



Journal of Information Technology Management

ISSN #1042-1319

A Publication of the Association of Management

MODERATING ROLES OF USER DEMOGRAPHICS IN THE AMERICAN CUSTOMER SATISFACTION MODEL WITHIN THE CONTEXT OF MOBILE SERVICES

ALEXANDER SERENKO
LAKEHEAD UNIVERSITY
aserenko@lakeheadu.ca

OFIR TUREL
MCMASTER UNIVERSITY
turelo@mcmaster.ca

SERT YOL
LAKEHEAD UNIVERSITY
syol@lakeheadu.ca

ABSTRACT

This study contributes to the mobile commerce literature by investigating the moderating roles of demographic variables, namely age, income, and gender, in forming perceptions and behavioral outcomes with regards to mobile phone services. To this end, hypotheses and research questions are developed and structural equation modeling techniques are applied to a dataset of 1,253 mobile phone users in the U.S. Using this data, the relationships between antecedents of satisfaction with mobile services, user satisfaction with those services, and its outcomes, are examined in different demographic groups. Based on this comparative analysis, several observations that advance our understanding of user interaction with mobile services are made, and a number of strategic recommendations for mobile service providers are outlined. Overall, it is believed that a convergence of marketing and management information systems theories, combined with a practical yet scientific approach to the investigating of important issues in mobile commerce, may potentially contribute to both theory and practice.

Keywords: Mobile commerce, customer satisfaction, loyalty, American Customer Satisfaction Model, moderation, age, income, gender.

INTRODUCTION

In today's economy, most managers realize that organizational performance objectives can only materialize through high levels of customer satisfaction [11]. As demonstrated by the growing

body of academic and practitioner-oriented literature, for most products and services, customer satisfaction has a strong positive effect on critical success factors, such as customer loyalty and the likelihood of product or service repurchase [1]. As such, all-purpose customer satisfaction measures and indices (i.e., "barometers") were developed

[e.g., 10]. The extant literature also provides a number of antecedents and consequences of customer satisfaction that are presented within several nomological networks. Among these widely used measures and models, the American Customer Satisfaction Model (ACSM) [13] has drawn the attention of the research community. The advantage of using this model is two-fold. First, it offers several key antecedents and consequences of customer satisfaction. It is vital for both researchers and practitioners to know what factors affect satisfaction, and what effect satisfaction has on other constructs that are directly linked to the overall organizational performance. Second, the ACSM is robust, and it may be successfully adapted to various products and services, including information technologies [9], and mobile services [31].

Satisfaction with mobile services is an important investigation area since satisfaction may affect service adoption and use. As mobile IT services become more widespread, the significance of customer satisfaction, loyalty, and retention becomes vital to the financial performance of the industry [21]. Wireless services, despite their short time-span of existence, have had a phenomenal growth. By March 2005, there had been 1.6 billion subscribers [26]. At the same time, the mobile phone industry has been lagging behind most other sectors in terms of customer satisfaction. Particularly, in recent years, there has been a noticeable decline in the level of US consumers' satisfaction with mobile services [12]. Given the abovementioned potential implications of user satisfaction with these services, there is a need to further understand the nomological network of the user satisfaction concept in the context of mobile phone services.

To date, several attempts to understand user perceptions and satisfaction with mobile services have been undertaken. For example, the ACSM with regards to mobile IT services was tested and validated [33]. On the one hand, these projects offer valuable information for both academics and wireless phone service providers. On the other hand, all previous studies report on the usage of the ACSM in the aggregate form, and investigations of possible moderating effects of consumer demographics on the ACSM relationships are noticeably lacking. Understanding roles of key moderators is vital for both scholars and managers. For researchers, understanding impacts of salient moderators may reveal new phenomena and improve the predictive validity of research models [28]. For managers, it may have some policy

implications; for instance, they can adjust their customer services to meet the attributes of specific groups. Based on this information, managers and marketers of wireless technologies may make better strategic decisions in terms of budget allocations, promotions, and customer service strategies.

In order to address the abovementioned needs and gaps, this project reports on confirmatory and exploratory investigations, using a dataset of 1,253 wireless subscribers in the U.S. First, a confirmatory analysis was applied to the adaptation of the ACSM. Second, an exploratory investigation of the moderating roles of demographic variables in forming perceptions and behavioral outcomes of satisfaction with regards to mobile phone services was conducted. Specifically, age, income, and gender were chosen for the latter analysis because they have been shown to affect the links among constructs of various models within the Management Information Systems [e.g.,35] and marketing [e.g., 25] contexts. As such, this study builds on the convergence of marketing and management information system disciplines (i.e., it employs a model developed in the domain of marketing and applies it to an information technology services). This convergence is needed since mobile IT services go beyond the traditional, free-of-charge, organizational IT. Individuals may pay for each and every use of these services, utilize them for hedonic or utilitarian purposes, and within a wider range of contexts [32]. Overall, it is believed that the adaptation of the ACSM to study mobile phone services, combined with the usage of several important moderators, may reveal new phenomena related to user perceptions and behavioral outcomes of satisfaction with mobile services.

To describe this study and present the contributions, the paper has three sections. First, theoretical background of the research model and the selected moderators is offered. Second, the analysis and results are presented. Finally, a discussion of the findings and several conclusions are outlined.

