Should mobile Internet services be an extension of the fixed Internet?

Context-of-use, fixed-mobile reinforcement and personal innovativeness

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Abstract—**Consumers can increasingly use mobile phones to carry out similar tasks as they do on the fixed Internet. Literature on reinforcement and displacement states that the use of new media depends on whether users are inclined to replace or reinforce their existing media use on a new device. This paper analyzes whether the importance that users attribute to using similar services on their mobile phone as on the fixed Internet can explain the intention to adopt mobile services. Specifically, we investigate if such fixed-mobile reinforcement attitude could mediate the impact of personal innovativeness and context-of-use on intention to adopt mobile services. We compare basic Internet services, entertainment services and transaction services. We find that especially the intention to adopt basic Internet services largely depends on the importance of using similar services in the mobile domain as on the fixed Internet. Several context-of-use predictors are partially or even fully mediated by our novel construct. The results convey a positive message to operators that are betting on converged multimedia services that can be accessed from any device and from any fixed or mobile network.**

Keywords-reinforcement; displacement; context-of-use; TAM; mobile services

I. INTRODUCTION

The vision of the mobile phone and mobile Internet as a replication of the web access experience has always been highly sensitive. Operators' decision to market the first version of WAP as `the Internet in your pocket' has often been quoted as one of its main failure factors as this promise could not by far be delivered due to technical inferiority. Also nowadays, there is still a mobile digital divide between those consumers that want to use their mobile phone for various applications and those that are happy just to stick with calling and texting. In the annual consumer survey that we have carried out since 2007, many respondents keep complaining that they do not want all kinds of fancy mobile services and do not want to be bothered with the multitude of possibilities to apply their mobile device. Apparently, this group of consumers wants to have clearly separated functionality for each device that they use. As such, the question emerges whether the need to carry out similar tasks on the mobile, as the consumer knows from the PC is indeed a decisive factor in predicting whether or not consumers are willing to adopt mobile services.

Despite all this, various industry trends point to renewed interest in the thesis that mobile Internet is just an extension to fixed Internet services. The core networks of fixed and mobile networks are indeed converging thanks to the all-IP trend, while the performance gaps between PCs, laptops, tablets and high-end smartphones are reducing regarding screen size, CPU speed and storage capacities. As a result, telecom operators have embraced the converged multimedia paradigm, that is, the idea that the same services can be accessed from any mobile or fixed device and from any network. The same operators bet their money on the assumption that consumers will want a trusted third party (i.e., the operator) that manages the (preferably IMS-based) sessions, user profiles, address books and so on. At least, this appears to be the strategic rationale behind initiatives as IP Multimedia Subsystem (IMS) and Rich Communication Suites (RCS). This so-called converged multimedia paradigm poses a last escape route from the bit pipe scenario that their counterparts in the fixed Internet industry have long come to terms with. Underlying assumption is that the customer relation, customer data and the customer contacts are unique assets that are reusable on multiple channels.

Hence, the question emerges whether consumers actually find it important to be able to use the same functionality on their mobile phone as on the fixed Internet. The concept of fixed-mobile service substitution or reinforcement may help to explain this issue. Prior research shows substitution effects on a macro level [1, 2] and when using household level data [3]. These studies, however, merely focus on the telecommunication aspect of the mobile phone. Due to increasing features of the mobile phone it is questionable whether this substitution effect will reflect on more advanced mobile Internet services. Moreover, the study of Rodini, Ward & Woroch [3] mainly examines fixed-mobile access substitution, thus providing little information about

behavioral displacement. In a previous study [4], we have shown that the usage of specific mobile service categories correlates with the usage of the same service types on fixed Internet. In other words, the use of specific service types on fixed Internet *reinforces* rather than replaces the use of the same service types on mobile phones.

We propose that the importance that users attribute to using similar services on a mobile phone as they are used to on the fixed Internet (from here on referred to as *FMR: Fixed-mobile reinforcement attitude*) can play a major role in explaining their intention to adopt mobile services. However, FMR may also play a mediating role in the effect of established predictors. For example, it may be expected that more innovative consumers find it more important to use the same innovative services on their mobile phone as they are used to from the web. Regarding context-of-use, it might be that users that find it important to use mobile devices in a specific context attribute more value to the possibility to use the same services from the fixed Internet.

