PREDICTING SOCIAL NETWORKING SITES CONTINUANCE INTENTION: SHOULD I STAY OR SHOULD I GO?

by

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Predicting Social Networking Site Continuance Intention: Should I Stay or Should I Go?

Thesis directed by Associate Professor Judy Scott

ABSTRACT

This research develops and tests models to predict continuance intention on social networking sites. The models adds new factors which are relevant to social networking sites continuance intention. The social networking site continuance model adds five factors: personal innovativeness, habit, attitude toward alternatives, interpersonal influence, and consumer switching costs to enhance the predictive power of information systems continuance. Interpersonal influence, alternative perceptions and procedural and relational costs are theorized to have a direct effect on continuance intention. Personal innovativeness and habit are theorized to have a direct and moderating effects on continuance intention. The results have a large positive effect of the explanatory power in explaining more of the variance of continuance intention on a social networking site. The information systems (IS) continuance model explains approximately 66.8% of the variance and the social networking site continuance model with the five added factors explains 76.7% of the variance and is considered to have a large effect in the explained variance. All of the factors have statistical significance; the factors with the largest path coefficients are, in order, satisfaction & perceived usefulness (β = 0.3686), consumer switching costs (β = 0.2496), alternative perceptions (β = -0.2069), habit (β = 0.1642), personal innovativeness (β = -0.0589) and interpersonal influence (β = -0.0451). Habit and personal innovativeness, as moderators, were not statistically significant and did not substantially aid in the interpretation of the factors. The research helps explains the relevant factors for why users of social networking sites will

continue to use or abandon a site.

The form and content of this abstract are approved. I recommend its publication.

Approved: Judy Scott

DEDICATION

For my wife, Christine: thank you for your love and support through this long and arduous journey. Adventure is out there – now let's go have a new one!

For my parents: thank you for teaching me the importance of education and encouraging me to follow this path. For my father who encouraged me to go to college and pursue academic opportunities. For my mother who learned introductory computer programming when I was in middle school and showed me her programs which were printed on giant spools of paper. At first I was just looking for paper to draw on and later I wanted to understand how the instructions on those pages made computers work. Thank you for all of the sacrifices you have made and all that you have given me.

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"Our chief want is someone who will inspire us to be what we know we could be." — Ralph Waldo Emerson, *Conduct of Life.*

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1 Introduction

Social network sites (SNS) are composed of a series of dynamic processes; users join the site, connect with users, share content, interact with users, disconnect from users, take breaks from the site and abandon the site. Users who initially adopt the site may continue to use the social networking site, take breaks from the site or stop using the site all together (Raine et al., 2013); the factors that contribute to users' continuance intentions on social network sites are not well known. This research provides the theoretical background, motivation and methods to examine social networking site continuance intentions of users by adapting Bhattacherjee's (2001) information systems (IS) continuance theory to the social networking site environment. The goal of the research is to examine the role of factors *alternative perceptions* (e.g. do users show an intention to discontinue use of a site when other social network sites are being considered), *interpersonal influence*, *personal innovativeness*, *habit*, and *consumer switching costs* on users' *social networking site continuance intention*.

Research on SNS cover areas that focus on the individual user behavior (motivations of use, tie formation (*friending, following, connecting*, etc.), tie dissolution (*unfriending, unfollowing, disconnecting*, etc.), individual-to-site relationships (*social capital, context collapse, site satisfaction,* and *network abandonment*), and larger environmental concerns like privacy policies. Research in SNS may extend beyond the individual to collective intelligence; researchers make predictions for elections, box office revenue, communicable disease detection and transmission, etc. where collective individual actions are aggregated and the individual behavior is less important. Other research interests include identity management (Hewitt and Forte, 2006), trust (Dwyer et al., 2007), self-presentation (Stutzman, 2006), surveillance and privacy con-

cerns (Gross and Acquisti, 2005), social capital (Ellison et al., 2007). Much of the academic research on Facebook has focused on identity presentation and privacy concerns (Ellison et al., 2007).

Technology acceptance has been studied by information systems (IS) researchers for a variety of classes of applications such as work-related applications (health care, scheduling, etc.), general applications (email, telecommunication, etc.), and e-commerce applications (King and He, 2006). Technology usage research has moved beyond the initial adoption stage of the technology acceptance model (TAM) of Davis (Davis, 1989; Davis et al., 1989) to predict user's continuance intentions (Bhattacherjee, 2001; Bhattacherjee and Premkumar, 2004; Thong et al., 2006), i.e. whether a information systems user continues to use or discontinues use of an information system post-acceptance. For information systems to be helpful they must be adopted (Davis, 1989) but the longer-term consequences of an information system may be more directly related to its continued use rather than its initial acceptance (Bhattacherjee, 2001; Thong et al., 2006).

Research into social networking sites fit into the larger domain of information systems research. Research regarding information systems usage has been a significant topic of information systems research (Liao et al., 2009; Bhattacherjee and Premkumar, 2004; Bhattacherjee, 2001; King and He, 2006; Lee et al., 2003; Hovorka et al., 2013). Research of the *use domain* (acceptance phase of technology) accounts for the largest portion of generated hypotheses in two core information systems journals: MIS Quarterly (MISQ) and Information Systems Research (ISR) (Hovorka et al., 2013). Hovorka et al. (2013) noted that the domain *satisfaction with technology* (related to information systems continuance) shares an area of interest as it is referenced by the two major domains of IS research: IS development theory and IS use. Research in

information system continuance may help identify the pathways of multi-level phenomena that emerge by integrating individual use and broader organizational success (Hovorka et al., 2013).

The technology acceptance model (TAM) proposed by Davis (Davis, 1989; Davis et al., 1989) explains motivations of information system acceptance and predicts user's behavioral intentions to accept a new information system (Bhattacherjee, 2001). TAM is centered around initial acceptance of an information system which is an important phase in the life cycle of information system usage. TAM is based on the Fishbein and Azjen's (1975) Theory of Reasoned Action (TRA); TRA is an intention model that helps predict and explain behaviors across multiple domains including information system domains (Davis et al., 1989).

The motivation of this research is to develop and test a model of social networking site continuance with factors that are helpful in understanding the phenomenon. The research of acceptance and continuance has focused on the individual's attitude toward the technology without examining how competing products or services may influence acceptance or continuance and how the competing products or services may influence continuance intention. Psychosocial factors like habit, personal innovativeness, interpersonal influence and consumer switching costs may also exert an influence on continuance intention that are not currently captured in the IS continuance theory.

1.1 Importance of Topic

Information systems continuance on social networking sites is an important topic because whether users continue to use a given information system has a significant impact on whether a site can continue as a going concern. Bhattacherjee (2001) argues that the long-term viability of information systems

depends more on its continued use (or post-adoption behavior) rather than initial adoption. The context of this research is social networking sites where Americans spend the largest share of their time online (Nielsen, 2011). Social networking sites allow researchers to examine systems which are highly voluntary in nature because there is little overt direct external pressure to join, use, or discontinue use of sites like Facebook, Twitter, LinkedIn, Google Plus, etc. Researching social networking sites allows researchers to extend models for success beyond traditional areas like e-commerce into areas that have been under-researched (Schaupp, 2011).

Social networking site users have largely abandoned sites that were once popular like Six-degrees, Friendster and MySpace for other social networking sites and indicates that site users make decisions to discontinue use of once successful sites. There are over one billion worldwide users of the social networking site Facebook[1]; in the United States there are over 150 million Facebook users, 37 million Twitter users, and 26 million Google plus users (Nielsen, 2012). Continuance intention and social networking sites have broad implications for information systems and may inform areas beyond social networking sites, in particular in areas where there is a high degree of voluntariness, where habitual use of an information system is expected, where interpersonal influence is a factor, and where procedural and relational costs may impact IS continuance decisions.

1.2 Research Problem and Scope

The goal of this research is to develop and test a model of information systems continuance that more directly applies to social networking sites; i.e. what factors are relevant to social networking site users when they choose to con-

[1] `http://newsroom.fb.com/Key-Facts`

tinue or discontinue use of a site. The research will use information systems continuance theory from Bhattacherjee (2001) as a theoretical foundation and include additional factors such as alternative perceptions, personal innovativeness, interpersonal influences, habit and consumer switching costs.

The research will focus on the individual level of analysis where users make decisions whether to continue or discontinue use of an individual site. The research may have implications beyond the individual level as Hovorka et al. (2013) suggests that satisfaction and continuance may act as a bridge between the individual level adoption behaviors and organizational level success and may help build multi-level theory that links the individual level of analysis to the organizational level of analysis. Satisfaction has been used as an independent factor in information systems and consumer behavior research to predict switching or continuance behavior; however, satisfaction has been shown in consumer behavior research to explain approximately 25% of the variance of customer switching or discontinuance behavior (Burnham et al., 2003; Szymanski and Henard, 2001). The research adds factors added to IS continuance theory that may help explain more of the variance in continuance decisions.

1.3 Research Questions

Information systems continuance of Bhattacherjee (2001) extends expectation-confirmation theory to predict continuance intention through three factors: perceived usefulness, confirmation and satisfaction. Satisfaction, as a measure of continuance, limits the amount of explained variance of continuance intention by itself as there may be additional direct and moderating factors in continuance decisions.

- What are the important motivating factors that predict an individual's intention to continue to use a social networking site?

- How do psychosocial factors like *personal innovativeness, habit,* and *interpersonal influence* predict an individual's intention to continue to use a social networking site?
- How do *consumer switching costs* predict an individual's intention to continue to use a social networking site?
- How do *alternative perceptions* predict an individual's intention to continue to use a social networking site?

1.4 Research Contribution

There are two main expected contributions of the research as proposed. The first is a literary contribution of examining the information systems and consumer behavior research to determine relevant academic research related to continuous intention.

The second contribution is regarding continuance intention on social networking sites. The research model specifically expands beyond satisfaction as a measure of continuance intention to include additional relevant factors. Factors such as *habit* have been studied in other contexts within information systems (e.g. Limayem et al. (2007)) and may have an impact on social networking sites, in particular it may help explain why a site like Facebook with relatively low levels of satisfaction[2] continue to show high usage patterns. The relevant costs of consumer switching behavior based from Burnham et al. (2003) may have a strong role to play in switching behavior. Burnham et al. (2003) found that the consumer costs had a larger role in switching intention than satisfaction. Satisfaction, in the consumer behavior literature, explains approximately 25% of the variance in continuance intention (Burnham et al., 2003; Szymanski and Henard, 2001). The research examines the impacts of

[2] `http://www.theacsi.org/index.php?option=com_content&view=article&id=147&catid=14&Itemid=212&i=Internet+Social+Media`

alternative service substitutions on continuance intention to include relevant social networking site competitors as a factor in an individual's decision to continue to use a social networking site. The model provides a more complete theoretical foundation for examining continuance intention.

1.5 Outline of Dissertation

The dissertation is organized as follows. The introduction covers the general overview of the problem, importance, research questions, potential outcomes - Section 1. A literature review of information systems technology acceptance and information systems continuance intention, consumer switching behavior, and information systems continuance as applied to social networking sites is developed in Section 2. Relevant factors to information systems continuance for social networking sites and their importance to the field are described in Section 3. An initial study predicting end-user satisfaction based on perceived ease-of-use and perceived usefulness is described in Section 4. A model of social networking site continuance is developed with the relevant hypotheses in Section 5. The instrument design, data collection method, and analytical techniques are described in Section 6.1. The statistical analysis and results for the models are found in Section 7. The discussion explains the findings of results in Section 8. The conclusion (Section 10) provides final remarks about the factors and goals of this research. The Appendix shows additional details such as common method variance and individual factor models in greater detail (the impact of a single introduced factor (e.g. habit) on SNS Continuance).

2 Acceptance and Continuance Theories

Technology adoption has been widely studied for more than two decades after the development of the technology acceptance model (TAM) by Davis (Davis et al., 1989; Davis, 1989); the model may be the most widely studied theoretical model in information systems (Venkatesh et al., 2007; Lee et al., 2003). TAM predicts a user's behavioral intention-to-use a given information system; the model has been shown to have strong predictive validity to predict actual system use (Venkatesh et al., 2007). Information systems research regarding adoptions was largely focused on measures like satisfaction and attitude prior to TAM's theoretical development (Venkatesh et al., 2007). Bhattacherjee (2001) developed information systems (IS) continuance theory based on expectation-confirmation theory of Oliver (1980) from consumer behavior research to examine post-adoption behavior (behavior beyond initial adoption of a technology). IS continuance theory predicts continuance behavior using three factors: perceived usefulness, confirmation and satisfaction.

The information systems continuance model of Bhattacherjee (2001) is based on expectation-confirmation theory from the consumer behavior area. Consumer behavior research in the marketing field has examined reasons for consumer discontinuance and switching from one provider to a different provider of products and services. Keaveney (1995) developed an eight category typology for consumer switching behavior for service providers. Bansal and Taylor (1999) developed a psychometric model based on Keaveney (1995) and the theory of planned behavior (Fishbein and Azjen, 1975) called the *service provider switching model* (SPSM). Keaveney and Parthasarathy (2001) examined customer switching behavior in the context of online service providers and used attitudes, behaviors and demographics to predict switching behavior.

Burnham et al. (2003) examined customer switching behavior through three different costs and satisfaction to predict switching behavior. Givon (1984) developed a stochastic model of customer switching behavior through the lens of variety seeking behavior. Many studies of consumer switching behavior use satisfaction as a factor in the model; however, researchers also add additional factors to increase the explained variance in the model to gain predictive power (Keaveney, 1995; Keaveney and Parthasarathy, 2001; Burnham et al., 2003). Consumer behavior research may provide a foundation to explain how information systems users continue-to-use or switch to different service providers - see Section 2.2.

Researchers often use technology acceptance model and information systems continuance theory as a foundation to explore additional factors in related studies on adoption and post-adoption behavior. Liao et al. (2009) compared a revised technology acceptance model (TAM), information systems continuance and expectation-confirmation theory to compare the explained variance each theory predicts for a user's continuance intention. Researchers have used Bhattacherjee (2001) information systems continuance theory to determine continuance intention in many domains and specifically in the social network domain. Researchers have used IS continuance with Maslow's hierarchy of needs (Cao et al., 2013), network externalities (Lin and Lu, 2011), commitment-trust (Xu et al., 2012), social exchange theory, social capital theory and flow theory (Hu and Kettinger, 2008) to predict continuance intention for social networking sites - see Section 2.3.

2.1 Technology Acceptance and Information Systems Continuance

Davis et al. (1989) adapted the theory of reasoned action (TRA) to explain IS acceptance through two constructs: perceived usefulness (PU) and perceived

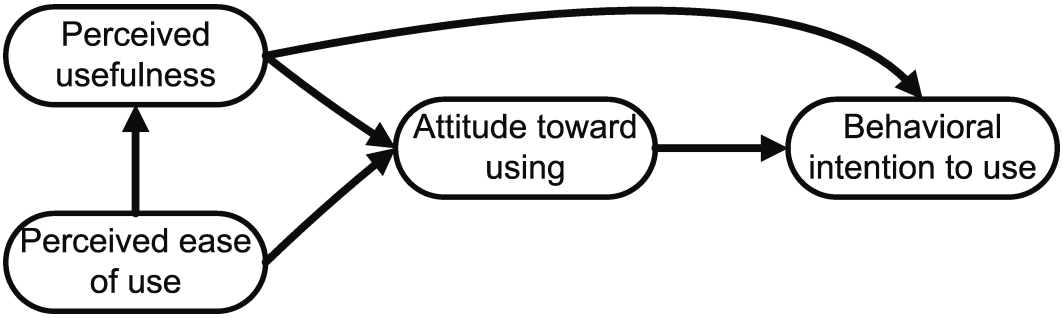


Figure 1: Technology Acceptance Model - Davis (1989)

ease-of-use (PEOU) to explain system users' intention-to-use and adoption behavior - see Figure 1. Davis (1989, p. 320) defined *perceived usefulness* as, "the degree to which a person believes that using a particular system would enhance his or her job performance," and defined *perceived ease-of-use* as, "the degree to which a person believes that using a particular system would be free of effort." The initial research by Davis (1989, p. 320) was about adoption within organizational contexts; however; TAM has been used to predict acceptance in many IS domains outside the organizational context.

Venkatesh et al. (2007) noted that TAM has been widely accepted among IS researchers and widely replicated with little material theoretical advancement two decades after its publication. The researchers noted that there may be several reasons for the theory's adoption by IS researchers including its parsimonious nature, the robustness of the scales and the generalizability of the model. TAM was shown to have better predictive power than the more general theory of reasoned action upon which it is based (Venkatesh et al., 2007) indicating it is more useful than a more generalized psychologically-based model.

TAM has been replicated in many settings over time with many populations and in different contexts and has proven robust (Venkatesh et al., 2007). Lee et al. (2003) describes a chronology of TAM research where the model was first introduced, replicated, validated, extended, and elaborated. Sev-

eral variables have been introduced to TAM in subsequent studies through extensions, Lee et al. (2003) notes that variables *voluntariness, relative advantage, compatibility, complexity, observability, trialability, image, self efficacy, end user, support objective usability, personal innovativeness, computer playfulness, social presence, subjective norms/social influence, visibility, job relevance, computer attitude, accessibility, result demonstrability, management support, computer anxiety, perceived enjoyment, system (output or information quality), facilitating conditions* and *prior experience* have all been studied within the context of technology adoption. One concern regarding TAM is that its emphasis on the initial phase of technology acceptance may limit its ability to predict and inform usage at post-adoption stages (Bhattacherjee, 2001; Venkatesh et al., 2007; Lee et al., 2003). Venkatesh et al. (2007) noted that an emerging area beyond the initial phase of acceptance is the application of expectation-confirmation theory from marketing research by Oliver (1980) to information system continuance behavior by Bhattacherjee (2001).

Bhattacherjee (2001) moved beyond first-time use of an information system to examine the longer term consequences of continued use or continuance (vs. acceptance). IS continuance is important to software development firms because customers, market share and revenue depend on both initial adoption *and* continued use. One advantage of IS continuance theory over initial acceptance is that IS continuance specifically addresses the phenomena of discontinuance (those who decide to stop use) after initial acceptance (Bhattacherjee, 2001). An additional advantage of IS continuance theory is that it provides a model of the psychological motivations of continued use after initial acceptance.

Bhattacherjee (2001) based the theory of IS Continuance on Oliver's (1980) expectation-confirmation theory from consumer behavior research. The model

includes three constructs, perceived usefulness, confirmation, and satisfaction to predict IS continuance intention - see Figure 2. IS continuance is primarily determined by the consumers satisfaction of prior use, i.e. consumers who have a positive experience with software tend to have higher continuance intentions than others. Satisfaction is determined by two factors, the *perceived usefulness* (Oliver (1980) calls this factor *expectation*) and *confirmation*. Higher levels of confirmation indicate that the users initial expectation of the experience has been exceeded by actual use and lower levels indicate that the actual use did not meet the expectation. Higher levels of confirmation are expected to have a positive impact on satisfaction of the system. Perceived usefulness largely captures expectation perceptions of post-consumption usage and is related to the TAM factor of the same name. Higher levels of perceived usefulness in the system are expected to lead to higher levels of satisfaction. Perceived usefulness is also expected to have a direct effect on IS continuance intention; i.e. higher levels of perceived usefulness are expected to increase IS continuance intention. The last relationship in the model is that higher levels of confirmation are expected to have higher levels of perceived usefulness - this is similar to the TAM relationship that perceived ease of use is positively related to perceived usefulness.

Expectation-confirmation theory (Oliver, 1980) is designed to use both pre-consumption and post-consumption expectations to predict repurchase intentions; however, Bhattacherjee's (2001) research examined only the post-consumption relationship to predict IS continuance. The results of Bhattacherjee's (2001) suggested that post-consumption behavior is more important than pre-consumption behavior and Bhattacherjee's subsequent research in 2004 found that as users gained more experience with a software product their satisfaction levels regressed toward the mean and had a less predictive power on

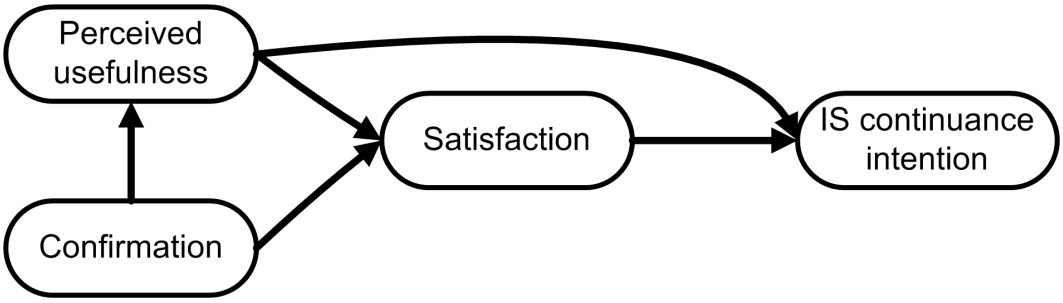


Figure 2: Information System Continuance - Bhattacherjee (2001)

overall satisfaction.

Liao et al. (2009) compared the competing models of TAM, IS continuance theory, expectation-confirmation theory to predict continuance intention. The models all supported the hypotheses that they generated. The findings suggest that expectation-confirmation theory has more predictive power than IS continuance which has better predictive power than TAM. However, as Bhattacherjee (2001) explains, IS continuance theory is used to predict and explain how the factors influence continuance decisions and may have stronger theoretical foundation to predict continuance intention.

2.2 Consumer Switching Behavior

Consumer research in marketing has examined reasons for customers discontinuing use of a product or service or switching from one service provider to a different service provider (Keaveney, 1995; Keaveney and Parthasarathy, 2001; Bansal and Taylor, 1999; Burnham et al., 2003; Sanchez-Garcia et al., 2012). Keaveney and Parthasarathy (2001) note that service switching in the face of increased competition is often called *churn* in the consumer behavior area. Customer switching is a concern because customer acquisition and retention costs can be high (Keaveney and Parthasarathy, 2001; Parthasarathy and Bhattacherjee, 1998). Rapidly changing markets may experience more customer churn where customer retention is a concern of service providers.

Lowering the rate customer switching may increase revenues and lower costs of service providers (Keaveney and Parthasarathy, 2001). Companies who have higher retention rates (or lower churn rates) may increase consumer word of mouth and increase market share (Keaveney and Parthasarathy, 2001). Customer satisfaction and service quality are found to have a strong relationship with switching intentions in a variety of studies (Keaveney, 1995; Keaveney and Parthasarathy, 2001; Bansal and Taylor, 1999; Burnham et al., 2003; Sanchez-Garcia et al., 2012). Studies also note that research should consider other causes of switching beyond satisfaction (Keaveney and Parthasarathy, 2001; Parthasarathy and Bhattacherjee, 1998; Burnham et al., 2003). Burnham et al. (2003) notes that while the evidence is strong that satisfaction influences repurchases behavior it typically explains approximately one quarter of the variance of behavioral intentions (Szymanski and Henard, 2001; Burnham et al., 2003).

2.2.1 Exploratory Research in Customer Switching Behavior

Keaveney (1995) researched customer switching behavior in service industries by examining more than 500 service customers who cited more than 800 critical behaviors that lead customers to switch service providers. The motivation behind the research was to determine why customers switch service providers, what events and combination of events lead a customer to change providers, how do service encounters and service quality influence the decision to switch. The research found 8 categories of service switching behaviors (and *other*): (1) pricing, (2) inconvenience, (3) core services failures, (4) failed service encounters, (5) response to failed services, (6) competition, (7) ethical problems and, (8) involuntary switching. Fewer than 5% of incidents were classified as *other* indicating that the eight major categories cover the majority of switching be-

haviors. Switching behavior was categorized as *simple* (one factor) or *complex* (multi-factor). Simple switching accounted for forty-five percent of switching, two-factor incidents accounted for thirty-six percent of switching, three factor incidents accounted for fifteen percent of incidents and four-or-more- factor incidents account for four percent. Keaveney notes that the research expands the reasons for why customers switch service providers beyond service quality and satisfaction to include the factors found in the research.

Six of the eight reasons for service failure are controllable by the firm where two are beyond the business's control (Keaveney, 1995). Companies can manage the pricing, inconvenience, service failure, service encounters, response to failure and ethical issues, where involuntary switching and competition are beyond the firm's control. Customers may change providers even when they are satisfied with the existing services, e.g. an accountant may provide satisfactory service but a different service provider may provide more direct access and is what the customer desires. Another example in the study was of a customer who was satisfied with a mechanic but switched because a different mechanic also performed satisfactory work on a spouse's automobile. A confounding issue is that dissatisfied customers may also stay with service providers despite issues with the service (Keaveney, 1995).

2.2.2 Service Provider Switching Model

Bansal and Taylor (1999) advanced the descriptive research of Keaveney (1995) and developed a psychometric model of customer switching and named the resulting model the service provider switching model (SPSM). The researchers grouped Keaveney's results into two components - service performance (core service failure, service encounter failure, response to service failure, and ethical problems) and cost of switching (price, inconvenience and competition).

Keaveney's research is not an *intentional* model as it collected data on service switching that occurred. Bansal and Taylor (1999) included Fishbein and Azjen theory of planned behavior to include attitude and behavior factors to develop a behavioral intention model. The model includes four direct antecedents to predict switching intention: satisfaction, perceived switching costs, attitude toward switching and subjective norms to predict switching intentions.

The Bansal and Taylor (1999) model was validated and accounts for 76% of the variance in switching behavior intentions. The logistic regression model could correctly classify 74% of switching behaviors and account for 30% of the variance. The service provider switching model (SPSM) uses attitude toward switching (behavioral intentions of the theory of planned behavior), satisfaction (service performance), switching costs and self-efficacy to predict the majority of the variance in customer switching intentions and customer switching behaviors.

2.2.3 Customer Switching Behavior for Online Service Providers

Keaveney and Parthasarathy (2001) examined customer switching behavior for online service providers (e.g. America online, Compuserve, etc.). The researchers note that some customers elect to discontinue service completely while other customers choose different service providers. The researched used a combination of attitudes, behaviors and demographics as predictors of switching behavior. The researchers used external source of information (mass media, marketing information, etc.), interpersonal source of information (word of mouth), experiential source of information (product engagement), service usage (frequency of use, intensity of use, usage-overall) and risk taking behavior, satisfaction and involvement to measure attitudes and behaviors. Income and

education were used as demographic predictors.

The Keaveney and Parthasarathy (2001) results show that customers who continued to use their existing service provider relied more on external sources of information (e.g. mass media) when making their subscription decisions than those who switched. Customers who stayed with their existing provider relied less on interpersonal sources of information (e.g. word of mouth) when making the subscription decision than those who switched. Customers who relied more on their own experience with a service continued to use the service more than those who switched. Customers who stayed with their existing provider used the service at higher frequency of use and had higher overall usage, but did not have any greater intensity of use than those who discontinued use. Customers who stayed with their existing provider had higher levels of satisfaction than those who left the service. Online service continuers had greater involvement with the service than those who discontinued use. One unexpected finding was that customers who continued with an existing service had now lower propensity for risk taking than those who switched their service provider.

One goal of the research by Keaveney and Parthasarathy (2001) was to provide a framework for predicting which customers may leave an existing service provider and go to another. If customers who may leave a service can be identified then strategies may be enacted to retain customers. The researchers suggest that companies increase satisfaction as well as involvement, and service usage (especially frequency) to increase customer retention and reduce customer churn.

2.2.4 Consumer Switching Costs

Burnham et al. (2003) examined consumer switching costs through a typology

of three different costs. The examined procedural switching costs (loss of time and effort), financial switching costs and relational switching costs (psychological or emotional discomfort due to the loss of identity and the breaking of bonds). The research shows that while companies will want to manage customer satisfaction they should also manage the perceptions that customers have of switching costs. The model defines three groups (procedural, financial and relationship) of eight switching costs: economic risk costs, evaluation costs, learning costs, setup costs, benefit loss costs, monetary loss costs, personal relationship loss costs, brand relationship costs to examine consumer switching costs - see Table 1.

The research by Burnham et al. (2003) supported that satisfaction and the three switching costs (procedural, financial and relational) were all significant predictors of service provider switching intention. Consumers with higher perceived procedural switching costs were less likely to change providers. Services that are perceived to be more complex and difficult to evaluate were less likely to be substituted for competing products. Consumers who thought there would be a negative financial impact were more likely to stay with with a service provider. The results suggest that loyalty programs, bundling of services and complex service offerings can reduce service provider switching. Consumers who perceived high relational costs with the service provider were less likely change service providers; consumers can strongly identify with a service provider and will be less likely to choose a different service provider. Relational costs had the highest standardized estimate (.44) followed by procedural costs (.15), then financial (.13) as predictors for customer switching behavior. Satisfaction was also supported as a significant predictor of switching intentions where higher satisfaction was associated with lower switching of service providers.

Table 1: Typology of Consumer Perceptions of Switching Costs

Cost	Components
Procedural Switching Costs	***Economic Risk Costs*** - "the costs of accepting uncertainty with the potential for a negative outcome when adopting a new provider about which the consumer has insufficient information." p. 111
	Evaluation Costs - "the time and effort costs associated with the search and analysis needed to make a switching decision." p. 111
	Setup Costs - "the time and effort costs associated with the process of initiating a relationship with a new provider or setting up a new product for initial use." p.111
	Learning Costs - "the time and effort costs of acquiring new skills or know-how in order to use a new product or service effectively." p. 111
Financial Switching Costs	***Benefit Loss Costs*** - "the costs associated with contractual linkages that create economic benefits for staying with an incumbent firm." p. 111
	Monetary Loss Costs - "the onetime financial outlays that are incurred in switching providers other than those used to purchase the new product itself." p. 111
Relational Switch Costs	***Personal Relationship Loss Costs*** - "the affective losses associated with breaking the bonds of identification that have been formed with the people with whom the customer interacts." p.111-112
	Brand Relationship Loss Costs - "the affective losses associated with breaking the bonds of identification that have been formed with the brand or company with which a customer has associated." p.112

Adapted from Burnham et al. (2003)

A direct comparison of the three switching costs vs. the satisfaction measure showed that the switching costs explained more of the variance (30%) than satisfaction (16%) in intention to switch service providers (Burnham et al., 2003). The results show that switching costs may have more predictive power for customer switching behavior that satisfaction. Burnham et al. (2003) strongly suggest that switching costs should be incorporated into customer switching behavior research in addition to satisfaction measures. The researchers also note costs may apply to different settings in varying amounts, for example, in social networking sites like Facebook and Twitter the financial costs may not apply as the service is free - see Section 5 for the application of consumer behavior research to social network site continuance intention.

2.2.5 Variety Seeking Behavior

Givon (1984) examined customer switching behavior through the lens of *variety seeking behavior* - operationalized as, "as a measure of individual tendency to vary consumption. This tendency is measured on a continuum that extends from extreme tendency to vary consumption to an extreme tendency to avoid variety" (Givon, 1984, p. 2). McAlister and Pessemier (1982) note that some researchers find that variety seeking behavior is *inexplicable* or so inherently complex to be rendered operationally inexplicable, while other researchers have attempted a more rigorous explanation of variety seeking behavior. McAlister and Pessemier (1982) noted that researchers who tried to explain why consumers exhibit variety seeking behavior classify the behaviors into two classes *derived* and *direct*. Derived behavior refers to, "behavior resulting from external or internal forces that have nothing to do with a preference for change in and of itself,"(McAlister and Pessemier, 1982, p. 313). Derived behavior is the result of some other motivation such as a change in tastes, change in

constraints, satisfying multiple needs, etc. Direct behavior is where change is a motivation in and of itself (change is inherently satisfying and may be influenced by peers) and broken into two groups: intrapersonal motives and interpersonal motives. Intrapersonal motives are motives such as *desire for the unfamiliar, alternation among the familiar* and interpersonal motives are motives such as *affiliation* and *distinction*.

Givon (1984) researched variety seeking behavior to determine how widespread the phenomenon is and at what intensity. Repeat buying or consumer sighting behavior can be stochastic within a given product class. Consumer switching is not a simple manifestation of satisfaction or dissatisfaction (utility or disutility). Consumers may receive a utility from continuing with a known product or service or may receive utility from switching to a competing product or service. The results found that 50% of households were indifferent to variety seeking with food products, likewise the remaining 50% were actively looking or trying to avoid change. The research did not examine satisfaction with current products to model consumer switching behavior but developed a probabilistic model based on past purchases and psychological measures to determine the probability of brand switching. Givon (1984) notes that it may be easier to introduce new products to consumers who exhibit higher levels of variety seeking behavior - but it may be harder to keep them from switching to alternate products as well. Givon (1984) also found demographic differences in variety seeking behavior where younger consumers tended to be variety seekers compared to their older counterparts.

2.2.6 Consumer Behavior Research Applications in Information Systems

Consumer behavior research may help serve as a foundation for information systems continuance behavior. Bhattacherjee (2001) theory is an application of expectation-confirmation theory of Oliver (1980). Researchers in the consumer behavior area make an appeal to others in the field to include factors in addition to satisfaction to explain which users continue or discontinue use or switch to a different service provider. Information systems continuance theory will, likewise, often serve as a foundation for IS continuance behavior, but additional factors may be added to further explain how individuals decide to continue to use an information system.

2.3 IS Continuance Applied to Social Networking Sites

Researchers have applied information systems continuance theory to predict continuance intention on social networking sites. Kim (2011) examined factors *perceived usefulness* and *perceived enjoyment* as direct effects on both satisfaction and continuance intention. The research examined the factors of *interpersonal influence* and *media influence* as direct effects on *continuance intention*. All factors had a significant role to play in the model except media influence which was not significant.

2.3.1 Maslow's Hierarchy of Needs

Cao et al. (2013) examined continuance intention through the theoretical lens of Maslow's hierarchy of needs. The model used two factors, fulfillment of social needs and fulfillment of self-actualization needs, to determine the direct effect on both satisfaction and continuance intention. The research found that fulfillment of self-actualization needs had direct effects on both satisfaction

and continuance intention. Fulfillment of social needs had a direct effect on satisfaction and no statistically significant effect on continuance intention.

2.3.2 Network Externalities

Lin and Lu (2011) examined the role of network externalities to predict IS continuance. The researchers examined the number of members, number of peers and perceived complementarity as antecedents to perceived benefits (usefulness and enjoyment) which subsequently predicted IS continuance intention. The researchers found that number of members predicted usefulness, number of peers predicted usefulness, enjoyment and continuance intention and perceived complementarity predicted usefulness and enjoyment. The model found significant differences of continuance intention between how men and women, where the model was able to account for much more of the variance in the dependent variable than for men.

2.3.3 Social Networking Site Stickiness

Xu et al. (2012) developed a theoretical model for social networking site *stickiness* to determine why users continue to use particular sites based on a commitment-trust model. Xu et al. (2012) note that satisfaction does not appear to be a measure that strongly predicts continuance behavior on social network sites; the researchers note that Facebook has a relatively low satisfaction score of 64 out of 100 (2010 figure) and despite this satisfaction score the site continues to grow. Xu et al. (2012) extend the commitment-trust model of website stickiness where *commitment* and *trust* are factors that predict *stickiness intention*. *Commitment* is predicted by *investment size*, *alternative quality* and *gratification*. *Trust* is predicted by *communication quality*, *opportunistic behavior* and *gratification*. Both *commitment* and *trust* have *gratifi-*

cation as a antecedent which indicates that both the commitment and trust factors are mediated factors between gratification and stickiness intention.

2.3.4 IS Continuance, Social Exchange Theory, Social Capital Theory & Flow Theory

Hu and Kettinger (2008) developed a model for information systems continuance of social networking services based on IS continuance, social exchange theory, social capital theory and flow theory. The Hu and Kettinger (2008) model uses IS Continuance theory of Bhattacherjee (2001) as its theoretical foundation. The model suggests that user satisfaction is the major driver of IS continuance through perceived usefulness and confirmation of expectations. Hu and Kettinger (2008) augment the IS Continuance theory with social exchange theory, social capital theory and flow theory. Social exchange theory asserts that individual behavior is guided to maximize gains and marginal utility - individuals attempt to balance costs and benefits of potential social exchanges. The potential rewards of a social exchange are not contractual in nature - trust acts as a mechanism that encourages members to contribute in a social exchange. Social capital generally refers to the skills and knowledge that are accessible to an individual through their relationships with others (Coleman, 1988). Coleman (1988) notes that an important form of social capital is the ability to acquire information through relationships; information itself may be valued highly and is generally costly to acquire. Access to a large and weakly-tied tied network may provide more benefits than a smaller strongly-tied network (Granovetter, 1973). Flow theory is the experience of complete absorption in the present moment (Nakamura and Csikszentmihalyi, 2009). Flow theory is related to the intrinsic role of flow experience in terms of concentration and perceived enjoyment that people experience when they act

with total involvement. When in *flow* an individual is operating at full capacity (Nakamura and Csikszentmihalyi, 2009). Individuals who experience *flow* want to return to those activities because of the positive experiential rewards (Nakamura and Csikszentmihalyi, 2009). The model then groups factors into three major components - satisfaction, perceived benefits and perceived costs to predict usage continuance. Usage history, which includes frequency of prior usage and comprehensive of prior usage, is used to moderate the antecedents of usage satisfaction. Continuance intention is predicted by six factors: (1) social influence, (2) flow experience, (3) usage satisfaction, (4) perceived value, (5) perceived information risks and (6) perceived effort. Hu and Kettinger (2008) provided a road map of future work where they would collect data from college students and analyze data with partial least squares (PLS).

2.3.5 Satisfaction Scores of Social Networking Sites

The American Customer Satisfaction Index (ACSI) measures satisfaction ratings on a scale of 0-100[3] for seven sites and Facebook has the lowest rating on the social networking sites that were measured at an individual level; the ratings are (1) Google plus (78), (1)Wikipedia (78), (3) YouTube (73), (4) Pinterest (69), (5) Twitter (64), (6) LinkedIn (63), (7) Facebook (61).[4] The ACSI results also show that Facebook satisfaction is declining; the change from the previous years satisfaction is -7.6% and -4.7% since the first year ACSI collected satisfaction ratings for sites (2010). Despite the relatively low satisfaction scores Facebook continues to achieve high levels of customer attention where there are 1.11 billion monthly active users (March 2013). [5].

[3] http://www.theacsi.org/acsi-results/acsi-results

[4] http://www.theacsi.org/index.php?option=com_content&view=article&id=147&catid=14&Itemid=212&i=Internet+Social+Media

[5] http://newsroom.fb.com/Key-Facts

2.3.6 Naming the Dependent Variable Social Networking Site Continuance Intention

This research uses the term *social networking site continuance intention* to make clear the context of the study. Information systems continuance theory of Bhattacherjee (2001) measures *continuance intention* but uses the term *information systems continuance intention* and expectation-confirmation theory of Oliver (1980) measures *continuance intention* and uses the term *intention.* Information systems researchers tend to use the context of the study to label the dependent variable: Kim (2011) used *SNS Continuance Intention*, Xu et al. (2012) used *stickiness intention*, Hu and Kettinger (2008) used *usage continuance*, and Lin and Lu (2011) used *Continued Intention to Use.*

Researchers in marketing have a bit less variety in their naming conventions of continuance intention. Cao et al. (2013) used *continuance intention*, Keaveney (1995) uses *switching behavior*, Bansal et al. (2005) use *switching intention/switching behavior*, Keaveney and Parthasarathy (2001) use *switching behavior*, Burnham et al. (2003) use *intention to stay with incumbent provider*, and Givon (1984) uses *brand switching.* Marketing researchers appear to have an emphasis on switching to a different provider. Most of these researchers are focused on service switching as opposed to product switching, but some study both products and services. In the context of social networking site continuance, the focus is on service switching.

2.4 Summary of Theories

Table 2 summarizes the theories applicable to information systems continuance and Table 3 summarizes the theories from the consumer switching literature. The research in consumer behavior and information systems continuance intention may serve as a theoretical foundation for additional studies into contin-

uance intention on social networking sites. Information systems continuance theory is largely guided by satisfaction; the consumer behavior literature also uses satisfaction as a predictor for switching behavior. The consumer behavior literature suggest that a number of factors can be added to more accurately and completely predict continuance intention.

Table 2: Information Systems Theoretical Foundation

Study	Theory/Area	Independent Variables	Dependent Variable
Davis (1989); Davis et al. (1989)	theory of reasoned action, technology acceptance model (TAM)	perceived ease-of-use, perceived usefulness, attitude toward using	behavioral intention-to-use
Bhattacherjee (2001)	expectation-confirmation Theory, information systems continuance	confirmation, perceived usefulness, satisfaction	information systems continuance intention
Cao et al. (2013)	information system continuance + Maslow's hierarchy of needs	fulfillment of social needs, fulfillment of self-actualization, satisfaction	information systems continuance intention
Lin and Lu (2011)	motivation theory + network externalities	perceived benefits (usefulness and enjoyment), network externalities (number of members, number of peers, perceived complementarity)	information systems continuance intention
Xu et al. (2012)	commitment-trust theory + uses and gratification theory	commitment (investment size, alternative quality, gratification), trust (communication quality, opportunistic behavior, gratification), gratification	stickiness intention
Hu and Kettinger (2008)	information system continuance, social exchange theory, social capital theory, flow theory	perceived benefits, perceived costs, usage satisfaction	usage continuance

Table 3: Consumer Switching Theoretical Foundation

Study	Theory Name/area	Independent Variables	Dependent Variable
Keaveney (1995)	customer switching behavior	pricing, inconvenience, core services failures, failed service encounters, response to failed services, competition, ethical problems, involuntary switching	switching behavior
Bansal and Taylor (1999)	service provider switching model (SPSM)	satisfaction, perceived switching costs, attitude toward switching, subjective norms	switching intention
Keaveney and Parthasarathy (2001)	switching behavior for online service providers	external influence, interpersonal influence, usage (frequency, intensity, overall), risk taking behavior, satisfaction, involvement	switching behavior
Burnham et al. (2003)	typology of switching costs	procedural switching costs, financial switching costs, relational switching costs, satisfaction	switching intention
Givon (1984)	variety seeking behavior	brand preference, variety seeking (probability model)	brand switching

3 Social Networking Sites

3.1 Social Networking Sites Today

Social networks sites are where Americans spend the largest share of their time online; Americans spend approximately 25% of their time online on SNS and blogs (Nielsen, 2011). Social network sites span a variety of contexts from general purpose social sites like Facebook, Google+, and Twitter (micro-blogging), to content focused sites like MySpace (music), LinkedIn (professional), YouTube (video), Flickr (photo sharing), etc. Social media (social networking sites and blogs) reach the majority of U.S. Internet users; approximately 80% of internet users access these sites and approximately 25% of American's time online is spent on these sites (Nielsen, 2011). Americans spend more time of Facebook than any other U.S. website (Nielsen, 2011); Facebook has 1.11 global active monthly users (March 2013) and is believed to be the largest social networking site.[6]

Social networks research and social network analysis are among the early forms of sociological research (Scott, 1988). Social networks are often modeled as a graph where the relationships between actors (e.g. individuals, organizations), and their relationships are shown (Brandes et al., 2012). The relationships between the actors are often social relationships but may also show other relationships. Social network research often examines properties of the network like centrality, density and connectedness (Scott, 1988). Social network analysis has been used to investigate social mobility, class structure, perceptions of class, welfare support, academic citations, etc. (Scott, 1988). Social network research often will focus on community studies (ego-centric studies where the focus is on individual actors) or inter-organizational relationships

[6] `https://newsroom.fb.com/Key-Facts`

(where the relationships between organizations are the focus) (Scott, 1988). The individual and collective actions on a social networking site are expected to share similarities with social networks in face-to-face settings; however, social networking sites are likely to have a specific context for which these relationship connections are formed and unformed. Relationship formation and dissolution, for example may be experienced in different ways online from face-to-face settings. In face-to-face setting connections between individuals may be more difficult to ascertain as there may be less certainty about whether a connection exists whereas in online settings dyadic connections are often explicit and visible.

Joinson (2008) examined motivations for using Facebook and found that the users said that they wanted to "keep in touch" with others as their main motivations where other uses such as social surveillance, reconnecting with others, etc. were less common. boyd (2006) examined *friending* behavior on two early general purpose social networks Friendster and MySpace; boyd's research shows that *friends* can be actual friends, or acquaintances, colleagues, people that have never met in face-to-face settings, etc. Ellison et al. (2007) examined the benefits of Facebook use and social capital. Social capital generally refers to the skills and knowledge that are accessible to an individual through their relationships with others (Coleman, 1988). Coleman (1988) notes that an important form of social capital is the ability to acquire information through relationships; information itself may be valued highly and is generally costly to acquire. Access to a large and weakly-tied tied network may provide more benefits a smaller strongly-tied network (Granovetter, 1973).

There are a host of reasons to study social networking sites; these sites have changed the way people communicate, interact, collaborate, share information, search for jobs, provide social support, build social capital, have practical

political implications for social movements[7](Nardi et al., 2011). Facebook, Microsoft and Google support economic growth and innovation; understanding how the Internet-based tools are used may help the these tools reach their potential (Nardi et al., 2011). Wilson et al. (2012) provides three reasons why Facebook research is relevant to social scientists - the online interactions leave concrete observable data that can be analyzed, the sites popularity, and the potential benefits and dangers of its use (e.g. social capital as a benefit and privacy as a danger).

The consequences of information technology often emerge unpredictably from complex social interactions between technology and the social systems in which they are embedded (Markus and Robey, 1988) - online social media is increasingly being used in business contexts. It is often difficult to predict how technology affects social structures and how social structures shape technological innovation (Orlikowski and Robey, 1991). Information technology users can appropriate technology in ways beyond their original intent (Orlikowski and Robey, 1991).

3.2 Social Networking Sites in Decline

Social networking sites may face growth and decline patterns typical of other online services such as online communities of practice. Iriberri and Leroy (2009) identified a five stage model for communities of practice that covered inception to death that may be applied to social networking site life cycle models. Social networking sites and online communities of practice are both socially based websites where information is shared between members. Pew Internet Project asked Facebook users for the reasons why they discontinued use of the site for multi-week periods (Raine et al., 2013). The research found

[7] `http://somelab.net/some-lab-themes/`

Table 4: Pew Internet - Reason for Facebook Breaks

Stated Reason for break	(%)
Was too busy / Didn't have time for it	21
Just wasn't interested / Just didn't like it	10
Waste of time / Content was not relevant	10
Too much drama/gossip/negativity/conflict	9
Was spending too much time using the site	8
Only an intermittent or infrequent user	8
Went on vacation/trip/deployment	8
Just got tired/bored with it	7
No real reason / Just because	6
Concerns about privacy/security/ads/spam	4
Did not have computer/internet access	2
Prefer other ways to communicate / Facebook not "real life"	2
Health or age issues	2
Took a break for religious reasons	1
Didn't like posting all the time / Didn't want to share	1
Total	**99**

Source: Pew Research Center's Internet & American Life Project Omnibus Survey, conducted December 13 to 16, 2012 on landline and cell phones. N=316 for Facebook users who have taken a break from using the site in the past (Raine et al., 2013).

that the top reasons were (1) being too busy / did not not time for it (21%), (2) not interested, did not like (10%), (3) waste of time / content not relevant (10%) - see Table 4.

3.2.1 Communities of Practice and Online Communities of Practice

Communities of practice (CoP) and online communities of practice (OCoP) are socially based organizations where members create, hold and transfer knowledge in a community (Roberts, 2006). Lave and Wenger (1991, p.98) defined community of practice as "set of relations among persons, activities and the

world, over time and in relation with other tangential and overlapping communities of practice." CoP are a type of social networks but are defined within the specific context of knowledge creation and transfer among its members. These communities are not simple stable entities but dynamic enterprises that evolve over time as new members join and existing members depart (Roberts, 2006). CoPs are not not always strongly defined with easily definable membership as the community boundaries may evident (Roberts, 2006).

Online communities of practice tend to be more open as they may more easily cross organizational boundaries enabled by technology like web 2.0 technologies. The communities tend to have a life cycle of five stages: *inception, creation, growth, maturity* and *death* (Iriberri and Leroy, 2009). Each stage has different challenges and success factors that allow the community to grow or cause its demise (Iriberri and Leroy, 2009). Social networking sites and communities of practice are likely to have many commonalities however many social network sites are more focused on the creation and maintenance of social relationships compared to the knowledge focused communities of practice (Iriberri and Leroy, 2009). General purpose social network sites may have more conflicts from context collapse where the users are posting about a variety of topics vs. communities of practice whose posting behavior may be more focused on a particular topic. boyd (2006) notes that online communities of practice share similarities with social networking sites but notes that the social networking sites are about the members first and interests second - that is the community is define egocentrically. Social networking site users can set the context of the discussions and social boundaries more personally than communities of practice where the social norms are defined at the community level (boyd, 2006; Lave and Wenger, 1991).

3.2.2 Taking Breaks on Social Networking Sites

Facebook may be a social networking site that is in maturity or death phase (decline). According to the Pew Internet Project Survey, *Coming and Going on Facebook*, Facebook users are taking multi-week breaks from the site (Raine et al., 2013). The same Pew Internet Project survey found that 27% of users said they planned to spend less time on the site, 3% said they wanted to spend more time on the site and 69% said they planned to spend the same amount of time on the site. Research shows that teens have declining interest in Facebook; teens stated that increased use of adults, over-sharing and stressful "drama" are all reasons for decreased enthusiasm (Madden et al., 2013). Teens still show interest in social networking sites as their uptake of the social networking site Twitter has shown significant growth (Madden et al., 2013). Twitter is used by 24% of online teens in 2013 compared to 16% in 2011. There are popular media reports that discuss why users are leaving sites like Facebook and turning to other social networking sites. For example, 7 Reasons I Dumped Facebook[8] stated that: 1) Facebook sucks time from my life, 2) Most of my Facebook friends aren't (actually friends), 3) There are other (better) options for photo sharing, 4) Facebook brings out the worst in people, 5) I learn more on Twitter, 6) The presence of ads on Facebook is getting ridiculous, 7) Less is more. The descriptive research by the popular media about continuance on the site does not focus on satisfaction, the main antecedent to information system continuance but on other factors.

[8] `http://www.forbes.com/sites/timmaurer/2013/06/20/7-reasons-i-dumped-facebook/`

3.2.3 Engagement Level Concerns of Facebook

Facebook notes that its active user growth rate will decline over time as higher market penetration rates are achieved.[9] Facebook's 10-K filing notes that, "A number of other social networking companies that achieved early popularity have since seen their active user bases or levels of engagement decline, in some cases precipitously. There is no guarantee that we will not experience a similar erosion of our active user base or engagement levels. Our user engagement patterns have changed over time and can be difficult to measure, particularly as users engage increasingly via mobile devices and as we introduce new and different services." The filing also notes that user retention, growth, and engagement may be negatively affected as users increasingly engage with other products or activities. The report suggest that social networking site services from other companies may be acting as product substitutes and not product complements and may erode Facebook's engagement levels. Xu et al. (2012) note that the social networking site MySpace had more than 100 million users before 2008 but fell to 54.4 million by November 2010. MySpace had a market valuation of 580 million when News Corp bought the site in July 2005 to 35 million when Specific Media purchased the site in June 2011.[10] Xu et al. (2012) note that social networking sites rely on user generated content and suggest that the long term viability of a social networking site depends on continued user participation.

