Why won't Google users switch to Bing? Understanding factors that promote and barriers that prevent software users from switching

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Abstract: In this study we investigate factors that promote and barriers that prevent software users from switching. This investigation is relevant. Providers of software products are interested in creating conditions to make it difficult for existing users to switch to competitive products and in making their product attractive for users of competitive products to switch to their own product. The findings of the study with users of search engines indicate that chronic "regulatory focus", an enduring user characteristic, is the most important factor for switching. Users with the gain seeking "promotion focus" were three times more likely to switch than users with loss-aversive "preventive focus". Further the users' regulatory focus moderated the impact on software switching of other factors such as the value (utilitarian/ hedonic) derived from the use of the software, software use experience, costs of software switching and the attractiveness of software alternates. These findings can help software product managers identify defection prone users and opens up new avenues for research in post-adoption user behaviors.

Keywords: Software Switching, Switching costs, Utilitarian Value, Hedonic Value

1 Introduction

Switching occurs when users migrate from one software product to another in the same product category. As losing users can have an adverse impact on providers of software products as well as on organizations that deploy them, it is important for them to understand why users switch. However, currently there is a gap in information systems literature. Although there is a vast body of research on the intention of users to use a particular software product, there is little research investigating user switching behavior between software products.

Software development organizations are not only interested in user's intention to use their software products but also their continued use intention during the product's life span. Attracting a new user is more expensive than retaining an existing one (Zhang and von Dran, 2001). Therefore user retention is critical for a healthy bottom line (Fornell, 1992; Reichheld, 1996).

The Technology Acceptance Model (TAM) is concerned only with why workers accept/ reject tools including software that have been designed to support the work they are doing. TAM assumes the worker does not get a choice in the tool they use. Their only choice is to use or not use the tool. However, TAM does not investigate how users evaluate software in the post-adoption stage and how this evaluation influences their decision to continue with the existing software or switch. While technology acceptance and adoption is important, researchers have suggested that software product success is determined more by user continuance rather than initial adoption of a technology (Bhattacherjee, 2001; Hong, Thong and Tam, 2006).

However, unlike user acceptance of software, very few studies have investigated software user switching behavior. Further, they were all cross sectional studies investigating antecedents of user intention to switch. The impact of the predictors on actual switching behavior has not been examined. User intention to switch may not translate into user action of actually switching (Yang and Peterson, 2004).

Keeping this context in view, in this study, we first investigate the various factors that influence actual switching behavior of software users based on concepts gleaned from a multi-disciplinary review of literature. We then propose and test the model for switching behavior in a longitudinal study with actual users of software products and for actual switching behavior observed during the period. The objective is to gain

Reference this paper as: Kumar Kakar A, "Why won't Google users switch to Bing? Understanding factors that promote and barriers that prevent software users from switching" *The Electronic Journal Information Systems Evaluation Volume 19 Issue 3 2016, (pp180-196*), available online at www.ejise.com

insights into why software users switch products as well as what prevents them from doing so. The findings of the study are discussed along with their implications for practice and future research.

2 Literature Review

2.1 Technology Acceptance

Historically, information systems (IS) research has focused on why IS project implementations fail. One of the critical reasons for failure is user resistance to new IS implementation (Kim and Kankanhalli, 2009). Although many theories to user resistance have been proposed, the technology acceptance model (TAM) is widely recognized as one of the more influential theories in the area, and provides a practical and parsimonious framework for IT (Information Technology) adoption (Davis, Bagozzi and Warshaw, 1989; Lucas and Spitler, 1999; Venkatesh and Davis, 2000).

The core TAM consists of three major variables: Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Behavioral Intention (BI). Davis (1989) defined PU as the "degree to which an individual believes that a particular system would enhance his or her job performance and PEOU as the degree to which an individual believes that using a particular system would be free of physical and mental effort." Behavioral Intention is the users' intention to use the system. PU is used as both dependent and independent variable as it is predicted by PEOU, and predicts BI at the same time. PEOU was found as a significant antecedent of PU, and predicts BI directly as well as indirectly through PU (Davis et al., 1992).

Later TAM researchers found that PU and PEOU may not be the sole prominent determinants for using hedonic systems (Wu and Du, 2012). Perceived enjoyment (PE) defined as the""extent to which using a system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (Davis et al., 1992), also plays an important role in user technology acceptance and has great implications, especially for hedonic systems (Sun and Zhang, 2006). Studies have shown that while perceived usefulness in TAM is the strongest determinant of user acceptance in utilitarian system-use environments, it is less influential than perceived enjoyment in hedonic system-use settings (Hsu and Lu, 2004; Koufaris, 2002). However, a recent meta-analysis of TAM research (Gerow, Ayyagari, Thatcher and Roth, 2013) showed that PE and PU are both salient in technology acceptance of even utilitarian software.

2.2 Software Switching

Unlike technology acceptance research, studies on post-adoption behavior of technology users have been relatively sparse. They include investigating switching behavior of online brokers (Chen and Hitt, 2002), mobile services (Kazakevitch, Torlina and. Hendricks, 2005; Ranganathan, Seo and Babad, 2006), online consumer websites (Li, Browne and Wetherbe, 2007) and email services (Kim, Shin and Lee, 2006). However, most of these studies have centered on identifying the determinants of behavioral intention of users to switch. By comparison there is a huge body of research in consumer behavior literature mainly investigating user switching of non-software products and a few also investigating user switching of software products (e.g., Keaveney and Parthasarathy, 2001; Ye, Seo, Desouza, Papagari and. Jha ,2006).

