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A study of mobile user engagement (MoEN): Engagement motivations, perceived value, satisfaction, and continued engagement intention

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ABSTRACT

The growth of mobile technology mediated environments is accelerated by its accessibility and easy use tools, such as smartphones and tablets. User friendly and intuitive features drive user value and satisfaction. These features motivate and drive further mobile user engagement. Smartphones, for example, allow users to control when, where, and how they engage in chosen activities that serve their needs, saving time, completing a task (utilitarian), entertain them (hedonic), or connect with others (social). Few studies have examined why and how mobile users are continually engaging mobile activities. Focusing on mobile engagement which has not previously been explored, this study investigates, proposes, and tests a mobile user engagement (MoEN) model to explain mobile user engagement intention through user's motivations, perceived value and satisfaction. Findings indicate that mobile users' engagement motivations do influence perceived value, satisfaction and mobile engagement intention.

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1. Introduction

Mobile technologies such as smartphones change our communication, information seeking behavior, lifestyle, etc. The access to and growth of mobile technologies creates new opportunities for business marketers and managers. Smartphone location-based mobile apps offer a personalized and customized marketing strategy for businesses. Mobile technologies give customers a variety of experiences that often compel them to continuously engage in activities that create value and satisfaction for them.

Continuous engagement in mobile technology as part of life sees technology acceptance as a starting point of technology engagement. Technology acceptance and technology engagement conceptually overlap, but they are different in terms of definition, conceptual foundation, and application. Acceptance generally refers to the stage in which something (e.g., a smartphone) is selected for use by an individual or an organization while engagement refers to the state of being involved, occupied, retained, and intrinsically interested in something [55]. In this study mobile technology acceptance and adoption decision is already made with user's current technology engagement. This behavior reflects users' post adoption behavior thus engagement consists of the users' ongoing activities, attitudes, and intrinsic interest [34,50]. Previous studies [9,50] indicate that engagement is related to user experience characterized by attributes of challenge, positive affect, attention, feedback, novelty, interactivity, perceived user control, and others. Thus, engagement is beyond the concept of acceptance that is a subset of engagement.

Engagement is a state characterized by energy, involvement, and efficacy [48] and is conceptually described as a behavioral flow without any intentional mindset: e.g., control, attention, focus, curiosity, and/or intrinsic interest [9]. Engagement is not a momentary and specific state, but it is a more persistent and pervasive cognitive–affective state [66]. In organizational and individual level contexts, there is a strong connection between engagement and profitability through customer satisfaction, increased sales, employee retention, and productivity [23]. For the case of mobile technology, successful technologies are not simply usable; they should engage users [50]. When firms increase users' engagement and build an environment that helps to foster engagement, they can significantly increase the chances of success in their business [23]. Engagement in mobile technology and its ubiquitous service drives value and satisfaction which can lead to future loyal users [54,64].

Despite the importance of mobile engagement, there is little research to date that examines mobile users' engagement. This study seeks to fill this gap and has the following three goals: i) to propose a theoretical model – i.e., namely mobile user engagement (MoEN) model – to explain mobile users' continued engagement intention through users' motivations, perceived value and satisfaction, ii) to

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empirically validate the proposed MoEN model using data collected from actual smartphone users,[1] and iii) to provide practical insights for better understanding mobile users' engagement behavior.

The following section presents the conceptual and theoretical background of the study. In Section 3, the research model and hypotheses are presented with supporting arguments. A description of the research methodology used, data analysis, and results follow. The final section discusses the practical and theoretical contributions along with the limitations and future directions of the study.

2. Theoretical background

As theoretical background of the study, the three dimensional stage of human attitude (i.e., cognition, affection and conation) and engagement motivations depict the fundamental structure and framework for mobile users' engagement behavior, which is very critical in understanding mobile users' behavior.

2.1. Three dimensional stage of human attitude: cognition, affection, and conation

Behavior motivation studies [3,20,36,75–77] support the relationship that attitudes and their formation can be used to explain the various behaviors around us and furthermore, predict future intention and behavior. According to Fishbein and Ajzen [20], an attitude can be defined as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object. Attitudes should be consistent over time as a learned process and actual behavior will be consistent with attitudes. Attitudes are generated by past experiences and affected by current behavior, such as feelings, which positively or negatively can exist in physical as well as mobile contexts [44]. Attitudes are broadly described and analyzed as cognitive, affective, and conative.

According to Wilkie [79], human behavior is a combination of three components: mental, emotional, and physical dimensions. The mental and emotional components based on Rosenberg and Hovland's research [65] are classified into *cognition*, *affection*, and *conation*. These components have been used to propose theoretical models such as the Theory of Reasoned Action (TRA) [20], the Theory of Planned Behavior (TPB) [2], the Technology Acceptance Model (TAM) [11], and the Unified Theory of Acceptance and Use of Technology (UTAUT) [76] which are significant contributions to behavioral research literature. Some of these studies were designed to examine users' technology acceptance level on different subjects (e.g., computer and internet), how they planned to use technology based on past behavior to predict future intention. This research incorporates users' motivational factors within the cognitive, affective, and conative contexts, their value and satisfaction using their smartphone to drive continued engagement.

