitations, and possible directions for future work in section VI.

II. PERSONALIZATION RESEARCH:

Personalization is the process of catering tailored content, website structure and look & Feel of Website with presentation by identifying users' implicit and explicit needs(Desai 2017). Personalization has been researched by large community of researchers from diverse fields; research in personalization can be classified into three streams (Oulasvirta and Blom 2008) of research on personalization in the information systems area. The first stream focuses on examining different types of personalized services and their potential applications in different marketing domains (e.g., Brusilovsky et al., 2007). The second is dedicated to designing technologies for personalized services with an emphasis on the receiver's profile, and then matching the personalized service with the receiver's needs by using tools such as data and text mining (Shahabi and Banaei-Kashani, 2003; Zhang et al., 2007). The third category evaluates the effect of personalized services on the receiver's' attitudes and acceptance of recommendation intention (Komiak and Benbasat, 2006; Liang et al., 2006; Tam and Ho, 2005; Tam et al., 2006).

Previous research has approached personalization from several dimensions in last few decades, which, in summary answers the questions 'what', 'who', 'how,' 'to whom' , 'to what extent'', 'when,' and 'based on what,' in personalization research which we have elaborated as follows in Table 1.1:

Table 1: Personalization classification and evaluation Research

Dimensions	Explanation	References
What should be personalized(object), who does(subject) and to what extent(level)	Content , Interface and to whom i.e 1-1/1-N/1-all, who does(system initiated or user initiated)	Kwiseok Kwon, Cookhwan Kim (2012)
What should be personalized & Personalize to whom	Content, interface, functionality, Channel ,personalization to whom i.e 1-N and 1-1	Chao wen, victor prybutok & chenyan xu (2011)
Perceived risk on intention to buy & What should be personalized	Reduction of perceived risk enhances customer satisfaction and purchase intention	Narongsak Thongpapanal & Abdul Rehman (2011)
What should be personalized	Information/Content, Interface, Navigation Personalization effect on decision process of the user	WANG Ying(2009)
What should be personalized Who does Personalization & Personalize to whom	Content, interface, functionality, Channel , Individuals or categories of Individuals	(Sunnika and Bragge 2008)
What should be personalized To Whom Personalize & Who does Personalization	Content, interface, functionality, Channel, 1-1,1-N, Implicit or Explicit	(Tam Ho 2008;Fan and Poole 2006)
Personalize to whom	Individuals or categories of	(Fan and Poole 2006)

	Individuals	
Who personalizes	Implicit or explicit personalization user or system personalization	(Bunt et al. 2007; Fan and Poole 2006)
When to personalize	Static or dynamic	(Bunt et al. 2004)
Personalize on the basis of what? How to personalize?	Frequent task; usage data, content, structure;	(Bunt et al. 2004)
How much can be personalized	Number of personalization options(e.g. breadth and depth)	(Wu et al. 2003)

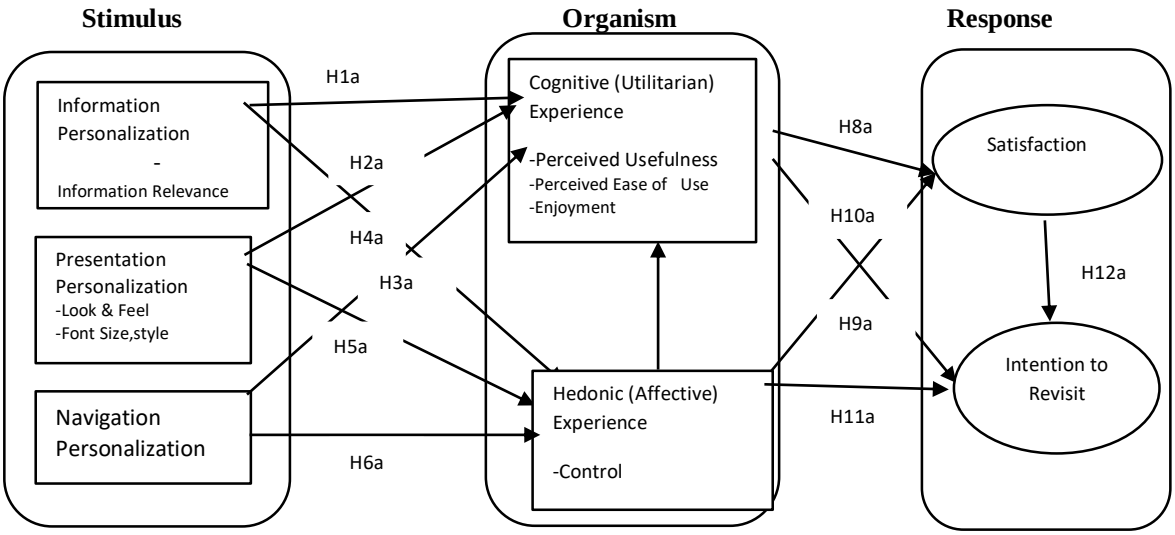
As shown in Table 1.1 ,Kwon et al. 2012 studied personalization in dimensions of object(What should be personalized), subject(Who does) and (to what extent)level with respect to customer retention. (May Wang 2009) studied What to personalize, its cognitive effect and affective reaction on users. (Wu et al. 2003) scored level of personalization based on the breadth and depth of the personalization options on offer. The "what" to personalize represents objects to be personalized i.e. information/content, website interface, structure/functionality/navigation. (Bunt et al. 2004) also classified Personalization as static or dynamic based on when personalization can be enacted according to the object/objects for which personalization has been designed to individual or group. Personalization can also be examined based on the degree to which personalization is automated and (implicit or explicit) user involvement (Bunt et al. 2007; Fan and Poole 2006).

