Dimensions of Autotelic Personality in the Context of Mobile Information and Entertainment Services

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ABSTRACT

Autotelic Personality represents an important individual construct in flow theory yet little is known about its underlying dimensions. Csikszentmihalyi (1988) suggested that the higher the autotelic nature of an individual, the more likely for him/her to experience flow. This study explores autotelic personality, its underlying dimensions and its relationship with perceived playfulness in the context of Mobile Information and Entertainment Services (MIES). This study found Autotelic Personality to be an important quality in order for users to experience perceived playfulness in the MIES context. Several underlying dimensions of Autotelic Personality were identified, including personal innovativeness, self efficacy and control.

INTRODUCTION

Autotelic Personality characterizes a person "who is able to enjoy what he is doing regardless of whether he will get external rewards from it and who thus is more likely to experience flow for a given activity" (Hoffman & Novak, 1996). Csikszentmihalyi (1988) in his study of happiness identified what an 'autotelic' personality is – a person who sets their own goals, whether short-term or long-term, and then has great fun in achieving them. As Csikszentmihalyi stated:

"...the complexity of a flow activity is limited by the degree of challenge it can provide, and by the willingness and "creativity" of the person to create challenges in an activity. A person who can do this well, or who has the ability to enter a flow state relatively easy, is said to have an "autotelic personality"

Although Autotelic Personality is identified as an essential part of the Flow model by Csikszentmihalyi, very little research explored the underlying dimensions of Autotelic Personality (Finneran and Zhang, 2005; Nakamura and Csikszentmihalyi, 2002).

The convergence of mobile commerce and internet technologies has promised users unprecedented convenience and greater enjoyment. In recent years, mobile information and entertainment services (MIES) has been gradually gaining popularity among mobile phone users (Garcia-Macias, 2003; Baldi and Thaung, 2002; Van de Kar et al. 2003). Research into mobile internet to date has by and large focused on extrinsic use of these services, for example, productivity and usefulness and has largely ignored important end-user characteristics. To better understand users' acceptance of MIES, we argue that it is equally important to examine an intrinsic motivator "Perceived Playfulness", defined as:

"The extent to which the individual perceives that his or her attention is focused on the interaction with the World-Wide-Web; is curious during the interaction; and finds the interaction intrinsically enjoyable or interesting" (Moon and Kim, 2001)

This construct was proposed by Moon and Kim (2001) based on the theory of flow and its importance verified by Chung and Tan (2004). However, some researchers have recently pointed out that individual differences have been ignored in many flow related studies (Finneran and Zhang, 2005; Nakamura and Csikszentmihalyi, 2002).

Therefore to gain a better understanding of the role of Autotelic Personality in MIES, it is important to identify those individual differences likely to make up Autotelic Personality and which contribute to the emergence of Perceived Playfulness.

INDIVIDUAL DIFFERENCES AND PERCEIVED PLAYFULNESS

Individual differences refer to factors such as personality, situational, and demographic variables that influence user's beliefs about and use of information technology. In the context of Flow, Webster and Martocchio (1992) studied microcomputer playfulness and suggest microcomputer playfulness act as an individual' tendency to interact spontaneously, inventively and imaginatively with microcomputers. It is a situation specific individual characteristics represents a type of cognitive playfulness. Moon and Kim (2001) considered Perceived Playfulness as an intrinsic belief or motive, which is formed by an individual's subjective experience with IS/IT. Hence, identifying those individual characteristics that lead to Perceived Playfulness may provide insight into this (stable) individual belief construct.

This study examines the pattern of relationships between Perceived Playfulness and those individual differences that lead to its occurrence. We are also keen to know whether these individual differences are likely to be the dimensions of Autotelic Personality. This study draws upon previous research on Flow as Perceived Playfulness is fundamentally based on Flow. Prior work related to the state of flow with information technologies has adopted alternative conceptualizations, often with different terminology of the major dimensions related to Flow construct (Siekpe, 2005; Finneran and Zhang, 2005). Most research tends to use these individual differences (except Focused Attention) as antecedents of flow instead of underlying dimensions as shown in Table 1.