[9] http://investor.fb.com/secfiling.cfm?filingID=1326801-14-23&CIK=1326801

[10] http://allthingsd.com/20110629/exclusive-myspace-to-be-sold-to-specific-media-at-35-million/

4 Predicting End-User Satisfaction through Perceived Ease-of-Use and Perceived Usefulness - Study 1

Study 1 - Summary

This study predicts end-user satisfaction on Facebook through two constructs: perceived ease-of-use and perceived usefulness. Usefulness was operationalized to reflect the perception that the site is helpful for friendship maintenance and social surveillance. The results show that Facebook users perceive the site to be both easy-to-use and useful. Perceived ease-of-use and perceived usefulness were statistically significant predictors for satisfaction; the perceived usefulness of the site has a greater impact on satisfaction than perceived ease-of-use. Several control variables were included to adjust the results. Satisfaction is statistically significantly higher for users who have more friends and interact with more people compared to those who had fewer friends and fewer interactions. Satisfaction is not statistically different for males and females when accounting for users' perception of usefulness and ease-of-use. This study applies the IS success model developed for more utilitarian systems to a hedonic social network site.

This study examines end-user satisfaction through two established constructs: perceived ease-of-use and perceived usefulness (Davis, 1989). Perceived usefulness is operationalized in this study as how useful the site is for maintaining friendships and conducting social surveillance. Social network sites like Facebook allow users to accumulate social capital; however, the site appears to benefit weak-tie relationships more than strong-tie relationships (Ellison et al., 2007; Vitak et al., 2010). Relationship strength may vary from weak- to strong-ties, although there is some consensus that the majority of ties on Facebook are weak (Vitak et al., 2010; Lewis and West, 2009).

Although Facebook is a popular site in terms of the proportion of time spent online that fact alone does not indicate that the users are highly satisfied with the site, or believe it is either useful or easy-to-use. Facebook users may have

a variety of motivations to use the site beyond these elements. SNS might feel compelled to use the site through social pressure or because they find it necessary to monitor their network. Joinson (2008) examined motivations for using Facebook and found that the users said that they wanted to "keep in touch" with others as their main motivations where other uses such as social surveillance, reconnecting with others, etc. were less common. Studies on end-user satisfaction have largely focused on utilitarian web sites leaving hedonic systems under-researched (Ong and Day, 2010; Schaupp, 2011). The purpose of this research is to determine how the perceived ease-of-use and perceived usefulness of Facebook contribute to end-user satisfaction. There is strong evidence that Facebook, at the U.S. national level, is quite popular; however, this analysis is at the user-level and brings insight into the user-level attributes for satisfaction and specifically examines the hedonic web site of Facebook. The study was conducted by analyzing survey responses of 1,552 Facebook users who were recruited through Twitter.

4.1 Literature Review

boyd and Ellison (2007a) defined social network sites based on three system capabilities. The systems: "allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system" (boyd and Ellison, 2007a, p. 210). After users join a site they are asked to identify others in the network with whom they have an existing relationship. The links that are generated between individuals become visible to others in the local subspace. There are general social network sites (e.g. Facebook) and others that are content focused.

Davis et al. (1989) adapted TRA to explain IS acceptance through two constructs: perceived usefulness (PU) and perceived ease-of-use (PEOU) to explain system users' intention-to-use and adoption behavior. Davis (1989, p. 320) defined *perceived usefulness* as "the degree to which a person believes that using a particular system would enhance his or her job performance," and defined *perceived ease-of-use* as "the degree to which a person believes that using a particular system would be free of effort." Conceptually, an application that is perceived to be easier to use is more likely to be adopted, ceteris parabus. The initial research by Davis (1989, p. 320) was about adoption within organizational contexts where employees are "generally reinforced for good performance by raises, promotions, bonuses, and other rewards," however; TAM has been used to predict acceptance in many IS domains outside the organizational context. The two constructs, PEOU and PU, can predict a user's attitude toward the system and their behavioral *intention-to-use* (Davis et al., 1989). Davis et al. (1989) stated that TAM was developed to create a model to explain the determinants of computer acceptance that was capable of explaining user behavior across a broad range of end-user computing technologies and user populations.

Research related to TAM has emphasized different aspects over time as theory has become more accepted and widespread. Lee et al. (2003) discuss four phases in the progression of research related to TAM; the phases are: model introduction, model validation, model extension and model elaboration. During the model introduction phase, researchers replicated TAM in a variety of settings and over longer time periods. Researchers compared and contrasted the features of TAM with TRA to determine which theory better explains adoption. During the validation phase, researchers examined the instrument in a number of different settings to determine whether the constructs had ac-

ceptable discriminant and convergent validity. The model validation phase examined TAM's boundary conditions and investigated the moderating effects such as, "culture, gender, task, user time and IS type" (Lee et al., 2003, p. 757). During the model elaboration phase, TAM was modified to address concerns such as multi-level analysis and address concerns regarding the context (voluntary and mandatory settings).

DeLone and McLean (1992; 2003) (D&M) examined IS success through six variables: system quality, information quality, use, user satisfaction, individual impact and organizational impact to determine what makes a given information system successful. The D&M model identified the relationships between the variables and cautioned that additional research was needed (Petter and McLean, 2009). At the individual level, end-user satisfaction is a major component of IS success; the variable is one of the most widely used single measures of IS success (DeLone and McLean, 1992). DeLone and McLean (2003) caution users of their model to select the dependent variable of success that is appropriate to the objectives and the context of the empirical investigation. The D&M 2003 model includes a feed back loop between *use* and *user satisfaction* because *use* necessarily precedes *user satisfaction* and greater *satisfaction* will increase *use*. As users increase use and satisfaction the user will accumulate net benefits (the 2003 success model redefined individual and organizational impacts as *net benefits*) and can help determine the success of an information system. Petter and McLean (2009) meta-analysis of IS success studies found that there was statistically significant relationship between intention-to-use (based on TAM) and end-user satisfaction.

Joinson (2008) examined Facebook users' motivations and uses of SNSs. The research identified themes from open-ended survey questions and found that *keeping in touch* [with friends and acquaintances] received the largest

share of responses (47.3%), and *social surveillance* (second largest category) accounted for an additional 17.3%. Other categories included reconnecting with lost contacts, communicating with others, viewing photographs, etc. A minority of respondents were interested in making new friends (4.5%). Joinson found that women used the site more often than men and was the largest positive predictor for frequency of visits to Facebook. The research also found that those who used the site for social investigation (defined in the study as virtual people watching, stalking others, etc.) used Facebook more often. The largest negative predictors for frequency of use were those who use Facebook to update their personal status or view status updates from their network followed by those who use the site to look at photographs. Kwon and Wen (2010) researched how six factors (social identity, altruism, telepresence, PEOU, PU, perceived encouragement) could predict system use on SNS. Their research found that PEOU and PU had the strongest statistically significant relationship to predict actual system usage.

4.2 Study Design

Based on previous research, this investigation was designed to predict end-user satisfaction on the social network site Facebook with two constructs: perceived ease-of-use and perceived usefulness. Perceived usefulness has been operationalized in this case to mean friendship maintenance and social surveillance, which are two of the dominant motivations of Facebook users (Joinson, 2008). This research uses the established theory from Davis's Technology Acceptance Model (Davis, 1989) for two of the constructs, *perceived ease-of-use* and *perceived usefulness*, to predict *end-user satisfaction.* TAM was designed to predict computer users' behavioral intention-to-use a system (Davis, 1989). In this research the survey population already adopted Facebook; therefore,

this research uses end-user satisfaction as the dependent variable. *Intention-to-use* and *system usage* have been shown in previous studies to be linked to end-user satisfaction (Petter and McLean, 2009; DeLone and McLean, 2003). Baroudi et al. (1986) found both user *information satisfaction* and *user involvement* to have a statistically significant correlation with *system usage.* Several studies have found PEOU and PU to have statistically significant relationships with related measures of user satisfaction and usage (Srinivasan, 1985; Petter and McLean, 2009; DeLone and McLean, 2003; Adamson and Shine, 2003). Adamson and Shine (2003) predicted *end-user satisfaction* using *perceived ease-of-use* and *perceived usefulness* for a bank treasury application. Adamson and Shine's (2003) research into satisfaction was in the context of a mandatory environment, i.e. the users of the system were required to use the system to complete their work and had no viable alternatives. IS researchers have focused their attention more on utilitarian uses of information systems (e-commerce, task-oriented computing, office-type applications) compared to more hedonic uses (like SNS, blogging sites, entertainment, etc.) (Ong and Day, 2010; Schaupp, 2011). This research focuses on Facebook where the users voluntarily choose to use the online social network for largely hedonic purposes.

There are several control variables used to adjust the primary constructs in the study; the control variables are: age, gender, location (reside in U.S. or outside U.S.), number of interactions with Facebook users, number of friends on the site and years of social network site use. Age and gender have been found to have moderating effects on behavioral intention to use and usage (Gefen and Straub, 1997; Joinson, 2008; Lee et al., 2003; King and He, 2006; Petter and McLean, 2009). Several studies have found cultural differences (based on location) in end-user satisfaction (Lee et al., 2003; King and He,

2006; Petter and McLean, 2009); this study uses location as a proxy to culture to determine whether U.S. Facebook users have different levels of end-user satisfaction than those who reside outside the U.S . The *number of interactions* measures the number of friends with whom the user typically interacts and may be related to the bridging social capital that users obtains from the site (Yoder and Stutzman, 2011). Joinson (2008) found several differences in frequency of use and time spent on the network site that varied based on the *number of friends* on the site and may have an impact on satisfaction. The variable *years of social network site use* is used as a proxy for SNS self-efficacy. Users who have used SNS for longer periods of time (which includes sites other than Facebook, such as MySpace) may be related to that user's SNS self-efficacy and may have an effect on satisfaction. The control variables are not the primary predictive variables in this research but are used to control for user differences.

Based on the literature review and research question, this study proposes the following hypotheses to predict the relationship between perceived ease-of-use, perceived usefulness and end-user satisfaction:

H1: Perceived ease-of-use of Facebook increases the perceived usefulness of Facebook

H2: Perceived ease-of-use of Facebook increases the end-user satisfaction of Facebook

H3: Perceived usefulness of Facebook increases the end-user satisfaction of Facebook

Figure 3 shows the research model used for this investigation.

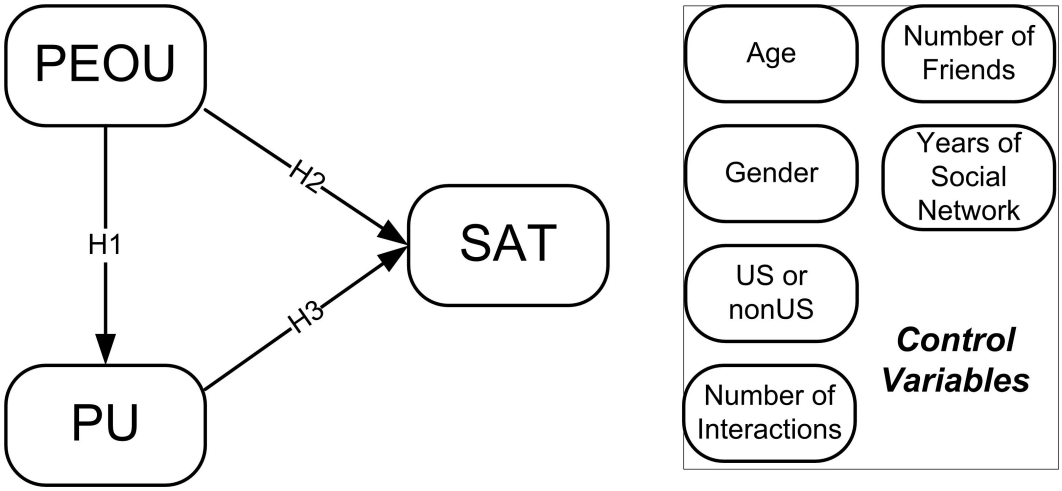


Figure 3: Research Model & Control Variables

4.2.1 Survey

The research was conducted using a survey to determine the survey respondent's opinions and behaviors about their satisfaction with Facebook. The survey was conducted solely on the Internet using a commercially available survey tool. The survey used established questions from previous studies operationalized to predict Facebook end-user satisfaction. Demographic items were used as control variables in the analysis.

Parts one and two of the survey asked questions unfriending behaviors - both unfriending the survey respondent performed and unfriending that was done to the survey respondent. Part three, the focus of this study, asked questions about satisfaction, perceived usefulness and perceived ease-of-use of Facebook. Part four asks demographic questions: age, gender, education, the number of years of social networking site use and whether the person lives in the United States of America. The control variables were categorical in nature and collected through self-report measures, e.g. the users were asked how often they went to Facebook each day on average but were not asked to track their usage, provide account names or other identifying information.

4.2.2 Data Collection

Survey recruitment was conducted by sending Twitter users who posted about Facebook a tweet that asked the user to take a survey about the site. Twitter was used to recruit survey participants for several reasons: Twitter has a large user population where the majority of users have publicly accessible messages; Twitter users had a good fit with research (social network sites); it is a simple process to contact a person on Twitter through the @reply mechanism; and the tweets can be screened for recruitment purposes. There is not a random sample in this research; a purposive sampling method was used to recruit participants. The recruitment tweet was sent in a single tweet of 140 characters and provided enough information to the Twitter user to take the survey. It was not considered unduly burdensome by the researcher or the Institutional Review Board (IRB) to send a single request to the Twitter user to take a survey.

The recruitment tweet was designed to follow the methodology of Dillman et al. (2008) as much as possible within the constraints of Twitter. Dillman et al. (2008) state that emails for survey recruitment should include the following sections: university sponsorship logo, header, etc., informative subject heading, current date, appeal for help, statement as to why the survey respondent was selected, usefulness of survey, directions on how to access survey, clickable link, individualized ID (for tracking), statement of confidentiality and voluntary input, contact information about survey creator, expression of thanks, and indicate the survey respondent's importance.

The measures used to operationalize the constructs were adapted from previous research. Table 5 shows constructs and their items. Validated measures from prior research were used in the survey where possible although minor changes in questions were necessary to be meaningful for the context of this

survey. All of the survey items, except open-ended responses and demographic information, were measured using a 7-point Likert scale from *Strongly Disagree* (1) to *Strongly Agree* (7).

Surveys were collected between April 17th and September 15, 2010 for 151 total days. 7,327 recruitment tweets were sent during the time period. A total of 2,865 surveys were started and 1,552 were completed; 54% of those who started the survey completed the survey. The surveys were started by 39.6% of those who were sent tweets and completed by 21.3%. The survey is 15 pages in length and took, on average, approximately 18 minutes to complete. Twitter respondents were gathered by screening tweets that had the term "unfriend," "defriend," or "unfriending." Tweets that met a screening criterion were sent replies inviting the person to take the survey about unfriending. The tweet reply sent was retweeted by many people who received the initial tweet.

4.2.3 Data Analysis

The raw data was collected from a commercially available survey tool (Survey Monkey) and analyzed with SPSS version 18 and structural equation modeling (SEM) was completed with AMOS version 18 and PLS-Graph build 1130. AMOS was used for the initial measurement model to examine the categorical variables at a more granular level than PLS allows in the subsequent structural model. SEM helps explain the relationship between multiple variables including latent (unobservable) factors in a single, systematic and comprehensive manner (Hair et al., 2006; Gerbing and Anderson, 1988; Gefen et al., 2000). The analysis used a measurement model to assess goodness of fit for the overall model and factor analysis, construct validity and reliability (convergent and discriminant) for the latent constructs (Hair et al., 2006; Gefen et al., 2000; Wetzels et al., 2009). After the measurement model was validated, a structural

model was generated to determine the path coefficients between the constructs and the associated error coefficients with the control variables included. This research uses two independent variables (*perceived ease-of-use* and *perceived usefulness*) to predict one dependent variable (*satisfaction*). Two items from the survey were dropped because their loadings were below a .5 threshold, or they shared little proportion of variance in common with other items in its construct and were strongly correlated with the items of other constructs. Control variables for the research include: age, gender, whether the person lives in the United States, number of friends, number of friends with whom the person interacts, and years of social networking site use.

Statistical analysis alone cannot prove causation, because it does not establish isolation or temporal ordering (Bollen, 1989). Correlation analysis, including SEM, can be used to show that the correlations found in the data are in accordance with the causation predicted by an established theory-base (Bollen, 1989; Gefen et al., 2000). Structural models may overfit the model to the data so it important to have a theoretical basis for testing the theory in the analysis (Gefen et al., 2000). This research applies established research models and theories regarding end-user satisfaction and is a good candidate to apply SEM in a confirmatory manner.

4.3 Results

The structural model was generated using the partial least squares (PLS) method, since it focuses on prediction of the constructs rather than explanation of the relationships between items (Hair et al., 2006). The latent factors were analyzed for convergent and discriminant validity by analyzing the factor loadings, average variance extracted (AVE), construct reliability (CR) and cross loading through correlation of constructs. Factor loadings for the items

for the latent constructs PEOU, PU and SAT were all greater than .70 and indicate that the items converge on the latent construct at adequate levels (Hair et al., 2006) - see Table 5. Composite reliability and validity was examined for appropriateness. Composite reliability for all factors range from .88 to .93 and exceed .70 which suggests adequate reliability (Hair et al., 2006). Table 6 shows the correlation estimates between the constructs and the square root of the average variance extracted (AVE) for each construct on the diagonal. The square roots of the AVE are from .83 to .85. These values are higher than the correlation estimates, which range from .55 to .72. The correlation estimate between PU and SAT, and PEOU and SAT are high (.72 and .69, respectively); however, there is little cross-loading among the measured variables. Overall, these results support the discriminant validity of the model.

Figure 4 shows the path coefficients for the structural model. The model is assessed by the path coefficients and the coefficient of determination (R^2) values, since PLS does not produce an overall goodness of fit indices. All of the hypotheses were supported. PEOU's effect on PU is supported, 0.50, $p < .001$. PEOU's effect on SAT is also supported, 0.41, $p < .001$. Finally, PU's effect on SAT is supported, 0.47, $p < .001$. The t values for the significant paths range from 19.16 to 22.38. R^2 values measure the proportion of the variance of the latent endogenous variable that is explained by the latent exogenous variables (Hair et al., 2006). The endogenous variables are SAT and PU, and the exogenous variables are PEOU and PU. The R^2 values show that SAT has the largest share of the variance explained through the factors (R^2= .65), and PU the second ($R^2 = .34$), which are between substantial ($R^2 = .67$) and moderate ($R^2 = .33$) (Chin, 1998).

The effect of age on PEOU is significant, -0.15, $p < .001$. The effect of gender on PU is significant, 0.06, $p < .01$. The effect of whether the person

Table 5: Composite Reliability

Construct (Abbr)	Items	Mean	Std. Dev	Composite Reliability	No. of Items
Perceived ease-of-use (PEOU)	Easy to learn, easy to use, easy to find what I need	5.39	1.14	.88	3
Perceived Usefulness (PU)	Useful in maintaining friends, helpful in maintaining friends, helps me know what my friends are doing, maintain friend contact information	5.56	1.02	.90	4
Satisfaction (SAT)	Enjoy, satisfied, features I like, high quality, better than other SNS, recommend to others	5.08	1.23	.93	6

Mean and Standard Deviation based on Likert Scores 1-7 where 1 is strongly disagree and 7 is strongly agree

Table 6: Correlation of the constructs

	PEOU	PU	Sat
PEOU	.85		
PU	.55	.83	
SAT	.69	.72	.83

Diagonal values are the square roots of the AVE

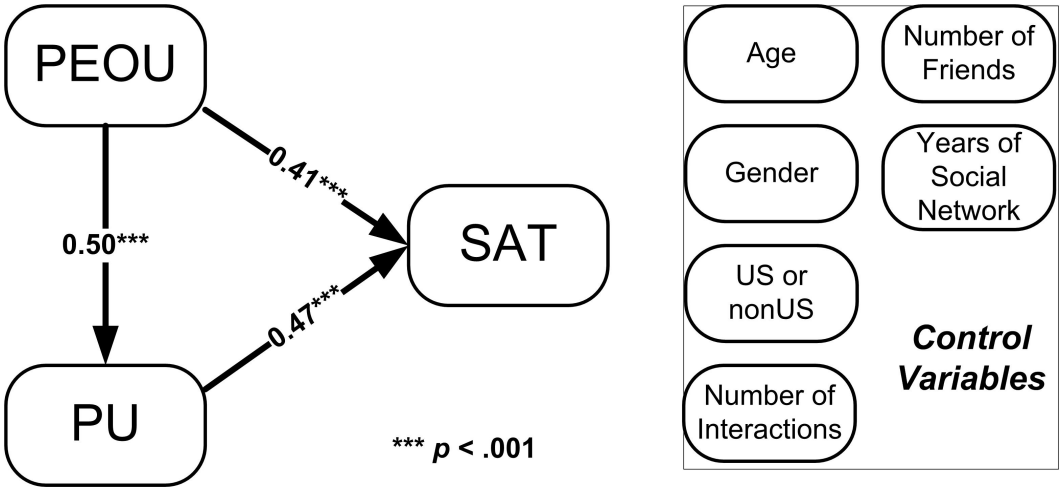


Figure 4: Model Path Coefficients & Control Variables

lives in the U.S. on PU is significant, -0.05, $p < .05$. The effects of the number of friends on PEOU, 0.14, $p < .001$; PU, 0.09, $p < .01$; and SAT, 0.06, $p < .01$ are significant. The effect of the number of friends with whom the person interacts on PEOU, 0.18, $p < .001$; and PU, 0.13, $p < .001$ are significant, Finally, the effect of the number of years of social networking site use on PEOU, -0.06, $p < .05$; and SAT, -0.05, $p < .01$ are significant. Table 7 summarizes the hypotheses supported and the effect of CVs.

Table 7: Support for hypotheses and the effects of the control variables

Hypothesis	Estimate	t-statstic
H1: PEOU → PU	0.50	19.16 ***
H2: PEOU → SAT	0.41	19.21 ***
H3: PU → SAT	0.47	22.38 ***
Age → PEOU	-0.15	5.69 ***
Age → PU	0.04	1.74
Age → SAT	0.03	1.75
Gender → PEOU	0.02	0.89
Gender → PU	0.06	2.91 **
Gender → SAT	0.00	0.19
U.S. vs. NonU.S. → PEOU	-0.01	0.36
U.S. vs. NonU.S. → PU	-0.05	2.18 *
U.S. vs. NonU.S. → SAT	-0.02	1.23
No. Friends → PEOU	0.14	4.16 ***
No. Friends → PU	0.09	3.00 **
No. Friends → SAT	0.06	3.19 **
No. Interactions → PEOU	0.18	6.37 ***
No. Interactions → PU	0.13	5.11 ***
No. Interactions → SAT	0.04	1.67
Yrs SNS Use → PEOU	-0.06	2.08 *
Yrs SNS Use → PU	0.01	0.59
Yrs SNS Use → SAT	-0.05	2.84 **

* $p < .05$; ** $p < .01$; *** $p < .001$

4.4 Discussion & Conclusion

Social networking sites make up the largest share of time spent online in the U.S. according to Nielsen (2011). Facebook itself is very popular, it is considered the largest social networking site by nearly a factor of three with over 140 million unique visitors in May, 2011 compared to the second largest social network site, Blogger, which had approximately 50 million unique visitors for the same month (Nielsen, 2011). Popularity, by itself, does not indicate that the users have high or low end-user satisfaction or show how the two constructs, perceived usefulness and perceived ease-of-use contribute to satisfaction. Popularity at Nielsen's level of analysis is at the macro-level, this research investigates the relationship of end-user satisfaction at the individual level.

The DeLone and McLean (2003) updated IS success model show that there is a feedback loop between use, end-user satisfaction and the net benefits that are accrued. A meta-analysis of the D&M (2003) model by Petter and McLean (2009) found that the relationship between actual system use (through self-report, actual use, depth of use and importance of use, depending on the study) and user satisfaction to be weak but still statistically significant through the analysis of 26 related studies. The meta-analysis found that intention-to-use and user satisfaction has a strong and statistically significant relationship with user satisfaction through the analysis of 9 related studies. Petter and McLean (2009) propose that one reason intention-to-use and user satisfaction is more strongly linked is that the intention-to-use is more reliable than the *use* measures in the related studies. When SNS users *use* an information system and attain *end-user satisfaction* the user may achieve *net benefits* which may feed back into more *use* and *end-user satisfaction*.

The net benefits at the individual that may be accrued through Face-

book use may be social capital. Social capital generally refers to the skills and knowledge that are accessible to an individual through their relationships with others (Coleman, 1988). Coleman (1988) notes that an important form of social capital is the ability to acquire information through relationships; information itself may be valued highly and is generally costly to acquire. Access to a large and weakly-tied tied network may provide more benefits a smaller strongly-tied network (Granovetter, 1973). Ellison et al. (2007) found a strong positive relationship with Facebook use and bridging social capital. Facebook use was also found to increase levels of bonding and maintenance of social capital in the same study but at lower levels than bridging social capital. Vitak et al. (2010) found that Facebook use had limited effects on bonding capital; i.e. Facebook use did not strongly impact strong-tie relationships. Facebook users may believe that increased social capital is a net benefit of site use.

The purpose of this research is to determine how the perceived ease-of-use and perceived usefulness of Facebook contribute to end-user satisfaction. This research uses TAM with age, gender, whether the person lives in the U.S., number of friends, number of friends with whom the person interacts, and years of social networking site use as control variables. The results show that Facebook users *somewhat agree* that they are satisfied with the site. Facebook users are satisfied with the site when they find it useful and easy to use. The first hypothesis, *H1*, posits that perceived ease-of-use of Facebook increases the perceived usefulness of Facebook, which is supported. The second hypothesis, *H2*, posits that perceived ease-of-use of Facebook increases the end-user satisfaction of Facebook, which is supported with the third hypothesis, *H3*, which posits that the perceived usefulness of Facebook increases end-user satisfaction with Facebook. These results coincide with previous TAM research used to predict acceptance in many IS domains, as stated in the literature

review. The results are helpful in that hedonic websites like Facebook appear to share similar relationships that utilitarian websites have regarding end-user satisfaction.

Facebook users' satisfaction was impacted more by its usefulness than its ease of use, but both factors are important in predicting satisfaction. Usefulness has been operationalized in this research in terms of friendship maintenance and social surveillance based on previous studies (Joinson, 2008). The usefulness found in this study has a good fit with Facebook's stated purpose where they state that the site "is a social utility that helps people communicate more efficiently with their friends, family and coworkers."[11] Users who found Facebook easy-to-use had higher satisfaction with the site than those who found it difficult to use.

The results also show interesting effects of control variables on perceived ease-of-use, perceived usefulness, and satisfaction. Older users perceive the site to be more difficult to use than younger users. Younger users may be more familiar with the Internet, state-of-the-art IT technology, etc. than older users; however, age does not affect perceived usefulness or satisfaction on Facebook. Female users perceive Facebook to be more useful than male users. This result is similar to Gefen and Straub's (1997) study of women having higher perceived usefulness of email than men. However, unlike their result that men have higher perceived ease-of-use for email usage, gender does not effect perceived ease-of-use on Facebook. Gender does not effect satisfaction on Facebook either. U.S.-based Facebook users find the site to be more useful than those who live outside the U.S.; however, there are no differences in perceived ease-of-use or satisfaction based on location. The number of friends control variable is notable in that it effects all three constructs and is the only control variable

[11] `http://www.facebook.com/press.php`

to do so. When users have more friends, they have higher perceived ease-of-use, perceived usefulness, and satisfaction than users who have fewer friends. When users have more interactions, they have higher perceived ease-of-use and perceived usefulness than users who have fewer interactions. In general, increasing the number of interactions with users may lead the user to increased site use, which makes users feel more at ease with the site. However, number of friends with whom the person interacts does not effect satisfaction. Finally, when users have more years of SNS experience, they have higher perceived ease-of-use and satisfaction than users who have less experience. However, years of SNS use does not effect perceived usefulness.

Limitations to this study include the use of Twitter to recruit survey respondents. The survey respondents were tweeting about a particular act (unfriending) on SNSs and may have more intensity of use on SNSs then the general Facebook user. The survey respondents were users who, at a minimum, used two SNS, Facebook and Twitter. An advantage to surveying this population is that the age, and location biases were lower compared to traditional methods of Facebook research (student surveys and ad-hoc methods like posting fliers on campus and online forum recruitment). This study examined Facebook on a macro-level and did not distinguish between a variety of features available on the site, e.g. chat features, commercial interests, games, entertainment, etc.

Future research will need to expand the definition of usefulness of Facebook beyond friendship maintenance and social surveillance to examine other aspects of Facebook such as the entertainment value and commercial value of the network. Facebook has been adopted by commercial interests who try to build brand loyalty and disseminate information through the "like" functionality. When Facebook users "like" a page they make a connection to that page

and content will appear in the user's timeline and may appear in the user's news feed. Facebook's strategy has continued to evolve where it has become a platform for applications beyond status updates. Mark Zuckerberg, Facebook's founder, stated, "The past five years have been about being connecting people and the next five to ten years are about what are all the things that can be built now that these connections are in place" (Rao, 2011). The ease-of-use construct can be expanded to cover more specific parts of Facebook, e.g. chat features, gaming features, privacy controls, to gain more insight into the usability of specific Facebook areas. Future studies can address the specific functions of Facebook at a more granular level to determine how satisfied users are with features like connecting to commercial parties, entertainment, games, chat, etc. beyond connecting to SNS users.

Facebook users' satisfaction can be predicted by two constructs, perceived ease-of-use and perceived usefulness. This study successfully applies the traditional IS success model developed for more utilitarian purposes to a hedonic social network site.

5 Factors in Social Networking Site Continuance Intention

Theory building and theory testing are both critical for the advancement of knowledge (Bhattacherjee, 2012). Theories should match empirical realities and empirical data should be able to contribute to the development of meaningful theories (Bhattacherjee, 2012). Theory building tends to be more valuable when there are fewer theories in the field to explain phenomena and theory testing tends to be more valuable when there are multiple competing theories of the same phenomena (Bhattacherjee, 2012). This section will describe the factors that are important in social networking site continuance and develop testable hypotheses for evaluation.

The proposed model of social networking site continuance intention for social networking adds five constructs to the Bhattacherjee (2001) model of IS continuance: *personal innovativeness, habit*, *alternative perceptions, interpersonal influence* and *consumer switching costs* - see Figure 5. There are five hypotheses generated based on the background presented earlier and the theoretical arguments provided in this section.

5.1 Product Substitutions and Alternative Perceptions

The diffusion of innovations theory of Rogers (1976) defined a model for which innovations are adopted; the model had four main elements: an *innovation* is *communicated* over *time* to members of a *social system.* The initial diffusions of innovations model assumed that any innovation is independent of all other innovations and has been extended include more complexity to account for other adoptions (Mahajan et al., 1990).

Information systems are not introduced in static environments, there are product complements and substitutions that may add or remove value from

any innovation (Mahajan et al., 1990). Products introduced to the marketplace may have a positive or negative influence on adoption decisions. Certain products may require a product to be in the marketplace before supporting products can be introduced (product complements). New products may replace products that have already been in the market (product replacement). Models of adoption should more accurately consider adoption beyond a single adoption by a single potential adopter (Mahajan et al., 1990). Consumers may be first-time adopters or repeat consumers and may decide to either repeat their past consumer decisions or replace current products or services with different systems. Mahajan et al. (1990) recommends that studies of diffusions of innovations consider how competition and rivalry may influence the growth of a product category and how it may affect the entry/exit patterns of competitors. The result of a new product entering the market may be an expansion of the market, diversion of demand from incumbents to competitors or a combination of the outcomes (Mahajan et al., 1993). New product introductions often expand the market because product variety increases and potential customers may become aware of newly introduced products, although these market expansion effects are more often seen in less mature environments (Mahajan et al., 1993).

Parthasarathy and Bhattacherjee (1998) examined the role of replacement (substitution) and disenchantment (low satisfaction) on service discontinuance. The research showed that approximately 60% of subscribers to online services who discontinued the service did so because the subscriber was disenchanted with the service. Approximately 35% of subscribers discontinued service because the subscriber chose a replacement service; 5% of users discontinued for unknown reasons. Parthasarathy and Bhattacherjee (1998) found weak support for their hypothesis that subscribers who replaced their online services

are early adopters and those who were disenchanted with their service are late adopters. The research found that those who replaced the service used the service more extensively during the initial period compared to those who were disenchanted with the service. This suggests that subscribers who used the service less were unable or disinclined to fully use the service. The inability to successfully exploit the service options may lead to dis-confirmation gap between the expectations and confirmation results whereas those who could more fully utilize the service were more likely to change service providers.

Facebook cited that some of its users may substitute services from other providers for its own service. Facebook's 10-K filing said the following:[12]

> We believe that some of our users, particularly our younger users, are aware of and actively engaging with other products and services similar to, or as a substitute for, Facebook. For example, we believe that some of our users have reduced their engagement with Facebook in favor of increased engagement with other products and services such as Instagram. In the event that our users increasingly engage with other products and services, we may experience a decline in user engagement and our business could be harmed.

5.1.1 Alternative Attractiveness in Consumer Service Switching

The marketing literature often uses *attractiveness of alternatives* as a measure to examine service provider switching *(Jones et al., 2000; Bansal et al., 2005; Sharma and Patterson, 2000).* Sharma and Patterson (2000) note that relationship between service provider and service consumer is complicated due to

[12] `http://www.sec.gov/Archives/edgar/data/1326801/000132680113000003/fb-12312012x10k.htm`

high switching costs of changing providers and because there can be a lack of an attractive alternative provider.

Jones et al. (2000, p. 262) defines *attractiveness of alternatives* as the, "customer perceptions regarding the extent to which viable competing alternatives are available in the marketplace." Conceptually, consumers who perceive that there are fewer alternatives to using a given service are more likely to stay with the service, and consumer who perceive that there are more available alternatives are more likely to switch (Jones et al., 2000). Jones et al. tested two hypotheses in their work; the researchers tested both the direct effect of alternative attractiveness and the interaction effect where alternative attractiveness interacts with the relationship between satisfaction and repurchase intention (or, what in information systems is typically called continuance intention). The direct effect of alternative attractiveness was not supported, however the interaction effect was supported.

Bansal et al. (2005) examined both *alternative attractiveness* and *attitude toward switching* to predict *stickiness intention [continuance intention]* and *switching behavior*. Alternative attractiveness is described as a pull factor, or a factor that may pull the service user away from an existing service provider to a new service provider. Bansal et al. (2005, p. 100) claims that alternative attractiveness is the, "only existing variable from the service switching literature that conforms to this conceptualization [push-pull effects] is alternative attractiveness." The *attitude toward switching* measures the degree to which a service consumer may be favorably disposed to switching service providers. Having a favorable attitude toward switching may indicate that the consumer is more willing to switch. The research supported that alternative attractiveness was a statistically significant factor in predicting continuance intention. The individual effect of attitude toward switching is unclear in the research re-

sults because the factor is not evaluated as an individual factor but through the larger construct *mooring.* Attitude toward switching, however, was the largest factor in predicting the *mooring* effects (reasons why people would continue with an incumbent service provider), which was statistically significant factor in predicting switching intention.

Sharma and Patterson (2000) notes that a lack of alternative service providers benefits service providers to retain customers and that when service customers are unaware of attractive alternatives then they may stay in the relationship despite perceived low satisfaction levels. Sharma and Patterson (2000) examined the relationship of alternative attractiveness as a moderator between trust and relationship commitment (continuance intention) and service satisfaction and relationship commitment (continuance intention). The research found that alternative attractiveness was an impact factor in predicting relationship commitment. The findings were:

1. Satisfaction has a stronger impact on relationship commitment under conditions of high alternative attractiveness.

2. Trust has a stronger impact on commitment under low alternative attractiveness.

3. Under conditions of high alternative attractiveness, the impact of satisfaction on relationship commitment is stronger than that of trust.

4. Under conditions of low alternative attractiveness, the impact of trust on relationship commitment is stronger than that of service satisfaction.

5.1.2 Alternative attractiveness applied in information systems research

Zhang et al. (2009) examined the role of gender in blogger switching behavior with two factors satisfaction and alternative attractiveness and mediating factors of gender and sunk cost. Zhang et al. (2009) notes that alternative attractiveness is similar to relative advantage in the information systems diffusions and adoption. The research found that users who perceived attractive alternatives to their current blogging platform had higher intentions to switch their service.

Hsieh et al. (2012) included three first-order factors, enjoyment, relative usefulness and relative ease-of-use to measure the second-order *pull effects* to the alternative attractiveness of competing service providers. Pull effects had the largest impact of three factors, push effects, mooring effects and pull effects that predicted switching intention of bloggers to new blogging platforms. This study examined bloggers intention to move from an existing blogging platform to Facebook.

Bhattacherjee and Park (2013) used the push-pull-mooring framework to examine why information systems users may intend to migrate to cloud service providers. The researchers used the concept of alternative attractiveness to measure the difference between the existing service provider product or service with substitute services. Bhattacherjee and Park (2013) used two factors in the pull model, relative usefulness and expected omnipresence for the second order factor *pull* which they used to predict intention to migrate (switch service providers from the existing provider to a cloud service). The researchers found that relative usefulness had statistically significant positive effect on intention to switch and expected omnipresence had a marginally significant positive impact on intention to switch.

Alternative Perceptions Hypotheses Alternative Perceptions will have a direct effect on SNS Continuance intention. The rise of both general purpose and special interest sites may show that the system environment is not static but dynamic as products are introduced. New social networking sites may complement the existing systems or be a replacement. Keaveney (1995) notes that some factors are beyond the control of a business, like competition. Some researchers view variety seeking as inexplicable but others model variety seeking behavior as *derived* or *direct* (Givon, 1984). The research on variety seeking behavior also indicates that people make choices to vary consumption among competing products. Users with high levels of personal innovativeness may be more prone to replacing an existing system with a new one whereas users with lower levels of personal innovativeness may be more likely to be service discontinuers based on Parthasarathy and Bhattacherjee (1998). Social networking site users may exhibit high levels of satisfaction and may still replace systems with new systems as innovations are introduced to the marketplace.

Hypothesis 1: Social networking site users with high a positive attitude to switch and who are attracted to competing social networking sites will negatively affect continuance intention on the social networking site.

5.2 Personal Innovativeness

Individual adopters may have different predispositions to adopt new technologies. Some potential users will readily adopt a new information system while others will reject them (Agarwal and Prasad, 1998). Agarwal and Prasad (1998) proposed using the construct *personal innovativeness* to explicitly define how users may adopt technology based on psychometric characteristics.

Individuals who have higher levels of personal innovativeness may adopt innovations earlier than others and may act as change agents and opinion leaders to further diffuse a new technology.

Rogers (1964) developed five categories of adopters: *innovators, early adopters, early majority, late majority* and *laggards (Mahajan et al., 1990).* Traditionally adopter categories are defined by *time of adoption* however this categorization has also been criticized for negative methodological consequences (Agarwal and Prasad, 1998; Mahajan et al., 1990). The use of *time of adoption* limits the ability to compare studies across different products and has reliability and validity issues. Personal innovativeness is not directly visible in the technology acceptance model (TAM) of Davis (1989) although Agarwal and Prasad (1998) argue that there is strong theoretical and empirical support of the characteristics role innovation in adoption. Agarwal and Prasad (1998, p. 206) defined personal innovativeness as, "the willingness of an individual to try out any new information technology." Personal innovativeness is hypothesized to moderate the antecedents and consequences of perceptions related to adoption, i.e. the perceptions about new information systems and the intention to use a new information system are moderated by personal innovativeness (Agarwal and Prasad, 1998). Agarwal and Prasad (1998) also recommend that personal innovativeness be used as a control variable in individual studies and that the factor may account for a significant portion of the variance in innovation-related dependent variables. Based on the properties of the factor, personal innovativeness is used as a direct factor for predicting social networking site continuance and as a moderating factor.

Thatcher and Perrewé (2002) applied personal innovativeness to understand the relationship between dynamic individual attributes (e.g. computer anxiety and computer self-efficacy) and stable individual attributes (e.g. per-

sonal innovativeness, negative affectivity, and trait anxiety). The results showed that personal innovativeness has a positive relationship with self-efficacy and negative relationship with computer anxiety.

5.2.1 Personal Innovativeness Hypotheses

Personal innovativeness is expected to have a direct and moderating effect on continuance intention based on Agarwal and Prasad (1998) and Thatcher and Perrewé (2002). Personal innovativeness is derived from Rogers's diffusions of innovation theory and adapted to the information system domain.

Hypothesis 2a: Personal innovativeness will negatively affect continuance intention of social networking sites.

Hypothesis 2b: The relationship between satisfaction and social networking site continuance intention will be moderated by personal innovativeness on social networking sites.

5.3 Interpersonal Influences

Rogers (1976) believed that diffusions research should focus beyond the individual to dyads, cliques, networks or system of individuals. Social systems can be expected to exert a significant influence on individual adoption and continuance or discontinuance of technology. The role of opinion leads may have a stronger influence on potential users then other members of a social network. Granovetter (1973) suggests that weak-tie relationships may have a stronger effect on an individual receiver compared to strong-tie relationships; it is likely that adoptions of innovations may be strongly influenced by interpersonal relationships and by those who are not particularly close to another potential adopter. The social network may influence the adoption or continuance inten-

tions of social networking site users. The model of diffusion developed by Bass assumes that potential adopters of an innovation are influenced by one of two means - the mass media and word of mouth (Mahajan et al., 1990). *Innovators,* the earlier adopters of an innovation, are influenced by mass media (external influence), where as *imitators* are influenced by word of mouth communications (interpersonal influence). The models inform research by providing user typologies and how they may be influenced as they adopt innovative products and services.

Parthasarathy and Bhattacherjee (1998) examined the role of interpersonal influence on service continuation; the research showed that users who discontinued services are more influenced by interpersonal sources of information during the adoption phase than those who continued services. That is, users who stopped using a system after acceptance were more influenced by their relationships than those who continued to use the system. The research also found that discontinuers of online servers are less influenced by external sources (e.g. media) during the initial acceptance than those who continued the using the service. Early adopters exhibit different patterns of discontinuance compared to late adopters; early adopters tend to be influenced by external sources such as mass media and late adopters tend to be influenced by interpersonal information (Parthasarathy and Bhattacherjee, 1998).

Hardgrave et al. (2003) investigated the role of five factors on software developers decisions to follow mandated development methods. The research found that interpersonal influences were a strong factor in predicting the behavioral intentions of software developers to conform to the prescribed method and stronger than organizational mandates. The four factors that determined intention to follow the method are *usefulness, social pressure, compatibility, organizational mandate* and *complexity*, in order of highest predictive power.

The first four factors were statistically significant predictors of intention to follow the method, complexity was not found to be a significant factor. The research shows that interpersonal influence and external influence can affect user adoption and continuance intentions.

Kim (2011) examined the role of interpersonal influence on information system continuance for social networking sites. The research found that when members of a user's social network believed that using a social networking site was a good idea users were positively influenced to continue using the site.

5.3.1 Interpersonal Influences Hypotheses

Interpersonal influence is expected to have a direct effect on information system continuance. Kim (2011) found a statistically significant relationship between how members perceived the usefulness of social networking sites and continuance intention. Social networking sites are inherently social so members of one's social network can be expected to have an influence on whether a user continues to use a site.

Hypothesis 3: Interpersonal influence will negatively affect continuance intention of social networking sites.

5.4 Habit

User *habits* may have a significant role in information systems continuance decisions (Limayem et al., 2007). Limayem et al. (2007, p. 705) defined habit for information system usage as, "the extent to which people tend to perform behaviors (use IS) automatically because of learning." The research found that antecedents to information system continuance include continuance intention moderated by habit. Limayem et al. (2007) model used three factors

to predict habit: satisfaction, comprehensiveness of usage, and frequency of past behavior. Habit's role was tested as a moderator between information system continuance intention and information system (actual) usage and as a direct effect to information system (actual) usage. Limayem et al. (2007) reviews prior research where habit is used as a: (1) direct factor on behavior, (2) as an indirect effect and as a (3) moderator between intentions and behavior in several contexts within and outside of information systems research.

Gefen and Straub (2003) suggests that habit has a strong theoretical role as a direct factor in behavioral intentions. Gefen and Straub (2003) argues that repeated exposure to a system will develop *habit of use* and increase intention to use a system. The use of habit with other factors for continuance intention allows that users can make both a rational assessment of continued use (perceived usefulness and perceived ease-of-use) and factors which lack rational assessment like habit (Gefen and Straub, 2003). This research model includes habit as both direct and moderating factor as a predictor of continuance intention.

Pew Internet Project found that while teens have less enthusiasm for the social networking site Facebook they continue to use the site as the teenagers state the site is an important part of overall teenage socializing (Madden et al., 2013). Teens stated that they disliked increasing adult presence on the site, that their *friends* shared excessive information and found that the site had a lot of "drama." Despite the difficulty of the site teens felt a need to continue using the site so they did not miss out on social interactions and information. The study also found that teens with more than 600 friends visited the site several times a day. The majority of teens who use social networking sites said they visit the site daily. The Pew Internet Project study may suggest that habit has a role in social networking site continuance behavior as teen

behavior appears to have a strong comprehensiveness of usage and frequency of past behavior which are both antecedents to Limayem et al. (2007) model for how habit may impact information system usage.

5.4.1 Habit Hypotheses

Habit is expected to have a direct and moderating effect on continuance intention based on Limayem et al. (2007), Gefen and Straub (2003) and Pew Internet Project's research on teenage usage of social networking sites (Madden et al., 2013). When social networking site users habitually use the system their satisfaction has a suppressant effect on continuance intention, i.e. those who use the site habitually will continue to use the site even while their satisfaction may be low.

Hypothesis 4a: Habit will positively affect continuance intention of social networking sites.

Hypothesis 4b: The relationship between satisfaction and social networking site continuance intention will be moderated by habit.

5.5 Switching Costs

The research by Burnham et al. (2003) supported that satisfaction and the three switching costs (procedural, financial and relational) were all significant predictors of service provider switching intention. The switching costs had a larger impact on continuance intention than satisfaction in the Burnham et al. (2003) study. Many of the costs can be adapted for use in a study for social networking sites to increase the amount of explained variance in the model.

Procedural switching costs include: economic risk costs, evaluation costs, setup costs, learning costs. Burnham et al. (2003, p. 111) describes economic

risk costs as, "the costs of accepting uncertainty with the potential for a negative outcome when adopting a new provider about which the consumer has insufficient information." Evaluations costs are the costs related to determining whether a switch should be made, including collecting and analyzing data regarding a switch. Learning costs are the new skills that need to be acquired to effectively use a new product. Setup costs describe the costs of acquiring and setting up a product for initial use; e.g. on a social network a user may need to setup profile information and establish a network for the site to function like a social network.

Financial switching costs of switching to a new social networking site are low to non-existent, e.g. switching from Friendster to MySpace, MySpace to Facebook, or Facebook to Twitter have no financial cost to the user as all sites are free. The two financial costs in Burnham et al. (2003) are benefit loss costs (e.g. accrued points, discounts, etc.) and monetary loss costs (e.g. initiation fees, deposits, etc.). While social networking site users may lose information if they discontinue site use (e.g. coupons that may be offered) the costs are low. The monetary loss costs are also low to non-existent on many general purpose social networking sites as the sites are mostly offered for free.

The relational switching costs include personal relationship loss costs and brand relationship loss cost (Burnham et al., 2003). The relational costs in Burnham et al. (2003) were the strongest predictor of continuance intention by a factor of three[13] and may also be a strong predictor for continuance intention on social networking site as the sites are define, in part, by the relationships in the network. Personal relationship loss costs are defined as, "the affective losses associated with breaking the bonds of identification that have been formed with the people with whom the customer interacts" (Burnham et al., 2003, p.

[13]Standardized coefficients (β) are: relational: 0.44, procedural 0.15 and financial 0.13.

111-112). The consumer behavior literature notes that these costs are due to the changes with the existing service provider employees and does not directly apply to social networking sites as such. The measure can be modified in this context to note the affective losses of breaking the social networking site ties of the social networking site members. Brand relationship costs are related to the losses that occur when the bonds of identification that were formed with a brand are now broken. Consumer form bonds through their purchases and the services can provide a sense of identity.

The procedural and relational switching costs may serve as a strong foundation for studying continuance intention on social networking sites. The financial costs do not need to be included in the model as they do not apply; however, the procedural and relational costs can be adapted to predict continuance intention on social networking sites.

5.5.1 Switching Costs Hypotheses

Users of an information system may consider the switching costs involved in changing social networking sites. Burnham et al. (2003) cited three costs associated with switching costs, procedural, financial and relational. There are few financial considerations when switching social networking sites; however, procedural and relational costs may affect continuance decisions.

Hypothesis 5: Greater procedural and relational switching costs will positively affect continuance intention of social networking sites.

Table 8: Social Networking Site Continuance Model Hypotheses

Num	Hypothesis
1	Social networking site users with high a positive attitude to switch and who are attracted to competing social networking sites will negatively affect continuance intention on the social networking site.
2a	Personal innovativeness will negatively affect continuance intention of social networking sites.
2b	The relationship between satisfaction and social networking site continuance intention will be moderated by personal innovativeness on social networking sites.
3	Interpersonal influence will negatively affect continuance intention of social networking sites.
4a	Habit will positively affect continuance intention of social networking sites.
4b	The relationship between satisfaction and social networking site continuance intention will be moderated by habit.
5	Greater procedural and relational switching costs will positively affect continuance intention of social networking sites.

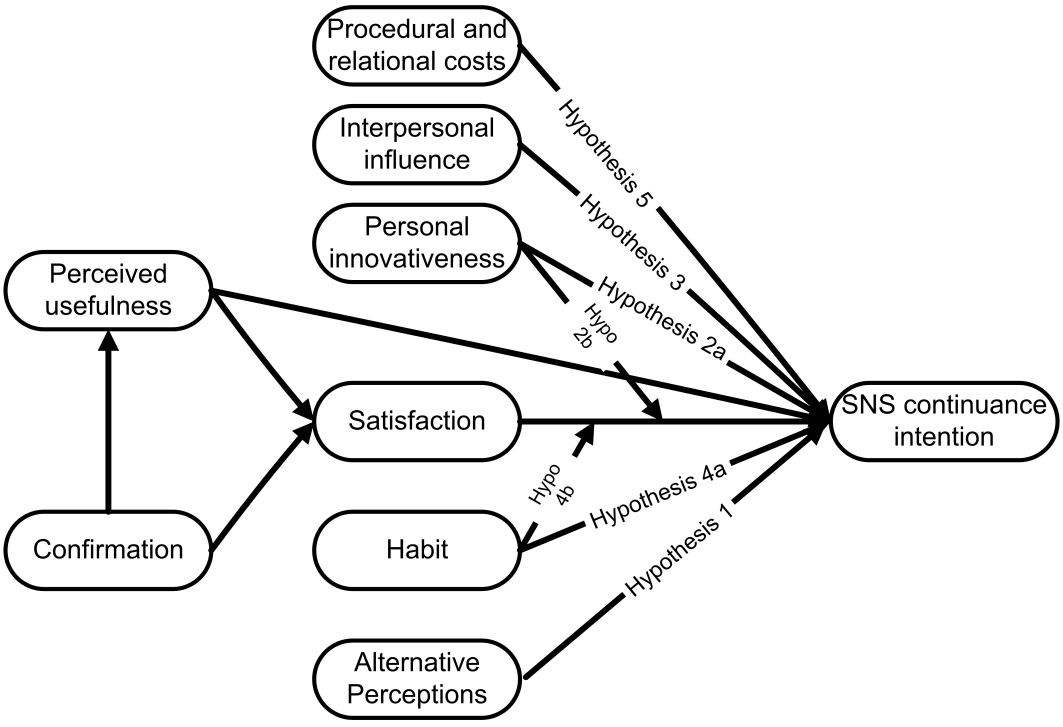


Figure 5: Social Networking Site Continuance Model

6 Research Design and Method

6.1 Instrument Design

The investigation into social networking site continuance will be conducted through an internet-based survey tool. The survey questions are a combination of established questions from previous studies and adapted for this investigation - see Section 6.2. The survey will begin with a cover letter to introduce the survey using the *Tailored Design Method* by Dillman et al. (2008). The survey will screen users to determine if the person is over 18 and a Facebook user. The survey was reviewed and approved by the Colorado Multiple Institutional Review Board at the University of Colorado Denver prior to its administration; the protocol number is *COMIRB Protocol 13-3126*.