In this paper, we will study how the importance that user attribute to using similar services on a mobile phone as they are used to on the fixed Internet mediated the impact of context-of-use and personal innovativeness on the intention to adopt mobile Internet services. We will explore how the effects found differ among basic Internet, entertainment and transaction services. We will do so by analyzing the results of a representative survey among Dutch consumers, which was carried out in spring 2010.

This study extends the scientific debate on displacement and reinforcement to the domain of mobile Internet services. This study also contributes to scholarly understanding of why consumers intend to adopt mobile Internet services, and especially to models that include context-of-use and personal innovativeness. The study will also provide insights for practitioners, for example by showing whether it is worthwhile to focus on delivering consistent service experiences on the mobile web and the fixed Internet. Especially for operators, we provide feedback as to whether the fixed-mobile converged multimedia paradigm can be viable.

Section II discusses the background of the present paper, focusing on context-of-use, personal innovativeness and displacement and reinforcement literature. Section III details the method and Section IV provides the results of both models. Section V discusses results, limitations and implications.

II. Background

A. Personal innovativeness

It is widely assumed that people's attitudes towards innovation predict how likely they are to adopt a wide variety of technological innovations [5]. Generic attitudes towards innovation have been a central concept in studies on the diffusion of innovation [6]. Personal innovativeness, which was initially proposed as a moderator, was later re-conceptualized as a direct determinant of behavioral intention [7].

People's attitudes towards innovation are likely to influence their use of mobile services [8], which is why we propose that

H1: A positive attitude towards mobile innovations has a positive effect on the future use of mobile services

B. Context-of-use

Because people carry around their mobile device all the time, the range of situations in which mobile services can be used is virtually limitless. The emergence of fixed-mobile convergence solutions like IMS, the success of software platforms like Apple's apps platform, and resulting multimodality options increases the scope of contexts in which mobile services may provide added value. Consequently, shaping mobile services towards specific context-of-use has received a great deal of attention. Typical examples are the kind of location-based services that emerged several years ago, and, more recently, social networking applications that take advantage of the social context-of-users. Context adaptation relates to personalization, as it takes care of user preferences and interests as well as user context.

Context was first conceptualized from a linguistic and artificial intelligence perspective, before it entered the world of mobile computing [9]. Despite its importance in the mobile domain, the concept of context is still a fairly ambiguous one. The concept context, and its synonyms [10], is hard to define, because there are many relevant views, i.e. technical, design, acceptance research, marketing, and, physical, social, cultural dimensions. Ciborra [11] discusses context or situation from a phenomenological and interpretative perspective, but offers few concrete pointers for empirical research. Dey and Abowd [12] define context from a human-computer interaction perspective, as 'any information that can be used to characterize the situation of entities (i.e., whether a person, place or object) that are considered relevant to the interaction between a user and an application, including the user and the application themselves'. Hristova and O'Hare [13] state that context-related information can consist of user profiles and preferences, their current location, the type of connection that to the mobile network, the type of wireless device being used, the objects that are currently in the user's proximity, and/or information about their behavioral history. In addition, softer attributes regarding mood or situation-related issues are also part of the context, for example indicating that a certain user is in a business meeting and therefore cannot be disturbed [14].

Schilit and Adams [15] divide context into three dimensions: spatial context (where you are), user context (who are you with), and physical context (what resources are nearby). Sometimes changes in the status of these are also considered [16]. Following this focus on context dynamics, Chen & Kotz [17] add time as a fourth category. Pedersen and Ling [18] distinguish between the modalities of mobility, work and leisure, specific demographic groups as proxies for distinctions between end-users contexts, between public and private context and dynamic context, discussing the

various roles and identities that users assume in different contexts. Gerstheimer and Lupp [19] suggest that users (individuals, group or organization), type of process (leisure or business) and place (fixed, mobile) are relevant aspects of context. Others include the emotional state of a person as a context variable [20]. It is clear that depending on the discipline and the focus on technical or social and human aspects or disciplines, context is framed differently, ranging from hard core technical aspects to very soft human factors. Bradley and Dunlop [21] try to cover all these aspects. We will use this distinction between more technology related context, i.e. the place where a mobile service is used, and the more social context, i.e. the social environment the mobile service is or will be used.

