

# The Effects of Intrinsic, Extrinsic, Hedonic, and Utilitarian Motivations on IS Usage: An Updated Meta-analytic Investigation

*Full Paper*

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## Abstract

This study reports on a meta-analytic investigation of the effects of intrinsic, extrinsic, hedonic and utilitarian motivations on IS system usage. The study extends the work of Wu and Lu (2013) and considers the effects of 16 motivations on usage, behavioural intention, perceived usefulness (PU) and perceived ease of use (PEOU). 73 studies published between 2009 and 2016 met the inclusion criteria. Bare bones and true score correlations were calculated and moderation analysis was performed. Curiosity has the strongest effects on behavioural intention while social interaction has the strongest effects on usage. Results also show that enjoyment and playfulness motivations have strong effects on behavioural intention in hedonic system contexts, and reward motivation has strong effects on utilitarian systems usage. The application of motivation theory to adoption and use of information systems together with synthesis of empirical data may provide new insights in system usage behavior.

## Keywords

Intrinsic, extrinsic, hedonic, utilitarian, systems usage, meta-analysis.

## Introduction

Motivations are a primary impetus for people to engage in various behaviours (Deci, 1975). They include intrinsic (e.g. fun) and extrinsic motivations (e.g. reward) (Ryan and Deci, 2000) as well as hedonic (e.g. social interaction) and utilitarian (e.g. convenience) motivations (Batra and Ahtola, 1991; Hirschman and Holbrook, 1982). Motivations have been associated with aspects of behavioural activation and intention (Deci, 1975), and thus their role in IS usage behaviour has consequently been the subject of much attention (e.g., Agrifoglio, Black, Metallo and Ferrara, 2012; Jin, Park and Kim, 2010; Kim and Forsythe, 2008; Lin and Liu, 2012; Teo et al., 1999). However, extant research has demonstrated wide variations in the predicted effects of motivations on system usage. Some studies found high correlations between motivation and usage (e.g., enjoyment-usage  $r=0.601$  reported by Lee, 2009), and others report little or no effects (e.g., enjoyment-usage  $r=0.061$  reported by Mun and Hwang, 2003). Different motivations also have varying effects on the use of different types of information systems. For example, in utilitarian system contexts the enjoyment-usage relationship had a low correlation of  $r=0.135$  (Igbaria, Iivari and Maragahh, 1995), but the image-usage relationship had a higher correlation of  $r=0.582$  (Mohammadi, 2015). Few studies have attempted to reconcile these conflicting results, Wu and Lu (2013) are a notable exception. In their earlier meta-analytic study of motivations and IS usage, Wu and Lu (2013) focused on effects of extrinsic and intrinsic motivations on using utilitarian, hedonic and dual-purposed information systems. They reviewed IS studies published through 2009, and found that in the context of hedonic systems, intrinsic motivations are more important than extrinsic motivations whereas in the context of utilitarian systems, extrinsic motivations play a more critical role than hedonic motivations. However, in the years since their review, i.e. 2009 to 2016, the role of motivation in system usage behaviour has gained increased attention. Recently, researchers are examining different types of motivations, e.g. convenience (Mansumitichai, Park and Chiu, 2012), entertainment, image, and social interaction (Hamari and Koivisto, 2015; Hsiao and Tang, 2016), alongside more established motivations such as enjoyment. Moreover, new types of IS systems such as social network sites as well as mobile applications are

becoming more prolific since the Wu and Lu study, and their use may be differentially effected by motivations.

The purpose of our study is to build upon and extend their findings by providing an updated meta-analytic investigation of the influence of motivation on system usage. Specifically, we examine studies of motivation in IS usage post 2009, and examine possible changes in the strength of effects over time as systems have become more embedded into workplace and social contexts (Leftheriotis and Giannakos, 2014). This study also extends Wu and Lu (2013) by observing effects of motivations not included in their study such as entertainment, convenience, and social interactions.

To define IS usage, we draw on the technology acceptance model (TAM). Specifically, we consider the relationship between motivations and four IS usage constructs, namely perceived usefulness, perceived ease of use, behavioural intention, and actual usage. Inclusion of the technology acceptance model's (TAM) salient beliefs of perceived usefulness and perceived ease of use provides for a more comprehensive assessment of the role of motivation in technology usage. In addition, the study considers the moderating effects of system type, specifically hedonic versus utilitarian systems, on the relationships between motivation and usage. The study also examines the moderating effects of culture (using country as a proxy), portability of the technology (e.g. mobile vs non-mobile), and the population examined in the study (students versus non-students).

Specifically, we pose the following research questions:

1. What is the overall effect of motivations on perceived usefulness, perceived ease of use, behavioural intention to use and actual system usage?
2. To what extent are these effects moderated by factors such as system type, portability of the technology, culture and population examined in the study?

To answer these questions, we carry out a meta-analytic examination of the bare-bone effect sizes and true-score effect sizes, and we carry out homogeneity tests for determining potential for the moderating effects of system type and other methodological factors on the links between motivations and IS usage. We focus our investigation on studies published after 2009, and thereby extend the work of Wu and Lu. These repeated investigations over time allow studies to build on previous ones and examine new sources and reasons for heterogeneity in effect sizes, and thus allowing for new insights.

