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Ya-Ling Wu

*Tamkang University*, joanneuw@mail.tku.edu.tw

Ying-Siou Ye

*Tamkang University*, 600630551@s00.tku.edu.tw

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# UNDERSTANDING IMPULSIVE BUYING BEHAVIOR IN MOBILE COMMERCE

Ya-Ling Wu, Department of Information Management, Tamkang University, Xinbei City,  
Taiwan, R.O.C., joannewu@mail.tku.edu.tw

Ying-Siou Ye, Department of Information Management, Tamkang University, Xinbei City,  
Taiwan, R.O.C., 600630551@s00.tku.edu.tw

## Abstract

*Mobile commerce, under the mature development of mobile devices and mobile technology services, has gradually influenced consumer shopping behavior and e-commerce patterns. The majority of past research of mobile commerce has concentrated on mobile technology and consumer shopping behavior. Fewer works took a mobile media application point of view to discuss the effects of mobile devices, mobile service performance and content on consumers' impulse buying intent. Therefore, the aim of this study is to take the perspective of mobile media technology convergence on combination with the impulsive personality of consumers and flow experience to understand the impulsive purchase intent of consumers on mobile commerce platforms. Data collected from 322 customers of the iTunes (App store) provide strong support for the research model. The results indicate that a higher level of impulsivity reduces the effect of enjoyment on irresistible urge to buy. The data also show that emotional conflict, positive buying emotion, mood management, cognitive deliberation, disregard the future and unplanned buying are important to impulsivity formation and thus relevant within the context of impulse buying intention. The survey results provide service providers to design applications that attract consumers to make impulse purchases.*

*Keywords: Mobile Commerce; Digital media convergence; Flow Experience; Impulsive personality of consumers*

# 1 INTRODUCTION

Because the Internet has developed rapidly and mobile devices (such as smart phones, PDAs and tablet computers) have constantly seen innovation and improvement, mobile entertainment services have become very popular. Mobile commerce refers to enterprises using wireless communication devices to conduct business model regardless of location (Jonker, 2003). With the expansion of bandwidth and increased spread of smart handheld devices, mobile broadcasts, wireless broadband, Voice over Internet Protocol (VoIP) and other emerging mobile technologies have led to the promotion of an All-IP network architecture development for mobile communications technology. This has enabled the Internet and mobile communications networks to become closely integrated into new generation networks. Mobile users can use Internet Protocol (IP) through an Access Point (AP) to connect wirelessly to the Internet (Akyildiz et al., 2004). In addition to voice, data, images, music and video, in recent years, based on mapping information and other applications, many location-based services (LBS), entertainment, social networks, and virtual reality (AR) have been developed, making the development of current commercial applications more diversified. These commercial possibilities have received attention from the mobile commerce industry. As smart phones increase in popularity, the integration of commerce and entertainment into one product design will become the subject of attention from telecom operators. Additionally, the gradual maturing of the cloud computing environment will bring more possibilities for the development of mobile services. The focus of mobile commerce is on the business value derived from mobility and portability in order to create a business model different from traditional e-commerce (Ng-Kruelle et al., 2002).

Among the mobile commerce success stories, NTT DoCoMo in Japan is the most famous. Within two years of the 1999 launch of its “i-mode mobile service” that provides email, music, games, ringtones and an electronic wallet service it had more than 15 million users. Due to its large number of mobile Internet users, high-speed mobile communications infrastructure, and real-time personalized content NTT DoCoMo dominated the market of mobile commerce in Japan to become the first mobile communications company to offer nationwide service. And, its success drove even more opportunities for mobile commerce (MIC, 2001; NTT DoCoMo, 2003). Although Taiwan has seen a gradual rise in mobile commerce service offerings, users making purchases through mobile devices is still a potential market. According to MIC (Market Intelligence and Consulting Institute) (2012) analysis of mobile shopping from 2009 to 2011, the main use of mobile commerce by users was for “search”. Thus, those users still take an attitude of wait and see toward using mobile commerce to make purchases.