The consumer behavior literature reveals that there are primarily three types of triggers for users to switch products: Situational triggers, Influential triggers and Reactional triggers (Gustaffson, Johnson and Roos, 2005; Roos, Edvardsson and Gustafsson, 2004; Roos, Gustafsson and Edvardsson, 2006). Situational triggers are those that reflect a change in the users' own situation that makes users switch. For example a user may land up in a new job where the employers want their employees to use certain software products. A familiarity with new products and benefits derived from its use may make users change products even for their personal use. Examples of Influential triggers include attractiveness of available product alternatives. Examples of Reactional triggers include users' response to certain negative events that make them want to switch such as a realization that they are not deriving adequate value from the product or events that make them doubt its performance. Thus the concepts of PU and PE in TAM are relevant even for software switching. While PU represents utilitarian value provided by the software product PE represents hedonic value provided by the software product to the user.

There are also various barriers that prevent users from switching. Switching barriers include costs that users perceive they will incur before switching and the costs that users perceive they will incur after switching. Product evaluation costs are the time and effort costs associated with the search and analysis needed to make

a switching decision (Samuelson and Zeckhauser, 1988; Shugan, 1980). Learning costs are the time and effort costs of acquiring new skills or know-how in order to use a new product or service effectively (Alba and Hutchinson, 1987; Eliashberg and Robertson, 1988; Guiltinan 1989; Wernerfelt, 1985). Setup-costs are the time and effort associated with building relationship with a new provider or setting up a new product for initial use (Guiltinan, 1989). Economic costs are the costs of accepting uncertainty with the potential for a negative outcome when adopting a new provider about which the customer has insufficient information (Guiltinan, 1989; Jackson, 1985; Klemperer, 1995; Samuelson and Zeckhauser; 1989).

In addition there are user specific factors that may make some users more or less disposed to switching than others, such as their length of experience with the use of the product, and their propensity for gain seeking versus loss aversion (regulatory focus). In developing a model of software switching we use concepts from both IS and non-IS literature.

3 Model Development

3.1 Value derived from the use of Software

Products including software products are multifaceted. Some are predominantly utilitarian, others predominantly hedonic and still others hybrid which provide utilitarian value as well as hedonic value to the user (Wu and Lu, 2013). Product attributes which provide utilitarian value are goal oriented and functional. They evoke cognitive response from the user. The product attributes which provide hedonic value evoke affective user responses and represent product aesthetics novelty, pleasure and fun (Strahilevitz and Myers, 1998). They have a positive effect on the usability of not only hedonic but also utilitarian products (Tractinsky, Katz and Ikar, 2000; van Schaik and Ling, 2003). Together, the utilitarian and hedonic dimensions of a product capture essential and distinct facets of a product (Veryzer, 1995; Batra and Ahtola, 1999; Dhar and Wertenbroch, 1999; Schmitt and Simonson, 1997; Mano and Oliver, 1993; Block, 1995; Strahilevitz and Myers, 1998).

The value provided by the product to the user is considered a primary motivation for product patronage (Casalo et al., 2008; Sirdeshmukh, Singh and Sabol, 2002; Holbrook, 1994; Yang and Peterson, 2004). The utilitarian value provides extrinsic motivation to the user to patronize the software product by helping her achieve her functional and practical goals (Wu and Lu, 2013). The hedonic value provides intrinsic motivation to the user to patronize the software product by providing her with pleasure, enjoyment or fun (Wu and Lu, 2013). Thus both utilitarian value and hedonic value promote continued use of the software product. The greater the utilitarian value and hedonic value derived by the user of the software product the greater will be its effect on preventing users from switching to other products. This leads us to the following hypotheses:

Hypothesis 1: The value provided by the software product is negatively linked to users' switching behavior
Hypothesis 1a: Utilitarian value provided by the software product is negatively linked to users' switching behavior
Hypothesis 1b: Hedonic value provided by the software product is negatively linked to users' switching behavior

3.2 Software Switching Costs

Switching costs are the users' perceptions of time, effort and money they will have to incur for changing the product (Jones, Mothersbaugh and Beatty, 2000). We identify the following costs of switching software in the context of software products:

1. Pre-switching evaluation and search costs: Pre-switching evaluation and search costs are the user perceptions of the effort and time required in looking out for information and assessing the viability of available software alternatives prior to switching.
2. Uncertainty costs (Jiang et al. 2000; Krovi, 1983; Guiltinan, 1989; Schmalensee, 1982): Uncertainty costs are prominent in intangible products and services such as software (Zeithaml et al., 1985). They reflect the psychological uncertainty or perceptions of risk surrounding the performance of unknown, untested or untried software. Further, risk and uncertainty are higher when quality is difficult to judge or varies considerably across alternatives.
3. Learning costs: Learning costs occurs after switching, as consumers adjust to a new alternative. They are behavioral and cognitive costs of using new software and reflect the user perceptions of the

time and effort needed to effectively use the software (Joshi, 1991; Joshi, 2005; Hirschheim and Newman, 1988; Markus, 1983; Martinko et al., 1996).

4. Setup costs (Guiltinan, 1989; Jackson, 1985; Porter, 1980): When customization is high, there are additional learning and coordination costs involved with the new software provider. These setup costs vary from software to software and can be very high for certain applications such as ERP (Enterprise Resource Planning) softwares.
5. Sunk costs (Dick and Lord, 1998): Sunk costs represent customer perceptions of the non-recoupable time, money, and effort invested in the existing software which will be lost after switching. Sunk costs are economically irrelevant but psychologically important to the user.

