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ARTICLE DE RECHERCHE

The moderating effect of gender on continuance intention for mobile Internet services (MIS)

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ABSTRACT

The paper investigates the moderating effect of gender on the intention to continue using mobile Internet services (MIS) in an everyday life context. An extended model based on the technology acceptance model (TAM) is applied to predict MIS continuance intention, with gender as the moderating variable. The hypotheses are tested on data from a survey of 648 French MIS users. The findings show that female users expressed a stronger need for perceived usefulness and ease-of-use than male users. Interestingly, the stronger effect of perceived usefulness in females was contrary to prior TAM research. These results may be partially explained by the role of intrinsic motivation. The effect of perceived enjoyment was not significant for either males or females. The observed gender differences suggest that MIS providers should consider user gender when advertising and marketing MIS.

Keywords: gender, continuance intention, Mobile Internet Services, TAM.

RÉSUMÉ

Le présent article examine l'effet modérateur du sexe sur l'intention de continuer à utiliser les services de l'Internet mobile (SIM) dans la vie quotidienne. Un modèle adapté de la théorie de "technology acceptance model" (TAM) a été appliqué pour mesurer l'intention de continuer à utiliser SIM, avec le sexe comme une variable modératrice. Les hypothèses ont été testées sur des données provenant d'une enquête auprès de 648 utilisateurs français de SIM. Contrairement aux études antérieures basées sur le TAM, les résultats montrent que les femmes sont plutôt motivées par l'utilité perçue et la facilité d'utilisation que les hommes. Ceci peut être expliqué par le rôle que joue la motivation intrinsèque dans l'usage des SIM par les femmes. L'effet ludique perçu n'était pas significatif ni pour les femmes, ni pour les hommes. Cette différence observée laisse entendre que les opérateurs de SIM devraient prendre en considération le sexe des utilisateurs pour la différenciation de leurs offres.

Mots-clés : genre, intention de continuer l'utilisation, services de l'internet mobile, TAM.

INTRODUCTION

The information technology (IT) literature reveals that gender differences have been always a topic of research interest. Considerable evidence indicates that the qualitative use of both computers and Internet differs greatly between males and females, which may indicate subtle differences in attitudes toward these technologies (Gefen and Straub, 1997; Venkatesh and Morris, 2000; Venkatesh et al., 2000). However, gender differences regarding mobile Internet services (MIS) have received little attention in the IT literature. MIS differ from the traditional stationary Internet in that they are more ubiquitous and can be used in a wider variety of contexts (Lee et al., 2005). They provide everyday users with wireless access to Internet content and services such as text messaging and multimedia services, contact services, payment services, and gaming services (Nysveen et al., 2005b). Understanding gender differences regarding the intention to continue using MIS in everyday life is important for theory and practice.

The ubiquity of MIS has given rise to new attitudes toward MIS use, leading to differences in usage across gender (Economides and Grousopoulou, 2008; Lyytinen and Yoo, 2002). In contrast to computers and Internet, where gender-related differences in use are still pervasive, MIS are usually described as highly egalitarian technologies that have been adopted similarly by the two genders (Geser, 2006; Rakow, 1992). MIS have indeed contributed to equalizing the communicative social integration of males and females much more than computers and Internet, where male users still dominate (Geser, 2006).Yet males and females have been found to maintain quite different attitudes toward MIS and to give them a different place in everyday life (Rakow, 1992). Overall, cultural differences are also noted as impacting attitudes toward MIS usage (Harris et al., 2005).

By focusing on gender differences, it may be possible to gain a more nuanced understanding of the motives driving MIS continuance intention in males as opposed to females. While great progress has been made in understanding users' continuance intention (Bhattacherjee, 2001), research suggests that low MIS acceptance by users is still a barrier to adoption and continuance intention (López-Nicolás, 2008; Lu et al., 2008). For this reason, the technology acceptance model (TAM) was applied in our research to examine gender differences regarding MIS continuance intention. The research question of our investigation is the following: Do perceptions and attitudes regarding MIS continuance intention vary with gender?

Our model was tested using data collected from 648 French MIS users. The results indicate that perceptions affect MIS continuance intention across gender. Female users were more strongly influenced by perceived ease-of-use than male users. Contrary to prior TAM research (Venkatesh and Morris, 2000), perceived usefulness had a strong influence on females compared with males. The findings highlight the role of intrinsic motivation in females' MIS continuance intention. Overall, these

results have some interesting implications for research and practice.

Our research contributes to a better understanding of the gender differences regarding the intention to continue using MIS. *First*, it suggests that gender attitudes toward MIS continuance intention differ from those toward computers and Internet, although this relationship has received little attention in the IT literature. *Second*, it highlights the importance of perceived usefulness in determining females' MIS continuance intention, a counterintuitive result that can be useful for scholars and practitioners alike. *Third*, it emphasizes the importance of perceived ease-of-use – intrinsic to MIS – in explaining females' MIS continuance intention. *Last*, it provides new insights about gender differences regarding MIS continuance intention in the French context, in line with the observation of researchers (Straub et al., 1997) that new IT needs to be understood in a variety of cultural settings.

The paper unfolds as follows. The second section presents the theoretical foundation; the conceptual model applied for this research, and the formulation of hypotheses regarding the moderating effects of gender. The third section discusses the methodology and data analysis used to validate the scales and test the model. The fourth section presents the results. The fifth section discusses the results and presents their implications for theory and practice. The paper will be concluded by pointing out the limitations and perspectives for further research.