Among all the issues pertaining to personalization, "what" to personalize is the most fundamental problem researched for the effective personalized website design. Different design aspect of personalization may have different impact on users' information processing and decision making. Moreover, the different roles played by different personalization features in website design have not been comprehensively investigated. User experience design principle (Garrett 2003) shows functionality design of system at different level with interface, navigation and information model design. So webs consider only navigation, interface and information model design. Navigation plays an important role in website conceptual and architectural design. Therefore, we classify website design in three components for personalization, i.e. Information/Content, presentation/interface and navigation design.

III. RESEARCH MODEL:

Research model is derived based on previous literature review and identified, firstly various personalization design aspects i.e. information personalization, presentation personalization, and navigation personalization used in websites which are web stimuli, secondly impact of personalization aspects (Web Stimuli) on hedonic, utilitarian state of user, thirdly its effect on user's behavioural response and satisfaction. Moreover, interaction among cognitive/hedonic experience, utilitarian/affective state, satisfaction and intention to revisit are also explored, which is missing in prior literature.

The proposed research model is derived from the environmental psychology theory, S-O-R (Stimulus- Organism-Response) theory, TAM3 (Technology Acceptance Model) (Venkatesh, and Bala 2008) and Information System success model. Impact of different aspects of personalization effects on decision making process, is described with cognitive/ hedonic and utilitarian experience of user like perceived ease of use, perceived usefulness, enjoyment and control. User with positive hedonic and utilitarian experience has more satisfaction and is likely to revisit / reuse the personalized websites. More specifically, this study focuses on how user perceives personalization aspects and their influence in decision making to reuse the website. Hypotheses are proposed to address the research questions. Quality of information is one of the parameter to measure information overload, Quality of information measured with relevance of information and validity of information which is included questionnaire.



[Figure 1: Personalization Stimulus Organism and Response Model]

Website design, structure and aesthetic work as stimulus to users behaviour and interest while browsing website. Eroglu et al. (2001) defined website stimuli e.g. environmental cues as high task-relevant and low task-relevant online cues. High task-relevant cues include verbal or pictorial contents and low task- relevant cues, on the other hand, are peripheral contents like color, background patterns, type, styles, fonts and images. Even though low task-relevant cues can lead to a more pleasant online shopping experience, these cues do not directly influence the completion of the shopping task. Low task-relevant cues function to create a mood or an image for the online website.

Personalized website is key to address individual need of diverse user. Personalization is the process of tailoring website by satisfying user's implicit and explicit need (Desai and Kumar 2016). The goal of web personalization is to deliver individualized right content to users at the right time to induce a favourable response to the personalized offerings and to increase user loyalty for future interaction. Personalization is the extent to which a site is perceived to provide information / interface / navigation personalized to the unique needs of each user. Information personalization is the extent to which information can be catered according to user's' implicit or explicit requirement (Desai 2015). Users can specify their requirements of the information through customization choices to search or get recommendations from the website. Presentation personalization is the extent to which interface can be modified according to user implicit or explicit requirement (e.g. color, layout, background, themes etc.). Navigation personalization is the extent to which navigation can be modified in according to user requirement (e.g. new tabs and re-organized the elements to new tabs). User can reorganize the website structure by creating new categories and move information into them or generating quick links.