THEORETICAL BACKGROUND

Figure 1 describes the adapted ACSM and the relationships among its major constructs. Customer satisfaction (CS) is a central construct of the model; it is affected by perceived quality (PQ), and perceived value (PV) of mobile phone services. In turn, customer satisfaction has a negative direct impact on customer complaints (CC) and a positive

direct effect on both repurchase likelihood (RL) (i.e., the likelihood of purchasing additional services or renewing a contract with the current provider in future) and price tolerance (PT) (i.e., the probability of staying with the current provider if it increases prices or if a competitor decreases prices). Please refer to Fornell et al. [13] for further justification and detail.

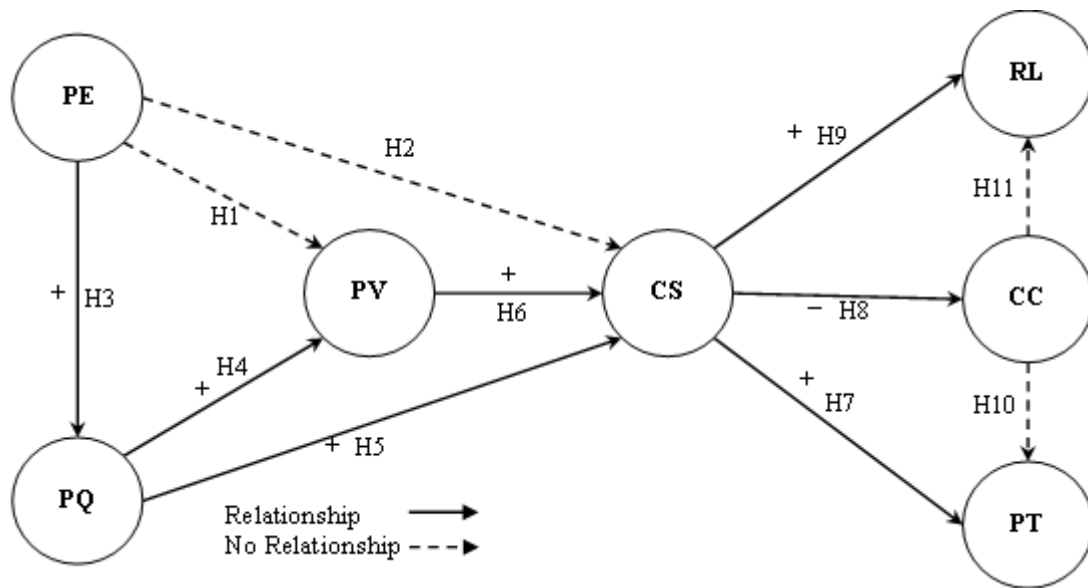


Figure 1: The Study Model

Since ACSM is both forward and backward looking, it depicts both the past customer experiences and their future attitudes towards the service; as such, it has both a predictive and analytical value. Prior Expectations (PE) is the key independent variable; and RL, CC and PT are the main dependant variables of the model that enable the predictive functionality of CS. Higher satisfaction results in higher repurchase likelihood and price tolerance, but in lower complaints rates. The ultimate purpose of the ACSM is to understand and explain customer behaviors. Thus, customer satisfaction, through its antecedents, can explain how consumers' past experience and evaluation regarding a particular provider form perceptions of satisfaction, which in turn, influences consumers' future dispositions and intentions regarding further patronizing of that provider.

The American Customer Satisfaction Model and its adaptations have been subjected to

extensive validity testing in terms of various products and services. For example, it was applied to study customer satisfaction with the local government in New York City [34] and to explore the behaviors and service perceptions of conference delegates [16]. In most prior projects, the ACSM research instrument exhibited acceptable levels of psychometric properties. The following links: PE-PQ, PQ-PV, PQ-CS, CS-PT, CS-CC, and CS-RL held true in all previous studies. Recently, the ACSM was applied to study wireless services in two independent studies [29, 33]. The former investigation reports on the insignificant PE-PV and PE-CS links, and the latter paper demonstrates the insignificance of PE-PV, PE-CS, CC-PT and CC-RL relationships.¹ Based on the existing body of literature as well as

¹ Tenenhaus et al. (2005) did not test the CC-PT and CC-RL links (i.e., these relationships were omitted).

these two projects, a set of hypotheses pertaining to the validity of the adapted ACSM is suggested. These hypotheses correspond to the paths in Figure 1.

- H1: Prior Expectations do not have a direct effect on Perceived Value of mobile phone services.
- H2: Prior Expectations do not have a direct effect on Customer Satisfaction with mobile phone services.
- H3: Prior Expectations have a positive direct effect on Perceived Quality of mobile phone services.
- H4: Perceived Quality has a positive direct effect on Perceived Value of mobile phone services.
- H5: Perceived Quality has a positive direct effect on Customer Satisfaction with mobile phone services.
- H6: Perceived Value has a positive direct effect on Customer Satisfaction with mobile phone services.
- H7: Customer Satisfaction has a positive direct effect on Price Tolerance towards mobile phone services.
- H8: Customer Satisfaction has a negative direct effect on Customer Complaints regarding mobile phone services.
- H9: Customer Satisfaction has a positive direct effect on Repurchase Likelihood of mobile phone services.
- H10: Customer Complaints do not have a direct effect on Price Tolerance towards mobile phone services.
- H11: Customer Complaints do not have a direct effect on Repurchase Likelihood of mobile phone services.