I. THEORETICAL DEVELOPMENT

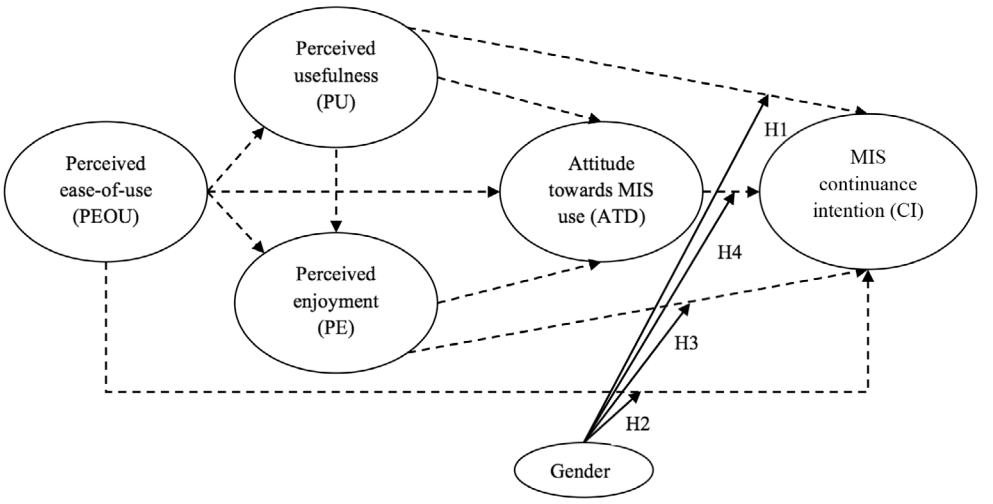
Many of the studies pertaining to IT continuance intention have used Davis et al.'s (1989) technology acceptance model, according to which continuance intention is defined as the usage stage when IT use transcends conscious behavior and becomes part of normal routine activity. This model has also been applied for understanding MIS continuance intention (Barnes, 2011; Kim and Steinfield, 2004; Lee et al., 2005; Lu et al., 2010). The TAM model focuses on the attitudinal explanations of intention to continue using a specific system or service. Perceived usefulness and perceived ease-of-use are assumed to positively influence behavioral intention through attitudes toward use. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance," while perceived ease-of-use is considered as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Ajzen (1988) defined attitudes as predispositions to respond favorably or unfavorably to the use of a system. Ajzen's definition thus emphasizes the notion of "user satisfaction" (Melone, 1990). In general, individuals intend to continue using a system if they are satisfied with their use of it (Bhattacherjee, 2001). The intention to continue the use is based on the behavioral intention and is defined as "the strength of one's intention to perform a specific behavior" (Fishbein and Ajzen, 1975, p. 288). Behavioral intention is found to have a positive effect on behavior in studies based on

the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the TAM.

Most studies based on the TAM (Davis et al., 1989) have been conducted in an organizational context in which motives are mainly utilitarian, with an emphasis on the useful functionalities provided by a system. However, when the purpose is to explain MIS continuance intention in an everyday context, it seems appropriate to also include non-utilitarian motives (Deng et al., 2010). Non-utilitarian motives for MIS continuance intention are reported in some of the studies from uses and gratification research (Leung and Wei, 2000; Nysveen et al., 2005a; Nysveen et al., 2005b). These studies suggest that in everyday life, enjoyment and entertainment are significant motivations for MIS continuance intention. Perceived enjoyment is defined as the extent to which the activity of using the system is perceived to be enjoyable in its own right (Davis et al., 1992). Moreover, recent hedonic/utilitarian systems research reveals that pleasure and enjoyment should not be overlooked in designing systems for everyday use (Deng et al., 2010; Kim and Hwang, 2006; Van der Heijden, 2004; Wakefield and Whitten, 2006; Wakefield et al., 2011). For these reasons, perceived enjoyment is included as an antecedent of MIS continuance intention in the model applied in this research (Figure 1).

The effects of perceived usefulness on IT usage intention are related to instrumental behavior (Davis et al., 1989; Lin et al., 2005). Usefulness represents an extrinsic motivation that is based on goal achievement as the main motivation for behavioral intention (Venkatesh, 1999). An extrinsically motivated user is "productivity-oriented" and motivated by what he or she can do with the IT to improve task performance (Van der Heijden, 2004). Perceived usefulness is also positively related to enjoyment (Wakefield et al.,

Figure 1: Research Model



2011). Users feel great pleasure when they are able to accomplish a job as expected using the IT. Further, perceived usefulness was found to be a positive motive for MIS continuance intention (Deng et al., 2010; Kim and Steinfield, 2004). Several studies have reported that males are more driven by instrumental factors than females (Faulkner, 2001; Kelan, 2008; Nysveen et al., 2005a; Ong and Lai, 2006; Venkatesh and Morris, 2000; Venkatesh et al., 2000; Wajcman, 1991). Instrumental use of MIS includes accessing messages and emails, following the stock exchange, personal banking and consulting investment services (Kim and Steinfield, 2004; Nysveen et al., 2005b). We hypothesize that male users will demonstrate more instrumental motivation than female for using MIS. Thus, it is expected that the perception of usefulness will have a stronger influence on MIS continuance intention in male users than in female users. We therefore investigate the following hypothesis:

H1: *The effect of perceived usefulness on MIS continuance intention will be stronger for male users than for female users.*