The cognitive behavior context is related to the individual's perception about the object including people, products, brands, etc. [27]. Mobile users' motivations to engage in the cognitive behavioral stage are conscious decisions concerning their behavioral purpose serving user driven needs (functional service delivery anywhere, anyplace — the easy to use and usefulness of smartphones), social needs connecting with others, or enjoyment in using. Affective behavior represents the personal feelings one has toward an object (smartphones). According to Wilkie [79], "affect" can have or exhibit positive or negative feelings about the object. These positive and negative feelings are primarily evaluative as favorable or unfavorable, are a current assessment, considered an essential aspect of their attitude [79]. Kim et al. [37] conclude that users' smartphones deliver motivation benefits based on serving instrumental and hedonic need states. Their research emphasizes hedonic consumption and usefulness benefits to users and given these two, hedonic consumption has greater importance for continued use. The third component, conative behavior, covers a tendency to act. It is the likelihood that an individual will exhibit an "action" or behavior [79]. Conative behavior is an expression of the consumer's intention. User intentions represent their likelihood of acting in a certain manner. These behaviors reflect attitudes, and attitudes are an important explanation as to how consumers think, feel, and behave.

2.2. Mobile engagement motivations

Studying users' motivation to engage in activities using mobile technology can provide insights to further explain their continuing engagement behavior. Firms need to understand how users utilize mobile technologies such as smartphones for work, leisure, entertainment, etc. and what drives further involvement/engagement with their smartphones. Features, functions, and applications build enduring and engaging relationships that can incorporate friends, workers and others in social networks. Engagement with smartphones gets users involved. This engaged involvement creates value for users who spend more time engaged. Their continuing use drives users' motivation behavior making them loyal to their devices, driving their value and satisfaction which further fuels engaged involvement motivation behavior. Motivation can be classified as functional (efficiency, ease of use, saving time), hedonic (fun, enjoyment, pleasure), and social (desire to connect and share with others). Smartphones support user motivation to drive further engagement/involvement thus building long term relationships. Doing so should lessen the likelihood of leaving, stop using, or no longer engaging. Recognizing and understanding smartphone user motivations that deliver value and satisfaction should see continued use and greater mobile engagement [78].

Smartphone engagement can encourage a variety of user experiences which can be functionally, hedonically, or socially driven depending on user context. Mobile users' constant engagement using smartphones, for example, can be primarily driven by those motivations (i.e., functional, hedonic, and social). These motivations can drive continuous engagement and use, representing users' emotional attachment that can be cognitively and affectively driven behavior [37]. Mobile users' engagement motivation is a conscious decision choice. Cognitive engagement motivation includes utilitarian motives which may impact the affective stage as well. Engaging experiences that are fun and enjoyable are emotional and affective experiences driving hedonic value which supports low user technology effort to deliver high value [12,14]. It is this continued usage that delivers value more so than initial adoption tendencies to create effective engagement [37]. Continued engagement can be viewed as post-adoptive driven lifestyle decision choices [4]. Knowing that smartphones are always on/readily available increases user engagement tendencies, saves time, and creates enjoyable and pleasurable experiences delivering value, satisfaction, and driving a further need to engage [37]. In this study, we employ these components to evaluate mobile users' engagement cognitive and affective motivation and value state influence on their satisfaction and conative influence on their continued smartphone engagement intention. Fig. 1 below demonstrates the relationships.

3. Research model and hypothesis

The conceptual framework utilizes motivation to engage in cognition, affection as delivering hedonic values and current satisfying experiences, and conation as their intention to continue engaging with

[1] Even though the main focus of the study is mobile users' engagement, this study utilizes the data collected from only smartphone users because their mobile computing environment (e.g., Internet connectivity, portability, etc.) is fairly different from that of other mobile devices such as tablets, notebooks, etc. In this study, we use mobile engagement and smartphone engagement, interchangeably.

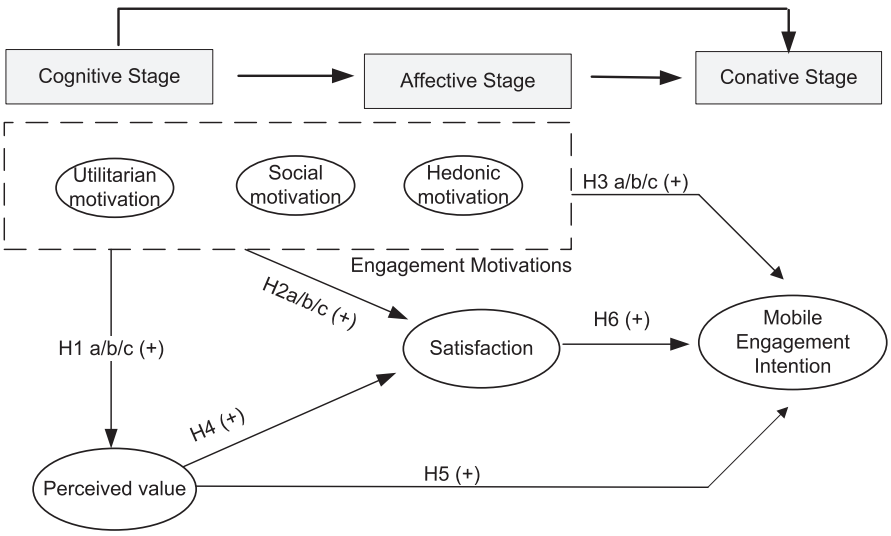

Fig. 1. Research model and hypotheses.

their smartphone. This study identifies and examines user engagement motivations: utilitarian and perceived value within the cognitive stage, hedonic motivation and satisfaction in the affective stage, social motivation between cognitive and affective stages, and mobile users' engagement intention as their conative attitude. Fig. 1 shows the proposed research model namely the mobile user engagement (MoEN) model and hypotheses.