The nature of the hypotheses above is confirmatory, and together they form a context-specific adaptation of the ACSM theory. Overall, it is believed that testing these hypotheses contributes to the overall body of knowledge on the topic. At the same time, other new user-dependent variables may be included to further improve our understanding of the antecedents and consequences of customer satisfaction with mobile phone services.

Moderators

Moderators are variables that affect the strength or direction of relationships between

exogenous and endogenous variables; they divide “a focal independent variable into subgroups that establish its domains of maximal effectiveness in regard to a given dependent variable” [3, p. 1173]. Moderators modify the relationships through re-allocations of the error terms or interactions with either dependent or independent variable. Despite their potential value, the usage of moderators is currently under-represented, especially, in MIS research [28].

The employment of moderators may potentially increase the predictive validity of a model under investigation, and explain the inconsistent findings in various disciplines [18]. For instance, Sun and Zhang [28] argue that low explanatory powers and factor inconsistencies of MIS models may be explained by the exclusion of important moderating variables reflecting individual differences, such as age and gender. Marketing scholars continue this line of reasoning by suggesting that age, income, and gender play a crucial role in affecting the strengths and directions of various relationships in many models [e.g., 25].

Despite various moderators exist, in this study, only demographic moderators such as age, income and gender were considered. The rationale was to select the most important moderators consistent with the previous body of knowledge. This study aims to test the possible moderating effects of consumer demographics on the ACSM within the context of mobile phone services. Specifically, changes in the structural relationships as depicted in Figure 1, depending on moderator levels, are examined.

Age is the first important personal characteristic within the category of demographic variables. From a marketing perspective, the identification of age groups within a population allows for market segmentation. Within the context of MIS, age was found to moderate a variety of construct relations. For example, it was demonstrated that age moderates technology adoption related relationships [24, 35], and online shopping related relationships [19]. Such studies demonstrate that different age groups think and behave differently, and as such, age may potentially moderate some of the ACSM’s relationships. Thus, the following research question is proposed:

Research Question 1: Does a person’s age moderate the relationships among the constructs of the adapted American

Customer Satisfaction Model in the context of mobile phone services?

Income is the second significant personal characteristic within the category of the demographic variables. From economic and marketing viewpoints, income is one of the major determinants of product and service demand, and is used for forming market segments with varying purchasing powers. Within the domains of MIS and marketing, income was found to moderate a variety of construct relations. For instance, it has been empirically demonstrated that income affects consumer purchasing behaviors [25], consumptions patterns [36], and the usage of information and telecommunications technologies [27]. These findings suggest that the identification of the role of income as a moderator of the ACSM is important. It is noted that in the present study the level of household (i.e., not individual) income was measured. The rationale is that most households rather than individuals pay their mobile service bills regardless of who brings a major part of the income to the family. Accordingly, the following research question is suggested:

Research Question 2: Does a household's income moderate the relationships among the constructs of the adapted American Customer Satisfaction Model in the context of mobile phone services?

Gender is the third important personal characteristic considered in this study. Social scientists argue that gender differences are one of the aspects of cultural differences that exist among people. Gender roles are transferred through socialization, and men are taught to be more assertive, and women more nurturing. Many MIS and marketing studies demonstrate that there are perceptual and behavioral differences between males and females. For example, Gefen and Straub [15] empirically showed that men and women differ in their perceptions but not in their usage of email.

Furthermore, traditional gender role distinctions are commonly utilized to explain web-based services usage patterns and preferences [23]. In the technology acceptance context, gender and its interactions with other adoption predictors have been shown to affect adoption behaviors [35]. Therefore, it is important to continue investigating the moderating role of gender in other contexts. Thus, the research question below is suggested:

Research Question 3: Does a person's gender moderate the relationships among the constructs of the adapted American Customer Satisfaction Model in the context of mobile phone services?

METHODOLOGY AND RESULTS

In order to answer the study's hypotheses (i.e., the confirmatory part) and research questions (i.e., the exploratory part), a dataset of 1,253 American mobile phone users was subjected to Partial Least Squares (PLS) analysis. These data were collected in the first quarter of 2005 by the National Quality Research Center at the University of Michigan. Potential respondents were randomly chosen from the entire U.S. population (one from each household). The selected individuals were called and asked whether they currently utilized a mobile phone. Only those who employed mobile phones were allowed to participate in the survey. It is noted that even though the questions pertaining to the current mobile service providers were asked (e.g., provider's name), this information may not be released for confidentiality reasons. An acceptable level of response rate was achieved. Overall, it was believed that the study's subjects accurately represented the entire U.S. population of mobile phone users. The questionnaire items were adapted from Fornell et al. [13]. This instrument is considered highly reliable and valid as demonstrated by various previous studies in marketing and MIS areas [33].