Personal Innovativeness and Flow

The flow experience usually occurs in structured activities such as games, ritual events, sports, artistic performances, etc. (Csikszentmihalyi 1988). It does not normally occur in everyday life because challenges and skills are rarely balanced. However, even if skills and challenges are balanced, it does not guarantee a flow experience occurring. This is due to the fact that activities only provide the challenges; it is still up to the individual to recognize the challenge, provide the skills, and extract enjoyment from the activity. Therefore, challenge is more related to the perceived complexities *provoked by* the activity rather than the individual per se. As Csikszentmihalyi (1988) stated; the complexity of a flow activity is limited by the degree of challenge it can provide, and by the willingness and "creativity" of the person to create challenges in an activity. Because of this reason, Personal Innovativeness introduced by Agarwal and Prasad (1998) was deemed important in the context of our study. Personal Innovativeness in the domain of information technology is conceptualized as an individual trait reflecting a willingness to try out any new technology. Furthermore, Agarwal and Karahanna (2000) provide

Table 1. Different conceptualizations of personal innovativeness, self efficacy, control and focused attention

Individual Difference	Construct	Dimensions	Antecedents
Personal Innovativeness	Cognitive absorption; Flow	Flow-Finneran and Zhang (2003)	Cognitive absorption-Agarwal and Karahanna (2000)
Self Efficacy/Skills	Flow		Koufaris (2002); Ghani et al. (1991); Hoffman and Novak (1996); Novak et al. (2000)
Control	Flow; Perceived Playfulness	Trevino and Webster (1992); Webster et al. (1993); Koufaris (2002)	Chung and Tan (2004); Ghani and Despande (1994); Ghani et al. (1991); Webster and Ho (1997); Chen (2000);
Focused Attention	Flow; Perceived Playfulness	Trevino and Webster (1992); Webster et al. (1993); Koufaris (2002)	Hoffman and Novak (1996); Novak et al. (2000); Chung and Tan (2004);

empirical support of its influence on cognitive absorption, which is a construct similar to flow. In this regard, Pagani (2004) suggests individual innovativeness can be seen as willingness to adopt 3G multi-media services.

Self Efficacy and Flow

Self Efficacy is similar to Skill which has been well studied in research on Flow (Koufaris, 2002; Ghani et al. 1991; Hoffman and Novak, 1996; Novak et al. 2000). Recall that the most important condition for a Flow state to occur is when the challenges of a situation match the skills of the participant. Past researches have drawn distinction between general self-efficacy and computer self-efficacy (CSE). While the former being an overall judgement of an individual on efficacy across multiple computer application domains, the later represents the judgement on specific task in the domain of general computing. Agarwal et al. (2000) pointed out that there is a significant support for a relationship between self efficacy and individual beliefs about IT. Their result suggests software specific self-efficacy will have a stronger effect than the initial general self-efficacy due to the "carryover" effect, i.e. the accumulated application specific self-efficacy will eventually displace the effects of initial belief with the passage of time. Because of this reason, Computer Self Efficacy (CSE) is preferred over Skill as the latter may convey the meaning of general competency on everyday tasks.

Control, Focused Attention and Flow

Hoffman and Novak (1996) developed a theoretical mode of Flow within the hypermedia context. In this model, Challenges, Skills and Focused Attention have been modeled as the primary antecedents of flow. Other secondary antecedents (Interactivity and Telepresence) were also added in accordance to the literature of hypermedia. The consequence of flow leads to increased learning, perceived control, exploratory behavior and positive experience. However, their earlier work is exploratory in nature therefore all the hypothesized relationships were not empirically tested. Novak et al. (2000) later revised the original model and changed Control as a primary antecedent of flow. The revised model was then tested and results showing all these four antecedents exert positive and significant on flow. A somewhat interesting finding is that they model Control and Skill together as a higher order construct (i.e. Skill/Control) However, a distinction should be made between these two, control capturing an individual's perception that he/she exercises control over the interaction with environment (Webster et al.. 1993) whereas Self Efficacy (Skill) is the judgement on specific task in a specific domain prior to that interaction. Chung and Tan (2004) in their study also proposed Focused Attention and Control as two individual cognitive aspects that lead to Perceived Playfulness.