MIC (2011) “Current Status and Development of Online Shopping Market in Taiwan” the development of online shopping had a relatively slow start, mostly because the consumption habits of users largely revolves around using shopping websites. The proportion using mobile devices to make purchases was just 16.5 % of the online shopping population (MIC, 2011). A report published by international research consultancy Gartner (2011/02) “10 Consumer Mobile Applications to Watch in 2012” estimated that in the future the number of consumers using location based services would

increase to 4 billion by 2014. The report also pointed out that applications integrating mobile search with social networking will create enormous mobile commerce business opportunities by providing users with a more intelligent, differentiated, and rich user experience, thereby helping a commercial transformation (Gartner, 2011). Thus, mobile commerce is through convenient Web technology infrastructure, using mobile devices with different performance, as well as different forms of mobile content to cause differing impacts on the purchasing behaviors of users (MIC, 2012). Accordingly, this study tends to understand “Convergence in Mobile Media Technology”, which is separated into three main dimensions: mobile service content, mobile devices, and mobile communications infrastructure to enable the promotion of usage efficiency of mobile commerce.

Through mobile devices, consumers can make real-time data transmissions and receive responses that will achieve successful consumer transactions (Mahatanankoon et al., 2005). Because consumers' intention to purchase is often connected to psychological factors, when consumers are faced with a wide variety of purchase choices, they must depend on impulses to make decisions. The impulsive nature of consumers will cause them to engage in purchasing behavior (Shen, 2005). There are many studies exploring the impulsive nature of consumers. Academics believe the inner impulsivity of consumers is the key element to intention to purchase (Wells et al., 2011). However, past research has not pointed out interaction between personal impulse buying characteristics and environmental elements (Youn and Faber, 2000). Therefore, along with the prosperity and development of mobile Internet, impulse buying on the mobile Internet is an emerging phenomenon. Thus, the purpose of this study aims to understand the factors affecting consumers' impulsive intention to purchase.

Although there are many different mobile devices with many different functions that can use a wide variety of mobile application services, MIC (2011) discovered in its “2010 Online Shopping Behavior Survey of Taiwan Users” that the intention of online shoppers to use mobile devices to make purchases had already increased. However, in the past there have been many studies related to mobile services from mobile technology (Shih and Shim, 2002; Varshney and Upkar, 2003), mobile service applications (Kumar and Zahn, 2003; Gebauer and Shaw, 2004) to consumer purchase behavior (Anckar and D Incau, 2002; Lee and Benbasat, 2004), few studies paid attention to investigate users' involvement and impulsive purchase affected by digital media convergence (Xu et al., 2010). Therefore, this study aims to investigate the influence of digital media convergence in mobile commerce and attentional involvement and enjoyment of flow experience. In addition, in combination with Youn (2000) impulse buying characteristics, to delve deeply into the influence of consumers' impulsivity to realize whether consumers' impulse purchase intention can be induced.

## **2 CONCEPTUAL DEVELOPMENT**

This study investigates the influence of the impulsive personality of consumers on buying behavior during mobile service transactions. According to a comprehensive compilation and review of past literature, through the use of the digital media convergence model put forward by Xu et al. (2010) as a

basis for this study to develop a convergence in mobile media technology model. That combines with flow experience to understand consumers' attentional involvement and enjoyment during the consumption process. Then, the viewpoint of impulsive personality of consumers is added to explore consumers' impulse buying intention while on the mobile commerce platform.

## **2.1 Hypotheses related to the Convergence in Mobile Media Technology**

Digital media technology convergence model refers to, after content has been digitized, users can access it through the Internet on electronic devices (Gordon, 2003). The concept of media convergence originally belonged to a coming together of different types of media. The simple definition of media convergence refers to the trend towards a single multifunctional media. It refers to integration of previous types into digital media technology (Ithiel De Sola Pool, 1983; Yoffie, 1997). In 2010, Morgan Stanley further pointed out that the media technology convergence includes the aggregation of 3G wireless Internet, social networking sites, audio/video, VoIP, smart phones and other technologies (Morgan Stanley, 2010). Doyle (2002) believed media convergence refers to communications technology, computer technology and media content integration. Hence, this study mainly uses the definition of Rich Gordon (2003) for digital media convergence and is divided into three parts: media content, media device, and infrastructure; to explore the three main facets of convergence in mobile media technology: media service content, mobile devices, and mobile communications infrastructure. There is the need for a combination of rich mobile media content with high-performance mobile devices and mobile communications infrastructure, to satisfy user needs for mobile media technology convergence.

