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UNDERSTANDING THE KEY DRIVERS IN USER LOYALTY TOWARD MOBILE DATA SERVICES

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Abstract

Given the rapid growth and large investments in mobile data services (MDS), it has become important to examine how to enhance satisfaction with MDS (M-satisfaction) and how to build loyalty toward MDS (M-loyalty). This paper develops an integrated model to deeply understand the antecedents of M-loyalty through constructs prescribed by two established research streams on information system (IS) success, namely user satisfaction and information technology (IT) motivation. The research model was tested by using survey data collected from 747 users who have experience with MDS. Analysis results show that the proposed model provides a significant explanation of the variance of M-loyalty, indicating that the unified perspective it provides helps enhance our knowledge of how to build M-loyalty. This study should help MDS researchers and practitioners better understand user behavior in MDS.

Keywords: user satisfaction, user loyalty, mobile data service, IT motivation

1 INTRODUCTION

Numerous studies in both the industry and academia have attempted to find and explore key drivers of information system (IS) behaviors in order to understand users' decision making processes in IS behaviors. Prior empirical works on IS can be separated into initial adoption and continued usage. The initial adoption works have recognized users' IS acceptance at the pre-adoption stage while the continued usage works have identified users' post-adoption criteria toward IS. Recently, many researchers have stated that the feasibility and eventual success of IS depends upon continued usage more than on initial adoption. Since user satisfaction and loyalty make users less prone to abandon IS (Geyskens et al., 1999), it is important to understand what drives user satisfaction and loyalty toward IS. Understanding the mechanisms leading to satisfaction and loyalty can help IS companies increase profitability, as it may result in increased consumption by existing users as well as the spread of positive word-of-mouth.

Mobile data services (MDS) are wireless access to digitalized contents of the Internet through a hand-held mobile device. MDS has diffused throughout the globe due to rapid adoption of mobile devices offering access to the Internet. Even in North America, which was lagging in terms of MDS adoption as compared to Asia and Europe, there were almost 200 million wireless service subscribers by the end of 2004, and penetration rates are expected to grow from around 65% to about 80% by 2009

(eMarketer, 2005). In a dynamic MDS environment, user loyalty toward MDS (M-loyalty) is critical for establishing a long-term relationship with existing MDS users. MDS researchers and practitioners must understand how to satisfy MDS users and how to build M-loyalty. Although a fundamental understanding of the formation processes of M-loyalty is of great importance to MDS, researchers have shed little light on what drives M-loyalty. Both the IT motivation and user satisfaction research streams help sharpen our understanding of the key derivers of M-loyalty, MDS design, and consumer behavior issues. A research framework is developed here by synthesizing these two research streams on IS success, and the unified perspective would elucidate the users' formation processes of M-loyalty.

The purpose of this paper is to conceptualize, develop, and validate independent variables that result in M-loyalty. Based on the user satisfaction and IT motivation disciplines, a theoretical model is developed for understanding a set of M-loyalty determinants. The findings, using structural equation modeling (SEM), suggest that the proposed framework offers metrics that provide a statistically significant explanation of the variation in M-loyalty. From a practical perspective, the findings can help MDS investments and design decisions by predicting M-loyalty.

2 LITERATURE REVIEW

In the marketing and IS industry, user loyalty has long been regarded as an important goal. The most widely agreed-upon definition of user loyalty is "behavioral response expressed over time by some decision-making unit with respect to one or more alternatives" (Dick & Basu, 1994; Jacoby & Chestnut, 1978). Oliver (1997) defines user loyalty as "a deeply held commitment to rebuy or repatronise a preferred product or service in the future." Because user loyalty is one major driver of IS success, many companies have been trying to enhance their user loyalty through several marketing strategies. User loyalty is so important since loyal users bring many benefits to a firm. According to Reichheld and Kumar (2000), the various benefits of user loyalty include a continued stream of profit, reduction of marketing costs, and growth of per-user revenue.