In the next section, we discuss motivation theory and different motivations considered in past research work as influencing system usage. We present a research model that underpins our meta-analytic investigation. Next, the methodology and approach to the meta-analysis are outlined. Then the results will be presented followed by conclusions.

## **Theoretical Background**

Past IS research has promoted the study of motivations as an influence on information system adoption and use (Davis, Bagozzi, and Warshaw, 1992), with an initial focus on the argument that employees may use an information system because it fulfils their intrinsic motivations i.e. enjoyable, fun or entertaining. Other studies later supported the effects of intrinsic motivation on system use behaviour (Davis et al., 1992; Hwang, 2005; Lee, Cheung and Chen, 2005; Teo, Lim and Lai, 1999; Venkatesh, 1999; Venkatesh, 2000). Over the years, motivation theory has become an increasingly popular underpinning theory in examining factors that influence information systems use (Ayeh, Au and Law, 2013). IS researchers have extended this work by studying different types of motivations influencing IS use. These include convenience, social interaction, image, reward, enjoyment, playfulness, arousal, escapism, flow and entertainment amongst others. Some studies have even suggested that the use of hedonic systems like games, or those offering entertainment content and playful services, is driven largely by intrinsic motivations as opposed to other factors such as ease of use (Shin and Shin, 2011).

Interest in the effects of motivation led to the development of the hedonic motivation system adoption model (Lowry, Gaskin, Twyman, Hammer and Roberts, 2012). The model describes how intrinsic motivations are more prominent in a process-oriented context, than outcome-oriented extrinsic motivation that are highly emphasized in traditional information systems adoption and use studies. Hedonic motivations to use an IS are based on the system providing functionalities which make it possible

for the user to fulfil the need to belong, socially interact and therapy (Hirschman and Holbrook, 1982). It is the feeling resulting from using the IS which motivates the use of the IS (Xu, Lin, and Chan, 2012).

Fewer studies have however examined extrinsic and utilitarian motivations (e.g. Beldona, Kline and Morrison, 2004). Extrinsic motivations focus on the pursuit of a reward and gain or the avoidance of loss as the motivation for system use (Ryan and Deci, 2000). For example, the relationship between IS use and reward has been examined and found to be positive especially for work-related systems (Martins and Kellermanns, 2004). The relationship between punishment, image and IS use has also been found to be positive (Tong, Teo and Tan, 2008). The explanation is that by using the IS individuals may get the opportunity to enhance their social image, else by not using the IS they may lose certain incentives. So, the desire to avoid such loss or to benefit from such gain may serve as external motivational factors for employees to use the IS.

Utilitarian motivations to use an IS are based on the functionalities provided by the system which make it possible for the user to accomplish a mission or task often in a more convenient way (Batra and Ahtola, 1991; Sherry et al., 1993; Babin et al., 1994). When the technology has features or utility which serve as an instrumental means to an end then users are motivated to use it (Kempf, 1999). For example, mobile and internet banking make it convenient for users to access different functionalities such as making payments and checking account balances. If users attach much importance to these utility aspects then the use of the information system is more likely (Xu et al., 2012).

Elsewhere, the effects of motivations such as enjoyment on productivity-oriented versus pleasure-oriented systems has been examined (e.g. van der Heijden, 2004). Despite these past works, IS researchers are yet to make conclusions regarding the overall effects of motivations on system usage, and how different motivations interact to influence usage behaviour. Similarly, the role of different motivations in different contexts is not well understood, e.g. whether intrinsic motivations are important for all systems (Gerow, Ayyagari, Thatcher and Roth, 2013) or more so for hedonic systems (Wu and Lu, 2013).

Based on the above discussion, the four types of motivations that will be investigated in this meta-analysis are presented in Figure 1. Because understanding the sources of variation or heterogeneity in previously reported effect sizes should be an important goal of any meta-analysis, we also depict the potential of system type and other methodological factors to moderate the links between motivations and IS usage.

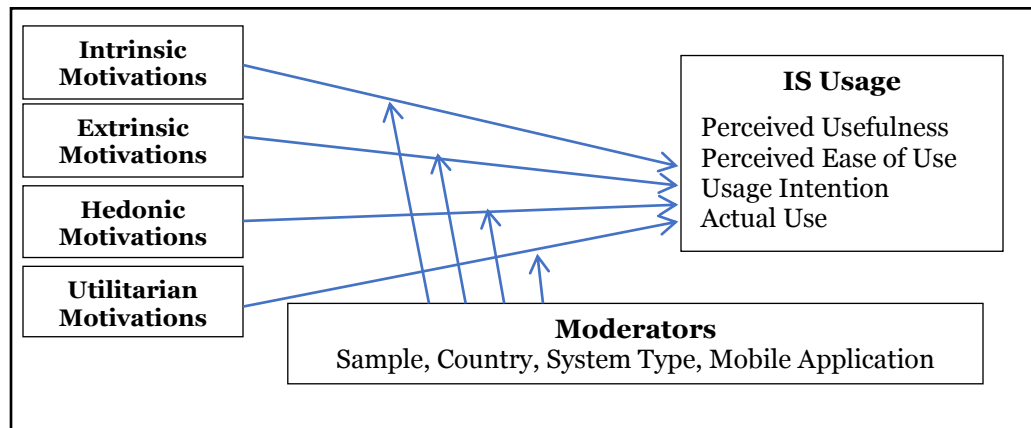


Figure 1. Research Model

## Methodology

Meta-analysis is the statistical analysis of a large collection of prior empirical results for the purpose of integrating the findings (Glass, 1976) and aims to offer an unbiased synthesis of empirical data (Crombie and Davies, 2009). Synthesizing past studies allows us to understand which motivations are most important in technology acceptance and system usage. Effect sizes will be examined to identify heterogeneity, and further analysis will be carried out to examine the influence of system type, portability of the system, culture and population examined in the study as moderators.