Attentional involvement refers to perceived attention to media information without interference from outside or other factors unrelated to the media (Calvert, 1994). Past related research has explored the relationship between digital media convergence and users' attentional involvement. Xu et al. (2010) pointed out that the mobile service content appearing on mobile device infrastructure and mobile commerce platforms will go through media convergence. The difference in degree of convergence will lead to differences in user's attentional involvement. In regard to the convergence in mobile media technology of mobile devices, mobile service content and mobile communications infrastructure, the higher the level of convergence, the more users can use high-performance mobile devices to access richer and fuller mobile media content, thus raising user's attentional involvement. Conversely, when the mobile communications infrastructure quality for mobile devices is poor, when users are browsing mobile commerce platforms that will lead to unstable performance or an inability to support situation, thereby affecting users continued attentional involvement. Therefore, this study puts forward Hypothesis 1:

*Hypothesis 1: Convergence in mobile media technology has a positive influence on consumers' attentional involvement.*

## 2.2 Hypotheses related to the Flow Theory

Enjoyment is an emotion formed by interaction between an individual experience and environment. (Barnett, 1991; Moon and Kim, 2001). Positive psychology put forward by Seligman and Csikszentmihalyi (2000) mainly explore positive emotions, positive qualities and positive environments. These positive experiences and environments can help individuals become more invested in positive emotions and feel happier, thus raising quality of life. According to flow theory, the more an activity is enjoyed, the greater the desire to repeat it. Constantly being in a state of flow will increase attentional involvement and enjoyment of the activity (Csikszentmihalyi, 1975). A user that enters a state of flow during human-computer interaction the degree of attentional involvement will cause psychological and emotional reactions known as enjoyment (Ghani and Deshpande, 1994). Ghani and Deshpande's (1994) study showed that flow experience can be formed from the two concepts of concentration and enjoyment. Therefore, this study of flow experience includes two concepts: attentional involvement and enjoyment.

User's attentional involvement will influence the continued use of the mobile device to browse mobile service content. When the user's interaction with the mobile device is going smoothly it will be accompanied by a feeling of enjoyment that produces a state of flow (Hoffman and Novak, 1996). Hence, when users are browsing mobile commerce platform content on a mobile device, the higher the degree of attentional involvement, the more enjoyment the user will feel. Conversely, when user's attentional involvement is low, the user's enjoyment will be correspondingly low. In addition, Moon and Kim (2001) found that the higher the enjoyment felt by consumers on the Internet, the more likely they were to make an online purchase. Keeney (1999) further pointed out that online shopping enjoyment can promote consumers making more purchases online. Hence, the enjoyment consumers feel while using a mobile device to access mobile commerce platform content will make them produce impulse buying intention. The consolidated opinion of the academics above is, consumers' flow experience has a positive influence on the impulse buying of products. Therefore, this study proposes the following hypotheses.

*Hypothesis 2: Consumers' flow experience has a positive influence on impulse buying intention.*

*Hypothesis 2a: Consumers' attentional involvement has a positive influence on enjoyment.*

*Hypothesis 2b: Consumers' enjoyment has a positive influence on impulse buying intention.*

## 2.3 Hypotheses related to the Consumer Impulsivity

The concept of impulse buying originated from DuPont Studies (1950). To understand consumer buying behaviors a study uncovered the idea of impulse buying, whose definition was unplanned

purchasing. The impulsive personality of consumers is an important factor that influences impulse buying behavior. Martin, et al. (1993) concerned that impulse buying behavior was a matter of degree, believing that individuals shopping by themselves are more likely to engage in unintended, voluntary and non-habitual buying behavior. Furthermore, Youn (2000) performed a cognitive response assessment in regard to impulse buying behavior and developed a six dimensional scale of Consumer Buying Impulsivity (CBI) as follows: First, emotional conflict which refers to consumers who want to buy products but hesitate to control the buying impulse or the pleasurable feelings. Second is irresistible urge to buy, where a consumer is difficult to resist his/her strong impulse shopping desire. Third, positive buying emotion refers to the positive mood state produced by impulse buying. Mood management refers to part of impulse buying motivation is the desire to change or manage intrinsic feelings or moods. Cognitive deliberation refers to sudden impulsive behavior that without deliberation or consequence. Finally, disregard the future and unplanned buying refers to a lack of a clear plan while choosing an immediate option without thought about the future. The affective process involves emotion, the state of feelings and moods aspects of the process including emotional conflicts, irresistible urge to buy, positive buying emotion, mood management. The cognitive process refers to thinking, understanding and interpretation of the process, including cognitive deliberation, disregarding the future and unplanned buying. In summary, through the use of the affective and cognitive two oriented six dimensions developed by Youn (2000) this study attempts to understand whether consumers using mobile devices to conduct impulse buying have been affected by emotions. After discussions with and suggestions from industry experts this study will use emotional conflict, positive buying emotion, mood management, cognitive deliberation, and disregard the future and unplanned buying as second-order factors of the impulsive personality of consumers. However, irresistible urge to buy, the three experts assessed its meaning as having a connotation of intentional behavior, so this study will use it as a dependent variable to understanding the impulse buying intention of mobile commerce consumers.