User satisfaction is widely accepted as a strong predictor for user loyalty (Mittal et al., 2001; Lam et al., 2004). Satisfied users have a higher usage level of service than those who are not satisfied and are more likely to recommend the service to their acquaintances (Bolton and Lemon, 1999; Zeithaml et al., 1996). Numerous empirical studies on IS and marketing areas have strongly supported that user satisfaction plays an important role in determining user loyalty. Lin and Wang (2006) suggested that the M-loyalty is affected by the combination of satisfaction, perceived value, trust, and habit. They found that M-satisfaction plays a mediating role in the relationship of perceived value and trust to M-loyalty.

According to the IS success model (DeLone and McLean, 1992), user satisfaction has become the prevailing proxy determinant of the net benefit from IS usage. When identifying the structure and dimensionality of the user satisfaction construct, DeLone and McLean made an explicit distinction between information aspects and system features as determinants of user satisfaction. Mckinney et al. (2002) investigated how website information and system quality characteristics affect overall satisfaction. They found an explicit distinction between information aspects and system features as determinants of user satisfaction due to the feasibility of separating content from the content-delivery system. They also found that the web-site system and information satisfaction significantly influence overall satisfaction. Wixom and Todd (2005) developed an integrated research model that distinguishes beliefs and attitudes about IS (object-based beliefs and attitudes) from beliefs and attitudes about using IS (behavioral beliefs and attitudes). This integrated model provided an advanced understanding of the difference between object-based beliefs and attitudes and behavioral beliefs and attitudes toward IS use.

In a similar vein, MDS users determine the level of M-loyalty based on two distinct types of beliefs and attitudes: object-oriented beliefs and attitudes, and behavioral beliefs and attitudes. As prior user satisfaction researchers pointed out, object-oriented beliefs and attitudes can be divided into MDS

information aspects and MDS system features. On behavioral beliefs sides, we delve into the IT motivation theory, and its synthesis with user satisfaction literature. In the IT motivation discipline, extrinsic and intrinsic motivations are considered as prominent behavioral beliefs shaping user satisfaction and continued usage toward IS. Satisfied users result from not only the extrinsic rewards of using MDS, but also from a personal and emotional reward from pleasure derived by using MDS (Seddon, 1997; Wixom and Todd, 2005). Therefore, this paper examines the users' formation processes of M-loyalty by an integrated analysis using multiple constructions of user satisfaction research and IT motivation research.

3 THEORETICAL MODEL AND HYPOTHESES

By unifying the user satisfaction and IT motivation disciplines, we posit that M-satisfaction has four distinctive sources: extrinsic motivation from performing a behavior to achieve a specific goal, intrinsic motivation from the pleasure derived from a specific activity, satisfaction with the quality of the MDS information content, and satisfaction with the MDS system performance in delivering information. The theoretical framework is represented in Figure 1.