Website design based on personalized implicit or explicit need of the user stimulates thinking and affect emotion to influence for decision making. Most work in environmental psychology conceptualized the affective states along three dimensions (Eroglu et al. 2003), i.e. pleasure, arousal, and dominance (PAD). Cognitive state refers to user internal mental processes and states including attitudes, beliefs, attention, comprehension, memory, and knowledge. User's cognitive or utilitarian and affective/hedonic states are induced by environmental stimuli and also influence response. Users experience utilitarian benefit with the relevant personalized information reduces information search.

Hypotheses:

Personalization and Cognitive/Utilitarian Experience:

User experiencing perceived usefulness of information and ease of use of website are more likely to enjoy using ecommerce website and creates positive shopping experience. So we can say that users' cognitive/utilitarian experience is associated with perceived usefulness, ease of use and enjoyment with relevant and quality information. Personalization Content refers to the degree to which customers are provided with uniquely tailored information on the basis of their own individual needs as gathered from the consumer's interaction with the provider (Chellappa and Sin 2005; Liang et al. 2007;Tsekouras et al. 2011). Personalized content decreases the cognitive effort needed in order to assess the information. Therefore, we propose hypotheses:

H1a: Users' Cognitive Experience is positively associated with Information personalization.

The perceived ease of use of the website layout influences consumers' internal states and behaviour (Manganari et al. 2011, Egle et al. 2013). Wang 2009 posit that Navigation personalization is positively related to user's' cognitive state perceived usefulness and ease of use. Navigation personalization facilitates users with system initiated personalized structure that reduces users efforts for information search. Also, it provides quick links to minimize navigations, result cognitive load reduction so user feel enjoyment and increases cognitive experience with perceived ease of use and usefulness. User initiated personalization can be produced by explicitly providing users' choice of quick links and producing personalized website structure. So we propose hypothesis:

H2a: Users' Cognitive Experience is positively associated with presentation personalization.

User interface customization options presented to personalize website help users' reduce information processing complexity, increases effectiveness and efficiency. (Kamis et al. 2008). When there are more choices in modifying the presentation feature, e.g. layout and background, the higher level of personalization will give more flexibility in alleviating the complexity. Therefore, more presentation personalization facilitates the user task effectively. Personalized interface induce positive cognitive feeling in user with improved aesthetics, finds ease of use and enjoy operating with the personalized system (Monk et al. 2007). So we posit hypothesis:

H3a: Users' Cognitive Experience is positively associated with navigation personalization.

Personalization and Hedonic experience

Personalization provided with the choices to users generates high level of perceived control and users experience flow with personalization process(Koufaris 2002) are more likely to have comfort level and enjoy(Manuel and Joaquina 2004) while interaction with the website. So we postulate hypotheses

H4a: Users' Hedonic Experience is positively associated with information personalization.

Information relevance and quality of information presented to users induces more hedonic experience. Structure of information presentation and navigation positively influence the consumer's perception of being in control during the online shopping episode (Éthier 2008). So, we propose:

H5a: Users' Hedonic Experience is positively associated with presentation personalization.

H6a: Users' Hedonic Experience is positively associated with navigation personalization.

Greater customer control of the shopping experience increased the pleasure of shopping (De Wulf et al. 2006). Users with a high level of perceived control are likely to feel more a high comfort level with the activity. Thus, they would be more inclined to feelings of joy using the website more frequently (Manuel and Joaquina 2004). Studies in Human Computer Interaction also found that more control correlates with enjoyment (Lindley and Monk 2008). Therefore, we propose that:

H7a: Users' Cognitive Experience is positively associated with hedonic experience.

DeLone and McLean (1992) reported that user satisfaction has been widely employed in practice as a surrogate measure of information systems effectiveness. So, we posit:

H8a: Users' satisfaction is positively associated with cognitive experience using personalized website.

Prior research suggested that emotions mediate the impact of environment on user intention (Kaltcheva and Weitz 2006; Lee et al. 2008). We expect the effects of website environmental cues on user during interaction with Web Portal to be similar. If the users enjoy their experience during web site interactions, they are more likely to visit the Web Portal again. Echoing TAM3 research study which argues that the degree to which the website is perceived to be easy to use affects the perception of the usefulness and the intention to continue to use this website (Chau and Lai 2003).

H9a: Users' intention to revisit is positively associated with cognitive experience using personalized website.