6.2 Survey Questions

6.2.1 Perceived Usefulness

Davis (1989, p. 320) defined *perceived usefulness* in the technology acceptance model (TAM) as, "the degree to which a person believes that using a particular system would enhance his or her job performance." The questions are adapted to fit Facebook's *perceived usefulness* in maintaining friendships and social surveillance. Joinson (2008) examined motivations for using Facebook and found that the users said that they wanted to "keep in touch" with others as their main motivations where other uses such as social surveillance, reconnecting with others, etc. were less common. Sibona and Choi (2012) used the questions to examine satisfaction of Facebook through the constructs *perceived usefulness* and *perceived ease-of-use*.

	Perceived Usefulness - Davis et al. (1989)	**Adapted study questions -** Sibona and Choi (2012)
1	Using WriteOne would improve my performance in the MBA Program	Facebook is helpful in maintaining friends
2	Using WriteOne in the MBA program would increase my productivity	Facebook helps me know what my friends are doing
3	Using WriteOne would enhance my effectiveness in the MBA Program	Facebook is useful in maintaining friends
4	I would find WriteOne useful in the MBA Program	Facebook helps me maintain my friend's contact information

6.2.2 Confirmation

Bhattacherjee (2001, p. 353) defined *confirmation* as an, "[assessment] of the perceived performance vis-à-vis their original expectation and determine the extent to which their expectation is confirmed." The construction was operationalized in the study as, "Users' perception of the congruence between expectation of online banking division (OBD) use and its actual performance," Bhattacherjee (2001, p. 359).

	Confirmation - Bhattacherjee (2001)	**Adapted study questions**
1	My experience with using OBD was better than what I expected	My experience using Facebook was better than what I expected
2	The service level provided by OBD was better than what I expected	The service level provided by Facebook was better than what I expected
3	Overall, most of my expectations from using OBD were confirmed	Overall, most of my expectations from using Facebook were confirmed
4	My experience with using this website was better than what I expected (Kim et al., 2009)	The benefits provided by Facebook are better than what I expected

6.2.3 Satisfaction

Oliver (1980, p. 461)defined *satisfaction* as "an additive combination of the expectation level and the resulting disconfirmation" Bhattacherjee (2001, p. 359) operationalized *satisfaction* as the, "users' affect with (feelings about) prior online banking division (OBD) use," based on Spreng et al. (1996) *overall satisfaction* scale.

	Satisfaction - Bhattacherjee (2001)	**Adapted study questions**
1	How do you feel about your overall experience of OBD use: very dissatisfied-very satisfied	How do you feel about your overall experience of Facebook use: very dissatisfied-very satisfied
2	How do you feel about your overall experience of OBD use:very displeased-very pleased	How do you feel about your overall experience of Facebook use:very displeased-very pleased
3	How do you feel about your overall experience of OBD use: very frustrated-very contented	How do you feel about your overall experience of Facebook use: very unhappy-very happy
4	How do you feel about your overall experience of OBD use: absolutely terrible-absolutely delighted	N/A

6.2.4 Habit

Limayem et al. (2007, p. 705) defined habit as, "the extent to which people tend to perform behaviors (use IS [information systems]) automatically because of learning." Limayem et al. (2007) note that habit, as defined, has little overlap with intention and may provide additional explanatory power beyond information system usage. Limayem et al. (2007) used habit as a moderating construct between information systems continuance intention and information systems confirmation usage. The study does not define the items for continuance usage - but the authors state that the variable is based on two formative questions. This study uses *habit* as a moderating construct between *satisfaction* and *continuance intention.*

	Habit - Limayem et al. (2007)	**Adapted study questions**
1	Using the WWW has become automatic to me	Using the Facebook has become automatic to me
2	Using the WWW is natural to me	Using the Facebook is natural to me
3	When faced with a particular task, using the WWW is an obvious choice for me	When faced with a particular task, using the Facebook is an obvious choice for me

6.2.5 Personal innovativeness

Agarwal and Prasad (1998, p. 206) define personal innovativeness in the domain of information technology (PIIT) as, "the willingness of an individual to try out any new information technology." Agarwal and Prasad (1998, p. 206) state that personal innovativeness are personal traits and that they are not influenced by environmental or internal variables, i.e. the traits are not expressed by situationally.

	Personal Innovativeness - Agarwal and Prasad (1998)	**Adapted study questions**
1	If I heard about a new information technology I would look for ways to experiment with it	If I heard about a new social networking site I would look for ways to experiment with it
2	In general, I am hesitant to try out new information technologies	In general, I am hesitant to try out new social networking site
3	Among my peers, I am usually the first to try out new information technologies	Among my peers, I am usually the first to try out new social networking site
4	I like to experiment with new information technologies	I like to experiment with new social networking site
5	I like to explore new Web sites (McKnight et al., 2002)	I like to explore new social networking sites

6.2.6 Interpersonal Influence

Parthasarathy and Bhattacherjee (1998, p. 369) defined *interpersonal influence as,* "the relative influence of external and interpersonal information sources on respondents' initial adoption decisions." The construct is based on innovation diffusion theory Rogers (1964) that examines influence in purchasing decisions based on external sources and interpersonal sources Parthasarathy and Bhattacherjee (1998).

	Interpersonal Influence - Parthasarathy and Bhattacherjee (1998)	**Adapted study questions**
1	How much did each of the following sources influence you to subscribe to [this] service? opinion of friends, colleagues, relatives or others	How much did the opinion of your friends influence you to use Facebook
2		How much did the opinion of your classmates influence you to use Facebook
3		How much did the opinion of your family members influence you to use Facebook
4		How much did the opinion of others influence you to use Facebook

6.2.7 Procedural and Relational Costs

Burnham et al. (2003) examined three costs: procedural, financial and relational, in the study of consumer behavior research. The dominant general purpose social networking sites today have no financial costs so this study focuses on the procedural and relational costs. Burnham et al. (2003, p. 112) defined *procedural switching costs* as: "the economic risk, evaluation, learning, and setup costs, this type of switching cost primarily involves the expenditure of time and effort," and *relational switching costs* as "the personal relationship loss and brand relationship loss costs, this type of switching cost involves psychological or emotional discomfort due to the loss of identity and the breaking of bonds." The Burnham et al. (2003) study views the relational costs as between buyer and seller where this study adapts the questions to online social networking sites as the relational costs of dissolving the connections between users.

	Procedural - Economic Risk Costs - Burnham et al. (2003)	**Adapted study questions**
1	I worry that the service offered by other service providers won't work as well as expected	I worry that other social networks won't work as well as expected
2	If I try to switch service providers, I might end up with bad service for a while.	If I try to switch to another social networking site, I might end up with negative impacts for a while.
3	I am likely to end up with a bad deal financially if I switch to a new service provider.	*not applicable*
4	Switching to a new service provider will probably result in some unexpected hassle	Switching to a new social networking site will probably result in some unexpected hassle
5	I don't know what I'll end up having to deal with while switching to a new service provider	I don't know what I'll end up having to deal with while switching to a new social networking site

	Procedural - Evaluation Costs - Burnham et al. (2003)	**Adapted study questions**
1	I cannot afford the time to get the information to fully evaluate other service providers.	I cannot afford the time to get the information to fully evaluate other social networking sites.
2	How much time/effort does it take to get the information you need to feel comfortable evaluating new service providers?: very little-a lot	I feel very comfortable evaluating a new social networking site to see if it suits me.
3	Comparing the benefits of my service provider with the benefits of other service providers takes too much time/effort, *even when I have the information.*	Comparing the benefits of Facebook with the benefits of other social networking sites takes too much time/effort, *even when I have the information.*
4	It is tough to compare the other service providers	It is tough to compare the other social networking sites

	Procedural - Learning Costs - Burnham et al. (2003)	**Adapted study questions**
1	Learning to use the features offered by a new service provider as well as I use my service would take time.	Learning to use the features offered by a new social networking site as well as I use Facebook will take time.
2	There is not much involved in understanding a new service provider well.	There is not much involved in understanding a new social networking site well.
3	Even after switching, it would take effort to "get up to speed" with a new service	Even after switching, it would take effort to "get up to speed" with a new social networking site
4	Getting used to how another service provider works would be easy.	Getting used to how another social networking site works would be easy.

	Procedural - Setup Costs - Burnham et al. (2003)	**Adapted study questions**
1	It takes time to go through the steps of switching to a new service provider.	It takes time to go through the steps of switching to a new social networking site.
2	Switching service providers involves an unpleasant sales process.	Switching social networking site involves an unpleasant sales process.
3	The process of starting up with a new service is quick/easy	The process of starting up with a new social networking site is quick/easy
4	There are a lot of formalities involved in switching to a new service provider.	There are a lot of formalities involved in switching to a new social networking site.

	Relationship - Personal Relationship Loss Costs - Burnham et al. (2003)	**Adapted study questions**
1	I would miss working with the people at my service provider if I switched providers.	I would miss my friends on Facebook if I switched to a different social networking site.
2	I am more comfortable interacting with the people working for my service provider than I would be if I switched providers.	I am more comfortable interacting with my friends on Facebook than I would be if I switched to a different social networking site.
3	The people where I currently get my service matter to me.	My friends on Facebook matter to me.
4	I like talking to the people where I get my service.	I like talking to my friends on Facebook.

	Relationship - Brand Relationship Loss Costs - Burnham et al. (2003)	**Adapted study questions**
1	I like the public image my service provider has	I like the public image of Facebook
2	I support my service provider as a firm.	I support Facebook as a firm.
3	I do not care about the brand/company name of the service provider I use.	I do not care about the Facebook brand.

6.2.8 Alternative Perceptions

The majority of the research examines alternative service providers in one large disambiguated group without specificity, i.e. the question researchers tend to ask is whether service consumer is attracted to *any other* service provider not a specific service provider. There are exceptions, Hsieh et al. (2012) was less concerned about the incumbent blogging platform that the blogger was using and more concerned about whether Facebook, in particular, would be considered an attractive alternative.

The research question in the initial proposal intended to examine specific alternatives to Facebook, like Twitter, Instagram, Tumblr, and Pinterest. It may be risky to ask only about the specific alternatives given the past research; I suggest that I ask two sets of questions in the pilot, one set regarding *other* social networking sites, in general, and a specific set about the alternatives like Twitter, Tumblr, etc.

The survey questions below cover both *alternative attractiveness* and *general attitude toward switching* from Bansal et al. (2005) and in a higher-order measure are *alternative perceptions*. Bansal et al. (2005) uses both sets of questions as direct factors to predict switching intention. The questions have been adapted to fit the specific context of the study.

	Alternative Attractiveness - Bansal et al. (2005)	**Adapted study questions**
1	All in all, competitors would be much more fair than "my hair stylist" is	All in all, other social networking sites would be much more fair than Facebook is
2	Overall, competitors' policies would benefit me much more than "my hair stylist's" policies	Overall, other social networking sites' policies would benefit me much more than Facebook policies
3	I would be much more satisfied with the service available from competitors than the service provided by "my hair stylist"	I would be much more satisfied with the service available from other social networking sites than the service provided by Facebook
4	In general, I would be much more satisfied with competitors than I am with "my hair stylist"	In general, I would be much more satisfied with other social networking sites than I am with Facebook
5	Overall, competitors would be better to do business with than "my hair stylist"	Overall, other social networking sites would be better to use than Facebook

	Alternative Attractiveness - Bansal et al. (2005)	**Adapted study questions - specific**
1	All in all, competitors would be much more fair than "my hair stylist" is	All in all, <Twitter, Instagram, Tumblr, and Pinterest> would be much more fair than Facebook is
2	Overall, competitors' policies would benefit me much more than "my hair stylist's" policies	Overall, <Twitter, Instagram, Tumblr, and Pinterest> policies would benefit me much more than Facebook policies
3	I would be much more satisfied with the service available from competitors than the service provided by "my hair stylist"	I would be much more satisfied with the service available from <Twitter, Instagram, Tumblr, and Pinterest> than the service provided by Facebook
4	In general, I would be much more satisfied with competitors than I am with "my hair stylist"	In general, I would be much more satisfied with <Twitter, Instagram, Tumblr, and Pinterest> than I am with Facebook
5	Overall, competitors would be better to do business with than "my hair stylist"	Overall, <Twitter, Instagram, Tumblr, and Pinterest> would be better to use than Facebook

	Attitude Toward Switching - Bansal et al. (2005) - For me, switching from "my hair stylist" to a new hair stylist within the next 2 months would be:	**Adapted study questions -** For me, switching from Facebook to a new social networking site within the next 6 months would be:
1	A bad idea . . . A good idea	A bad idea . . . A good idea
2	Useless . . . Useful	Useless . . . Useful
3	Harmful . . . Beneficial	Harmful . . . Beneficial
4	Foolish . . . Wise	Foolish . . . Wise
5	Unpleasant . . . Pleasant	Unpleasant . . . Pleasant
6	Undesirable . . . Desirable	Undesirable . . . Desirable

6.2.9 Social Networking Site Continuance Intention

Bhattacherjee (2001, p. 359) defined continuance intention as a, "users' intention to continue using online banking division (OBD)," based on Mathieson (1991) behavioral intention scale. Bhattacherjee (2001) states that, based on expectancy-confirmation theory, continuance intention is primarily determined by user satisfaction.

	Information Systems Continuance Intention - Bhattacherjee (2001)	**Adapted study questions**
1	I intend to continue using OBD rather than discontinue its use	I intend to continue using Facebook rather than discontinue its use
2	My intentions are to continue using OBD than use any alternative means (traditional banking)	My intentions are to continue using Facebook than use an alternative social networking site (Twitter, Pinterest, etc.)
3	If I could I would like to discontinue my use of OBD	If I could, I would like to discontinue my use of Facebook

6.2.10 Demographics And Screening

The following demographic questions will be asked: age, gender, and education. Screening questions will be asked to ensure that the survey respondent is over the age of 18 and has a Facebook profile. Madden and Smith (2012) noted significant gender differences in the way men and women manage their profiles; women were more restrictive in how they managed their privacy settings. Age has been shown to be correlated with unfriending behavior as well; Madden and Smith (2012) noted that younger Facebook users unfriended members of their social networks more often than older users Madden and Smith (2012). The control variables are not the primary predictive variables in this research but are used to control for user differences.

6.3 Sampling And Participants

A survey was administered to three distinct groups: a public announcement will be made to gather survey takers, students at the University of Colorado Denver and Oracle employees from three offices in Colorado to collect data on social networking site continuance intention. The public survey respondents will be examined in depth as that group may be the most representative of the general population. Students are the selected population as they were the population who initially could join Facebook and have the longest tenure with the social networking site.[14] Youth appear to have "waning enthusiasm" for the site (Madden et al., 2013) and may be experiencing high variation in their continuance intention. The total number of teens using Facebook has not decreased in the U.S. however the amount of time spent on the site is decreasing (Madden et al., 2013). Oracle office workers will be used to include older users in the sample. A comparison across the three datasets is examined in depth in Chapter 7.10.

6.4 Analytical methods

The analysis was conducted using partial least square structural equation modeling (PLS-SEM). A measurement model and structural model was developed and tested to evaluate the hypotheses generated in Section 5. The factors are evaluated for reliability, average variance extracted (AVE), and discriminant validity. Factors are checked for outliers, normality, homoscedasticity, and are transformed as necessary prior to PLS-SEM evaluation. The factors are examined to ensure they meet the assumptions of the analytical method prior to the development of the structural model. Hair et al. (2011) recommends that the sample size should meet one of two heuristics - (1) the sample should

[14] `https://newsroom.fb.com/Timeline`

be ten times the largest number of formative indicators used to measure one construct or (2) ten times the largest number of structural paths directed at a particular latent construct in the structural model. The measurement and structural model are evaluated based on goodness of fit measures, r-square, Fornell and Larcker (1981) criterion, etc. following the heuristics in Hair et al. (2006); Wetzels et al. (2009); Fornell and Larcker (1981). Goodness of fit measures are computed as the geometric mean of average communality and average R^2 for endogenous latent constructs according to Wetzels et al. (2009). The loadings and statistical significance for each of the factors are evaluated and shown as necessary. The hypotheses are tested for statistical significance through boot-strapping.

6.4.1 Goodness of Fit Measures and PLS-SEM

Hair et al. (2011, p. 143) states that, "there is no adequate global measure of goodness of model fit [in PLS-SEM]." Goodness-of-fit measures are restricted to reflective outer models and can not be computed for all models in this research, i.e. models are reflective-formative in nature do not have a computable goodness-of-fit measure (Henseler et al., 2009). Wetzels et al. (2009) used a global fit measure based on Tenenhaus et al. (2005) where goodness-of-fit was defined as the geometric mean of the average communality and average R^2 (for endogenous constructs). Henseler et al. (2009) states that this approach has not been systematically analyzed in simulation studies and suggests that it should be restricted to reflective outer models only. In subsequent simulation study research by Henseler and Sarstedt (2013, p. 577), the authors state:

> The underlying idea would be that the model with a higher fit is the better or more valid model. However, using simulated data, we have illustrated that the GoF and the GoF rel are not suitable

> for model validation. Neither of these indices is able to separate valid models from invalid models. In fact, researchers would be misled if they chose for the model yielding the highest GoF. Instead, researchers should carefully evaluate the path coefficients and particularly their significance in order to decide upon which paths to leave in the model and which to discard.

Therefore, goodness-of-fit comparisons would not offer a valid way to choose which models are valid from a set competing models (Henseler and Sarstedt, 2013). Researchers continue to investigate how to develop a relevant goodness-of-fit measure for PLS-SEM models (Hair et al., 2011; Henseler et al., 2009).

6.4.2 Higher-order constructs

Several higher-order reflective-formative constructs were generated in the model development. To develop second and third-order constructs several methodical decisions were made based on Becker et al. (2012). Becker et al. (2012) guide was developed to address the features that PLS-SEM tools provide. A reflective-formative constructs are generated when there are lower-ordered constructs that are reflectively measured that do not share a common cause and a higher-order construct mediates the influence on subsequent endogenous constructs (Becker et al., 2012). An example from the Burnham et al. (2003) cost model are the three costs (procedural, financial and relational) that form the higher-order construct *costs* in the model. *Costs* are formed by the three reflective constructs: procedural, financial and relational. There are three general approaches for PLS-SEM to measure latent higher-order constructs: 1. repeated indicators, 2. sequential latent variable score or two-stage approach and 3. a hybrid approach (Becker et al., 2012). Becker et al. (2012) recommends the repeated indicator approach for reflective-formative models. Model

development has options to weight different aspects of the model - the model can be weighted the factors or the paths. For reflective-formative constructs the recommendation is to weight the paths (Becker et al., 2012). The models developed in Section 7 follow the recommendations - they are developed using the repeated indicator approach and use the path-weighted mode. Becker et al. (2012) states that the recommended approach for reflective-formative models is less-biased and therefore produces more precise parameter estimates and more reliable higher-order construct scores.

Researchers can use covariance-based structural equation models (CB-SEM) or partial least squared structural equation models (PLS-SEM) (Hair et al., 2011). Hair et al. (2011) states several rules of thumb in how to choose CB-SEM or PLS-SEM for a research project. PLS-SEM is designed to maximize the explained variance of the dependent latent constructs and differs from CB-SEM where the goal is to reproduce the theoretical covariance matrix. PLS-SEM is better at predicting the key target constructs; however, CB-SEM is better for theory testing, theory confirmation or comparisons of alternative theories. PLS-SEM handles formative constructs better than CB-SEM. PLS-SEM can work with more complex models where many constructs and many indicators are present better than CB-SEM. PLS-SEM works well with relatively low sample sizes, and when larger sample sizes are used the results of CB-SEM and PLS-SEM are similar.

The model that is employed in this research uses several formative constructs (in particular reflective-formative constructs), has a medium level of complexity and several mediating constructs that favor PLS-SEM over CB-SEM. CB-SEM would provide stronger ability to compare alternative theories that are used in this research; however, given the other set of constraints PLS-SEM was deemed to provide a better fit with the research objectives. The

software that will be used is SmartPLS 3.0 (Ringle et al., 2005).

6.4.3 Moderating effects

To test for moderating effects recommendations from Chin et al. (2003) were followed. The interaction effects were tested through hierarchical PLS-SEM models where compared. Standardized indicators were used for the interaction effects following the recommendations of Chin et al. (2003). Interaction effects can be left unstandardized, standardized or mean-centered. Chin et al. (2003) states that at least one of two methods should be used, standardized or mean-centered; the recommendation for Likert-scale items whose items are theoretically parallel (as is the case in this research) is to standardize the items. Cohen's effect size (f^2) will be calculated to compare the added benefit of the interaction term where 0.02, 0.15 and 0.35 are considered to have a small, moderate or large effect, respectively (Chin et al., 2003). The effect size of a moderating term may be small but meaningful if the path coefficients change in a meaningful manner (Chin et al., 2003).

Hair et al. (2006) states that ideally moderators and the other constructs in the analysis are uncorrelated to help distinguish the moderators effects (in this case the other constructs are *satisfaction and perceived usefulness* and *continuance intention*). Increasing strength of the correlations makes it difficult to have a valid interpretation of the results (Hair et al., 2006). Whisman and McClelland (2005) state that collinearity is not a problem (as long as an approach to standardizing or centering the interaction term is taken); interaction effects are often different because it is estimating a *very* different effect. Moderator models estimate simple effects of one variable when the other variable is fixed at 0. Whisman and McClelland (2005) state that the interaction term is often highly correlated with its components (e.g. the interaction term *satisfaction*

& perceived usefulness x habit is likely to be correlated with both *habit* and *satisfaction & perceived usefulness*). Changing the origin of the scales using either method (standardizing or centering) will not affect the test of the interaction and will reduce the correlations between the interaction term and its components to zero (Whisman and McClelland, 2005).

6.5 Design

The research uses independent constructs and covariates to predict one dependent variable- SNS Continuance. The independent variables are alternative attractiveness, attitude to switch, brand relationship, confirmation, habit, interpersonal influence, perceived usefulness, personal innovativeness, personal relationship loss, procedural economic cost, procedural evaluation cost, procedural learning cost, procedural setup cost and satisfaction. Three covariates are used to adjust and measure demographic variables; these are age, gender and education. Second- and third-order constructs were generated to group reflective-formative constructs into meaningful groups. Alternative attractiveness and attitude to switch from Bansal and Taylor (1999) were group as alternative perceptions. Relationship costs includes brand relationship and personal relationships as defined by Burnham et al. (2003). The four procedural costs (procedural economic cost, procedural evaluation cost, procedural learning cost, procedural setup cost) were combined into one procedural cost construct (Burnham et al., 2003). The main factors of IS Continuance (Bhattacherjee, 2001), Satisfaction and perceived usefulness were combined into a higher-order construct to allow for simpler interpretation of the results. A third-order factor of *cost* was developed to include the relationship costs and procedural costs into one construct.

Specific alternative social networking sites were examined based on ques-

tions about social networking sites Twitter, TUMBLR, Instagram and Pinterest. The questions were developed by asking survey respondents which social networking sites they used and to ask more specific questions about their opinions of those sites based on Bansal and Taylor (1999). The specific alternative social networking sites are examined in depth to determine how attitudes regarding those specific sites can predict whether a person will continue or discontinue use of Facebook.

7 Results

The results will compare a series of competing models that predict social networking site continuance through independent constructs. The base model is the IS continuance model of Bhattacherjee (2001). Individual factors will be added to the base model to determine their effects separately to determine the independent impact of a factor and any moderating effects on models that have moderators; the individual factor models are in the Appendix. Three models are presented in detail, the IS Continuance model of Bhattacherjee (2001) - Section 7.5, the non-moderated model with additional factors - Section 7.6, and the complete moderated model - Section 7.7. A backwards regression was developed to include only the statistically significant factors. Models to determine how attitudes about specific alternative products (Twitter, Tumblr, Instagram, and Pinterest) predict continuance on Facebook are in the Appendix F. A summary of the findings shows the coefficient of determination (R^2) and effect size (f^2) for each of the models to show the effects of the factors in predicting continuance.

7.1 Common Method Variance

The survey instrument was developed using a single method research design and common method variance should be measured to determine how much of the variance in the survey is due to the single survey method (Podsakoff et al., 2003). To test whether common method bias was in the survey instrument a Hartmann single-factor test post-hoc statistical tests were developed. 62 variables were entered into an exploratory factor analysis, using the rotated principal components factor analysis with the Variamax rotation function to determine the number of factors that are necessary to account for the variance

in the variables. The results showed that 13 factors were present and the most covariance explained by one factor is 21.46% of the variance which is below the .50 recommendation and is considered acceptable.

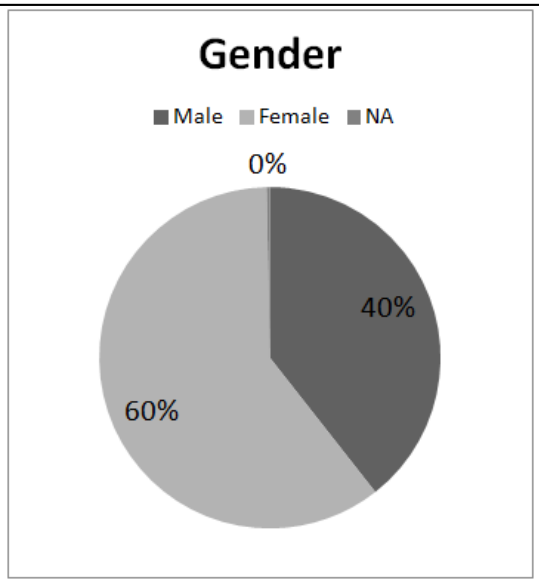
A second method to determine common method variance was employed using the *common method factor* (Podsakoff et al., 2003; Liang et al., 2007). A first-order latent variable was created for every indicator in the model. Each first-order latent variable was then connected to a new second-order latent variable from the theoretical model using the repeated indicator approach, i.e. satisfaction in the model has three indicators therefore three latent variables were generated (sat1, sat2, sat3) and one satisfaction exogenous variable was generated using the repeated indicator approach and connected to sat1, sat2, sat3. A new *method* latent variable was then created also by the repeated indicator approach (the *method* latent variable contains all variables in the model). The *method* latent variable was then connected to all first-order latent variables in the model. The path coefficients between every latent variable and its second-order construct (*substantive* factor loading) was then computed as well as the path coefficient between the method latent variable and every latent variable. For an extended discussion on the approach see Liang et al. (2007)Liang et al. (2007, Appendix E - Using PLS to Assess CommonMethod Bias).

The average of all *substantive* loadings, and *substantive* explained variance (loading squared) and *method* factor loadings and *method* explained variance (loading squared) were then calculated - see Table 43. The results show that the average substantively explained variance of the indicators is .6419, while the average method-based variance is 0.0101. The ratio of the substantive variance to method variance is approximately 63:1. It is unlikely that the survey method is biased for this study based on the ratio of substantive variance

to method-variance.

Table 9: Gender

Gender	Frequency	Percent	Cumulative percent
Male	513	39.4	39.4
Female	785	60.3	99.7
NA	4	.3	100.0
Total	***1302***	***100.0***	***100.0***



7.2 Demographics

Demographic information regarding age, gender and education was collected in the survey. The Tables 9,10 and 11 show the distribution of each demographic variable. The majority of the survey takers were women (59.7%). A majority (52.7%) of the survey takers were 39 years old or younger and the majority of survey takers completed a bachelors degree or had more education.

7.3 Continuance Dependent Variable

The continuance factor was measured on a Likert-scale seven item scale with three questions. Continuance ranged from 1 to 7 and had a mean of 4.6922 with a std. deviation of 1.52. Figure 6 shows that the distribution of continuance is not normal, values at the extreme range of do not plan to continue and plan

Table 10: Age

Age	Frequency	Percent	Cumulative percent
18-19	14	1.1%	1.1%
20-24	137	10.5%	11.6%
25-29	211	16.2%	27.8%
30-34	192	14.7%	42.5%
35-39	135	10.4%	52.9%
40-44	170	13.1%	66.0%
45-49	165	12.7%	78.6%
50-54	125	9.6%	88.2%
55-59	86	6.6%	94.9%
60-64	37	2.8%	97.7%
65-69	20	1.5%	99.2%
70-74	5	0.4%	99.6%
75+	1	0.1%	99.7%
NA	4	0.3%	100.0%
Total	***1302***	***100.0***	***100.0***

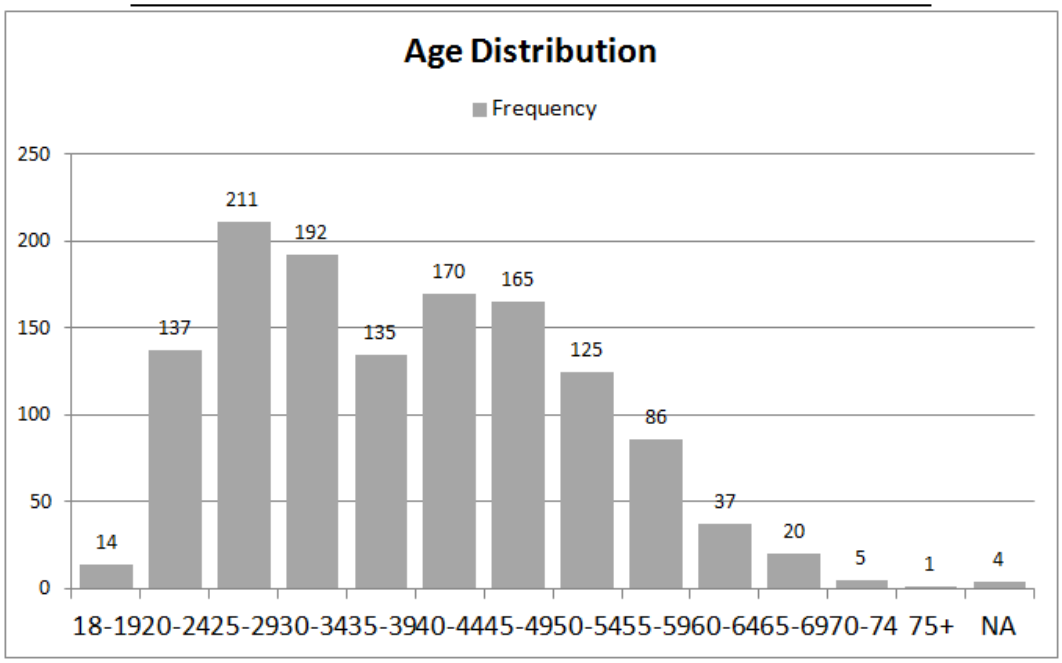


Table 11: Education

Education	Frequency	Percent	Cumulative Percent
Less than high school	1	0.1%	0.1%
High School	29	2.2%	2.3%
Some college	146	11.2%	13.5%
Associates	88	6.8%	20.3%
Bachelor	529	40.6%	60.9%
Masters	429	32.9%	93.9%
Doctorate	76	5.8%	99.7%
NA	4	0.3%	100.0%
Total	***1302***	***100.0%***	100.0%

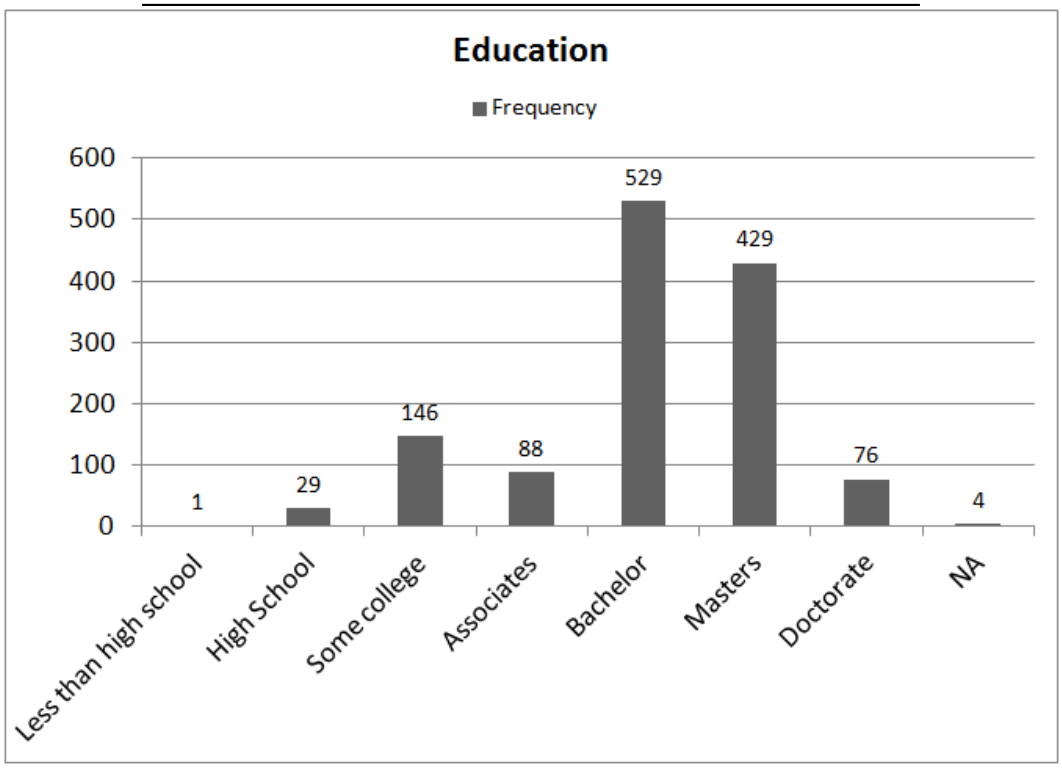


Table 12: Continuance Descriptives

Measure	Statistic	Std. Error
Mean	4.6922	0.0423
95% Confidence Interval for Mean – Lower Bound	4.6092	
95% Confidence Interval for Mean – Upper Bound	4.7751	
5% Trimmed Mean	4.7669	
Median	4.9754	
Variance	2.3270	
Std. Deviation	1.5254	
Minimum	1.0000	
Maximum	7.0000	
Range	6.0000	
Interquartile Range	1.9578	
Skewness	-0.7271	0.0678
Kurtosis	-0.0476	0.1355

to continue are over-represented in the distribution. The majority of users are on the positive side of continuance indicating that the user intends to continue use of Facebook. Users were asked a single questions as to whether they were planning to leave the network, continue on the network or have already left in the near term. Approximately 77% said they intended to continue use of the site - see Table 13.

7.4 Outlier Analysis

Outlier analysis was performed to reduce the effects influential cases that have a disproportionate influence in the regression analysis (Hair et al., 2006). Outlier analysis was performed comparing the predicted value ($\hat{y}$) and actual value (y) to remove outliers at the 95% confidence level ($\alpha = .05$). Hair et al. (2006) indicates that this is the most widely used outlier removal technique to address influential observations in regression analysis. There are many options

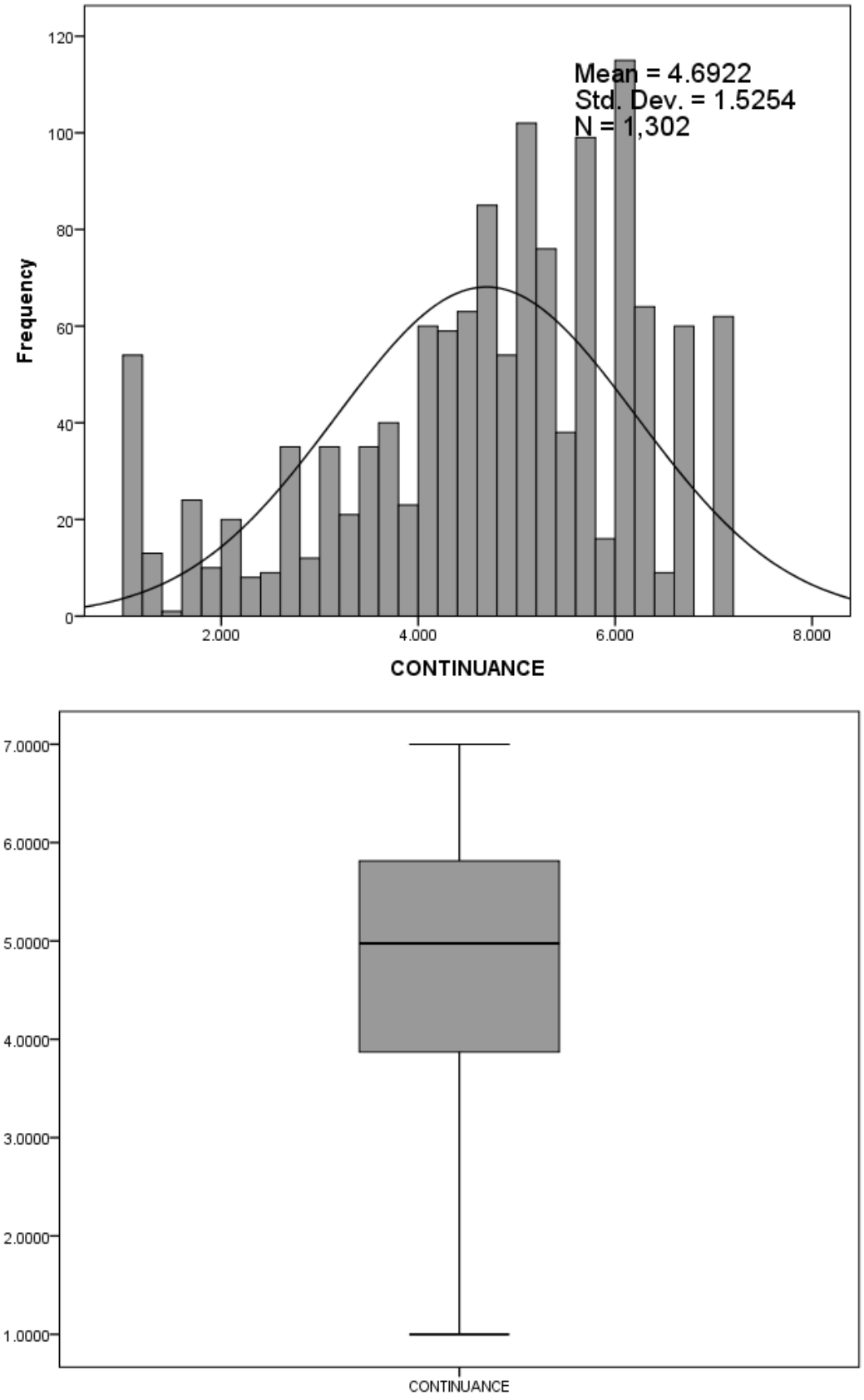
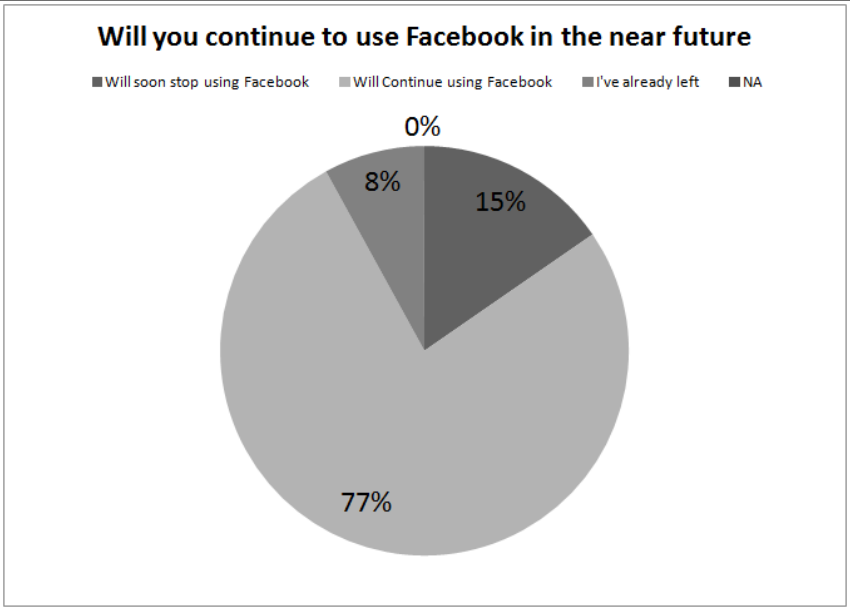


Figure 6: Continuance Histogram

Table 13: Single-Item Continuance

	Frequency	Percent	Cumulative Percent
Will soon stop using Facebook	200	15.4%	15.4%
Will Continue using Facebook	998	76.7%	92.0%
I've already left	103	7.9%	99.9%
NA	1	0.1%	100.0%
Total	**1302**	**100.0%**	0.1%



to reduce the effects of influential observations in a regression analysis including: correcting data, removing cases that are considered valid but exceptional, deciding whether to remove observations that have no likely explanation, and re-assessing the conceptual model when observations whose individual characteristics are unexceptional but when combined with other observations are exceptional (Hair et al., 2006). The option chosen in this analysis is to remove potentially valid but exceptional cases to reduce the outsized effect influential cases have on the analysis. Outlier analysis was performed in SPSS through automatic linear modeling regression analysis. Residuals were removed when the predicted value ($\hat{y}$) and actual value (y) were outside the 95% confidence level. The initial number of observations was 1370 and after outlier removal 1302 remained in the analysis or 95.0% of the survey respondents - see Figures 7 and 8 for distribution details of the initial and retained dataset, respectively.

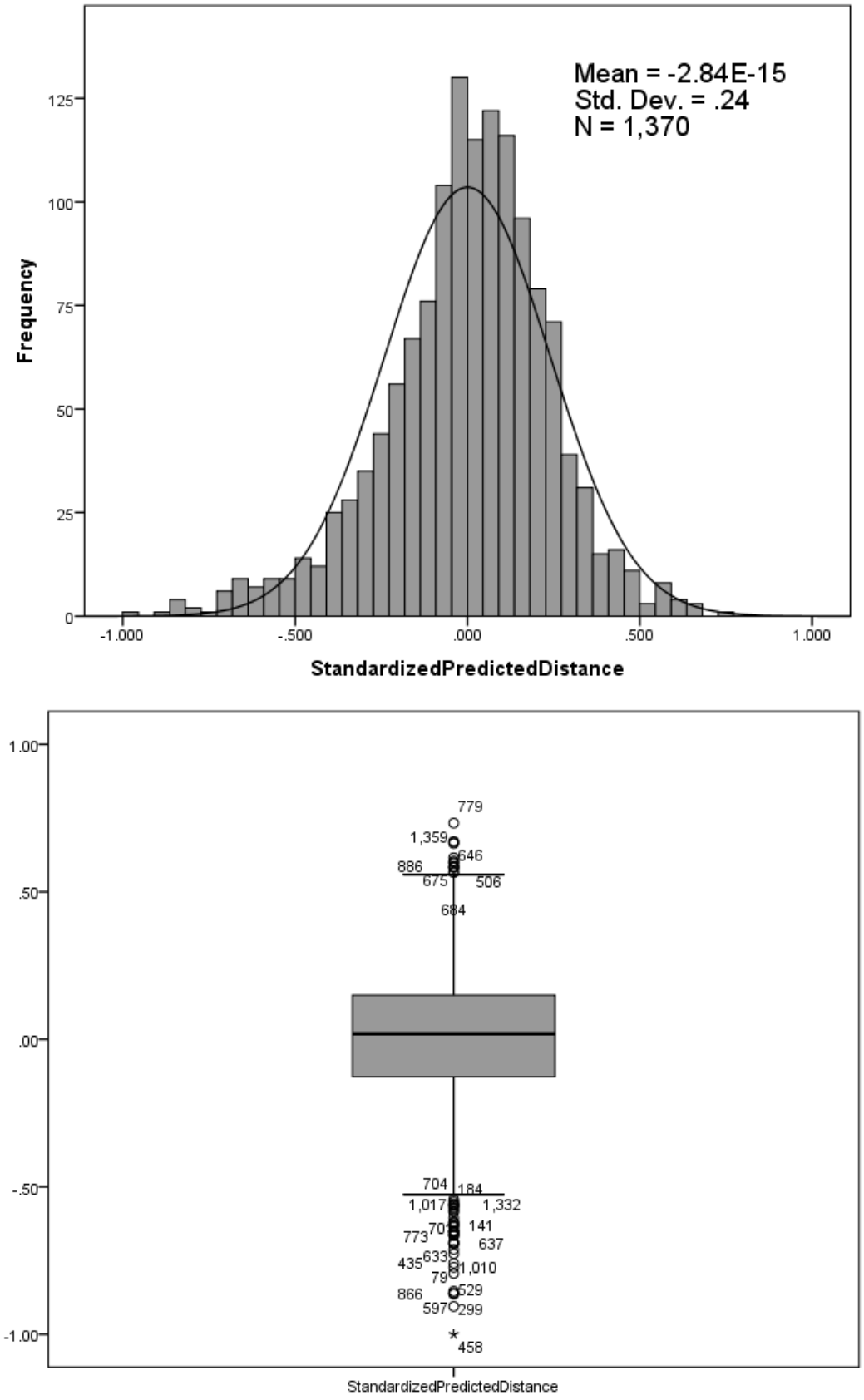


Figure 7: Initial Residual Analysis - Continuance

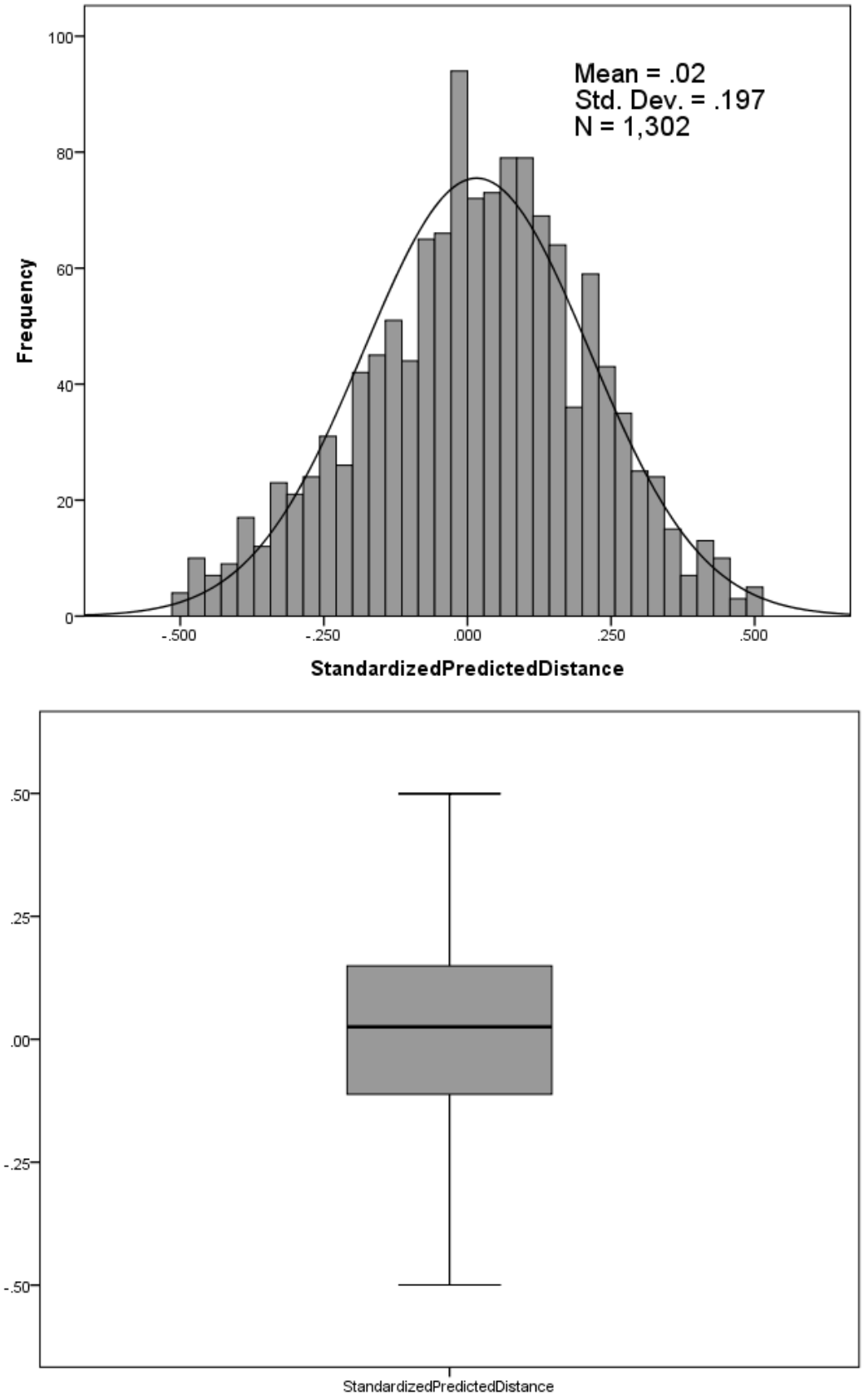


Figure 8: Residual Analysis After Outliers Removed- Continuance

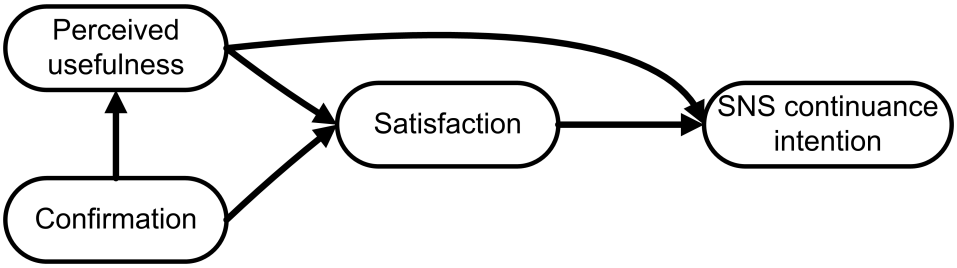


Figure 9: Base Model - IS Continuance

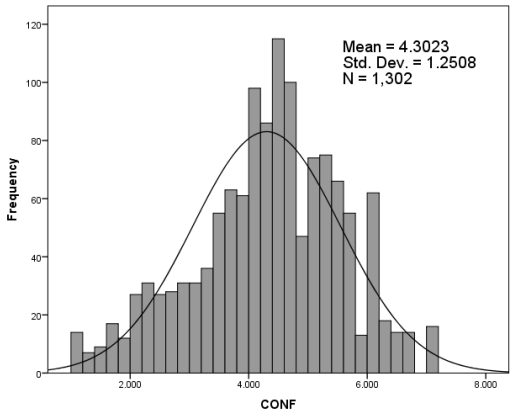
7.5 Base Model-IS Continuance Model

7.5.1 Model Description

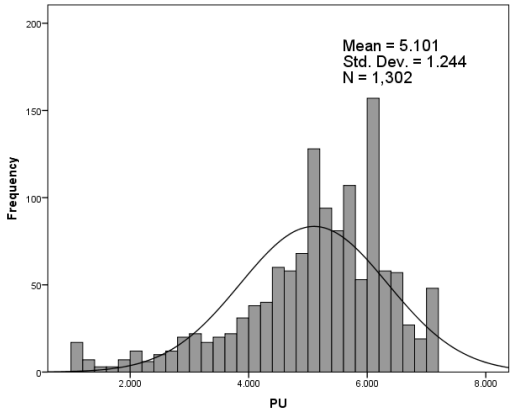
The base model includes the measures from the IS continuance model of Bhattacherjee (2001) as a basis of comparison against the other models in this research. The base model uses the independent constructs confirmation, perceived usefulness, satisfaction to predict social networking site continuance intention. Perceived usefulness and satisfaction are theorized to have direct effects and confirmation is theorized to be fully mediated by by perceived usefulness and satisfaction.