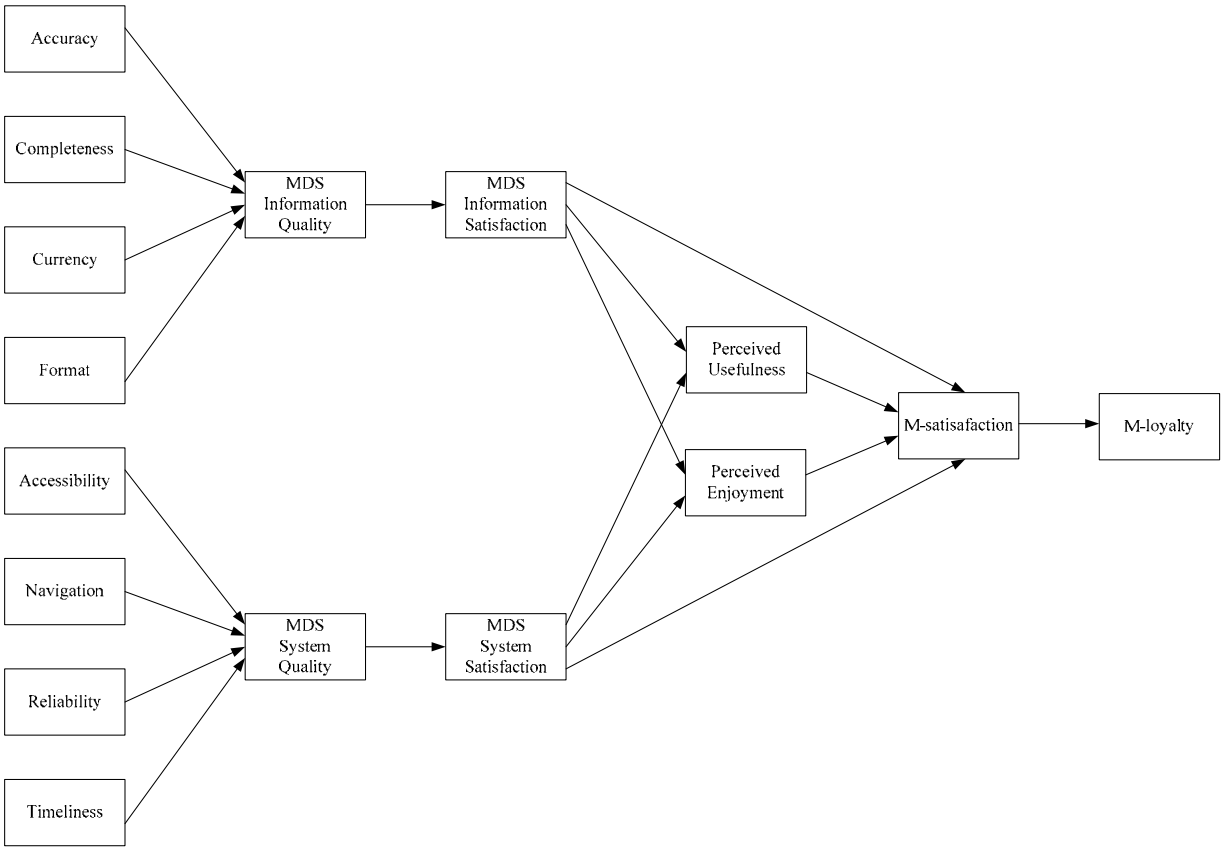

Figure 1 Research Model

3.1 M-Satisfaction

M-Satisfaction is an ex post evaluation of user experience with MDS and is captured as a positive feeling, indifference, or a negative feeling (Anderson, 2005). Spreng et al. (1996) found that feelings of satisfaction arise when users compare their perceptions of the performance of a service with both their desires and expectations. Anderson and Srinivasan (2003) stated that dissatisfied users are more

likely to search for information on alternatives and have a lower level of loyalty than satisfied users. In the MDS context, it is expected that M-satisfaction is a significant factor in measuring MDS success and determining M-loyalty.

H1: M-satisfaction significantly influences M-loyalty.

3.2 Extrinsic and Intrinsic Motivation

The cognitive evaluation theory classifies motivations into extrinsic and intrinsic subsystems (Deci, 1971). Extrinsic motivation refers to the performance of an activity to achieve a specific goal while intrinsic motivation refers to the performance of an activity for no apparent reason other than the process of performing it (Davis et al., 1989; Davis et al., 1992). A number of empirical studies in the IS implementation and diffusion area have found significant effects of extrinsic and intrinsic motivation on user satisfaction in a variety of contexts. This study also considers extrinsic and intrinsic motivation as the major determinants prompting a positive attitude toward MDS. Based on Davis et al. (1992), this study defines perceived usefulness as an extrinsic source of motivation and perceived enjoyment as an intrinsic source of motivation. Thus, it is hypothesized that M-satisfaction is affected by perceived usefulness and perceived enjoyment.