Research shows that relevant information personalization reduces information overload, increases user involvement with increase efficiency, performance and satisfaction (Liang et al. 2007, Kwon et al. 2012, Thongpapanl et al. 2011, Desai 2016). User with positive hedonic experience of control with personalization features like user interface, information, and navigation over website with involvement using website is more satisfied and likely to revisit the personalized website. So we propose hypothesis:

H10a: Users' satisfaction is positively associated with hedonic experience (Control) using personalized website.

H11a: Users' intention to revisit website is positively associated with hedonic experience (Control) using personalized website.

DeLone & McLean's (1992) identified satisfaction and usage of system to measure the Information system success which is found as an antecedent of information and system quality. DeLone & McLean's (2003) in Updated IS Success Model states that user's intention to reuse the system is highly associated with Satisfaction. So we propose hypothesis as:

H12a: Users' intention to reuse/revisit the personalized website is positively related to user satisfaction.

IV. RESEARCH METHODOLOGY:

This research is descriptive research with qualitative nature of study as we investigate effect of personalization on user's behavioural intentions and satisfaction. Non-Probability sampling method convenience sampling is used for data collection after pilot study of 50 users. The purpose of the pilot study was to check for the reliability of the questionnaire items construct to finalize for actual study. Responses from fifty users were collected through questionnaires by asking them about their general online shopping experiences with personalized websites, their perceptions and attitudes towards different personalization aspect when using ecommerce websites. Questionnaire for survey had all construct items used as five point likert scale and adopted from previous literature (Wang 2009; Kamis et. al.2008, Mc Lean 2003).

We collected 600 responses from users of ecommerce websites like Amazon.com, Flipkart.com & eBay.com in India. Before proceeding with the final analysis data was cleaned by removal of incomplete and inconsistent data from both responses of ecommerce website out of which 547 valid responses were used from ecommerce.Incomplete and inconsistent data from responses were cleaned with data screening process. After initial screening of data, further responses were also removed with less standard deviation (i.e. below .30) to get valid responses. The Cronbach's Alpha coefficient for assessing reliability of survey items(variables) and analysis result indicate that all survey items were in the range of 0.70~0.93, indicating a high level of internal consistency for the scales of questionnaire items used within this survey. According to Nunnally (1978), reliability coefficients of 0.70 or more are considered as a criterion for an internally consistent scale constructs of survey items. Thus, all survey items in Table were reliable and appropriate to use in an actual research study.

Table 2: Reliability Coefficients of Constructs			
Web Portal	**Constructs**	**No. of items**	**Cronbach's Alpha**
Ecommerce Questionnaire	Information Personalization	6	0.777
	Presentation Personalization	6	0.816
	Navigation Personalization	5	0.767
	Utilitarian/Cognitive Experience (Perceived Ease of Use, Perceived Usefulness, Enjoyment)	9	0.892
	Hedonic Experience(Control)	2	0.772
	Satisfaction	2	0.945
	Intention to Revisit	3	0.989

V. RESULTS & FINDINGS:

We used factor analysis technique to summarize data, to interpret the relationships and understand the patterns of variables. This technique is used to regroup the variables in set of clusters based on their shared variance. We used exploratory factor analysis(EFA) to identify the number of factors with group of variables and named that factors or constructs. Confirmatory Factor Analysis (CFA) is used to find interrelationship among constructs. In this study, EFA is needed to explore different aspects or dimensions of personalization and items of satisfaction. We used maximum likelihood method of extraction as it gives correlation between factors in addition to factor loadings and promax oblique rotation technique is used because it is relatively efficient in achieving a simple oblique structure. The larger the sample size, smaller loadings are allowed for a factor to be considered significant (Stevens, 2002). Factor loading score of variable above 0.32 is statistically significant for sample size above 300 (Tabachnick & Fidell 2007). The factor loadings in the above table of ecommerce websites show fairly desirable factor loadings above 0.32.

EFA for Ecommerce website:

Kaiser-Meyer-Olkin Measure of Sampling Adequacy plays an important role for accepting the sample adequacy. While the KMO ranges from 0 to 1, the world-over accepted index is over 0.6. Results shown in table below depicts KMO value 0.926 which is above 0.6 showing good sampling adequacy for our research.