7.5.2 Measurement Model

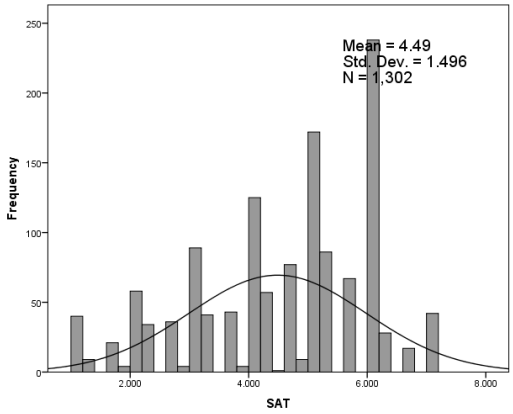
The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency and reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent vari-



(a) Confirmation Histogram



(b) Perceived Usefulness Histogram



(c) Satisfaction Histogram

Figure 10: Base Model Histograms

Table 14: Base Model - IS Continuance Measurement Model

Construct	AVE	Composite Reliability
CONF	0.6910	0.8968
CONTINUANCE	0.6677	0.8831
PU	0.6804	0.8938
SAT	0.9309	0.9758

Table 15: Base Model - IS Continuance Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	Confirmation	Perceived Usefulness	Satisfaction	Continuance
Confirmation	**0.8311**			
Perceived Usefulness	0.7108	**0.8472**		
Satisfaction	0.5994	0.6299	**0.8249**	
Continuance	0.7887	0.7890	0.5990	**0.9648**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagnol elements are the latent variable correlations.

able correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 15. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid.

7.5.3 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction to predict social networking site continuance intention. The predictors confirmation, perceived usefulness and satisfaction explain approximately 66.8% of the variance (R^2) in continuance intention and is considered to have a moderate level of explana-

Table 16: Base Model - IS Continuance Structural Model

Goodness of Fit
.6490

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	R^2	Q^2
Perceived Usefulness	0.3592	0.2435
Satisfaction	0.6469	0.6021
Continuance	0.668	0.4751

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

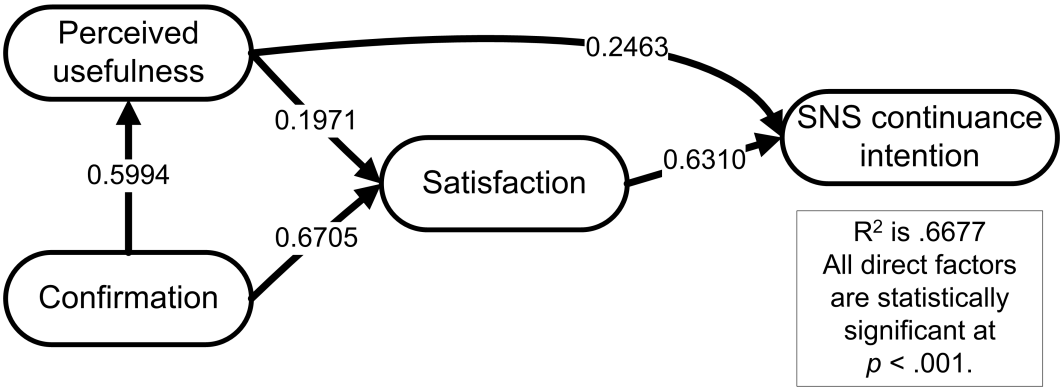


Figure 11: Base Model - IS Continuance

tion[15]; the model also exhibits predictive relevance (Q^2) where its value is .4751 (scores above zero indicate predictive relevance in PLS path models). Satisfaction had the strongest predictive ability for satisfaction with a standardized path coefficient (β) of .631 ($t = 31.1585$) followed by perceived usefulness with a standardized path coefficient (β) of .1971 ($t = 10.6813$). The coefficients are both positive and indicate that higher levels satisfaction and higher levels of perceived usefulness are associated with higher levels of continuance intention.

[15]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Table 17: Path Coefficients

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		
Satisfaction → Continuance	0.6310	31.1585
Perceived Usefulness → Continuance	0.2463	10.6813
Other Path Coefficients		
Perceived Usefulness → Satisfaction	0.1971	8.7811
Confirmation → Satisfaction	0.6705	34.0352
Confirmation → Perceived Usefulness	0.5994	32.7735
Total Effects		
	Sample Mean (M)	**T Statistics**
Continuance Path Coefficients		
CONF → CONTINUANCE	0.6454	49.0332
SAT → CONTINUANCE	0.6315	31.1585
PU → CONTINUANCE	0.3708	15.4962
age → CONTINUANCE	0.0719	4.6425
gender → CONTINUANCE	0.0411	2.6427
ed → CONTINUANCE	0.0144	0.8395
Other Path Coefficients		
CONF → SAT	0.7888	74.4869
PU → SAT	0.1984	8.7811
CONF → PU	0.5995	32.7735

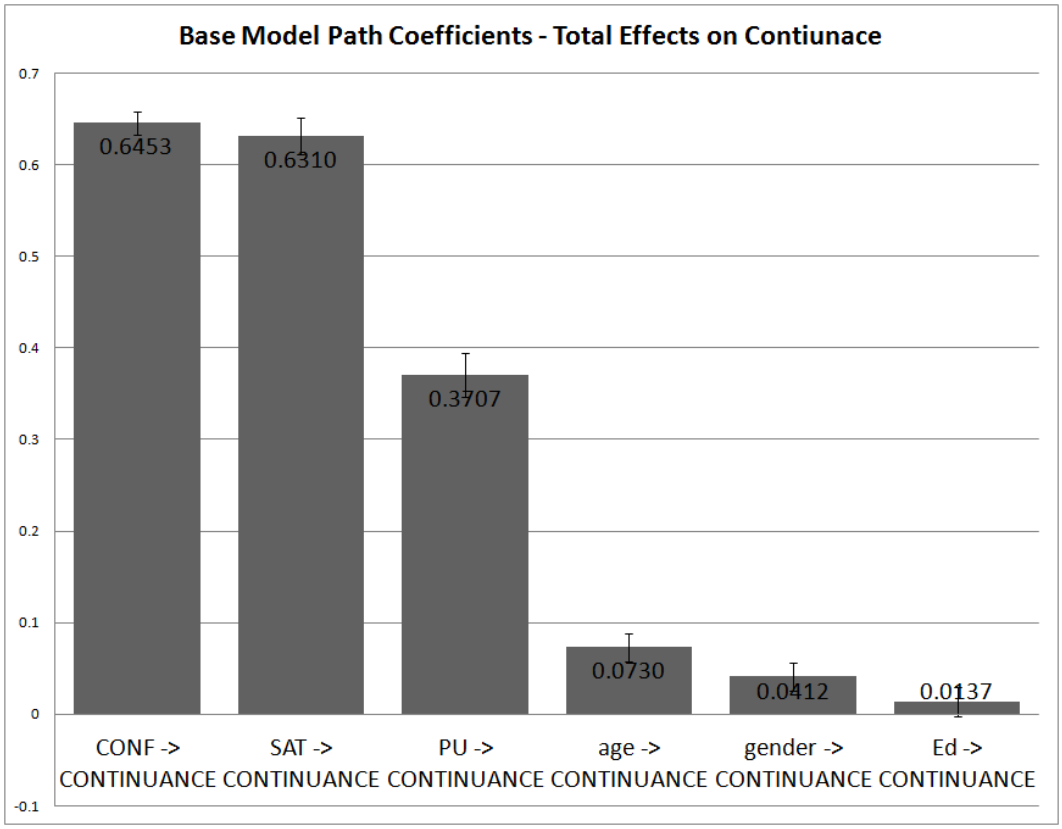


Figure 12: Base Model Total Effects Path Coefficients on IS Continuance

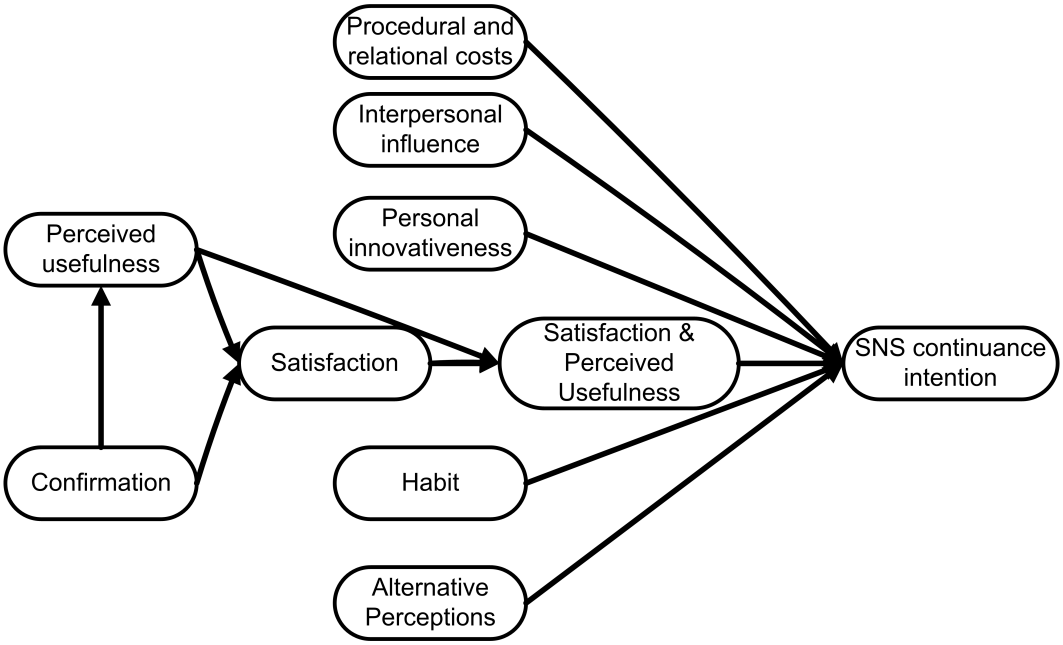
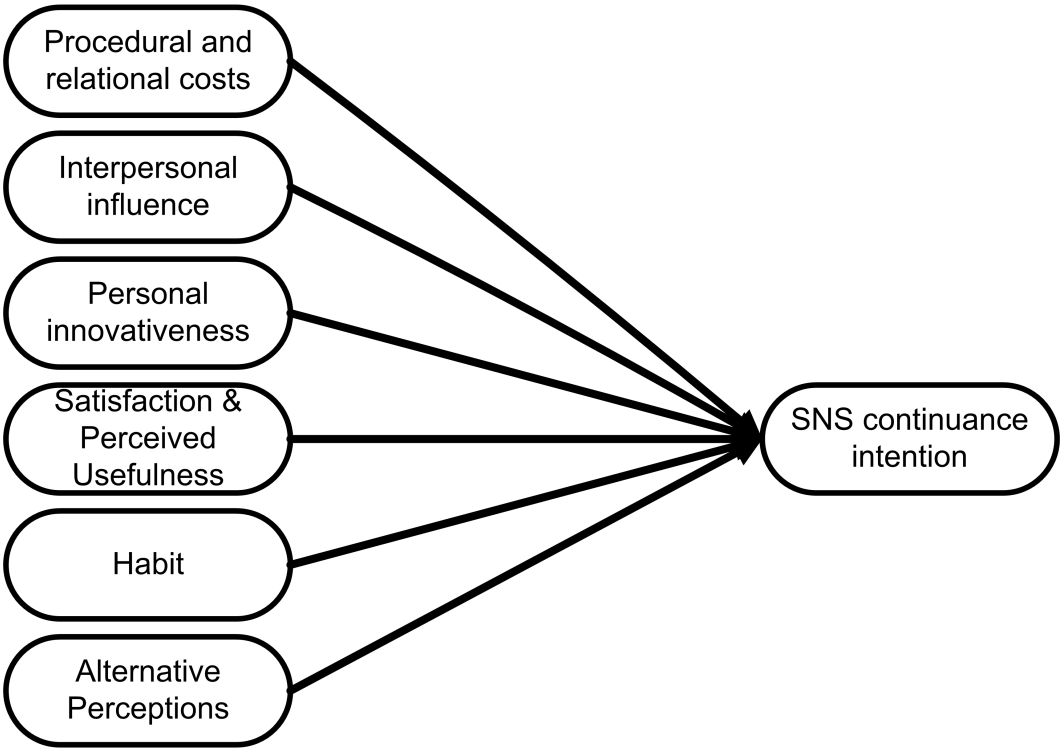


Figure 13: Complete Non-Moderated Model

7.6 Complete model - Non Moderated

7.6.1 Model Description

The model includes the measures from the IS continuance model (Bhattacherjee, 2001) and factors: consumer switching costs, habit, personal innovativeness, interpersonal influence, and alternative perception. The two predictors for SNS Continuance, satisfaction and perceived usefulness have been combined into a single reflective-formative construct that allows for a more direct comparison of the competing models and allows the model to be compared at a higher level (Hair et al., 2006). The Burnham et al. (2003) cost model was initially developed as a formative-reflective model and does not need a transformation. The cost model uses the independent constructs economic risk, evaluation costs, learning costs and setup costs (procedural costs) and personal relationship loss and brand relationship loss (relational costs) to predict continuance intention. The IS continuance model uses the independent

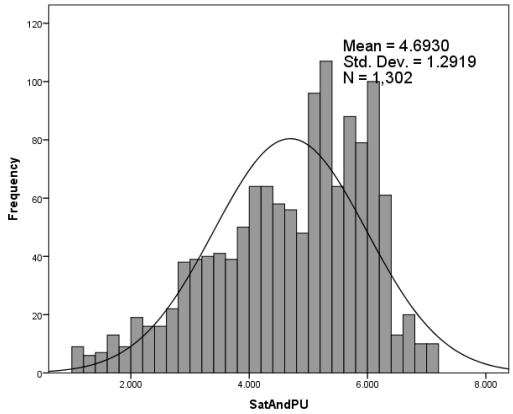


Only higher-order factors are shown

Figure 14: Complete Non-Moderated Simplified Model

constructs confirmation, perceived usefulness, satisfaction to predict information systems continuance intention. Outer loading analysis for each item and the related construct composite reliability and Cronbach's alpha can be found in Appendix B. For moderating effects of the complete model see Section 7.7.

The theoretical model has independent factors for satisfaction and perceived usefulness as predictors for continuance intention and does not combine these factors into a single construct. The analysis here, as stated above combines the two factors, and the measurement model and structural model was conducted on this model. An additional model was generated with to show the effects of satisfaction and perceived usefulness on continuance intention with the moderated factors as shown in Figure 13 the results of which are shown in Figure 33. The tables and figures in this section use the analysis of the combined factors for perceived usefulness and satisfaction except as noted in the



Combined second order construct of Satisfaction and Perceived Usefulness

Figure 15: *Second Order Construct:* Satisfaction and Perceived Usefulness Histogram

two Figures 13 and 33. As designed, with repeated indicators for higher-order factors and path-weighting, the differences between the two models with PLS-SEM is small. The coefficient of determination (R^2) for the simplified model is 0.7667 and for the complete non-moderated model is 0.7693, or the change (∇) in the coefficient of determination of the two models is 0.0026. The effect size (f^2) between the two models is 0.0113 and is considered less than small (.02 is considered small based on *Chin et al. (2003)*). Theoretically, the independent factor model is stronger, but there is tension between the stronger theoretical model and the more parsimonious model that allows factors to be evaluated at a similar level (Hair et al., 2006). The simplified model allows factors to be analyzed at a more appropriate level with five additional factors beyond the factors in IS continuance model of Bhattacherjee (2001) that are considered in the non-moderated model. The higher-order model allows those factors to be analyzed at a level that is more appropriate for this research.

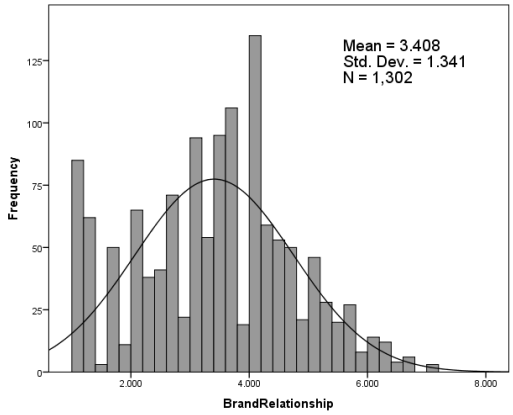


Figure 16: Brand Relationship Histogram

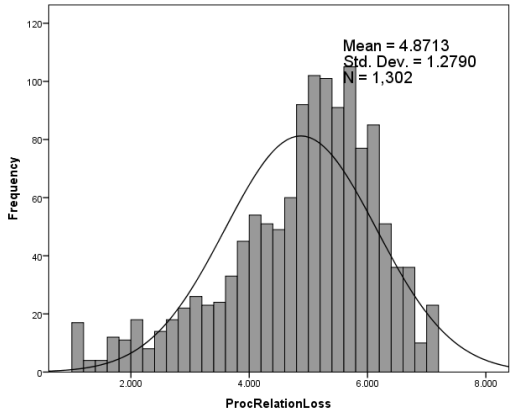


Figure 17: Personal Relationship Histogram

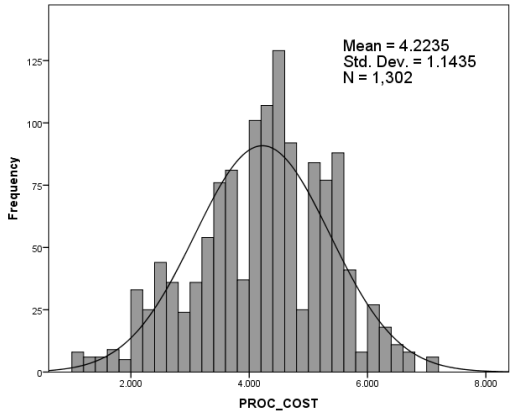


Figure 18: Procedural Economic Cost Histogram

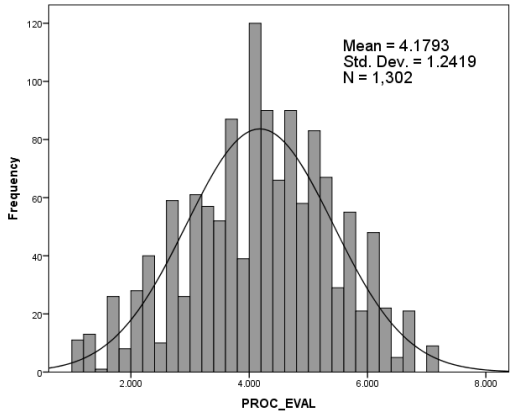


Figure 19: Procedural Evaluation Cost Histogram

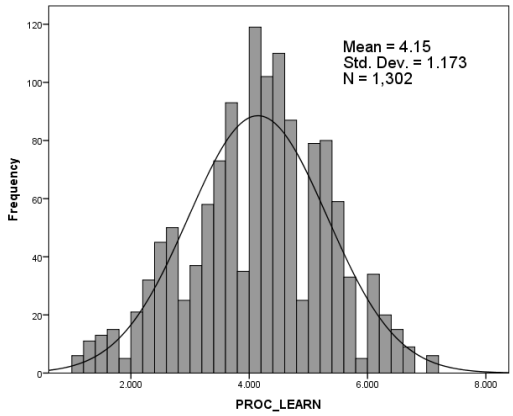


Figure 20: Procedural Learning Cost Histogram

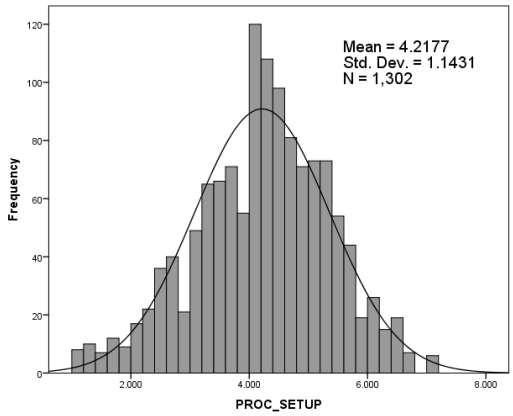


Figure 21: Procedural Setup Cost Histogram

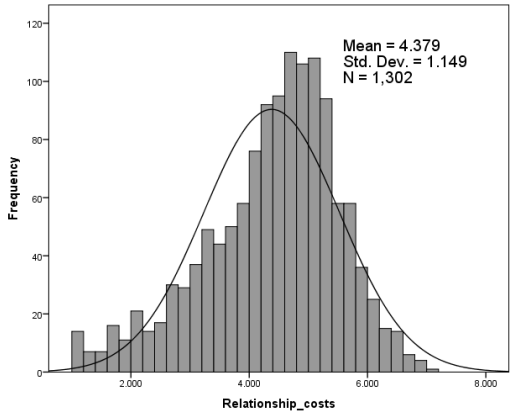
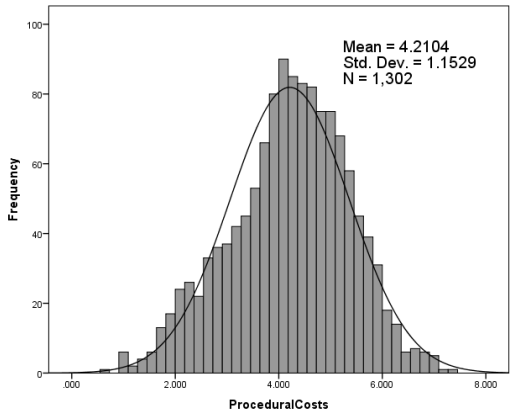
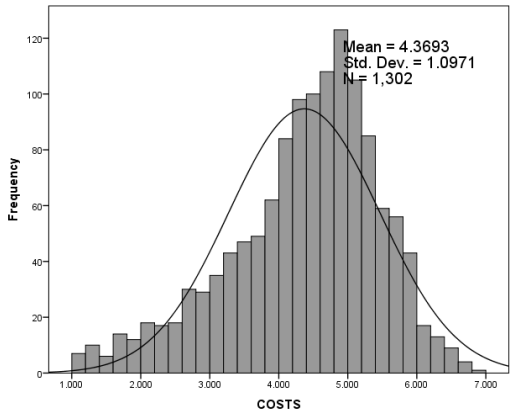


Figure 22: *Second Order Construct:* Relationship Cost Histogram
Combined second order construct of Brand Relationship and Personal Relationship Costs



Combined second order construct of Procedural Economic Cost, Procedural Evaluation Cost, Procedural Learning Cost and Procedural Setup Cost

Figure 23: *Second Order Construct:* Procedural Cost Histogram



Combined Third order construct of Relationship Cost and Procedural Cost

Figure 24: *Third Order Construct:* Cost Histogram

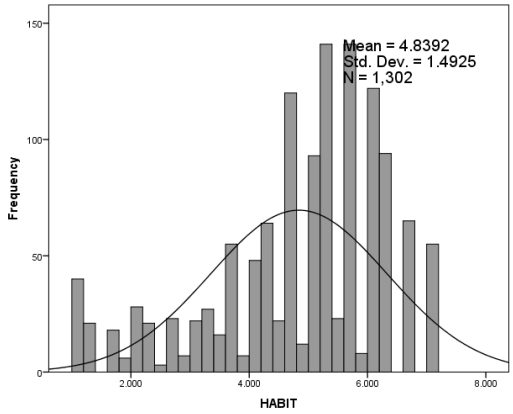


Figure 25: Habit Histogram

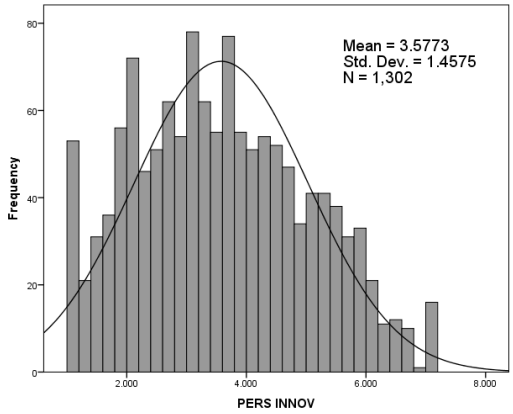


Figure 26: Personal Innovativeness Histogram

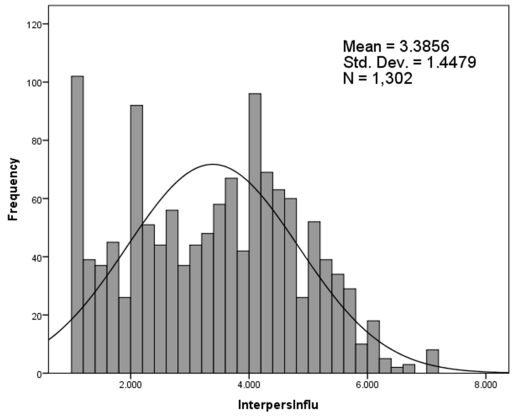


Figure 27: Interpersonal Influence Histogram

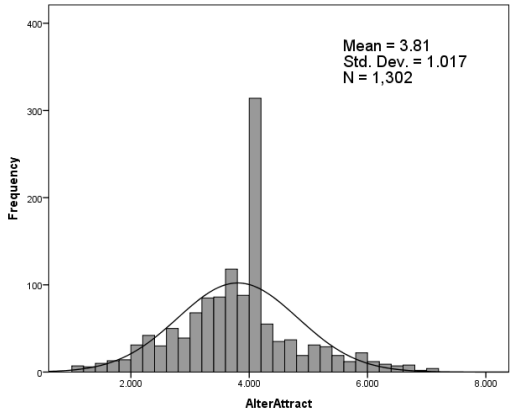


Figure 28: Alternative Attractiveness Histogram

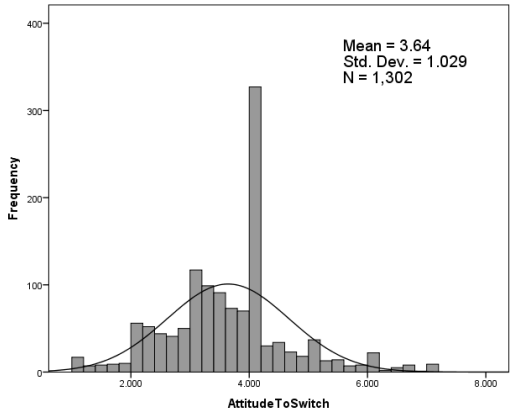
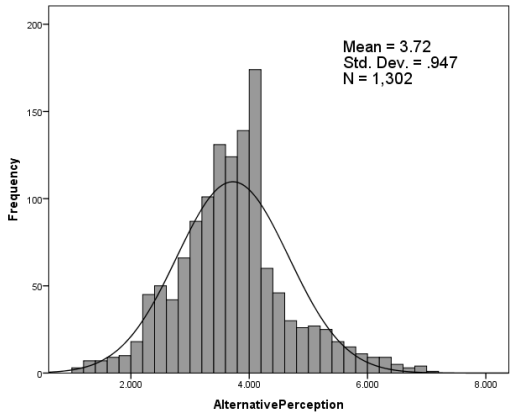


Figure 29: Attitude To Switch Histogram



Combined second-order construct of Alternative Attractiveness and Attitude to Switch

Figure 30: *Second Order Construct:* Alternative Perceptions Histogram

7.6.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 19. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid.

Table 18: SNS Cost Measurement Model

Construct	AVE	Composite Reliability
PROC_SETUP	0.5938	0.8530
PersRelationLoss	0.6416	0.8990
Alter Attract	0.6475	0.9012
Attitude To Switch	0.7380	0.9440
Brand Relationship	0.6809	0.8638
CONF	0.6910	0.8969
CONTINUANCE	0.7166	0.8831
HABIT	0.7671	0.9079
Interpers Influ	0.6087	0.8599
PERS INNOV	0.7038	0.9219
PROC COST	0.5646	0.8382
PROC EVAL	0.6013	0.8181
PROC LEARN	0.6041	0.8590
PU	0.6805	0.8939
SAT	0.9309	0.9758

Table 19: Complete Model with Moderators - Discriminant Validity

Fornell and Larcker (1981)Criterion

	PROC SETUP	Proc Relation-Loss	Alter Attract	Attitude To Switch	Brand Relation-ship	CONF	CON-TINU-ANCE	HABIT	Interpers Influ	PERS IN-NOV	PROC COST	PROC EVAL	PROC LEARN	PU	SAT
PROC SETUP	**0.7706**														
ProcRelationLoss	0.3388	**0.8010**													
Alter Attract	-0.2262	-0.4442	**0.8047**												
Attitude To Switch	-0.4500	-0.4143	0.5752	**0.8591**											
Brand Relationship	0.1169	0.4936	-0.4867	-0.3264	**0.8252**										
CONF	0.2251	0.6732	-0.4942	-0.4412	0.6519	**0.8313**									
CONTINUANCE	0.2888	0.7318	-0.6122	-0.5544	0.6098	0.7116	**0.8465**								
HABIT	0.2623	0.7443	-0.4132	-0.3846	0.4975	0.6372	0.6952	**0.8758**							
InterpersInflu	0.1981	0.1940	-0.0219	-0.1205	0.1650	0.2108	0.1058	0.1440	**0.7802**						
PERS INNOV	-0.4141	-0.0284	0.2811	0.4140	0.0501	-0.0396	-0.1633	-0.0082	-0.0555	**0.8389**					
PROC COST	0.7094	0.4668	-0.2153	-0.4307	0.2221	0.3395	0.3733	0.3685	0.2338	-0.3249	**0.7514**				
PROC EVAL	0.5409	0.1478	-0.1995	-0.3975	0.0776	0.1424	0.2034	0.0921	0.1297	-0.6325	0.4839	**0.7754**			
PROC LEARN	0.6849	0.3127	-0.2452	-0.3530	0.1776	0.2003	0.2723	0.2056	0.1820	-0.3679	0.6428	0.5005	**0.7772**		
PU	0.2808	0.7555	-0.3716	-0.3510	0.4734	0.5991	0.6306	0.6550	0.2569	-0.0284	0.3850	0.1103	0.2428	**0.8249**	
SAT	0.1785	0.6674	-0.5658	-0.4567	0.6370	0.7879	0.7861	0.6219	0.1096	-0.0370	0.2519	0.1115	0.2015	0.5982	**0.9648**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

7.6.3 Structural Model

The structural model was assessed to determine how the independent constructs from IS Continuance theory and consumer switching costs predict information systems continuance intention.. The predictors explained approximately 76.7% of the variance (R^2) in continuance intention and is considered to have a substantial level of explanation[16]; the model also exhibits predictive relevance (Q^2) where its value is .5403 (scores above zero indicate predictive relevance in PLS path models). Satisfaction and perceived usefulness, in a combined measure, predict continuance intention with a standardized path coefficient (β) of .368 (t = 13.5952). All of the costs predict continuance intention with a standardized path coefficient (β) of 0.250 (t = 7.9023). Alternative perception had the third largest path coefficient (β= -0.207, t = 10.3132) followed by habit (β= .164, t = 6.7738), personal innovativeness (β= -.059, t = 4.0897) and interpersonal influence (β= -.045, t = 3.2342). Coefficients that are positive indicate that are associated with higher levels of continuance intention.

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		
SatAndPU → CONTINUANCE	0.3686	13.5952
COSTS → CONTINUANCE	0.2496	7.9023
AlternativePerception → CONTINUANCE	-0.2069	10.3132

[16]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
HABIT → CONTINUANCE	0.1642	6.7738
PERS INNOV→ CONTINUANCE	-0.0589	4.0897
InterpersInflu → CONTINUANCE	-0.0451	3.2536
Other Path Coefficients		
Relationship_costs → COSTS	0.9791	86.4142
PersRelationLoss → Relationship_costs	0.7353	35.1657
CONF → SAT	0.6706	33.1904
SAT → SatAndPU	0.7851	32.4689
CONF → PU	0.5993	31.6692
AlterAttract → AlternativePerception	0.6621	17.6155
BrandRelationship → Relationship_costs	0.4053	15.9571
PROC_COST → ProceduralCosts	0.9373	13.3217
AttitudeToSwitch → AlternativePerception	0.4552	10.9372
PU → SatAndPU	0.3074	10.4468
PU → SAT	0.1971	8.883
ProceduralCosts → COSTS	0.038	1.7011
PROC_LEARN → ProceduralCosts	0.1468	1.6372
PROC_EVAL → ProceduralCosts	-0.1159	1.6114
PROC_SETUP → ProceduralCosts	0.0175	0.1869

Relation	Path Coeffi-cient	T-statistic
Total Effects		
Continuance Path Coefficents		
SatAndPU → CONTINUANCE	0.365	13.5952
CONF → CONTINUANCE	0.2932	13.2753
SAT → CONTINUANCE	0.2863	12.0838
PU → CONTINUANCE	0.1688	10.8282
AlternativePerception→ CONTINUANCE	-0.2072	10.3132
AlterAttract → CONTINUANCE	-0.137	9.3630
COSTS → CONTINUANCE	0.2568	7.9023
Relationship_costs → CONTINUANCE	0.2508	7.8161
PersRelationLoss → CONTINUANCE	0.1846	7.6372
AttitudeToSwitch → CONTINUANCE	-0.0943	7.1346
BrandRelationship → CONTINUANCE	0.1013	7.0277
HABIT → CONTINUANCE	0.1642	6.7738
age → CONTINUANCE	0.0613	4.3408
PERS INNOV → CONTINUANCE	-0.059	4.0897
InterpersInflu → CONTINUANCE	-0.0434	3.2342
PROC_COST → CONTINUANCE	0.0096	1.6601
ProceduralCosts → CONTINUANCE	0.0104	1.6396

Relation	Path Coefficient	T-statistic
education → CONTINUANCE	0.0210	1.4686
gender → CONTINUANCE	0.0167	1.2233
PROC_EVAL→ CONTINUANCE	-0.0011	1.1223
PROC_LEARN → CONTINUANCE	0.0015	1.0321
PROC_SETUP → CONTINUANCE	0.0002	0.1520
Other Path Coefficients		
Relationship_costs→ COSTS	0.9767	86.4142
CONF → SatAndPU	0.8032	75.3986
CONF → SAT	0.7888	69.2248
PersRelationLoss → COSTS	0.7187	35.7847
PersRelationLoss → Relationship_costs	0.7359	35.1657
SAT → SatAndPU	0.7842	32.4689
CONF → PU	0.5998	31.6692
AlterAttract → AlternativePerception	0.6616	17.6155
BrandRelationship → Relationship_costs	0.4039	15.9571
PU → SatAndPU	0.4627	15.8195
BrandRelationship → COSTS	0.3946	15.1307
PROC_COST → ProceduralCosts	0.9331	13.3217
AttitudeToSwitch → AlternativePerception	0.4544	10.9372

Relation	Path Coefficient	T-statistic
PU → SAT	0.1977	8.8830
PROC_COST → COSTS	0.0377	1.7277
ProceduralCosts → COSTS	0.0407	1.7011
PROC_LEARN → ProceduralCosts	0.1449	1.6372
PROC_EVAL → ProceduralCosts	-0.1133	1.6114
PROC_EVAL → COSTS	-0.0042	1.1616
PROC_LEARN → COSTS	0.0058	1.0693
PROC_SETUP → ProceduralCosts	0.0157	0.1869
PROC_SETUP → COSTS	0.0009	0.1551

Table 20: Indices

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
AlternativePerception	0.9924	0.5352
CONTINUANCE	0.7667	0.5403
COSTS	0.9942	0.2178
PU	0.3589	0.2433
ProceduralCosts	0.9933	0.3252
Relationship_costs	0.9988	0.5006
SAT	0.6457	0.6010
SatAndPU	0.9999	0.6083

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

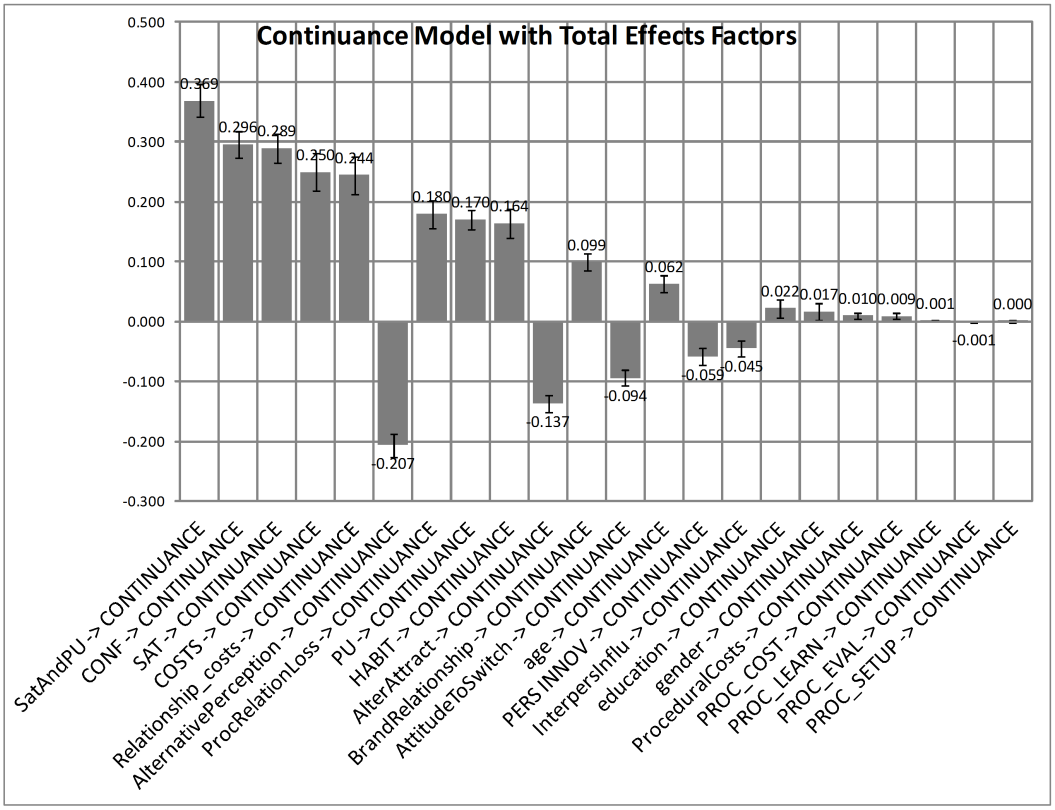


Figure 31: Complete Non-Moderated Model Path Coefficients for SNS Continuance

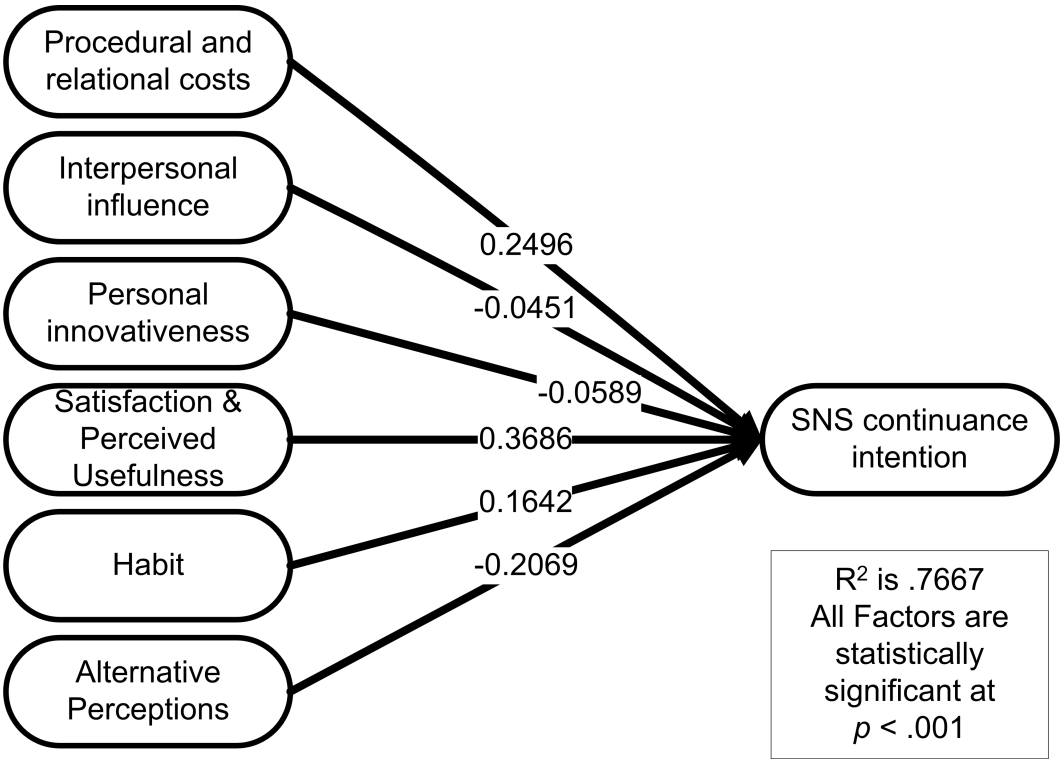


Figure 32: Complete Non-Moderated Simplified Model

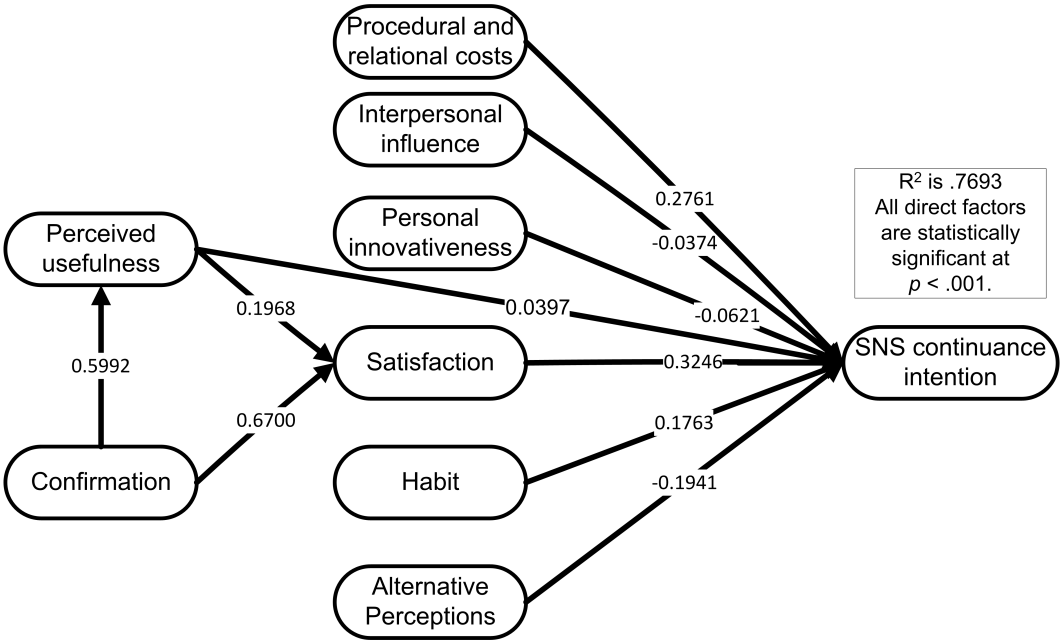


Figure 33: Complete Non-Moderated Model

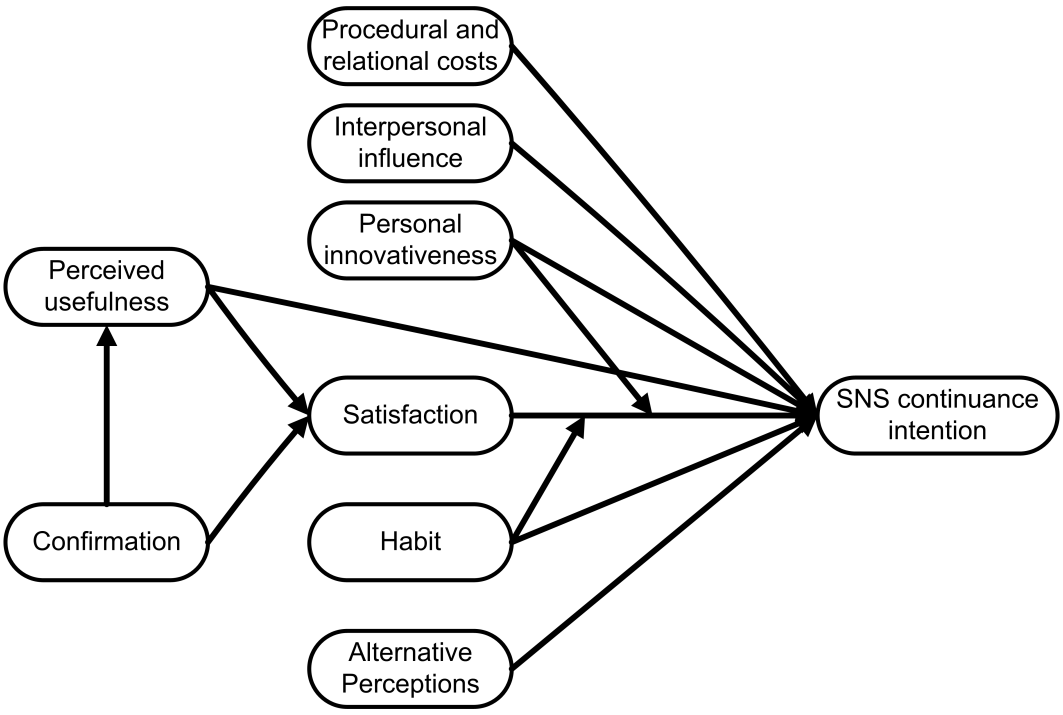


Figure 34: Complete Moderated Model

7.7 Complete model - Moderating Factor Analysis

7.7.1 Model Description

The model includes the measures from the IS continuance model (Bhattacherjee, 2001) and factors: consumer switching costs, habit, personal innovativeness, interpersonal influence, and alternative perception and two moderating factors, satisfaction and perceived usefulness x habit and satisfaction and perceived usefulness x personal innovativeness. The two predictors for IS continuance, satisfaction and perceived usefulness have been combined into a single reflective-formative construct that allows for a more direct comparison of the competing models; this combined factor was used for the moderating factor analysis. The Burnham et al. (2003) consumer switching cost model was initially developed as a formative-reflective model and does not need a transformation. The cost model uses the independent constructs economic risk,

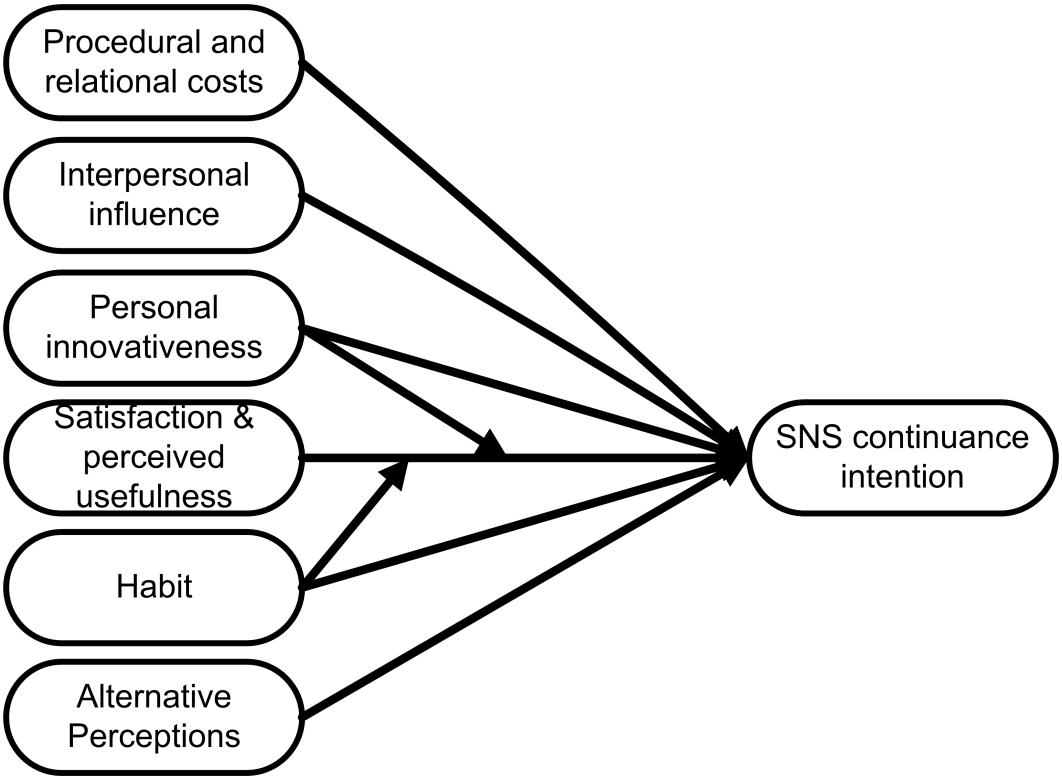


Figure 35: Complete Moderated Simplified Model

evaluation costs, learning costs and setup costs (procedural costs) and personal relationship loss and brand relationship loss (relational costs) to predict social networking site continuance intention. The IS Continuance model uses the independent constructs confirmation, perceived usefulness, satisfaction to predict social networking site continuance intention.

