Consumer Acceptance of Personal Information and Communication Technology Services

James Y. L. Thong, Viswanath Venkatesh, Xin Xu, Se-Joon Hong, and Kar Yan Tam

Abstract—In today's information and communication technology (ICT)-enabled service economy, there is great interest in digital service management. While the extant technology acceptance research has mainly studied user acceptance of various ICTs, there is a dearth of research on consumer acceptance of personal ICT services. In this paper, we extend the unified theory of acceptance and use of technology to the context of ICT services by examining the moderating role of ICT service type. We tested the proposed model in a large-scale survey of 4777 consumers, including both potential and current consumers of mobile data services (MDS), of two different types of MDS: communication and infotainment services. The results strongly supported the model with service type moderating key relationships. The findings have theoretical and practical implications for digital service management in particular and service science in general.

Index Terms—Consumer acceptance, digital service management, mobile data services (MDS), personal information and communication technology (ICT) services, technology adoption, unified theory of acceptance and use of technology (UTAUT).

I. INTRODUCTION

INFORMATION and communication technologies (ICTs) play a key role in today's service economy [1]. Advances in ICTs are enabling firms to provide high quality, diversified, and personalized services more easily and affordably than ever earlier. Indeed, firms in the ICT industry are also transforming themselves from technology vendors to service providers. Many firms now have an emphasis on research and business activities related to services. For instance, IBM has established a long history of research on service science, management, and engineering.[1] Microsoft has more recently announced its "software-as-a-service" (SaaS) strategy.[2] Similarly, in the ICT consumer market, network operators have shifted their strategic focus from technology to services [2]. An example is America Online's (widely known as AOL) transformation from being an access provider to a content portal [3]. These strategic shifts have led to calls for research into digital service management in particular [1] and service science in general [4]. Understanding the success of technology-enabled services is important for firms to reap benefits from their investments in technology-enabled business processes [5]. ICT plays a central role in transforming the business processes related to services that provides strategic advantages, such as customer loyalty and long-term profitability [6], [7]. In this paper, by studying consumers' decision making about ICT services, we aim to contribute to the ongoing dialog related to better service management and delivery.

There has been remarkable progress in understanding individual-level technology awareness, acceptance, and use [8] in various contexts, such as digital libraries [9], collaboration systems [10], [11], etc. In fact, technology acceptance research is one of the most, if not the most, mature streams in IS research [12], [13].[3] This maturity is underscored by a review and synthesis of eight models from theory bases in IS, psychology, and sociology into a unified theory of acceptance and use of technology (UTAUT) [13]. UTAUT explained about 70% of the variance in *intention to use* a technology among employees in a workplace. UTAUT was validated, and then, cross validated with data gathered from four and two organizations, respectively. Such a robust pattern of results coupled with the large proportion of variance explained prompted Venkatesh *et al.* [13], p. 471] to conclude that we may be "reaching the practical limits of our ability to explain individual acceptance and usage decisions." Particularly, ICT services have received little attention in this stream and have been identified as one of the key future research directions, where models of technology acceptance can be applied and extended [14]. While some IS research examined issues related to ICT-enabled services, such as IS service quality [15]–[19] and service management and ICT [20], prior work has mainly focused on issues internal to the organization and its business partners. Given the proliferation of ICT services for the mass market [21], there is a pressing need to understand individual consumers' decision-making about ICT services.

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[1]https://www.ibm.com/developerworks/mydeveloperworks/groups/service/html/communityview?communityUuid=d433e517-1ebc-410d-bdc3-cc2b4c1952fc

[2]http://news.com.com/Gates+telegraphs+Microsofts+software+services/2100-1012_3-5863294.html

[3]The terms acceptance and adoption are sometimes used interchangeably, and on other occasions, used to refer to different phases of diffusion. We use the term acceptance and define it as the initial decision regarding whether or not to use a technology service. Likewise, the term usage and use are used interchangeably in the literature. We use the term use, but in cases, where model names incorporate the term usage, we stay true to the prior research.