Perceived ease-of-use has been regarded as an important factor in determining MIS continuance intention (Kim and Steinfield, 2004; Nysveen et al., 2005b). Perceived ease-of-use is an assessment of the mental effort involved in using a technology (Davis, 1989). MIS that are difficult to access are less likely to be used (Kim and Steinfield, 2004). The effect of perceived ease-of-use on behavioral intention is mediated by perceived usefulness and perceived enjoyment (Van der Heijden, 2004). The less complex the Internet service is the more useful and enjoyable the user perceives it to be (Moon and Kim, 2001). Further, Venkatesh and Morris (2000) found that ease-of-use was a stronger antecedent for IT usage intention in the workplace among women then among men. Men are more likely to be willing to put in effort to overcome constraints in order to achieve their objectives, without necessarily thinking about or emphasizing the magnitude of the effort involved (Venkatesh et al., 2000). In addition, women display somewhat higher levels of anxiety and lower technology aptitude than men (Venkatesh and Morris, 2000). However, according to Nysveen et al. (2005a), one should be careful in adopting the same line of argument for MIS. The authors explained that the use of MIS is voluntary in everyday life, so the arguments related to higher anxiety and lower aptitude may be less valid when applied to MIS. Still, the theoretical explanations from previous IT research (Venkatesh and Morris, 2000; Venkatesh et al., 2000) are obviously important for predicting the effect of ease-of-use on MIS continuance intention and suggest that constraints to perceived ease-of-use will be more salient to women than to men. Moreover, one may argue that while usefulness is more important for men in achieving the end-goals of MIS usage (i.e., extrinsic motivation), ease-of-use is more important in determining women's satisfaction with the process of Internet service access itself (i.e., intrinsic motivation). We therefore investigate the following hypothesis:

H2: *The effect of perceived ease-of-use on MIS continuance intention will be stronger for female users than for male users.*

Previous IT research has revealed that the effects of perceived enjoyment on IT usage intention are related to intrinsic motivation (Davis et al., 1992; Van der Heijden, 2004; Wakefield et al., 2011). Intrinsic motivation refers to "the pleasure and inherent satisfaction derived from a specific activity" (Venkatesh, 1999, p. 240). An intrinsically motivated user is "pleasure-oriented" and motivated to continue the use of the IT for fun and enjoyment (Wakefield and Whitten, 2006). Perceived enjoyment has been regarded as a factor that is positively related to MIS continuance intention (Deng et al., 2010). Further, research showed that women are more likely to value intrinsic factors such as variety and task enjoyment than men (Nysveen et al., 2005a; Venkatesh et al., 2000). As MIS are increasingly used for intrinsic and hedonic gratifications such as downloading logos, ring tones, music, graphics, videos and games (Nysveen et al., 2005b), we expect that intrinsic enjoyment will more strongly influence MIS continuance intention among female users than male users. We therefore investigate the following hypothesis:

H3: *The effect of perceived enjoyment on MIS continuance intention will be stronger for female users than for male users.*

The attitude toward using MIS is defined as the degree of user satisfaction with the current services (Deng et al., 2010). Attitude toward using MIS in an everyday life setting is particularly influenced by perceived usefulness, perceived ease-of-use and perceived enjoyment (Nysveen et al., 2005b). Still, one may argue that attitude reflects the instrumental outcomes of MIS usage (Deng et al., 2010; Nysveen et al., 2005a). As usefulness is hypothesized to be a stronger determinant of MIS continuance intention for male users, who are considered more instrumental than women, we hypothesize that the effect of attitude on MIS continuance intention will be stronger for male than female users. Thus, for MIS continuance intention male users will be more influenced by instrumental factors (PU and ATD), whereas female users will be more directly influenced by motivational factors (PEOU and PE). We therefore investigate the following hypothesis:

H4: *The effect of attitude on MIS continuance intention will be stronger for male users than for female users.*

II. METHODOLOGY

II.1. Sample and data collection

To test our research model and its associated hypotheses, a web-based survey was conducted to collect data from users of mobile Internet services. An email invitation was sent to over 3,500 undergraduate and graduate students at two French business schools. Interested students were able to click on the link in the email invitation to be directed to the survey website. A screening question was included at the beginning of the survey to determine whether the respondent was using MIS at the time of the survey. Respondents

were asked to answer the survey related to four MIS (Nysveen et al., 2005b): text messaging and multimedia services (SMS, MMS), contact services (social networks), payment services (ringtones), and gaming services (games). The survey website was designed in such a way that only current users of MIS could proceed with the survey. The non-current users were directed to the end of the survey.

A total of 863 (24.7%) responses were received, and 648 responses were from current MIS users. As Table 1 shows, the current users were 310 women (47.8%) and 338 men (52.2%). The majority of the respondents were between 21 and 25 years old with a mean age of 22.5 years for female respondents and 23.6 for male respondents.

The respondents had been using MIS from 0.5 to 5 years, with a mean value of 1.7 years for females and 2.2 years for males. In all, 51.6% of the female respondents and 50.5% of the male respondents reported using MIS very frequently every day.

The sample is representative of the French population, since many public surveys and studies point out a 'young age effect' in the French population regarding the usage of mobile Internet services (ARCEP, 2009; Bigot and Croutte, 2008; Danjou, 2010).

II.2. Measures

The model presented in Figure 1 includes five constructs measured by adapting valid and reliable scales used in IS research to mobile information systems. The participants indicated their agreement with a set of statements using a 7-point Likert-type scale that ranged from strongly disagree to strongly agree. We measured perceived ease-of-use (PEOU) using four items that we adapted from Wakefield and Whitten's (2006) study. Perceived enjoyment (PE) and usefulness (PU) were measured using, respectively, eight and nine items adapted from the original work of Van der Heijden and Sorensen (2003). Last, we measured attitudes (ATD) and continuance intention (CI) using, respectively, three and four items that we adapted from Deng et al.'s (2010) study on MIS. All measures were translated into French by the author and then back-translated into English by an independent native speaker.