The impulsive personality of consumers is an internal factor that influences consumers' impulse buying intention. Winberg and Gottwald (1982) believed that impulse buying behavior refers to consumers having an affective response to stimulation in a particular environment, causing irrational consumption. Consumers' impulse buying intention, in addition to the influence of enjoyment felt while on a mobile commerce platform, the impulsive personality of consumers is another important factor that will influence impulse buying intention (Shen, 2005). Even if the effect of the enjoyment is not significant, as long as the consumer has a high level of the impulsive personality of consumers, it can still trigger impulse buying intention. Youn and Faber (2000) pointed out that in traditional shopping environments, individual personality traits combined with environmental stimulus would induce impulse buying. More impulsive personalities would be more responsive to the environmental stimuli that induce impulse buying behavior. These individual traits are called the impulsive personality of consumers. Under the influence of the impulsive personality of consumers, when impulsive people feel a strong impulse they are more willing to buy, but when the impulse is weak the

willingness to buy will also be significantly weaker. Therefore, this study believes that the impulsive personality of consumers will influence consumers' impulse buying intention. The Hypothesis 3 is as follows:

*Hypothesis 3: Consumers' impulsivity has a positive influence on impulse buying intention.*

## **2.4 Hypotheses related to the Moderating effect of consumer impulsivity**

To understand the urge to purchase Apps on mobile commerce platform, you must first understand effects of interaction between individual characteristics and environmental factors(Hertzog and Nesselroade, 1987). People who often buy on impulse usually have the same personality and characteristics. From an impulse buying viewpoint, extremely impulsive people will have a stronger response to environmental factors (e.g. mobile service content, mobile device, mobile communications infrastructure etc.) (Smith and Ellsworth, 1985). Therefore, the positive (or negative) influences of environmental factors will be amplified, leading to a result to buy (or not buy) (Wells et al., 2011). In other words, the changes caused by influence of the impulsive personality of consumers produced by their feelings and thoughts will result in a strengthening of impulse buying intention formed by the enjoyment of users(Beatty and Ferrell, 1998). Consumers with highly impulsive characteristics are often caused by high-quality environmental factors. Coming into contact with the stimulus of certain environmental factors will lead them to a variety of emotional responses and can turn a negative user experience into positive. The longer the period of time that the consumer feels impulsive, the more the impulse buying intention formed by enjoyment will be become obvious. When the impulse is shorter, the impulse buying intention formed by enjoyment will reduce. Therefore, the impulsive personality of consumers will influence the impulse buying intention formed by the enjoyment of users on mobile commerce platforms and produce an adjusting influence.

To consolidate the above research viewpoints, this study believes the impulsive personality of consumers, if it can enhance the influence of enjoyment on impulse buying intention that will cause consumer to produce impulse buying intention. Thus, the following hypothesis is proposed:

*Hypothesis 4: Consumer impulsivity moderates the effect of enjoyment on impulse buying intention.*

## **3 RESEARCH METHODOLOGY**

This study investigates the influence of the impulsive personality of consumers on buying behavior during mobile commerce service transactions. According to a comprehensive compilation and review of past literature, through the use of the digital media convergence model put forward by Xu et al. (2010) as a basis for this study to develop a convergence in mobile media technology model. That will combine with flow experience to understand consumers' attentional involvement and enjoyment during the consumption process. Then, the viewpoint of impulsive personality of consumers will be added to explore consumers' impulse buying intention while on mobile commerce platforms.



### **3.1 Measurement development**

The questionnaire for this study is divided into five parts. The first part is “Demographic information”, the second is “Convergence in Mobile Media Technology”, third is “Flow Experience”, fourth is “Consumers Impulsivity”, and fifth is “Irresistible Urge to Buy”.