We extend UTAUT to the context of ICT services for consumers. As ICT services are used by consumers mainly on a self-service basis, consumer interaction and experience with the technology has been found to be an integral part of improving consumer satisfaction [22]. The technology infusion in service encounters was argued as the key to improve customer services and research was called upon into consumer acceptance and use of technology-based services [14], [23]. Thus, understanding how consumers perceive and evaluate the technology element is essential for understanding consumer decision making about ICT services. In this regard, technology acceptance research can be applied to the context of digital service acceptance. The technology acceptance model (TAM) [24] has been found to be applicable to a variety of contexts. As the number of technologies for consumer use continue to increase by leaps and bounds [21], the availability of a model that can help prediction of consumer acceptance of technologies is critical to study problems of theoretical and practical significance in this area. In fact, key constructs from TAM have been widely integrated in research on consumer technology acceptance. For example, these constructs have been included in research on both e-commerce and mobile commerce acceptance [25]–[27]. Likewise, Koufaris [28] examined consumers' intention to shop online, regarding consumers as both technology users and customers. Thus, while ICT services for the consumer market differ from technology use within organizations (as we discuss in the next section), there is evidence that existing technology acceptance research can inform acceptance of ICT services. A good starting point to investigate these differences is to examine a comprehensive model from technology acceptance research in the context of ICT services for consumers. Because of the wide application of TAM and the integration of TAM, and other models into a holistic model in UTAUT, we adapted UTAUT to the context of ICT services for consumers.

The technology was treated as a black box in many prior studies on technology acceptance, including the original conceptualization of UTAUT [13]. Most examinations focus on the generalizability and invariance across technologies, thus explicitly ignoring the unique characteristics and attributes that the technology may bring to the enabled services. However, there is evidence that the type of technology or its unique characteristics could potentially make a difference [29]–[31]. It has been argued that the technology artifact needs to receive a more central treatment in IS theories and models [32], [33]. Related to this, it has been suggested that there is a greater need to examine how the application of design science will influence end-user behavior [34]. Given the great variety of ICT services for consumers, such as communication with their friends (e.g., sending text messages, pictures, videos, and e-mails), retrieving online information (e.g., reading news reports and TV schedules) and conducting online transactions (e.g., booking tickets), it is critical to understand how the various complex contingencies suggested in UTAUT may differ across types of ICT services that have different characteristics. To address this gap, we examine UTAUT in the context of mobile data services (MDS), probe further by examining two different types of MDS—namely, communication services and infotainment services—and under-

stand the ways in which certain relationships in UTAUT may be different depending on the particular service and its unique characteristics. In sum, this paper has two objectives:

1) Extend UTAUT to the context of ICT services for consumers and examine the moderating role of ICT service type.
2) Empirically test the proposed model in a survey of both potential and current consumers of two different types of MDS, i.e., communication and infotainment.

II. THEORETICAL FOUNDATION

### A. Unified Theory of Acceptance and Use of Technology

UTAUT synthesizes the literature on user acceptance of technology [13]. In UTAUT, there are four main constructs that influence intention and use: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). *PE* is defined as the degree to which using a technology is perceived as providing gains in performing certain activities; *EE* is the degree of ease associated with the use of a technology; *SI* is the extent to which an individual perceives that important others (e.g., superiors and peers) believe the individual should use a particular technology; and *FC* are environmental factors that support the use of a technology [13]. In UTAUT, PE, EE, and SI are theorized to have direct effects on users' behavioral intention (BI) to use the technology. BI and FC together determine technology use. Also, there are four moderators—namely, age, gender, experience, and voluntariness—of key relationships.