H2: Perceived usefulness significantly influences M-satisfaction.

H3: Perceived enjoyment significantly influences M-satisfaction.

3.3 MDS Information Satisfaction and System Satisfaction

This study defines MDS information satisfaction as the user satisfaction with the quality of information provided by MDS, and MDS system satisfaction as the user satisfaction with MDS performances in information retrieval and delivery. Doll et al. (1994) and Mckinney et al. (2002) noted that an important role of IS is information delivery and that the quality of that information is also considered critical in IS success. Several empirical works in the marketing and IS domain (Spreng et al., 1996; Szymanski and Hise, 2000) identified information and system satisfaction as a prominent antecedent in forming overall satisfaction. In the context of MDS, it is expected that satisfaction with MDS information and system quality plays a critical role in determining M-satisfaction.

H4: MDS information satisfaction significantly influences M-satisfaction.

H5: MDS system satisfaction significantly influences M-satisfaction.

According to the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975), object-based beliefs determine satisfaction with an object, and that level of satisfaction subsequently affects beliefs about the consequences of using the object (Ajzen and Fishbein, 2005; Wixom and Todd, 2005). Wixom and Todd (2005) considered information and system satisfaction as object-based attitudes, serving as external variables shaping behavioral beliefs. Behavioral beliefs regarding MDS (perceived usefulness and perceived enjoyment) are shaped by object-based attitudes toward MDS. Thus, satisfaction with the information and system quality of MDS may influence users' perception of usefulness and enjoyment. The higher the satisfaction with information produced by MDS, the more likely users will find that the contents enhance work performance and provide them with enjoyment. A similar effect is anticipated in terms of MDS system satisfaction. The relationships between MDS system

satisfaction and behavioral beliefs are explained as stemming from a situation where, other things being equal, the more satisfied a user is with the MDS system itself, the more useful and enjoyable the MDS can be.

H6(a, b): MDS information satisfaction significantly influences (perceived usefulness[a], perceived enjoyment[b]).

H7(a, b): MDS system quality satisfaction significantly influences (perceived usefulness[a], perceived enjoyment[b]).

4 RESEARCH METHODOLOGY

Development of the survey instrument followed the generally accepted guidelines (Moore and Benbasat, 1991). A literature review was conducted to determine the survey measurements for the constructs to ensure their content validity. The question items were modified to fit the target MDS context. Before implementing the survey, the instrument was reviewed by a professor of MIS, six doctoral students of MIS and marketing, and three practitioners engaged in MDS industry to identify problems with wording, content, format, and question ambiguity. After minor changes were made based on their suggestions, the modified questionnaire was pilot tested on 62 active users. The data were analyzed regarding the internal reliability of the constructs using Cronbach's alpha, and each exceeded the accepted 0.7 level of reliability (Nunnally, 1978). Each question is measured on a seven-point Likert-type scale, ranging from (1) strongly disagree to (7) strongly agree. The survey items are listed in Appendix A.

Questionnaires were administered to 200 middle school students, 200 high school students, 500 undergraduate students, 200 graduate students, and 300 employees by asking some teachers, professors, and informants to gather data from students or employees. Small gifts were given to the respondents. The first question of our survey is designed to divide the respondents into inexperienced and experienced users. Incomplete questionnaires and those from respondents who had not used MDS were discarded, leaving an analysis sample of 747. The age of respondents in the final sample ranged from 14 to 57 years, with a mean of 22.7 years.

5 DATA ANALYSIS AND RESULTS

The research model was tested using partial least squares (PLS), PLS Graph version 3.0, a structure modelling technique that is well suited for highly complex predictive models having a large number of constructs (Chin, 1998).