The higher the switching costs the lower will be the motivation of the user to change, leading to the following hypothesis:

Hypothesis 2: Users' perceived switching costs are negatively linked to their switching behavior

3.3 Attractiveness of alternatives

Alternative attractiveness is conceptualized as the client's estimate of the likely satisfaction available from an alternative product (Ping, 1993). If a customer is either unaware of attractive alternatives or simply does not perceive them as any more attractive than the current product, then they are likely to continue with that product, even when it is perceived as less than satisfactory. The lack of attractive alternatives will therefore inhibit switching behavior. But if the users perceive there are attractive alternatives available then it may promote switching behavior of the users.

Hypothesis 3: Users' perceived attractiveness of available alternatives has a positive effect on switching behavior

3.4 Length of Use Experience

If the user derives value from using a software it becomes increasingly important to him due to habitual use behavior. When a behavior has been performed many times in the past, subsequent behavior increasingly becomes under the control of an automated cognitive process (Aarts, Verplanken and van Knippenberg, 1998). Users form favorable intentions about acts they have frequently performed in the past (Ouellette and Wood, 1998), such as repeated use of software, making them increasing dependent on the habit (Gefen, 2003) thereby preventing switching behavior.

Hypothesis 4: The length of software use experience will have a negative effect on switching behavior

3.5 Regulatory Focus of User

Further, drawing on consumer behavior literature we propose that enduring personality characteristics such as the regulatory focus of individuals may also have an impact on switching behavior.The well established theory of regulatory focus postulates two different self-regulatory systems to achieve a goal. People can either target their attention towards the achievement of ideals and gains, or the fulfillment of duties and the avoidance of losses (Werth and Forester, 2005a). Depending on how individuals direct their attention, they find themselves in either a so-called promotion or prevention focus (Higgins, 1997).

Fundamentally, the regulatory focus can either be situational or dispositional. The dispositional regulatory focus or the chronic focus of an individual represents an individual's enduring approach or personality feature (Werth and Forster 2007). Sometimes the situation a person finds himself in also determines his regulatory focus. If at a point in time he is looking for reliable software to meet his instrumental needs he shows preventive focus. If he wants to pursue fun and pleasure from the use of software he demonstrates promotion focus. In this study we investigate the impact of dispositional regulatory focus of an individual on his witching behavior.

Users with prevention focus are likely to behave in a safe responsible manner. Hence they are less likely to indulge in switching behavior. Further, they will exaggerate switching costs, use experience and the importance of utilitarian benefits as utilitarian value provided by the product fulfills *prevention* (pain avoidance) goals of the user (Chernev, 2004; Chitturi, Raghunathan and Mahajan, 2007; Higgins, 2001; Higgins,

1997). By contrast, users with promotion focus aspire for achievement of ideals and are more likely to indulge in switching behavior. They are more likely to underestimate switching costs, use experience and the overestimate importance of hedonic benefits as hedonic value fulfill *promotion* (pleasure seeking) goals (e.g., Chernev, 2004; Chitturi, Raghunathan and Mahajan, 2007; Higgins, 2001; Higgins 1997).