Mallat et al [22] focus on context and Technology Acceptance Model concepts, e.g. perceived ease of use, perceived usefulness and behavioral intention. Their study does not discuss mobile services in general but only a specific class of services i.e. mobile ticketing. In this paper we will not focus on the mediating role of context between the TAM concepts perceived ease of use and behavioral intention but relate the context concept directly to behavioral intention. We also do not consider a specific service but mobile services in general. Following Mallat et al [22] we expect that the more people are inclined to use mobile services within a specific context, the more they will use mobile Internet services in general. We thus propose that:

H2: A positive attitude towards using mobile services in a specific context has a positive effect on the future use of mobile services

In the present paper, we consider multiple dimensions of context-of-use. As may be clear from the review of literature in this section, there is no consensus in literature on what dimensions of context-of-use are most important to consider, and basically literature is rather ambiguous regarding such dimensions. In this paper, we select three dimensions of context-of-use that are often used, but we are aware that other dimensions might be relevant as well. Task-related dimensions of context are prominent in recent literature. Carlsson [23] argues, for instance, that, in order for mobile services to be adopted, they to fit and add value to specific tasks (the Braudel Rule). This also relates to the notion of media choice and task-technology fit, which states that a user's behavioral intention is closely related to whether or not the technology fits the intended activities [24-26]. This view is empirically supported by Bouwman & Van de Wijngaert [24, 27]. Within this paper, we consider the generic task-related context but also more specific work-related and killing-time-related context.

Besides these task-oriented context dimensions, we also consider social context. Social context-aware applications are applications that discover and adapt to a social or group context [12, 17, 28]. The main focus of these applications is on defining, identifying and adapting to a social context. In particular user identification applications are aimed at managing the availability of users. However, developing a software system that autonomously adapts to changes in a

mobile user's social context is a challenging task [28]. Moreover, the use of mobile applications in social situations is not always deemed acceptable.

C. Displacement and reinforcement

IS literature often focuses on one single medium or technology in the study of why users adopt it. TAM types of models focus on the characteristics of technologies such as usability, costs and usefulness, while DoI models often focus on personal and social circumstances of the users. In the mobile domain, context-of-use type of variables are often added to these models, thus evaluating whether specific physical, social or work situations make it more likely for users to adopt mobile services. The task-technology fit (TTF), first coined by Goodhue and Thompson [26] indicates a key role for matching information systems with the organizational tasks. In addition to use, the importance of fit between tasks and technology were also an important factor that explains performance impacts of the systems. Matching media also plays a vital role in the media richness theory [29]. The media richness theory states that when ambiguity and uncertainty of a task increases people seek richer media, which is able to reproduce the information. Bouwman and Van de Wijngaert [24] shows that context and task related factors are explain the intended use, while attitudes and perceptions on ease of use or usefulness are less relevant.

In displacement literature, it is argued that usage of one medium negatively influences the use of other media. Media scholars investigated this displacement effect by the advent of new technologies including television [30] and VCR [31]. It is even suggested that a revolution in the way people consume media, ultimately lead to the dissolution of traditional media [32]. More recent studies have focused on displacement effects by the Internet on traditional media [33].

Whether the uptake of newly emerging media has displacement effects on the older media seems, in practice, rather difficult to conclude. After a concise literature review, Lee & Leung [33] conclude that numerous studies have explored these displacement effects but that they have shown various, sometimes contradictory, findings. The key factor in this is to what extend the characteristics of the two media overlap – on issues that are relevant to the specific user groups. Prior displacement effects literature on emerging media focuses on two generic dimensions that are assumed to overlap, involving time and functional displacement.