5.1 Confirmatory Factor Analysis

Confirmatory factor analysis allows for tests to be conducted for internal consistency and convergent validity, as well as discriminant validity of the instrument items. Internal consistency is demonstrated when item loadings are 0.70 or higher (Chin et al., 1998). The lowest loading of this study is 0.79, satisfying internal consistency. To check convergent validity, composite reliability (CR) and average variance extracted (AVE) were calculated using the procedure outlined by Fornell and Larcker (1981). The CR estimate for each construct ranged from 0.88 to 0.96, exceeding the 0.70 recommended cutoff values. The AVEs, ranging from 0.70 to 0.88, exceed the recommended 0.50 level. For satisfactory discriminant validity, the AVE from the construct should be greater than the variance shared between the construct and other constructs in the model (Chin et al., 1998). The diagonal of Table 1 contains the square root of the AVEs. All AVEs are greater than the off-diagonal elements in the corresponding rows and columns, demonstrating discriminant validity.

Table 1 Correlation Matrix and Discriminant Assessment

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. MLO	0.86															
2. MSA	0.61	0.87														
3. PUS	0.49	0.52	0.85													
4. PEN	0.37	0.42	0.52	0.93												
5. MIS	0.41	0.50	0.62	0.50	0.92											
6. MSS	0.40	0.52	0.50	0.47	0.54	0.94										
7. MIQ	0.40	0.50	0.56	0.43	0.74	0.50	0.93									
8. MSQ	0.44	0.53	0.60	0.45	0.59	0.69	0.60	0.93								
9. ACU	0.25	0.29	0.39	0.18	0.51	0.25	0.50	0.35	0.91							
10.COM	0.31	0.39	0.44	0.31	0.54	0.38	0.52	0.43	0.37	0.84						
11. CUR	0.24	0.30	0.38	0.34	0.51	0.33	0.52	0.38	0.43	0.40	0.87					
12. FOR	0.27	0.37	0.41	0.32	0.49	0.43	0.53	0.42	0.36	0.39	0.30	0.88				
13. ACE	0.24	0.23	0.45	0.31	0.38	0.35	0.36	0.39	0.32	0.24	0.33	0.23	0.90			
14. NAV	0.26	0.34	0.44	0.32	0.39	0.48	0.37	0.50	0.18	0.33	0.22	0.45	0.29	0.93		
15. REL	0.25	0.29	0.38	0.25	0.40	0.41	0.36	0.49	0.27	0.27	0.22	0.30	0.41	0.30	0.84	
16. TIM	0.32	0.38	0.49	0.27	0.43	0.57	0.41	0.41	0.25	0.30	0.26	0.36	0.36	0.49	0.51	0.90

Note: MLO (M-loyalty); MSA (M-satisfaction); PUS (Perceived Usefulness); PEN (Perceived Enjoyment); MIS (MDS Information Satisfaction); MSS (MDS System Satisfaction); MIQ (MDS Information Quality); MSQ (MDS System Quality); ACU (Accuracy); COM (Completeness); CUR (Currency); FOR (Format); ACE (Accessibility); NAV (Navigation); REL(Reliability); TIM(Timeliness); Diagonal elements are the square root of AVE.

5.2 Hypothesis Testing

Analysis results of the SEM are depicted in Figure 2. Consistent with our expectation, the relationship between M-satisfaction and M-loyalty is strongly supported, resulting in the acceptance of H1. Perceived usefulness and perceived enjoyment are significantly related to M-satisfaction, so H2 and H3 are supported. The information and system satisfaction of MDS also have a significant effect on M-satisfaction, resulting in the acceptance of H4 and H5. MDS information and system satisfaction are also all significantly related to perceived usefulness and perceived enjoyment, respectively. This implies that MDS information and system satisfaction have direct and indirect effects on M-satisfaction through perceived usefulness and perceived enjoyment. Therefore, H6a, H6b, H7a, and H7b are accepted.