Table 3: KMO and Bartlett's Test(Ecommerce Website)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.926
Bartlett's Test of Sphericity	Approx. Chi-Square	12420.300
	Df	496
	Sig.	0.000

In Figure 2 Total Variance Explained for ecommerce websites, Communalities show the proportion of each variable's variance that can be explained by the factors (e.g., the underlying latent continua). It is also noted that Chi- Square can be defined as the sum of squared factor loadings for the variables. I**nitial** maximum likelihood factoring, the initial values on the diagonal of the correlation matrix are determined by the squared multiple correlation of the variable with the other variables.
Kaiser's criterion suggests retaining all factors that are above the Eigenvalue of 1(Kaiser, 1960) which is a rule of thumb. Exploratory Factor analysis explores number of factors based on total variance explained table which mentions factors, Eigen values, percentage of variance and cumulative percentage with extraction and rotation sum of square loadings. Table shows 67.940 % of cumulative variance for seven factors.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	11.770	36.783	36.783	8.515	26.608	26.608	9.732
2	2.803	8.759	45.541	1.876	5.861	32.469	7.670
3	2.283	7.133	52.674	3.979	12.436	44.905	5.056
4	1.544	4.826	57.500	2.112	6.601	51.507	7.249
5	1.259	3.934	61.434	.812	2.538	54.044	6.149
6	1.077	3.366	64.800	1.152	3.599	57.643	5.793
7	1.005	3.140	67.940	.939	2.935	60.578	5.112
8	.785	2.453	70.393				
9	.742	2.318	72.711				
10	.663	2.071	74.783				
11	.634	1.982	76.765				
12	.622	1.942	78.707				
13	.586	1.831	80.538				
14	.562	1.757	82.295				
15	.508	1.588	83.882				
16	.495	1.547	85.430				
17	.474	1.482	86.912				
18	.440	1.374	88.286				
19	.436	1.364	89.649				
20	.427	1.333	90.983				
21	.382	1.192	92.175				
22	.366	1.143	93.318				
23	.341	1.065	94.383				
24	.324	1.012	95.395				
25	.301	.941	96.336				
26	.296	.924	97.260				
27	.262	.819	98.079				
28	.252	.788	98.867				
29	.234	.731	99.599				
30	.071	.222	99.820				
31	.040	.126	99.946				
32	.017	.054	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Figure 2: Total Variance Explained for ecommerce websites

Table 4 states factor loadings of through pattern matrix generated with maximum likelihood extraction method and promax rotation method. Pattern matrix result gives all the factors, their loadings with items with similarity in exploratory factor analysis. Appropriate name of the factors were given based on nature of the questions and measuring variables falling under each factors. We were able to derive seven factors and named factors as information personalization, navigation personalization, presentation personalization, cognitive\utilitarian experience, hedonic experience (control), satisfaction and intention to revisit. Table 4 below mentions factor loadings of variables with underlying constructs of ecommerce web portals' personalization design aspects and its interrelationship with users cognitive experience, control, satisfaction and intention to revisit.

Table 4: Factor loadings with ecommerce website

Constructs	Variables	Factor						
		1	2	3	4	5	6	7
Cognitive Experience	ECPEU4	.820						
	ECPEU1	.820						
	ECENJ1	.801						
	ECENJ2	.772						
	ECPU1	.661						
	ECPEU3	.594						
	ECPEU2	.555						
	ECPU3	.473						
	ECPU2	.463						
Presentation Personalization	ECPP5		.837					
	ECPP3		.813					
	ECPP2		.674					
	ECPP1		.657					
	ECPP4		.629					
	ECPP6		.628					
Information Personalization	ECIP2			.813				
	ECIP3			.755				
	ECIP4			.717				
	ECIP6			.633				
	ECIP1			.631				
	ECIP5			.627				
Intention to Revisit	ECINT1				.970			
	ECINT3				.947			
	ECINT2				.916			
Navigation Personalization	ECNP2					.838		
	ECNP1					.706		
	ECNP3					.674		
	ECNP4					.619		
Satisfaction	ECSAT1						.983	
	ECSAT2						.914	
Control	ECCON1							.875
	ECCON2							.502
	Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.							
	a. Rotation converged in 7 iterations.							

Residuals are computed between observed and reproduced correlations in exploratory factor analysis with maximum likelihood extraction method. There are 20 (4.0%) non-redundant residuals with absolute values greater than 0.05. A model that is a good fit will have less than 50% of the non-redundant residuals with absolute values that are greater than .05 which is true for our example. We can also compare the Reproduced Correlation Matrix with the original Correlation Coefficients Matrix. If the model is a good fit, we should expect small residuals between the two matrices. Our research shows 4% of residual which shows good model fit of factors.