DEVELOPMENT OF THE RESEARCH HYPOTHESES

From the literature review, several limitations were identified. It was noted that there was a lack of focus on the individual side in the literature on intrinsic motivation. It has also been found autotelic personality as an important personality construct has not been well examined in previous studies. The hypotheses to be explored in this paper therefore are:

H1: Personal Innovativeness, Focused Attention, Self Efficacy and Control are positively related to Perceived Playfulness
H2: Autotelic Personality is a second order reflective structure formed by Personal Innovativeness, Self efficacy, Control and Focused attention
H3: Autotelic Personality is positively related to Perceived Playfulness

RESEARCH METHODOLOGY

Sampling

The sample consisted of university students who attend information system and business lectures at Auckland University of Technology. Participants were a total of 149, who volunteered to participate in the study. The participants were 99 males and 55 females. In terms of phone categories, about 60% of all the respondents specified they have WAP-enabled mobile phone or GPRS phone. Respondents holding a 3G mobile phone came second in the list, with a significant proportion of 12% among the respondents. Users of the CDMA mobile phone are relatively few, only 7% compared to other phone categories. At the same time, 21% of all the respondents are not sure about the phones they are using. When asked whether their phone provides a feature with which to access MIES services, 83% of the respondents answered "Yes" to this question. This indicates the wide availability of mobile internet capable phones in the New Zealand market.

Research Design

Data was collected via personally-administered questionnaires in class. This study aims to explore the antecedents of Perceived Playfulness in the context of mobile information and entertainment services (MIES). It explains the relationships among variables and constructs in a theoretical model and examines the differences between two groups. Therefore, the purpose of this research is hypothesis testing, based on our extensive knowledge of the variables and their relationships in the theoretical framework. A questionnaire was used to collect the data. A participant information sheet was also given to each respondent. The data collection was conducted in November 2005 at Auckland University of Technology. Students from six classes were invited to do the questionnaires. A total of

Table 2. Measurements items

Variable	Source
Personal Innovativeness	*Agarwal and Prasad (1998)*
Self Efficacy	*Hung et al. (2003)*
Control	*Agarwal and Karahanna (2000)*
Focused Attention	*Webster et al. (1993)*
Perceived Playfulness	*Moon and Kim (2001)*

186 questionnaires were returned. Incomplete questionnaires were discarded, leaving 149 usable samples.

In terms of measurement, all items were constructed as agree-disagree statements on a seven-point Likert scale. Since the variables in interest have been previously validated under different contexts, mirroring the same items in a new context is straightforward. To ensure measurement reliability, items validated in previous research have been used (see Table 2). The measures for Personal Innovativeness, Self Efficacy, Control, Focused Attention and Perceived Playfulness were taken from or based on previous IS research and were modified to suit the MIES context. Adopting the same measures as others instead of creating new measures may enhance the comparability of the paper with others, specifically when existing measures already become a field standard (Churchill et al. 1999).

DATA ANALYSIS AND RESULTS

The data analysis technique employed in this study is Partial Least Squares (PLS). PLS is a recent technique that generalizes and combines features from principal component analysis and multiple regressions (Thompson et al. 1995). The PLS approach provides a means for directly estimating latent variable component scores. It is a technique comprised of measurement and structural models (Gefen et al. 2000). The aim of testing the measurement model is to specify how the latent variables are measured in terms of the observed variables, and how these are used to describe the measurement properties (validity and reliability) of the observed variables. The structural model investigates the strength and direction of the relationships among theoretical latent variables. Autotelic Personality as a second order factor can be approximated using various procedures. One of the easiest to implement is the approach of repeated indicators known as the hierarchical component model suggested by Lohmöller (1989, pp. 130-133). In essence, a second order factor is directly measured by observed variables for all the first order factors. This procedure works best with equal numbers of indicators for each construct.