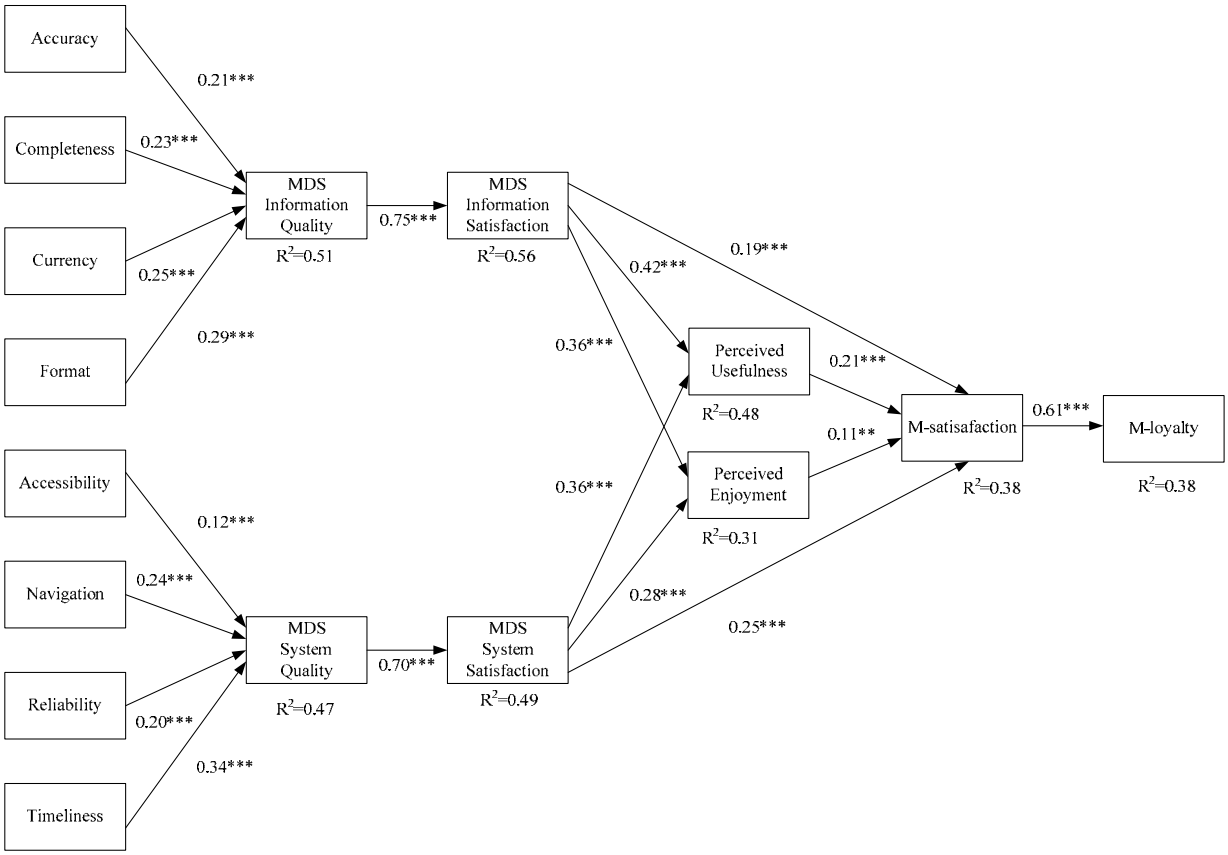

Figure 2 Analysis Result

6 DISCUSSION

6.1 Discussion of Findings

Analysis results indicate that the proposed theoretical model adequately explains the key factors leading to M-loyalty and M-satisfaction. This study confirms the saliency of M-satisfaction in explaining M-loyalty. Extrinsic and intrinsic motivations are justified by their consistent predictive power for M-satisfaction. This implies that an MDS user's extrinsic and intrinsic motivation leads to high levels of M-satisfaction, and ultimately enhances M-loyalty. User satisfaction with the information and system quality of MDS also has a strong direct effect on M-satisfaction. This means that MDS information and system satisfaction are important antecedents of determining M-satisfaction. More importantly, M-satisfaction is largely explained by satisfaction with the MDS system, implying that it is the most critical factor for building M-loyalty among MDS users.