Residual	ECPEU2	.006	-.040	.004	.008	-.002	-.020	.008	.014	-.017
	ECPEU3	-.002	.004	-.012	.010	.001	.018	.003	-.033	.012
	ECPEU4	.002	.001	-.002	-.006	.001	-.014	.007	-.024	.012
	ECPU2	.016	.027	.003	-.004	.000	-.005	.050	-.052	-.010
	ECPU3	.008	.034	.010	.002	-.003	-.019	-.013	.009	.001
	ECPU1	-.005	.024	.002	-.002	-4.815E-005	-.039	-.012	.045	-.024
	ECPP1	-.014	.014	-.002	-.006	.002	-.024	-.011	.034	-.011
	ECPP2	-.004	-.008	-.006	-.006	.003	-.003	.027	.002	.009
	ECPP3	-4.219E-005	-.001	-.001	-.001	.000	.011	-.011	-.014	.047
	ECPP4	-.004	.001	.001	.004	-.001	.025	-.015	-.066	-.008
	ECPP5	.003	.005	-.005	.005	.000	.006	.001	.019	-.029
	ECPP6	.010	-.035	.013	.005	-.004	-.012	-.001	.024	-.007
	ECSAT1	.000	.001	.000	.000	.000	.002	-.002	.003	.000
	ECSAT2	.002	-.004	.001	.001	-.001	-.007	.005	-.009	.005

Extraction Method: Maximum Likelihood.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 20 (4.0%) nonredundant residuals with absolute values greater than 0.05.

Figure 3: Non redundant Residuals with ecommerce website

Factor Correlation Matrix

Factor	1	2	3	4	5	6	7
1	1.000	.609	.447	.664	.561	.576	.529
2	.609	1.000	.392	.419	.568	.434	.441
3	.447	.392	1.000	.248	.257	.260	.282
4	.664	.419	.248	1.000	.427	.531	.512
5	.561	.568	.257	.427	1.000	.330	.351
6	.576	.434	.260	.531	.330	1.000	.455
7	.529	.441	.282	.512	.351	.455	1.000

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.

Table 5: Factor Correlation Matrix

Above table 5 shows correlation matrix of all seven identified matrix with good correlations amongst factors. Information, navigation, presentation personalization is highly correlated with cognitive, hedonic experience, satisfaction and intention to revisit.

CFA for Ecommerce website:

A Confirmatory Factor Analysis (CFA) was done with SPSS AMOS 21.0, it used to validate Measurement model by establishing acceptable levels of goodness-of–fit for the measurement model and finding specific evidence of construct validity. The CFA would also provide evidence that all items are properly aligned with the correct latent variables within the general construct being measured.

Our result of CFA for ecommerce website shows Minimum Discrepancy which is chi-Square divided by degree of freedom i.e. CMIN/DF 2.393 which should be less than 5 so my parsimonious model is fit. All NFI, RFI and TLI are nearer to 0.9 which is good. RMSEA is 0.051 which is less than 0.06 so the model is having good fit. The Root Mean Square Error of Approximation (RMSEA) is related to the residuals in the model. RMSEA values range from zero to one with a smaller RMSEA value indicating better model fit. Good model fit is typically indicated by an RMSEA value of 0.06 or less (Hu & Bentler, 1999).

Table 6 : Fit Statistics of Measurement Model for ecommerce website		
Fit statistics	**Recommended**	**Obtained**
CMIN	-	988.269
DF	-	413
CMIN Significance	p < = 0.05	0.000
CMIN/DF	< 5.0 (Bentler and Bonnett, 1980)	**2.393**
GFI	> 0.80 (Joreskog & Sorbom, 1981	0.897
AGFI	> 0.80 (Joreskog & Sorbom, 1981	0.876
NFI	> 0.90 (Bentler and Bonnet 1980)	0.920
RFI	> 0.90 (Bollen, 1986)	0.910
CFI	> 0.90 (Hu and Bentler 1999)	0.952
TLI	> 0.90 (Tucker and Lewis, 1973)	0.946
RMSEA	< 0.06 (Browne and Cudeck, 1993)	0.051
RMR	<0.02 (Hu and Bentler 1999)	0.027

The results of the model estimation are shown in Figure below. The confirmatory factor analysis showed an acceptable overall model fit and hence, the theorized model fit well with the observed data. It can be concluded that the hypothesized factor CFA model fits the sample data very well.