The theoretical model has independent factors for satisfaction and perceived usefulness as predictors for continuance intention and does not combine these factors into a single construct. The analysis here, as stated above combines the two factors, and the measurement model and structural model was conducted on this model. An additional model was generated with to show the effects of satisfaction and perceived usefulness on continuance intention with the moderated factors as shown in Figure 34 the results of which are shown in Figure 37. The tables and figures in this section use the analysis of the

combined factors for perceived usefulness and satisfaction except as noted in the two Figures 34 and 37. The differences between the coefficients of determination (R^2) for the simplified and completed model are small, the R^2 for the simplified model is .7687 and the theoretical model is .7707 or the change (∇) in the coefficient of determination of the two models is 0.0020. The effect size (f^2) between the two models is 0.0087 and is considered less than small (.02 is considered small based on *Chin et al. (2003)*). The β coefficients for the simplified and complete model are not significant for the moderators in either model.

7.7.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .70 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 23. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

Table 22: SNS Cost Measurement Model

Construct	AVE	Composite Reliability
PROC_SETUP	0.5938	0.8530
PersRelationLoss	0.6416	0.8990
AlterAttract	0.6475	0.9012
AttitudeToSwitch	0.7380	0.9440
BrandRelationship	0.6809	0.8638
CONF	0.6910	0.8969
CONTINUANCE	0.7165	0.8831
HABIT	0.7671	0.9079
InterpersInflu	0.6089	0.8600
PERS INNOV	0.7038	0.9219
PROC_COST	0.5646	0.8382
PROC_EVAL	0.6013	0.8181
PROC_LEARN	0.6041	0.8590
PU	0.6805	0.8939
SAT	0.9309	0.9758
SatAndPU * HABIT	0.4199	0.9366
SatAndPU * PERS INNOV	0.4265	0.9537

Table 23: Base Model - SNS Continuance Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	PROC SETUP	Proc Relation-Loss	Alter Attract	Attitude To Switch	Brand Relation-ship	CONF	CON-TIN-U-ANCE	HABIT	Interpers Influ	PERS IN-NOV	PROC COST	PROC EVAL	PROC LEARN	PU	SAT	Sat And PU * Habit	Sat And PU * Pers In-nov
PROC SETUP	**0.77**																
PersRelationLoss	0.34	**0.80**															
Alter Attract	-0.23	-0.44	**0.80**														
Attitude To Switch	-0.45	-0.41	0.58	**0.86**													
Brand Relationship	0.12	0.49	-0.49	-0.33	**0.83**												
CONF	0.23	0.67	-0.49	-0.44	0.65	**0.83**											
CONTINUANCE	0.29	0.73	-0.61	-0.55	0.61	0.71	**0.85**										
HABIT	0.26	0.74	-0.41	-0.38	0.50	0.64	0.70	**0.88**									
InterpersInflu	0.20	0.19	-0.02	-0.12	0.17	0.21	0.11	0.14	**0.78**								
PERS INNOV	-0.41	-0.03	0.28	0.41	0.05	-0.04	-0.16	-0.01	-0.06	**0.84**							
PROC COST	0.71	0.47	-0.22	-0.43	0.22	0.34	0.37	0.37	0.23	-0.32	**0.75**						
PROC EVAL	0.54	0.15	-0.20	-0.40	0.08	0.14	0.20	0.09	0.13	-0.63	0.48	**0.78**					
PROC LEARN	0.68	0.31	-0.25	-0.35	0.18	0.20	0.27	0.21	0.18	-0.37	0.64	0.50	**0.78**				
PU	0.28	0.76	-0.37	-0.35	0.47	0.60	0.63	0.66	0.26	-0.03	0.39	0.11	0.24	**0.82**			
SAT	0.18	0.67	-0.57	-0.46	0.64	0.79	0.79	0.62	0.11	-0.04	0.25	0.11	0.20	0.60	**0.96**		
SATAndPU * HABIT	-0.11	-0.43	0.09	0.10	-0.21	-0.28	-0.35	-0.43	-0.14	-0.01	-0.20	-0.04	-0.11	-0.44	-0.28	**0.65**	
SATAndPU * PERS INNOV	0.05	-0.11	-0.09	-0.07	-0.04	-0.06	-0.07	-0.09	0.05	-0.05	-0.01	0.05	0.03	-0.03	-0.03	0.36	**0.65**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

7.7.3 Structural Model

The structural model was assessed to determine how the independent constructs from IS Continuance theory and consumer switching costs predict information systems continuance intention.. The predictors explained approximately 76.9% of the variance (R^2) in continuance intention and is considered to have a substantial level of explanation[17]; the model also exhibits predictive relevance (Q^2) where its value is 0.5401 (scores above zero indicate predictive relevance in PLS path models). Satisfaction and perceived usefulness, in a combined measure, predict continuance intention with a standardized path coefficient (β) of 0.3672 (t = 14.0414). Costs had the second largest path coefficient (β = 0.2381, t = 7.8851), followed by alternative perception (β = -0.2191, t = 10.5662), habit β = (0.1564, t = 6.1575), personal innovativeness (β = 0.0618, t = 3.6746), interpersonal influence (β = -0.0439, t = 3.0296), moderating factor satisfaction and perceived usefulness x personal innovativeness (β = -0.0334, t = 1.5965), and moderating factor satisfaction and perceived usefulness x habit (β = -0.0223, t = 0.9708).

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		
SatAndPU→CONTINUANCE	0.3672	14.0414
COSTS→CONTINUANCE	0.2381	7.8851
AlternativePerception→CONTINUANCE	-0.2191	10.5662

[17]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
HABIT→CONTINUANCE	0.1564	6.1575
age→CONTINUANCE	0.0618	4.6029
PERS INNOV→CONTINUANCE	-0.0570	3.6746
InterpersInflu→CONTINUANCE	-0.0439	3.0296
SatAndPU * PERS INNOV→CONTINUANCE	-0.0334	1.5965
SatAndPU * HABIT→CONTINUANCE	-0.0223	0.9708
education→CONTINUANCE	0.0206	1.4701
gender→CONTINUANCE	0.0180	1.2129
Other Path Coefficients		
Relationship_costs→COSTS	0.9802	86.0357
PROC_COST→ProceduralCosts	0.9477	14.0233
SAT→SatAndPU	0.7846	34.1109
PersRelationLoss→Relationship_costs	0.7337	34.2792
CONF→SAT	0.6701	33.1767
AlterAttract→AlternativePerception	0.6608	18.8908
CONF→PU	0.5991	31.3832
AttitudeToSwitch→AlternativePerception	0.4567	11.5569
BrandRelationship→Relationship_costs	0.407	15.7015
PU→SatAndPU	0.3082	11.0637

Relation	Path Coefficient	T-statistic
PU→SAT	0.1968	8.5347
PROC_LEARN→ProceduralCosts	0.1503	1.6705
PROC_EVAL→ProceduralCosts	-0.1239	1.7226
ProceduralCosts→COSTS	0.0358	1.5859
PROC_SETUP→ProceduralCosts	0.0045	0.0496
Total Effects		
Continuance Path Coefficents		
SatAndPU→CONTINUANCE	0.3672	14.0414
CONF→CONTINUANCE	0.2948	13.6612
SAT→CONTINUANCE	0.2881	12.511
COSTS→CONTINUANCE	0.2381	7.8851
Relationship_costs→CONTINUANCE	0.2334	7.8567
AlternativePerception→CONTINUANCE	-0.2191	10.5662
PersRelationLoss→CONTINUANCE	0.1713	7.585
PU→CONTINUANCE	0.1699	11.1883
HABIT→CONTINUANCE	0.1564	6.1575
AlterAttract→CONTINUANCE	-0.1448	9.9052
AttitudeToSwitch→CONTINUANCE	-0.1001	7.1652
BrandRelationship→CONTINUANCE	0.0950	7.2462

Relation	Path Coefficient	T-statistic
age→CONTINUANCE	0.0618	4.6029
PERS INNOV→CONTINUANCE	-0.0570	3.6746
InterpersInflu→CONTINUANCE	-0.0439	3.0296
SatAndPU * PERS INNOV→CONTINUANCE	-0.0334	1.5965
SatAndPU * HABIT→CONTINUANCE	-0.0223	0.9708
education→CONTINUANCE	0.0206	1.4701
gender→CONTINUANCE	0.018	1.2129
ProceduralCosts→CONTINUANCE	0.0085	1.5315
PROC_COST→CONTINUANCE	0.0081	1.5399
PROC_LEARN→CONTINUANCE	0.0013	1.0715
PROC_EVAL→CONTINUANCE	-0.0011	1.2122
PROC_SETUP→CONTINUANCE	0.0000	0.0405
Other Path Coefficients		
Relationship_costs→COSTS	0.9802	86.0357
PROC_COST→ProceduralCosts	0.9477	14.0233
CONF→SatAndPU	0.8029	81.0546
CONF→SAT	0.7879	74.9908
SAT→SatAndPU	0.7846	34.1109
PersRelationLoss→Relationship_costs	0.7337	34.2792

Relation	Path Coefficient	T-statistic
PersRelationLoss→COSTS	0.7192	35.4088
AlterAttract→AlternativePerception	0.6608	18.8908
CONF→PU	0.5991	31.3832
PU→SatAndPU	0.4626	16.2700
AttitudeToSwitch→AlternativePerception	0.4567	11.5569
BrandRelationship→Relationship_costs	0.4070	15.7015
BrandRelationship→COSTS	0.3989	14.8049
PU→SAT	0.1968	8.5347
PROC_LEARN→ProceduralCosts	0.1503	1.6705
PROC_EVAL→ProceduralCosts	-0.1239	1.7226
ProceduralCosts→COSTS	0.0358	1.5859
PROC_COST→COSTS	0.0339	1.6038
PROC_LEARN→COSTS	0.0054	1.0816
PROC_SETUP→ProceduralCosts	0.0045	0.0496
PROC_EVAL→COSTS	-0.0044	1.2504
PROC_SETUP→COSTS	0.0002	0.0414

Table 24: Indices

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
AlternativePerception	0.9924	0.5354
CONTINUANCE	0.7687	0.5401
COSTS	0.9942	0.2179
PU	0.3589	0.2433
ProceduralCosts	0.9933	0.3252
Relationship_costs	0.9988	0.5007
SAT	0.6457	0.6010
SatAndPU	0.9999	0.6084

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

7.7.4 Moderating Effect Analysis - Habit

The results of the moderating term are less than small according to Chin et al. (2003). The R^2 for the non-moderated model is 0.7667 and for the moderated model it is 0.7677. The path coefficient (β) for *satisfaction and perceived usefulness* in the moderated model is 0.364 and non-moderated model are 0.367. The path coefficient for habit in the moderated model is 0.1553 and non-moderated model are 0.1642. The path coefficient for *satisfaction and perceived usefulness x habit* in the moderated model is -0.0348 and its sign is negative indicates increases in habit decreases the effect satisfaction and perceived usefulness on continuance intention as expected from the theoretical model. The moderating t-statistics for *satisfaction and perceived usefulness x habit* indicates that the moderator is not statistically significant (t=1.8136) and the effect size f^2 in the change of the coefficient of determination (R^2) is 0.0043 which does not meet the threshold for to be considered as having an

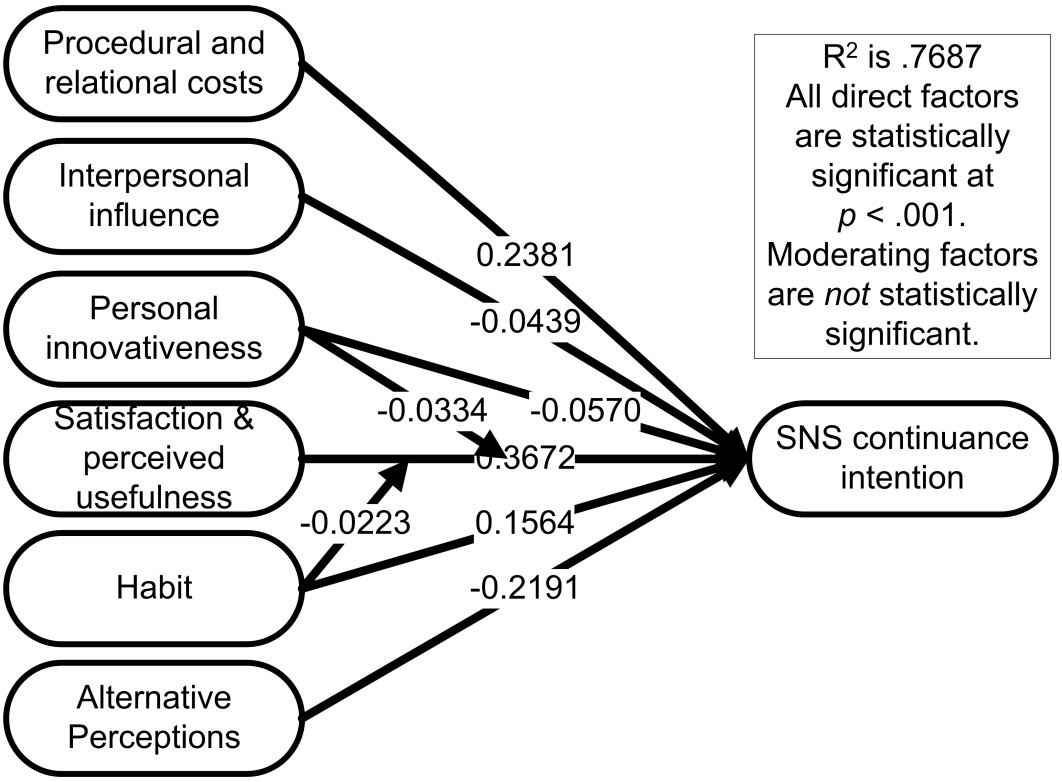


Figure 36: Complete Moderated Simplified Model

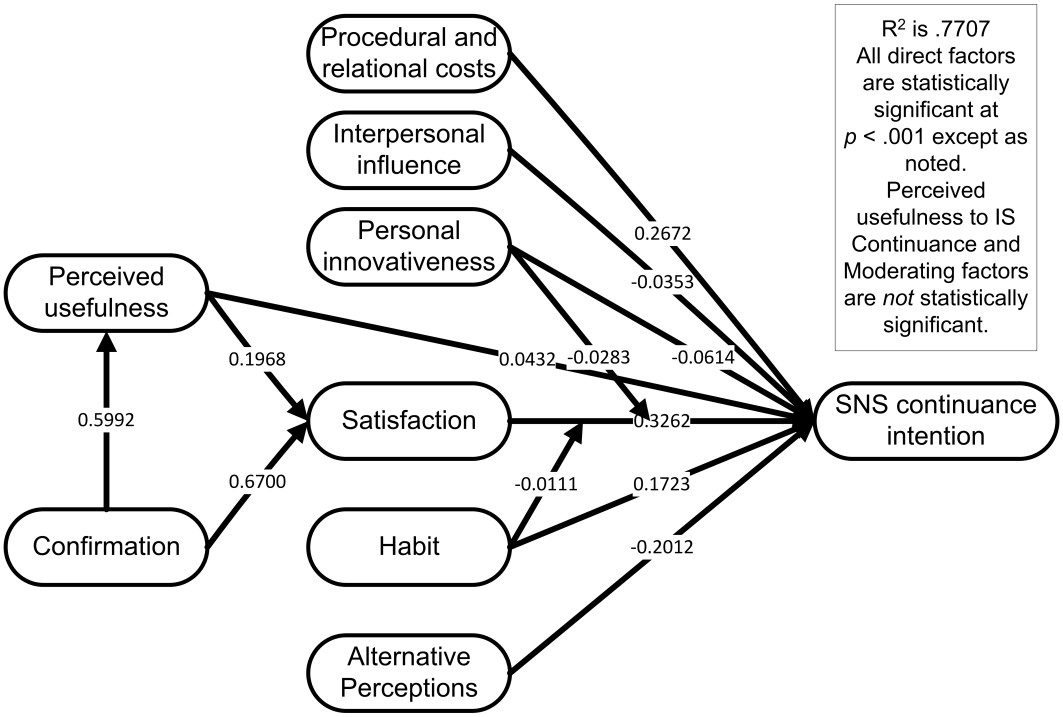


Figure 37: Complete Moderated Model

effect (threshold for small effects (f^2) is .02) based on *Chin et al. (2003)*.

7.7.5 Moderating Effect Analysis - Personal Innovativeness

The results of the moderating term are less than small according to Chin et al. (2003). The R^2 for the non-moderated model is .7667 and for the moderated model it is .7683. The path coefficient (β) for *satisfaction and perceived usefulness* in the moderated model is .3702 and non-moderated model are .367. The path coefficient for personal innovativeness in the moderated model is -0.0581 and non-moderated model are .0591. The path coefficient for *satisfaction and perceived usefulness x personal innovativeness* in the moderated model is -0.0401 . The moderating t-statistics for *satisfaction and perceived usefulness x personal innovativeness* indicates that the moderator is statistically significant (t=1.9931) and the effect size f^2 in the change of the coefficient of determination (R^2) is 0.0069 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .02) based on *Chin et al. (2003)*.

7.7.6 Moderating Effect Analysis - Two Factors - Habit and Personal Innovativeness

The results of the moderating term are less than small according to Chin et al. (2003). The R^2 for the non-moderated model is 0.7667 and for the moderated model it is 0.7687. The path coefficient (β) for *satisfaction and perceived usefulness* in the moderated model is 0.3672 and non-moderated model are .3426. The path coefficient for habit in the moderated model is 0.1564 and non-moderated model are 0.1642. The path coefficient for personal innovativeness in the moderated model is -0.0570 and non-moderated model are -0.0589.

The path coefficient for *satisfaction and perceived usefulness x habit* in the moderated model is -0.0223 ($t = 0.9708$). The path coefficient for *satisfaction and perceived usefulness x personal innovativeness* in the moderated model is -0.0334 ($t = 1.5965$). The moderating t-statistics for both moderators indicates that neither moderators is statistically significant and the effect size f^2 is 0.0086 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .02) based on *Chin et al. (2003)*.

For more fine-grain analysis of the moderating factors see Appendix C and D.

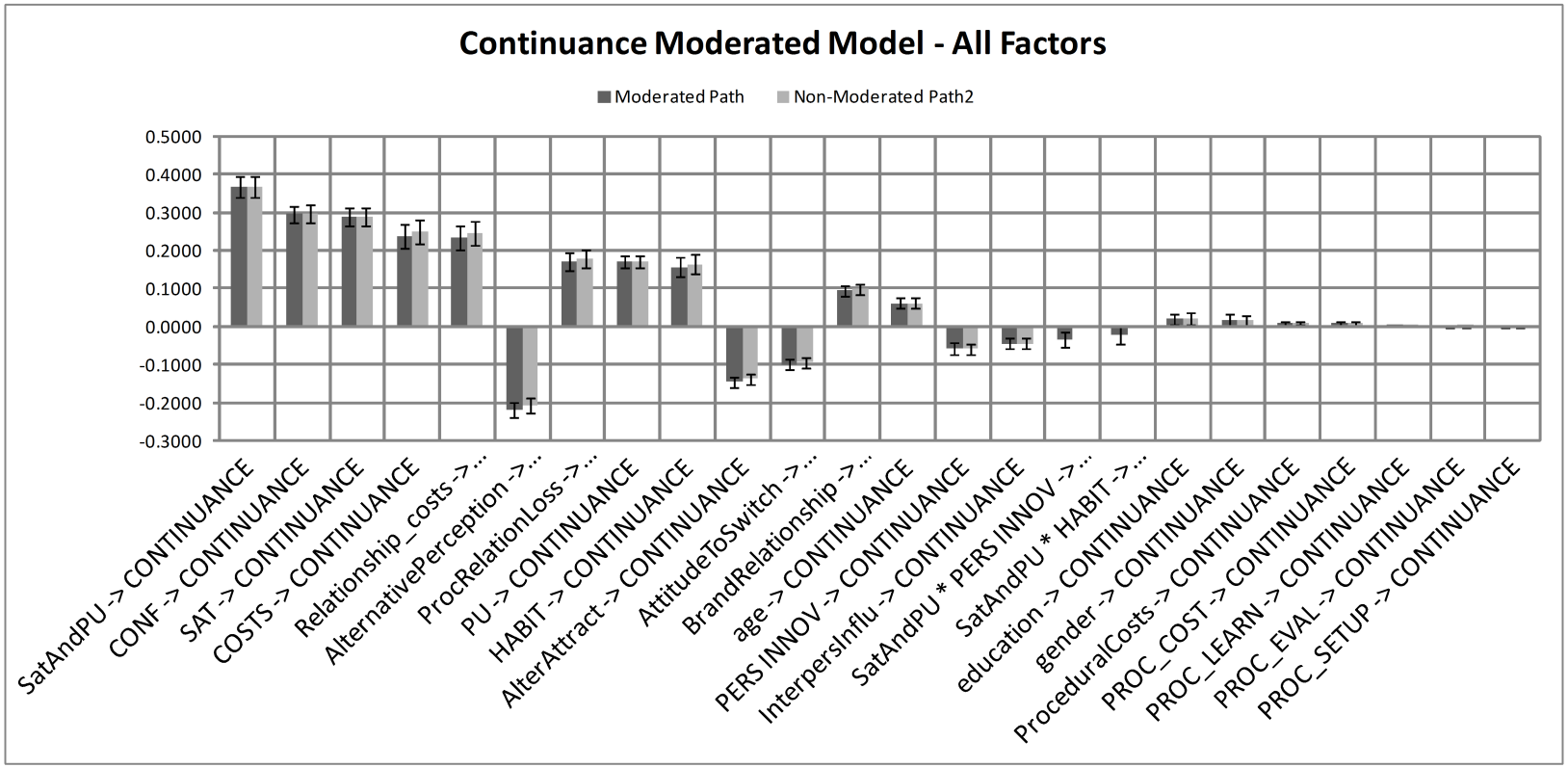


Figure 38: Moderated Model Path Coefficients on SNS Continuance

7.8 Complete Non-Moderated model - Backward Stepwise Refinement

7.8.1 Model Description

This model includes the backward stepwise refinement of the complete non-moderated model where the constructs with the least statistical significance are removed in a stepwise manner of least impact to the overall coefficient of determination. The model includes the measures from IS Continuance model (Bhattacherjee, 2001), the consumer switching cost model (Burnham et al., 2003) and habit, personal innovativeness, interpersonal influence, and alternative perceptions. The two predictors for IS continuance, satisfaction and perceived usefulness have been combined into a single reflective-formative construct that allows for a more direct comparison of the competing models. The Burnham et al. (2003) cost model was initially developed as a formative-reflective model and does not need a transformation. The consumer switching cost model uses the independent constructs economic risk, evaluation costs, learning costs and setup costs (procedural costs) and personal relationship loss and brand relationship loss (relational costs) to predict information systems continuance intention. The IS continuance model uses the independent constructs confirmation, perceived usefulness, satisfaction to predict information systems continuance intention. Two moderators have been dropped, habit x satisfaction and personal innovativeness x satisfaction as previous analyses have shown the relationship with continuance intention did not have a moderating effect.

7.8.2 Refinements

Refinements were made by examining the total effects tables for exogenous constructs and those with the lowest statistical relevance were removed in a stepwise manner. The covariates of age, gender and education are included until the last step to adjust results for covariates as these variables are under secondary consideration. The refinements removed the procedural costs in the Burnham et al. (2003) cost model as all of the costs were below the threshold. Two covariates were removed, gender and education, as the values were below the threshold; age was retained as a statistically significant covariate. See Table 26 for details.

7.8.3 Measurement Model

After all constructs and covariates that had t-statistic values less than 2.58 were removed, the measurement model was assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 28. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

Table 26: Refinement

Step	Construct Removed	Total Effect Path Coefficient	T-statistic	R^2
Initial Model				.767
1	PROC_SETUP → CONTINUANCE	0.0002	0.1451	.767
2	PROC_LEARN → CONTINUANCE	0.0014	1.1316	.767
3	PROC_EVAL → CONTINUANCE	-0.0007	0.8428	.767
4	PROC_COST → CONTINUANCE	0.0168	1.1299	.766
All Constructs with T-statistics less than 1.96 and 2.58 removed				
Step	Covariates Removed	Total Effect Path Coefficient	T-statistic	R^2
Initial Model				.766
1	Gender	0.0167	1.1986	.766
2	Education	0.0211	1.3944	.765
3	Age	0.0640	4.3821	.762
All Covariates removed				

R^2 for continuance after removal

Table 27: SNS Cost Measurement Model

Construct	AVE	Composite Reliability
PersRelationLoss	0.6424	0.8993
AlterAttract	0.6476	0.9013
AttitudeToSwitch	0.7379	0.9440
BrandRelationship	0.6813	0.8640
CONF	0.6907	0.8968
CONTINUANCE	0.7179	0.8838
HABIT	0.7657	0.9072
InterpersInflu	0.6090	0.8600
PERS INNOV	0.7043	0.9221
PU	0.6804	0.8938
SAT	0.9308	0.9758

Table 28: Statically Significant Factors - Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	Proc Relation Loss	Alter Attract	Attitude to Switch	Brand Relationship	CONF	CONTINUANCE	HABIT	Interpers Influ	PERS INNOV	PU	SAT
Proc Relation Loss	**0.801**										
Alter Attract	-0.449	**0.805**									
Attitude To Switch	-0.416	0.575	**0.859**								
Brand Relationship	0.493	-0.488	-0.327	**0.825**							
CONF	0.673	-0.497	-0.443	0.651	**0.831**						
CONTINUANCE	0.732	-0.614	-0.556	0.609	0.711	**0.847**					
HABIT	0.744	-0.418	-0.387	0.497	0.635	0.695	**0.875**				
Interpers Influ	0.196	-0.022	-0.121	0.166	0.214	0.108	0.147	**0.780**			
PERS INNOV	-0.031	0.280	0.414	0.049	-0.042	-0.165	-0.012	-0.055	**0.839**		
PU	0.757	-0.372	-0.351	0.473	0.599	0.631	0.656	0.258	-0.029	**0.825**	
SAT	0.670	-0.567	-0.459	0.637	0.789	0.787	0.623	0.112	-0.038	0.599	**0.965**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

Table 29: Indices

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
AlternativePerception	0.9925	0.5357
CONTINUANCE	0.7654	0.5459
COSTS	0.9988	0.5011
PU	0.3591	0.2435
SAT	0.6469	0.6021
SatAndPU	0.9999	0.6097

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

7.8.4 Structural Model

The structural model was assessed to determine how the independent constructs from IS Continuance theory and consumer switching costs predict information systems continuance intention.. The predictors explained approximately 76.5% of the variance (R^2) in continuance intention and is considered to have a substantial level of explanation[18]; the model also exhibits predictive relevance (Q^2) where its value is .5459 (scores above zero indicate predictive relevance in PLS path models). Satisfaction and perceived usefulness, in a combined measure, predict continuance intention with a standardized path coefficient (β) of .373. All of the costs predict continuance intention with a standardized path coefficient of .239. Alternative perceptions had the third largest path coefficient (-.208), followed by habit (.171), personal innovativeness (-.072) and interpersonal influence (-.041). Coefficients that are positive indicate that are associated with higher levels of continuance intention.

[18]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
Theoretical Model		
Continuance Path Coefficients		
SatAndPU → CONTINUANCE	0.3737	13.6107
COSTS → CONTINUANCE	0.2393	7.953
AlternativePerception → CONTINUANCE	-0.2075	10.6461
HABIT → CONTINUANCE	0.1712	7.2769
PERS INNOV → CONTINUANCE	-0.0721	4.7918
InterpersInflu → CONTINUANCE	-0.0427	2.9938
Other Path Coefficients		
CONF → SAT	0.6706	33.0243
PersRelationLoss → COSTS	0.7257	32.2281
CONF → PU	0.5993	31.1625
SAT → SatAndPU	0.785	31.1428
AlterAttract → AlternativePerception	0.662	17.3973
BrandRelationship → COSTS	0.4161	15.3979
AttitudeToSwitch → AlternativePerception	0.4554	10.7596
PU → SatAndPU	0.3075	9.8987
PU → SAT	0.1971	8.7098
Total Effects		

Relation	Path Coefficient	T-statistic
Continuance Path Coefficents		
SatAndPU → CONTINUANCE	0.3722	13.6107
CONF → CONTINUANCE	0.299	13.2167
SAT → CONTINUANCE	0.2921	11.7331
PU → CONTINUANCE	0.1717	11.0174
AlternativePerception → CONTINUANCE	-0.2091	10.6461
AlterAttract → CONTINUANCE	-0.1388	9.5387
COSTS → CONTINUANCE	0.2416	7.953
PersRelationLoss → CONTINUANCE	0.1751	7.5119
BrandRelationship → CONTINUANCE	0.1008	7.4619
HABIT → CONTINUANCE	0.1687	7.2769
AttitudeToSwitch → CONTINUANCE	-0.0945	7.1759
PERS INNOV → CONTINUANCE	-0.0716	4.7918
age → CONTINUANCE	0.0641	4.6439
InterpersInflu → CONTINUANCE	-0.041	2.9938
Other Path Coefficients		
CONF → SatAndPU	0.8034	74.8767
CONF → SAT	0.7888	70.1917
PersRelationLoss → COSTS	0.7243	32.2281

Relation	Path Coefficient	T-statistic
CONF → PU	0.5997	31.1625
SAT → SatAndPU	0.7844	31.1428
AlterAttract → AlternativePerception	0.6643	17.3973
BrandRelationship → COSTS	0.4175	15.3979
PU → SatAndPU	0.4615	15.372
AttitudeToSwitch → AlternativePerception	0.4515	10.7596
PU → SAT	0.1962	8.7098

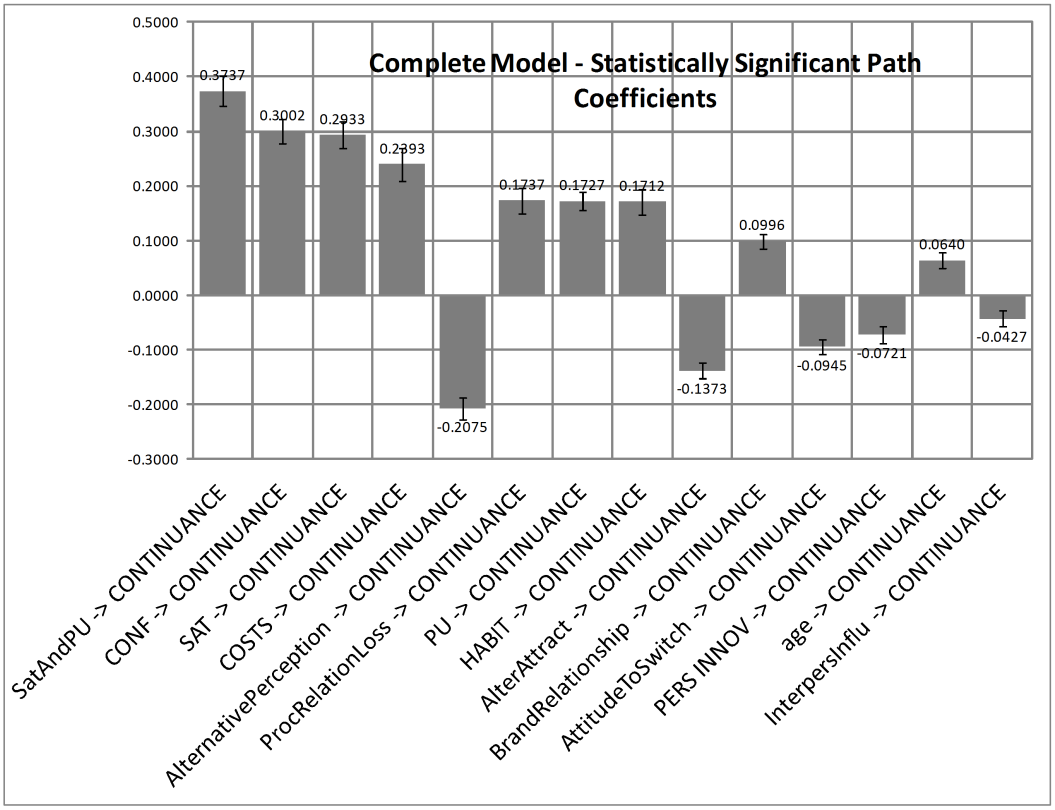


Figure 39: Base Model And Costs Path Coefficients on SNS Continuance

7.9 Backward stepwise refinement with effect sizes

A backward stepwise refinement model was developed where the initial model contained all theoretical constructs of the non-moderated model and were removed from the model in a stepwise manner based on the total effect path coefficient (smallest path coefficient first). The initial model had fourteen constructs and three covariates and an initial R^2 of .767. The final model had one construct, satisfaction, and had an R^2 of .623. Satisfaction, alone, can explain 62.3% of the variance in continuance intention. Table 31 shows the steps in the analysis starting with the removal of the construct with the least total effect on continuance, procedural setup cost, through the last remaining construct, satisfaction. The effect size f^2 is calculated to show the difference that the construct had in effect as compared to the previous step and the initial model based on the change in the coefficient of determination R^2.

Table 31: Stepwise Refinement with effect size

Step	Construct Removed	Total Effect Path Coefficient	T-statistic	R^2 after removal	f^2 previous step	f^2 description - previous step	f^2 initial	f^2 description - initial
Initial Model				0.7670				
1	PROC_SETUP → CONTINUANCE	0.0002	0.1451	0.7670	0.0000	less than small	0.0000	less than small
2	PROC_LEARN → CONTINUANCE	0.0014	1.1316	0.7670	0.0000	less than small	0.0000	less than small
3	PROC_EVAL → CONTINUANCE	-0.0007	0.8428	0.7670	0.0000	less than small	0.0000	less than small

Table 31: Stepwise Refinement with effect size

Step	**Construct Removed**	**Total Effect Path Coefficient**	**T-statistic**	**R^2 after removal**	**f^2 previous step**	**f^2 description - previous step**	**f^2 initial**	**f^2 description - initial**
4	PROC_COST → CONTINUANCE	0.0168	1.1299	0.7660	0.0043	less than small	0.0043	less than small
5	gender → CONTINUANCE	0.0166	1.2481	0.7660	0.0000	less than small	0.0043	less than small
6	education→ CONTINUANCE	0.0211	1.4803	0.7650	0.0043	less than small	0.0085	less than small
7	InterpersInflu → CONTINUANCE	-0.0433	3.1188	0.7640	0.0043	less than small	0.0127	less than small

Table 31: Stepwise Refinement with effect size

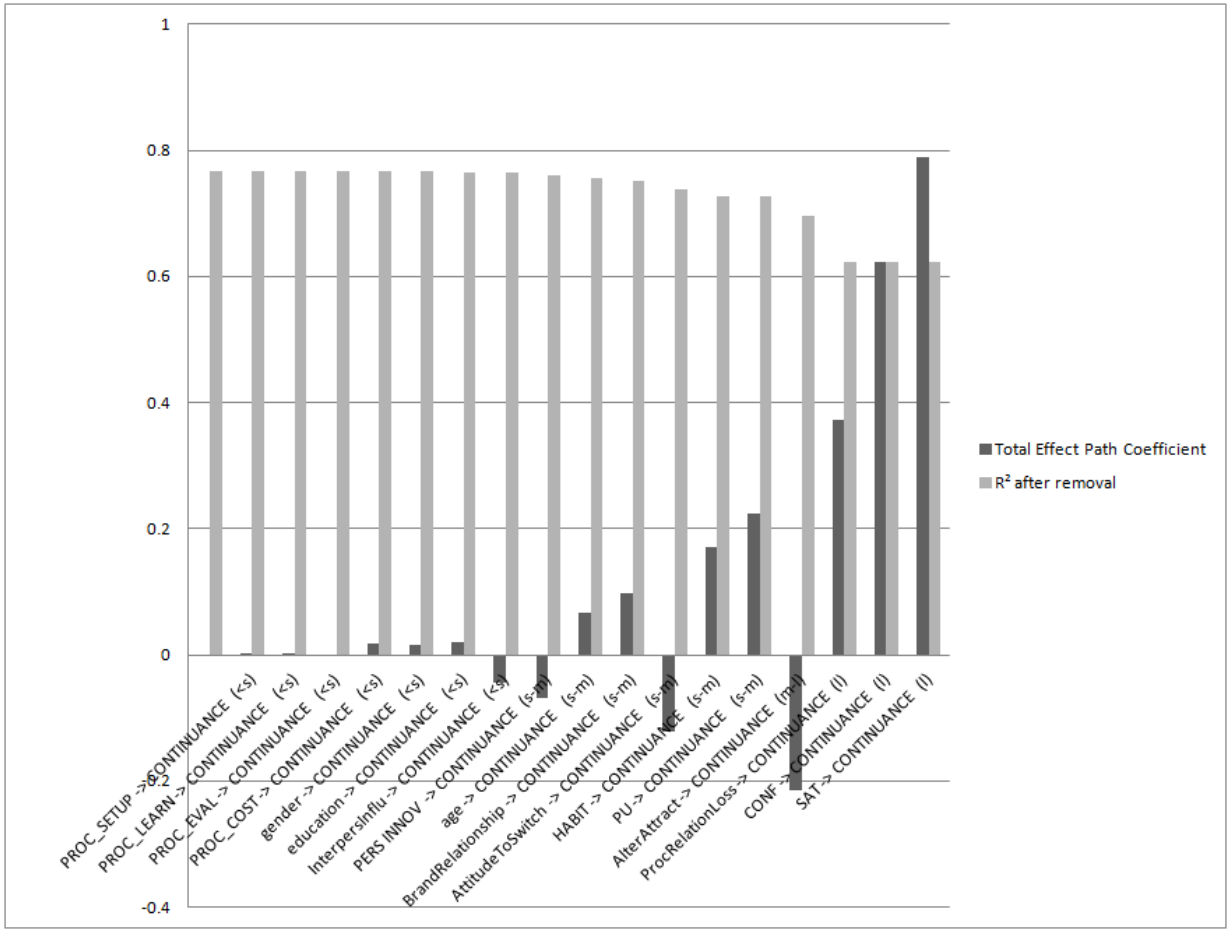
Step	**Construct Removed**	**Total Effect Path Coefficient**	**T-statistic**	**R^2 after removal**	**f^2 previous step**	**f^2 description - previous step**	**f^2 initial**	**f^2 description - initial**
8	PERS INNOV → CONTINUANCE	-0.0682	4.4937	0.7600	0.0169	less than small	0.0292	small to medium
9	age → CONTINUANCE	0.0670	4.8748	0.7560	0.0167	less than small	0.0451	small to medium
10	BrandRelationship → CONTINUANCE	0.0981	7.4168	0.7510	0.0205	small to medium	0.0643	small to medium

Table 31: Stepwise Refinement with effect size

Step	**Construct Removed**	**Total Effect Path Coefficient**	**T-statistic**	**R^2 after removal**	**f^2 previous step**	**f^2 description - previous step**	**f^2 initial**	**f^2 description - initial**
11	AttitudeToSwitch → CONTINUANCE	-0.1226	8.4482	0.7380	0.0522	small to medium	0.1107	small to medium
12	HABIT → CONTINUANCE	0.1707	6.2707	0.7260	0.0458	small to medium	0.1496	small to medium
13	PU → CONTINUANCE	0.2240	12.4121	0.7270	-0.0036	less than small	0.1465	small to medium
14	AlterAttract→ CONTINUANCE	-0.2152	10.3265	0.6970	0.1099	small to medium	0.2310	medium to large

Table 31: Stepwise Refinement with effect size

Step	**Construct Removed**	**Total Effect Path Coefficient**	**T-statistic**	R^2 **after removal**	f^2 **previous step**	f^2 **description - previous step**	f^2 **initial**	f^2 **description - initial**
15	PersRelationLoss → CONTINUANCE	0.3720	15.9291	0.6230	0.2442	medium to large	0.3820	large
16	CONF → CONTINUANCE	0.6221	44.6553	0.6230	0.0000	less than small	0.3820	large
Final Model	SAT → CONTINUANCE	0.7894	70.5415	0.6230	0.0000	less than small	0.3820	large



Key parenthesis indicate effect size from initial model:
<s - less than small, s-m - small to medium, m-l - medium to large, l - large

Figure 40: Backward Stepwise Refinement-Effect size

7.10 Three Dataset comparisons

Three distinct sets of data were collected in the course of this study; a public data set, a student dataset and an Oracle dataset. The results analyzed used only the public dataset (those who came to the survey through a public notice). The student dataset was gathered through student contacts and contains 217 cases. The Oracle dataset was gathered through a public notice to three different Oracle locations in the state of Colorado and contains 46 cases. The data was analyzed to see if there were differences between the three datasets. The constructs are relatively similar across the three data sets while there are larger differences in demographics between the student dataset and the two other sets where the age of the students is much younger and the education level is also lower.

The datasets share many similarities in different analyses, but there are differences as well. The R^2 is highest for the Oracle dataset at .8838, followed by the public dataset (.7667) then the student dataset (.6896) - see Table 32 for the complete non-moderated model.

There are twenty constructs and demographic variables in the analysis; some statistically significant differences can be found among the constructs, but there are many similarities. In a t-test between the public dataset and student dataset there were three constructs with statistically significant differences and all three demographics were statistically significant different - and the remaining 17 constructs had no statistically significant differences. In a t-test between the public dataset and Oracle dataset there were seven constructs with statistically significant differences and one demographic (age) that were statistically significant different - the remaining 14 constructs and two demographics (education and gender) had no statistically significant differences. In a t-test between the student dataset and Oracle dataset there were nine con-

structs with statistically significant differences and two demographics (age & education) that were statistically significant different - the remaining 12 constructs and gender had no statistically significant differences - See Tables 33, 34, 35, and 36 and Figure 41. The constructs are notably similar with some exceptions as noted.

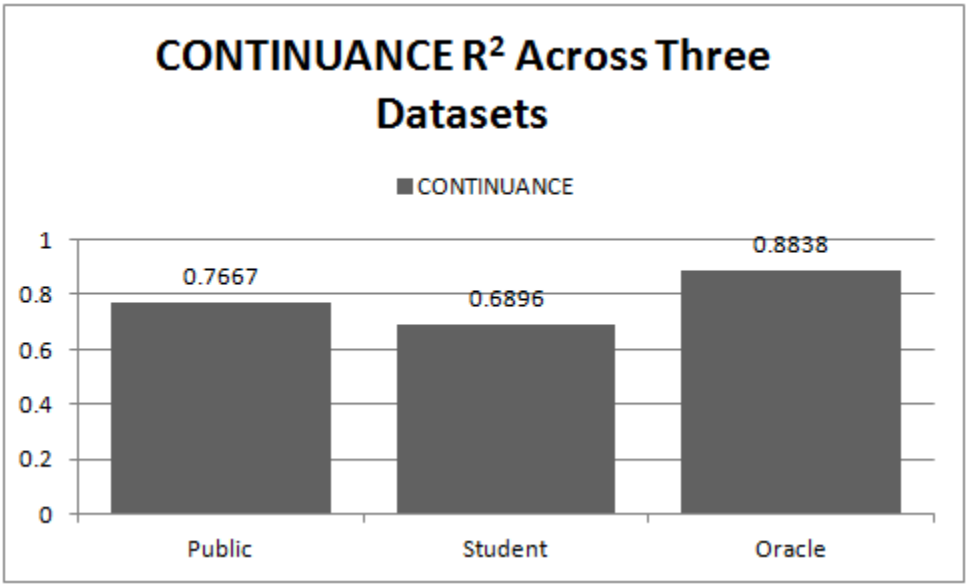
Dataset path comparisons using MANOVA in SPSS by collecting a bootstrap sample of 500 iterations across the three datasets are shown in Table 37 and 38 and Figures 42, 43 (significant paths only) and 44 (Cohen's D). The MANOVA analysis was found to be significant using four measures, Pilia's Trace, Wilk's Lambda, Hotelling's Trace, and Roy's Largest Root. The paths coefficients (β) of the public and student dataset are similar in nature and the path coefficients between the Oracle dataset and the two other datasets differ in notable ways. The Oracle dataset is much smaller which may lead to some over-fitting of the PLS-SEM model, however the models also differ in demographics where the Oracle dataset contains an older population. Age accounts for a small amount of the variance in the model ($\beta = .0623$) so it is not that the age of the Oracle sample is older. The consumer switching cost factors are much larger for the Oracle dataset where, in particular, the relationship costs and brand relationship costs were much higher than the other two datasets. Satisfaction and perceived usefulness had little effect in the Oracle sample as well because the model major factors were from the consumer switching cost model. There were 11 statistically significant differences between the public and student dataset and 19 statistically significant differences between the public and Oracle dataset and 20 statistically significant differences between the student and Oracle dataset. There are a total of 22 constructs measured in the complete model.

Tables 37 and 38 show the path coefficients for the original sample and

their standard error as well as a bootstrap sample of 500 iterations for each dataset and a comparison of statistical significance to a different dataset. Hair et al. (2006) notes that large sample sizes of 400 or larger reduce sampling error to such a small level that small differences are considered statistically significant. Effects sizes were calculated in Table 38 and shown in Figure 44. Large effects may be considered where Cohen's D is greater than 5. For this research, Cohen's D of small, medium and large for the path coefficients may be considered at the 5, 10, and 20 level. There where 15 path coefficients that were substantially similar between the public and student dataset, 2 small effects between the public and student dataset, 4 medium, and 1 large. There where 6 that were substantially similar between the public and Oracle dataset, 2 small to medium effects, 1 medium to large effect, and 13 large. There where 4 effects that were substantially similar between the student and Oracle dataset, 1 small to medium effect, 4 medium to large effects, and 13 large. These results suggest that the path coefficients between the public and student dataset are largely similar, where as the public-Oracle and student-Oracle dataset have a greater number and larger differences.