3.1. Mobile engagement and usage

Worldwide mobile subscribers increased from 2.2 billion in 2005 to 5.4 billion in 2010 with 4.7 billion mobile subscriptions in 2009 [30,67]. Portio Research [61] and Ericsson [19] predict mobile subscriptions worldwide will reach between 8 and 9 billion subscribers with broadband mobile connecters reaching a market share of 5 billion by 2017. Potentially, it could reach up to 87% of the world population [1]. The merging in size between smartphones and tablets often termed *phablets* in the mobile marketplace are used to engage and involve consumers. Today users expect technology availability 24/7 on their terms. Smartphones are 60% of the current purchases in the US market and will reach an estimated $31 billion in market value by 2016 [40]. Users are connected and engaged in activities that further drive their engagement behavior. Jacques et al. [31] argue that users' engagement experience can be explained as feelings that their interests have been captured and attracted by the system for their internal rewards.

Technology acceptance researchers from Davis et al. [13] and Ajzen's [2] planned behavior were centered theoretically on the intention to continue. As the technology lifecycle matured, technology mobility access has morphed beyond user's intention to predict their behavior. Kim et al.[37] and Lehrer et al. [44] believe that mobile technology success depends on continuing to be involved and using on a daily basis versus users' initial adoption choices.

Today mobile users accept and expect technology delivery when, where, and how they choose to engage and use their mobile devices [78]. Users' attitudes and behavior with mobile technology allow them to choose where, when, and how they choose to engage and control their user driven activities. The technology is embedded in their user driven engagement behaviors. The attributes, value, and satisfaction derived for user driven engagement further extend the technology acceptance model research into the post technology era to encompass the ubiquity that mobile technology offers. According to Wachter et al. [78], "Mobile's engaging features and functions were identified and supported as their primary motivation to use their mobile devices as features and function are perceived to give them value and satisfaction now and with future mobile engagement" (p. 11).

Post technology acceptance can and will be based on user driven engagement behaviors. This study, as recognized by Kim et al. [37] and Lehrer et al. [44], acknowledges the acceptance and pervasive usage of technology and mobility that smartphones offer. Engagement behavior is driven by smartphone's variety of activities and user choices as to access, convenience, and opportunities offered [78]. Engagement behaviors, including reasons users choose to engage, extend the post technology acceptance model. Users are engaging in mobile technology (e.g., smartphone) and engagement tendencies further extend technology adoption research into the mass post-tech era: continued use over initial adoption [37].

Attributes and experiences offered to users with mobile devices deliver benefits that are valuable and satisfying to them [36]. User driven experiences in mobile contexts drive further engagement based on users' different motivations (e.g., hedonic, social, and utilitarian) that mobile technology (i.e., smartphones) offer. A study by Sheng and Teo [67] conceptualizes value based on user experiences in mobile contexts. Today users have control over when, where, and how they choose to use mobile technology. This research proposes that post-technology acceptance is motivated by user choices of when, where, and how users choose to engage in mobile mediated environments [78]. Mobile technology user's continued engagement is important as it offers immediacy, relevance to user, and efficiency productivity in daily activities. Mobile engagement behavior can reflect the next evolution of our ubiquitous life.

3.2. Engagement motivation and value

Engagement is defined as the state of being involved, occupied, retained, and intrinsically interested in something [55]. Kearsley and Shneiderman [35] view engagement as a series of emotional and behavioral activities, including cognitive processes, reasoning, decision-making, problem-solving, and evaluation. In the context of smartphones, we define engagement motivation as user's motivation to engage in activities using their smartphones. Mobile engagement occurs when users interact with their devices to satisfy a need state

[41,51]. These need states can be cognitively driven motivations. The ability to deliver satisfying experiences influences the value of engaging in these activities. These engagements are motivated and categorized based on different user purposes and activities. Engagement behaviors that serve useful (utilitarian), and enjoyable (hedonic) purposed and as a connection with others (social) drive further engagement (time spent) [3,75–77].

Users' engagement motivation can be based on lifestyle decisions, organizing schedules, appointments, etc., prioritizing activities and tasks, functionality and useful purpose (utilitarian) motivations. Venkatesh and Brown [76] suggest that utilitarian values are strongly related to the effective and efficient use of an information system. Utilitarian value is a strong determinant impacting behavioral motivation to use an information system [29,38]. Utilitarian motivation reflects users' belief that mobile engagement serves a purpose that satisfies user needs [3,36,76]. These motivations encourage continued use of smartphones [36]. Thus, perceived value, as an antecedent of behavior, can be predicted by utilitarian motivation.

Activities that offer variety, enjoyment and relaxation engage users in pleasurable pursuits that are hedonically motivated [76]. Hedonic motivation stems from activities that are fun, exciting, and enjoyable, satisfying intrinsic needs. The term hedonic, of Greek origin, means relating to or characterized by pleasure [25,49]. Pleasure and enjoyment drive hedonic value as mobile users consider these activities personal (intrinsic) to them [28]. Holbrook and Batra [28] state that consumers' user experience can satisfy intrinsic needs when the experience provides pleasure, fun, and excitement. Lee and Jun [43] show that an interesting activity intrinsically motivates people to be more engaged with mobile technology. User activity engagement motivations that are pleasurable and enjoyable to them are hedonically driven [36,68]. It is empirically shown that hedonic motivation is a key value driving system use [72,76]. Thus, higher hedonic engagement motivation should lead to higher user perceived value.