Table 1: Sample characteristics

Demographics			Female subgroup			Male subgroup		
			N=310 (47.8%)			N=338 (52.2%)		
			Mean	SD		Mean	SD	
Age			22.5	3.2		23.6	4.5	
Years of experience with MIS			1.7	1		2.2	1.2	
MIS usage frequency per day	Never	Very low	Low	Medium	Frequently	Quite frequently	Very frequently	Total
Female (%)	1%	4.8%	4.5%	8.7%	14.2%	15.2%	51.6%	100%
Male (%)	0.3%	3.7%	3.4%	7.4%	15.2%	19.5%	50.5%	100%

Data were analyzed using both SPSS and AMOS 19.0 to test the measurement and structural model. Frequently used in IS research, AMOS is considered to be more confirmatory in nature and it provides various overall goodness-of-fit indices to assess model fit (Byrne, 2001). Moreover, AMOS is particularly useful for our study because it provides more rigorous testing of moderation effects (Arbuckle, 2010).

The measurement model was assessed separately for the full group and each subgroup (female and male). The psychometric properties of the measurement scales for the first-order factors were assessed in terms of convergent validity, discriminant validity, and reliability for subgroup analyses. To test convergent validity, we applied principal component analysis with Varimax rotation. The resulting factor loadings are shown in Table 2 with all 21 retained items exceeding 0.50 (Hair et al., 2010) on their corresponding constructs, indicating adequate convergent validity.

The discriminant validity was determined by comparing the square root of the average variance extracted (AVE) for every construct with the inter-correlations among these constructs (Fornell and Larcker, 1981). The square root of AVE should be greater than the inter-correlation estimates (Hair et al., 2010). The reliability of the measurement items was examined using Cronbach's alpha coefficient (Cronbach, 1971) and composite reliability (Hoyle, 1995). Table 3 shows that all the values of the square roots of AVE, Cronbach's alpha and the composite reliability are well above the suggested 0.70 threshold (Hair et al., 2010), indicating good evidence of discriminant validity and reliability.

Following the factor analysis, multiple-group structural equation modeling tested the moderating effect of gender (Hair et al., 2010). The structural model estimate was assessed for moderation by a comparison of two group models. The first, totally free model, called *the unconstrained group model*, was estimated with path estimates calculated separately for each subgroup (female and male). A second group model, called *the constrained group model*, was then estimated, with the structural path estimate constrained to be equal between the subgroups. Comparison of the differences between models with a chi-square difference test ($\Delta\chi^2$) indicated whether the model fit significantly decreased (i.e., an increase in chi-square) when the estimates were constrained to be equal. A statistically significant difference between models indicated that the path estimates were different (i.e., model fit was significantly better when separate path estimates were made) and that moderation occurred. If the models were not significantly different, then there is no support for moderation because the structural path estimates were not different between subgroups. Using the multiple-group analysis with AMOS, the $\Delta\chi^2$ test and its significance could be calculated (Arbuckle, 2010).

III. RESULTS

Before testing female and male subgroup models, we tested the structural full group model. Results show good