As we will discuss in the following, ICT services differ from the technology in a few important ways, e.g., dynamic use contexts and distinctive service types. A reasonable starting point for deriving the theoretical and practical implications from these differences is to examine the applicability of UTAUT to the ICT services context. By comparing the results from the *service* context with the *technology* context, differences in the established relationships and the limitation of the explanatory power of UTAUT may be observed, following which, researchers can revise and build new models for ICT services. As UTAUT is a synthesis of about two decades of individual-level technology acceptance research, UTAUT was built upon models that have been applied to various user groups and technologies. While UTAUT may not be the final model for service acceptance and use, we believe that it is an appropriate choice as a baseline model that can be extended to the ICT service context.

B. Technology Versus Services: Contextualizing UTAUT to ICT Services for Consumers

In order to contextualize UTAUT to the context of ICT services for consumers, we make three key changes[4] to UTAUT based on the key distinctions in services relative to what has

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[4]An additional change is necessary to make UTAUT applicable to the context of a voluntary behavior. While voluntariness is a moderator of the SI–BI relationship in UTAUT, consumers have no organizational mandate and their behaviors are voluntary. Thus, we drop voluntariness from our model. This change will only affect the SI–BI relationship. We draw from Morris *et al.* [35] to suggest a four-way interaction effect of SI X gender X age X experience on intention, instead of the five-way interaction proposed in UTAUT.
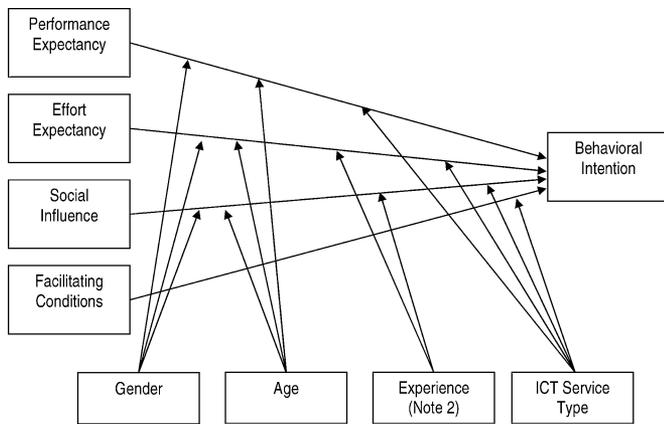
Notes: 1. All interactions are hypothesized as the highest-order terms.
2. Experience is a moderator only for current consumers and not for potential consumers.

Fig. 1.   Research model for potential and current consumers

been found in prior research in organizational settings. Fig. 1 presents our proposed research model.

First, most of the key research on technology acceptance was conducted in organizational settings. The organizational or work context is quite different from the personal services context (specifically, ICT-enabled services for consumers). While employees in organizations enjoy a relatively homogeneous and stable environment in using an organizationally sanctioned technology for the general purpose of productivity improvement, consumers use ICT services in fluid contexts for varied purposes. For instance, in the case of MDS, consumers can access MDS in various contexts—whenever they prefer and wherever they are—for different purposes, such as communication with their friends (e.g., text messages, pictures, videos, and e-mails), retrieving online information (e.g., news reports and TV schedules), and conducting online transactions (e.g., ticket bookings and online games). The dynamic use contexts highlight the importance of FC in consumer decision making. Consumers need more external support and they will take the FC into account even when forming their BIs. Moreover, consumers' perceptions of ease of use will be an ongoing issue as the contexts are dynamic (i.e., undergoing rapid changes) and consumers typically do not have access to formal training or technical support when compared to employees. Thus, we expect that *FC* and *EE* will have strong direct effects on consumer decision making about ICT services, somewhat in contrast to employees' technology acceptance decisions in organizational settings.