The first step of the meta-analysis involved a literature search strategy. The search covered all articles published from 2010 up to present 2017. The search included papers post 2009 so as to extend the meta-analysis of Wu and Lu (2013), which covered papers through 2009. A search for literature was conducted in the following online databases: ACM, Jstor, Emerald, ABI/INFORM Global, ProQuest, Web of Science, EBSCO and Science Direct. Search strings were constructed around the study's focus on users of information technology as the population of interest, information systems acceptance and usage as the criterion variables of interest (outcome) and motivations as the determinants of usage. Because the focus of a meta-analysis was on quantitative studies, additional search terms were added such as regression, correlations, relational and empirical. All full-text studies had to be accessible to the authors through their university's library system and its comprehensive electronic database subscription. A number of additional articles were identified for inclusion in the meta-analysis by examining the reference lists of the extracted papers.

A review of the titles and abstracts was carried out and all non-empirical studies, and those that were not in English were excluded. Articles were also excluded if the dependent variable was not behavioural intention or usage (e.g. Verhagen, Feldberg, van den Hoof, Meents and Merikivi, 2012), there was no correlation matrix of constructs (e.g. Lee, Lee and Hwang, 2015; Rouibah, Lowry and Hwang, 2016), no reliability of variables reported, measurement items not included (e.g. Reyshav, Ndicu and Wu, 2016) or sample size not reported. A total of 73 studies were extracted that met these inclusion criteria.

Summary of included studies (the total number of papers extracted =73)	
Years 2010 (5); 2011 (8); 2012 (9); 2013 (17); 2014 (12); 2015 (13); 2016 (9)	Publication Type Journal (66); Conference (7)
System Type Mobile (19); Non-mobile (54)	Type of Information System Hedonic (26); Utilitarian (22); Hybrid (25)
Actual systems Business Intelligence (1); Online blog (1); Online booking system (1); E-commerce (8); E-learning (6); Enterprise social network (1); Facebook (4); Games (9); Green devices (2); Internet (2); Knowledge repository (1); Messaging (1); e-coupon (1); Online advertising (1); Online communities (2); Online newspaper (3); Online service (1); Online self-service (1); Smartphone (2); Social network sites (14); Technology Innovation (1); Online travel planner (1); Twitter (1); Virtual world (4); E-book (3); Smartwatch (1)	
Country Chile (1); China (11); Finland (1); Germany (2); Global (2); Iran (1); Israel (1); Japan (1); Jordan (1); Korea (13); Malaysia (1); North America (1); Portugal (1); Saudi Arabia (1); Spain (3); Taiwan (11); Thailand (3); United Kingdom (1); United States (17)	
Respondents (user type) Students (27); non-students (46)	

**Table 1. Summary of Accepted Articles**

In order to code the various motivations, the conceptual and/or operational definitions of the studies' constructs were examined to confirm their consistency with the conceptual definitions of each construct. Intrinsic motivation variables were coded if they reflected participation in an activity because it was intrinsically enjoyable or doing an activity for its own sake, because one enjoys the process (Roca and Gagne, 2008; Ryan and Deci, 2000). This includes variables such as playfulness (PLA), entertainment (ENT), enjoyment (ENJ) and fun (FUN) (Wu and Lu, 2013). Extrinsic motivation variables were coded if they reflected doing an activity for a consequence separable from the activity itself, as the pursuit of a reward or the avoidance of a punishment (Roca and Gagne, 2008; Ryan and Deci, 2000). This included coding variables such as pay (PAY), image (IMA), reward (REW), promotion (PRO) and deadline (DEA) (Wu and Lu, 2013). Utilitarian motivation variables were coded if they reflect beliefs in effectiveness and

efficiency as outcomes that could be derived from the use of a system (Venketash and Brown, 2001). This included coding for utilitarian variables such as convenience (CONV). Hedonic motivation variables were coded if they reflect non-instrumental, experiential, and affective results gained from using the system (Hong and Tam 2006). This required coding for different hedonic motivations such as interactions and belonging as (INTR).

In addition, the acceptance and usage variables, namely actual system usage, behavioural intention, perceived usefulness, and perceived ease of use were also coded based on Davis (1989). For each extracted study, we also recorded the system and system type under study i.e. utilitarian (UT) e.g. ERP, hedonic (HE) e.g. games or hybrid (HY) e.g., social network sites. We recorded the country in which the study was conducted, sample size, the sample respondents (students or non-students), and the year of publication. We summarize these in Table 1.