The influences of object-based attitudes on behavioral beliefs are demonstrated by the strongly significant relationships between satisfaction with MDS-accessed information and the MDS system and user perception of usefulness and enjoyment. Satisfaction with MDS-accessed information and the MDS system explains 48% of the variance of perceived usefulness and 31% of the variance of perceived enjoyment. This is in line with Wixom and Todd's study (2005) that object-based attitudes serve as external variables shaping behavioral beliefs. Total effect of MDS information and system satisfaction on M-satisfaction is also substantial. This mean that MDS users with high levels of satisfaction with the information and system quality of an MDS increase their perceptions of usefulness and enjoyment, ultimately resulting in greater M-satisfaction and M-loyalty.

6.2 Theoretical Implications

This study provides an in-depth understanding of the key factors influencing user satisfaction and loyalty toward MDS. The proposed theoretical framework integrates important constructs from IT motivation research into user satisfaction research by positioning them as the key determinants of M-satisfaction. By demonstrating that constructs used in prior user satisfaction and IT motivation research are indeed determinants of M-loyalty, the current research provides preliminary evidences that two research disciplines can complement each other in developing a synergistic framework to study user satisfaction and loyalty toward MDS.

Further, the relationships between object-based attitudes (MDS information and system satisfaction) and behavioral beliefs (perceived usefulness and perceived enjoyment) are newly established based on TRA. Previous literature on user satisfaction has found that the information quality of a web-site is positively related to perceived usefulness (Seddon, 1997). In this study, we find that satisfaction with the information quality of an MDS significantly influences both perceived usefulness and perceived enjoyment. This is because MDS is capable of offering several types of services, including instrumental services such as navigation and mobile banking and hedonic services such as mp3 access and game play. The study also finds that satisfaction with the MDS system itself enhances user's perception of usefulness and enjoyment. Thus, this study recognizes user's perceptions of usefulness and enjoyment as the reasonable external variables of MDS information and system satisfaction.

6.3 Practical Implications

In order to enhance M-loyalty, it is crucial that MDS providers better understand the formation processes of user M-loyalty. The research model described here provides a mechanism leading to M-loyalty. This study demonstrates that M-satisfaction a strong predictor of M-loyalty and it is a function of perceived usefulness, perceived enjoyment, MDS information satisfaction, and MDS system satisfaction. User satisfaction in an MDS environment is well managed when the four sources of M-satisfaction are addressed simultaneously. Furthermore, MDS providers should be able to determine what kinds of changes are likely to have the most meaningful impacts on M-satisfaction for the four groups. For the most important group in MDS success, intense users, MDS system satisfaction plays the most dominant role in the formation process of M-loyalty, so MDS providers can effectively enhance intense user's M-loyalty by improving their perception of the system quality of MDS.

MDS providers must identify the unique information and system quality metrics of MDS and examine their impacts on M-loyalty. This study investigates how those quality metrics affect M-loyalty. This study proves that the information and system characteristics of MDS reliably influence satisfaction with the MDS information and system, respectively. These satisfactions, in turn, indirectly influence M-satisfaction through perceived usefulness and perceived enjoyment, and directly influence M-satisfaction, and ultimately M-loyalty. Thus, the research model provides detailed guidance about the interrelationship among MDS investments, user's perceptions, M-satisfaction, and M-loyalty.

7 CONCLUSION

This study attempts to understand the formation processes of M-loyalty in MDS users. The study proposes a theoretical framework incorporating IT motivation research into user satisfaction research, each regarded as important contributors to IT success. That theoretical framework was applied to conduct a test using survey data from 747 existing MDS users, and the data was analyzed using SEM. The results demonstrate the important role of all tested constructions from the user satisfaction and IT motivation disciplines on the formation of M-loyalty.