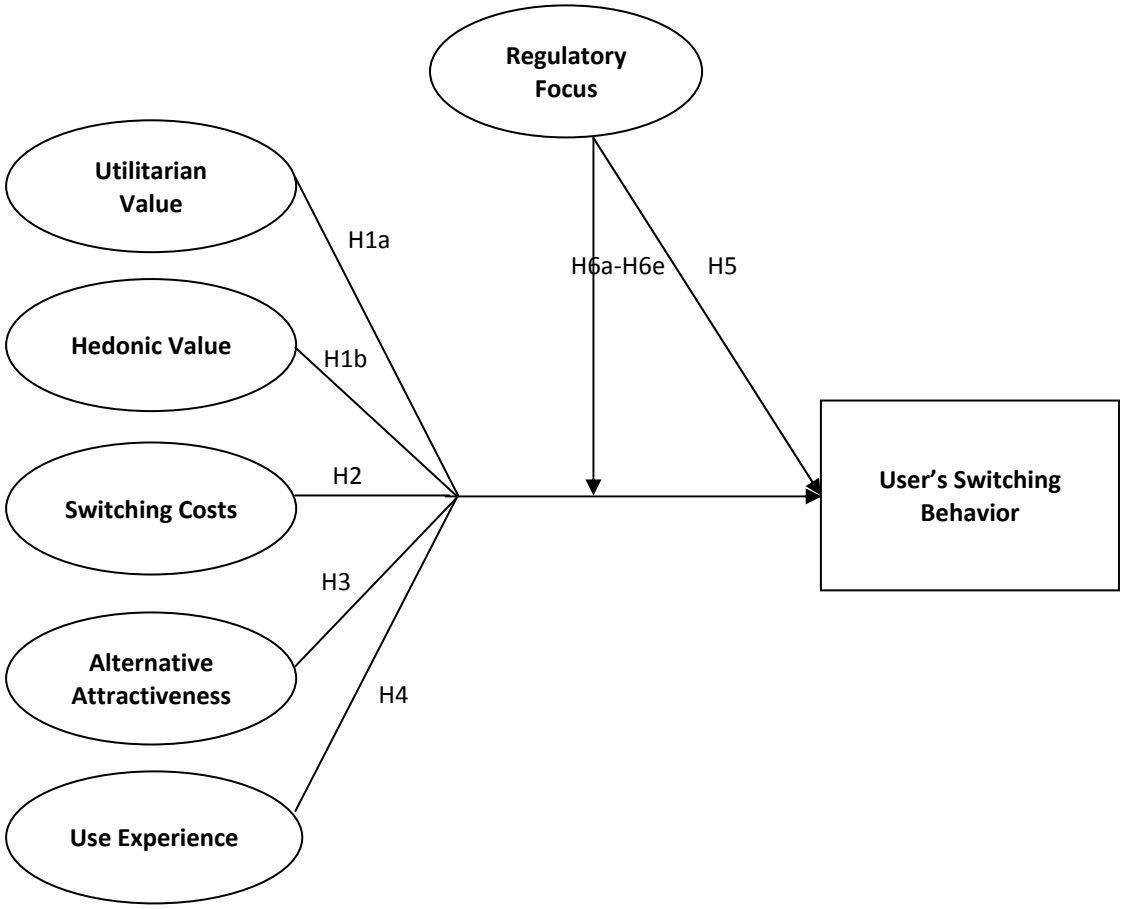

Figure 1: Conceptual Model

The foregoing arguments lead to the following hypotheses:

Hypothesis 5: The regulatory focus of the user will significantly impact switching behavior such that users with chronic promotion focus will exhibit significantly higher switching behavior than users with chronic prevention focus

Hypothesis 6: The regulatory focus of the user will moderate the impact of use experience, switching costs, alternative attractiveness and the utilitarian/ hedonic value provided by the software product on switching behavior

Hypothesis 6a: Users' with promotion focus will experience a lower impact of switching costs on their switching behavior than users with prevention focus

Hypothesis 6b: Users' with promotion focus will experience a lower impact of use experience on their switching behavior than users with prevention focus

Hypothesis 6c: Users' with promotion focus will have a lower impact of utilitarian value on their switching behavior than users with prevention focus

Hypothesis 6d: Users' with promotion focus will experience a higher impact of hedonic value on their switching behavior than users with prevention focus

Hypothesis 6e: Users' with promotion focus will show a higher impact of attractive alternatives on switching behavior than users with prevention focus

4 Method

4.1 Study Setting and Design

Web search is considered a "killer app" of the Internet era (Laudon and Laudon, 2012). It is a primary method for quickly searching and accessing useful content on the web. To test the proposed model for software switching (Figure 1) we conducted a longitudinal study with users of search engines including among others Google, Bing and Yahoo. The popularity of search engines enabled us to recruit a large sample of actual users for our study. In addition we expect switching between search engines will be easier compared to other software products due to minimal costs of switching. This will make it possible to observe the switching behavior within a short time span of the study of 1 year. Longer time frame of longitudinal study is likely to create complications such as higher drop-out rates of subjects and changes in product mix within a software product class under investigation.

4.2 Subjects

The subjects were recruited from a large public university. In a coordinated effort with the faculty, 8 research associates helped conduct a pencil and paper survey at the same time in different lecture halls. The study was conducted with freshman and sophomores as it was planned as a longitudinal study. A total of 487 subject responses were obtained in the first round of the study pertaining to their most preferred search engine. In the second round of the same survey conducted a year later we received responses from 431 students who participated earlier in round 1. All students who participated in both rounds of the study received an extra credit. Student responses were tracked based on student identification numbers. The 422 valid responses obtained from the students who participated in both rounds were analyzed for testing the proposed hypotheses. Table 1 provides the demographic profile of these 422 students.

Table 1: Demographic Profile of Subjects

	Round 1		**Round 2**	
	Male	Female	Male	Female
Number	214	208	214	208
Freshman	133	126	5	0
Sophomore	81	82	209	208
Average Age	22.34	22.22	23.23	23.13
Experience	5.42	4.54	6.33	5.44
Google	152	146	155	141
Bing	38	39	38	41
Yahoo	17	12	14	13
Others	10	8	9	11

4.3 Variables used in the Study

The independent variables were the utilitarian value, hedonic value, switching costs, attractiveness of alternatives, length of use experience and regulatory focus and dependent variable was actual switching behavior. To control for other source of variation, age and gender were statistically controlled. Tested measures from prior literature were used to capture data pertaining to these variables.

Utilitarian Value. The Venkatesh and Davis (2000) scale was used for measuring the Utilitarian Value of search engines. A sample item from this scale is: "Using the search engine increases my productivity".

Hedonic Value. The Babin, Darden and Griffin (1994) scale used in past information systems studies, including mobile internet and retail websites (Park, 2006; Wang, Baker, Wagner and Wakefield, 2007), was used for measuring the Hedonic Value of search engines. A sample item from this scale is: "Compared to other similar things I could have done, the time spent using the search engine was truly enjoyable."

Switching Costs. The Switching costs scale items were adapted from Ping (1993). A sample item from this scale is: "For me the costs in time, money and effort to switch search engines are high".

Attractiveness of Alternatives. The Jones, Mothersbaugh and Beatty (2000) scale was used for measuring the attractiveness of alternative search engines. A sample item from this scale is: "If I need to change search engines there are other good search engines to choose from".

Regulatory Focus. The 11 item (RFQ) Regulatory Focus Questionnaire (Higgins, Tory, Friedman, Harlow, Idson, Ayduk and Taylor, 2001) consisting of two subscales assessing chronic prevention and promotion focus was used to ascertain individuals' dispositional or chronic regulatory focus. A sample item from the chronic prevention subscale is "Not being careful enough has gotten me into trouble at times." A sample item from the chronic promotion subscale is "Do you often do well at different things that you try?"

For a complete list of items used please see Appendix A. All the above measures used a 9-point Likert scale with anchors of 1 (strongly disagree) and 9 (strongly agree). A review of the literature indicates that expanding the number of choice-points beyond 5- or 7-points does not systematically damage scale reliability, yet such an increase does increase scale sensitivity (Cummins and Gullone, 2000). Scale items were averaged to create an overall value for each construct. Responses were coded such that high levels of the constructs are represented by high values. Some items were reverse coded.