Effect sizes (correlations) were recorded. Direction of the correlations were reversed for measures phrased in the negative. In addition to the effect size, reliabilities of each study's variable were coded using the reported Cronbach's alpha coefficient or, if not available, the reported composite reliability scores.

### ***Meta-Analytic Approach***

The study was guided by Hunter and Schmidt's (2004) methods in estimating effect sizes. First a sample size adjusted mean ( $r_+$ ) was calculated, which is the weighted average of individual correlations. Then corrected true-score correlations ( $r_c$ ) were calculated, to correct for measurement error (Schmidt and Hunter, 2014). Homogeneity tests were carried out to determine whether there was any heterogeneity in the underlying correlations (Hedges and Olkins, 1985). Homogeneity Q, which is used to determine the potential for moderator effects should not exceed the critical value, if it does then moderating effects should be suspected (Schepers and Wetzels, 2007). To do the Homogeneity test, the Fisher Z transformation was used to calculate Homogeneity Q, which gives an indication of possible moderator effects. Finally, fail-safe test was carried out to test the robustness of the findings and provide for an indication of publication bias by estimating the number of non-significant results or non-published studies that would be required to reduce an obtained mean effect to a trivial level (Rosenthal, 1979). It is expected that fail-safe N value should exceed  $5k+10$  (where k is the number of observed correlations).

## **Results**

### ***Effects of motivations on system usage***

Meta-analysis results are presented in Table 3 and Table 4. For each motivation, we report the total number of studies, the total number of observed correlations, and range of correlation, average correlation, and range of sample size, the total sample size and the average of sample size. Because some publications reported results from tests on more than one sample under examination, the number of available pair-wise correlations could exceed the number of publications. Then, we calculated  $r_+$ ,  $r_c$ , the variance of  $r_+$ , and 95% confidence interval of  $r_+$ . We also did a fail-safe N test to further evaluate the significance of each motivation.

The meta-analysis results of intrinsic motivations (ENJ and PLAY) (Table 2) indicate that both of them have significant effects, and enjoyment has the strongest effects. Among them, we obtained 15 correlations between enjoyment and actual use, and 2 correlations between playfulness and actual use. However, we obtained 46 correlations between enjoyment and behavioural intention. Enjoyment exerts the largest effects across all TAM constructs, perceive ease of use ( $r_+=0.468$ ), perceive usefulness ( $r_+=0.405$ ), behavioural intention ( $r_+=0.57$ ), and actual use ( $r_+=0.43$ ), compared to other motivations. All the true-score correlations are larger than 0.400. These findings suggest that enjoyment as an intrinsic motivation has important inter-relationships with TAM (PU, PEOU, BI and Use). Comparing the lower and upper correlation reveals large difference in the correlations across studies indicating that potential moderators may exist. Other important intrinsic motivations were playfulness (PLA), entertainment (ENT) and curiosity (CUR). All these three had effects ( $r_+>0.4$ ) on all TAM constructs except for usage.

Fewer studies included extrinsic motivations (IMG and REW). We obtained 3 correlations between image and actual use, and 2 between reward and actual use. The relationships between image-TAM constructs, and reward-TAM constructs were all significant, except for reward-usage relationship. However, a much

larger number of studies examined links between image and behavioural intention (15 correlations), and reward and behavioural intention (6 correlations) and the other TAM constructs of PU and PEOU. Results showed that these extrinsic motivations exert the least effects on perceived ease of use ([IMG-PU  $r_+ = 0.368$ ], [IMG-PEOU  $r_+ = 0.244$ ], IMG-Use  $r_+ = 0.451$ ], [IMG-BI  $r_+ = 0.38$ ] and [REW-PU  $r_+ = 0.405$ ], [REW-PEOU  $r_+ = 0.155$ ], [REW-BI  $r_+ = 0.49$ ], [REW-USE  $r_+ = 0.40$ ]).

With regards to hedonic motivation of social interaction (INT), significant and almost equal effects were observed on actual use, behavioural intention, and perceived usefulness with all exhibiting an  $r_+$  above 0.4, except for PEOU with  $r_+ = 0.270$ . Only the effect on perceived ease of use was non-significant. Results show that the utilitarian motivation of convenience (CON) has a large effect size on perceived ease of use  $r_+ = 0.506$ .

Compared to Wu and Lu (2013), enjoyment and image's effects are higher in the studies examined post 2009 (See Table 5). Rewards have only more recently been examined, whilst the effects of playfulness as an intrinsic motivation appear stable and relatively unchanged. The studies that examined rewards were focused on systems such as business intelligence systems, online banking and knowledge repository systems which are largely utilitarian systems.

Some of the motivations were not presented in the table because only one correlation was observed (e.g. arousal-use, entertainment-use, fantasy-use, pleasure-intention, fantasy-intention, reward-ease of use, pleasure-ease of use). Across all the studies, few studies examine the effect of motivations on actual use. In summary (Table 3), all the motivations (CON, INT, IMG, REW, ENJ, FLW, PLA, ARO, ENT, CUR) and TAM (PU, PEOU) constructs were significantly related to behavioural intention, except FLW. Table 3 also shows that PU, PEOU, CON, INT, IMG, ENJ and PLA were significantly related to actual use except REW and PLA.