Social engagement motivation is technologically determined through events and moments that users construct, create, and share with others that can serve needs virtually but not physically. Mobile technology engagement motivation that is socially based involves structures that satisfy and serve user needs [17]. Engagement motivations influence the value of user experiences, contexts, and meanings attributed to their engagement motivation satisfaction [15,73,74]. Social networks allow users' co-creation activities to produce and share with other mobile users [17,26]. Social engagement motivations are context driven, value added activities [26]. These social tendencies influence users' attitudes and perceptions of other users [16]. Users' social engagement motivation affects the way users perceive and structure their network activities within the mobile environment [22]. Thus, we propose the first proposition which has three sub hypotheses:

Proposition 1. Motivations to engage using a smartphone positively influence users' perceived engagement value.

H1a. Utilitarian motivation positively influences users' perceived value.

H1b. Hedonic motivation positively influences users' perceived value.

H1c. Social motivation positively influences users' perceived value.

3.3. Engagement motivation and satisfaction

Satisfaction with mobile engagement provides value to users which in turn can lead to continued user engagement with mobile devices (i.e., smartphones), thereby reducing the likelihood of their disengagement or turnover intention [24,32]. Pura [62] suggests that mobile technology can deliver satisfaction when user contexts are fun and exciting/enjoyable to them. Satisfaction and intention to keep engaging may depend on users' perceived value and intention to continue chosen activities in the future. Mobile users' continued engagement behavior occurs when the activities are relevant to intended motivation(s) for engaging (e.g., connection, content, interactivity, and context) [8,58]. Overall satisfaction is important for successful smartphone user engagement as it influences user consumption activity choices. The features and services offered impact users' continued intention to engage with mobile technology.

Activities that require little effort can increase the likelihood that one will engage [12]. The ubiquity and seamless nature for mobile users and their motivation engagement tendency influence value driven satisfactions. Users' perceived value is their perception and attitude toward their mobile devices' ability to conveniently and easily deliver their desired end state (activity and goal) when engaged [69]. Users' value derived from mobile engagement should enhance their relationship satisfaction during and after the activity which increases their value engagement attitude. Engagement motivation is driven by the potential to offer value added satisfactory activity experiences to users. When user experience activities achieve their desired end state (utilitarian, hedonic, social), users should be satisfied [15,17,36,62]. Thus, we propose the second proposition which has three sub hypotheses:

Proposition 2. Motivations to engage with smartphones positively influences users' engaged satisfaction.

H2a. Utilitarian motivation positively influences mobile users' satisfaction.

H2b. Hedonic motivation positively influences mobile users' satisfaction.

H2c. Social motivation positively influences mobile users' satisfaction.

3.4. Engagement motivation and engagement intention

Mobile technology's ubiquity encourages and often drives users' motivation engagement to communicate with others in social or hedonic contexts and environments. Creating and building new engagement relationships with mobile users shift the power in the relationship to the engaged mobile user. Mobile integrates information across formerly distinct separate channels (e.g., Web, internet, and business) to offer individualized, involved, and engaged experiences driving further engagement behaviors. User's motivation engagement behaviors (activities & situations) and engagement level (user and mobile device) can build continuing engagement to create and deliver high value, personal, and engaged smartphone user experiences [41]. These behaviors exemplify long term use beyond initial adoption and as such become continued usage rather than an intention state [37].

Mobile engagement orientation is efficacy driven behavior. Mobile users' engagement is defined as user interaction with their devices to deliver experiences that give them value and satisfaction [41,51]. Mobile users' engagement motivation influences their cognitive and affective user experience behaviors in real time [75]. User efficacy and chosen activity determine the level of involvement and user willingness to engage with mobile devices [75,83]. Users who enjoy using their mobile technologies will maintain their engagement behaviors for longer time periods. These engagement experiences can build overall value, satisfaction, and long term loyalty with continued engagement. Users have their own motivation for using and engaging with their mobile technologies. Their motivation engagement with mobile technologies can shape their attitudes' influence on overall value, continued engagement, and intention to continue their mobile activity engagement.

Mobile technologies allowing engagement for whatever reason or purpose can increase the likelihood of users' willingness to continue to engage in the future [9,54,64,71]. Mobile users' continued engagement intention is influenced by how users characterize their engagement behavior. When these experience contexts are relevant to them, this should create value-added benefit and their continuing engagement [8,15,36,58]. The value-added benefits to lifestyle activity, whether motivations are social, utilitarian, or hedonically driven,

serve user needs. Need motivation states that deliver valuable and satisfying engagement relationships should create continued engagement with users [37,44,46,64]. This should encourage continued engagement with others (social) to meet current needs (utilitarian), and be enjoyable (hedonic) [42]. Thus, we propose the third proposition and three sub hypotheses:

Proposition 3. Motivations to engage using smartphone positively influence users' mobile engagement intention.

H3a. Utilitarian motivation positively influences mobile users' engagement intention.

H3b. Hedonic motivation positively influences mobile users' engagement intention.

H3c. Social motivation positively influences mobile users' engagement intention.