Firstly, the main objective of the first part is to understand users' background information. The second part, Convergence in Mobile Media Technology, refers to the transmission of digital content through a mobile network allowing users to access the content on a mobile device. The questions referred to Aladwani and Palvia's (2002) and are separated into three sections: mobile service content, mobile devices and mobile communications infrastructure. The third section is Flow Experience to understand the feelings of consumers when using a mobile device to purchase Apps on a mobile commerce platform, including attentional involvement and enjoyment. The questionnaire was designed by Ghani and Deshpande (1994) and adjusted for the purposes of this study. The fourth section is entitled “Consumer Impulsivity”. This section attempts to understand factors behind impulse buying on mobile commerce platforms by consumers. It takes into consideration Youn's (2000) Consumer Buying Impulsivity (CBI) scale and is divided into two sections: emotional process and cognitive process. The affective process includes emotional conflict, positive buying emotion, mood management. Cognitive process includes cognitive deliberation, disregard the future and unplanned buying. Finally, “Irresistible Urge to Buy” attempts to understand consumers' impulse buying behaviour intention, and this section considers the definition of Youn (2000).

### **3.2 Survey administration**

"iTunes (App store)" is a mobile commerce platform developed by Apple Inc. This platform primarily available to the iOS operating system of mobile devices (i.e., iPhone, iPad, etc.) to browse and download purchased mobile applications, and provided other services from the iTunes Store. iTunes Store now offers more than 2,800 kinds of music, videos and mobile applications (Apps). Opened in the name of the iTunes (App Store) on July 11, 2008, As of 2012, App Store, there are at least 620,000 applications available for download for iOS devices. 37% of these applications are free of charge, with an average price of about \$ 3.64. (Plunkett Research, Ltd.,2012) Hence, this mobile commerce platform was chosen because it is the most popular mobile commerce platform in Taiwan, and the research model was tested with data from the customers of the iTunes (App store).

In order to target the mobile customers of the iTunes (App Store), a web-based survey was employed. A banner with a hyperlink to our web survey was published via a number of bulletin board systems (BBS), chat rooms and virtual communities. The respondents were instructed to answer all of the questions based on their mobile shopping experience with the iTunes (App Store). The web survey yielded a total of 322 complete, valid responses for the data analysis. Table 1 lists the demographic information about the respondents.

Measure	Items	Freq.	Percent	Measure	Items	Freq.	Percent
Gender	Male	174	54.0	Gender	Female	148	46.0
Education	~High school	15	4.6	Mobile Shopping frequency (per week)	<3	193	59.9
	University /College	239	74.2		3-5	80	24.8
	Graduate School	68	21.1		6-7	13	4.0
					8~	36	11.2
Age	<15	1	0.3	Mobile Shopping Experience (in years)	<1	108	33.5
	15-20	44	13.7		1-2	130	40.4
	21-30	251	78.0		2-3	60	18.6
	31~40	22	6.8		3-5	15	4.7
	40~	4	1.2		>5	9	2.8

Table 1. Demographic information about the respondents (N=322).

### 3.3 Data analysis

In this study, using a two-step approach, recommended by Anderson and Gerbing (1988). A two-step approach was adopted for the data analysis; the first step involves the analysis of the measurement model while the second step tests the structural relationships among the latent constructs. The objective of the two-step approach is to establish the reliability and validity of the measures before assessing the structural relationship of the model. SmartPLS 2.0.M3 (Partial least squares) is a software application for graphical path modeling with latent variables. SmartPLS 2.0.M3 was used to perform the analysis because it allows latent constructs to be modeled as formative or reflective indicators. PLS adopts a component-based approach for estimation and places minimal restrictions on sample size and residual distribution.

#### 3.3.1 Measurement model

Measurement items were adapted from the literature. A small-scale pretest of the questionnaire was conducted with 2 experts in mobile commerce field and 3 Ph.D. students with using iTunes (App store) experience to evaluate its correctness and ease of understanding, and contextual relevance. Next, a pilot test with 50 users of iTunes (App store) was conducted to confirm the measurement properties of the final items. These individuals were asked to fill in the questionnaires and give their opinions of the content of the questionnaire. 50 fabulous stationeries were used as the incentive for participation.

The results of pretest and pilot test indicate the measurement model fulfills the criteria for reliability and validity while Cronbach's  $\alpha$  exceeded 0.7 for all constructs, and factor loadings of the items all exceeded 0.7. These results showed that the questionnaire is reliable and valid.

Our model includes two second-order constructs which are: Convergence in Mobile Media Technology and consumer impulsivity. Second-order constructs are composed by specifying a latent variable which represents all the manifest variables of the underlying lower-order factors.