Basic argumentation, regarding time displacement, is that people have limited amount of time to spend on the consumption of different media [34]. Concerning the use of media, this leads to the assumption that a person can only use one medium at a time. Hence, the use of a new medium, subsequently, means decreasing the time spent with existing media. Earlier time displacement studies to the displacement effects of television indicated a reduction in time spent listening to the radio, reading comic books and attending movie theaters [35]. With the growth of Internet usage scholars became interested in the displacements effects of the Internet. Studies assumed negative correlations between

Internet and television viewing. Also the Internets' impact on traditional media (e.g. newspaper and bulletin boards) is assumed to be present. Literature is, however, inconclusive regarding the displacement effects of the Internet. Some scholars found negative correlation concerning television viewing [36], telephone use [37], book reading [38], and newspaper reading, thus indicating a displacement effect of Internet of these media. Positive correlation, however, are also found, thus not indicating a displacement effect. Examples of these are for instance between television viewing, radio listening, book and newspaper reading [39], or between movies, and video games [40].

Studies concerning functional displacement are focused on the satisfaction of user needs by using media. In line with the uses and gratifications theory, studies posit an active and purposive role of the users. In contrast to the dimension of time, the functional dimension predicts an increase use of other media in order to fulfill the needs. For instance, when people tend to have a high need for entertainment it is likely that they spend time viewing television, but also go more often to the cinema. Hence, in contrast to the displacement hypothesis, use and gratifications theory predicts that media is supplementary rather than competitive [41]. However, scholars did find overlapping needs regarding different media. The need for relaxation and entertainment by cinema indicated to be replaced by watching videos via VCR [42]. In addition, the Internet was found to be a functional alternative to television regarding entertainment, passing time, relaxation, social interaction and information [43].

In sum, literature show ambiguous results concerning possible reinforcement or displacement effects between different media. The question is whether the relation between fixed and mobile Internet is that of reinforcement or displacement. Probably the most obvious benefit of mobile services is its relation to the situation where it is used in [24], thus having a high mobility in space. While moving around, people are able to use mobile devices and services [44]. Anytime and anyplace, therefore, are concepts that are closely related to mobile services. Hence, the nomadic value of mobile services is a key differentiator with respect to other media (e.g. television and fixed internet). Due to this mobility factor, we assume that the displacement or reinforcement effects between fixed and mobile services are consistent with the uses and gratifications theory (U&G). A reinforcement effect between both media is, subsequently, assumed. All in all, we propose that:

H3: The importance that users attribute to using similar services on a mobile phone as they are used to on the fixed Internet positively impacts the intention to use mobile Internet services

Moreover, we propose that FMR may mediate the impact of Personal innovativeness. More innovative consumers may find it more important to use the same innovative services on their mobile phone as they are used to from the web:

H4: The importance that users attribute to using similar services on a mobile phone as they are used to on the fixed

Internet mediates the impact of Personal innovativeness on the intention to use mobile Internet services

Regarding context-of-use, it might be that users that find it important to use mobile devices in a specific context attribute more value to the possibility to use the same services from the fixed Internet:

H5: The importance that users attribute to using similar services on a mobile phone as they are used to on the fixed Internet mediates the impact of Context-of-use on the intention to use mobile Internet services

The general model is specified for mobile entertainment services (e.g., downloading games, buying or downloading music-files and using mobile TV); basic mobile Internet services (e.g., e-mail, surfing the web, accessing search engines and news services); and mobile transaction services (e.g., buying train and airline tickets, checking timetables, checking and booking hotels and using localization services).

Figure 1 presents the conceptual model, which comprises the hypotheses proposed in this section.
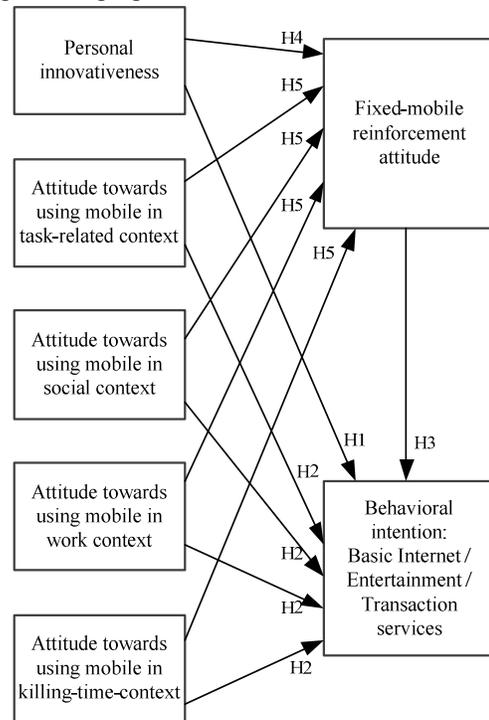