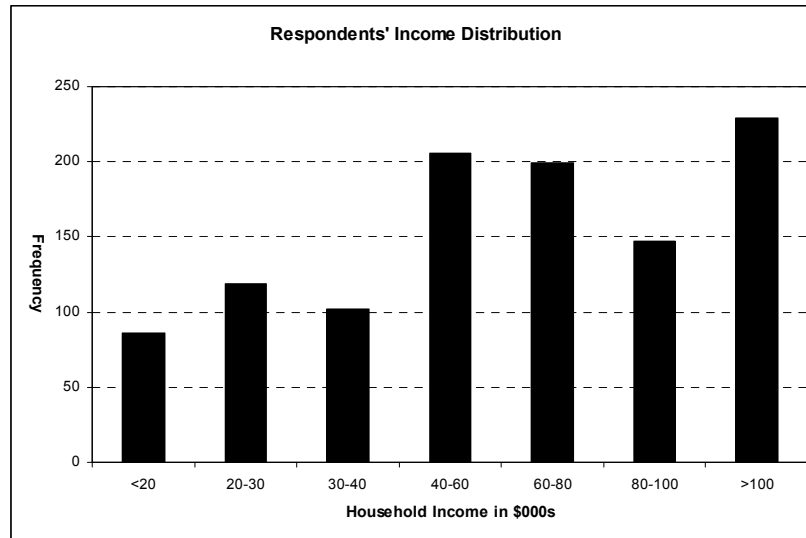


Figure 2: Income Distribution

The correlations between the moderating factors (age, gender, and income) were tested for descriptive purposes. Results show that respondent gender does not correlate with income or age. This indicates that similar age and income groups were sampled from both genders. While one may expect an income bias towards males [e.g., 20], this is not observed here. A potential explanation would be that household income is reported, which, for the most part, includes both males and females that confirms the validity of the data. Age and income were found to be marginally correlated (Spearman Rho of 0.1, $p < 0.001$). This is also understandable since senior

personnel may receive higher wages, and individual salaries can increase over time.

Measurement Model

PLS analysis [5] was employed to validate the model because it has traditionally been used with the ACSM, and it handles deviation from normality relatively well [30].

Table 1 presents a set of measurement items. The loadings of all items exceeded the required threshold of 0.7, the item-to-total correlations were above 0.35, and all Cronbach's Alphas were acceptable.

Table 1: Measurement Items

Item	Mean	Std dev	Loading	Error	Item-to-Total Correlation
PE1	7.73	1.83	0.799	0.358	0.554
PE2	8.06	1.77	0.874	0.236	0.615
PE3	7.13	2.18	0.743	0.451	0.465
PQ1	7.26	2.35	0.927	0.142	0.819
PQ2	7.14	2.49	0.932	0.132	0.827
PQ3	6.96	2.65	0.873	0.238	0.746
PV1	6.64	2.49	0.954	0.093	0.834
PV2	6.96	2.46	0.961	0.077	0.834
CS1	7.14	2.47	0.952	0.095	0.884
CS2	6.29	2.52	0.933	0.134	0.850
CS3	6.41	2.57	0.918	0.162	0.822
PT	10.40	8.39	1.000	0.000	-
CC	41%	-	1.000	0.000	-
RL	6.94	3.09	1.000	0.000	-

A matrix of loadings and cross-loadings was constructed to test discriminant validity (Table 2), which showed that all items had higher loadings with their corresponding factors in comparison to their cross-loadings. Fornell and Larcker's [14] measures of internal consistency and convergent validity of all constructs were greater than the 0.7 and 0.5 thresholds respectively (Table 3). The square root of the average variance extracted was compared to the construct correlations (Table 4). All values along the

diagonal were greater than those in corresponding rows and columns. Convergent validity was also estimated by analyzing the t-tests for all item loadings [2], and all t-values were significant. Therefore, it is believed that the discriminant and convergent validities are assured. It is noted that some construct correlations are relatively high. This, however, is common in the usage of the ACSM and does not threaten the validity of the psychometric properties of the instrument [9].

Table 2: Matrix of Loadings and Cross-Loadings

	PE	PQ	PV	CS	PT	CC	RL
PE1	0.799	0.171	0.168	0.170	0.076	-0.052	0.163
PE2	0.874	0.223	0.178	0.206	0.091	-0.062	0.198
PE3	0.743	0.207	0.107	0.172	0.057	-0.074	0.135
PQ1	0.222	0.927	0.644	0.804	0.342	-0.360	0.738
PQ2	0.207	0.932	0.665	0.847	0.343	-0.350	0.736
PQ3	0.170	0.873	0.570	0.688	0.257	-0.364	0.623
PV1	0.181	0.724	0.954	0.798	0.357	-0.323	0.673
PV2	0.181	0.817	0.961	0.843	0.344	-0.358	0.719
CS1	0.174	0.838	0.700	0.952	0.390	-0.409	0.808
CS2	0.171	0.781	0.668	0.933	0.363	-0.367	0.750
CS3	0.200	0.787	0.673	0.918	0.397	-0.331	0.746
PT	0.081	0.342	0.312	0.414	1.000	-0.182	0.446
CC	-0.049	-0.318	-0.211	-0.331	-0.158	1.000	-0.336
RL	0.171	0.737	0.618	0.821	0.446	-0.360	1.000

Table 3: Construct Statistics

	PE	PQ	PV	CS
Arithmetic Mean	7.64	7.12	6.8	6.61
Cronbach's Alpha	0.73	0.90	0.91	0.93
Internal Consistency	0.848	0.936	0.956	0.952
Convergent Validity	0.651	0.830	0.915	0.870

Table 4: Correlation Matrix and Discriminant Validity

	PE	PQ	PV	CS
PE	0.807			
PQ	0.249	0.911		
PV	0.214	0.807	0.957	
CS	0.228	0.889	0.858	0.933

Structural Model

Bootstrapping with 250 re-samples was done to derive t-statistics for parameter estimates [5]. Based on the results, all hypotheses were supported (i.e., links H1, H2, H10 and H11 were rejected, and H3 – H9 were supported). In order to further demonstrate the insignificance of rejected

links, those relationships were dropped, and the model was re-evaluated. Since the removal of these links did not have any influence on the model, it was concluded that those relationships were in fact insignificant. The model has a high predictive power in terms of customer satisfaction; it explains almost 85% of the construct's variance (Figure 3).