3.5. Perceived value, satisfaction, and engagement intention

Parasuraman [56] acknowledges perceived value as one of the most important measures for gaining a competitive advantage. In addition, a few studies demonstrate that consumers' perception of value is related to their overall satisfaction [63,81]. These studies indicate that there is a strong and positive relationship between two values: perceived value and satisfaction. Customers' perceived value that lacks their overall satisfaction may not provide an adequate explanation of their future/continued engagement behavior [81]. Eggert and Ulaga [18] confirmed that both cognitive and affective variables need to be measured simultaneously together. It is also argued that perceived value and satisfaction cannot be substitutes but should complement each other [18]. Thus, we propose that:

H4. Smartphone users' perceived value positively influences their satisfaction.

Personal values reflect an individual's behavioral standard, including the level of his/her engagement. According to Kahn [32], there are three antecedents of engagement: value congruence, perceived support, and core self-evaluation. In addition, he states that engagement is maintained while they are involved, and they can be physically, cognitively, and/or emotionally engaged in a chosen activity/task [33]. When users are involved, it drives further engagement and has greater personal value to them [36]. This demonstrates that an individual's satisfaction influences their engagement behavior leading to less likelihood of leaving their chosen activity [36]. Thus, we propose

H5. Smartphone users' perceived value positively influences their engagement intention, and

H6. Smartphone users' satisfaction positively influences their engagement intention.

4. Research methodology

A survey was designed to test the proposed research model. The survey instrument was constructed to measure participants' motivation to engage, their perceived value, satisfaction, and intention to keep engaging their smartphones. A pretest was performed with ninety-one undergraduate students at a southeastern university in the U.S. Cronbach's alpha results from the pretest sample ranged from 0.84 to 0.91. The final survey questionnaire consisted of twenty items to measure smartphone users' behavior, twelve items for engagement motivations, three items for perceived value on continued engagement, three items for engagement satisfaction and two for users' intention to keep engaging including demographic questions for the final sample data (see Appendix A for measurement items).

4.1. Data collection

The data were collected from undergraduate students at a southeastern university in the U.S. A brief explanation concerning research using mobile technology and how one chooses to use these devices in daily life was given by the researcher before distribution of the survey. Participation was anonymous and voluntary with neither a penalty nor checking for non-participating respondents. A two-day collection process obtained 604 surveys from a variety of courses and class times. Incomplete and invalid responses (e.g., not smartphone users) were discarded from the dataset, leaving 297 usable samples (49%). Of the valid samples, 150 (50.3%) are males and 147 (49.3%) are females, paralleling U.S. 2010 census data (49.2% male and 50.8% female) [6].

5. Data analysis and results

5.1. Measurement model testing

Since we measure latent constructs by multiple measurement items, the structural equation model (SEM) approach was used to analyze the data for both the measurement model and structural model. SEM is a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of the interrelationships between latent constructs (i.e., causal relationship) theory [5,7,10]. To ensure the appropriateness of the instrument, reliability, construct validity, and convergent validity of the measurement model were tested before the structural model testing. Table 1 shows the summarized results of the measurement model testing including descriptive statistics for the constructs.

Table 1
Descriptive statistics and reliability coefficients for constructs.

Constructs	No. of items	Mean[a]	S.D.[a]	Cronbach's alpha	Composite reliability[b]	AVE[c]	Concept & scales adapted from
Utilitarian motivation	6	3.679	.139	0.712	0.703	0.750	[39]
Hedonic motivation	3	3.672	.628	0.755	0.704	0.710	[39]
Social motivation	3	3.711	.336	0.726	0.725	0.730	[39]
Perceived value	3	3.966	.059	0.801	0.804	0.883	[57,82]
Satisfaction	3	3.899	.093	0.777	0.782	0.872	[53]
Mobile engagement intention	2	4.539	.079	0.696	0.668	0.821	[11]

[a] Mean and standard deviation (S.D.) are calculated using the average of construct items.

[b] Composite Reliability $= \frac{(\sum \lambda i)^2 \, \mathrm{var} F}{(\sum \lambda i)^2 \, \mathrm{var} F + \sum \Theta ii}$, where λi is the component loading to an indicator. $\mathrm{var}(\varepsilon i) = 1 - \lambda i$. The composite reliability as a measure of internal consistency should be higher than 0.7 [21].

[c] AVE $= \frac{\sum \lambda i^2 \, \mathrm{var} F}{\sum \lambda i^2 \, \mathrm{var} F + \sum \Theta ii}$, where λi is the component loading to an indicator and $\mathrm{var}(\varepsilon i) = 1 - \lambda i$. The average variance extracted should be higher than 0.5 [21].

Table 2
Correlations among research constructs.

Items	1	2	3	4	5	6
1. Utilitarian motivation	**0.613**					
2. Hedonic motivation	0.569	**0.675**				
3. Social motivation	0.601	0.566	**0.644**			
4. Perceived value	0.328	0.471	0.332	**0.846**		
5. Satisfaction	0.285	0.365	0.292	0.682	**0.834**	
6. Mobile engagement intention	0.284	0.320	0.292	0.457	0.471	**0.834**

Note: Bold diagonal elements are the square root of AVE (Average Variance Extracted), which should exceed the off-diagonal inter-construct correlations for adequate discriminant validity.