Table 32: Coefficient of Determination Comparison Across Three Datasets

	Public R^2	Student R^2	Oracle R^2
CONTINUANCE	0.7667	0.6896	0.8838



Public Dataset N = 1302, Student Dataset N = 217, Oracle Dataset N = 46

Table 33: Construct Comparison across datasets - 1

Value	PROC_SETUP Proc Relation Loss		AlterAttract	Alternative Perception	Attitude To Switch	Brand Relationship
Average Public Score	4.2177	4.8713	3.8059	3.7224	3.6428	3.4080
Std. Dev Public	1.1431	1.2790	1.0165	0.9470	1.0289	1.3414
Average Student Score	4.1803	4.5879	3.7200	3.7285	3.7632	3.9829
std. Dev Student	0.9810	1.0967	0.9786	0.9359	1.0362	1.1098
Average Oracle Score	4.4733	5.1596	3.6118	3.7227	3.5439	3.5276
std. dev Oracle	1.0226	1.2500	0.9104	0.7934	1.1333	1.2483
t-test public to student	0.6490	0.0021 ***	0.2466	0.9294	0.1110	0.0000 ***
t-test public to Oracle	0.1351	0.1330	0.2017	0.9983	0.5233	0.5515
t-test student to Oracle	0.0689	0.0019 ***	0.4913	0.9686	0.2008	0.0141 **

Table 34: Construct Comparison across datasets - 2

Value	CONF	CONTINUANCE	COSTS	HABIT	InterpersInflu	PERS INNOV
Average Public Score	4.3023	4.6922	4.3693	4.8392	3.3856	3.5773
Std. Dev Public	1.2508	1.5254	1.0971	1.4925	1.4479	1.4575
Average Student Score	4.4381	4.6898	4.3407	4.7575	3.9000	3.6583
std. Dev Student	0.9169	1.2162	0.9179	1.3620	1.3360	1.3083
Average Oracle Score	4.2826	4.8670	4.7409	4.2585	3.2996	2.4441
std. dev Oracle	1.3591	1.5597	1.1639	1.4999	1.4425	1.5157
t-test public to student	0.1255	0.9830	0.7165	0.4505	0.0000 ***	0.4418
t-test public to Oracle	0.9166	0.4454	0.0244 **	0.0096 ***	0.6921	0.0000 ***
t-test student to Oracle	0.3421	0.3954	0.0112 **	0.0275 **	0.0068 ***	0.0000 ***

Table 35: Construct Comparison across datasets - 3

Value	PROC_COST	PROC_EVAL	PROC_LEARN	PU	Procedural Costs	Relationship-_costs
Average Public Score	4.2235	4.1793	4.1472	5.1011	4.2104	4.3789
Std. Dev Public	1.1435	1.2419	1.1732	1.2440	1.1529	1.1495
Average Student Score	4.1694	4.3067	4.1569	4.9566	4.2021	4.3718
std. Dev Student	1.0513	1.0787	1.0764	1.1598	1.2426	0.9578
Average Oracle Score	4.5790	4.6584	4.5526	5.0888	4.1590	4.7169
std. dev Oracle	1.0556	1.2467	1.0066	1.2526	1.3532	1.0794
t-test public to student	0.5142	0.1545	0.9093	0.1101	0.9220	0.9312
t-test public to Oracle	0.0380 **	0.0102 **	0.0208 **	0.9478	0.7676	0.0497 **
t-test student to Oracle	0.0172 **	0.0519	0.0228 **	0.4892	0.8337	0.0309 **

Table 36: Comparison across datasets - 4

Value	SAT	SatAndPU	age	education	gender
Average Public Score	4.4872	4.6930	5.3744	5.0847	1.6048
Std. Dev Public	1.4960	1.2919	2.4163	1.1339	0.4883
Average Student Score	4.6332	4.7397	2.2673	3.4654	1.4747
std. Dev Student	1.1254	0.9945	1.1396	0.8552	0.5005
Average Oracle Score	4.7178	4.8596	7.2391	5.0435	1.6304
std. dev Oracle	1.5896	1.3267	2.1724	1.2103	0.4880
t-test public to student	0.1696	0.6118	0.0000 ***	0.0000 ***	0.0003 ***
t-test public to Oracle	0.3054	0.3906	0.0000 ***	0.8088	0.7262
t-test student to Oracle	0.6691	0.4861	0.0000 ***	0.0000 ***	0.0552

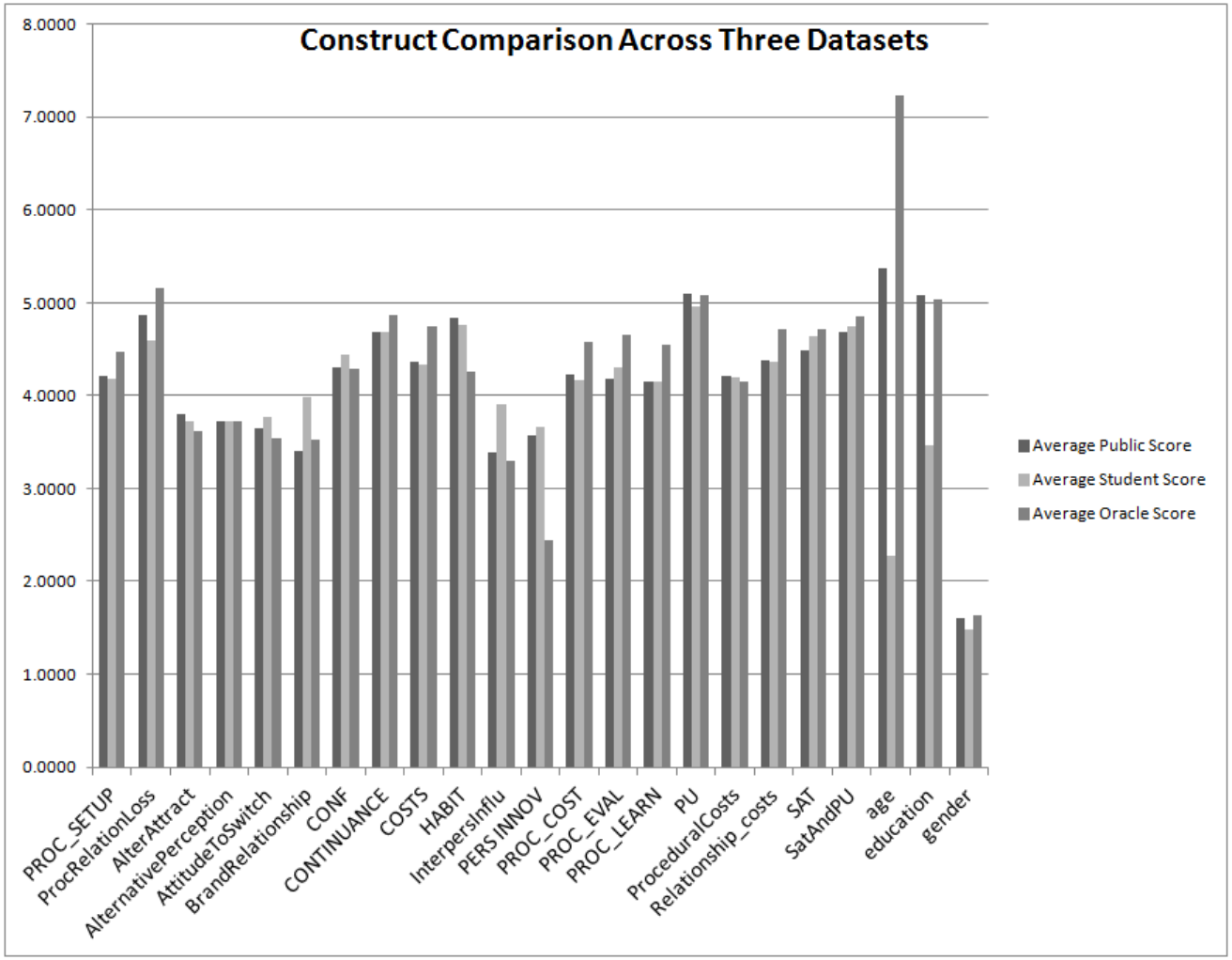


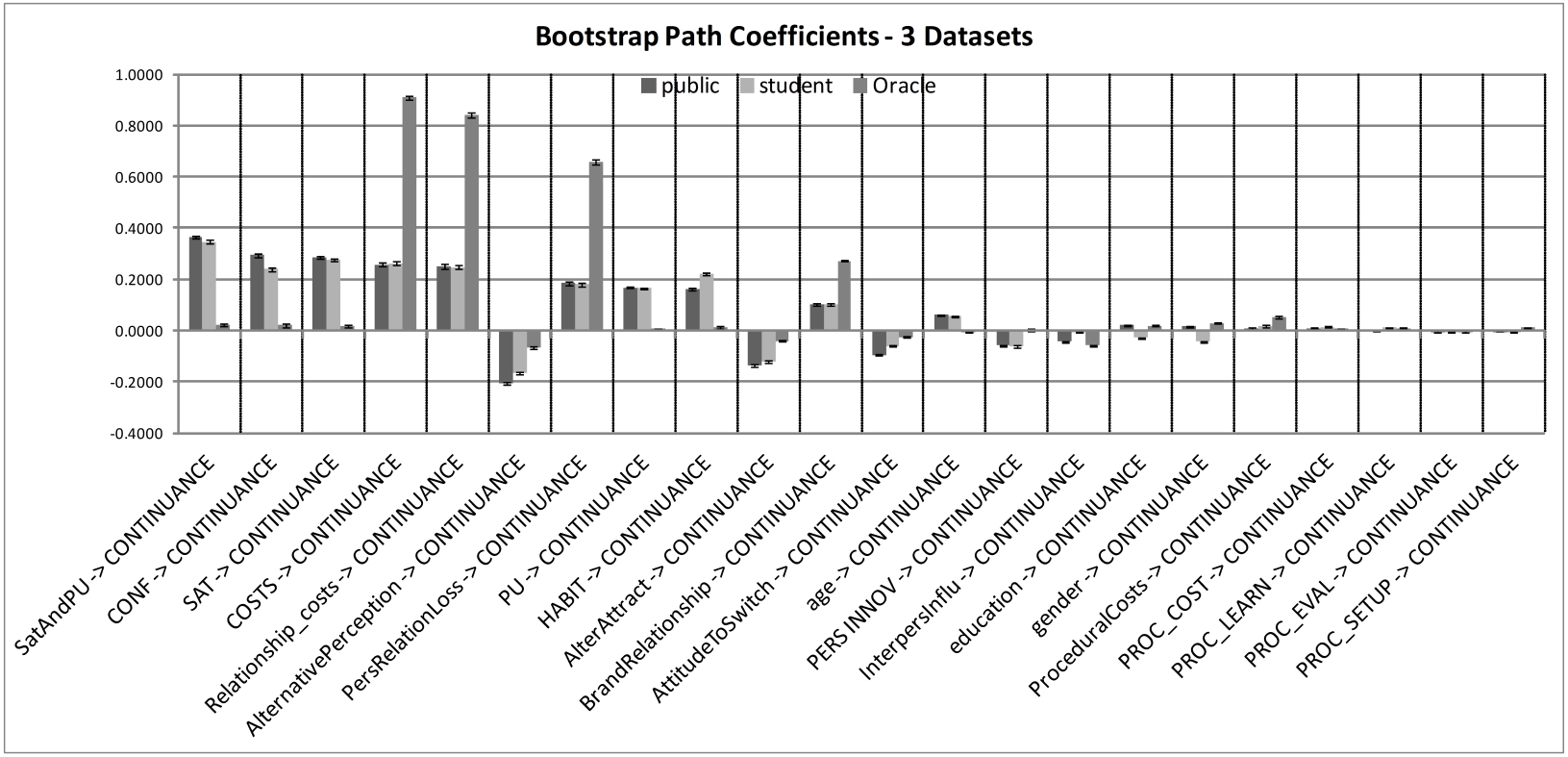
Figure 41: Construct Mean Comparison Across Three Datasets

Table 37: Path Comparisons across three datasets - Bootstrap Sample

Path	Public Path	Student Path	Oracle Path	STERR	*p* public-student		*p* public-oracle		*p* student-oracle	
SatAndPU→CONT	0.3658	0.3466	0.0224	0.0067	0.0131	**	0.0000	***	0.0000	***
CONF→CONT	0.2937	0.2393	0.0205	0.0058	0.0000	***	0.0000	***	0.0000	***
SAT→CONT	0.2874	0.2764	0.0191	0.0049	0.0755		0.0000	***	0.0000	***
COST→CONT	0.2576	0.2576	0.9090	0.0076	1.0000		0.0000	***	0.0000	***
Relationship_costs→CONT	0.2519	0.2476	0.8414	0.0085	1.0000		0.0000	***	0.0000	***
AlternativePerception→CONT	-0.2076	-0.1649	-0.0647	0.0047	0.0000	***	0.0000	***	0.0000	***
PersRelationLoss→CONT	0.1847	0.1793	0.6590	0.0092	1.0000		0.0000	***	0.0000	***
PU→CONT	0.1687	0.1653	0.0059	0.0035	0.9933		0.0000	***	0.0000	***
HABIT→CONT	0.1596	0.2207	0.0135	0.0048	0.0000	***	0.0000	***	0.0000	***
AlterAttract→CONT	-0.1369	-0.1206	-0.0406	0.0035	0.0000	***	0.0000	***	0.0000	***
BrandRelationship→CONT	0.1025	0.1013	0.2729	0.0044	1.0000		0.0000	***	0.0000	***
AttitudeToSwitch→CONT	-0.0948	-0.0598	-0.0264	0.0024	0.0000	***	0.0000	***	0.0000	***
age→CONT	0.0617	0.0560	-0.0030	0.0024	0.0480	**	0.0000	***	0.0000	***
PERS INNOV→CONT	-0.0582	-0.0610	0.0030	0.0033	1.0000		0.0000	***	0.0000	***
InterpersInflu→CONT	-0.0441	-0.0036	-0.0575	0.0028	0.0000	***	0.0000	***	0.0000	***
education→CONT	0.0212	-0.0286	0.0181	0.0028	0.0000	***	0.7705		0.0000	***
gender→CONT	0.0099	0.0201	0.0501	0.0025	0.0000	***	0.0000	***	0.0000	***
ProceduralCosts→CONT	0.0099	0.0201	0.0501	0.0050	0.1312		0.0000	***	0.0000	***
PROC_COST→CONT	0.0093	0.0151	0.0056	0.0033	0.2449		0.7997		0.0131	**
PROC_LEARN→CONT	0.0015	0.0114	0.0095	0.0023	0.0001	***	0.0018	***	1.0000	
PROC_EVAL→CONT	-0.0011	-0.0047	-0.0006	0.0043	1.0000		1.0000		1.0000	
PROC_SETUP→CONT	0.0000	-0.0028	0.0105	0.0028	0.9923		0.0007	***	0.0000	***
Total Statistically Sig Differences						11		19		20

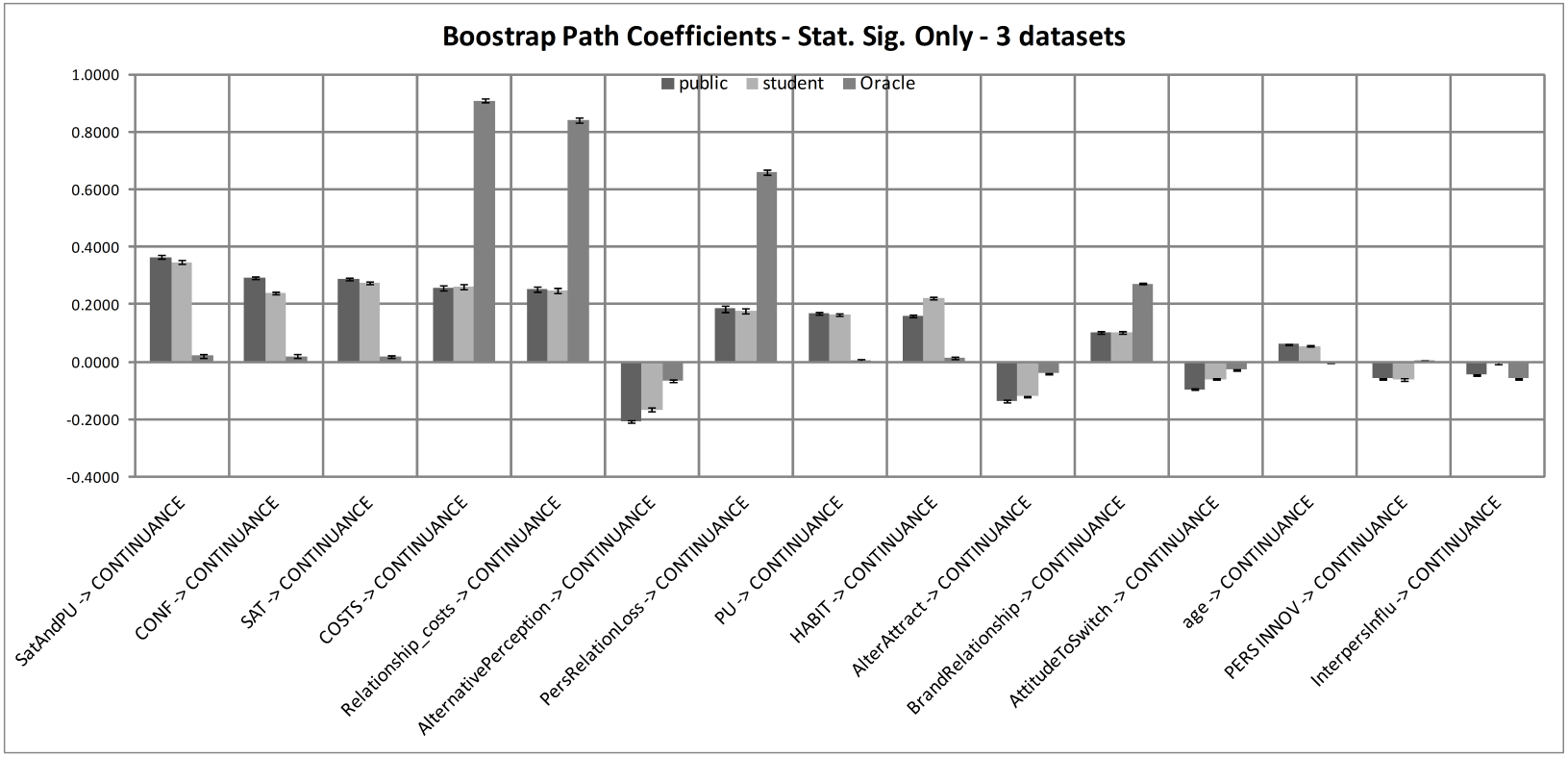
Public Dataset N = 1302, Student Dataset N = 217, Oracle Dataset N = 46

CONT: Continuance Intention



Public Dataset N = 1302, Student Dataset N = 217, Oracle Dataset N = 46

Figure 42: Path Comparison Across Three Datasets



Public Dataset N = 1302, Student Dataset N = 217, Oracle Dataset N = 46

Figure 43: Path Comparison Across Three Datasets - Stat Sig Paths only

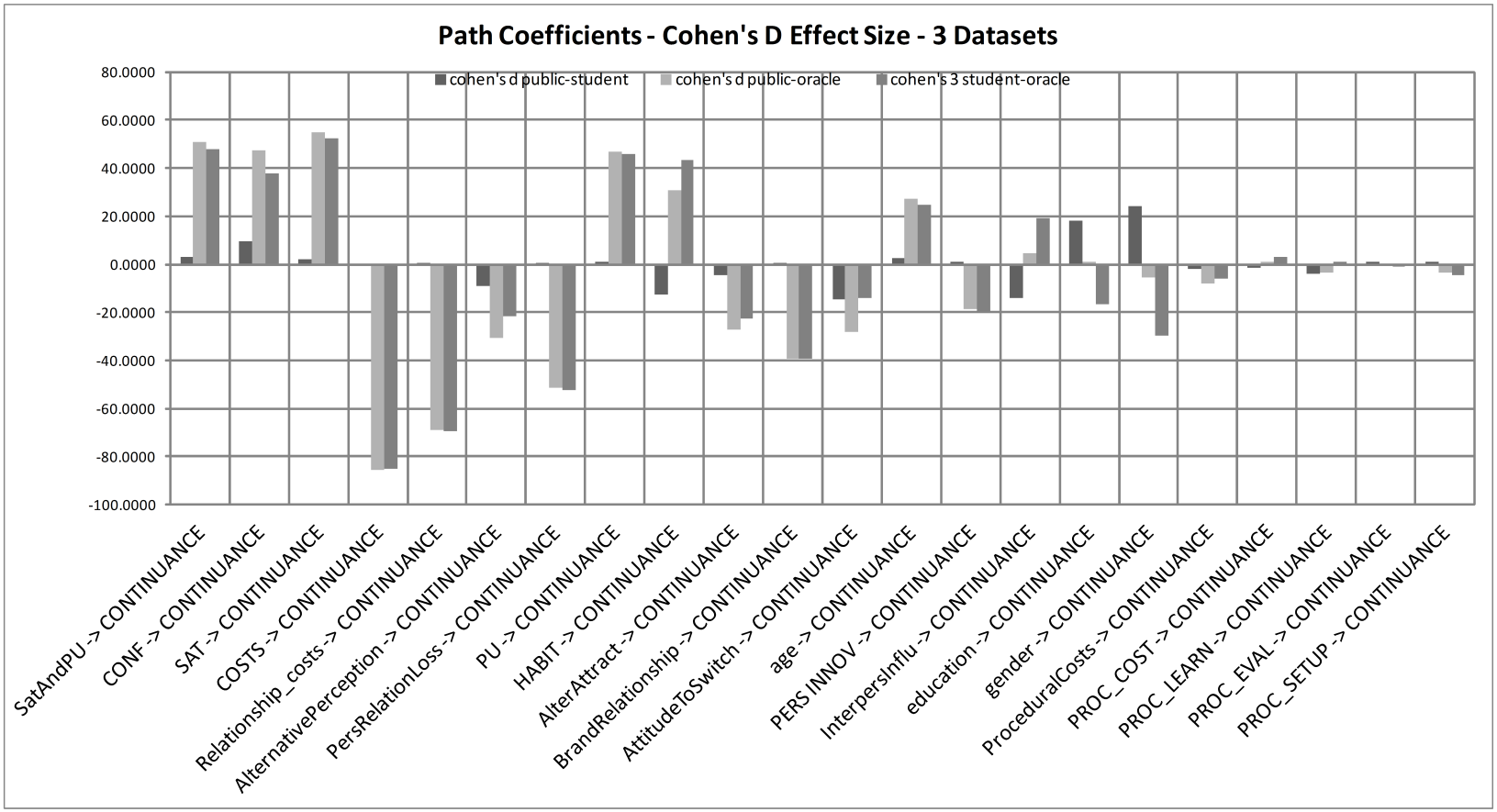
Table 38: Path Comparisons across three datasets Cohen's d- Bootstrap Sample

Path	Public Path	Student Path	Oracle Path	Cohen's d public-student	Cohen's d public-oracle	Cohen's d student-oracle
SatAndPU→CONT	0.3658	0.3466	0.0224	2.8548	50.9002	48.0454
CONF→CONT	0.2937	0.2393	0.0205	9.4272	47.4070	37.9798
SAT→CONT	0.2874	0.2764	0.0191	2.2413	54.8358	52.5945
COST→CONT	0.2576	0.2576	0.9090	-0.5244	-85.7817	-85.2573
Relationship_costs→CONT	0.2519	0.2476	0.8414	0.5040	-69.0345	-69.5385
AlternativePerception→CONT	-0.2076	-0.1649	-0.0647	-9.1375	-30.5789	-21.4414
PersRelationLoss→CONT	0.1847	0.1793	0.6590	0.5863	-51.5961	-52.1824
PU→CONT	0.1687	0.1653	0.0059	0.9722	46.9885	46.0163
HABIT→CONT	0.1596	0.2207	0.0135	-12.7453	30.5029	43.2482
AlterAttract→CONT	-0.1369	-0.1206	-0.0406	-4.5920	-27.1536	-22.5616
BrandRelationship→CONT	0.1025	0.1013	0.2729	0.2633	-39.0932	-39.3565
AttitudeToSwitch→CONT	-0.0948	-0.0598	-0.0264	-14.5377	-28.4227	-13.8850
age→CONT	0.0617	0.0560	-0.0030	2.4119	27.2705	24.8586
PERS INNOV→CONT	-0.0582	-0.0610	0.0030	0.8804	-18.7312	-19.6116
InterpersInflu→CONT	-0.0441	-0.0036	-0.0575	-14.2502	4.7248	18.9750
education→CONT	0.0212	-0.0286	0.0181	17.9749	1.1344	-16.8406
gender→CONT	0.0099	0.0201	0.0501	24.1529	-5.4382	-29.5911
ProceduralCosts→CONT	0.0099	0.0201	0.0501	-2.0182	-7.9617	-5.9435
PROC_COST→CONT	0.0093	0.0151	0.0056	-1.7425	1.1114	2.8539
PROC_LEARN→CONT	0.0015	0.0114	0.0095	-4.2702	-3.4417	0.8286
PROC_EVAL→CONT	-0.0011	-0.0047	-0.0006	0.8331	-0.1274	-0.9605
PROC_SETUP→CONT	0.0000	-0.0028	0.0105	0.9729	-3.7013	-4.6742
Total Statistically Sig Differences						

Shade of grey denotes small to medium, medium to large, and large effects size
CONT: Continuance Intention

Table 39: Cohen's D Categorization of Path Coefficient Differences

Effect	Cohen's D Value	Public-Student (N)	Public-Oracle (N)	Student-Oracle (N)
Less than Small	*<5*	15	6	4
Small to medium	*>=5*	2	2	1
Medium to large	*>=10*	4	1	4
Large	*>=20*	1	13	13
Total		***22***	***22***	***22***



Public Dataset N = 1302, Student Dataset N = 217, Oracle Dataset N = 46

Figure 44: Path Comparison - Cohen's D Effect Size Three Datasets

7.11 Summary

The research examined many models to determine which the individual effects of the constructs and an overall model evaluation with multiple effects. An evaluation of the hypotheses examined is shown is Table 40. A summary table of the results is provided - see Table 41.

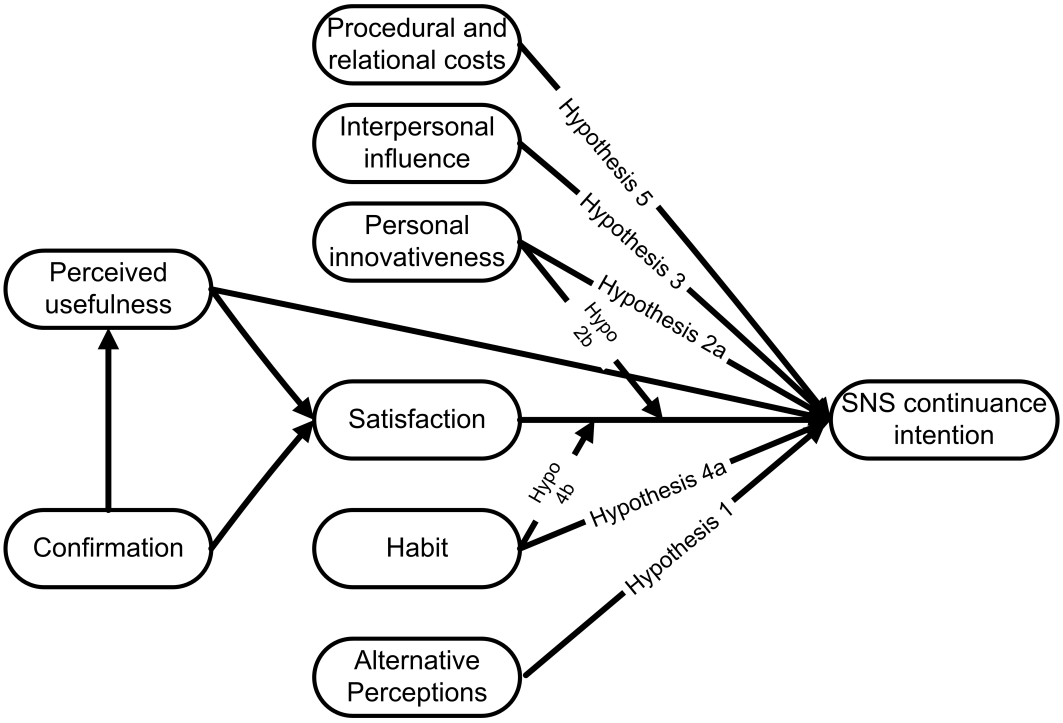


Figure 45: Social Networking Site Continuance Model

Table 40: Social Networking Site Continuance Model Hypotheses Evaluated

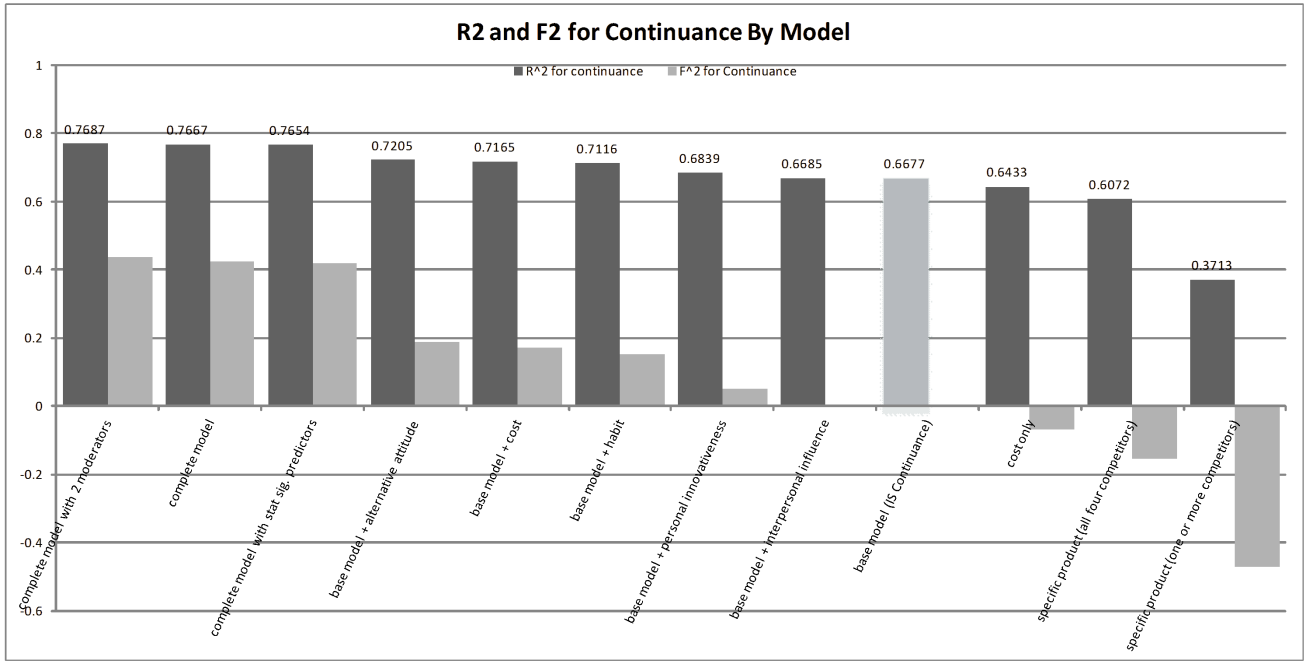
Num	Result	Hypothesis
1	Y	Social networking site users with high a positive attitude to switch and who are attracted to competing social networking sites will negatively affect continuance intention on the social networking site.
2a	Y	Personal innovativeness will negatively affect continuance intention of social networking sites.
2b	N	The relationship between satisfaction and social networking site continuance intention will be negatively moderated by personal innovativeness on social networking sites.
3	Y	Interpersonal influence will negatively affect continuance intention of social networking sites.
4a	Y	Habit will positively affect continuance intention of social networking sites.
4b	N	The relationship between satisfaction and social networking site continuance intention will be negatively moderated by habit.
5	Y	Greater procedural and relational switching costs will positively affect continuance intention of social networking sites.

Table 41: Summary Table

Model Name	R^2	R^2 Interpretation	f^2	f^2 Interpretation
specific product (one or more competitors)	0.3713	weak to moderate	-0.4714	large (neg)
specific product (all four competitors)	0.6072	moderate to substantial	-0.1540	medium to large (neg)
cost only	0.6433	moderate to substantial	-0.0684	small to medium (neg)
base model (IS Continuance)	0.6677	moderate to substantial	0.0000	less than small
base model + interpersonal influence	0.6685	moderate to substantial	0.0024	less than small
base model + personal innovativeness	0.6839	moderate to substantial	0.0512	small to medium
base model + habit	0.7116	moderate to substantial	0.1522	medium to large
base model + cost	0.7165	moderate to substantial	0.1721	medium to large
base model + alternative perceptions	0.7205	moderate to substantial	0.1889	medium to large
complete with stat sig. predictors	0.7654	substantial	0.4165	large
complete model with all predictors	0.7667	substantial	0.4243	large
complete model with two moderators	0.7687	substantial	0.4367	large

- Base model is IS continuance
- base model + <factor> indicates one added factor
- complete model indicates that multiple factors are added and no product specific factors are added
- specific product model is for attitudes towards specific products like Twitter, TUMBLR, Pinterest and Instagram

$R^2$and f^2interpretation based on Hair et al. (2012)



R^2Interpretations: Weak = 0.25, Moderate = 0.50, Substantial = 0.75
f^2Interpretations: Small = 0.02, Medium = 0.15, Large = 0.35
$R^2$and f^2interpretation based on Hair et al. (2012)

Figure 46: R^2 and f^2 Continuance By Model

Table 42: Goodness of Fit comparison

Model Name	**Goodness of Fit**	**GoF Interpretation**
specific product (one or more competitors)	0.5427	large
specific product (all four competitors)	0.6908	large
cost only		N/A
base model (IS Continuance)	0.6490	large
base model + interpersonal influence	0.6360	large
base model + personal innovativeness	0.6394	large
base model + habit	0.6590	large
base model + cost		N/A
base model + alternative perceptions		N/A
complete model with stat sig. predictors		N/A
complete non-moderated model		N/A
complete moderated model		N/A

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

8 Discussion

The goal of this research was to extend information systems continuance of Bhattacherjee (2001) which predicts continuance intention through three factors: perceived usefulness, confirmation and satisfaction to explain more of variance of continuance intention. Researcher who use only the factors in IS continuance limit the amount of explained variance of continuance intention when additional direct and moderating factors in continuance decisions have important impacts. This research examined important motivating factors to predict an individual's intention to continue to use a social networking site, including:

- How do psychosocial factors like *personal innovativeness, habit,* and *interpersonal influence* predict an individual's intention to continue to use a social networking site?
- How do *consumer switching costs* predict an individual's intention to continue to use a social networking site?
- How do *alternative perceptions* predict an individual's intention to continue to use a social networking site?

This research used factors from Bhattacherjee's (Bhattacherjee, 2001) IS continuance theory and five additional factors to predict continuance intention on the social networking site Facebook. The five additional factors include: Burnham et al.'s (Burnham et al., 2003) consumer switching costs, alternative attractiveness, habit, personal innovativeness, and interpersonal influence. The non-moderated model explains approximately 76.7% of the variance of continuance intention; a substantial amount of the variance according to Hair et al. (2011). The moderated model explained 76.9%. The habit and per-

sonal innovativeness, as moderators were not statistically significant and were dropped from the model. The results examined in the discussion will focus on the non-moderated model except where noted.

Five hypotheses were confirmed, satisfaction & perceived usefulness, as a combined second-order construct, was the major statistically significant factor in the model ($\beta = 0.3686$), followed by costs ($\beta = 0.2496$), alternative perceptions (β =-0.2069), habit (β =0.1642), personal innovativeness (β =-0.0589) and interpersonal influence (β =-0.0451). Two hypotheses were rejected; habit and personal innovativeness, as moderators were not statistically significant and did not substantially aid in the interpretation of the factors.

The factors predicting continuance intention had theoretical support from past research studies. The results support that satisfaction and perceived usefulness are important factors for SNS continuance. Survey respondents who were satisfied with Facebook and who perceived the site as useful had higher levels of continuance intention and support the major predictors in IS continuance(Bhattacherjee, 2001). Consumer switching costs was the second most important factor and supports that survey respondent who perceived that leaving Facebook would be have high costs were more likely to stay and supports Burnham et al. (2003). Burnham et al. (2003) defined three costs, procedural, financial and relational costs and this research used two costs, procedural and relational and did not include financial as the sites studied do not have any financial cost to use. The relational costs had a strong effect on whether a survey respondent would continuance to stay on Facebook where the procedural costs were not an important factor. Survey respondents who perceived that alternative social networking sites were viable candidates have lower levels of continuance intention on Facebook and support Bansal et al. (2005). Habit has a strong direct effect on continuance intention and indicates

that survey respondents who use Facebook out of habit are more likely to continue to use the site and supports Limayem et al. (2007). Habit did not have a statistically significant moderating effect regarding its interaction with satisfaction to predict continuance intention and was not supported. Social networking site users who have higher levels of personal innovativeness on social networking sites had higher levels of discontinuance intention and supports Agarwal and Prasad (1998). Survey respondents who were more influenced to join the network by their personal contacts had higher levels of discontinuance and supports Parthasarathy and Bhattacherjee (1998). Four factors have both statistical and practical significance: satisfaction & perceived usefulness, consumer switching costs, alternative perceptions and habit. Two factors have statistical significance but not practical significance: personal innovativeness and interpersonal influence.

The research results are within the context social networking site continuance intention. These results show how this model performs for social networking site users, and, specifically, Facebook. The factors come from a both marketing research and information systems research and some of the factors have been applied specifically to the social networking site context. The factors in this study and the results are expected to be generalizable to other social networking sites such as Twitter, Tumblr, Instagram and Pinterest. These factors may be less helpful in studying continuance intention in other contexts in information systems research (e.g. word processing, general business applications). Social networking sites are largely hedonic and have a high degree of voluntariness so the factors in this research were applied because they may have strong predictive power in continuance intention within this context.

8.1 IS Continuance Theory

The results support that satisfaction & perceived usefulness are important predictors of continuance behavior supporting Bhattacherjee's (2001) IS continuance theory and Oliver's (1980) expectation-confirmation theory from consumer behavior research. Satisfaction was a stronger predictor than perceived usefulness for continuance intention. Bhattacherjee suggests that satisfaction is more realistic and stable measure over time compared to perceived usefulness. Perceived usefulness is a perceptual measure that may include both pre-usage and post-usage beliefs and is expected to decrease over time as familiarity with the service grows (Bhattacherjee, 2001; Oliver, 1980).

Facebook has been popular since at least 2009 when it had 360 million users[19] and would allow many if not most survey respondents ample time to determine whether the site is useful and reach a stable level. Bhattacherjee (2001) suggests that perceived usefulness is more important at the acceptance stage and satisfaction is more important in the continuance stage; i.e. perceived usefulness is a better predictor for technology acceptance than information systems continuance. The results from this study confirm that satisfaction is a more important factor in ongoing continuance intention than perceived usefulness.

The confirmation factor from Bhattacherjee's (2001) IS continuance and Oliver's (1980) expectation-confirmation theory can be examined through its effects on perceived usefulness and satisfaction and its total effects on continuance intention. Confirmation had a strong effect on both perceived usefulness and satisfaction and a larger effect on satisfaction than perceived usefulness. The results indicate that meeting or exceeding social networking site users' expectation through their use is an important factor in continuance intention.

[19] `http://newsroom.fb.com/company-info/`

Confirmation is the *strongest* first-order factor on continuance in the model exceeding that of satisfaction and costs when total effects are measured. Confirmation occurs when users assess whether their perceived performance expectation is met through use. The results support the role that confirmation is an important factor in SNS continuance.

It is often useful to exceed user expectations (confirmation) where users may have low expectations and product performance exceeds those expectations leading to higher satisfaction and continuance (Bhattacherjee, 2001; Oliver, 1980). When users' expectations are not met it can lead to disconfirmation, dissatisfaction and lower continuance intention. Consumer's expectations should exceed a threshold level of expectation about a service in the acceptance stage otherwise they may not choose to use it at all; i.e. if an expectation of a service is so low as to deem a product not worthy to try than it may not be used at all. Oliver (1980) found that confirmation and satisfaction have similar strengths in predicting consumer repurchase intentions (continuance); these results are in line with that finding. The total effects for both confirmation and satisfaction are statistically significant (confirmation $\beta = 0.2961$; satisfaction $\beta = 0.2894$).

8.2 Consumer switching costs

The results show that consumer switching costs had a strong role in predicting continuance intention on Facebook ($\beta = 0.2496$). The switching costs indicate that Facebook users make decisions on whether to stay or leave Facebook based on the costs involved with leaving (higher costs indicate that the user is *more* likely to continue with the service). The costs, however, did not exceed that of satisfaction and perceived usefulness as a higher-order construct. Switching costs is a formative measure which theoretically includes procedural costs,

financial costs and relational costs(Burnham et al., 2003); this study uses procedural costs and relational costs only as there are no financial costs to use Facebook. The relational costs (composed of personal relationship costs and brand relationship) had a strong effect on continuance intention and the procedural costs (setup, economic, evaluation and learning) had little to no effect as either a direct effect on costs and as a total effect on continuance intention.

Facebook users who perceived that switching to a new site would have a positive cost to their relationships (which includes both brand and personal) had higher continuance intention to stay on Facebook. In the total effects first-order construct results, personal relationship cost is the fifth highest factor, ahead of perceived usefulness but behind satisfaction (satisfaction $\beta = 0.2894$, personal relationship cost $\beta = 0.1797$, and perceived usefulness $\beta = 0.1704$). The personal relationship items were adapted from Burnham et al. (2003) and measure whether personal relationships would suffer if the survey respondent switched (or added) a different social networking site. The items measure how comfortable the survey respondent is with interacting with their friends on Facebook compared to other sites, whether their friends on Facebook matter to them, if they enjoy talking to their friends on the platform, and if they would miss their friends if they switched to a different site. The survey questions themselves are agnostic as to whether switching would mean they would stop using Facebook, or simply add an additional social networking site to their set of social networking site. Regardless of the ambiguity, survey respondents who said that there are high costs to their personal relationships if they switched to a social networking site had higher intentions to stay on Facebook. The results support that personal relationship cost is an important factor in continuance intention on Facebook.

The brand relationship costs are an important factor in how survey respondents valued the relational costs of leaving Facebook and overall continuance intention. In the total effects first-order construct results, brand relationship cost is the seventh highest factor, behind of alternative attractiveness (alternative attractivenessβ =-0.1370 , brand relationship $\beta = 0.0990$). The brand construct items measure whether the survey respondents like the brand, support the company and believe the company has a positive public image. Survey respondents who saw the brand in a positive manner had higher continuance intention suggesting that Facebook should attempt to garner a positive image with its user community.

The procedural costs of economic, learning, evaluation and setup had no predictive value for continuance intention. It could be that the majority of the survey respondents had at least one other social networking site (70.5% used at least one other social networking site and 19.4% used three or more) so the procedural costs may not be burdensome to this sample. The survey recruitment via a public announcement may have recruited people who more familiar with the procedural costs of adding a social networking site as the majority have added other sites to their set of social networking sites and did not feel that the costs were demanding. The survey respondents were not asked to actually use or shown a different social networking site so it may have been difficult to evaluate the costs as an intellectual exercise. Bhattacherjee and Park (2013) used learning costs and setup costs in past research and found the procedural costs to be relevant; however, they demonstrated a specific application to their respondents prior to conducting a survey. The survey respondents in the Bhattacherjee and Park (2013) research did not use the application so their pre-acceptance opinions may have been stronger without use.

Both Bhattacherjee (2001) and Oliver (1980) indicate that pre-acceptance beliefs can significantly decrease overtime with actual usage of a service, e.g. perceived usefulness as a pre-acceptance belief tends to regress to the mean through actual usage. It could be that the consumer switching costs are an important pre-acceptance measure but not important in post-consumption usage.

The impact of consumer switching costs were lower than expected; there are several possible explanations for the results found in this research. Burnham et al. (2003) stated that approximately 25% of continuance intention in services are a result the level of consumer satisfaction; in this research the IS continuance model by itself explains a much larger proportion of continuance intention (R^2= .668 or 66.8% of the variance). That satisfaction and perceived usefulness explain so much of the variance of continuance intention may be why consumer switching intention has lower explanatory power than satisfaction. Another possible explanation is that social networking sites are hedonic in nature so satisfaction may be a primary driver in continuance vs. consumer switching costs. Consumer switching costs are comprised of three costs, procedural, financial and relational, but for most social networking sites and Facebook in particular, there are no financial costs. Removing one of the three factors may also have a negative impact on the explanatory power of the model. The procedural costs had practically no explanatory power in continuance intention, this may be that when survey respondents considered the setup costs for social networking sites they were just not as relevant as other factors. The range of procedural costs did range from low to high and had a reasonable distribution, but simply do not appear to matter in continuance intention as other factors are more important. Consumer switching costs, by themselves, explain a moderate to substantial amount of continuance inten-

tion (R^2 = 0.6433 or 64.3% of the variance). Consumer switching costs do appear to be a strong predictor in continuance intention, just not as much as satisfaction and perceived usefulness are in terms of their explanatory power.

8.3 Alternative Perceptions

Alternative perceptions were the third largest factor (β =-0.2069) in SNS Continuance where survey respondent who believed alternative social networking sites were viable candidates had high lower levels of continuance intention on Facebook. Alternative perceptions are composed of two constructs, attitude toward switching and alternative attractiveness. Alternative attractiveness has a larger effect on continuance intention (β =-0.1370) than attitude toward switching (β =-0.0942) and indicates that survey respondents those who were attracted to alternatives were more likely to discontinue use of Facebook compared to those who have a more favorable attitude toward switching.

Survey respondents were asked questions regarding whether a different social networking site would be an attractive alternative to Facebook without specifying an alternative site. The alternative attractiveness questions were asked in terms of would a different social networking site be more fair, have policies that benefit you more, be more satisfying, etc. than Facebook and not did not offer a specific site to compare against Facebook (e.g. Twitter or Pinterest). Those who felt that attracted to other sites had lower levels of continuance intention on Facebook. The *attitude toward switching* measures the degree to which a service consumer may be favorably disposed to switching service providers; questions were asked in terms of whether it would be a good idea, useful, beneficial, etc. to switch to a new social networking site in the next six months. Survey respondents who had favorable attitudes toward switching were more likely to discontinue use of Facebook.

This research examined how attitudes about specific alternatives (Twitter, Instagram, Pinterest and Tumblr) predict continuance intention on Facebook. The research found that holding an account on an alternative site had low explanatory power of continuance intention (R^2 =.051, or explained approximately 5.1% of continuance intention) - Appendix F. Instagram may be considered a complement to Facebook as having an account *increased* continuance intention on Facebook, whereas Twitter may be considered a substitute to Facebook as having an account *decreased* continuance intention on Facebook. The attitudes formed by using specific alternative products explained a small to moderate amount of continuance intention on Facebook for social networking site users that used at least one alternative product (R^2 =.371, or explained approximately 37.1% of continuance intention). General alternative perceptions about alternative services were strong predictors for continuance intention where they are the third largest factor of continuance intention in this study. These results suggest that social networking sites may develop a general alternative perception about a site outside the specific social networking site services that are helpful in predicting continuance intention.

8.4 Habit

Habit was the fourth largest factor (β =0.1642) in SNS Continuance where survey respondents who have higher habitual use of Facebook are more likely to continue using the site. Limayem et al. (2007, p. 705) defined habit for information system usage as, "the extent to which people tend to perform behaviors (use IS) automatically because of learning." Survey respondents who use the site as part of a routine may continue to use the site as part of their daily course. Habit may help explain why teens who show less enthusiasm for the social networking site Facebook continue to use the site as it is an

important part of overall teenage socializing (Madden et al., 2013). Teens stated many reasons for disliking the Facebook including an increased adult presence, excessive sharing of information and the amount of "drama" but continue to keep their accounts. Facebook may be a platform where people are less excited about using it or have lower enjoyment through use but continue to use it as the platform may be important means of communication. Facebook users may be incorporating the site into their lives but may be less excited about using the site.

The role of habit may increase over time as an important factor in SNS continuance as satisfaction may decrease as it historically does and regresses to the mean (Bhattacherjee and Premkumar, 2004). Facebook was started in 2004 and open to all users over 13 years old in 2006 so many of the sites' users have had considerable experience with the site.[20] As users become more familiar with a product they continually set and reset their expectations and confirm their expectations over time (Bhattacherjee and Premkumar, 2004). People tend to have complex views about new communication technologies as they are adopted; some are skeptical of the technology while others embrace it (Baym, 2010). New communication technology is often viewed as providing great benefits; soon after the radio was invented it was though that every home would be an extension of Carnegie Hall or Harvard University and when television was invented it was expected to bring world peace and social harmony (Mosco, 2004). Some believe that the new technology devalues face-to-face communication and express concern that communication will grow increasingly shallow. Others will embrace the technology and tout its benefits to create stronger relationships and new opportunities to interact with new people. As the technology is adopted by greater numbers, people see the pros

[20] `http://newsroom.fb.com/company-info/`

and cons of new media and accept it for what it provides Baym (2010). Habit may be a factor in why, as satisfaction and expectations become increasingly more realistic people continue to use the site. Facebook use may become part of people's daily routines even if they are not they do not find the site particularly enjoyable it may be a channel in which they communicate with members of their social network.

Habit did not make a statistically significant difference in terms of moderating the relationship between satisfaction and continuance intention as hypothesized. In the individual factor model (Appendix C) where IS continuance and habit are the only factors present it was a statistically significant relationship where those with lower satisfaction levels would continue to use Facebook if they had higher levels of habit. The moderating t-statistic for habit x satisfaction ($t = 4.3531$) indicates that it is statistically significant although the effect size f^2 is .0139 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .02) based on *Chin et al. (2003)*.

8.5 Personal Innovativeness

Personal innovativeness was the fifth largest factor (β =-0.0589) in SNS Continuance where survey respondents who had higher levels of personal innovativeness were more likely to discontinue use of Facebook. Agarwal and Prasad (1998, p. 206) defined personal innovativeness as, "the willingness of an individual to try out any new information technology." Personal innovativeness explicitly defines how users may adopt technology based on psychometric characteristics. Individuals who have higher levels of personal innovativeness may adopt innovations earlier than others and may act as change agents and opinion leaders to further diffuse a new technology. Personal innovativeness is simi-

lar to Rogers's (1964) five categories of adopters: *innovators, early adopters, early majority, late majority* and *laggards* however these adopter categories are defined by *time of adoption* and not psychometric attributes (Agarwal and Prasad, 1998; Mahajan et al., 1990). Those who adopt Facebook earlier may have higher personal innovativeness on social networking sites and may also be moving to newer or more innovative sites.

Personal innovativeness did not make a statistically significant difference in terms of moderating the relationship between satisfaction and continuance intention as hypothesized. In the individual factor model (Appendix D) where IS continuance and personal innovativeness are the only factors present it was not a statistically significant relationship where those with lower satisfaction levels would continue to use Facebook if they had higher levels of personal innovativeness. The moderating t-statistic for personal innovativeness indicates that it is not statistically significant ($t = 1.4588$); the effect size f^2 is 0.0028 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .0200) based on *Chin et al. (2003)*.

Agarwal and Prasad (1998) recommended to researchers to use personal innovativeness as a control variable in future studies when examining individual usage intention and not specifically continuance. Studies regarding the role of personal innovativeness have been inconsistent where personal innovativeness has been shown to a valuable antecedent to some factors such as cognitive absorption, perceived ease of use and perceived usefulness but often not having a strong relationship to usage intention (Lu et al., 2005). Thatcher and Perrewé (2002) suggest that personal innovativeness should be used as an antecedent to both *beliefs* (e.g. ease-of-use) and *attitude formation* (e.g. acceptance and continuance). Arguably, personal innovativeness may have a strong role to play on *acceptance* more so than *continuance* as it has stronger theoretical sup-

port from Rogers (1964) *diffusion of innovations* theory. Ahuja and Thatcher (2005) refer to personal innovativeness as a trait and, as such should not vary across different environments, again suggesting that personal innovativeness may be more appropriate as a control variable. boyd and Ellison (2007b) discuss several cases where early adopters have left social networking sites like SixDegrees and Friendster for new sites such as MySpace after encountering difficulty with earlier innovations and suggests that being an early adopters has an impact on post-acceptance (continuance) behavior. In the context of this research, it may be more appropriate to view personal innovativeness as a control variable, and one in which there is a statistically significant relationship but does not rise to the level of practical significance.

8.6 Interpersonal Influence

Interpersonal influence is the final and sixth factor (β =-0.0451) in SNS Continuance where survey respondents who had higher levels of interpersonal influence were more likely to discontinue use of Facebook. Examining the role of interpersonal influence allows the research to extend beyond the individual to systems of individuals (Rogers, 1976). Survey respondents who came were influenced by their online and offline social network (friends, family members, classmates and others) had higher levels of discontinuance compared to those who were less influenced by their personal relationships to use Facebook. The research supports Parthasarathy and Bhattacherjee (1998) regarding the role of interpersonal influence on service continuation. Parthasarathy and Bhattacherjee (1998) found that users who stopped using a system after acceptance were more influenced by their interpersonal relationships than those who continued to use the system. Parthasarathy and Bhattacherjee (1998) also found that discontinuers of online servers are less influenced by external sources (e.g.

media) during the initial acceptance than those who continued the using the service. Kim (2011) examined the role of interpersonal influence on information system continuance for social networking sites. Kim (2011) found that when members of a user's social network believed that using a social networking site was a good idea users were positively influenced to continue using the site.

These results suggest that users who joined because of their personal relationships have higher levels of discontinuance and are more likely to stop using the Facebook. The results confirm that the role interpersonal relationships at the time of adoption influence how people make discontinuance decisions. Parthasarathy and Bhattacherjee (1998) theorize that individuals who adopt based on their interpersonal relations tend to become more disenchanted with services compared to those who adopt based on mass communication. The same effects may be seen on Facebook continuance, those who were influenced by their interpersonal relationships may be disenchanted with the site and have higher discontinuance intention. Facebook is a social communication tool and members who join the site are asked to make connections with people they know. Some Facebook users may join because they are asked by their existing friends to join (interpersonal relationships), they may use the site and decide it is not what they expected or that the service is not useful and decide to discontinue. The factor allows a greater understanding of how factors outside the specific product and service impact the consumers' intention to continue use.

8.7 Demographic Variables

Three demographic variables were tested as covariates for continuance intention in this research; age, gender and education were identified as potential

influences in predicting continuance intention. Age was the only statistically significant relationship in the non-moderated model with a $\beta = 0.0613$ (t=4.3408) where older Facebook users show higher levels of continuance than younger users. This finding supports Madden (2013) findings where younger users were more likely to indicate they were going to spend less time on Facebook that older users. Madden (2013) found that 38% of those between 18 and 29 intended to spend less time on Facebook compared to those in the 30 to 49 year age group (26%) and 50+ (17%). Gender was not statistically significant (β =0.0167, $t = 1.2233$) and does support that gender is a statistically significant factor. Madden (2013) found gender differences in how gender is associated with Facebook use among internet users. Madden (2013) found that 62% of male internet users use Facebook at 72% of female internet users used Facebook. This research shows that these differences may be better explained by other factors regarding continuance intention based on other factors (satisfaction, consumer switching costs, etc.) than gender alone. Education was not found to be a statistically significant factor (β =0.021, $t = 1.4686$); those with higher education did not have a statistically significant relationship with continuance intention. Madden (2013) found some differences in educational attainment and their usage of Facebook where 60% of internet users who had less than a high school education to high school graduate used Facebook, and 73% of of internet users who had some college experience used Facebook, and 68% of internet users who were college graduates and beyond used Facebook. This research shows that these differences may be better explained by other factors regarding continuance intention that educational attainment. Overall, the demographic variables were used to adjust the results of the main factors under consideration and none of the demographics variables rise to the level of practical significance.

8.8 Implications for Researchers

There were five additional factors examined in to determine the relationship with IS continuance theory and continuance intention. All five of the factors were statistically significant predictors; however, the practical significance of the coefficients should be examined as well as the statistical significance. Statistical significance in this research may be more easily found because there is a large sample size ($N = 1302$). Three factors appear to have both statistical and practical significance in addition to satisfaction & perceived usefulness: consumer switching costs, alternative perceptions and habit. Two factors have statistical significance but lack practical significance: personal innovativeness and interpersonal influence.