4.4 Method of Analyses

To establish reliability and validity of the measures used in the study factor analysis was performed on the combined data set obtained and internal reliabilities and correlation matrix of the measures were examined. Participants were classified into chronic prevention or chronic promotion focused categories based on the median split on the difference between their RFQ promotion and RFQ prevention scores in the sample (e.g., Louro, Pieters and Zeelenberg, 2005; Avnet and Higgins, 2006). Users with Promotion focus were coded as 1 and users with Prevention focus were coded as 0.

Logistic regression was used to model the factors influencing switching behavior. In recent years, logistic regression has become a preferred statistical technique for multivariate modeling of categorical dependent variables (DeMaris, 2012). Research has shown that using linear regression with expected value E(Y) as dependent variable is problematic because of its underlying assumptions (for more details see Aldrich and Nelson, 1984; Hanushek and Jackson, 1977; Maddala, 1983).

5 Results and Analyses

Factor analysis procedure was done using IBM SPSS Statistics Version 19. Dimension reduction was performed on the data pertaining to all the 6 measurement scales. The results of Varimax rotation show that the 6 factors extracted represented each of the 6 scales. All items of a scale loaded on the respective factors (U1 to U5 represented items in the utilitarian value scale, H1 to H5 represented items in the hedonic value scale, S1 to S3 represented items in the switching costs scale, A1 to A4 represented items in attractiveness of alternatives scale and R1 to R11 represented items in the regulatory focus scale including promotion and prevention subscales). Convergent and discriminant validity between scales are evident by the high loadings within factors, and no significant (> .40) cross loadings among factors (see Appendix B). We then measured the internal reliabilities of the scales used in the study. As can be seen from the Table 2, the alpha reliabilities are all greater than .70.

Table 2: Internal Reliability of Scales

Name of the scale	Cronbach's alpha	N of Items
Utilitarian Value	.872	5
Hedonic Value	.901	5
Switching Costs	.893	3
Attractiveness of Alternatives	.845	4
Promotion Focus	.916	6
Prevention Focus	.876	5

Table 3: Means, Standard Deviations, Correlations

Variable	Mean	Std. Dev.	1	2	3	4	5	6	7
Utilitarian Value	6.837	0.526	1						
Hedonic Value	7.367	0.694	0.187	1					
Switching Costs	5.217	0.386	0.163	0.125	1				
Attractiveness of Alternatives	4.365	0.693	0.129	0.214	0.243	1			
Regulatory Focus - Promotion	4.315	0.495	0.285*	0.252*	0.134	0.283*	1		
Regulatory Focus - Prevention	5.365	0.628	0.329**	0.114	0.243*	0.146	0.087	1	
Length of use experience	4.987	0.461	0.211*	-.072	0.231*	0.043	0.011	0.256*	1

*** p < .05 ** p < .01 ***p<.001**

Table 3 shows the means, standard deviations, and correlation matrix for the variables used in this study. From the data presented in these tables it is clear that none of the correlations are too high (> 0.65) demonstrating that each scale is adding something new.

The results of the logistical regression for Models 1 and 2 are shown in Table 4. As can be seen from the results for Model 1, age and gender did not impact switching behavior significantly. Also, there was no significant (p =<0.05) chi-square difference between Model 1 with age and gender included and Model 2 without age and gender. Hence keeping in view parsimony as consideration we adopted Model 2 for subsequent analyses. Regulatory focus, as predicted, had a significant direct as well as interaction effect with Hedonic Value, Utilitarian Value, Alternative Attractiveness, Use Experience and Switching costs. Also, the direct impacts of hedonic value, utilitarian value, Attractiveness of Alternatives, Switching costs and Use Experience were found significant and their valence were as predicted. Thus hypotheses 1 to 6 were fully supported, thereby validating the proposed model.

Table 4: Coefficients for various logistic regression models of the log odds of Switching

Variable	Model 1	Model 2
Intercept	0.013	0.024
Hedonic value (HV)	-0.225 **	-0.265**
Utilitarian value (UV)	-0.291**	-0.185**
Alternative Attractiveness (Att)	0.319**	0.262**
Regulatory Focus (RF)	0.443***	0.457***
Switching Costs (SC)	-0.123**	-0.082*
Experience	-0.192**	-0.242**
Age	-0.002	-
Gender	-0.005	-
HV*RF	-0.192*	-0.119**
UV*RF	0.281**	0.118**
Experience*RF	0.076*	0.082**
SC*RF	0.119**	0.049*
Att*RF	0.053*	0.152**
Degrees of freedom	15	13
Model Chi-square	105.44	108.63

*** p < .05 ** p < .01 ***p<.001**

The dependent variable in the logistic model is the log odds, log [π/ (1-π)], where log is the natural logarithm and [π/(1-π)] is the ratio of probability; implying in our case that the users are [π/(1-π)] as likely to switch as they are likely to not switch. Thus taking the exponent (exp) of the coefficients in Model 2 at mean value of the independent variables (Table 5) give us the estimated odds ratio of users switching of 0.069 implying that that the users are 0.069 times as likely to switch as they are likely to not switch. The probability of switching is therefore given by π = [(1+0.069)/0.069] = 0.065. Thus at mean value of the variables we find that users had a 6.5% probability of switching. The actual switching was found to be 7.1 % between round 1 and round 2.