The reliabilities of models were tested using Cronbach's Alpha and Fornell's composite reliability [21]. Cronbach's reliability coefficients and composite reliability should be greater than the benchmark of 0.7 to be considered adequate [21]. All reliabilities of constructs have a value higher than the minimum cutoff score of 0.7 except continued engagement. All constructs have an average variance estimate (AVE) of at least 0.5 [21]. The AVE can also be used for evaluating discriminant validity. The AVE for the construct should be higher than the variance shared between the construct and other constructs in the model [21]. As shown in Table 2, in all cases the correlations between each pair of constructs were lower than the square root of the AVE for the relevant constructs. Although the correlation between satisfaction and perceived value is relatively high (i.e., .68), the results of construct validity and discriminant validity show that the constructs appear to have acceptable convergent validity. We also checked the possibility of multicollinearity among all indicators of research constructs in the model using variance inflation factors (VIFs). VIFs less than 10 are typically viewed as justification for a lack of multicollinearity [52]. The results also show that all VIFs are around 5.0, which are below the 10 cutoff. The results indicate that multicollinearity is not a problem.

To ensure the acceptable level of convergent validity of the research instruments, an exploratory factor analysis (EFA) using the dataset was conducted and summarized in Table 3. The acceptable level is when all item loadings are greater than 0.50 and the measurement items for each construct load onto only one factor [80]. The result of EFA demonstrates the six distinct factors shown with all items loading above .538 on all factors.

5.2. Common method bias testing

Once the measurement model is validated in terms of reliability, construct validity, and convergent validity, we check the severity of common method bias because all self-reported data have a potential for common method biases [47,59,60]. We used two approaches. The first simple approach is to examine a correlation matrix of the constructs in Table 2. If any of the correlations are higher than .90, it is strong evidence that common method bias exists. Correlations among research constructs summarized in Table 2 show that the highest correlation is .682, indicating that common method bias is not likely to be a big concern for this study. As a second approach, we conduct a Harmon one-factor test on the six conceptually separated variables by following Podsakoff and Organ [59]. Especially, we follow the detailed procedure suggested by Liang et al. [45] to check the ratio of two models with and without a latent common method variance factor (LCMVF)[2] using Smart PLS. The result is summarized in Table 4. The average substantively explained variance of the indicators (i.e., without LCMVF) is 51.51%, while the average method-based variance (i.e., with LCMVF) is 1.19%. The ratio of substantive variance to method variance is about 43:1. Based on the results, it would be reasonable to conclude that common method bias is not a likely contaminant of the results of the study.

[2] Please see Liang et al. [45] for a detailed procedure of this approach.

Table 3
Exploratory factor analyses.

Constructs	Items	Components					
		1	2	3	4	5	6
1. Utilitarian motivation	UM1	**0.604**	0.204	0.066	0.059	0.055	0.060
	UM2	**0.623**	0.358	0.180	0.128	0.155	0.117
	UM3	**0.617**	0.352	0.258	0.158	0.113	0.135
	UM4	**0.655**	0.356	0.237	0.211	0.155	0.076
	UM5	**0.659**	0.240	0.291	0.175	0.205	0.210
	UM6	**0.655**	0.284	0.189	0.127	0.146	0.044
2. Hedonic motivation	HM1	0.171	0.313	**0.820**	0.243	0.227	0.184
	HM2	0.216	0.270	**0.635**	0.157	0.095	0.097
	HM3	0.426	0.248	**0.646**	0.140	0.100	0.158
3. Social motivation	SM1	0.331	**0.747**	0.381	0.225	0.208	0.196
	SM2	0.253	**0.538**	0.308	0.158	0.100	0.116
	SM3	0.422	**0.649**	0.240	0.172	0.103	0.169
4. Perceived value	PV1	0.151	0.391	0.226	**0.841**	0.480	0.335
	PV2	0.256	0.355	0.212	**0.876**	0.626	0.396
	PV3	0.206	0.294	0.244	**0.726**	0.519	0.302
5. Satisfaction	OS1	0.142	0.263	0.172	0.600	**0.853**	0.489
	OS2	0.180	0.248	0.203	0.470	**0.776**	0.242
	OS3	0.297	0.361	0.197	0.577	**0.860**	0.340
6. Mobile engagement intention	CI1	0.140	0.245	0.153	0.305	0.374	**0.809**
	CI2	0.184	0.214	0.213	0.394	0.363	**0.843**

5.3. Structure model testing

To test the proposed hypotheses, we employ structural model testing using SmartPLS 2.0 M3, a component-based Partial Least Square (PLS) regression technique. SmartPLS supports complex nomological network models with less stringent data requirements (e.g., no distribution assumptions) and minimal demand of sample size, recommended at ten times the number of maximum arrowheads pointing onto a latent variable [70]. Fig. 2 illustrates the results of structural

Table 4
Common method bias analysis.

Construct	Indicator	Substantive factor loading (without LCMVF) (R1)	$R1^2$	Method factor loading (with LCMVF) (R2)	$R2^2$
1. Utilitarian motivation	UM1	0.5418	0.2935	−0.0321	0.0010
	UM2	0.5823	0.3391	−0.0282	0.0008
	UM3	0.6523	0.4255	−0.1935	0.0374
	UM4	0.5317	0.2827	0.0111	0.0001
	UM5	0.6165	0.3801	−0.0714	0.0051
	UM6	0.5669	0.3214	0.3150	0.0992
2. Hedonic motivation	HM1	0.7659	0.5866	0.1086	0.0118
	HM2	0.5078	0.2579	−0.1122	0.0126
	HM3	0.6550	0.4290	−0.0079	0.0001
3. Social motivation	SM1	0.7990	0.6384	−0.0661	0.0044
	SM2	0.8042	0.6467	−0.1093	0.0119
	SM3	0.5047	0.2547	0.1554	0.0241
4. Perceived value	PV1	0.8434	0.7113	−0.0976	0.0095
	PV2	0.8752	0.7660	0.0511	0.0026
	PV3	0.7260	0.5271	0.0459	0.0021
5. Satisfaction	OS1	0.8346	0.6966	0.0283	0.0008
	OS2	0.7891	0.6227	−0.1025	0.0105
	OS3	0.8694	0.7559	0.0623	0.0039
6. Mobile engagement intention	CI1	0.8274	0.6846	−0.0040	0.0000
	CI2	0.8265	0.6831	0.0040	0.0000
Average		0.7060	0.5151	−0.0022	0.0119