The results find many factors that are helpful in understand continuance intention. Satisfaction & perceived usefulness and consumer switching costs, alternative perceptions and habit have a strong relationship with continuance intention whereas personal innovativeness and interpersonal influence may be small. The effects of satisfaction & perceived usefulness could be misleading in the parsimonious model of IS continuance. The IS Continuance model explained 66.8% of the variance of continuance intention whereas adding five additional factors raised the amount of explained variance to 76.7%. The effect of the factors increased the explained variance of the model from *moderate to substantial* to *substantial*; the effects of the new factors are also considered to be large. The IS continuance model had high loading factors for satisfaction (total effects$\beta = 0.6315$) and perceived usefulness (total effects$\beta = 0.3708$). The SNS continuance model (non-moderated) reduced the influence of satisfaction & perceived (as a combined second-order factor) to ($\beta = 0.3686$), when other factors are able to exert their influence. Satisfaction's role in continuance intention remains relatively high in terms of its influence on continuance

intention (total effects $\beta = 0.2894$) however perceived usefulness drops to $\beta = 0.1704$ (total effects) below personal relationship loss, alternative perceptions and consumer switching costs. The direct effects of perceived usefulness on continuance intention shown in the moderated model are much lower ($\beta = 0.0432$), lack practical significance and is not statistically significant ($t = 1.8277$) as a direct effect.

Bhattacherjee (2001) includes perceived usefulness because the factor is "the only belief that is demonstrated to consistently influence user intention across temporal stages of IS use," Bhattacherjee (2001, p. 355). Perceived usefulness is an influential factor in TAM-based studies (Bhattacherjee, 2001), but its effects in continuance intention may be less influential when other factors are considered such as the ones in this study. IS Continuance theory is based on Oliver's (1980) expectation-confirmation theory where perceived usefulness is not present. The justification for replacing *expectation* with *perceived usefulness* is that perceived usefulness may be more specific to the context of information systems and expectations may have a more broad context.Oliver's (1980) expectation-confirmation theory does not include a direct relationship between *expectation* and *continuance intention* because the model proposes that continuance intention is primarily predicted by satisfaction. Bhattacherjee (2001), includes a direct theoretical relationship between perceived usefulness and continuance intention because of its inclusion in TAM Davis (1989). Bhattacherjee (2001) states:

> Although the usefulness-intention association was originally derived in an acceptance context, it is likely to hold true in continuance contexts, because human tendencies for subconsciously pursuing instrumental behaviors or striving for rewards are independent of the timing or stage of such behaviors.

While adding a direct link between perceived usefulness and continuance intention may be justified on practical grounds in that continuance resembles acceptance, its theoretical inclusion is suspect and the factor may also be less influential than expected when additional factors are added to the model.

Looking beyond satisfaction and perceived usefulness was helpful where three factors had both statistical and practical implications - consumer switching costs, alternative perceptions and habit. Consumer switching costs showed that both the relationship with the brand and personal relationships with those in the network had large impacts on continuance intention. Alternative perceptions show that continuance intention is also impacted by factors beyond the service in the study (relative advantage of other sites). Researchers should extend beyond the particular service under investigation to determine if other sites are impacting continuance decisions. Lastly, habit has a role for continuance intention where users may continue using a site because it is part of a routine. These factors had large impact on continuance intention and may more appropriately define how satisfaction and perceived usefulness predict continuance intention in that the net effect of satisfaction and perceived usefulness is significantly lower with these factors in place.

The research used multiple analyses to determine how specific alternatives social networking site services and general alternative perceptions predict continuance intention. There were small differences in whether having an account with an alternative site was associated with higher or lower continuance intention on Facebook. The specific attitudes formed from alternatives (Twitter, Instagram, Pinterest and Tumblr) were helpful in predicting continuance intention, but the general alternative perceptions were much stronger regarding the predictive power of continuance intention. The results suggest that general alternative perceptions are more helpful in determining continuance intention

compared to examining an individual alternative perception (e.g. is Twitter a viable alternative to Facebook).

8.9 Implications for Practice

There are several implications for practice as a result of this research. Satisfaction & perceived usefulness continue to be an important factor in continuance intention. Companies whose goals include customer retention should attempt to increase user satisfaction and perceived usefulness. Usefulness may be an important predictor for overall satisfaction but when other factors are included in a model then its direct effects are modest. Confirmation of expectations through product use is the most important first-order factor in the model. Confirmations are set and reset through use over time (Bhattacherjee and Premkumar, 2004) so it may be important to add new features to hedonic social networking sites that users will use and enjoy.

There were two major factors regarding consumer switching costs that effect continuance intention. Facebook should focus on the personal bonds that exist on the site as survey respondents who believe their personal relationships would be damaged by switching to other services. Facebook focuses on existing personal relationships and latent ties so that its members can connect to others. To the extent that these relationships are important to its users they may continue to use the site at higher rates than others. Brand relationships were also an important component to consumer switching costs where survey respondents who valued the Facebook brand had stronger continuance intention. Facebook could try to build its reputation within its service so that people have favorable attitudes toward the brand. One area in which Facebook appears to have issues regarding its brand is with its privacy policies[21]

[21]Facebook SEC 10-Q quarterly Report, April 25, 2014http://investor.fb.com/secfiling.cfm?filingID=1326801-14-23&CIK=1326801

(boyd, 2008; boyd and Hargittai, 2010). boyd (2008) suggests that changes to Facebook's privacy policies in the past lead its users to feel that they had increased exposure and that the company allowed an invasion of privacy and these policy changes may lead users to trust Facebook less. (boyd and Hargittai, 2010, Web) state that news coverage regarding Facebook's privacy policies relay a consistent message, "do not trust Facebook." Advocates suggested that that May 31st 2010 be declared "Quit Facebook Day" however few users actually did quit (boyd and Hargittai, 2010) and the site continues to gain users.[22] Facebook's 10-Q (April 25, 2014) states, "We will also continue to experience, media, legislative, or regulatory scrutiny of our decisions regarding user privacy or other issues, which may adversely affect our reputation and brand." Competing service may wish to continue to highlight the perceived difficulty in setting Facebook's privacy settings in the intended manner.

Facebook will continue to face alternative products in the marketplace. Some products may be complementary (e.g. Instagram) while others may be more appropriately viewed as substitutes (Twitter). Instagram users show an increase of continuance intention on Facebook; it may be that strong integration between the two products is helpful to both products. The products may be complementary in that the status updates in Facebook are text based and Instagram adds a visual component. Users who have Twitter accounts, on the other hand, have lower intentions to continue using Facebook. It appears that Twitter may be behaving more like a substitute product where use of Twitter leads to lower intentions to continue using Facebook. The users may use the sites differently; cross-posting of text is possible between the two sites can be configured but may not be particularly helpful to the users. Both Twitter updates and Facebook updates are largely text based, with Twitter only

[22] `http://newsroom.fb.com/company-info/`

allowing for tweets of 140 characters compared to Facebook's more generous text allocation. In this case, having text from one site cross-posted to another site may not be considered particularly useful. Pinterest and Tumblr account holders had no statistically significant difference in continuance intention on Facebook. The mean values for account holders indicate that the majority of the survey respondents planned to continue using Facebook; but the results show differences in the strength of that relationship. Facebook may continue its mergers and acquisition policies to continue to aid Facebook. Facebook purchased WhatsApp for up to $19 billion dollars in 2014 to increase its mobile communication presence.[23] Facebook has also developed additional mobile products that exist outside its Facebook domain (e.g. Paper)[24]. Facebook may need to develop and acquire products that keep their user base loyal to the brand.

The company can promote its role as a communication medium to help build a habit of use and increase continuance intention. Facebook users already appear to have a high level of habit of use however overtime habit may increasingly become important as satisfaction may decrease over time as users have more realistic expectations. Teens may have a decreased interest in Facebook but they continue to use the site and retain their accounts (Madden, 2013; Madden et al., 2013). So while decreased use may be a concern for Facebook the larger concern may be if its user base discontinues and remove their accounts altogether. Garcia et al. (2013) suggests that the user community can have important impacts on a sites ability to remain an ongoing concern. If the user base quits sites may go into rapid decline. Promoting a habituation of use can help Facebook remain a viable company.

[23] http://www.businessweek.com/articles/2014-02-19/facebook-acquires-whatsapp-for-19-billion

[24] http://newsroom.fb.com/news/2014/01/introducing-paper-stories-from-facebook-2/

There are two factors which exhibit statistical significance but not practical significance: personal innovativeness and interpersonal influence. There is not significant justification, based on this research, to start major initiatives to keep those who show more personal innovativeness. Personal innovativeness is associated with higher variety seeking behavior, people with higher personal innovativeness tend to be easier to attract to a service *and* more difficult to retain. The strength of the relationship between personal innovativeness is not strong and therefore other initiatives would take higher precedence. Those who came to Facebook due to their personal relationship leave at higher levels than those who said they came for other reasons. Facebook may want to have a larger mass media presence to attract and retain users due to these findings; however, any effect is likely to be small. Facebook has a adoption rate that is quite high among teenagers (94% in 2012) (Madden, 2013) and 67% of American adults are Facebook users (Raine et al., 2013). Raine et al. (2013) found that many Facebook users plan to spend less time on the site in the coming year where 38% of 18-29 year olds, 26% of 30-49, and 17% of 50 + said they planned to spend less time on Facebook. The results from this research indicate that about 8% of Facebook users have left and 15% plan to stop using Facebook soon. Facebook does have cause for concern regarding lower usage rates but the site remains sticky for many users.

9 Limitations

Participants in the present study were not recruited randomly. Respondents were recruited via a public announcement and will not be representative of all Facebook users. The recruitment method may also have led to the over-representation of those who more interest in the topic in general. There are three datasets in this research; a public dataset recruited by a public announcement, a student dataset and an Oracle dataset. The datasets are largely similar to each other; however, there are differences as well. The construct measurements seem to be relatively similar, but there were some differences in the path coefficients. The Oracle dataset had a much larger path coefficients (β) for the consumer switching cost model than the public and student dataset indicating that these users continuance intention is based more on the costs associated with moving away from a social networking site than satisfaction with the site. This difference may be explored in the future with post-hoc finite mixture analysis (FIMIX) McLachlan and Peel (2004).

The research investigates five major factors in addition to IS continuance theory to predict continuance intention on Facebook but there are may be additional factors that are relevant to switching intention. This research asked survey respondents about four different procedural costs (economic costs, learning costs, setup costs and evaluation costs) which may be difficult to answer without evaluating a specific competitor. Bhattacherjee and Park (2013) examined switching intentions after demonstrating one specific application to capture subjects' perceptions of new services and had some results that differ from these findings (learning costs and setup costs were significant factors). Users may switch social networking sites despite being generally satisfied with the site and the costs if other connections in their network are abandoning the site

(Garcia et al., 2013). Popularity of a site may be ephemeral, once popular sites like Friendster, MySpace, etc. are either no longer exist or in decline(Garcia et al., 2013). Factors such as the frequency of service usage and overall usage were not studied in this research but have been shown in past research to have an effect on continuance intention (Keaveney and Parthasarathy, 2001). The role of privacy has not been studied in this research but may also have an effect on continuance intention. The role of privacy may be captured by a user's perception of the brand from Burnham et al. (2003). Future studies may want to add factors not studied in this research to better understand the predictive power of those factors.

This research examined an individual's intention to continue to use a site, but does not examine the issue at the organizational level or use multi-level analysis. Garcia et al. (2013) suggests that the role of the individual has organizational impacts and can help determine whether a site is growing, in decline, or steady.

The survey questions themselves are agnostic as to whether *switching* means that a user would stop using Facebook, or simply add an additional social networking site to their set of social networking site. The survey question could more clearly define whether *switching* to a new site means removing their accounts from Facebook or adding accounts to other social networking sites and retaining their Facebook account. That is, a user may say they would continue to use Facebook if *switching* to Pinterest account meant they added a Pinterest account and retained their Facebook account; but another interpretation could mean that *switching* to a Pinterest account means they will add Pinterest and remove their Facebook account.

The practical significance of the coefficients should be examined as well as the statistical significance. Statistical significance in this research may be

more easily found because there is a large sample size ($N = 1302$). Practical significance is related to the magnitude of the path coefficients. Age, for example, in this research is statistically significant ($t = 3.826$) but the path coefficient is so small ($\beta = 0.055$) to not offer much practical significance. Hair et al. (2006) states that factor loadings $\pm.5$ are generally acceptable and $\pm.3$ to $\pm.4$ are minimally acceptable. Many of the factor loadings have both statistical and practical significance, but some statistically significant factors do not meet the practical threshold.

10 Conclusion

Understanding the dynamics of the social networking sites provides benefits to researchers and the community. The information system continuance model has been enhanced to include five factors which help explain user continuance decisions. Consumer switching costs have a strong direct effect on continuance intention as found in Burnham et al. (2003). Consumer switching costs are comprised of procedural and relational costs of which relational costs were important factor and procedural costs were not. Relational costs are the losses that occur from leaving a brand and leaving the relationships on social networking site to go to another. Procedural costs include the time it takes to evaluate a new service, setup the service and learn how to use the service. Social networking sites are being introduced in a dynamic environment where new general purpose social networking sites are introduced (e.g. Friendster, MySpace, Facebook, Twitter, Google Plus) and *alternative perceptions* have a strong affect on continuance intention. Facebook users who find alternative services to be a viable alternative show higher discontinuance intention on Facebook. The role of *habit* shows that users who use a social networking site with high rates of habit continue to use the site at higher levels. The moderating effect of habit on satisfaction for continuance intention was not supported. Personal innovativeness may be considered a control variable in this research; there was a small direct effect where those with higher personal innovativeness had higher levels of discontinuance. The role of *personal innovativeness* did not have moderating effect on SNS Continuance where users with high levels of personal innovativeness did not moderate the relationship between satisfaction and continuance intention. *Interpersonal influence* had a small direct effect on continuance intention where those who joined the site

due to their personal relationships were more likely to discontinue use of the site.

The goal of the models in this research was to find factors that explained more of the variance of continuance intention on social networking sites by adding five additional factors to IS continuance (Bhattacherjee, 2001). The non-moderated model explains approximately 76.7% of the variance of continuance intention, a substantial amount according to Hair et al. (2011) and is considered a large increase over the IS continuance model level of explained variance of (66.8%). The research examined five constructs, personal innovativeness, habit, alternative perceptions, interpersonal influence, and procedural and relational switching costs to predict continuance intentions. Five of seven hypotheses were supported by this research - all major direct effects were supported and two moderating effects were not supported.

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A Common Method Variance

Common method variance results are shown using a common method factor as described by Podsakoff et al. (2003) and Liang et al. (2007). The analysis was performed on the complete non-moderated model.

Table 43: Common Method Bias Analysis

Construct	**Indicator**	**Substantive Factor Loading (S)**	**Path Coefficient (S)**	**Method Factor Loading (M)**	**Path Coefficient (M)**
Alternative Attractiveness	AltAtt1	0.7235	0.5235	0.1640	0.0269
	AltAtt2	0.7369	0.5430	0.1572	0.0247
	AltAtt3	0.8653	0.7487	0.0478	0.0023
	AltAtt4	0.8165	0.6667	-0.0723	0.0052
	AltAtt5	0.7650	0.5852	-0.1370	0.0188
Attitude Toward Switching	AttSwitch1	0.8944	0.8000	0.0099	0.0001
	AttSwitch2	0.9300	0.8649	0.0837	0.0070
	AttSwitch3	0.7638	0.5834	-0.0112	0.0001
	AttSwitch4	0.8488	0.7205	-0.0067	0.0000

Table 43: Common Method Bias Analysis

Construct	Indicator	Substantive Factor Loading (S)	Path Coefficient (S)	Method Factor Loading (M)	Path Coefficient (M)
	AttSwitch5	0.8439	0.7122	-0.0108	0.0001
	AttSwitch6	0.8968	0.8043	-0.0312	0.0010
BrandRelationship	Brand1	0.7691	0.5915	0.0994	0.0099
	Brand2	0.8497	0.7220	-0.0759	0.0058
	Brand3	0.7632	0.5825	-0.0377	0.0014
Continuance	Cont1	0.9028	0.8150	0.0257	0.0007
	Cont2	0.7443	0.5540	0.1103	0.0122
	Cont3	0.8787	0.7721	-0.1666	0.0278
Habit	Habit1	0.9133	0.8341	-0.0196	0.0004
	Habit2	0.9347	0.8737	-0.0224	0.0005
	Habit3	0.6503	0.4229	0.0576	0.0033
Interpersonal Influence	Interpers1	0.8966	0.8039	0.0024	0.0000
	Interpers2	0.7838	0.6143	-0.1013	0.0103
	Interpers3	0.4122	0.1699	0.0364	0.0013

Table 43: Common Method Bias Analysis

Construct	**Indicator**	**Substantive Factor Loading (S)**	**Path Coefficient (S)**	**Method Factor Loading (M)**	**Path Coefficient (M)**
	Interpers4	0.8549	0.7309	-0.0118	0.0001
Personal Innovativeness	PI1	0.8451	0.7142	0.0248	0.0006
	PI2	0.7121	0.5071	-0.0744	0.0055
	PI3	0.8122	0.6597	0.1193	0.0142
	PI4	0.9132	0.8339	0.0313	0.0010
	PI5	0.8742	0.7642	-0.0938	0.0088
Perceived usefulness	PU1	0.9082	0.8248	-0.0863	0.0074
	PU2	0.6850	0.4692	0.1211	0.0147
	PU3	0.9033	0.8160	-0.0394	0.0016
	PU4	0.6816	0.4646	-0.0259	0.0007
ProcCost	ProcCost1	0.6243	0.3898	0.0934	0.0087
	ProcCost2	0.7642	0.5840	-0.0310	0.0010
	ProcCost3	0.7994	0.6390	0.0212	0.0004

Table 43: Common Method Bias Analysis

Construct	Indicator	Substantive Factor Loading (S)	Path Coefficient (S)	Method Factor Loading (M)	Path Coefficient (M)
	ProcCost4	0.7987	0.6379	-0.0875	0.0077
ProcEval	ProcEval1	0.8461	0.7159	0.0619	0.0038
	ProcEval2	0.8755	0.7665	-0.1024	0.0105
	ProcEval3	0.6488	0.4209	0.0274	0.0008
	ProcEval4	0.2070	0.0428	0.2070	0.0428
ProcLearn	ProcLearn1	0.7749	0.6005	0.0116	0.0001
	ProcLearn2	0.5825	0.3393	-0.1714	0.0294
	ProcLearn3	0.7516	0.5649	0.1130	0.0128
	ProcLearn4	0.8107	0.6572	-0.0684	0.0047
Procedural Relationship	ProcRel1	0.8852	0.7836	-0.0781	0.0061
	ProcRel2	0.4350	0.1892	0.4350	0.1892
	ProcRel3	0.9144	0.8361	-0.1937	0.0375
	ProcRel4	0.8184	0.6698	-0.0395	0.0016
	ProcRel5	0.8820	0.7779	-0.1844	0.0340

Table 43: Common Method Bias Analysis

Construct	**Indicator**	**Substantive Factor Loading (S)**	**Path Coefficient (S)**	**Method Factor Loading (M)**	**Path Coefficient (M)**
P:rocedural Setup	ProcSetup1	0.7189	0.5168	0.0139	0.0002
	ProcSetup2	0.7646	0.5846	-0.0003	0.0000
	ProcSetup3	0.6738	0.4540	0.0227	0.0005
	ProcSetup4	0.7376	0.5441	-0.0377	0.0014
Satisfaction	Sat1	0.9603	0.9222	0.0097	0.0001
	Sat2	0.9801	0.9606	-0.0270	0.0007
	Sat3	0.9503	0.9031	0.0074	0.0001
Confirmation	Conf1	0.8679	0.7533	0.0253	0.0006
	Conf2	0.8309	0.6904	-0.0081	0.0001
	Conf3	0.6167	0.3803	0.0383	0.0015
	Conf4	0.8605	0.7405	-0.0510	0.0026
Average		***0.7894***	***0.6419***	***0.0012***	***0.0101***

B Outer Loading Analysis

Outer loadings analysis of the complete non-mediated model.

Table 44: Outer Loading Analysis

Construct	Indicator	Loading	C.R.	Cronbach's Alpha
Alternative Attractiveness	AltAtt1	0.7454	0.9012	0.8627
	AltAtt2	0.7031		
	AltAtt3	0.8594		
	AltAtt4	0.8595		
	AltAtt5	0.8428		
Attitude Toward Switching	AttSwitch1	0.909	0.9440	0.9286
	AttSwitch2	0.8336		
	AttSwitch3	0.7989		
	AttSwitch4	0.8689		
	AttSwitch5	0.8522		
	AttSwitch6	0.8872		
BrandRelationship	Brand1	0.8812	0.8638	0.7634
	Brand2	0.875		
	Brand3	0.7076		
Continuance	Cont1	0.9118	0.8831	0.8004
	Cont2	0.8413		
	Cont3	0.7813		

Table 44: Outer Loading Analysis

Construct	Indicator	Loading	C.R.	Cronbach's Alpha
Habit	Habit1	0.9088	0.9079	0.8469
	Habit2	0.9082		
	Habit3	0.8067		
Interpersonal Influence	Interpers1	0.8527	0.8599	0.7954
	Interpers2	0.6336		
	Interpers3	0.7569		
	Interpers4	0.8564		
Personal Innovativeness	PI1	0.8545	0.9219	0.8987
	PI2	0.7111		
	PI3	0.8989		
	PI4	0.8913		
	PI5	0.8252		
Perceived usefulness	PU1	0.8974	0.8939	0.8397
	PU2	0.7870		
	PU3	0.9057		
	PU4	0.6907		
ProcCost	ProcCost1	0.715	0.8382	0.7421
	ProcCost2	0.7469		
	ProcCost3	0.7975		

Table 44: Outer Loading Analysis

Construct	Indicator	Loading	C.R.	Cronbach's Alpha
	ProcCost4	0.7439		
ProcEval	ProcEval1	0.8074	0.8181	0.6703
	ProcEval2	0.6889		
	ProcEval3	0.8231		
	ProcEval4	N/A		
ProcLearn	ProcLearn1	0.8098	0.859	0.7832
	ProcLearn2	0.7201		
	ProcLearn3	0.8057		
	ProcLearn4	0.7699		
Personal Relationship Loss	ProcRel1	0.8306	0.8990	0.8585
	ProcRel2	0.6845		
	ProcRel3	0.8043		
	ProcRel4	0.8338		
	ProcRel5	0.8412		
P:rocedural Setup	ProcSetup1	0.8119	0.8530	0.7707
	ProcSetup2	0.8042		
	ProcSetup3	0.6525		
	ProcSetup4	0.8021		
Satisfaction	Sat1	0.9685	0.9758	0.9629

Table 44: Outer Loading Analysis

Construct	Indicator	Loading	C.R.	Cronbach's Alpha
	Sat2	0.9700		
	Sat3	0.9559		
Confirmation	Conf1	0.9145	0.8969	0.8427
	Conf2	0.8817		
	Conf3	0.5842		
	Conf4	0.8994		

C SNS Continuance and Habit

C.1 Model Description

The base model includes the measures from the IS Continuance Model of Bhattacherjee (2001) and examines the direct and moderating effects of *habit*. The model uses the independent constructs confirmation, perceived usefulness, satisfaction and habit to predict information systems continuance intention. Habit is theorized to have a moderating effect on Continuance through the satisfaction continuance path.

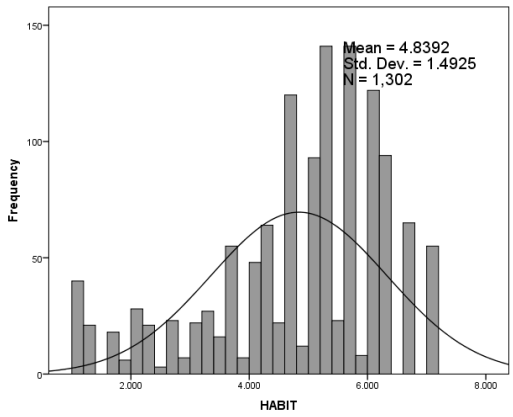


Figure 47: Habit Histogram

C.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations

Table 45: Base Model + Habit Measurement Model

Construct	AVE	Composite Reliability
Confirmation	0.6907	0.8968
Perceived Usefulness	0.6804	0.8938
Satisfaction	0.9308	0.9758
Continuance	0.7177	0.8837
Habit	0.7657	0.9072
Sat * Habit	0.766	0.9671

Table 46: Base Model + Habit Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	CONF	CONTINUANCE	HABIT	PU	SAT	SAT * HABIT
CONF	**0.8311**					
CONTINUANCE	0.7118	**0.8472**				
HABIT	0.6348	0.6970	**0.8750**			
PU	0.5994	0.6324	0.6562	**0.8249**		
SAT	0.7887	0.7879	0.6233	0.5990	**0.9648**	
SAT * HABIT	-0.2618	-0.3627	-0.4440	-0.3133	-0.2713	**0.8752**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 46. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

Table 47: Base Model + Habit Structural Model

Goodness of Fit (moderated model)
.6590

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	$\mathbf{R^2}$	$\mathbf{Q^2}$
Perceived Usefulness	0.3592	0.2435
Satisfaction	0.6469	0.6021
Continuance	0.7116	0.5057

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

C.3 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction and habit to predict information systems continuance intention.. The predictors confirmation, perceived usefulness, satisfaction, habit and satisfaction moderated by habit explain approximately 71.2% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[25]; the model also exhibits predictive relevance (Q^2) where its value is 0.5057 (scores above zero indicate predictive relevance in PLS path models). Satisfaction had the strongest predictive ability for satisfaction with a standardized path coefficient of .5224 (t = 22.8887*)* followed by Habit (.2633, t = 10.3241) and perceived usefulness with a standardized path coefficient of 0.2268 (t = 8.8468). The moderating effect of Habit * Satisfaction had the smallest effect (-0.0683, t = 4.3531). The coefficients that are positive indicate that are associated with higher levels of continuance intention. The moderating effect is negative most likely due to multi-collinearity.

[25]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
Theoretical Model		
Continuance Path Coefficients		
SAT → CONTINUANCE	0.5224	22.8887
HABIT → CONTINUANCE	0.2631	10.3241
PU → CONTINUANCE	0.1238	4.931
SAT * HABIT → CONTINUANCE	-0.0683	4.3531
Other Path Coefficients		
CONF → PU	0.5994	30.9255
CONF → SAT	0.6705	33.4842
PU → SAT	0.1971	8.8051
Total Effects		
Continuance Path Coefficients		
CONF → CONTINUANCE	0.4870	25.3226
SAT → CONTINUANCE	0.5226	22.8887
HABIT → CONTINUANCE	0.2633	10.3241
PU → CONTINUANCE	0.2275	8.8468
age → CONTINUANCE	0.0963	6.2138
SAT * HABIT → CONTINUANCE	-0.0671	4.3531
gender → CONTINUANCE	0.0199	1.3412

Relation	Path Coefficient	T-statistic
Education → CONTINUANCE	0.0145	0.8938
Other Path Coefficients		
CONF → PU	0.6000	30.9255
CONF → SAT	0.7890	68.2235
PU → SAT	0.1975	8.8051

C.4 Moderating Effect Analysis

The results of the moderating term are less than small according to Chin et al. (2003). The R^2 for the non-moderated model is .7076 and for the moderated model it is .7116. The path coefficient for *satisfaction* in the moderated and non-moderated model are .5224 and .5222, respectively. There is no change in the path coefficient for *perceived usefulness* to *satisfaction* (.1971). The moderating t-statistic ($t = 4.3531$) indicates that it is statistically significant although the effect size f^2 is .0139 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .02) based on *Chin et al. (2003)*.

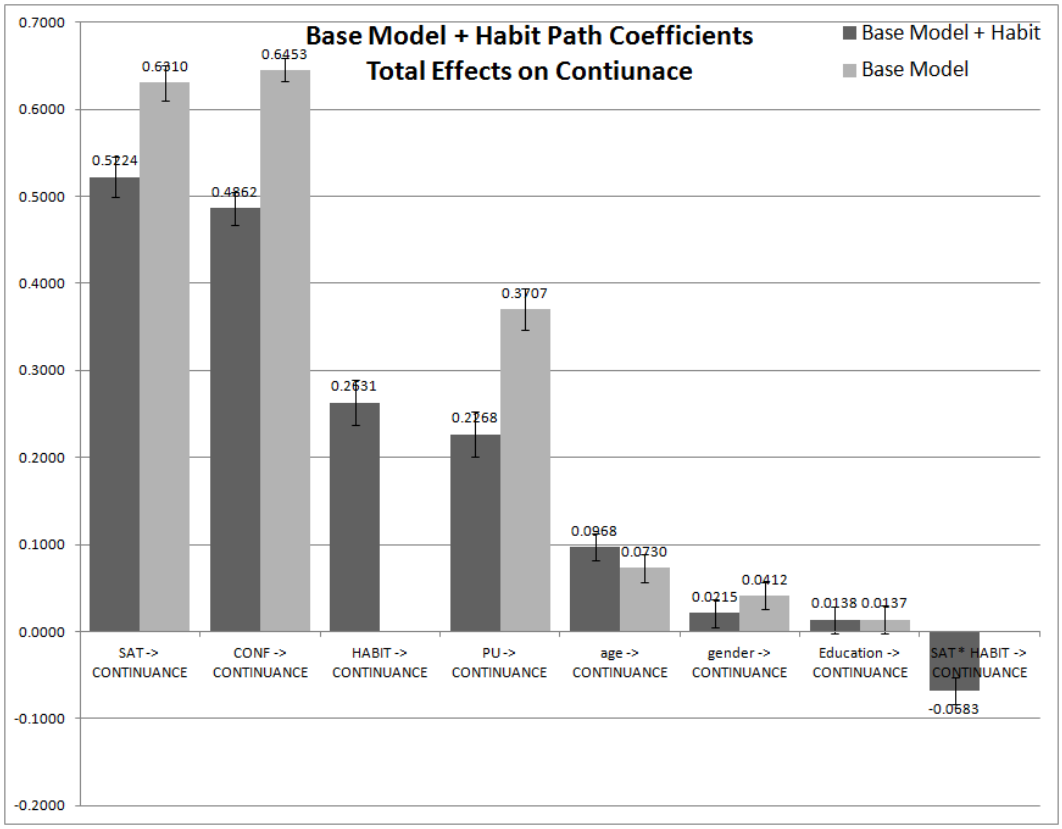


Figure 48: Base Model And Habit Path Coefficients on SNS Continuance

D SNS Continuance and Personal Innovativeness

D.1 Model Description

The base model includes the measures from the IS Continuance Model of Bhattacherjee (2001) and examines the direct and moderating effects of *personal innovativeness*. The model uses the independent constructs confirmation, perceived usefulness, satisfaction and personal innovativeness to predict information systems continuance intention. Personal innovativeness is theorized to have a moderating effect on continuance through the satisfaction continuance path.

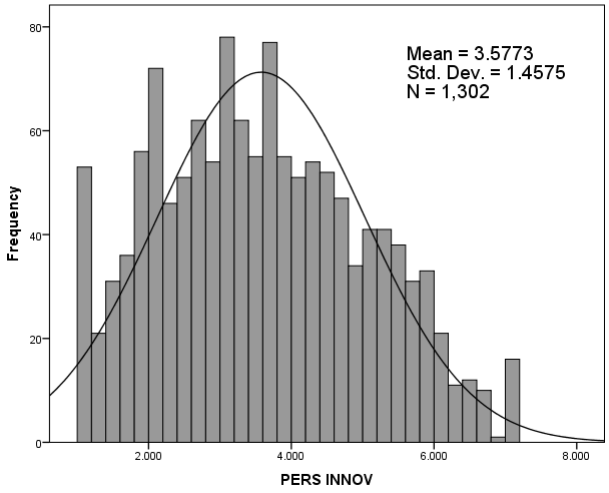


Figure 49: Personal Innovativeness Histogram

D.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal

Table 49: Base Model + Personal Innovativeness Measurement Model

Construct	AVE	Composite Reliability
Confirmation	0.6907	0.8968
Perceived Usefulness	0.6804	0.8938
Satisfaction	0.9308	0.9758
Continuance	0.7179	0.8839
Personal innovativeness	0.7040	0.9220
Sat * Personal innovativeness	0.6308	0.9616

consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 50. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

D.3 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction and personal innovativeness to predict information systems continuance intention.. The predictors confirmation, perceived usefulness, satisfaction, personal innovativeness and satisfaction moderated by habit explain approximately 68.4% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[26]; the model also exhibits predictive relevance (Q^2) where its value is .4878 (scores above zero indicate predictive relevance in PLS path

[26]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Table 50: Base Model + Personal Innovativeness - Discriminant Validity

Fornell and Larcker (1981)Criterion

	CONF	CONTINUANCE	PU	Personal Innovativeness	SAT	SAT * Personal Innovativeness
CONF	**0.8311**					
CONTINUANCE	0.7108	**0.8473**				
PU	0.5994	0.6302	**0.8249**			
Personal Innovativeness	-0.0427	-0.1618	-0.0291	**0.8390**		
SAT	0.7887	0.7877	0.5990	-0.0382	**0.9648**	
SAT * Personal Innovativeness	-0.0284	-0.0548	-0.0368	-0.0294	-0.0306	**0.7942**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

Table 51: Base Model + Personal Innovativeness Structural Model

Goodness of Fit (moderated model)
0.6394

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	$\mathbf{R^2}$	$\mathbf{Q^2}$
Perceived Usefulness	0.3592	0.2435
Satisfaction	0.6469	0.6021
Continuance	0.6839	0.4878

R^2 coefficient of determination
Q^2 predictive relevance. Scores above zero indicate predictive relevance.

models). Satisfaction had the strongest predictive ability for satisfaction with a standardized path coefficient of .6242 (t = 28.9068) followed by perceived usefulness with a standardized path coefficient of .2465 (t = 9.962) and personal innovativeness (-.1303, t = 8.3021). The moderating effect of personal innovativeness * Satisfaction had the smallest effect (-0.0305, t =1.4605). The coefficients that are positive indicate that are associated with higher levels of continuance intention.

Relation	Path Coefficient	T-statistic
Theoretical Model		
Continuance Path Coefficients		
SAT → CONTINUANCE	0.6242	28.9068
PU → CONTINUANCE	0.2465	9.962
PersonalInnovativeness → CONTINUANCE	-0.1303	8.3021
SAT * PersonalInnovativeness → CONTINUANCE	-0.0305	1.4605
Other Path Coefficients		
CONF → PU	0.5994	31.596
CONF → SAT	0.6705	32.1036
PU → SAT	0.1971	8.4888
Total Effects		
Continuance Path Coefficients		
CONF → CONTINUANCE	0.6389	46.4045
SAT → CONTINUANCE	0.6234	28.9068
PU → CONTINUANCE	0.3693	14.9739
PersonalInnovativeness → CONTINUANCE	-0.1312	8.3021
age → CONTINUANCE	0.0720	4.2785
gender → CONTINUANCE	0.0373	2.3325

Relation	Path Coefficient	T-statistic
SAT * PersonalInnovativeness → CONTINUANCE	-0.0292	1.4588
Ed → CONTINUANCE	0.0082	0.5400
Other Path Coefficients		
CONF → PU	0.5995	31.5960
CONF → SAT	0.7881	69.4189
PU → SAT	0.1979	8.4888

D.4 Moderating Effect Analysis

The results of the moderating term are less than small according to Chin et al. (2003). The R^2 for the non-moderated model is 0.6830 and for the moderated model it is 0.6839. The path coefficient for Satisfaction in the moderated and non-moderated model are .6242 and .6247, respectively. The path coefficient for perceived usefulness in the moderated and non-moderated model are 0.2465 and 0.2473, respectively.. The path coefficient for personal innovativeness changed from -.1303 (moderated model) to -.1293 (non-moderated model). The moderating t-statistic indicates that it is not statistically significant (t = 1.4588); the effect size f^2 is 0.0028 which does not meet the threshold for to be considered as having an effect (threshold for small effects (f^2) is .0200) based on *Chin et al. (2003)*.

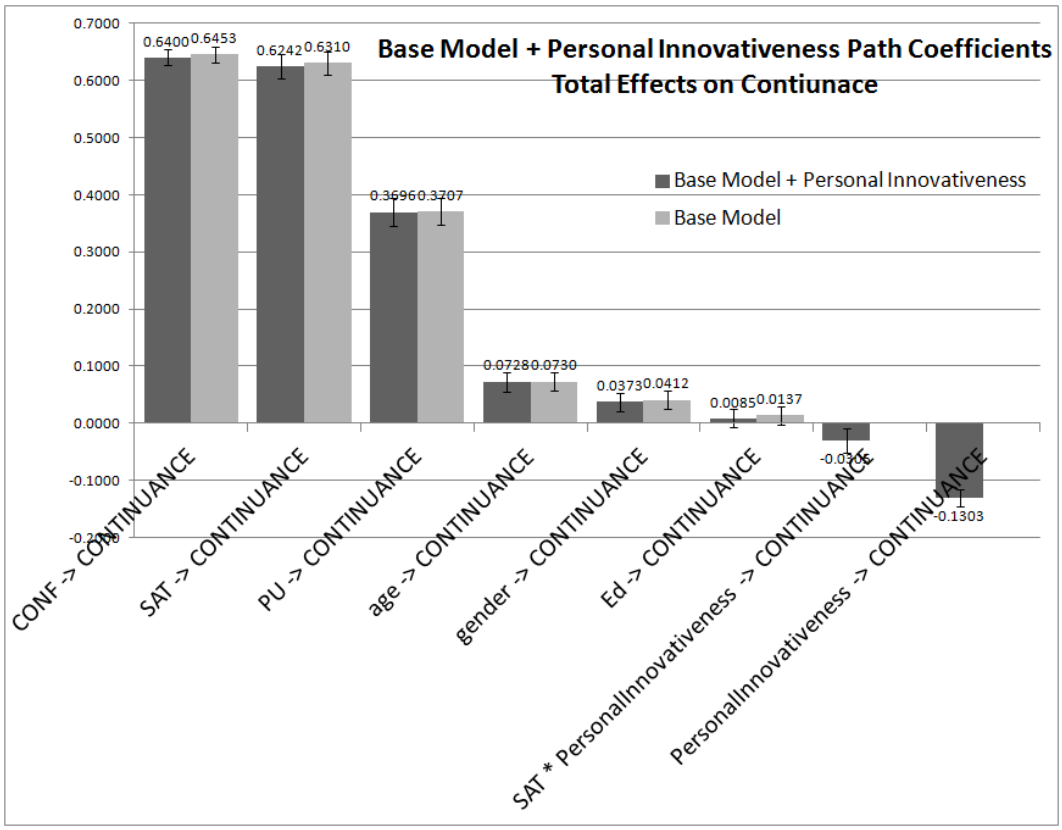


Figure 50: Base Model And Personal Innovativeness Path Coefficients on SNS Continuance

E SNS Continuance and Interpersonal Influence

E.1 Model Description

The base model includes the measures from the IS Continuance Model of Bhattacherjee (2001) and examines the direct effects of *interpersonal influence*. The model uses the independent constructs confirmation, perceived usefulness, satisfaction and interpersonal influence to predict information systems continuance intention.

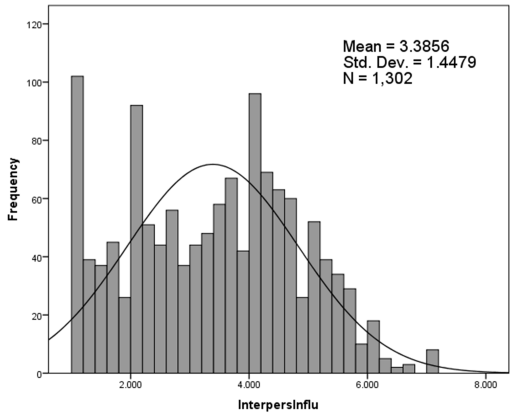


Figure 51: Interpersonal Influence Histogram

E.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 54.

Table 53: Base Model + Interpersonal Influence Measurement Model

Construct	AVE	Composite Reliability
CONF	0.691	0.8969
CONTINUANCE	0.7164	0.8831
InterpersInfluence	0.6072	0.8591
PU	0.6804	0.8938
SAT	0.9309	0.9758

Table 54: Base Model + Interpersonal Influence Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	CONF	CONTINUANCE	Interpers Influence	PU	SAT
CONF	**0.8313**				
CONTINUANCE	0.7112	**0.8464**			
Interpers Influence	0.2111	0.1028	**0.7792**		
PU	0.5992	0.6293	0.2565	**0.8249**	
SAT	0.7880	0.7889	0.1101	0.5983	**0.9648**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

E.3 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction and habit to predict

Table 55: SNS Continuance Structural Model and Interpersonal Influence

Goodness of Fit
0.6360

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	**R^2**	**Q^2**
CONTINUANCE	0.6685	0.4716
PU	0.3590	0.2433
SAT	0.6457	0.6010

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

information systems continuance intention.. The predictors confirmation, perceived usefulness, satisfaction, habit and satisfaction moderated by habit explain approximately 66.9% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[27]; the model also exhibits predictive relevance (Q^2) where its value is 0.4716 (scores above zero indicate predictive relevance in PLS path models). Satisfaction had the strongest predictive ability for satisfaction with a standardized path coefficient of .6294 (t = 30.4700) followed by perceived usefulness (.2543, t = 10.3447). Interpersonal influenced did not have a statistically significant effect on continuance; the path coefficient was -.0289 (t = 1.7005). The coefficients that are positive indicate that are associated with higher levels of continuance intention.

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		

[27]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
SAT → CONTINUANCE	0.6294	30.4700
PU → CONTINUANCE	0.2543	10.3447
Interpers Influence → CONTINUANCE	-0.0289	1.7005
Other Path Coefficients		
CONF → SAT	0.6700	32.7312
CONF → PU	0.5992	31.5449
PU → SAT	0.1968	8.8316
Total Effects		
Continuance Path Coefficients		
CONF → CONTINUANCE	0.6487	46.0435
SAT → CONTINUANCE	0.6300	30.4700
PU → CONTINUANCE	0.3769	15.0685
age → CONTINUANCE	0.0711	4.1547
gender→ CONTINUANCE	0.0422	2.5614
InterpersInfluence → CONTINUANCE	-0.027	1.7005
education → CONTINUANCE	0.0133	0.7563
Other Path Coefficients		
CONF → PU	0.5998	31.5449
CONF → SAT	0.7882	68.8001

Relation	Path Coefficient	T-statistic
PU → SAT	0.1961	8.8316

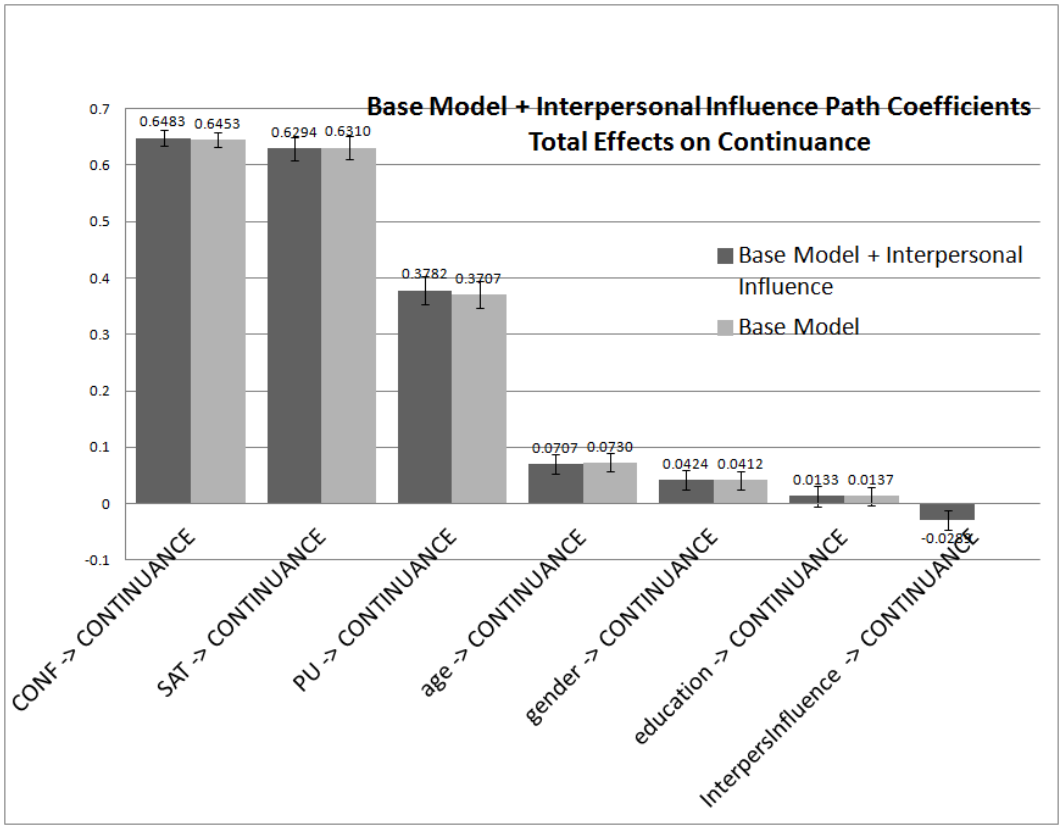


Figure 52: Base Model And Habit Path Coefficients on SNS Continuance

F SNS Continuance and Alternative Perceptions

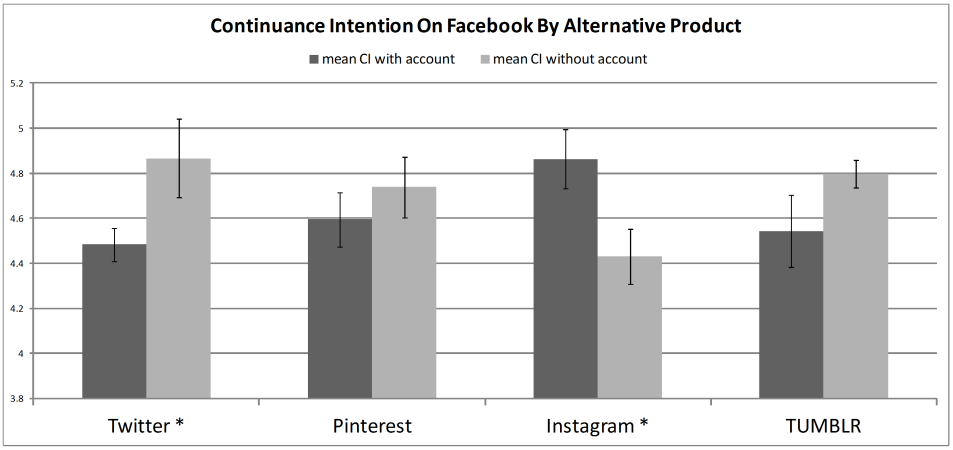
F.1 Four Alternative Social Networking Site Account Impact

ANCOVA was analyzed to determine whether simply having an account with one of four sites impacts continuance intention and measure any statistically significant differences between account holders of the specific sites and non-account holders. The analysis included covariates age and gender to adjust for differences. The dependent variable is continuance intention on Facebook. Two sites had statistically significant impacts; Twitter users were *more* likely to *discontinue* use of Facebook than those who did not use Twitter, and Instagram users were *more* likely to *continue* to use Facebook than those who did not use Instagram. Whether a user had a Pinterest or Tumblr account did not make a statistically significant difference on continuance intention. The adjusted coefficient of determination (R^2) was .057 and indicates that the model has less than a weak level of explanatory power (Hair et al., 2011). See Table 57and Figure 53for details.

Table 57: Four Alternative SNS Account Impacts

	N	**CI**	***p***	
Uses Twitter	708	4.483	0.043	*
Does Not Use Twitter	210	4.866		
Uses Pinterest	460	4.594	0.430	
Do Not Use Pinterest	458	4.738		
Uses Instagram	420	4.863	0.016	*
Do Not Use Instagram	294	4.431		
Uses Tumblr	159	4.798	0.136	
Do Not Use Tumblr	759	4.542		

CI is the continuance intention on *Facebook*, *: $p < .05$



CI is the continuance intention on *Facebook*

Figure 53: Four Alternatives SNS Account Impact

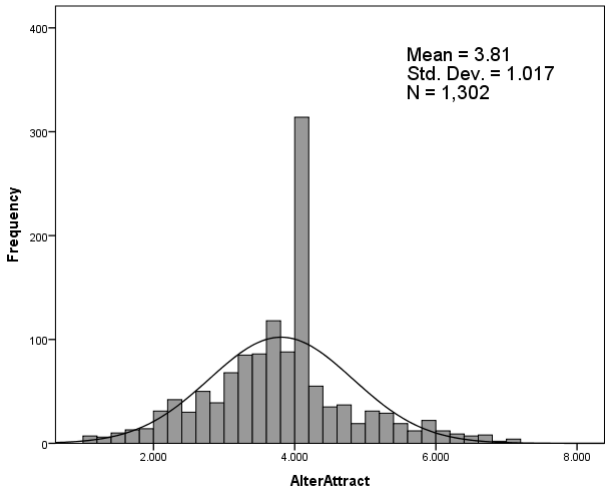


Figure 54: Alternative Attractiveness Histogram

F.2 Model Description

The base model includes the measures from the IS Continuance Model of Bhattacherjee (2001) and examines the direct effects of *alternative perceptions*. The model uses the independent constructs confirmation, perceived usefulness, satisfaction and alternative perceptions to predict information systems continuance intention. Alternative perceptions is a reflective-formative construct that is composed of alternative attractiveness and attitude toward switching.

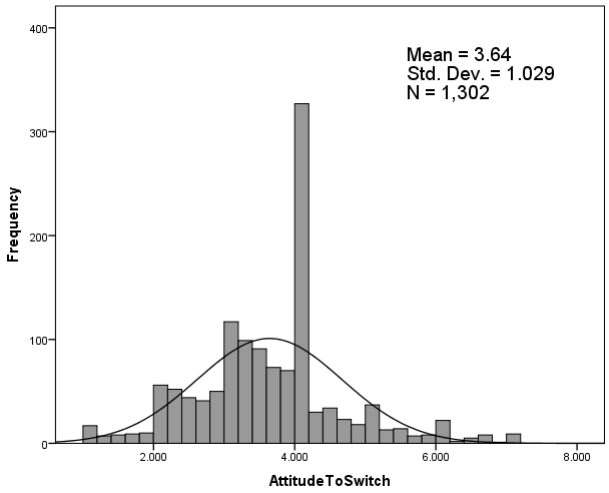
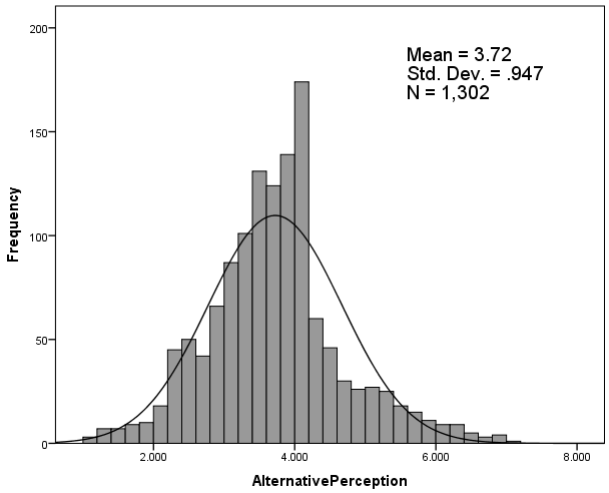


Figure 55: Attitude To Switch Histogram



Combined second-order construct of Alternative Attractiveness and Attitude to Switch

Figure 56: *Second Order Construct:* Alternative Perceptions Histogram

Table 58: IS Continuance Measurement Model with Alternative Perceptions

Construct	AVE	Composite Reliability
Alter Attract	0.6476	0.9012
Attitude To Switch	0.7380	0.9440
CONF	0.6910	0.8969
CONTINUANCE	0.7166	0.8832
PU	0.6804	0.8938
SAT	0.9309	0.9758

F.3 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 59. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

F.4 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction and habit to predict

Table 59: IS Continuance Measurement Model with Alternative Perceptions - Discriminant Validity

Fornell and Larcker (1981)Criterion

	Alter Attract	**Attitude To Switch**	**CONF**	**CONTINUANCE**	**PU**	**SAT**
Alter Attract	**0.8047**					
Attitude To Switch	0.5751	**0.8591**				
CONF	-0.4942	-0.4413	**0.8313**			
CONTINUANCE	-0.6133	-0.5523	0.7109	**0.8465**		
PU	-0.3717	-0.3510	0.5992	0.6289	**0.8249**	
SAT	-0.5658	-0.4567	0.7880	0.7874	0.5983	**0.9648**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

information systems continuance intention.. The predictors confirmation, perceived usefulness, satisfaction, habit and satisfaction moderated by habit explain approximately 72.1% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[28]; the model also exhibits predictive relevance (Q^2) where its value is .5097 (scores above zero indicate predictive relevance in PLS path models). Satisfaction had the strongest predictive ability for satisfaction with a standardized path coefficient of .472 (t = 20.9223) followed by alternative perceptions (-.294, t = 14.1585) and perceived usefulness (.216, t = 10.0472). The coefficients that are positive indicate that are associated with higher levels of continuance intention. Survey respondents who had higher attitudes toward switching and were attracted to alternatives were less likely to continue use of Facebook.