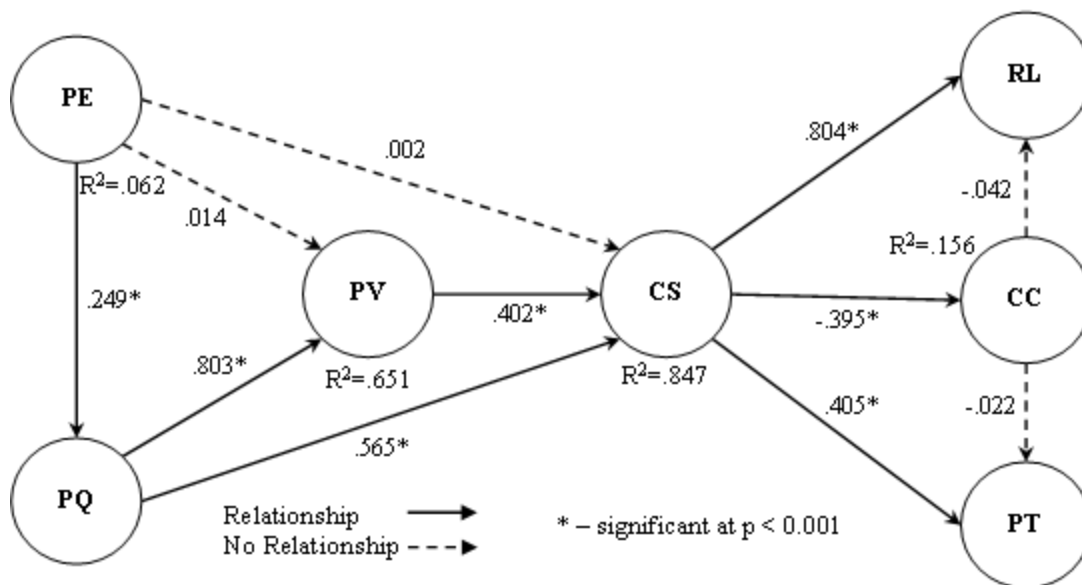


Figure 3: The Structural Model

Moderation Analysis

In order to answer Research Questions 1, 2 and 3, moderation analysis was done using the split-sample approach. There are three ways to split a dataset into sub-samples. First, a dataset may be

divided into two or more subsets based on a pre-established level of a moderator. The level of moderator emerges naturally from the study, and it cannot be modified by researchers. For example, a person's gender, recorded as male or female, naturally forms two moderator levels. This was used

in the present project: the dataset was divided into two sub-samples (i.e., male vs. female) to moderate for gender (Research Question 3). Second, researchers may attempt maximizing the similarity of the size of the sub-samples, or divide the set based on quartiles [e.g., see 4, 17]. In this case, a moderator variable is usually measured on an interval or ratio scale. Third, moderator levels can be selected based on theoretical rationale. In this case, cut-off values are established considering known population characteristics. A moderator variable may be measured on any scale, and researchers decide how to split the sample.

In this study, to identify a moderation level for age, the dataset was divided to form two sets each representing individuals who belong to a particular generation. An analysis of age distribution demonstrates that two major age groups emerged: baby boomers (i.e., those who were born from 1946 to 1964) and generation X (i.e., those who were born from 1964 to 1981) [22]. Only a minority of the subjects reported an age outside of these time periods. Representatives of these generations may be fundamentally different in terms of various characteristics, perceptions, and behaviors. Therefore, selecting a cut-off point of 40 years old at the day of the survey creates two categories of subjects who may potentially exhibit diverse structural relationships in the ACSM.

To specify a moderation level for income, a three-year-average median household income

(2002-2004) reported by the US Census Bureau of \$44,000 was selected. As indicated by historical data, income distributions always tend to be non-normal and highly skewed. That was also the case in the present project. Accepting a cut-off value at an average point of the entire sample would generate a bias because an average is affected by several extreme cases of high income. In the present study, a household income was recorded in categories with increments of \$10,000. This was done to reduce cognitive load on the subjects and obtain valid data. People are more inclined to specify their category of income rather than provide an exact income figure that is often difficult to recall precisely. Therefore, the closest cut-off point of \$40,000 was selected to create two groups of lower and higher income.

After designing several unique datasets and testing the model with each one, a series of Chow tests [6] was done for each moderator individually (see Table 5). Chow tests may be utilized to determine statistical significance of the difference between the strength of relationship among variables from two datasets. The results of this analysis reveal a number of significantly different structural relationships. It is noted that some n values do not add to 1,253 because of missing variables (e.g., some people did not reveal their age or income).