Table 2: Summary of retained items and loadings for Varimax rotation

Retained items and loadings	Full group					Female subgroup					Male subgroup				
	PEOU	PU	PE	ATD	CI	PEOU	PU	PE	ATD	CI	PEOU	PU	PE	ATD	CI
PERCEIVED EASE-OF-USE (PEOU)															
1. I found the MIS easy to access	0.62	0.26	0.22	0.43	0.19	0.58	0.29	0.20	0.46	0.23	0.64	0.26	0.22	0.42	0.19
2. The MIS doesn't require a lot of mental effort	0.90	0.11	0.06	-0.06	0.14	0.89	0.15	0.04	-0.06	0.11	0.90	0.08	0.09	-0.04	0.14
3. I found the MIS easy to use	0.74	0.19	0.23	0.35	0.18	0.76	0.18	0.20	0.21	0.25	0.71	0.20	0.25	0.40	0.16
PERCEIVED USEFULNESS (PU)															
4. I evaluate the MIS as helpful	0.16	0.70	0.24	-0.03	0.24	0.13	0.66	0.23	0.08	0.25	0.19	0.73	0.24	-0.12	0.23
5. I evaluate the MIS as efficient	0.08	0.73	0.18	0.29	0.20	0.10	0.73	0.18	0.23	0.28	0.07	0.73	0.18	0.29	0.15
6. I evaluate the MIS as effective	0.17	0.73	0.22	0.29	0.17	0.16	0.75	0.15	0.25	0.27	0.25	0.73	0.28	0.21	0.11
7. I evaluate the MIS as beneficial	0.14	0.77	0.28	0.04	0.27	0.22	0.81	0.23	-0.01	0.20	0.08	0.73	0.33	0.07	0.32
8. I evaluate the MIS as productive	0.07	0.78	0.27	0.13	0.13	0.11	0.83	0.27	0.03	0.13	0.01	0.71	0.27	0.27	0.12
PERCEIVED ENJOYMENT (PE)															
9. I evaluate the MIS as exciting	0.17	0.19	.787	.018	.194	0.18	0.16	0.79	-0.12	0.22	0.14	0.20	0.80	0.13	0.19
10. I evaluate the MIS as delightful	0.15	0.20	.761	.026	.142	0.13	0.16	0.75	0.03	0.16	0.16	0.21	0.77	0.10	0.13
11. I evaluate the MIS as fascinating	0.09	0.24	.861	.052	.064	0.09	0.25	0.85	0.04	0.02	0.08	0.22	0.87	0.10	0.09
12. I evaluate the MIS as playful	0.07	0.17	.786	.184	.128	0.03	0.13	0.68	0.49	0.13	0.10	0.20	0.83	0.05	0.13
13. I evaluate the MIS as thrilling	0.01	0.23	.847	.097	.090	0.05	0.24	0.83	0.14	0.06	0.00	0.23	0.86	0.07	0.11
14. I evaluate the MIS as pleasant	0.11	0.19	.713	.343	.202	0.05	0.18	0.67	0.45	0.24	0.18	0.22	0.72	0.24	0.20
15. I evaluate the MIS as amusing	0.10	0.13	.800	.134	.145	0.09	0.14	0.81	0.18	0.12	0.13	0.14	0.78	0,10	0.17
16. I evaluate the MIS as cheerful	0.06	0.19	.845	.078	.131	0.05	0.17	0.85	0.10	0.16	0.07	0.20	0.84	0.10	0.12
ATTITUDES (ATD)															
17. The experience that I have had with MIS has been satisfactory	0.24	0.37	0.27	0.64	0.43	0.31	0.41	0.23	0.55	0.46	0.23	0.36	0.28	0.65	0.43
18. In general, I am satisfied with MIS	0.26	0.38	0.30	0.66	0.36	0.28	0.43	0.28	0.52	0.44	0.29	0.36	0.29	0.69	0.31
CONTINUANCE INTENTION (CI)															
19. I intend to continue using the MIS in the future	.20	.27	.79	.20	.70	0.19	0.30	0.16	0.15	0.79	0.20	0.25	0.20	0.21	0.80
20. I will always try to use the MIS in my daily life	.10	.22	.81	.10	.81	0.09	0.28	0.20	0.06	0.80	0.13	0.17	0.20	0.05	0.82
21. I will keep using the MIS as regularly as I do now	.16	.27	.83	.15	.83	0.23	0.32	0.18	0.17	0.78	0.09	0.21	0.19	0.18	0.86

Note: PEOU = perceived ease-of-use; PU = perceived usefulness; PE = perceived enjoyment; ATD = Attitude towards MIS use; CI = MIS continuance intention.

Table 3: Inter-construct correlations, square root of AVE, Cronbach's alpha, and composite reliability

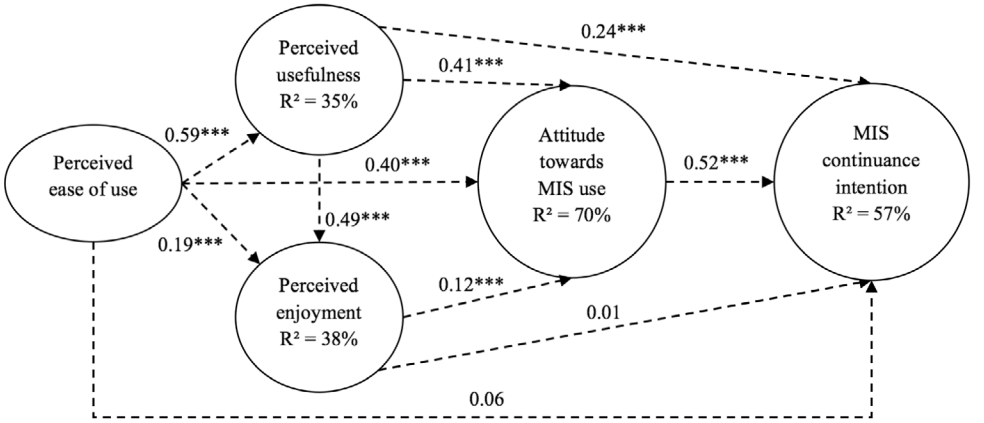
Full group, subgroups and constructs	Cronbach's alpha	Composite reliability	Correlation of constructs[a]				
Full group			PEOU	PU	PE	ATD	CI
PEOU	0.81	0.81	**0.77**				
PU	0.88	0.88	0.59	**0.78**			
PE	0.94	0.94	0.48	0.60	**0.82**		
ATD	0.93	0.87	0.73	0.74	0.57	**0.86**	
CI	0.87	0.88	0.58	0.66	0.47	0.74	**0.85**
Female subgroup							
PEOU	0.79	0.79	**0.75**				
PU	0.89	0.90	0.62	**0.80**			
PE	0.94	0.94	0.47	0.56	**0.81**		
ATD	0.94	0.87	0.70	0.74	0.57	**0.86**	
CI	0.87	0.88	0.67	0.70	0.47	0.78	**0.85**
Male subgroup							
PEOU	0.82	0.82	**0.78**				
PU	0.87	0.87	0.59	**0.76**			
PE	0.95	0.95	0.49	0.64	**0.84**		
ATD	0.93	0.87	0.76	0.74	0.57	**0.86**	
CI	0.88	0.89	0.54	0.61	0.47	0.70	**0.85**

[a]Diagonal elements in the inter-construct correlations matrix are the square root of the average variance extracted (AVE). For adequate discriminant validity, diagonal elements should be greater than corresponding off-diagonal elements.

fit (χ^2/df = 3.22, GFI = 0.92, CFI = 0.96, PNFI = 0.806, and RMSEA = 0.059). Figure 2 displays the standardized path coefficient estimates, and the amount of variance explained by the exogenous constructs (R^2). The model accounts for 57% of the variance of MIS continuance intention, 70% of the variance of attitudes, 35% of the variance of perceived usefulness, and 38% of the variance of perceived enjoyment. All path coefficients are significant at $p < 0.001$, except relationships between perceived ease of use ($\beta = 0.06$, n.s.), perceived enjoyment ($\beta = 0.01$, n.s.) and MIS continuance intention.