Table 4 shows that INT, IMG, REW, ENJ, PLA, ENT, CUR are all significantly related to perceived usefulness, and CON, IMG, ENJ, PLA, ENJ, PLA, ENT and CUR are significantly related to perceived ease of use except INT. Future research may do well to expand the examination of these relationships.

### ***Effects of moderators such as system type, sample, and country of study.***

The results of testing for moderation effects are reported in Table 2. Because Q values exceed the critical value for all motivations, we considered four moderators, namely type of IS (hybrid vs hedonic), type of IS (mobile vs non-mobile), country of study (western vs non-western), and sampling strategy (student vs non-student). Different motivations exert different effects depending on the system type. For example, intrinsic motivations (enjoyment and playfulness) and hedonic motivation (social interaction) exert nearly the same effects on hedonic and hybrid systems but slightly less effects on utilitarian systems. However, extrinsic motivations (image and reward) exert higher effects on utilitarian systems and less on hedonic systems. Hybrid systems such as social network sites are influenced strongly by intrinsic motivations such as enjoyment and playfulness but surprisingly less influenced by utilitarian motivations (e.g. rewards) than are pure hedonic systems. Sample strategy had an effect on most of the results.

## **Discussion and Conclusion**

The meta-analysis reported above has aggregated the findings of past studies examining the effects of motivation on information systems usage and has extended the study of Wu and Lu (2013). The search identified 16 motivations examined in studies post 2009. Enjoyment is the most commonly studied intrinsic motivations construct, with 46 correlations. Image is the highest studied construct amongst extrinsic motivation constructs with 15 correlations.

Our findings confirm that enjoyment, playfulness, enjoyment, reward, interaction, and entertainment do, on average, exert strong effects on IS usage constructs, most notably on behavioural intention and perceived usefulness. Also, enjoyment as a motivation has, on average, the highest correlation with behavioural intention, and social interaction motivation has the highest correlation with usage. Extending Wu and Lu (2013), this study observed how different motivations interact with TAM constructs. Enjoyment had the highest correlation with PU and PEOU. We also included hedonic motivations (e.g. social interaction), utilitarian motivations (e.g. convenience), and other intrinsic motivations (e.g. entertainment and curiosity) not considered in their work. Since the Wu and Lu (2013)

studies (refer to Table 5), systems have continued to embed themselves into workplace and social contexts. Whilst our results reach similar conclusions with regards to the average effects size for constructs such as enjoyment, we observed an increase in the number of studies examining motivations such as rewards which appear to be exerting strong effects in certain contexts under study. We now have a better sense of the role of rewards as extrinsic motivation. For utilitarian systems such as ERP, motivations such as reward exert larger effects than motivations such as enjoyment. However, consistent with Gerow et al. (2013), enjoyment nonetheless exerts strong effects (>.0.5) across all systems. Use of hybrid systems is largely predicted by motivations such as enjoyment and playfulness and less by utilitarian motivations. This might be because we classified social network sites as hybrid. The use of utilitarian features in hybrid systems may also appeal to intrinsic and hedonic motivations of users.

The results demonstrated that sampling strategy moderated the results. We expected based on van der Heijden (2004) that intrinsic motivation may be more important to students, and based on Gu, Fan, Suh and Lee (2010) that extrinsic and utilitarian motivations may be more important to non-students e.g. workers. However, intrinsic and utilitarian motivations were both found important for students. Culture only affected the relationship between reward and behavioural intention. Mobility of the system moderated the relationship between enjoyment and playfulness with behavioural intention. Future researchers may consider coding moderators differently, e.g. America vs Europe or workplace vs non-workplace setting. Motivations such as curiosity and reward were subjected to relatively less attention and future research may wish to consider their inclusion. We also recommend that researchers are cognisant of the type of system under study (e.g. hybrid vs hedonic) and explore the extent to which different types of motivations surfaced in this paper may exert differential effects on system usage.

Moderators		BI				
		INT	IMG	REW	ENJ	PLA
Q		22.24	165.54	48.03	1003.37	266.74
Critical		11.07	23.68	12.53	61.66	19.68
Population	Student	0.469	0.187	0.734	0.814	0.767
	Non	0.423	0.470	0.471	0.657	0.338
	Z	non	sig	sig	sig	sig
Country	Western	0.408	0.461	0.731	0.771	0.483
	Non Western	0.446	0.384	0.440	0.645	0.501
	Z	non	non	sig	non	non
Mobile Application	Mobile	0.399	0.345	0.557	0.596	0.665
	Non	0.493	0.431	0.576	0.747	0.454
	Z	non	non	non	sig	sig
System Type	Hedonic	0.590	0.391	0.528	0.709	0.510
	Utilitarian	0.402	0.500	0.721	0.6340	0.109
	Hybrid	0.470	0.406	0.463	0.724	0.691

**Table 2. Moderators**

(BI-behavioral intention, INT-social interaction, IMG-Image, REW-reward, ENJ-enjoyment, PLA-playfulness, TAM-technology acceptance model, PU-perceived usefulness, PEOU-perceived ease of use, CON-convenience, FLW-flow, ARO-arousal, ENT-entertainment, CUR-curiosity, HED-hedonic, UTI-Utilitarian)