Table 5: The Chow Tests of Moderation Effects

Link – beta and F/p-value	PE-PQ	PQ-PV	PQ-CS	PV-CS	CS-PT	CS-CC	CS-RL	R ² CS
Age Moderation								
Age – Generation X (Younger) (n=490)	0.173	0.798	0.590	0.375	0.349	-0.374	0.818	0.850
Age – Baby Boomers (Older) (n=749)	0.304	0.805	0.557	0.410	0.448	-0.416	0.823	0.846
F(3; 1,233)	3.57	0.63	0.28	0.36	2.64	0.55	0.24	0.43
p-value	<0.05	n.s.	n.s.	n.s.	<0.05	n.s.	n.s.	n.s.
Income Moderation								
Income – Lower (n=307)	0.312	0.810	0.554	0.407	0.420	-0.447	0.840	0.822
Income – Higher (n=781)	0.227	0.825	0.569	0.399	0.407	-0.366	0.809	0.861
F(3; 1,082)	1.78	3.78	0.73	0.11	0.70	3.31	2.89	0.18
p-value	n.s.	<0.01	n.s.	n.s.	n.s.	<0.05	<0.05	n.s.
Gender Moderation								
Gender – Male (n=526)	0.243	0.779	0.592	0.376	0.447	-0.393	0.812	0.839

Link – beta and F/p-value	PE-PQ	PQ-PV	PQ-CS	PV-CS	CS-PT	CS-CC	CS-RL	R ² CS
Gender – female (n=727)	0.250	0.825	0.541	0.425	0.401	-0.401	0.826	0.852
F(3; 1247)	0.75	1.45	0.57	1.61	3.70	2.05	0.71	1.53
p-value	n.s.	n.s.	n.s.	n.s.	<0.05	n.s.	n.s.	n.s.

DISCUSSION AND CONCLUSION

Based on the obtained results several conclusions can be made. First, this study confirms the validity and robustness of the adapted American Customer Satisfaction Model. It demonstrates that the ACSM may be successfully modified to study the antecedents and consequences of user satisfaction with mobile phone services. The study's model behaved as expected; customer satisfaction was influenced by perceived quality and perceived value, but not by pre-purchasing expectations. This demonstrates that the effect of pre-purchasing expectations on customer satisfaction is fully mediated by perceptions of the quality of mobile phone services. A potential theoretical explanation for this indirect effect is that users need to have some degree of experience with a service before they may form reliable perceptions of satisfaction. That is, prior expectations are meaningless before they are contrasted with the actual experience. As expected, it was also found that users reporting on higher satisfaction tend to repurchase new or additional services from their current service provider, and stay with their provider, even if it increases prices or if a competitor decreases prices. At the same time, highly satisfied customers complain less frequently than those who are dissatisfied. The model also shows high predictive power because it explains almost 85% of customer satisfaction variance. Overall, these observations are consistent with prior research.

Second, age moderates two of the model's relationships: Prior Expectations – Perceived Quality, and Customer Satisfaction – Price Tolerance. In both situations, the structural relationships are weaker for Generation X than for Baby Boomers mobile phone users. In terms of the PE – PQ link, it was observed that older individuals (Baby Boomers) put more emphasis on their prior expectations in forming quality perceptions ($\beta = 0.30$), whereas younger people (Generation X) consider their expectations with respect to service quality to a lesser degree ($\beta = 0.17$). Regarding the

CS – PT relationship, satisfaction has a higher impact on price tolerance for older individuals ($\beta =$ older: 0.45, younger: 0.35).

The observation above may be explained theoretically. It may be hypothesized that younger users consider not only their prior expectations but also other factors when forming their perceptions of service quality. They may also consider other issues when deciding whether to stay with their current provider when it increases its prices, or when a competitor decreases its fees. For instance, younger users may rely on the opinion of an important reference groups, such as peers. Given that they tend to spend more time investigating all product or service details [7], most younger individuals may form a complete picture of the offering before they actually start using the service. In this case, their Prior Expectations scores are more uniform than those for older users; this leads to the reduction in the PE construct variance that reduces the strength of the PE – PQ relationship. Indeed, the PE variance for younger users was lower (std = younger: 1.46, older: 1.61).

Younger individuals also provide more uniform scores on the Price Tolerance construct (std = younger: 7.92, older: 8.62). This demonstrates that they are more consistent in their price tolerance levels than older customers are; this in turn reduces PT variance that weakens the CS – PT link for younger individuals. As evidenced in prior research, baby boomers (i.e., those who were over 40 years old at the date of the survey) place a greater emphasis on various financial aspects of products and services [22]. This observation also holds true with regards to mobile services; the level of satisfaction is more critical in determining price tolerance behavior for older than for younger users. This suggests that improvements in customer satisfaction have better results with older people. Thus, wireless service providers may target the older users' market segment for service improvements that in turn may increase user satisfaction levels and reduce the probability of switching to a competitor.

Third, income moderates three of the model's relationships: PQ – PV, CS – CC, and CS -

RL. It is noted that the employment of age and income moderators affected different links; this is due to a relatively low correlation between these variables. In terms of the PQ – PV relationship, lower income users (household income is below \$40,000) emphasize prior expectations to a lesser degree than higher income users do (β = lower: 0.810, higher: 0.825). At the same time, it is acknowledged that even though the difference in betas is statistically significant, the difference between the coefficients is relatively minor. In addition, both betas are above 0.8; that is considered a very strong relationship in causal modeling. With respect to the CS – CC link, an important finding emerged. In both cases, the relationship was negative; it is, however, stronger for lower income individuals (β = lower: - 0.45, higher: - 0.37). This shows that if lower income users are more satisfied, they complain to a lesser extent than their higher income counterparts do. In other words, satisfaction is more essential in determining complaining behavior for the former group of people. From a theoretical perspective, it may be assumed that higher income individuals consider not only their overall satisfaction but also a variety of other factors when they contact a wireless provider to address service issues. Furthermore, they may have stronger self-efficacy with managing complaints, and feel that they have the power to get what they want. With regards to the CS – RL link, the relationship is stronger for lower income customers (β = lower: 0.840, higher: 0.809) that is partially due to a higher RL variance (std = lower: 3.26, higher: 3.04). Overall, the findings demonstrate that service providers are better off increasing satisfaction of lower income users. This may result in better behavioral outcomes than the ones they can obtain in the high-income segment. It may lead to a greater reduction in complaint rates and increased probability of repurchasing additional services.