Second and related to the first point, in order to accommodate the diversified and dynamic contexts, ICT services typically offer great variety and allow for customization by consumers. This is different from organizational settings where end users within a business unit typically use an IT application for a homogeneous purpose (e.g., Microsoft Word to prepare reports) and in similar ways (i.e., following a standard set of steps). While employees mainly communicate with their colleagues for work purposes (e.g., online meeting with team members), consumers typically use communication services to interact with a variety

of people, such as friends, classmates, and family members, thus making consumer acceptance and use of ICT services essentially a *meta decision* that involves the evaluation of different service portfolios. For instance, MDS can be generally classified into two types: communication and infotainment, which is a combination of information and entertainment services. MDS for communication includes text messaging [short messaging service (SMS)], multimedia messaging (MMS), e-mails, and mobile chatting [36]. These communication services are currently the most widely used MDS. Not far behind are MDS for infotainment that is very popular among consumers [36], [37]. Examples of MDS for entertainment include mobile gaming, video/audio service, gambling, fortune telling, dating services and pornography, and information-oriented MDS deliver content, such as news headlines, sports updates, and traffic conditions. In this research, we grouped these two categories together into the infotainment service portfolio for three reasons: 1) both information and entertainment services are essentially based on *content* available via the mobile Internet, e.g., financial news, sport news, movie trailers, and TV programs; 2) content services usually engage similar social settings and user interaction styles, thus playing a similar moderating role in our model; and 3) this classification is in line with Kraut *et al.*'s [38] categorization of Internet services.[5] We posit that ICT service type will play a moderating role in determining the relative importance of different UTAUT factors. This is because different types of ICT services are used in different social settings and play different roles in facilitating interpersonal interactions. Consumers tend to use infotainment services to meet personal needs, such as subscribing for timely financial information and playing games for fun. In contrast, they typically use communication services to interact with a variety of people, such as friends, classmates, and family members, suggesting that the use context of communication services is much more social than the use context of infotainment services. This suggests a greater impact for SI on consumers' decision making in the context of communication services. Moreover, a notable difference between communication and infotainment services is the way in which consumers interact with them. For example, while MDS for communication allow consumers to interact with their friends in different social settings, MDS for infotainment, such as news and stock quotes, allow consumers to personalize their MDS to fit their needs. This difference in the interaction with the services also suggests a moderating role for service type. Thus, our second adaptation to UTAUT is to add service type as a key moderator of different relationships.

Finally, the third change is aimed at strengthening the conceptualization of experience. Experience has been conceptualized in UTAUT as a continuum, although its treatment has been based on snapshots taken at discrete points of experience, e.g., immediately posttraining, after one month, and after three months of experience [13]. Other related research [39] has suggested "no experience" is different from some experience. Consistent with

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[5]We empirically examined the results with the information service and entertainment service subsamples separately and found no significant differences between the two groups.

this prior research, we contend that the factors relevant to the acceptance decision will be systematically different from the factors relevant to the use decision. Thus, combining these two conceptualizations of experience, we first separate consumers without experience, i.e., potential consumers, from consumers with experience, i.e., current consumers of ICT services. Further, among consumers with experience, we examine experience as a continuous, rather than dichotomous or ordinal, variable [13]. Such a treatment of experience will allow us to gain a deeper understanding of its role in consumer decision making.

C. Overview of MDS

With the convergence of mobile communication technologies and the Internet, the world is now witnessing many exciting new developments in the telecommunication industry, ranging from 3G mobile Internet services to online broadband TVs. One important technological innovation that can potentially have a significant impact on consumers' daily life is MDS, which are digital data services that can be accessed through a mobile phone. MDS allow consumers to conduct multimedia communication and access online infotainment. As a result, the MDS innovation has the potential to be a "killer application" that creates a new era in mobile commerce, influencing consumers' life. This is already a reality in countries with high-mobile phone penetration rates, such as Hong Kong, Japan, South Korea, the Scandinavian countries, and the U.S. [40], [41].

MDS and their use by consumers have some interesting characteristics. First, as discussed earlier, because MDS are mobile, they fit the lifestyle of consumers in diversified contexts. Second, MDS can be personalized, thus allowing consumers to use services in ways that suit their personal needs. For example, consumers can personalize their mobile phones with ring tones, selected types of news feed, and unique screen interface preferences. Third, MDS are highly visible as they are often used by consumers in public. According to Kunda [42], the use of an innovation (here, MDS) in a social setting provides the means for an individual to communicate his or her personal attributes to observers. Consumers can deliberately select MDS that are compatible with a particular social setting. For example, teenagers are motivated to use SMS in highly visible ways in order to maintain a high level of cohesiveness with their peers. In sum, MDS are becoming anytime, anyplace personal accessories to consumers in social settings. In this study, we use MDS as an exemplar of ICT services.