This study is not longitudinal and therefore the user beliefs and attitudes surveyed may not fully capture the dynamism of M-loyalty. Therefore, further research should adopt a longitudinal approach to examine changes in user perceptions and attitudes from a dynamic perspective.

Appendix A.

M-loyalty is derived from Cronin et al. (2000) and Zeithaml et al. (1996). (CR= 0.902; AVE= 0.755)

I will use MDS again.

I will recommend others to use MDS.

I intend to pay usage fees for using MDS

M-satisfaction is derived from Bhattacherjee (2001). (CR= 0.926; AVE= 0.759)

Very dissatisfied vs. Very satisfied

Very displeased vs. Very pleased

Very frustrated vs. Very contented

Very disappointed vs. Very delighted

Perceived Usefulness is derived from Davis et al. (1989). (CR= 0.915; AVE= 0.729)

Using MDS helps me accomplish task more quickly.

Using MDS enhances my task effectiveness.

Using MDS makes it easy to do my task.

Overall, using MDS is useful.

Perceived Enjoyment is derived from Davis et al. (1992). (CR= 0.952; AVE= 0.870)

Using MDS is pleasurable.

Using MDS provides me with enjoyment.

Overall, using MDS is interesting.

MDS Information Satisfaction is derived from Wixom and Todd (2005). (CR= 0.920; AVE= 0.853)

Overall, the information I get from MDS is very satisfying.

I am very satisfied with the information I receive from MDS.

MDS System Satisfaction is derived from Wixom and Todd (2005). (CR= 0.938; AVE= 0.883)

Overall, my interaction with MDS is very satisfying.

I am very satisfied with the system quality of MDS.

MDS Information Quality is derived from Wixom and Todd (2005). (CR= 0.952; AVE= 0.869)

Overall, I give the information from MDS high marks.

Overall, I give the information provided by MDS a high rating in terms of quality.

In general, MDS provides me with high-quality information.

MDS System Quality is derived from Wixom and Todd (2005). (CR= 0.956; AVE= 0.879)

In terms of system quality, I rate MDS highly.

Overall, MDS are of high quality.

Overall, I give the quality of MDS a high rating.

Accuracy is derived from Wixom and Todd (2005). (CR= 0.938; AVE= 0.834)

MDS produces correct information.

There are fee errors in the information I obtain from MDS.

The information provided by MDS is accurate.

Completeness is derived from Wixom and Todd (2005). (CR= 0.878; AVE= 0.707)

MDS provides me with a complete set of information.

MDS produces comprehensive information

MDS provides me with all the information I need.

Currency is derived from Wixom and Todd (2005). (CR= 0.904; AVE= 0.758)

MDS provides me with the most recent information.

MDS produces the most current information.

The information from MDS is always up to date.

Format is derived from Wixom and Todd (2005). (CR= 0.915; AVE= 0.783)

The information provided by MDS is well formatted.

The information provided by MDS is well laid out.

The information provided by MDS is clearly presented on the screen.

Accessibility is derived from McKinney et al. (2002). (CR= 0.933; AVE= 0.824)

MDS allows information to be readily accessible to me.

MDS makes information very accessible.

MDS makes information easy to access.

Timeliness is derived from Wixom and Todd (2005). (CR= 0.955; AVE= 0.876)

It takes too long for MDS to respond to my requests.

MDS provides information in a timely fashion.

MDS returns answers to my requests quickly.

Navigation is derived from McKinney et al. (2002). (CR= 0.882; AVE= 0.713)

MDS is easy to go back and forth between pages.

MDS provides a few clicks to locate information.

MDS is easy to recognize where the information I need is located.

Reliability is derived from Wixom and Todd (2005). (CR= 0.929; AVE= 0.813)

MDS operates reliably.

MDS performs reliably.

The operation of MDS is dependable.

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