Fourth, gender moderates only one of the model's relationships. It was found that male and female users follow a similar pattern of perception development in forming satisfaction assessments and behavioral outcomes. The only exception is the CS – PT link (β = male: 0.447, female: 0.401) that shows that highly satisfied male users are more price tolerant than female users are. Overall, it is proposed that gender has a very limited effect on the examined relationships in the mobile services context. Recently, DeBaillon and Rockwell [8] came to a similar conclusion by empirically demonstrating that males and females utilize mobile phones to a

similar extent. Given this observation, service providers should put an equal emphasis on the male and female market segments. One interesting implication, though, is that service providers are better off talking with male members of the family when they are trying to sell new features that increase the monthly bill. Assuming equal level of satisfaction with a service, males are more likely to tolerate such price increases.

Overall, these findings offer academic and practical implications. For researchers, the findings validate a model that examines the antecedents and outcomes of user satisfaction with mobile phone services. In addition, this investigation contributes to the current knowledge by filling a gap in the current literature regarding the moderating effects of consumer demographics on the ACSM in the mobile phone services industry. For mobile service providers, the findings suggest a certain market segmentation they should consider, and potential avenues of action they may take in order to improve desirable outcomes, such as higher retention and price tolerance, and a lower number of complaints. In addition, the findings may potentially enable researchers to apply similar approaches in other areas of interest and assist managers in the development of promotional, satisfaction, and loyalty programs.

REFERENCES

- [1] Anderson, E.W., and Fornell, C. "Foundations of the American Customer Satisfaction Index," *Total Quality Management & Business Excellence*, volume 11, Number7, 2000, pp. 869-882.
- [2] Anderson, J.C., and Gerbing, D.W. "Structural Equation Modeling in practice: A review and recommend two-step approach," *Psychological Bulletin*, Volume 103, Number 3, 1988, pp. 411-423.
- [3] Baron, R.M., and Kenny, D.A. "The Moderator Mediator Variable Distinction in Social Psychological-Research - Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, Volume 51, Number 6, 1986, pp. 1173-1182.
- [4] Bontis, N., and Serenko, A. "The moderating role of human capital management practices on employee capabilities," *Journal of Knowledge Management*, in press, 2006,
- [5] Chin, W.W. "The Partial Least Squares approach for Structural Equation Modeling," in

- A. Marcoulides, ed., *Modern methods for business research*, Mahwa, N.J.: Lawrence Erlbaum Associates, 1998, pp. 295-336.
- [6] Chow, G.C. "Tests of equality between sets of coefficients in two linear regressions," *Econometrica*, Volume 28, Number 3, 1960, pp. 591-605.
- [7] Cole, C.A., and Balasubramanian, S.K. "Age differences in consumers' search for information: Public policy implications," *Journal of Consumer Research*, Volume 20, Number 1, 1993, pp. 157-169.
- [8] DeBaillon, L., and Rockwell, P. "Gender and student-status differences in cellular telephone use," *International Journal of Mobile Communications*, Volume 3, Number 1, 2005, pp. 82-98.
- [9] Dow, K.; Serenko, A.; Turel, O.; and Wong, J. "Antecedents and consequences of user satisfaction with email systems," *International Journal of E-Collaboration*, Volume 2, Number 2, 2006, pp. 46-64.
- [10] Fornell, C. "A National Customer Satisfaction Barometer: The Swedish Experience," *Journal of Marketing*, Volume 56, Number 1, 1992, pp. 6-21.
- [11] Fornell, C. "The science of satisfaction," *Harvard Business Review*, Volume 79, Number 3, 2001, pp. 120-121.
- [12] Fornell, C., "Q1 2005: Transportation; Information; Utilities; Health Care and Accommodation & Food Services: Commentary by Class Fornell, C. Fornell," 2005, Ann-Arbor, MI, USA.
- [13] Fornell, C.; Johnson, M.D.; Anderson, E.W.; Cha, J.; and Bryant, B.E. "The American Customer Satisfaction Index: Nature, purpose, and findings," *Journal of Marketing*, Volume 60, Number 7, 1996, pp. 7-18.
- [14] Fornell, C., and Larcker, D.F. "Evaluating structural equation models with unobservable variables and measurement error," *Journal of Marketing Research*, Volume 18, Number 1, 1981, pp. 39-50.
- [15] Gefen, D., and Straub, D. "Gender differences in the perception and use of e-mail: An extension to the technology acceptance model," *MIS Quarterly*, Volume 21, Number 4, 1997, pp. 389-400.
- [16] Gorst, J.K.; Wallace, W.; and Kanji, G.K. "Customer satisfaction at the Sheffield World Congress, 1998," *Total Quality Management*, Volume 10, Number 4/5, 1999, pp. 561-568.
- [17] Igbaria, M.; Parasuraman, S.; and Badawy, M.K. "Work experiences, job involvement, and quality of work life among information systems personnel," *MIS Quarterly*, Volume 18, Number 2, 1994, pp. 175-201.
- [18] Judge, T.A.; Bono, J.E.; Thoresen, C.J.; and Patton, G.K. "The job satisfaction - job performance relationship: A qualitative and quantitative review," *Psychological Bulletin*, Volume 127, Number 3, 2001, pp. 376-407.
- [19] Koufaris, M. "Applying the Technology Acceptance Model and Flow Theory to online consumer behavior," *Information Systems Research*, Volume 13, Number 2, 2002, pp. 205-223.
- [20] Levernier, W.; Partridge, M.D.; and Rickman, D.S. "Differences in Metropolitan and Nonmetropolitan U.S. Family Income Inequality: A Cross-County Comparison," *Journal of Urban Economics*, Volume 44, Number 2, 1998, pp. 272-290.
- [21] Lin, H.-H., and Wang, Y.-S. "An examination of the determinants of customer loyalty in mobile commerce contexts. *Information & Management*, In Press, Corrected Proof, 2005,
- [22] Marconi, J. "Future marketing: Targeting seniors, Boomers, and Generation X and Y," Lincolnwood, IL: NTC Business Books; In conjunction with The American Marketing Association, 2001.
- [23] Morahan-Martin, J. "Males, females and the Internet," in J. Gackenbach, ed., *Psychology and the Internet: Intrapersonal, Interpersonal, and Transpersonal Implications*, San Diego, CA, USA: Academic Press, 1998, pp. 169-197.
- [24] Morris, M.G., and Venkatesh, V. "Age differences in technology adoption decisions: Implications for a changing work force," *Personnel Psychology*, Volume 53, Number 2, 2000, pp. 375-403.
- [25] Roslow, S.; Li, T.; and Nicholls, J.A.F. "Impact of situational variables and demographic attributes in two seasons on purchase behavior," *European Journal of Marketing*, Volume 34, Number 9/10, 2000, pp. 1167-1180.
- [26] Shim, J.P. "Why Japan and Korea Are Leading in the Mobile Business Industry," *Decision Line*, Volume 36, Number 3, 2005, pp. 8-12.
- [27] Spithoven, A.H.G.M. "Distribution of income and the structure of economy and society," *International Journal of Social Economics*, Volume 32, Number 1/2, 2005, pp. 133-154.