III. HYPOTHESIS DEVELOPMENT

Prior studies on technology acceptance have tested various models, such as TAM and theory of planned behavior (TPB), in both organizational and consumer settings. There were also studies that examined important external factors that influenced user beliefs [43]. As consumers have more direct interactions and knowledge about ICT services, not the underlying technology, we expect them to develop beliefs, attitude, and therefore, BI about ICT services. Thus, beliefs proposed in UTAUT can be applied to characterize consumer reactions to ICT services. For example, in the context of MDS, most consumers are likely to

find it difficult, if not impossible, to associate technical terms, such as *network bandwidth* and *packet-switching data transfer*, or the more general, *mobile Internet technology* with any specific benefits they can gain from MDS. However, they will quickly learn that they can share real-time experiences by using vivid mobile MMS with their friends, improve their personal efficiency with on-time financial information, such as real-time stock quotes and relax by enjoying games or TV programs anytime, anywhere.

With regard to the original relationships in UTAUT, we believe that the proposed direct effects of PE, EE, and SI on BI to use a technology will hold in the context of consumer acceptance of ICT services. Consumers will use MDS if the services are useful (i.e., meet their personal needs), easy to use, and considered as worth using by important others. We also retain the moderation effects of demographic variables, such as age and gender, as controlled covariates in the model. However, we will focus on the key extensions we make, i.e., the direct impact of FC on BI and the moderating effects of ICT service type.

For the consumer ICT service context, we make one change to the original UTAUT related to FC. While the original hypothesis in UTAUT for the work context argued for no direct effect of FC on BI, we suggest that there would be an effect in the consumer MDS context. As discussed earlier, ICT services are very diverse, thus making it difficult for consumers to learn all there is to know about various services. Also, unlike employees in organizational settings who can, on most occasions, contact an internal ICT department for training or assistance, consumers generally lack efficient and convenient access to formal channels of support about services. This is particularly true for MDS because consumers need different services in different contexts. While consumers are supposed to be able to access MDS for communication and infotainment ubiquitously, in reality, there are practical constraints that restrict mobility. These constraints include nondeployment of the necessary network infrastructure in certain geographical areas, MDS services that are operator-specific, and unresolved technical issues affecting universal roaming. As a result, network coverage is not as expansive as envisaged to ensure ubiquitous mobility. In sum, these unique characteristics of MDS are the justification for the direct effect of FC on BI to use MDS.

The various moderating effects of gender, age, and experience on the different relationships are well documented [13]. The theoretical justification for each of these moderators working separately and in tandem has been developed, and empirically demonstrated in a series of papers [13], [35], [44], [45]. It is not our intent to challenge these arguments or empirical findings but rather to suggest that, depending on the type of ICT service, these moderators will play a *differential* role, i.e., in some cases, the moderators will be particularly pronounced, while in other cases, they may be weak or even nonsignificant. Such contingencies depending on service type will require expanding the theoretical domain related to UTAUT to the context of ICT services and increasing the contextualization of UTAUT, thus making this a key next step in leveraging UTAUT to understand consumer use of ICT services.

A. Moderation of the PE–BI Relationship

In their review, Venkatesh *et al.* [13] found that PE[6] has been consistently strong in explaining BI across many studies and technologies and the effect has been found to be stable over time, even as user experience with a technology increases. Similarly, in UTAUT, user experience with the target technology is not theorized to be a moderator of the PE–BI relationship. Thus, we expect the effect of PE on BI would be similar for both potential and current consumers. Given its proven effect on user ICT acceptance behavior, in the ICT service context, where different services are supposed to help consumers perform personal activities, it is hypothesized that PE would influence BI. For instance, real-time stock quotes, mobile banking services or other mobile business solutions can all improve the personal productivity of consumers. In fact, performance gains in the form of utilitarian outcomes has been found to be a major factor in the consumer context, e.g., affecting PC acceptance in homes [25].