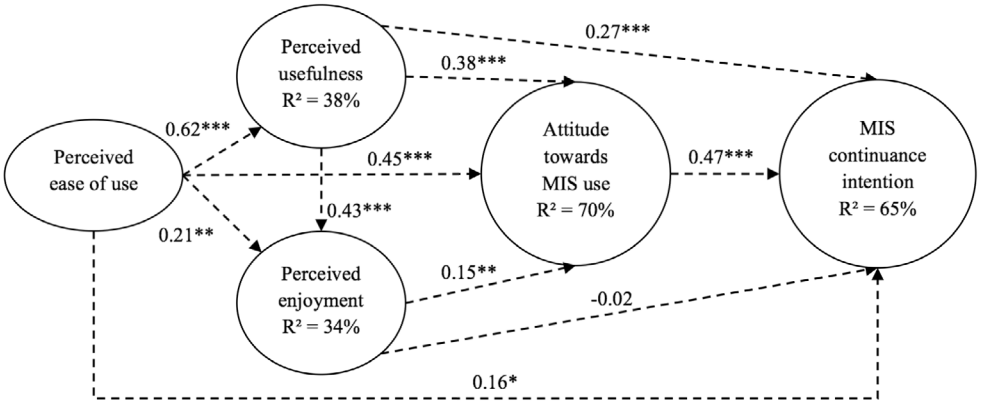
Figure 3 illustrates the MIS continuance intention model in the female subgroup. This model accounts for 65% of the variance of MIS continuance intention (CI), 70% of the variance of attitudes (ATD), 38% of the variance of perceived usefulness (PU), and 34% of the variance of perceived enjoyment (PE).

Figure 2: Full group model



Notes: ***p<0.001

Figure 3: Female subgroup model

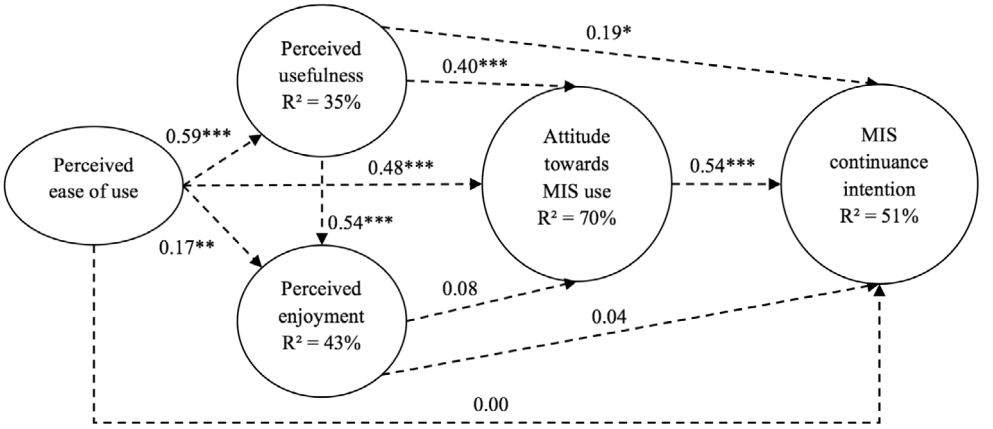


Notes: *p<0.05, **p<0.01, ***p<0.001

Figure 4 presents the MIS continuance intention model within the male subgroup. This model accounts for 51% of the variance of MIS continuance intention, 70% of the variance of attitudes, 35% of the variance of perceived usefulness, and 43% of the variance of perceived enjoyment (PE).

The totally free structural model estimates an identical structural model in both subgroups. The model fit statistics and path estimates for the PEOU→CI, PU→CI, PE→CI, and ATD→CI relationships are shown in Table 4. Then a second group model was estimated, the only difference being that the

Figure 4: Male subgroup model



Notes: **p<0.01, ***p<0.001

structural path estimates were constrained to be equal in the two subgroups. These fit results and path estimates are also shown in Table 4. Both models show acceptable fit indices, indicating their overall acceptability. The chi-square difference between models ($\Delta\chi^2$) is 41.74 with 26 degree of freedom (df). This is significant ($p < 0.05$; p-value = 0.031), indicating that constraining the PEOU→CI, PU→CI, PE→CI, and ATD→CI path estimates to be equal between subgroups produces a worse fit. Therefore, the unconstrained totally free model in which the PEOU→CI, PU→CI, PE→CI, and ATD→CI relationships are freely estimated in both subgroups is confirmed. This result suggests that gender moderates the relationships between PEOU→CI, PU→CI, PE→CI, and ATD→CI.