	IMG-BI	REW-BI	ENJ-BI	PLA-BI	ARO-BI
Wu and Lu (2013)	0.37	0.24	0.52	0.41	0.34
This study	0.384	0.405	0.577	0.431	0.33

**Table 3. Comparison with Wu and Lu (2013)**

	Perceived Usefulness								Perceived Ease of Use						
	HED	EXT			INTR				UTI	HED	EXT	INTR			
	INT	IMG	REW	ENJ	PLA	ENT	CUR	CON	INT	IMG	ENJ	PLA	ENT	CUR	
No. studies	4	6	3	37	8	3	2	2	4	6	37	8	3	2	
No. correlations	5	6	3	45	10	3	2	2	5	6	41	10	3	2	
Total sample size	2049	2136	513	14837	2544	1514	455	1805	2049	1624	13777	2487	1514	455	
Average	410	356	171	330	255	505	228	903	410	271	336	249	505	228	
Range	1409	662	333	1409	443	800	243	1409	1409	579	1409	443	800	243	
sample size	64	80	80	63	64	314	212	396	64	80	63	64	314	212	
Correlation	Upper	0.48	0.61	0.49	0.846	0.69	0.631	0.799	0.74	0.32	0.48	0.792	0.63	0.42	0.536
	Lower	0.308	0.142	0.361	0.07	0.25	0.282	0.651	0.44	0.116	0.14	0.08	0.065	0.166	0.316
	Avg.	0.408	0.389	0.437	0.571	0.444	0.458	0.725	0.59	0.195	0.265	0.461	0.38	0.294	0.426
r+		0.447	0.368	0.405	0.405	0.412	0.448	0.730	0.506	0.270	0.244	0.468	0.401	0.327	0.433
Rc		0.505	0.423	0.557	0.557	0.461	0.518	0.786	0.559	0.311	0.283	0.520	0.447	0.392	0.468
var r+		0.003	0.019	0.003	0.003	0.018	0.020	0.005	0.022	0.005	0.014	0.0411	0.030	0.011	0.012
95% confid. level (r+)	Upper	0.492	0.472	0.498	0.624	0.510	0.584	0.832	0.713	0.363	0.340	0.528	0.496	0.458	0.585
	Lower	0.402	0.264	0.403	0.517	0.313	0.313	0.627	0.298	0.178	0.147	0.409	0.306	0.200	0.281
5k+10		35	40	25	235	60	25	20	20	34	40	215	60	25	20
Fail-safe (0.05)		84	95	55	1207	188	59	82	56	35	60	811	154	34	36
Result		sig	sig	sig	sig	sig	sig	sig	sig	non	sig	sig	sig	sig	sig

Table 4. Perceived Usefulness and Perceived Ease of Use

	Behavioral Intention												Actual Use								
	TAM		UTI	HED	EXT			INTR				TAM	UTI	HED	EXT	INTR					
	PU	PEO	CON	INT	IMG	REW	ENJ	FLW	PLA	ARO	ENT	CUR	PU	EOU	CON	INT	IMG	REW	ENJ	PLA	
No. studies	44	42	3	6	15	6	43	2	12	2	3	2	10	9	3	2	3	2	13	2	
No. correlations	47	45	3	6	15	7	46	2	12	2	3	2	10	10	3	2	3	2	15	2	
Total sample size	15160	14909	2587	3034	4658	1843	14718	732	3469	1243	1514	455	2240	2338	539	452	866	333	3454	507	
Average	323	331	862	506	312	263	322	366	289	622	505	228	224	234	180	226	289	167	230	254	
Range	1409	1409	1409	1409	662	424	1409	534	534	800	800	243	443	443	383	388	390	233	443	443	
sample size	63	63	396	80	80	138	63	198	80	433	314	212	63	63	63	64	93	100	63	64	
Correlation	Upper	0.874	0.831	0.788	0.53	0.64	0.641	0.89	0.84	0.714	0.44	0.549	0.778	0.564	0.47	0.411	0.62	0.582	0.266	0.7	0.18
	Lower	0.06	0.031	0.26	0.35	0.178	0.28	0.148	0.04	0.05	0.27	0.171	0.691	0.105	0.13	0.22	0.24	0.282	0.23	0.15	0.1
	Average	0.56	0.450	0.51	0.45	0.31	0.50	0.59	0.44	0.46	0.35	0.39	0.730	0.34	0.26	0.33	0.43	0.40	0.24	0.46	0.14
r+		0.56	0.470	0.41	0.41	0.38	0.49	0.57	0.25	0.43	0.33	0.40	0.730	0.29	0.25	0.38	0.55	0.45	0.24	0.43	0.170
Rc		0.62	0.520	0.44	0.47	0.43	0.50	0.63	0.29	0.48	0.39	0.48	0.770	0.32	0.29	0.44	0.64	0.51	0.27	0.49	0.184
var r+		0.031	0.042	0.046	0.004	0.021	0.015	0.026	0.16	0.034	0.007	0.026	0.002	0.023	0.015	0.007	0.036	0.026	0.0003	0.020	0.001
95% confi level (r+)	Upper	0.611	0.525	0.654	0.476	0.463	0.589	0.624	0.811	0.558	0.448	0.564	0.798	0.396	0.326	0.470	0.830	0.240	0.266	0.509	0.225
	Lower	0.517	0.414	0.166	0.349	0.305	0.408	0.530	-0.3	0.304	0.213	0.240	0.677	0.186	0.189	0.300	0.303	0.105	0.216	0.361	0.114
5k+10		245	235	25	40	85	45	240	20	70	20	25	20	60	60	25	20	25	20	85	20
Fail-safe (0.05)		1220	875	40	115	240	155	1302	18	242	28	48	85	135	98	40	36	51	18	295	9
Result		Sig	sig	sig	sig	sig	sig	sig	non	sig	sig	sig	sig	sig	sig	sig	sig	sig	non	sig	non