Measurement Validation

To measure internal consistency of a given block of indicators, internal composite reliability (ICR) scores were obtained through PLS-GRAPH to assess the reliabilities of each latent variable. Where the internal consistency of any latent variable exceeds 0.70, this indicates tolerable reliability (Fornell and Larcker, 1981). All latent variables in our model have internal consistencies greater than 0.7, this indicates all constructs have high reliabilities. Two validities need to be captured in the measurement model: convergent validity and discriminant validity. Essentially, they estimate how well the measurement items relate to the constructs. PLS performs confirmatory factor analysis to establish factorial validity regarding these two validities (Gefen and Straub, 2005). To test convergent validity of the measures associated with each construct, the loadings and cross loadings of each indicator on the latent variables must also be examined. Convergent validity is shown when the *t-values* of these loadings are above 1.96 (Gefen and Straub, 2005). The results (Table 3) indicate almost all measurement items exhibit very high convergent validity on their measured latent variables.

However, it has been noticed that the first measure of Focused Attention (FoA1) and the second measure of Perceived Playfulness (PP2) exhibit very low loadings. The way to establish discriminant validity is to examine the square root of the AVE of each construct to the correlations of this construct to all other constructs.

Table 3. Convergent validities

	PI	SE	FoA	Ctrl	*PP*
PI1	**0.774**	0.257	0.190	0.331	*0.177*
PI2	**0.869**	0.410	0.261	0.417	*0.438*
PI3	**0.816**	0.492	0.104	0.412	*0.443*
PI4	**0.826**	0.372	0.213	0.357	*0.364*
SE1	0.410	**0.880**	0.041	0.443	*0.468*
SE2	0.408	**0.877**	0.012	0.443	*0.477*
SE3	0.475	**0.959**	0.045	0.470	*0.488*
FoA1	-0.021	0.017	**0.456**	0.123	*0.025*
FoA2	0.067	-0.058	**0.698**	0.168	*0.088*
FoA3	0.225	0.052	**0.866**	0.379	*0.281*
Ctrl1	0.401	0.430	0.304	**0.846**	*0.459*
Ctrl2	0.281	0.344	0.256	**0.769**	*0.329*
Ctrl3	0.442	0.415	0.369	**0.818**	*0.532*
PP1	0.152	0.076	0.300	0.226	***0.434***
PP2	0.107	-0.063	0.218	0.093	***0.105***
PP3	0.432	0.357	0.290	0.453	***0.779***
PP4	0.316	0.418	0.278	0.404	***0.775***
PP5	0.291	0.483	0.208	0.404	***0.768***
PP6	*0.379*	*0.488*	*0.230*	*0.498*	***0.846***

Table 4. Discriminant validities

	PI	SE	Ctrl	FoA	*PP*
PI	**0.824**				
SE	0.496	**0.934**			
Ctrl	0.468	0.498	**0.822**		
FoA	0.267	0.074	0.412	**0.808**	
PP	*0.486*	*0.534*	*0.557*	*0.316*	**0.739**

In the PLS-GRAPH, the AVEs can be easily obtained by performing a bootstrap re-sampling. Fornell and Larcker (1981) suggest that the square root of AVE should be greater than the corresponding correlations among the latent variables. The results shown in Table 4 demonstrate all latent variables exhibit high discriminant validities. The diagonal cells in the correlation matrix shown in Table 3 are the square root value of AVE for each latent variable.

The initial test of the measurement model using confirmatory factor analysis indicated that some construct revisions were needed. The loadings and cross-loadings of indicator FoA1 and PP2 in Table 3 showed relatively low correlations on the latent constructs they were meant to describe. Essentially this result presents a need to re-specify the instruments. The approach described in Churchill (1979) is to purify the measures. Items that do not share equally in the common core should be eliminated. As suggested by Straub et al. (2004), this approach can be applied to PCA, PLS and covariance-based SEM. As a result, FoA1 and PP2 were eliminated in the revised model.