Figure 1. Conceptual model

III. METHOD

Respondents were selected from a panel of 25,000 households that regularly take part in survey research and that are representative for the Dutch population. Potential respondents (N = 849) were first approached by telephone to

9

see if they were willing to participate and whether or not they used a mobile phone. In April 2010, respondents who agreed to participate and matched the selection criterion received an e-mail with a link to the online questionnaire. In all a total of 515 questionnaires were completed. The sample was checked against relevant criteria to make sure it was representative for the Dutch population. The results indicated that the sample was sufficiently representative, and wherever it was not, the data was weighted to correct for possible bias.

Behavioral intention was tested by listing sixteen different mobile services and asking respondents to rate to which extent they would be willing to (continue) using these services in the future. Based on exploratory factor analysis, we selected nine services that meet the three categories of mobile services. The dimensionality of the three service categories is confirmed in confirmatory factor analysis. Average variance extracted higher than .6 for all categories, standardized factor loadings exceed .7 for all items, and discriminant validity acceptable, as the square of the correlation of two constructs is smaller than their average variance extracted estimates.

The appendix provides a measurement summary including all the items. Personal innovativeness (i.e., people's attitude towards mobile innovation) was measured using three items provided by De Marez and Verleye [45], which we used in a previous study as well [46]. Social context was pre-tested [46]. Task-related items were based on Bouwman & Van de Wijngaert [24] and were also confirmed in our previous study [46]. The measurement scale on work-related context was pretested in a pretest study. We added a new scale to measure killing-time-related context, and a new scale for FMR attitude.

Table I provides the results of confirmatory factor analysis, which indicates acceptable overall fit. Average variance extracted higher than .6 for all categories, standardized factor loadings exceed .7 for all items, and discriminant validity acceptable, as the square of the correlation of two constructs is smaller than their average variance extracted estimates.

TABLE I.   CONFIRMATORY FACTOR ANALYSIS: CONTEXT MODEL

Construct	Item	Std factor loading	AVE	Cr. alpha
Personal Innovativeness	PI.1	.87		
	PI.2	.90	.79	.92
	PI.3	.90		
FMR	FMR.1	.92		
	FMR.2	.91	.84	.91
Attitude towards using mobile in task-related context	Task.1	.79		
	Task.2	.84	.68	.87
	Task.3	.86		
Attitude towards using mobile in social context	Soc.1	.89		
	Soc.2	.88	.78	.87

Construct	Item	Std factor loading	AVE	Cr. alpha
Attitude towards using mobile in work context	Work.1	.83		
	Work.2	.81	.67	.81
Attitude towards using mobile when killing time	KillTime.1	.95		
	KillTime.2	.87	.81	.92
	KillTime.3	.88		
Behavioral intention: Basic Internet services χ^2 (131)=243; NFI=.969; TLI = .981; CFI = .985; RMSEA = .041	BI_Basic.1	.94		
	BI_Basic.2	.86		
	BI_Basic.3	.71	.71	.91
	BI_Basic.4	.86		
Behavioral intention: Entertainment χ^2 (114)=220; NFI=.967; TLI = .978; CFI = .984; RMSEA = .043	BI_Ent.1	.85		
	BI_Ent.2	.74	.65	.84
	BI_Ent.3	.83		
Behavioral intention: Transaction services χ^2 (98)=182; NFI=.972; TLI = .982; CFI = .987; RMSEA = .041	BI_Trans.1	.89		
	BI_Trans.2	.84	.80	.89