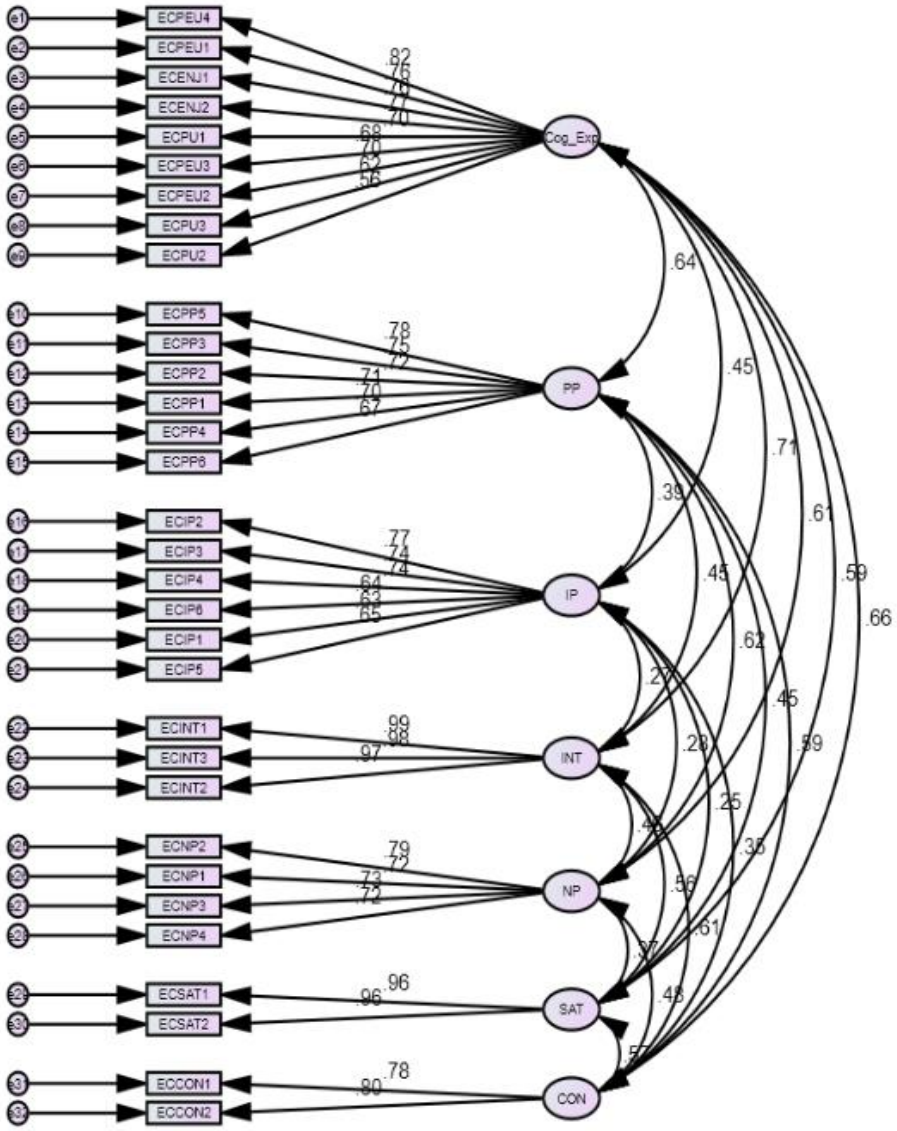


Figure 7: CFA model for ecommerce websites

SEM result for Ecommerce website:

Structural Equation Modeling (SEM) technique tests the models where causal relationships are hypothesized to exist between latent variables. Structural Equation Modelling of ecommerce website data shows that all the hypotheses are supported. This indicates that personalized ecommerce website has positive effect on users satisfaction and intention to revisit website through positive cognitive and hedonic experience .