Table 5: Means of Independent Variables

Variable	Mean	Standard Deviation
Hedonic Value	6.837	0.526
Utilitarian Value	7.367	0.694
Alternative Attractiveness	5.217	0.386
Regulatory Focus	0.305	0.460
Switching Costs	4.365	0.693
Experience	4.987	0.461
Age	23	1.085
Gender	0.427	0.495

Performing sensitivity analysis we find that a change in 1 SD above mean (see Table 6), users' regulatory focus had the maximum positive impact on the change in probability of switching followed by alternative attractiveness. Surprisingly, increase in switching costs had no impact on switching. A change in hedonic value and utilitarian value had a similar negative impact on switching.

Table 6: Sensitivity Analysis- Overall

Variable	Mean	SD	Mean + 1 SD	Probability	% change
HV	6.453	0.591	7.044	0.059	-9.23
UV	6.889	0.623	7.512	0.059	-9.23
Alternative Attractiveness	4.621	0.432	5.053	0.071	9.23
Regulatory Focus	0.305	0.344	0.649	0.098	50.77
Switching Costs	4.134	0.679	4.813	0.065	0.00
Experience	4.65	0.497	5.147	0.063	-3.08

Analyzing further for users with promotion focus (Table 7) a 1 SD change in hedonic value had the maximum negative impact on switching followed by length of use experience. Attractiveness of Alternatives had the maximum positive impact on switching. The overall probability of switching for this group of users with independent variables at 1 SD above mean was 14.7 %.

Table 7: Sensitivity Analysis – Promotion focus

Variable	Mean	SD	1+SD	Probability	% change
HV	6.447	0.561	7.044	0.122	-17.01
UV	6.890	0.686	7.512	0.141	-4.08
Alternative Attractiveness	4.978	0.343	5.053	0.158	7.48
Switching Costs	3.853	0.737	4.813	0.148	0.68
Experience	4.594	0.565	5.147	0.138	-6.12

For users with prevention focus (Table 8) the length of use experience had a maximum negative impact on switching followed by a change in hedonic value. Attractiveness of alternative had a positive impact on switching. The overall probability of switching for this group of users with independe3nt variables At 1 SD above mean was 5.6 %.

Table 8: Sensitivity Analysis – Prevention focus

Variable	Mean	SD	1+SD	Probability	% change
HV	6.442	0.498	6.940	0.047	-16.07
UV	6.941	0.700	7.642	0.048	-14.29
Alternative Attractiveness	4.593	0.421	5.014	0.059	5.36

Variable	Mean	SD	1+SD	Probability	% change
Switching Costs	4.362	0.657	5.019	0.053	-5.36
Experience	4.609	0.377	4.986	0.046	-17.86

A difference of proportion test shows that the net differences in switching (see Table 9) were non-significant (P =< 0.05) for all search engines during the period of the study.

Table 9: Net switching for major search engines between Round 1 and Round 2

	Number in Round 1	Outgoing switch	Incoming switch	Number in Round2	Net Difference
Google	298	22	20	296	-2
Bing	77	4	6	79	2
Yahoo	29	4	2	27	-2
Others	18	0	2	20	2

Investigating further for search engines Google and Bing the absence of significant switching between the two search engines could be explained by the observation that there was no significant (p =<0.05) difference between Google and Bing on any of the parameters (independent variables) in round 1 (see Table 10). Further the difference between the parameters for Google and Bing in round 2 was also insignificant (p <=0.05) indicating the likelihood of no significant switching between the two search engines in the near future too. This analysis could not be conducted for others search engines because their small sample size did not permit meaningful statistical analysis.

Table 10: Means of independent variables for Google and Bing in Round 1 and Round 2

	Round 1			Round 2		
Variable	Google	Bing	Difference	Google	Bing	Difference
HV	6.786	7.005	-0.219	7.149	7.159	-0.010
UV	7.405	7.258	0.146	8.327	8.069	0.258
Alternative Attractiveness	5.168	5.320	-0.152	5.726	5.587	0.139
Regulatory Focus	0.335	0.288	0.047	0.326	0.317	0.008
Switching Costs	4.371	4.360	0.011	3.163	3.230	-0.067
Experience	5.033	4.982	0.052	5.977	5.888	0.090

Table 10 shows the overall differences between parameters in round 1 and round 2 were significant (p =<0.05) except for regulatory focus of users. From the results presented in Table 10 we can infer that one can expect higher switching between search engines in the period after round 2. The non-significant overall net difference in proportion of users with a promotion focus (Table 10) shows that the regulatory focus of users' is indeed enduring. Further analysis using the difference in proportion test of specific subjects (based on student identification number) who underwent change in their regulatory focus between round 1 and round 2 also showed that overall the change was non-significant (p=<0.05).

Table 11: Difference in means of independent variables for Round 1 and Round 2

Variable	Mean	Standard Deviation	Mean	Standard Deviation	Difference
HV	6.837	0.526	7.150	0.480	0.313*
UV	7.367	0.694	8.074	0.738	0.707***
Alternative Att.	5.217	0.386	5.590	0.306	0.373**
Regulatory Focus	0.305	0.460	0.324	0.468	0.009
Switching Costs	4.365	0.693	3.210	1.436	-1.155***
Experience	4.987	0.461	5.890	0.278	0.903**

6 Discussion

The results of the study show that users with promotion focus (14.7 %) have a much higher likelihood of switching than users with prevention focus (5.6%). Further, for users with both prevention and promotion focus an increase (1 SD above mean) in attractiveness of alternatives had a positive impact on switching and an

increase in hedonic value, utilitarian value and length of use experience with the software had a negative impact on switching. However, for users with prevention focus an increase in use experience had a maximum negative impact on switching while for users with promotion focus hedonic value derived from the software product had a maximum negative impact on switching.