The history of MDS shows that communication services preceded infotainment services [46]. Consequently, communications services, compared to infotainment services, are more widely accepted and used among consumers [36], [37]. After the phenomenal commercial success of SMS in countries like Japan, South Korea, and the Scandinavian countries, such simple mobile communications services seem to have been taken for granted and viewed as being inseparable from mobile services. In contrast, infotainment services, such as news and mobile games, have only become available more recently and are still evolving. This type of service may be viewed as a value-added service by consumers when compared to their view of communications services. Further, the repertoire of infotainment services enables users to use different applications to satisfy various needs, ranging from information acquisitions (e.g., news, weather, and financial information) to leisure activities (e.g., music downloads). The varying use contexts and greater range of infotainment services are likely to be perceived by consumers as being more useful in various daily activities, compared to that of communications services that help consumers to meet the sole purpose of communicating with others. Therefore, PE will be more important in the context of infotainment services.

The moderation of the PE–BI relationship by gender [45], age [44], and in tandem [13], [35] is well documented in the literature. This prior research predicts that PE will be moderated by age and gender such that it is most important to younger men. While both infotainment and communication services have the potential to be viewed as beneficial by consumers, we believe that the moderating effects will be more pronounced in infotainment services. Several infotainment services are, particularly, targeted toward providing consumers with greater effectiveness in day-to-day activities, e.g., financial news and sports scores. Compared with communication services that mainly satisfy consumers' social needs, infotainment services improve their work or life efficiency with timely and even location-based informa-

tion, such as real-time stock quotes and street navigation guides. We expect that the purpose of infotainment services makes PE more important in the case of infotainment services among younger men, who would typically place a greater emphasis on effectiveness and are more task-oriented [13].[7] Therefore, we hypothesize as follows.

> H1: The effect of performance expectancy on behavioral intention will be moderated by gender, age, and service type, such that the effect will be strongest for younger men and particularly for infotainment services.

B. Moderation of the EE–BI Relationship

We argue for differential moderating effects of the EE relationship with BI across the services among potential consumers (i.e., no experience with MDS) and current consumers (i.e., low to high experience with MDS). Prior research has argued that gender X age X experience moderates the EE–BI relationship [13]. Among consumers with experience, we expect the interaction term to be more pronounced in the context of infotainment services. We attribute our prediction to the lack of stability in mobile infotainment services, i.e., features are constantly added, interfaces change, and the application and service spaces change. As predicted by the International Telecommunication Union [36], due to the rapid technological advances in bandwidth and transmission, more information and entertainment services have become a reality. Learning and relearning the application and services space will be a constant challenge in order to effectively use infotainment services, particularly given the small form factor of mobile devices [27]. Those groups, who are typically concerned about EE (e.g., older women) will be particularly affected by these problems. As EE often operates as a hurdle, it can increase in importance when the use of a system is perceived to be more effortful [31]. With experience, as consumers get accustomed to the many keystrokes necessary to use communication services, we can still expect EE to be important, but given the stability of communication services, EE will not be as important to consumer decision making as it would be in the ever-changing landscape of infotainment services. Consistent with prior research on the EE–BI moderation by gender, age, and experience, we expect EE to be most important among older women in early stages of experience and this effect to taper off with experience using communication, but not infotainment, services. Thus, we hypothesize as follows.

> H2a: For current consumers, the effect of effort expectancy on behavioral intention will be moderated by gender, age, experience, and service type, such that the effect will be strongest for older women in early stages of experience and particularly for infotainment services.

When it comes to potential consumers, we expect the differences between the services to be the opposite of what was predicted for current consumers. Using a small and inconvenient keypad for SMS and mobile chatting will be far more

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[6]Despite the different labeling of PE in different models (e.g., perceived usefulness: technology acceptance model, extrinsic motivation: motivational model, and relative advantage: innovation diffusion theory), the conceptual similarities among them have been acknowledged in many prior studies [13].