Looking at the standardized path estimates for the totally free results (Table 4, column 2); we found that the effect of perceived usefulness (PU) on MIS continuance intention (CI) is significant in both subgroups. Nevertheless, contrary to our expectation, the effects of perceived usefulness was stronger in the female subgroup (ß = 0.27, p<0.001) than the male subgroup (ß = 0.19, p<0.01). The difference is significant (p<0.05, p-value = 0.038; H1 is rejected). The findings also show that perceived ease-of-use was a significant determinant of MIS continuance intention for the female subgroup (ß = 0.16, p<0.05), but not for the males (ß = 0.00, n.s.). This result confirms hypothesis H2, and the effect difference between male and female users is significant at the 0.05 level (p-value = 0.044). However, perceived enjoyment played a very restricted role as a determinant of MIS continuance intention. In fact, perceived enjoyment had no significant effects for either female or male users. Consequently, H3 is rejected. Finally, H4, which pertains to the differential effect of attitude (ATD) on MIS continuance intention across genders, was not supported. Al-

Table 4: Testing for gender as a moderator in the MIS continuance intention model

Model characteristics	*Unconstrained group model (totally free for each structural subgroup)*	*Constrained group model (path estimates equal across structural subgroups)*	*Model differences ($\Delta\chi^2/\Delta df$)[b] significance*
Model fit[c]			
χ^2/df (< 5)	2.32	2.38	1.61 (41.74/26)
			(p-value = 0.031)*
GFI (≥ 0.90)	0.91	0.90	–
RMSEA (< 0.08)	0.05	0.05	–
CFI (> 0.92)	0.95	0.95	–
PNFI (> 0.70)	0.84	0.78	–
Standardized path estimates (ß)			
PU→CI		–	(p-value = 0.038)*
Female	0.27***		
Male	0.19**		
PEOU→CI		–	(p-value = 0.044)*
Female	0.16*	–	
Male	0.00		
PE→CI		–	Not significant (n.s.)
Female	-0.02		
Male	0.04		
ATD→CI		–	Not significant (n.s.)
Female	0.47***		
Male	0.54***		

Notes: [b] $\Delta\chi^2 = \chi^2$(constrained group) - χ^2(unconstrained group); Δdf = df(constrained group) - df(unconstrained group); [c] Thresholds measurement indices according to Hair et al. (2010); *p<0.05, ***p<0.001

though attitudes had a significantly stronger effect on MIS continuance intention in men (ß = 0.54, p<0.001) than women (ß = 0.47, p<0.001), the effect difference is not significant.

IV. DISCUSSION

The present research addressed the following question: "Do perceptions and attitudes regarding MIS continuance intention vary with gender?" It did so by investigating the moderating effect of gender on the intention to continue using MIS in everyday life. The TAM model was applied to data from a sample of 648 French MIS users and interesting findings emerged regarding gender-based perceptions and attitudes toward MIS use.

The results revealed that the effects of perceived ease-of-use on MIS continuance intention vary with gender. Female users were more influenced by perceived ease-of-use than males, which is consistent with previous IT studies (Gefen and Straub, 1997). Nevertheless, the direct and significant effect of perceived ease-of-use on females' continuance intention (Figure 3) attracted our attention and needs to be

highlighted. According to Gefen and Straub (2000), perceived ease-of-use is a dynamic construct with varying effects, depending upon whether the type of use is intrinsic or extrinsic to MIS. A direct and significant effect of perceived ease-of-use on MIS continuance intention was observed when the use was intrinsic to MIS (i.e., related to the primary tasks of MIS, such as informing, exchanging SMS and MMS or contacting friends), whereas a non-significant direct effect was observed when the use was extrinsic to MIS (i.e., not directly related to the primary tasks of MIS, such as improving an individual's gaming performance). Our results revealed that females were intrinsically motivated, while males were extrinsically motivated to continue using MIS.

The main finding in our study is the role of perceived usefulness in determining gender differences regarding MIS continuance intention. Interestingly, and contrary to prior TAM research (Venkatesh and Morris, 2000), perceived usefulness had a significantly stronger influence on female than male users. The role of intrinsic motivation is a key factor to explain this finding. The female users were intrinsically motivated to continue using MIS, as perceived ease-of-use exerted a direct and significant effect on their continuance intention. Yet perceived ease-of-use is a direct determinant of usefulness (Davis et al., 1989). All else being equal, the more female users are intrinsically motivated to use MIS, the more using them increases their usefulness and efficacy (Venkatesh and Davis, 2000). Arguably, intrinsic motivation plays an important role in determining the strong effect of perceived usefulness among females regarding MIS usage.

Our results revealed that the effect of attitude did not differ across gender, which confirms previous IT studies (Nysveen et al., 2005a; Venkatesh and Morris, 2000). Perceived enjoyment had no significant effect on MIS continuance intention for either female or male users. Contrary to previous findings (Venkatesh, 1999), perceived enjoyment played a very restricted role in determining MIS continuance intention. Nevertheless, Figure 3 indicates that perceived enjoyment significantly impacted females' attitudes toward MIS use ($\beta = 0.15$, $p < 0.01$), as opposed to males' attitudes. Perceived enjoyment had a significant indirect effect on females' continuance intention through its effect on attitudes toward MIS use. These findings point out that further research is needed to better determine the gender differences regarding the effect of perceived enjoyment on attitudes toward MIS use.

Our findings have some interesting implications for both research and practice.

From a theoretical perspective, studies explaining why and how perceptions and attitudes vary across gender regarding MIS usage are still scarce in the IT literature, yet the topic is of widespread relevance. MIS ubiquity has given rise to new attitudes toward MIS use, leading to differences in usage across gender (Lyytinen and Yoo, 2002). Our research highlights these attitudes and empirically demonstrates that males and females differ in perceptions regarding MIS continuance intention. This is an important theoret-

ical contribution that can enrich the existing IT literature on the topic.