Table 5. Behavioral Intention and Actual Use

References

Agrifoglio, R., Black, S., Metallo, C., & Ferrara, M. 2012. "Extrinsic versus intrinsic motivation in continued twitter usage". *Journal of Computer Information Systems*, (53:1), pp. 33-41.

Ayeh, J. K., Au, N., & Law, R. 2013. "Predicting the intention to use consumer-generated media for travel planning". *Tourism Management*, (35), pp. 132-143

Babin, B. J., Darden, W. R., & Griffin, M. (1994). "Work and/or fun: measuring hedonic and utilitarian shopping value". *Journal of consumer research*, (20:4), pp. 644-656.



- Batra, R., & Ahtola, O. T. 1991. "Measuring the hedonic and utilitarian sources of consumer attitudes". *Marketing letters*, (2:2), pp. 159-170
- Beldona, S., Kline, S. F., & Morrison, A. M. 2005. "Utilitarian value in the Internet: differences between broadband and narrowband users". *Journal of Travel & Tourism Marketing*, (17:2-3), pp. 63-77.
- Crombie, I. K., & Davies, H. T. 2009. What is meta-analysis? *What is*, pp. 1-8.
- Davis, F. D. 1989. "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS quarterly*, pp. 319-340.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. 1992. "Extrinsic and intrinsic motivation to use computers in the workplace". *Journal of applied social psychology*, (22:14), pp. 1111-1132
- Deci, E. L. 1975. *Intrinsic Motivation: (by) Edward L. Deci*. Plenum Press.
- Deci, E. L., & Ryan, R. M. 1987. "The support of autonomy and the control of behaviour". *Journal of personality and social psychology*, (53:6), pp. 1024
- Gerow, J. E., Ayyagari, R., Thatcher, J. B., & Roth, P. L. 2013. "Can we have fun@ work? The role of intrinsic motivation for utilitarian systems". *European Journal of Information Systems*, (22:3), pp. 360-380.
- Glass, G. V. 1976. "Primary, secondary, and meta-analysis of research". *Educational researcher*, (5:10), pp. 3-8
- Gu, J. C., Fan, L., Suh, Y. H., & Lee, S. C. 2010. "Comparing utilitarian and hedonic usefulness to user intention in multipurpose information systems". *Cyberpsychology, behavior, and social networking*, (13:3), pp.287-297.
- Hamari, J., & Koivisto, J. 2015. "Why do people use gamification services?". *International Journal of Information Management*, (35:4), pp. 419-431.
- Hedges, L., & Olkin, I. 1985. *Statistical Methods for Meta-Analysis*. Academic Press, Orlando, FL
- Hirschman, E. C., & Holbrook, M. B. 1982. "Hedonic consumption: emerging concepts, methods and propositions". *The Journal of Marketing*, pp.92-101.
- Hong, S. J., & Tam, K. Y. 2006. "Understanding the adoption of multipurpose information appliances: The case of mobile data services". *Information systems research*, (17:2), pp.162-179.
- Hsiao, C. H., Chang, J. J., & Tang, K. Y. 2016. "Exploring the influential factors in continuance usage of mobile social Apps: Satisfaction, habit, and customer value perspectives". *Telematics and Informatics*, (33:2), pp.342-355.
- Hunter, J. E., and Schmidt, F. L. 2004. *Methods of Meta-Analysis Correcting Error and Bias in Research Findings*. London, New Delhi, SAGE Publications.
- Hwang, Y. 2005. "Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model". *European journal of information systems*, (14;2), pp.150-161.
- Igbaria, M., Iivari, J., & Maragahh, H. 1995. "Why do individuals use computer technology? A Finnish case study". *Information & management*, (29:5), pp.227-238.
- Jin, B., Park, J. Y., & Kim, H. S. 2010. "What makes online community members commit? A social exchange perspective". *Behaviour & Information Technology*, (29:6), pp.587-599.
- Kempf, D. S. 1999. "Attitude formation from product trial: Distinct roles of cognition and affect for hedonic and functional products". *Psychology & Marketing*, (16:1), pp.35-50.
- Kim, J., & Forsythe, S. 2010. "Factors affecting adoption of product virtualization technology for online consumer electronics shopping". *International Journal of Retail & Distribution Management*, (38:3), pp.190-204.
- Lee, M. C. (2009). "Understanding the behavioural intention to play online games: an extension of the theory of planned behaviour". *Online Information Review*, (33'5), pp.849-872.
- Lee, M. K., Cheung, C. M., & Chen, Z. 2005. "Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation". *Information & management*, (42:8), pp.1095-1104.
- Lee, Y., Lee, J., & Hwang, Y. 2015. "Relating motivation to information and communication technology acceptance: Self-determination theory perspective". *Computers in Human Behavior*, (51), pp.418-428.
- Leftheriotis, I., & Giannakos, M. N. 2014. "Using social media for work: Losing your time or improving your work?". *Computers in Human Behavior*, (31), pp.134-142.
- Lin, S. W., & Liu, Y. C. 2012. "The effects of motivations, trust, and privacy concern in social networking". *Service Business*, (6:4), pp.411-424.
- Lowry, P. B., Gaskin, J., Twyman, N., Hammer, B., & Roberts, T. 2012. "Taking 'fun and games' seriously: Proposing the hedonic-motivation system adoption model (HMSAM)". *Journal of the Association for Information Systems*, (14:11), pp.617-671.