Second order constructs was approximated using the approach of repeated indicators (or repeated manifest variables) suggested by Chin, Marcolin, and Newsted (2003). The method of repeated indicators was the easiest to implement (Chin et al., 2003). In this approach, the second-order factor is directly measured by observed variables for all the first-order factors that are measured with formative indicators. While this approach repeats the number of manifest variables used, the model can be estimated by the standard PLS algorithm (Chin et al., 2003). The repeated indicators approach can be used with approximately equal numbers of indicators for each construct. Chin suggests that the approach of repeated indicators will cause the R-square for the formative second-order constructs to end up as 1.0.

Constructs	Items	Composite Reliability	Mean(STD)	AVE
Mobile Media Content (MMC)	3	0.87	2.43 (0.89)	0.70
Mobile Device (MD)	3	0.88	2.32 (0.79)	0.71
Mobile Communication Infrastructure (MCI)	3	0.89	2.47 (1.00)	0.73
Attentional Involvement (AI)	3	0.94	2.38 (0.98)	0.83
Enjoyment (EJ)	3	0.93	3.05 (1.13)	0.81
Emotional Conflict (EC)	3	0.91	3.67 (1.32)	0.78
Positive Buying Emotion (PBE)	3	0.94	3.29 (1.24)	0.83
Mood Management (MM)	3	0.94	3.94 (1.52)	0.83
Cognitive Deliberation (CD)	3	0.90	3.16 (1.24)	0.74
Disregard the Future and Unplanned Buying (DFU)	3	0.90	4.11(3.77)	0.75
Irresistible Urge to buy (IUB)	3	0.91	1.45 (1.44)	0.77

*Table 2. Descriptive statistics for the constructs.*

The adequacy of the measurement model will be evaluated on the criteria of reliability, convergent validity, and discriminant validity. Reliability was examined using the composite reliability values. Table 2 shows that all the values were above 0.7, which is the commonly accepted level for explanatory research. Additionally, the convergent validity of the scales was verified by using two criteria suggested by Fornell and Larcker (1981): all indicator loadings should be significant and should exceed 0.7; and the average variance extracted (AVE) by each construct should exceed the variance due to the measurement error for that construct (i.e. AVE should exceed 0.50). As shown in Table 3, all items exhibited a loading higher than 0.7 on their respective construct, and as shown in Table 2, all the AVEs ranged from 0.6989 to 0.8333. Hence, both conditions for convergent validity were met.