The second contribution is our "counterintuitive" finding that females consider perceived usefulness to a greater extent than males regarding MIS continuance intention. The mobile has contributed to improving the communicative social integration of females much more than computers and Internet, where male users still dominate. Our finding highlights a new trend regarding MIS usage. Further research is needed to validate our curious result and to improve our knowledge about MIS continuance intention across female and male users.

The third contribution is the clarification of the role played by perceived ease-of-use in determining females' continuance intention regarding MIS. As explained above, perceived ease-of-use increased MIS perceived usefulness for females because they were intrinsically motivated to continue using these services. This finding provides researchers with a tentative answer to the questions raised in some studies (e.g., Keil et al., 1995) concerning the importance and role of perceived ease-of-use across gender.

Last, the present research tested gender differences concerning MIS continuance intention in the "French context." Cultural differences are mostly noted as influencing attitudes toward MIS usage (Harris et al., 2005), and many researchers have recommended that new IT needs to be investigated in different cultural settings (Straub et al., 1997). Our research responds to this suggestion by providing new insights about gender differences regarding MIS continuance intention in another cultural setting.

From a practical perspective, MIS providers should consider gender when seeking to increase users' continuance intention, as the MIS market is expected to continue expanding in coming years (Vlachos and Vrechopoulos, 2004). Females are often ignored in MIS marketing plans because of the assumption that they are less likely to adopt MIS than males (Nysveen et al., 2005a). Our findings suggest that females are more willing to continue using MIS than males. The results show that perceived ease-of-use – intrinsic to MIS – is the main factor explaining females' continuance intention. Therefore, MIS providers, who might have been guided by previous TAM studies to underestimate the importance of perceived ease-of-use, should reconsider the extent to which perceived ease-of-use affects MIS continuance intention across gender. Perceived ease-of-use is important and it influences MIS continuance intention, but its effects are task-dependent (Gefen and Straub, 2000). Consequently, the advertising and marketing campaigns of MIS providers might advocate ease-of-use depending on whether the tasks are intrinsic or extrinsic to MIS. For instance, as female users are influenced by tasks that are intrinsic to MIS, such as sending text and multimedia messages and contacting friends, providers should offer a variety of promotional plans such as unlimited SMS and MMS, additional calling minutes or other alternatives. Providers should increase the offers in their marketing plans when targeting female users. A segmentation strategy

should include a focus on female MIS users, who are a previously underserved segment that could generate additional revenue for providers (Hamka, 2012; Nysveen et al., 2005a). Further, the mobile industry should consider enhancing mobile user-friendly interfaces when applications and services are designated for female users.

As male users are influenced by tasks that are extrinsic to MIS, such as improving their gaming performance, MIS providers can offer free games or provide promotional offers of online games and access to gaming platforms. To meet the shortfall, providers should regroup free services, for each gender segment, with other associated paid services offering a single support for several types of terminals like DSL and cable modems.

CONCLUSION

This research extends our understanding of the determinants of the intention to continue using MIS in everyday life, notably by revealing some key differences between female and male users. Female users were more strongly influenced by perceived ease-of-use than male users. Contrary to prior TAM research, perceived usefulness also had a stronger influence on females than on males. The findings further highlight the importance of intrinsic motivation in females' MIS continuance intention. Nevertheless, some limitations should be noted, especially for the construction of future studies.

First, the main limitation is related to the sample for this study. Given that all respondents were business school students from 21 to 25 years old, our results may not be applicable to other demographic groups. Although many public surveys and studies point to a "young age effect" in the French population regarding the usage of mobile Internet services (ARCEP, 2009; Bigot and Croutte, 2008; Danjou, 2010), the perceptions of young students with nonprofessional use may nevertheless be different from those with professional use (Deng et al., 2010). Future research is needed to replicate the study in a non-student sample with professional use.

Second, we investigated the moderating effect of gender on MIS continuance intention but we did not control for gender-based experience with MIS and usage, which could be tested with our model. This limitation should be overcome in future research as previous studies have suggested a significant influence of experience on IT use (Thompson et al., 1994).

Third, we examined gender differences related to individual factors. However, TAM model is not appropriate to understand behavioral intention to continue using an IT by a group (Sarker et al., 2005). Isaac et al. (2006), suggest that social influence can affect mobile technologies adoption. Likewise, studies have shown that social influence also differentiates gender-based behavioral intention to continue using IT (Venkatesh et al., 2000). The unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003) incorporates various aspects of social influence in concert with gender. It would be useful for future research to use the UTAUT model to in-

crease knowledge about MIS usage across females and males.

Fourth, we did not control for cross-service comparisons – for example, utilitarian services (e.g., payment services and contact services) *versus* hedonic services (e.g., text messaging services and gaming services) – that our respondents habitually use, yet it is possible that gender differences regarding MIS usage vary across services. Consequently, cross-service comparisons should be examined in future research (Nysveen et al., 2005b).

Last, our results are supported by studies dealing with an aspect of the "gender effect" that we do not discuss here (Durand-Delvigne, 1996; Mosconi, 2004). These studies highlight the role of intrinsic motivation in improving the mathematical performance of females at school, even when they display unwillingness for this discipline.

Despite these limitations, our research provides some interesting implications for research and practice. Our findings reveal curious patterns meriting replication in other contexts. For example, one perspective would be to examine whether gender differences in MIS usage – both at work and at home – reflect gender differences in labor force participation and in types of jobs held (Ono and Zavodny, 2005).

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