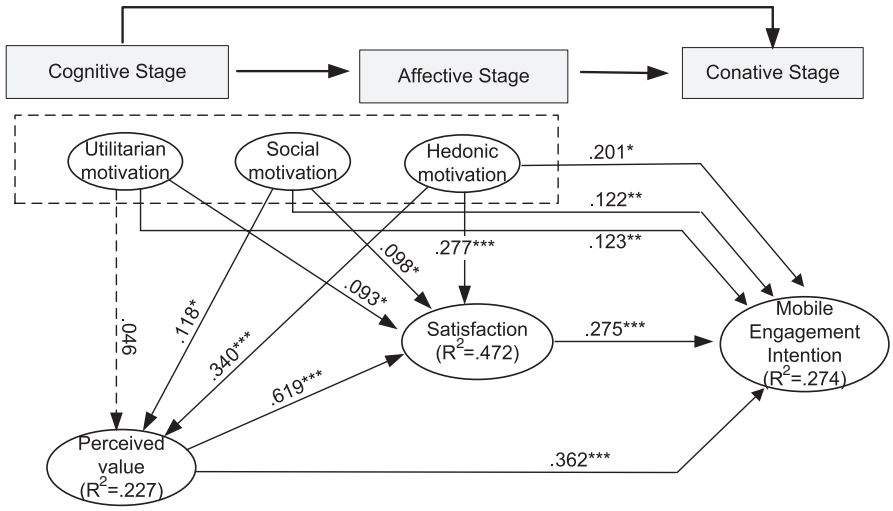

Fig. 2. PLS analysis result.

model testing including estimating path coefficients and R-squares, which can be interpreted as standardized beta weights and explained variances as in a regression analysis, respectively.

5.4. Results

As shown in Fig. 2, all three engagement motivations have a strong positive effect on overall satisfaction, and continued engagement. Two of the three motivations (social and hedonic) have strong positive effects on perceived value, while utilitarian motivation is not significant. Mobile users' perceived value has a strong positive effect on both overall satisfaction and continued engagement. Overall satisfaction shows a strong positive effect on users' continued engagement. These results support all proposed hypotheses except H1a and all proposed propositions except Proposition 1 which is partially supported (see Table 5).

Table 5
Results of hypothesis testing.

Proposition and hypothesis		Result
Proposition 1	Engagement motivations → Perceived value	Partially supported
H1a	Utilitarian motivation → Perceived value	NS
H1b	Hedonic Motivation → Perceived value	S***
H1c	Social motivation → Perceived value	S**
Proposition 2	Engagement motivations → Overall satisfaction	Fully supported
H2a	Utilitarian motivation → Overall satisfaction	S*
H2b	Hedonic motivation → Overall satisfaction	S***
H2c	Social motivation → Overall satisfaction	S*
Proposition 3	Motivations → Mobile engagement intention	Fully supported
H3a	Utilitarian motivation → Mobile engagement intention	S**
H3b	Hedonic motivation → Mobile engagement intention	S**
H3c	Social motivation → Mobile engagement intention	S**
H4	Perceived value → Overall satisfaction	S***
H5	Perceived value → Mobile engagement intention	S***
H6	Overall satisfaction → Mobile engagement intention	S***

Note: S = Significant, NS = Not Significant.
* Significant at the 0.1 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

6. Discussion and future directions

The most significant contribution of this study can be explained primarily in both theoretical and practical perspectives: i.e., managerial, marketing, and educational implications. In theoretical perspective, this study investigated, proposed, and tested a mobile user engagement (MoEN) model, which is beyond the concept of technology acceptance, to explain mobile user engagement with users' motivations, perceived value, satisfaction, and engagement intention. This study integrates and extends theoretical and conceptual behavioral constructs utilizing the cognitive–affective–conative stages framework beyond users' intention to use mobile technology to mobile user engagement motivations' impact on users' intention to keep engaging behavior. User's behavior engagement is beyond intention — they are engaged and thus motivations will drive future behavior. Rosenberg and Hovland's three stages framework [65] was applied to examine the proposed mobile user engagement (MoEN) model. We empirically validate the proposed model using actual smartphone users' data. As an addition to the technology modeling process research, this study includes users' motivations in continuing to engage with and use their smartphones. These motivations are further specified by three sub-elements: utilitarian, hedonic, and social motivations. In addition, this study proposed the concept of mobile engagement specifically using the smartphone context. Results provide empirical evidence for mobile (i.e., smartphone) user engagement, including their motivation (utilitarian, hedonic, and social), perceived value, satisfaction, and engagement intention. Results confirm the proposed model within the three stages of attitude: cognitive, affective, and conative. The MoEN model is supported by the empirical data collected from smartphone users: users' engagement motivation has a strong and positive relationship with their perceived value, satisfaction, and continued engagement intention; perceived value is strongly related to their satisfaction and continued engagement intention; satisfaction strongly influences users' continued engagement intention.