- [28] Sun, H., and Zhang, P. "The role of moderating factors in user technology acceptance," *International Journal of Human Computer Studies*, Volume 64, Number 2, 2006, pp. 53-78.
- [29] Tenenhaus, M.; Vinzi, V.E.; Chatelin, Y.-M.; and Lauro, C. "PLS path modeling," *Computational Statistics & Data Analysis*, Volume 48, Number 1, 2005, pp. 159-205.
- [30] Thomas, R.D.; Lu, I.R.R.; and Cedzynski, M. "Partial Least Squares: A critical review and a potential alternative," in *Proceedings of Administrative Sciences Association of Canada (ASAC) Conference*, Toronto, Ontario, Canada, 2005, pp. 121-135.
- [31] Turel, O., and Serenko, A. "Satisfaction with mobile services in Canada: An empirical investigation," *Telecommunications Policy*, Volume 30, Number 5-6, 2006, pp. 314-331.
- [32] Turel, O.; Serenko, A.; and Bontis, N. "User acceptance of wireless Short Messaging Services: Deconstructing perceived value," *Information & Management*, In Print, 2007,
- [33] Turel, O.; Serenko, A.; Detlor, B.; Collan, M.; Nam, I.; and Puhakainen, J. "Investigating the determinants of satisfaction and usage of mobile IT services in four countries," *Journal of Global Information Technology Management*, Volume 9, Number 4, 2006, pp. 6-27.
- [34] Van Ryzin, G.G.; Muzzio, D.; Immerwahr, S.; Gulick, L.; and Martinez, E. "Drivers and consequences of citizen satisfaction: An application of the American Customer Satisfaction Index Model to New York City," *Public Administration Review*, Volume 64, Number 3, 2004, pp. 331-341.
- [35] Venkatesh, V.; Morris, M.G.; Davis, G.D.; and Davis, F.D. "User acceptance of information technology: Toward a unified view," *MIS Quarterly*, Volume 27, Number 3, 2003, pp. 425-478.
- [36] Wong, G.K.-M., and Yu, L. "Income and social inequality in China: impact on consumption and shopping patterns," *International Journal of Social Economics*, Volume 29, Number 5, 2002, pp. 370-384.

AUTHOR BIOGRAPHIES

Alexander Serenko is an Assistant Professor of Management Information Systems in the Faculty of Business Administration, Lakehead University, Canada. He holds a M.Sc. in computer science, an MBA in electronic business, and a Ph.D. in Management Science/Systems. Dr. Serenko's research interests pertain to intelligent agents, user technology adoption, knowledge management, and innovation. Alexander's articles appeared in various refereed journals, and his papers received awards at Canadian and international conferences.

Ofir Turel is a PhD candidate at the Michael G. DeGroot School of Business, McMaster University. Before joining the Michael G. DeGroot School of Business, Ofir held senior positions in the information technology and telecommunications industries. He was a member of the GSM Association and contributed to the development of value added wireless services. His research interests include mobile services, human computer interaction and electronic negotiations.

Sert Yol earned both his Bachelor of Electrical Engineering and Master of Management degrees from Lakehead University in Thunder Bay, Ontario. His research interests include market segmentation, ERP implementation, business process reengineering, and monetary policy transmission mechanism.