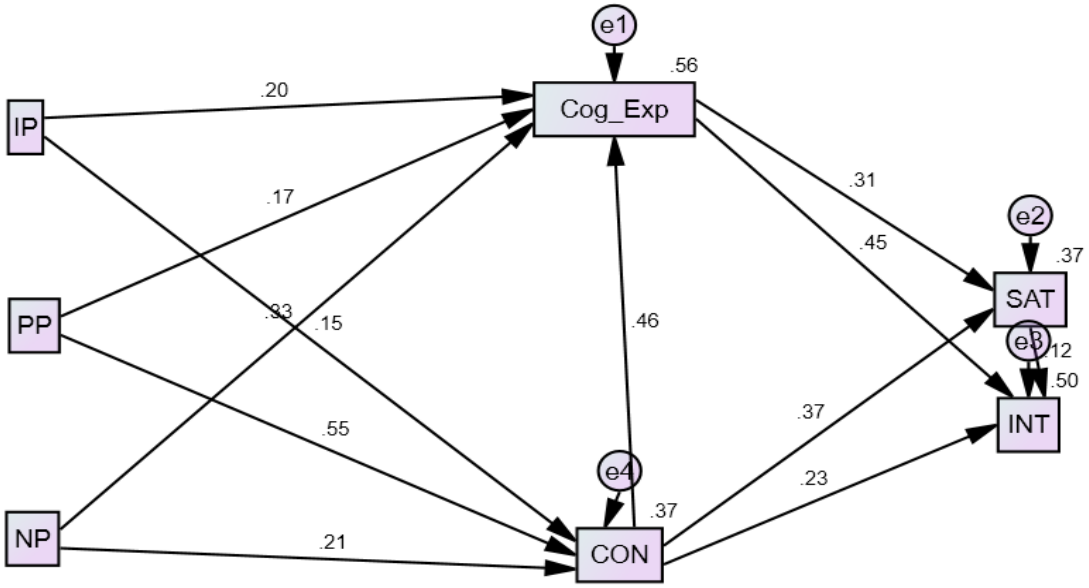


Figure 4: SEM for personalized ecommerce website

SEM Model for ecommerce website personalization shows that different dimension of personalization plays a different role in the decision making process by placing different impact on cognitive experience and hedonic experience of control which further lead to satisfaction and intention to revisit. The R^2 values ranges from 0.37 to 0.56. In PLS analysis, examining the R^2 scores and the structural paths assesses the explanatory power of a structural model. In this study, the model accounts for 37 to 56 percent of the variances (R^2).

VI. CONCLUSION:

Our results suggest that different design aspects of personalization play a different role in this decision making process. Users experience greater enjoyment when the level of presentation personalization is perceived to be higher. Users also appreciate information, presentation and navigation personalization very much since it enhances the perceived usefulness, perceived ease of use of a website, enjoyment and give users the experience of control. Among all the decision variables, cognitive experience with perceived ease of use, perceived usefulness and enjoyment are found to be the most important antecedent factor determining the decision to continue using a website. Information personalization and navigation personalization are high task relevant since they directly improve user effectiveness and efficiency in retrieving information. Presentation personalization adjust the layout of user interface and provide content with good look and feel in the form of personalized themes, font and background color generating ease of use and enjoy while browsing personalized ecommerce and social networking websites. Navigation Personalization also makes the website ease to use by giving internet users more flexibility and control. Result shows that information, presentation and navigation personalization increases Perceived Usefulness, Perceived Ease of Use and enjoyment inducing positive cognitive experience with ecommerce website. Our result supports finding by Koufaris 2002 that have an impact on enjoyment and control as user may experience flow during the personalization process. Eroglu et al. (2001) found that the presence of low task relevant cues positively affect the organism, e.g. pleasure, our results Therefore, the presentation personalization can arouse the enjoyment. Personalization has been defined as a process that changes the functionality, interface, information content, or distinctiveness of a system to increase its personal relevance to an individual (Blom and Monk 2008) and this finding is in line with our research findings.

Major findings of our research show that personalization reduces cognitive efforts of user by personalized information provided which, in turn, decreases search time of user and increases efficiency. Also, relevant personalized information induces perceived usefulness with increased ease of use and enjoyment, user experience flow using personalized ecommerce and social networking websites. Also, users feel satisfied with positive cognitive experience with personalized websites and likely to revisit the website, and this finding is consistent with similar findings in earlier research (Eroglu 2003, Koufaris 2002, and Wang 2009). In accordance with previous research findings this study finds that user with higher satisfaction is likely to revisit the personalized websites. Result in this research reveals that users who experience satisfaction with personalization features through positive cognitive and hedonic experience, intend to return with personalized ecommerce and social networking websites.

VII. FUTURE SCOPE RESEARCH:

Future research can be conducted in several directions. First, different methodology can be applied to cross-validate the findings in current study. Longitudinal study is expected to investigate the changing role of personalization features as user gains more experience. Second, other dimensions of personalization from different perspective are also interesting and may be the subject of investigation, e.g. personalization strategies. Then, more mediating and moderating factors could also be taken into consideration.

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