The findings provide several practical implications. Users' motivation to engage using their smartphones increases users' value and satisfaction. Most significantly, users' hedonic motivation, 'fun and excitement', influences their perceived value ($\beta = 0.340$) and satisfaction ($\beta = 0.277$). Smartphones that provide users with fun tools and applications will encourage future engagement. Users' social motivation also significantly influences their perceived value ($\beta = 0.118$) and satisfaction ($\beta = 0.098$). These specific findings explain that users' secondary motivation to engage with their smartphones (e.g., playing games and social networking) does have a positive impact on their perceived value and satisfaction,

which leads to their continued engagement intention. These results clearly support why "hedonic and social" motivations are highly related to their continued engagement intention. Although utilitarian motivation does not significantly influence perceived value in H1a ($p > 0.1$), it has a significant relationship with satisfaction ($\beta = 0.093$) and intention to keep engaging ($\beta = 0.123$). Utilitarian motivation (e.g., organizing activities and schedules efficiently and effectively), primary and functional in orientation, could be regarded as inherently part of the smartphones' capability (e.g., using their smartphone to check and respond to emails or organize schedules anywhere — ubiquitous life) rather than "necessity" in the motivation to engage smartphone users.

Other findings demonstrate that users' perceived value does influence their continued engagement intention ($\beta = 0.362$) more significantly than users' current satisfaction ($\beta = 0.275$) or hedonic engagement motivation ($\beta = 0.201$) which is the highest out of three motivation engagements (utilitarian motivation: $\beta = 0.123$ and social motivation: $\beta = 0.122$). Perceived value is more important for smartphone users to continue their engagement than their engagement motivation or present satisfaction in their engagement with their smartphone. In short, perceived value on smartphones has significant influences on their continued engagement intention. It possibly infers that smartphone companies need to provide more information or educational sessions for the current customers to perceive their device as a valuable tool after they purchase their device.

Marketing implications from this study relate to product and service offers. Users' motivations centered on satisfying hedonic and social needs can integrate functions and tools that support users' lifestyle activities. Although many applications or social network systems (SNS) can be downloaded easily, it could influence smartphone users' buying decision at little to no extra cost. Partnerships, via joint ventures and alliances, between smartphone manufacturers and SNS may assist in smartphone users' buying decision, contributing to and encouraging their continued engagement behavior. However, utilitarian functions should be provided as basics because users believe functionally that they are inherent in the operation/activation of their smartphone. On the other hand, more aggressive marketing strategies need to increase the perceived value of the brand/product image. The strong relationship between perceived value and users' intention to keep engaging implies that smartphone companies need to raise and place their position in a certain level to have an expected market share. This will help smartphone companies stablize their revenues over the long term.

For educators and researchers in terms of information technologies and digital environments, future research areas can assess consumer's engagement behavior in digital and educational environments, utilizing the theoretical framework used in this research. This theoretical framework could also be applied to other activities and different contexts, or in designing and forecasting models for digital and educational environments. It would be interesting to examine and compare the proposed model with different user groups and show robust model fit in different settings. This research may also be used as a basis to determine how young college students' engagement behavior may change over their life-stage activities.

Although the sample was collected from college students they will be the majority of mobile technology (i.e., smartphone) users now and in the future, the data from one southeastern university limits the generalizability to broader populations. Data from the other populations and geographic regions would be useful in the generalization and as a further support of the model and results. Nevertheless, we believe that our research results with the MoEN model represents a first step approach in addressing the post technology era research — beyond the intention to use, but rather the continuance to engage in the future. Additionally the proposed MoEN model and its results can be useful in strategic planning for the future information systems and marketing strategy research.

Appendix A. Measurement items

Constructs	Measurement Items
Utilitarian Motivation (1 — not at all important/5 — extremely important)	Please rate the importance of the following reasons when you are engaging in mobile technology UM1: To try and find new and different things using mobile technology. UM2: To keep me informed and updated using mobile technology. UM3: To increase my skills and knowledge in using technology. UM4: To keep me organized (e.g., checking email, schedule, and plan). UM5: To save and use my time more efficiently and effectively with what I have to do (e.g., assignment/project/work) UM6: It offers a variety of ways to communicate with others (e.g., voice, face-to-face, or text message).
Hedonic Motivation (1 — not at all important/5 — extremely important)	HM1: To get rest and relaxation using mobile technology. HM2: To enjoy the variety of contents (e.g., email, applications, weather, and scheduling) that mobile technology offers. HM3: To enjoy what I like about using technology.
Social Motivation (1 — not at all important/5 — extremely important)	SM1: To keep in touch/share events (community) with my friends and family. SM2: To be connected and meet other people with similar interests. SM3: To tell my friends and family about what I learned/read/heard using mobile technology.
Perceived Value (1 — not at all important/5 — extremely important)	PV1: Using mobile technology is an enjoyable experience. PV2: The overall value of my experience using mobile technology is outstanding. PV3: Mobile technology represents good use of my time and money.
Satisfaction (1 — Very dissatisfied/5 — Very satisfied)	OS1: Based on your total bill payments, how satisfied are you with your use/engagement in mobile technology? OS2: Based on your total time spent, how satisfied are you with your use/engagement in mobile technology? OS3: Overall, how satisfied are you with using/engaging in mobile technology?
Mobile Engagement Intention (1 — Unlikely/5 — Very likely)	CI1: How likely are you going to continue to engage in mobile technology? CI2: How likely are you going to recommend your engagement in mobile technology to someone?

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