	MMC	MD	MCI	AI	EJ	EC	PBE	MM	CD	DFU	IUB
MMC1	<b>0.8264</b>	0.4912	0.3866	0.4392	0.3053	0.1379	0.2011	0.1889	0.0582	0.1471	0.2012
MMC2	<b>0.8427</b>	0.4461	0.4506	0.4675	0.3187	0.1292	0.2304	0.1720	0.0403	0.1604	0.2053
MMC3	<b>0.8388</b>	0.4587	0.3994	0.3859	0.3629	0.1124	0.1874	0.1635	0.1163	0.1290	0.1798
MD1	0.4857	<b>0.7848</b>	0.4911	0.3525	0.3475	0.0597	0.2060	0.1300	0.1384	0.1140	0.2072
MD2	0.4194	<b>0.8496</b>	0.4323	0.2897	0.2157	0.0487	0.1788	0.1655	0.0945	0.1160	0.1306
MD3	0.4928	<b>0.8818</b>	0.5029	0.4207	0.2587	0.0321	0.1725	0.1569	0.0553	0.1182	0.1803
MCI1	0.4303	0.5317	<b>0.8255</b>	0.4339	0.3245	0.0356	0.1040	-0.0120	0.0468	0.0431	0.0634
MCI2	0.4178	0.4561	<b>0.8776</b>	0.4371	0.3844	0.1319	0.1969	0.0788	0.0334	0.2415	0.2454
MCI3	0.4189	0.4689	<b>0.8651</b>	0.4319	0.3267	0.0961	0.1615	0.0701	0.0597	0.2105	0.1887
AI1	0.4275	0.3787	0.4795	<b>0.9138</b>	0.4717	0.0885	0.3047	0.1469	0.0770	0.1629	0.2230
AI2	0.4432	0.3856	0.4316	<b>0.9222</b>	0.5053	0.0861	0.3309	0.2470	0.0498	0.2487	0.3042
AI3	0.5339	0.3962	0.4757	<b>0.8992</b>	0.5241	0.2010	0.4047	0.2296	0.0496	0.2062	0.3189
EJ1	0.3408	0.3357	0.3824	0.5574	<b>0.9020</b>	0.1177	0.3977	0.2730	0.0642	0.3666	0.3724
EJ2	0.3821	0.3288	0.4124	0.5049	<b>0.9296</b>	0.2063	0.4416	0.3456	0.0918	0.3555	0.4446
EJ3	0.3372	0.2077	0.2847	0.4133	<b>0.8652</b>	0.2754	0.4406	0.3755	0.0525	0.3747	0.4226
EC1	0.1092	0.0155	0.1329	0.1424	0.1795	<b>0.8873</b>	0.2630	0.3392	0.1613	0.3293	0.3814
EC2	0.1451	0.0724	0.0644	0.1422	0.2106	<b>0.8793</b>	0.3465	0.4112	0.1622	0.3813	0.4222
EC3	0.1442	0.0552	0.0783	0.0875	0.1873	<b>0.8829</b>	0.3402	0.4122	0.1952	0.3657	0.4553
PBE1	0.2381	0.2325	0.1714	0.3368	0.3714	0.3590	<b>0.9101</b>	0.5426	0.0366	0.3572	0.4893
PBE2	0.2218	0.1866	0.1385	0.3653	0.4381	0.3318	<b>0.9328</b>	0.5433	-0.0467	0.4095	0.4986
PBE3	0.2167	0.1868	0.1827	0.3447	0.4855	0.2974	<b>0.8953</b>	0.5691	0.0060	0.4261	0.5214
MM1	0.2550	0.1866	0.0898	0.2686	0.3721	0.4055	0.5892	<b>0.9139</b>	-0.0120	0.4886	0.5645
MM2	0.1010	0.1241	-0.0222	0.1326	0.2899	0.4445	0.5014	<b>0.9155</b>	0.0053	0.4820	0.5062
MM3	0.2142	0.1796	0.0769	0.2235	0.3369	0.3520	0.5594	<b>0.9013</b>	-0.0153	0.4243	0.4852
CD1	0.0920	0.0863	0.0474	0.0199	0.0750	0.1777	-0.0208	-0.0149	<b>0.9048</b>	-0.0679	0.0560
CD2	0.0322	0.0356	0.0537	-0.0054	0.0741	0.1278	-0.0186	-0.0443	<b>0.7137</b>	-0.0820	-0.0352
CD3	0.0605	0.1072	0.0578	0.0761	0.0762	0.1828	0.0084	-0.0131	<b>0.9510</b>	-0.0865	0.0151
DFU1	0.2280	0.0982	0.1706	0.2450	0.4039	0.3419	0.3827	0.4263	-0.0304	<b>0.8836</b>	0.6066
DFU2	0.0744	0.1414	0.1759	0.1579	0.2654	0.2763	0.3376	0.3826	-0.1073	<b>0.8339</b>	0.5412
DFU3	0.1430	0.1215	0.1542	0.1821	0.3735	0.4261	0.4051	0.5078	-0.0723	<b>0.8749</b>	0.6303
IUB1	0.2048	0.1504	0.1648	0.2629	0.3978	0.4402	0.5128	0.5360	0.0475	0.6415	<b>0.8624</b>
IUB2	0.1871	0.1680	0.1247	0.2431	0.3787	0.4043	0.4570	0.4936	0.0592	0.5854	<b>0.8953</b>
IUB3	0.2245	0.2282	0.2191	0.3138	0.4323	0.4105	0.4808	0.4719	0.0208	0.5838	<b>0.8799</b>

Table 3. PLS confirmatory factor analysis and cross-loadings.

Note: Bold numbers indicate item loadings on the assigned constructs.

Discriminant validity will be tested using the following three tests. First, an examination of cross-factor loadings (Table 3) indicates good discriminant validity, because the loading of each measurement item on its assigned latent variable is larger than its loading on any other constructs (Chin, 1998). Second, the correlations among all constructs are all well below the 0.85 threshold (Kline, 1998), suggesting that all constructs are distinct from each other. Third, the square root of the AVE from the construct is much larger than the correlation shared between the construct and other constructs in the model (Table 4) (Fornell and Larcker, 1981).