The Structural Model

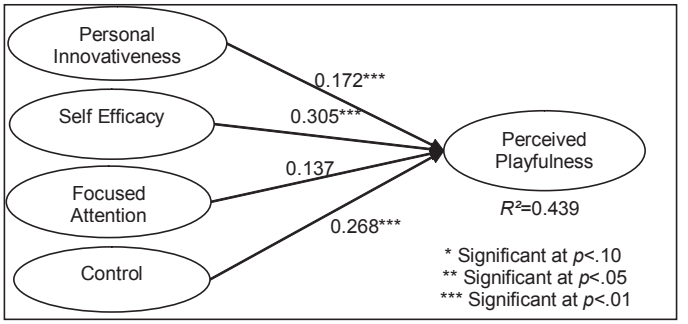
Testing Individual Differences on Perceived Playfulness

We first test the proposed four individual differences and their influences on Perceived Playfulness in the context of MIES. The results indicate all factors except Focused Attention exert significant influence on Perceived Playfulness as shown in Fig 1.

Testing Second Order Factor

When testing second order constructs, the percentage of the paths should be at 0.70 or above to establish the convergent validities of the first order factors (Chin, 1998). As shown in Fig 2, the correlations between Personal Innovativeness, Self Efficacy, Control and Autotelic Personality are highly correlated because the 0.70 threshold has been met. Since a reflective model would assume the first and

Figure 1. Individual differences as antecedents of perceived playfulness



second constructs are extremely highly correlated, a formative model seems less likely for Autotelic Personality. The low loading from Autotelic Personality on Focused Attention (after measurement revision) casts further doubt on its role in reflecting Autotelic Personality. Next, a mediation test was performed to see if the second order construct fully mediates the relationship between the first order factors and the theorized dependent variable (Chin, 1998). Autotelic Personality is used as a more parsimonious second order factor and it shows significant correlation its first order factors. As a surrogate of its first order factors, Autotelic Personality strongly influences Perceived Playfulness and is highly significant (β=0.647, t=11.2900). This aggregate measure is the only significant predictor of Perceived Playfulness when all first order factors are controlled for.

All items have large and significant loadings on their corresponding factors indicating evidence of good construct validities (Doll et al. 1994). For the latent variables, with *t-values* above 2.0 being considered significant, all factors except Focused Attention have large and significant structural coefficients, indicating good construct validity. The *R-square* values (0.627~0.672) showing three of the four first order factors (Personal Innovativeness, Self Efficacy and Control) can be reliably explained by Autotelic Personality. Based on these results, Hypotheses 1, 2 and 3 were supported.

DISCUSSION AND CONCLUSION

Chin and Gopal (1995) suggest the relative importance of the reflective model is established by contrasting the loadings from the overall latent belief with each of the individual beliefs. Each belief represents a separate attitudinal dimension which reflects an existing overall attitude. Our findings suggest all underlying factors (Personal Innovativeness, Self- Efficacy, Control and Focused Attention) significantly correlated with Autotelic Personality. The loading of Focused Attention indicate it is not an important underlying belief in reflecting Autotelic Personality compared to other factors. According to Buchanan et al. (2001), navigate the mobile internet via mobile phones can be a daunting experience given the constraints of small screen display and cumbersome input mechanisms. A common criticism of early WAP sites was that they involved too many selections and moves between menus and submenus, for the user to achieve their desired contents. Therefore, user's Focused Attention is likely to be affected by the screen size of mobile phones (Buchanan et al. 2001; Sweeney and Crestani, 2006).

Our findings suggest all underlying factors (Personal Innovativeness, Self- Efficacy, Control and Focused Attention) significantly correlated with Autotelic Personality. On the other hand, only Personal Innovativeness, Self Efficacy and Control significantly determine Perceived Playfulness. High correlations were also identified between these three factors and Autotelic Personality. This is consistent with Asakawa (2004) that autotelic students are those felt more in control of the situation and positive about challenges as compared to their non-autotelic counterparts. Acknowledging that an autotelic person perceived challenge situation differently from non-autotelic person, this study integrated Personal Innovativeness as one of the underlying dimension of Autotelic Personality (Agarwal and Karahanna, 2000). The higher loading of Autotelic Personality on Personal Innovativeness and Control indicates both constructs are important dimensions of Autotelic Personality. This study also provides empirical evidence that Self Efficacy is a significant dimension of Autotelic Personality in the context of MIES.