IV.   RESULTS

Figures 2-4 provide the structural models for each service category. All three models show acceptable overall fit. Social context has no significant effect in any of the models.
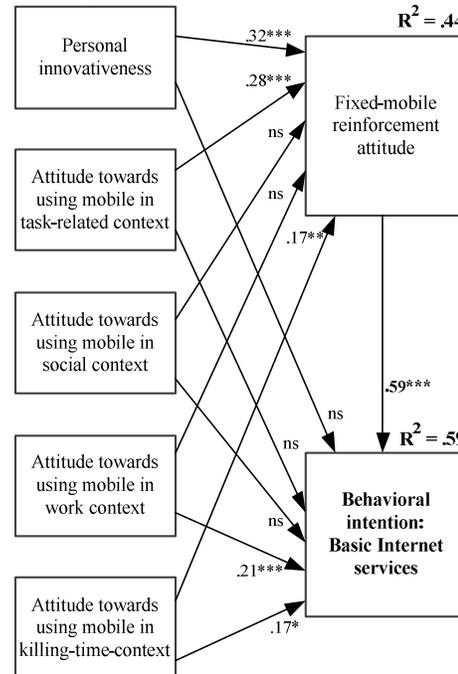

Figure 2.   **Basic mobile Internet services** (χ2 (136)=246; NFI=.968; TLI = .982; CFI = .985; RMSEA = .040)

Regarding basic mobile Internet services (e.g., email, MMS, surfing, search), Figure 2 shows that there is a major effect of FMR (.59). Personal innovativeness and the attitude towards using mobile in task-related context are fully mediated through FMR attitude, and killing-time-related context is partially mediated. Work context is the only construct, which has solely a direct effect on the behavioral intention. Explained variance of the intention to use basic mobile Internet services is rather high.

Regarding *entertainment services*, Figure 3 shows that the effect of FMR is considerable smaller (.37). Again, Personal innovativeness and task-related context are fully mediated, but killing-time-related context is now only partially mediated. Work context has no direct or indirect impact on behavioral intention. Explained variance of behavioral intention is substantially smaller than in the basic Internet services model.

Regarding *transaction services*, Figure 4 shows that the effect of FMR is .49. In contrast to the other two models, Personal innovativeness and task-related context are now only partially mediated. Strikingly, personal innovativeness has a positive indirect effect but a negative direct effect on behavioral intention. The killing-time related context is now fully mediated through FMR, whilst work context plays no role at all. Explained variance is lowest in this model.
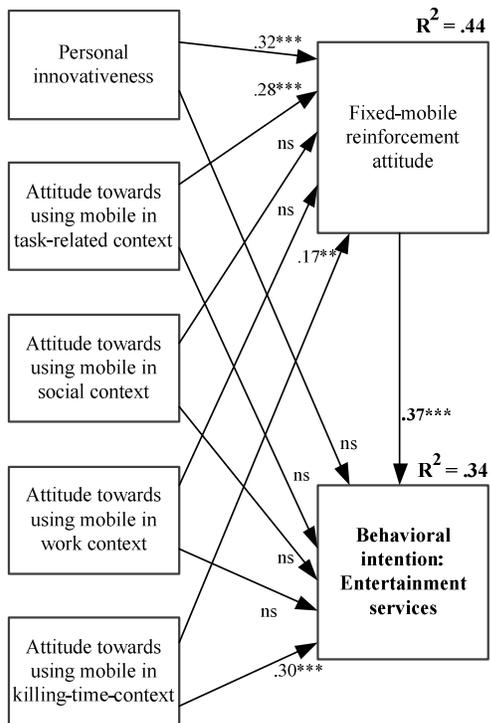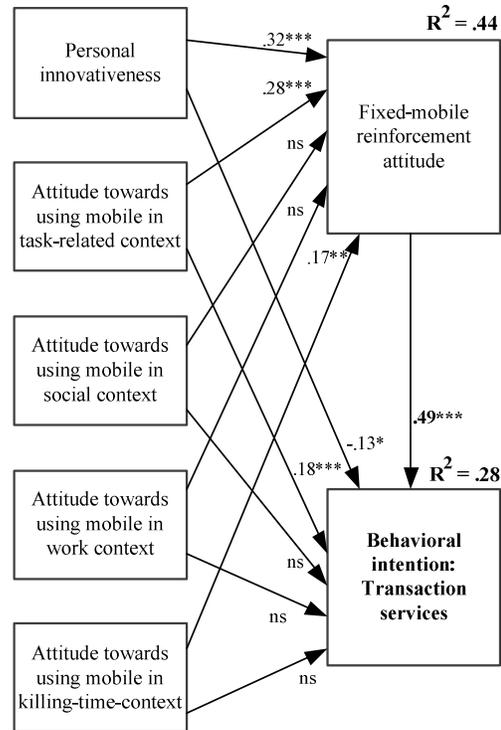