[28]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Table 60: IS Continuance Structural Model and Alternative Perceptions

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
CONTINUANCE	0.7205	0.5097
PU	0.3590	0.2433
SAT	0.6457	0.6010
Alternative Perceptions	N/A	0.5344

R2 coefficient of determination

Q2 predictive relevance. Scores above zero indicate predictive relevance.

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		
SAT → CONTINUANCE	0.4720	20.9223
Alternative Perception → CONTINUANCE	-0.2940	14.1585
PU → CONTINUANCE	0.2158	10.0472
Other Path Coefficients		
CONF → SAT	0.6700	32.0814
CONF → PU	0.5992	31.5416
Alter Attract → Alternative Perception	0.6667	18.6091
Attitude To Switch → Alternative Perception	0.4502	11.2022
PU → SAT	0.1968	8.6327
Total Effects		

Relation	Path Coefficient	T-statistic
Continuance Path Coefficients		
CONF → CONTINUANCE	0.5012	26.5944
SAT → CONTINUANCE	0.4720	20.9223
Alternative Perception → CONTINUANCE	-0.2940	14.1585
PU → CONTINUANCE	0.3086	13.8792
Alter Attract → CONTINUANCE	-0.1960	12.1855
Attitude To Switch → CONTINUANCE	-0.1323	8.2601
age → CONTINUANCE	0.0600	3.9292
gender → CONTINUANCE	0.0495	3.3283
education → CONTINUANCE	0.0091	0.5881
Other Path Coefficients		
CONF → SAT	0.788	65.9009
CONF → PU	0.5992	31.5416
Alter Attract → Alternative Perception	0.6667	18.6091
Attitude To Switch → Alternative Perception	0.4502	11.2022
PU → SAT	0.1968	8.6327

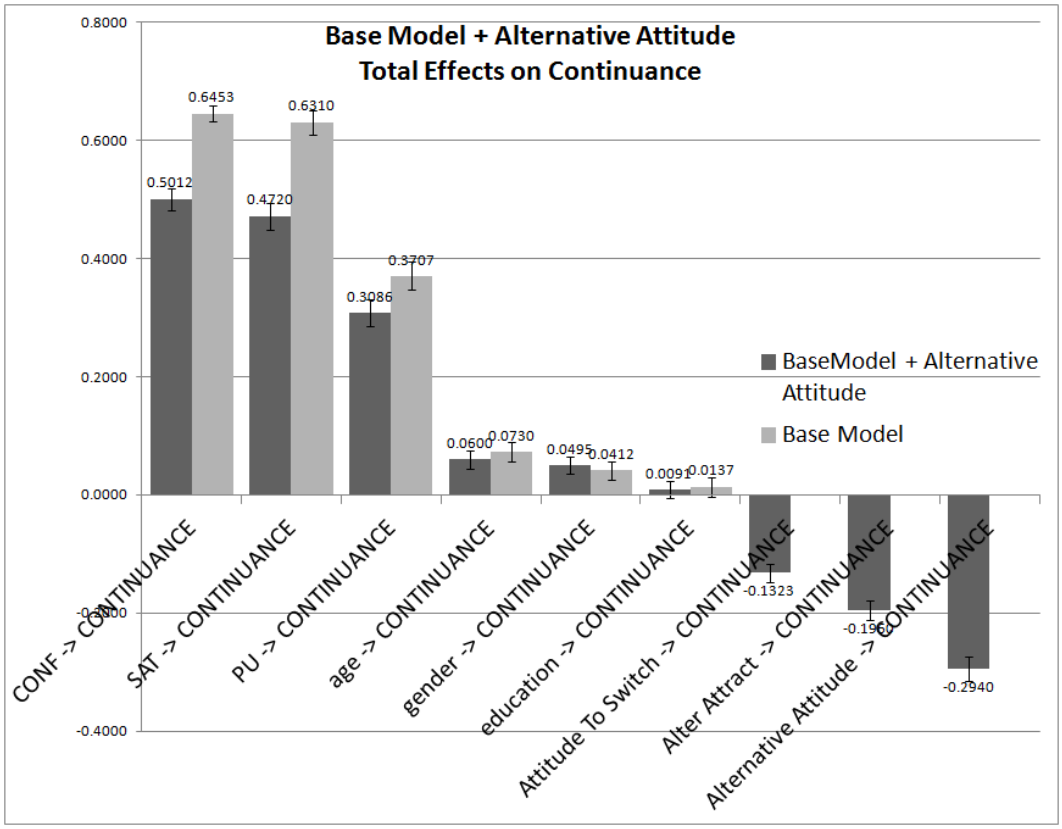


Figure 57: Base Model And Habit Path Coefficients on SNS Continuance

G Predicting SNS Continuance through Costs

G.1 Model Description

The model includes the measures from the Burnham et al. (2003) and examines the effects of two categories of costs: procedural and relational. The Burnham et al. (2003) includes three costs - procedural, financial and relational; however, for the majority of social networking sites, and for Facebook in particular, there are no financial costs. The model uses the independent constructs economic risk, evaluation costs, learning costs and setup costs (procedural costs) and personal relationship loss and brand relationship loss (relational costs) to predict information systems continuance intention. The costs reflect the cost to leave the current service provider, i.e. the higher the cost the more likely the customer is to stay with the current provider. The model is generated with second- and third-order constructs that combine the effects of lower-level constructs; the higher order constructs are reflective-formative in nature.

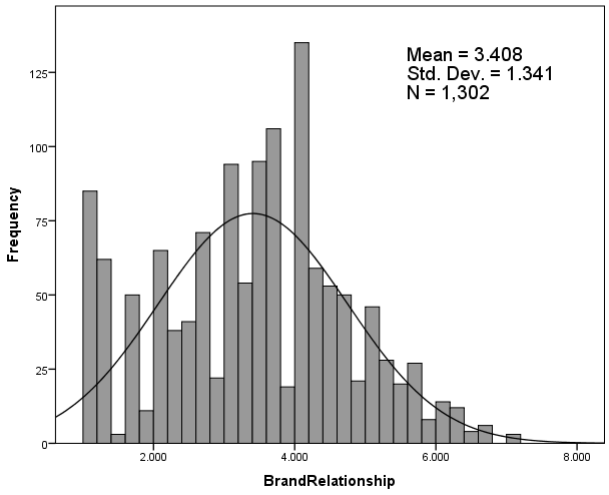


Figure 58: Brand Relationship Histogram

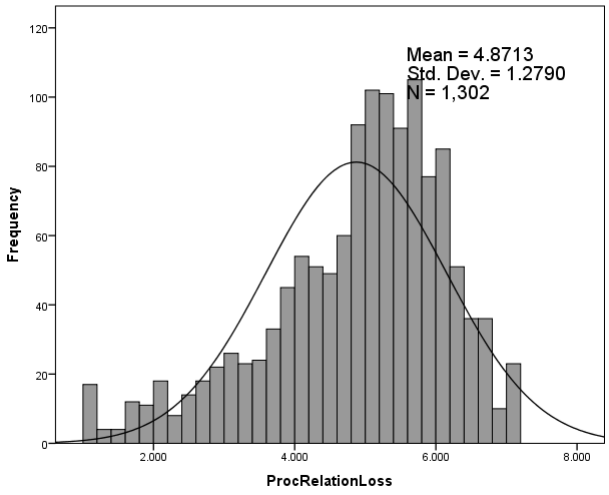


Figure 59: Personal Relationship Histogram

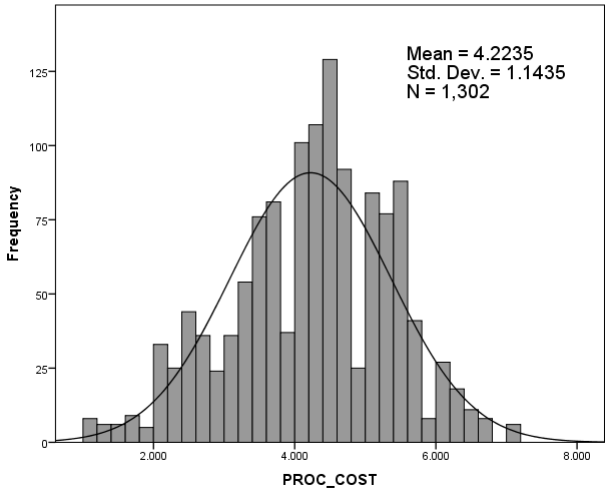


Figure 60: Procedural Economic Cost Histogram

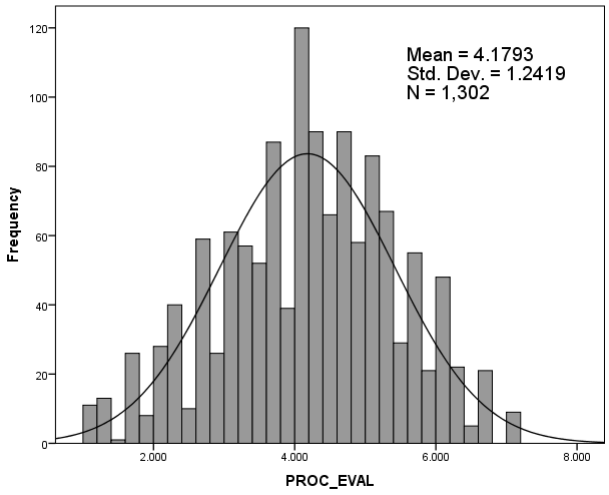


Figure 61: Procedural Evaluation Cost Histogram

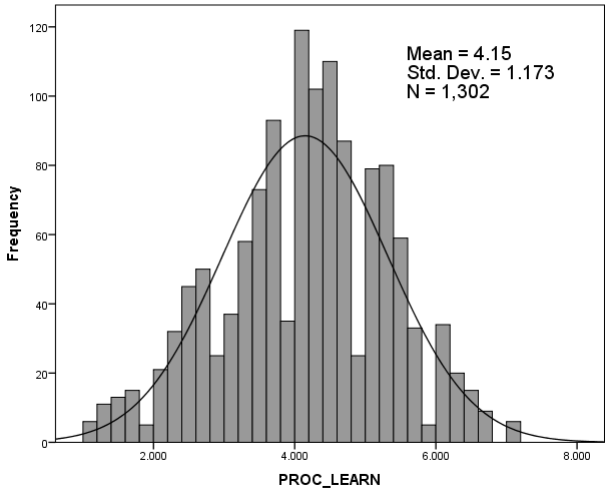


Figure 62: Procedural Learning Cost Histogram

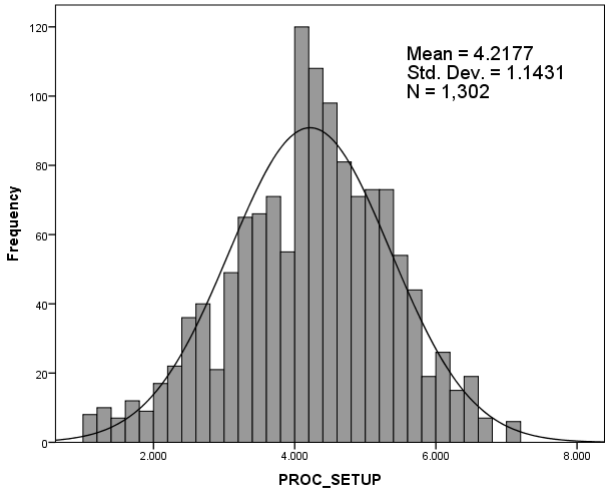
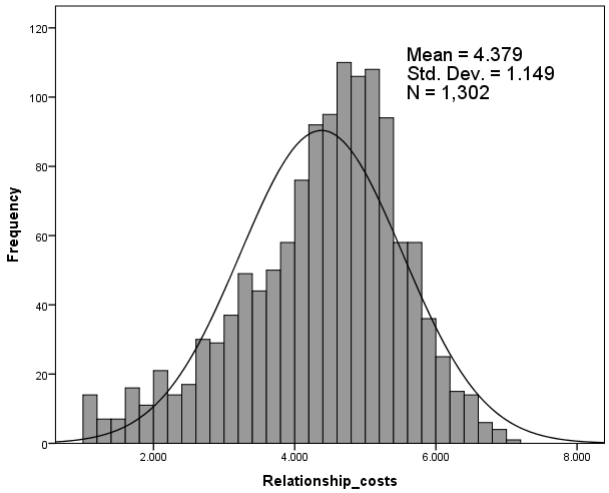
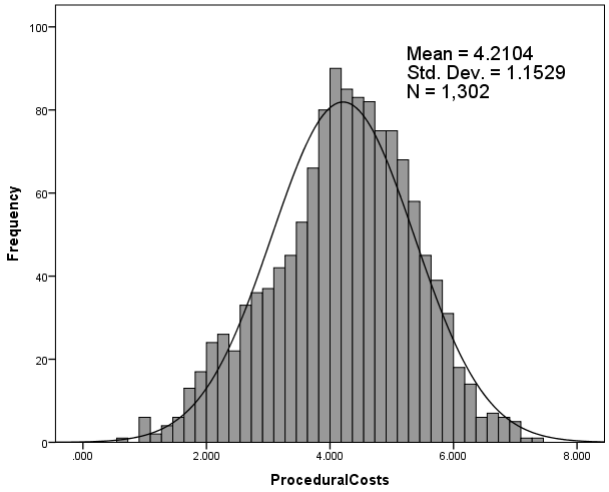


Figure 63: Procedural Setup Cost Histogram



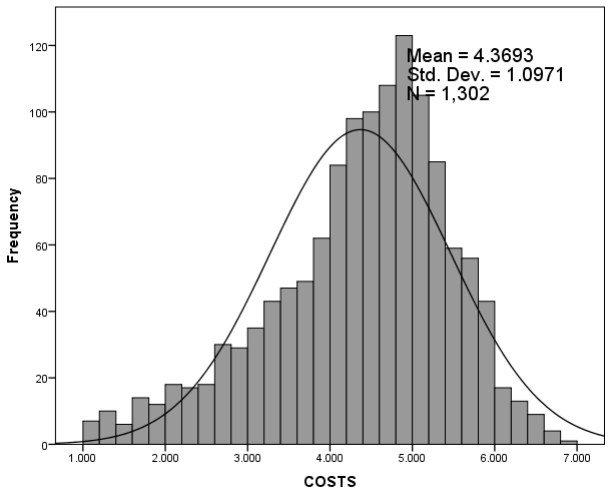
Combined second order construct of Brand Relationship and Personal Relationship Costs

Figure 64: *Second Order Construct:* Relationship Cost Histogram



Combined second order construct of Procedural Economic Cost, Procedural Evaluation Cost, Procedural Learning Cost and Procedural Setup Cost

Figure 65: *Second Order Construct:* Procedural Cost Histogram



Combined Third order construct of Relationship Cost and Procedural Cost

Figure 66: *Third Order Construct:* Cost Histogram

Table 62: SNS Cost Measurement Model

Construct	AVE	Composite Reliability
BRAND_RELATIONSHIP	0.6809	0.8638
CONTINUANCE	0.7165	0.8830
PROC_COST	0.5646	0.8382
PROC_EVAL	0.6013	0.8181
PROC_LEARN	0.6041	0.8590
PROC_RELATIONSHIP_LOSS	0.6416	0.8990
PROC_SETUP	0.5938	0.8530

G.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 63. The indicators in the reflective measurement models reach satisfactory indicator reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

Table 63: SNS Cost Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	BRAND RELA-TION-SHIP	CON-TINU-ANCE	PROC COST	PROC EVAL	PROC LEARN	RELA-TION-SHIP LOSS	PROC SETUP
BRAND RELA-TIONSHIP	**0.8252**						
CONTIN-UANCE	0.6097	**0.8465**					
PROC COST	0.2221	0.3734	**0.7514**				
PROC EVAL	0.0776	0.2027	0.4839	**0.7754**			
PROC LEARN	0.1776	0.2721	0.6428	0.5004	**0.7772**		
RELA-TIONSHIP LOSS	0.4936	0.7325	0.4668	0.1478	0.3127	**0.8010**	
PROC SETUP	0.1169	0.2886	0.7094	0.5408	0.6849	0.3388	**0.7706**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

Table 64: Indices

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
CONTINUANCE	0.6433	0.4507
Procedural Cost	0.9933	0.3249
Cost	0.9933	0.2178
RELATIONSHIP COSTS	0.9988	0.5006

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

G.3 Structural Model

The structural model was assessed to determine how the independent constructs confirmation, perceived usefulness, satisfaction and habit to predict information systems continuance intention.. The predictors confirmation, perceived usefulness, satisfaction, habit and satisfaction moderated by habit explain approximately 64.3% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[29]; the model also exhibits predictive relevance (Q^2) where its value is .4507 (scores above zero indicate predictive relevance in PLS path models). Cost is the only direct predictor for continuance intention and has standardized path coefficient of .796 ($t = 67.9214$). There are two predictors for cost, the procedural and relationship costs where relationship costs has a higher path coefficient of .981 ($t = 86.6208$) and procedural costs have the lower path coefficient of .035 ($t = 1.5556$). The relationship are statistically significant and the procedural costs are not statistically significant. The coefficients that are positive indicate that are associated with higher levels of continuance intention.

[29]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
Theoretical Model		
Continuance Path Coefficients		
COST → CONTINUANCE	0.7964	67.9214
Other Path Coefficients		
RELATIONSHIP_COSTS → COST	0.9806	86.6208
PROC_RELATIONSHIP_LOSS → RELATIONSHIP_COSTS	0.7339	34.5113
BRAND_RELATIONSHIP → RELATIONSHIP_COSTS	0.4067	16.0826
PROC_COST → PROCEDURAL_COST	0.9483	13.2494
PROC_EVAL → PROCEDURAL_COST	-0.125	1.7337
PROC_LEARN → PROCEDURAL_COST	0.1506	1.6895
PROCEDURAL_COST → COST	0.0351	1.5556
PROC_SETUP → PROCEDURAL_COST	0.004	0.0412
Total Effects		
Continuance Path Coefficients		
COST → CONTINUANCE	0.7964	67.9214
RELATIONSHIP_COSTS → CONTINUANCE	0.781	52.828
PROC_RELATIONSHIP_LOSS → CONTINUANCE	0.5732	31.1804

Relation	Path Coefficient	T-statistic
BRAND_RELATIONSHIP → CONTINUANCE	0.3176	15.1406
Ed → CONTINUANCE	0.0565	3.2817
Age → CONTINUANCE	0.0424	2.6689
PROC_COST → CONTINUANCE	0.0265	1.562
PROCEDURAL_COST → CONTINUANCE	0.028	1.5484
PROC_EVAL → CONTINUANCE	-0.0035	1.1836
PROC_LEARN → CONTINUANCE	0.0042	1.068
Gender → CONTINUANCE	0.0138	0.7793
PROC_SETUP → CONTINUANCE	0.0001	0.0333
Other Path Coefficients		
RELATIONSHIP_COSTS → COST	0.9806	86.6208
PROC_RELATIONSHIP_LOSS → COST	0.7197	35.6677
PROC_RELATIONSHIP_LOSS → RELATIONSHIP_COSTS	0.7339	34.5113
BRAND_RELATIONSHIP → RELATIONSHIP_COSTS	0.4067	16.0826
BRAND_RELATIONSHIP → COST	0.3988	15.172
PROC_COST → PROCEDURAL_COST	0.9483	13.2494
PROC_EVAL → PROCEDURAL_COST	-0.125	1.7337
PROC_LEARN → PROCEDURAL_COST	0.1506	1.6895

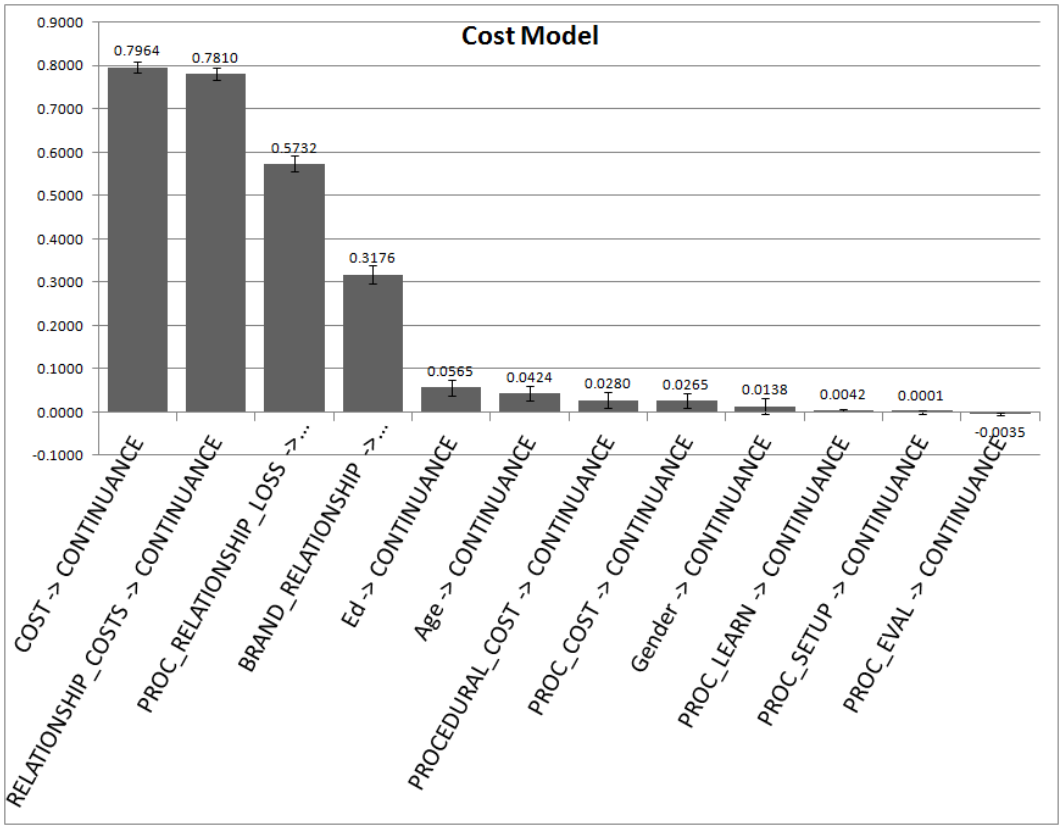


Figure 67: Cost Model Path Coefficients on SNS Continuance

Relation	Path Coefficient	T-statistic
PROC_COST → COST	0.0333	1.5698
PROCEDURAL_COST → COST	0.0351	1.5556
PROC_EVAL → COST	-0.0044	1.1887
PROC_LEARN → COST	0.0053	1.0707
PROC_SETUP → PROCEDURAL_COST	0.0040	0.0412
PROC_SETUP → COST	0.0001	0.0334

H Competing Models Cost vs. Satisfaction

H.1 Model Description

The model includes the measures from the Consumer Switch Cost model (Burnham et al., 2003) and IS Continuance model (Bhattacherjee, 2001). The two predictors for IS Continuance, satisfaction and perceived usefulness have been combined into a single reflective-formative construct that allows for a more direct comparison of the competing models. The Burnham et al. (2003) cost model was initially developed as a formative-reflective model and does not need a transformation. The cost model uses the independent constructs economic risk, evaluation costs, learning costs and setup costs (procedural costs) and personal relationship loss and brand relationship loss (relational costs) to predict information systems continuance intention. The IS Continuance model uses the independent constructs confirmation, perceived usefulness, satisfaction to predict information systems continuance intention.

H.2 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 67. The indicators in the reflective measurement models reach satisfactory indica-

Table 66: SNS Cost Measurement Model

Construct	AVE	Composite Reliability
PROC_SETUP	0.5938	0.8530
PersRelationLoss	0.6416	0.8990
BrandRelationship	0.6810	0.8638
CONF	0.6910	0.8969
CONTINUANCE	0.7165	0.8831
PROC_COST	0.5646	0.8382
PROC_EVAL	0.6013	0.8181
PROC_LEARN	0.6041	0.8590
PU	0.6805	0.8939
SAT	0.9309	0.9758

tor reliability levels. The measurement model assessment substantiates that all the construct measures are reliable and valid. The resulting tables show the complete model including the moderating effects although the moderating effects are less than small.

Table 67: SNS Cost Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	PROC SETUP	Proc Relation Loss	Brand Relationship	CONF	CONTINUANCE	PROC COST	PROC EVAL	PROC LEARN	PU	SAT
PROC SETUP	**0.7706**									
Proc Relation Loss	0.3388	**0.8010**								
Brand Relationship	0.1169	0.4935	**0.8252**							
CONF	0.2251	0.6732	0.6519	**0.8313**						
CONTINUANCE	0.2852	0.7313	0.6111	0.7117	**0.8465**					
PROC COST	0.7094	0.4667	0.2222	0.3395	0.3702	**0.7514**				
PROC EVAL	0.5408	0.1478	0.0776	0.1425	0.1993	0.4839	**0.7754**			
PROC LEARN	0.6849	0.3126	0.1776	0.2003	0.2705	0.6428	0.5004	**0.7772**		
PU	0.2808	0.7556	0.4734	0.5991	0.6303	0.3851	0.1103	0.2427	**0.8249**	
SAT	0.1785	0.6674	0.6370	0.7879	0.7878	0.2520	0.1116	0.2015	0.5982	**0.9648**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

Table 68: Indices

Goodness of Fit		
Not Applicable in reflective-formative models		
Endogenous Constructs	**R^2**	**Q^2**
CONTINUANCE	0.7165	0.5049
Procedural Cost	0.9933	0.3242
Relationship Cost	0.9988	0.5006
Satisfaction	0.6457	0.6010
SatAndPU	0.9999	0.6079
Costs	0.9944	0.2170
Perceived Usefulness	0.3589	0.2433

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

H.3 Structural Model

The structural model was assessed to determine how the independent constructs from IS Continuance theory and consumer switching costs predict information systems continuance intention.. The predictors explained approximately 71.7% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[30]; the model also exhibits predictive relevance (Q^2) where its value is .5049 (scores above zero indicate predictive relevance in PLS path models). Satisfaction and perceived usefulness, in a combined measure, predict continuance intention with a standardized path coefficient of .480 ($t = 17.4745$). All of the costs predict continuance intention with a standardized path coefficient of .399 ($t = 14.321$). The results indicate that IS Continuance explains more of the variance than the consumer switch cost model. Coefficients that are positive indicate that are associated with higher levels of continuance intention.

[30]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Relation	Path Coefficient	T-statistic
Theoretical Model		
Continuance Path Coefficients		
SatAndPU → CONTINUANCE	0.4803	17.4745
COSTS → CONTINUANCE	0.3986	14.321
age → CONTINUANCE	0.0543	3.8155
education → CONTINUANCE	0.0358	2.2875
gender → CONTINUANCE	0.013	0.8378
Other Path Coefficients		
Proc RelationLoss → Relationshipcosts	0.7302	35.0565
Brand Relationship → Relationship costs	0.4113	16.4335
CONF → PU	0.5991	31.1508
CONF → SAT	0.6701	32.756
PROC_COST → Procedural Costs	0.9496	13.9198
PROC_EVAL → Procedural Costs	-0.1283	1.7679
PROC_LEARN → Procedural Costs	0.1546	1.7937
PU → SAT	0.1968	8.9423
PU → SatAndPU	0.3049	10.3242
Procedural Costs → COSTS	0.0315	1.4065
Relationship costs → COSTS	0.9824	87.6927

Relation	Path Coefficient	T-statistic
SAT → SatAndPU	0.7873	32.3647
PROC SETUP → Procedural Costs	0.0002	0.0018
Total Effects		
Continuance Path Coefficients		
SatAndPU → CONTINUANCE	0.4803	17.4745
CONF → CONTINUANCE	0.3856	16.7192
SAT → CONTINUANCE	0.3781	14.4612
Relationship_costs → CONTINUANCE	0.3916	14.3975
COSTS → CONTINUANCE	0.3986	14.321
PersRelationLoss → CONTINUANCE	0.2859	12.9775
PU → CONTINUANCE	0.2208	12.6321
BrandRelationship → CONTINUANCE	0.1611	11.265
age → CONTINUANCE	0.0543	3.8155
education → CONTINUANCE	0.0358	2.2875
PROC_COST → CONTINUANCE	0.0119	1.3768
ProceduralCosts → CONTINUANCE	0.0126	1.3556
PROC_EVAL → CONTINUANCE	-0.0016	1.0628
PROC_LEARN → CONTINUANCE	0.0019	0.9744
gender → CONTINUANCE	0.013	0.8378

Relation	Path Coefficient	T-statistic
PROC_SETUP → CONTINUANCE	0	0.0015
Other Path Coefficients		
Relationship_costs → COSTS	0.9824	87.6927
CONF → SatAndPU	0.803	73.349
CONF → SAT	0.7879	67.2319
PersRelationLoss → COSTS	0.7173	35.5389
PersRelationLoss → Relationship_costs	0.7302	35.0565
SAT → SatAndPU	0.7873	32.3647
CONF → PU	0.5991	31.1508
BrandRelationship → Relationship_costs	0.4113	16.4335
BrandRelationship → COSTS	0.4041	15.5954
PU → SatAndPU	0.4598	15.4002
PROC_COST → ProceduralCosts	0.9496	13.9198
PU → SAT	0.1968	8.9423
PROC_LEARN → ProceduralCosts	0.1546	1.7937
PROC_EVAL → ProceduralCosts	-0.1283	1.7679
PROC_COST → COSTS	0.0299	1.4302
ProceduralCosts → COSTS	0.0315	1.4065
PROC_EVAL → COSTS	-0.004	1.0908

Relation	Path Coefficient	T-statistic
PROC_LEARN → COSTS	0.0049	1.002
PROC_SETUP → ProceduralCosts	0.0002	0.0018
PROC_SETUP → COSTS	0	0.0015

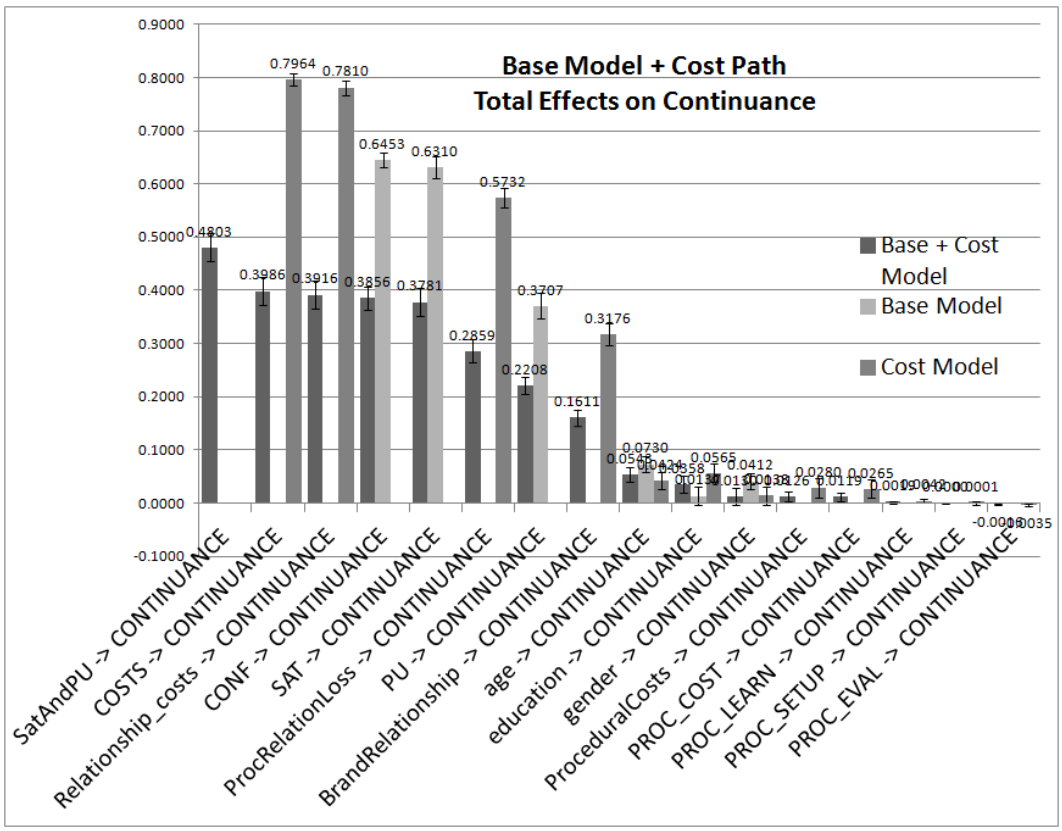


Figure 68: Base Model And Costs Path Coefficients on SNS Continuance

I Specific Alternative Product Effects

An examination of specific service alternatives was conducted to determine whether the number of social networking sites a user uses from the set of Instagram, Pinterest, Tumblr and Twitter, and how attitudes about the same set of sites predicts continuance intention.

I.1 Number of social networking site Analysis

To determine whether the number of social networking sites a user has can predict continuance intention the survey respondent was asked if they used Instagram, Pinterest, Tumblr and Twitter. The total number of sites used was then calculated. The majority of survey respondents used at least one other social networking site from the competing set (70.5%). The coefficient of determination is .0512 and indicates that approximately 5.1% of the variance is explained by the model and is considered weak.

All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006).

Fornell and Larcker (1981) criterion is not presented as all the predictors in this model are single item measures. Number of sites used predicts continuance intention with a standardized path coefficient of -0.0706 (t-statistic = 1.0929) and indicates that there is not a statistically significant relationship with the number of sites used and continuance intention, i.e. the number of sites a survey respondent uses does not predict whether the person will continue to use Facebook or discontinue use. The covariates, gender and age, had statistically significant effects in predicting continuance intention, and education had no

Table 70: Number of Social Networking Sites Used

Number of Sites Used	Count	%
0	384	29.49%
1	395	30.34%
2	271	20.81%
3	198	15.21%
4	54	4.15%
Total	**1302**	**100%**

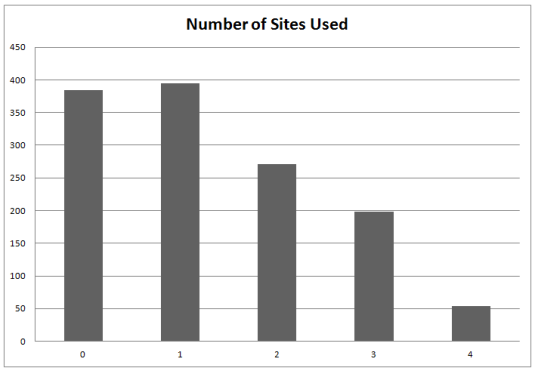


Table 71: Sites Used Measurement Model

Construct	AVE	Composite Reliability
CONTINUANCE	0.7149	0.8824

statistically significant effect in predicting continuance intention.

Table 72: Sites Used Structural Model

Goodness of Fit
0.2081

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	R^2	Q^2
Continuance	.0512	.0357

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

Table 73: Path Coefficients

Relation	**Path Coefficient**	**T-statistic**
Theoretical Model		
Continuance Path Coefficients		
SNSUse → Continuance	-0.0706	1.0929
Other Path Coefficients		
TUMBLR → SNSUse	0.9407	3.4590
Pinterest → SNSUse	-0.4372	1.0852
Twitter → SNSUse	0.1595	0.4233
Instagram → SNSUse	-0.0579	0.1614
Total Effects		
	Sample Mean (M)	**T Statistics**
Continuance Path Coefficents		
gender → Continuance	0.1725	4.0262
age → Continuance	0.1075	2.3474
TUMBLR → Continuance	-0.0787	1.4126
Pinterest → Continuance	0.0349	0.8343
SNSUse → Continuance	-0.0558	0.6505
Twitter → Continuance	-0.0127	0.2208
Instagram → Continuance	0.0069	0.1025
education → Continuance	0.0022	0.0705
Other Path Coefficients		
TUMBLR → SNSUse	0.4105	1.5834
Pinterest → SNSUse	-0.0038	0.8878
Twitter → SNSUse	0.2281	0.4847
Instagram → SNSUse	0.1031	0.1683

I.2 Alternatives by Specific Product

I.2.1 Survey respondents who used all four alternative products

I.2.2 Model Description

The model includes alternative attractiveness measures for alternative products Instagram, Pinterest, Tumblr and Twitter to predict continuance intention. The independent constructs Instagram Alternative, Pinterest Alternative, Tumblr Alternative and Twitter Alternative to predict information systems continuance intention. Survey respondents who perceive an alternative product to be a better alternative to Facebook are theorized to have direct effects on Facebook continuance. The users in this sample use *all* four products - the sample size is 54 users. The sample represents approximately 6% of the users who have at least one alternative social networking site, and 4% of the total survey respondents. The advantage of using this sample is that no replacement values for missing values are necessary and the ability to predict how users of multiple sites will continue or discontinue use of Facebook.

I.2.3 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981)

Table 74: Alternatives by Specific Product Measurement Model

Construct	AVE	Composite Reliability
Continuance	0.7437	0.8969
Instagram	0.733	0.8917
Pinterest	0.8423	0.9412
TUMBLR	0.8647	0.9504
Twitter	0.7454	0.8973

Table 75: Alternatives by Specific Product Measurement Model - Discriminant Validity

Fornell and Larcker (1981)Criterion

	Continuance	Instagram	Pinterest	TUMBLR	Twitter
Continuance	**0.8624**				
Instagram	-0.5791	**0.8562**			
Pinterest	-0.5821	0.6850	**0.9178**		
TUMBLR	-0.7284	0.6153	0.6102	**0.9299**	
Twitter	-0.6553	0.6250	0.5596	0.7417	**0.8634**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

criterion)- See: 75. The measurement model assessment substantiates that all the construct measures are reliable and valid.

I.2.4 Structural Model

The structural model was assessed to determine how the independent constructs to predict information systems continuance intention. The predictors Instagram Alternative, Pinterest Alternative, Tumblr Alternative and Twitter Alternative explain approximately 60.7% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[31]; the model also exhibits predictive relevance (Q^2) where its value is .3864 (scores above zero indicate predictive relevance in PLS path models). Tumblr Alter-

[31]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Table 76: Alternatives by Specific Product Structural Model

Goodness of Fit
.6908

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	R^2	Q^2
Continuance	0.6072	.4563

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

native had the strongest predictive ability for satisfaction with a standardized path coefficient of -.440 (*t-statistic* = 2.740) followed by Twitter Alternative with a standardized path coefficient of -.217 (t-statistic = 1.387), Pinterest (-.113, t-statistic=.792) and Instagram (-.089, t-statistic=.4994). Only Tumblr Alternative is a statistically significant predictor. The coefficients are all negative indicate that increasing perception that an alternative product is a viable substitute indicates lower levels of continuance intention.

I.2.5 Survey respondents who used at least one of four alternative products

I.2.6 Model Description

The model includes alternative attractiveness measures for alternative products Instagram, Pinterest, Tumblr and Twitter to predict continuance intention. The independent constructs Instagram Alternative, Pinterest Alternative, Tumblr Alternative and Twitter Alternative to predict information systems continuance intention. Survey respondents who perceive an alternative product to be a better alternative to Facebook are theorized to have direct effects on Facebook continuance. The users in this sample use *all* four products - the sample size is 918 users. The sample represents approximately 70.5% of

Table 77: Path Coefficients

Relation	Path Coefficient	T-statistic
Theoretical Model		
TUMBLR → Continuance	-0.4398	2.7401
Twitter → Continuance	-0.2167	1.3873
Pinterest → Continuance	-0.1133	0.792
Instagram → Continuance	-0.089	0.4994
Total Effects		
	Sample Mean (M)	**T Statistics**
TUMBLR → Continuance	-0.4398	2.7401
education → Continuance	0.1589	1.4531
Twitter → Continuance	-0.2167	1.3873
Pinterest → Continuance	-0.1133	0.7920
Instagram → Continuance	-0.089	0.4994
age → Continuance	-0.0135	0.1327
gender → Continuance	-0.015	0.1304

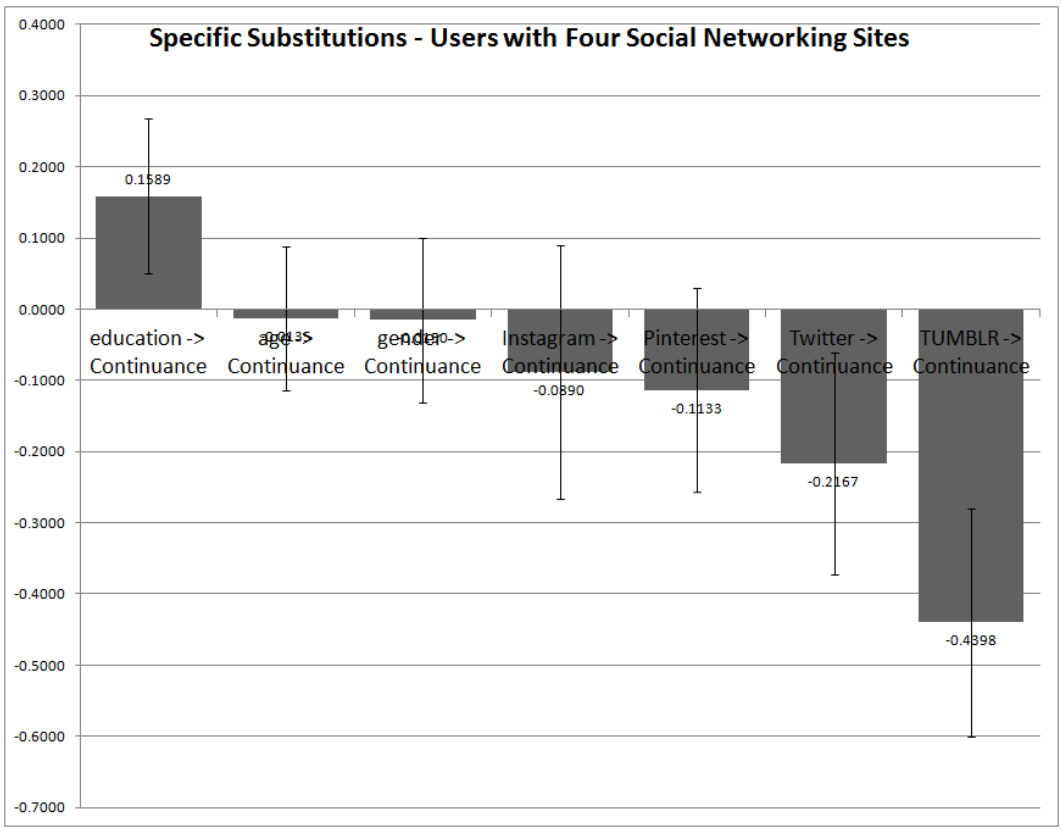


Figure 69: Specific Product Path Coefficients on SNS Continuance

the total survey respondents. The advantage of using this sample is that the sample is much larger so smaller but still statistically significant effects can be found. Missing values are replaced with the mean of the construct to predict how users of multiple sites will continue or discontinue use of Facebook; using the mean will not bias the result, but statistical significance may be lowered to account for the use of the mean value.

I.2.7 Measurement Model

The measurement model is assessed for reliability (construct indicator reliability and internal consistency) and validity (convergent and discriminant). All average variance extracted (AVE) values are above the .50 threshold, providing support for convergent validity (Hair et al., 2006). Composite reliability

Table 78: Alternatives by Specific Product Measurement Model

Construct	AVE	Composite Reliability
Continuance	0.7061	0.8779
Instagram	0.8151	0.9295
Pinterest	0.8144	0.9292
TUMBLR	0.8096	0.9272
Twitter	0.8203	0.9316

Table 79: Alternatives by Specific Product Discriminant Validity

Fornell and Larcker (1981)Criterion

	Continuance	Instagram	Pinterest	TUMBLR	Twitter
Continuance	**0.8403**				
Instagram	-0.3133	**0.9028**			
Pinterest	-0.3854	0.3310	**0.9024**		
TUMBLR	-0.2835	0.1841	0.1866	**0.8998**	
Twitter	-0.5389	0.3433	0.3651	0.2549	**0.9057**

Note: Diagonal elements (in bold) are the square root of the AVEs; non-diagonal elements are the latent variable correlations.

values are all greater than or equal to .7 providing evidence of the construct's internal consistency reliability (Hair et al., 2006). Composite reliability values are all greater than the AVE scores indicating convergent validity (Hair et al., 2006). The square roots of the AVE are all greater than the latent variable correlations indicating discriminant validity (Fornell and Larcker (1981) criterion)- See: 79. The measurement model assessment substantiates that all the construct measures are reliable and valid.

I.2.8 Structural Model

The structural model was assessed to determine how the independent constructs to predict social networking site continuance intention. The predictors Instagram Alternative, Pinterest Alternative, Tumblr Alternative and Twitter

Table 80: Alternatives by Specific Product Structural Model

Goodness of Fit
0.5427

Goodness of Fit measures: GoF_{small}=.1, GoF_{medium} = .25 GoF_{large}=.36 (Wetzels et al., 2009)

Endogenous Constructs	**R^2**	**Q^2**
Continuance	0.3713	0.2604

R2 coefficient of determination
Q2 predictive relevance. Scores above zero indicate predictive relevance.

Alternative explain approximately 37.1% of the variance (R^2) in continuance intention and is considered to have a moderate level of explanation[32]; the model also exhibits predictive relevance (Q^2) where its value is .2604 (scores above zero indicate predictive relevance in PLS path models). Twitter Alternative had the strongest predictive ability for satisfaction with a standardized path coefficient of -0.3889 (*t-statistic* = 12.2996) followed by Pinterest Alternative with a standardized path coefficient of -0.1830 (t-statistic = 5.5089), TUMBLR (-0.1256, t-statistic=3.7429) and Instagram (-0.0962, t-statistic=3.0192). All alternatives are considered statistically significant predictor. The coefficients are all negative indicate that increasing perception that an alternative product is a viable substitute indicates lower levels of continuance intention.

[32]Hair et al. (2011)- R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.

Table 81: Path Coefficients

Relation	Path Coefficient	T-statistic
Theoretical Model		
Twitter → Continuance	-0.3889	12.2996
Pinterest → Continuance	-0.1830	5.5089
TUMBLR → Continuance	-0.1256	3.7429
Instagram → Continuance	-0.0962	3.0192
Total Effects		
	Sample Mean (M)	**T Statistics**
Twitter → Continuance	-0.3889	12.2996
Pinterest → Continuance	-0.183	5.5089
gender → Continuance	0.1228	4.4128
TUMBLR → Continuance	-0.1256	3.7429
Instagram → Continuance	-0.0962	3.0192
age → Continuance	0.0377	1.395
education → Continuance	0.0254	0.9392

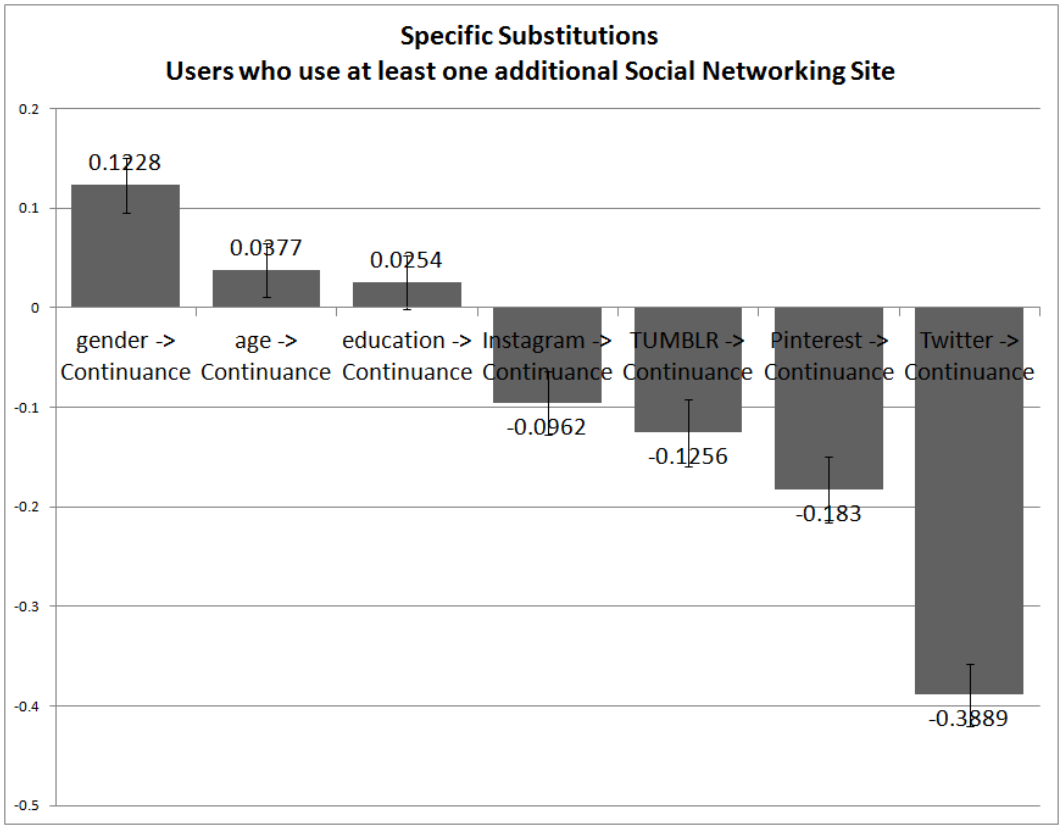


Figure 70: Specific Product (at least 1 alternate product) Path Coefficients on SNS Continuance