However, the sensitivity analyses threw up some surprising insights. While overall the switching costs significantly and negatively impacted switching behavior, an increase in switching costs by 1 SD over mean did not decrease switching significantly. This result seems surprising. Perhaps, the reason for this may lie in the nature of the software product examined in the study. Search engine switching has marginal learning, uncertainty, set-up and sunk costs for users compared to for example an ERP (Enterprise Resource Planning) or even an email software. Thus an increase in 1SD above mean may not be significant enough to prevent switching especially for users with promotion focus.

Attractiveness of alternatives had a positive impact on switching for both users with prevention as well as promotion focus. Software providers interested in gaining users from competition may therefore benefit from providing differentiators in their products such as special purpose features for specific user segments to increase the availability of attractive alternatives.

Yet, by far the most potent way to influence users to switch is to target users with promotion focus. The results of this study show that users with enduring promotion focus are almost three times more likely to switch than users with enduring prevention focus. It may therefore be advisable for software providers to identify and target users with promotion focus with suitable messaging such as the novelty and fun aspects of using their products.

The descriptive statistics of the parameters (independent variables) used in the model show (Table 11) that there was a significant increase in the means of all these variables except regulatory focus between rounds 1 and 2. The reason for the significant increase in means could be because of increased use of search engines between the period between round 1 and round 2. More experienced users derive higher utilitarian value and hedonic value by becoming more aware of the features available. Also over time the young users may have become more aware of the alternatives available in the search engine market, and an increase in use habit through an increase in length of experience may have increased the costs of switching.

However, in spite of this increase in means the net switching between browser users will continue to be non-significant. This is because at least in the case of major search engines, Google and Bing, there was no significant difference in means on all these parameters in round 2. Google and Bing will therefore have to differentiate themselves on the parameters proposed in the study if they hope to increase retention of existing users and attract potential new users.

7 Contribution

Software providers are interested in retaining their existing users as well as increasing their user base. Therefore an understanding of factors which prevent users from switching and which promotes their switching is important. At present the IS literature lacks a comprehensive model on software switching. The few studies that have investigated software switching have focused on determinants of behavioral intention to switch in cross sectional studies. None of the studies have tracked switching behavior of users over time and explored the determinants causing the actual switch. Behavioral intention to switch may not result in actual user switching. Further, cross-sectional studies are only useful for establishing associative relationships. To explore causal relationships of software product switching a longitudinal design is suggested (Ye, Seo, Desouza, Sangareddy and Jhai, 2008).

Further, none of the aforementioned studies have investigated the effects of user personality characteristics such as their regulatory focus in switching. As the results of the study show regulatory focus is a single most important factor which influences migration of users. Users with prevention focus are risk averse and cannot be easily swayed. The factors which influence their switching are different from the factors which influence users with promotion focus. Further, users with promotion focus are gain seeking and are more likely to switch. This finding is relevant for practitioners. The results of the study show that it is advisable for software providers to focus on targeting users with promotion focus if they want to quickly increase their user base.

This is a unique contribution of the study. A need has been expressed for identifying "defection-prone" customers, long considered a "pivotal requirement for companies and a ripe area for research" (Zeithaml, 2000).

This finding is also useful in future TAM studies. Traditionally TAM studies have explained 30-40% of the variance (Lee, Kozar and Larsen, 2003). Investigating the impact of regulatory focus of users might help explain a substantially higher variance of their behavioral intention to use the system through their moderating impacts on perceived usefulness (UV) and perceived enjoyment (HV) derived from the use of the system. It might also help organizations identify and target users that have lower resistance to adopting new technologies. It is reasonable to expect that the higher propensity of users with promotion focus to switch is also likely to be seen in technology adoption.

Finally, user switching behavior together with TAM can predict users' technology acceptance during the entire life cycle of a software product. Software development organizations are not only interested in user's intention to use their software products but also their continued use intention during the product's life span. They would like to prevent existing users from switching to competitive products. Thus the model for software switching complements TAM by explaining users' technology acceptance of a software product during its adoption as well as post-adoption phases.

8 Limitations and Future Research

The contributions of this study should be examined in the context of its limitations. Although overall the sample size was sufficiently large to test the proposed theoretical model, the number of subjects for non-Google users was much smaller than for Google users. So it is possible that the results are biased to reflect the behavioral pattern of Google users. However, it should be noted that the subjects were a representative sample of users of search engines. According to comScore Releases, February 2014, of U.S. search engines ranking, 68% of all search engines use Google, followed by Bing (18 %), Yahoo (10 %) and others 4%. The sample distribution of the subjects in the study was Google (70.6%), Bing (18.2 %), Yahoo (6.9 %) and Others (4.3 %).

The study was conducted for software products belonging to a single software product category. Additionally, a homogeneous sample of young student users within a narrow age group was chosen as subjects. While these design considerations helped mitigate alternative explanations of the results obtained, to examine the generalizability of the findings, future studies should be conducted for other product categories and for other subject populations. It is conceivable that the factors influencing switching behavior of users of other software products may have different magnitude of impacts for users in different product categories. For example, for email users switching costs may become more salient in predicting switching behavior than the hedonic value derived from using email. However, overall, the proposed causal relationships and the valence of their effects on switching are expected to prevail as they are built on strong conceptual foundations with supporting empirical evidence.