Figure 4. **Transaction services** (χ2 (103)=186; NFI=.972; TLI = .983; CFI = .987; RMSEA = .040)

As we aim to study the mediating effect of FMR, we compute direct and indirect effect sizes in Table II. We find that in two out of three models, Personal innovativeness is fully mediated. The extent of mediation for context-of –use is highly diverse across the different dimensions of context-of-use and across the different service types.

Figure 3. **Entertainment services** (χ2 (120)=226; NFI=.966; TLI = .979; CFI = .984; RMSEA = .042)

TABLE II.   CONTEXT MODEL: EFFECT SIZES

	Construct	Dir effect	Indir effect	Total effect	% Mediation
Basic mobile Internet services	Personal innovativeness	.00	.19	.19	100%
	Task-related context	.00	.17	.17	100%
	Social context	.00	.00	.00	n/a
	Work context	.21	.00	.21	0%
	Killing-time-context	.17	.10	.27	37%
Entertain-ment services	Personal innovativeness	.00	.12	.12	100%
	Task-related context	.00	.10	.10	100%
	Social context	.00	.00	00	n/a
	Work context	.00	.00	.00	n/a
	Killing-time-context	.30	.06	.36	17%

	Construct	*Dir effect*	*Indir effect*	*Total effect*	*% Mediation*
Trans-action services	Personal innovativeness	-.13	.16	.29	55%
	Task-related context	.18	.14	.32	43%
	Social context	.00	.00	.00	n/a
	Work context	.00	.00	.00	n/a
	Killing-time-context	.00	.08	.08	100%

V. DISCUSSION AND CONCLUSIONS

This study shows that the importance that users attribute to using similar services on a mobile phone as they are used to on the fixed Internet has a major effect on their intention to adopt mobile Internet services. This effect is especially strong for basic mobile Internet services like email, MMS, surfing and search, but still considerable for transaction and entertainment services. Apparently, users that are interested in adopting mobile services are also very keen on having similar services on their mobile phone as they already use on the fixed Internet.

We also find strong evidence that the importance of using similar services on mobile devices as on the web mediates the effect of both context-of-use and personal innovativeness. Especially those consumers that have a positive attitude towards innovative mobile devices and services find it important to be able to use the same services from the fixed Internet. This may be counterintuitive or even disappointing, as mobile scholars often argue that more advanced types of users will be inclined to use more advanced types of services, that is, mobile services that offer different functionality than the regular services on the fixed Internet. Apparently, these users are glad to stick with the services they know from the normal web.

The importance that consumers attribute to using mobile services in a specific context also impacts the importance of having similar services on a mobile device as on the web. Especially consumers that want to use mobile services for specific tasks or for killing time find it important to have services from the fixed Internet on their mobile device. Possibly, users find it important to have services they know and services they can handle when carrying out specific tasks. It might also be that users are unable to imagine which novel mobile service concepts might be useful for their tasks, and therefore they mainly look to what they already know.

According to the results, the importance of using mobile services in social situations does not impact the intention to use mobile services nor the importance of using fixed Internet services on mobile devices. The concept of social context-of-use (i.e., the attitude towards using mobile services in a social context) appears to be rather problematic. We have used the same construct, which largely the same measurement items in two previous studies. In the first study, based on data collected in the Netherlands in 2009 [46], we found that consumers that use their mobile devices in social contexts are less inclined to adopt mobile Internet services.