- Mansumittrchai, S., Park, C. H., & Chiu, C. L. 2012. "Factors underlying the adoption of social network: A study of Facebook users in South Korea". *International Journal of Business and management*, (7:24), pp.138.
- Martins, L., & Kellermanns, F. 2004. "A model of business school students' acceptance of web-based course management system". *Academy of Management Learning and Education*, (3:1), pp.7-26.
- Mohammadi, H., 2015. "Investigating users' perspectives on e-learning: An integration of TAM and IS success model". *Computers in Human Behavior*, (45), pp.359-374.
- Mun, Y. Y., & Hwang, Y. 2003. "Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model". *International journal of human-computer studies*, (59:4), pp.431-449.
- Reychav, I., Ndicu, M., & Wu, D. 2016. "Leveraging social networks in the adoption of mobile technologies for collaboration". *Computers in Human Behavior*, (58), pp.443-453.
- Roca, J. C., & Gagné, M. 2008. "Understanding e-learning continuance intention in the workplace: A self-determination theory perspective". *Computers in Human Behavior*, (24:4), pp.1585-1604.
- Rosenthal, R. 1979. "The file drawer problem and tolerance for null results". *Psychological bulletin*, (86:3), 638.
- Rouibah, K., Lowry, P. B., & Hwang, Y. 2016. "The effects of perceived enjoyment and perceived risks on trust formation and intentions to use online payment systems: New perspectives from an Arab country". *Electronic Commerce Research and Applications*, (19), pp.33-43.
- Ryan, R. M., & Deci, E. L. 2000. "Intrinsic and extrinsic motivations: Classic definitions and new directions". *Contemporary educational psychology*, (25:1), pp.54-67.
- Ryan, Richard M., and Edward L. Deci. "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being." *American psychologist* 55, no. 1 (2000): 68.
- Schepers, J., & Wetzels, M. 2007. "A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects". *Information & Management*, (44:1), pp.90-103
- Schmidt, F. L., & Hunter, J. E. 2014. *Methods of meta-analysis: Correcting error and bias in research findings*. Sage publications.
- Sherry, J. F., McGrath, M. A., & Levy, S. J. 1993. "The dark side of the gift". *Journal of Business Research*, (28:3), pp.225-244.
- Shin, D. H., & Shin, Y. J. 2011. "Why do people play social network games?". *Computers in Human Behavior*, (27:2), pp.852-861.
- Teo, T. S., Lim, V. K., & Lai, R. Y. 1999. "Intrinsic and extrinsic motivation in Internet usage". *Omega*, (27:1), pp.25-37.
- Tong, Y., Teo, H. H., & Tan, C. H. 2008. "Direct and indirect use of information systems in organizations: An empirical investigation of system usage in a public hospital". *ICIS 2008 Proceedings*, 138.
- Van der Heijden, H. 2004. "User acceptance of hedonic information systems". *MIS quarterly*, pp.695-704.
- Venkatesh, V. 1999. "Creation of favorable user perceptions: Exploring the role of intrinsic motivation". *MIS quarterly*, pp.239-260.
- Venkatesh, V. 2000. "Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model". *Information systems research*, (11:4), pp.342-365.
- Venkatesh, V., & Brown, S. A. 2001. "A longitudinal investigation of personal computers in homes: adoption determinants and emerging challenges". *MIS quarterly*, pp.71-102.
- Verhagen, T., Feldberg, F., van den Hooff, B., Meents, S., & Merikivi, J. 2012. "Understanding users' motivations to engage in virtual worlds: A multipurpose model and empirical testing". *Computers in Human Behavior*, (28:2), pp.484-495.
- Wu, J., & Lu, X. 2013. "Effects of extrinsic and intrinsic motivators on using utilitarian, hedonic, and dual-purposed information systems: A meta-analysis". *Journal of the Association for Information Systems*, (14:3), pp.153
- Xu, L., Lin, J., & Chan, H. C. 2012. "The moderating effects of utilitarian and hedonic values on information technology continuance". *ACM Transactions on Computer-Human Interaction (TOCHI)*, (19:2), pp.12.

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