In summary, the important dimensions of Autotelic Personality are: Personal Innovativeness, Self-Efficay and Control. These dimensions are positively related to Perceived Playfulness. This study thus empirically proves the existence of this important construct and the predisposition of its core dimensions to lead to the occurrence of Perceived Playfulness in the context of MIES. Our findings suggest individuals with Autotelic Personality are more likely to experience Perceived Playfulness in relation to these services. In terms of practice, it is possible to use these dimensions to address the unique needs of different user groups. For example, it might be a possibility to categorize MIES users according to the importance of Personal Innovativeness, Self Efficacy and Control when designing marketing strategies for service offerings. As Hoffman and Novak (1996) suggest, this has crucial implications for market segmentation of the mobile marketplace.

REFERENCES

Agarwal, R., Sambamurthy, V., & Stair, R. (2000). Research report: The evolving relationship between general and specific computer self-efficacy - An empirical assessment. *Information Systems Research*, 11(4), 418-430.

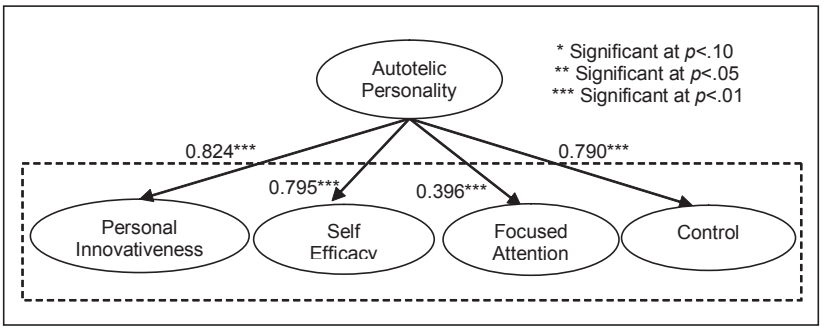
Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive Absorption and Beliefs about Information Technology Usage. *MIS Quarterly*, 24, 665-694.

Agarwal, R., & Prasad, J. (1998). A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. *Information Systems Research*, 9(2), 204-215.

Asakawa, K. (2004). Flow experience AND autotelic personality In Japanese College students: How Do They experience challenges In Daily life?. *Journal of Happiness studies*, 5(2), 123-155.

Buchanan G, Jones M., Thimbleby H., Farrant S. & Pazzani M. (2001). Improving mobile Internet usability. *Proceedings of the 10th International Conference on World Wide Web*, Hong Kong, May 2001, pp 673-680. ACM Press.

Figure 2. Second order reflective construct



Chen, H. (2000). Exploring Web Users' On-line Optimal Flow Experiences. Unpublished PhD Dissertation, School of Information Studies, Syracuse, NY: Syracuse University

Chin, W. W., & Gopal, A. (1995). Adoption intention in GSS: Relative importance of beliefs. *The Data Base for Advances in Information Systems*, 26(2/3), 42-64.

Chin, W. W. (1998). Issues and Opinion on Structural Equation Modeling. *MIS Quarterly,* 22(1), pp. vii – xvi.Chung, J., & Tan, F. B. (2004). Antecedents of Perceived Playfulness: An Exploratory Study on. User Acceptance of General Information-Searching Websites. *Information & Management,* 41(7), 869-881.

Chung, J., & Tan, F. B. (2004). Antecedents of Perceived Playfulness: An Exploratory Study on. User Acceptance of General Information-Searching Websites. Information & Management, 41(7), 869-881.

Churchill, G. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16**,** 64-73.