Further, self-report measures for independent variables were used in the study which has a potential for common method bias and can result in inflation of effect size. However, it should be noted that methods bias is unlikely to produce such inflation for moderation effects (Schmitt, 1994); the interaction effects are more likely to be attenuated rather than inflated (Evans, 1985). Also, to mitigate the effects of method bias we collected data on actual software product switching, an objective measure for the dependent variable (see Straub, Boudreau and Gefen, 2004; Sharma, Yetton and Crawford, 2009). Using self-report measures assumes that users possess accurate insights into their own experiences and motivations. Nonetheless, this concern is alleviated to the extent that all the scales used in the study have been tested across multiple studies and have been shown to have the requisite predictive validity.

9 Conclusion

In this study we identify the various factors that influence users' decision to switch software. Using tested measures we collected data from users of search engines to test the relationships between the identified factors proposed in the theoretical model by tracking their actual switching behavior in a longitudinal study. The proposed model was fully supported in the study. The predictive validity of the proposed model could be assessed from the marginal difference between the predicted switching (6.5 %) and actual switching behavior

of users (7.1%). The study findings provide useful guidance for software development organizations on retaining existing as well as attracting new users for their products.

Today, more software is developed for a larger market than for single customers (Berander, 2007). Software developed for the mass market do face special challenges. For software developed for single customers or internal use, software development organizations can have day to day interactions with the users and indulge in negotiation and conflict resolution to quickly resolve issues and prevent them from switching. By contrast, for software developed for the mass market, software development organizations have to deal with anonymous users and lack of frequent interactions. Individual user needs are therefore difficult to identify and address.

In such situations, a general understanding of the factors that influence user switching behavior is critical for success of the software. A decrease in user switching is known to lead to both top line and bottom line benefits (Fornell and Wernerfelt, 1987; Zeithaml, 2000). A better understanding of user switching can enable software development organizations to deploy both defensive as well as offensive strategies for increasing the market share of their products. It can help software development organizations in not only protecting their own turf by retaining existing users but also poach on users of competitive products by making them switch to their own products, thereby increasing their user base.

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Appendix A: Measures Used in the Study

Measures and Items
Utilitarian Value (Venkatesh and Davis, 2000)
Using the search engine improves my task performance
Using the search engine increases my productivity
Using the search engine enhances my effectiveness in performing my tasks
I find the search engine to be useful in my tasks
I find the search engine to be helpful in my tasks
Hedonic Value (Babin, Darden and Griffin, 1994)
While using the search engine, I feel happy.
Compared to other similar things I could have done, the time spent using the search engine was truly enjoyable.
When using the search engine, I feel excited.
I have a very nice time while using the search engine.
While using the search engine, I am able to forget my problems.
Switching Costs (Ping, 1993)
In general, it would be a hassle changing search engines
It would take a lot of time and effort changing search engines
For me the costs in time and effort to change search engines is high
Attractive Alternatives (Jones, Mothersbaugh and Beatty, 2000)
If I needed to change search engines there are other good search engines to choose from
I would probably be happy with the performance of another search engine
Compared to this search engine there are other search engines with which I would probably be equally or more
Compared with this search engine there are not very many other search engines with which I could be more satisfied (Reverse coded)
Regulatory Focus (Higgins, Shah and Friedman, 1997),
Compared to most people, are you typically unable to get what you want out of life? (R)a
Growing up, would you ever “cross the line” by doing things that your parents would not tolerate? (R)
Accomplishing things gets you “psyched” to work even harder? a
You get on your parents’ nerves when you were growing up? (R)
You often obey rules and regulations that were established by your parents?
Growing up, did you ever act in ways that your parents thought were objectionable? (R)
Do you often do well at different things that you try? a

Measures and Items
Not being careful enough has gotten me into trouble at times. (R)
When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. (R)a
I feel like I have made progress toward being successful in my life. a
I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. (R)a

a promotion item. (R) = reverse scored.

Appendix B: Results of Factor Analyses

Items	Factors					
	1	2	3	4	5	6
U1	**.896**	.123	.133	.100	.041	.041
U2	**.840**	.132	.010	.260	.064	.064
U3	**.867**	.129	.087	.078	.015	.015
H1	.000	**.635**	.264	.097	-.079	-.079
U4	**.882**	.103	.045	.166	.008	.008
H2	.087	**.889**	.003	.067	.074	.074
U5	**.899**	.165	.068	.069	-.020	-.020
H3	.122	**.862**	.088	.067	.018	.018
H4	.200	**.835**	.108	-.012	.029	.029
H5	.217	**.851**	.021	-.009	.035	.035
A1	.115	.386	**.733**	-.002	-.019	-.089
A2	.146	.105	**.870**	.091	.029	.044
A3	.067	.135	**.858**	.185	.002	.010
A4	.016	-.036	**.829**	.295	-.017	-.019
S1	-.019	.115	.378	**.733**	-.002	.029
S2	.002	.067	.135	**.858**	.185	.002
S3	.017	.016	-.036	**.829**	.295	-.017
R1	.019	-.044	-.052	.010	**.942**	-.137
R2	.023	.014	.040	-.010	-.040	**.906**
R3	.016	-.052	-.030	.004	**.910**	.063
R4	-.025	.045	.094	-.143	.046	**.799**
R5	-.001	.015	-.137	.086	**.**133	**.857**
R6	-.026	.075	-.040	-.017	.010	**.840**
R7	.019	.028	.063	-.003	**.868**	.087
R8	.104	-.002	.046	.025	.064	**.879**
R9	-.089	.148	.165	.125	**.834**	.045
R10	.044	.217	-.057	.199	**.798**	.003
R11	.010	.229	.073	.217	**.901**	.068