This might be because the social norms dictate that it is rude to use mobile Internet services when around others, or because mobile services are especially useful when not around others, for communication purposes. In a second (yet unpublished study, based on data collected in Finland in 2010, we found exactly the opposite, that is, the social context-of-use had a positive effect on the intention to adopt mobile Internet services. There might indeed be a positive effect, for example when using mobile video services to show short clips to friends or when using mobile TV when in a room with family members that wish to view other shows. Apparently, the positive and negative aspects of social context-of-use cancelled out in the present study, which leads to a non-significant effect. In any case, the attitude of people using mobile Internet services in social contexts warrants further attention.

Our earlier study indicated a strong reinforcement effect between mobile and fixed internet services [4]. This study not only confirms that finding, but also extends the theoretical role of fixed-mobile reinforcement attitude. More specifically, we show that fixed-mobile reinforcement attitude mediates the effect of personal innovativeness and the context-of-use on the behavioral intention to use mobile Internet services. Hence, further research concerning the measurement of these reinforcement effects between media should consider the context-of-use and the personal innovativeness of the user.

For service providers, the results imply that it may make sense to develop mobile services that closely resemble functionality and appearance of services that are already out on the fixed Internet. According to our results, it would make little sense to develop radically new service concepts just for the mobile domain. Even the most innovative types of users are mainly interested in using what they already know from their experiences with fixed Internet.

For operators, our results provide a welcome and a less-welcome message. On the positive side, we found that users are indeed interested in using similar services on a mobile device and on the fixed Internet. If operators could indeed leverage consumer trust, interoperability and means to provide security, a converged fixed-mobile service portfolio strategy might indeed be viable. On the negative side, our results once again stipulate the threat of being substituted by webcos. For webcos like Google and Skype, going to the mobile domain is a worthwhile strategy as our results indicate that is what consumers are interested in.

Our study entails some limitations that warrant further research. On the measurement theoretical side, our construct of Fixed-mobile reinforcement attitude contains two rather generic measurement items. Adding more items, investigating underlying dimensions and retesting the construct in other contexts would increase the confidence the measurement properties of the construct. Regarding the practical side, operators are mainly interested in bringing services like voice, videotelephony, file sharing and group messaging into a converged fixed-mobile service portfolio. However, these rich communication services were not part of the present study. Analyzing the model with these rich communication services as dependent variable could provide

even more valuable insights for operators. Regarding the theoretical contribution, we focused in this study only on context-of-use and personal innovativeness, while concepts of TAM and UTAUT are often used. For future research, we consider to add the Fixed-mobile reinforcement construct to an extended TAM model. We have done preliminary analysis that indicate that there may be very strong mediation effects regarding core TAM concepts, which may have theoretical implications.

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APPENDIX: MEASURES

Construct	Item	
Personal innovativeness	PI.1	I want my mobile telephone to be the latest model
	PI.2	I want to be one of the first to test new mobile services
	PI.3	I am one of the first to use new mobile technologies
FMR	FMR.1	Eventually, I want tob e able to do the same things on my mobile phone as on the web
	FMR.2	I would like to use the same services on my mobile phone as on the web
Attitude towards using mobile in task-related context	Task.1	To exchange realtime information
	Task.2	To quickly check something
	Task.3	To execute tasks where and where I want to
Attitude towards using mobile in social context	Soc.1	When I am in company of others
	Soc.2	When I am among friends
Attitude towards using mobile in work context	Work.1	When at work
	Work.2	When travelling for work
Attitude towards using mobile when killing time	KillTime.1	When I am bored
	KillTime.2	To relax, wherever and whenever I want
	KillTime.3	To kill time
Behavioral Intention: Basic Internet services	BI_Basic.1	Surfing over the internet with a mobile device
	BI_Basic.2	Email: Sending or receiving email via a mobile device
	BI_Basic.3	MMS
	BI_Basic.4	Mobile news and weather
Behavioral intention: Entertainment services	BI_Ent.1	Puchasing / Downloading music to mobile device
	BI_Ent.2	Downloading / Playing games
	BI_Ent.3	Streaming music
Behavioral intention: Transaction services	BI_Trans.1	Reserving and/or purchasing plane/train tickets
	BI_Trans.2	Presentations of hotels and/or hotel room reservations