	MMC	MD	MCI	AI	EJ	EC	PBE	MM	CD	DFU	IUB
MMC	<b>0.8360</b>										
MD	0.5564	<b>0.8397</b>									
MCI	0.4935	0.5676	<b>0.8563</b>								
AI	0.5158	0.4248	0.5074	<b>0.9118</b>							
EJ	0.3933	0.3268	0.4032	0.5499	<b>0.8993</b>						
EC	0.1514	0.0554	0.1023	0.1397	0.2185	<b>0.8831</b>					
PBE	0.2470	0.2210	0.1797	0.3824	0.4732	0.3607	<b>0.9129</b>				
MM	0.2091	0.1796	0.0529	0.2291	0.3661	0.4408	0.6044	<b>0.9103</b>			
CD	0.0853	0.1134	0.0545	0.0642	0.0780	0.1962	-0.0019	-0.0080	<b>0.8626</b>		
DFU	0.1742	0.1383	0.1921	0.2263	0.4056	0.4075	0.4358	0.5115	-0.0795	<b>0.8644</b>	
IUB	0.2339	0.2065	0.1931	0.3109	0.4586	0.4768	0.5512	0.5706	0.0484	0.6880	<b>0.8793</b>

Table 4. Correlation among constructs and the square root of AVE.

Note: Diagonal element (in bold) are the square root of the average variance extracted (AVE).

### 3.3.2 Structural model

In PLS analysis, examining the structural paths and the R-square scores of endogenous variables assesses the explanatory power of a structural model. Paths exhibiting a P-value less than 0.05 will be considered significant. Bootstrapping of the 322 cases was done with 500 samples for significance testing. The SEM analysis of the model indicated that all paths exhibit a P-value of less than 0.05 and the model accounts for 56.9% of the variance of irresistible urge to buy. The path coefficient between impulsivity and irresistible urge to buy is 0.665 and that between Enjoyment and irresistible urge to buy is 0.109. Thus, the fit of the overall model is fairly good.

## 4 CONCLUSION

This study validates this research model to explore each of the key constructs regarding convergence in mobile media technology, flow experience, and consumer impulsivity for understanding the key to consumers' impulse buying behavior while on mobile commerce platforms. The results provide strong support for the research model, and further indicate that a higher level of impulsivity reduces the

effect of enjoyment on irresistible urge to buy. The data also show that emotional conflict, positive buying emotion, mood management, cognitive deliberation, disregard the future and unplanned buying are important to impulsivity formation and thus relevant within the context of impulse buying intention. There are three contributions.

First, the perspective of convergence in mobile media technology can bring a new trend of “Attention Economy” to mobile commerce. “Attention Economy” refers to an economic activity that relies on media to attract public attention for economic and social effects. Mobile devices have become an important information media in peoples' lives. Therefore, how to attract consumers' attentions has become an important issue. This “economy of attention” will not only change consumers' lifestyles but also promote the development of a new mobile industry value chain. This study found, from the viewpoint of convergence in mobile media technology, mobile commerce applications and development needs to take into account a combination of three factors: mobile communications technology, mobile device and mobile media content in order that mobile commerce can bring greater business opportunities and possibilities.

Second, consumer impulsivity can induce impulse buying by consumers on mobile commerce platforms. This study expects that when consumers experience mobile commerce service after convergence in mobile media technology, they can receive a high degree of attentional involvement and then enjoyment that will influence consumers mobile service content' buying intent. At the same time, through the stimulation of the potential impulsive character of consumers, the impulse buying desire of consumers can be encouraged. Therefore, on mobile commerce platforms, if good use is made of convergence in mobile media technology in addition to inducements to consumers' potential impulse buying characteristics, the promotion of consumer spending on mobile commerce platforms can be enhanced. To summarize the above, in the future enterprises can design applications that induce consumers to lure consumers into impulse buying, and thus lead the development of mobile commerce.

Third, the results of this study provide enterprise management with a guide basis for the development of mobile commerce. In the past, traditional media used a variety of methods to transmit information to consumers. Although e-commerce has turned into mobile commerce some time ago it has not easily found a successful business model because, in its early days, the special characteristics of mobile commerce were not fully grasped. With mobile commerce gradually booming and the number of mobile device users continuing to rise, mobile commerce is set to become a major future development trend for enterprises. In addition, studies aimed at the concept of convergence in mobile media technology are rare. Future studies should be able to this study's results as a basis to further explore other convergence in mobile media technology related applications such as mobile learning.

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