Churchill, G. (1999). *Marketing Research: Methodological Foundation*. New York: The Dryden Press.

Csikszentmihalyi, M. (1988). The Future of Flow. In Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (Eds.), *Optimal Experience*: *Psychological Studies of Flow in Consciousness* (pp.364-383). New York.

Davis, F. (1989). Perceived Usefulness, Perceived Ease of Use, and User acceptance of Information Technology. *MIS Quarterly*, 13**,** 318-339.

Doll, W.J., Xia, W., & Torkzadeh, G. (1994). .A Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument. *MIS Quarterly*, 18, 453-461.

Finneran, C. M., & Zhang, P. (2005). Flow in computer-mediated environments: Promises and challenges. *Communications of the Association for Information Systems*, 15, 82-101.

Fornell, C., & Larcker, D. F. (1981) Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18, 39-50.

Garcia-Macias, J. A., Rousseau, F., Berger-Sabbatel, G., Toumi, L., & Duda, A. (2003). Quality of Service and Mobility for the Wireless Internet. *Wireless Networks*, 9, 341-352.

Gefen, D., & Straub, D. (2005). A Practical Guide to Factorial Validity Using PLS-Graph: Tutorial and Annotated Example. *Communications of the Association for Information Systems*, 16(5), 91-109.

Gefen, D., Straub, D., & Boudreau, M.C. (2000). Structural Equation Modeling and Regression: Guidelines for Research Practice. *Communications of the Association for Information Systems*, 4(7), 1-80.

Ghani, J., & Deshpande, S. (1994). Task Characteristics and the Experience of Optimal Flow in Human-Computer Interaction. *The Journal of Psychology*, 128, 381-391.

Ghani, J., Supnick, R., & Rooney, P. (1991). The Experience of Flow in Computer-Mediated and in Face-to-Face Group. In Degross, J., Benbasat, I., DeSanctics, G., & Beath, C. (Eds.), *Proceedings of the Twelfth International Conference on Information Systems* (pp. 229-238). New York.

Hoffman, D. L., & Novak T. P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations. *Journal of Marketing*, 60, 50-68.

Hung, S. Y., Ku, C. Y., & Chang, C. M. (2003). Critical factors of WAP services adoption: An empirical study. *Electronic Commerce Research and Applications*, 2, 42-60.

Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13(2), 205-23.

Lohmoller, J. B. The PLS Program System: Latent Variables Path Analysis with Partial Least Squares Estimation. *Multivariate Behavioral Research* (23), 1989, pp. 125-127.

Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management,* (38)4, 217-230.

Novak, T. P., Hoffman, D. L., & Yung, Y.-F. (2000). Measuring the Customer Experience in Online Environments: A Structural Modeling Approach. *Marketing Science*, 19(1), 22-42.

Nakamura, J., & Csikszentmihalyi, M. (2002). The concept of flow. In C.R. Snyder & S.J. Lopez (Eds.), *Handbook of positive psychology* (pp. 89-105). New York: Oxford University Press.

Pagani, M. (2004).Determinants of Adoption of Third Generation Mobile Multimedia Services. *Journal of Interactive Marketing*, 18(3), 46-59.

Siekpe, J. S. (2005). An Examination of The Multidimensionality of Flow Construct in a Computer-Mediated Environment. *Journal of Electronic Commerce Research*, 6(1), 31-43.

Straub, D., Boudreau, M.-C., & Gefen, D. (2004). Validation Guidelines for IS Positivist Research. *Communications of AIS*, (13)24, 380-427.

Sweeney, S., Crestani, F. (2006), Effective search results summary size and device screen size: Is there a relationship? *Information Processing & Management*, 42(4), 1056-1074

Trevino, L. K., & Webster, J. (1992). Flow in Computer-Mediated Communication. *Communication Research*, 19(5), 539-573.

Webster, J., & Martocchio, J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quarterly*, June, 201-226.

Webster, J., Trevino, L. K., & Ryan, L. (1993). The dimensionality and correlates of flow in human-computer interactions. *Computers in Human Behavior*, 9(2), 411-426.