[7]We note that this is a generalization and our statements are not meant to suggest that everyone in a particular group (e.g., older women) would behave the same way. Also, we imply no value judgments. Finally, it should be noted that such general statements and broad categorizations are commonly applied in social sciences research.

burdensome than the effort needed in terms of keystrokes to use infotainment services, where they can usually browse information or download services via a few steps using a menu. The effort required in terms of keystrokes, in particular, has been seen as a key determinant of ease of learning and error rate, especially early in one's learning life cycle [47]. In sum, we expect EE will have a greater influence on BI for potential communication services' consumers, particularly older women. Thus, we hypothesize as follows.

> H2b: For potential consumers, the effect of effort expectancy on behavioral intention will be moderated by gender, age, and service type, such that the effect will be strongest for older women and particularly for communication services.

C. Moderation of the SI–BI Relationship

SI is the normative pressure based on social values that define normal behavior for a group to which an individual belongs [48]. In much prior research, SI has been an important determinant of individuals' BI to use ICTs [45], [49] and consumers' intentions to purchase products [50], [51]. In the consumer ICT service acceptance context, we believe that the influence of peers, family, and superiors would affect BI because using MDS could help them maintain membership [52] or achieve status, such as recognition or leadership [39] within a social group.

We expect that the effect of SI would be more important for communication, rather than infotainment, services. Given that the major function of mobile communications services, represented by SMS, is to connect consumers electronically, the role of SI will undoubtedly be strong. For example, teenagers subscribe to SMS in order to be connected to peers because the use of SMS is a necessary condition to obtain and maintain membership in certain social groups [52]. In a survey of young consumers, Carroll *et al.* [53] found that those, who do not use communications services, such as SMS, appear to struggle to maintain social ties. In contrast to communication services that facilitate building and maintaining networks among consumers, information services (e.g., weather, dictionary, map, and stock information) and entertainment services (e.g., music downloads) focus on the needs of individuals. Infotainment services, by definition, do not target social interaction related use.

We argue that SI will have a stronger direct effect for communication services when compared to the effect it will have for infotainment services due to the social activities that the former supports. Using this logic, combined with the general logic presented in the PE and EE moderation hypotheses, we suggest that moderation of the SI–BI relationship by gender, age, and experience will be stronger in the context of communication services. Among potential consumers, i.e., those with no experience—SI will play a strong role, particularly among certain groups—e.g., older women [13], [35]. The rationale for this is their responsiveness to informational input from others and their own social needs. Such responsiveness to SIs will be stronger when the technology in question is socially oriented, thus resulting in the moderation by gender, age, and experience being more pronounced among communication services. A similar rationale holds for current consumers. However, as they acquire experi-

ence, the moderating role of SI typically declines steadily, but not so in the case of communication services, where we expect a much slower tapering off due to the continuing social pressure, critical mass, and network externality effects [54]. Thus, we hypothesize as follows.

> H3a: For potential consumers, the effect of social influence on behavioral intention will be moderated by gender, age, and service type, such that the effect will be strongest for older women and particularly for communication services.

> H3b: For current consumers, the effect of social influence on behavioral intention will be moderated by gender, age, experience, and service type, such that the effect will be strongest for older women in early stages of experience and particularly for communication services.

D. Facilitating Conditions

Consumers' perceptions of the resources and opportunities available to perform a behavior influence BIs [55]–[58]. In this paper, FC can be interpreted as the extent to which MDS is perceived as being able to provide pervasive and timely connections. Whether or not users can access MDS seamlessly and in a timely manner can be viewed as an important environmental factor that may impede or facilitate MDS use. Such access issues will be pertinent for both types of services. However, the relationship is expected to be stronger in the infotainment group than it will be in the communication group. Consumers are typically already familiar with the various contexts, where mobile communication services, such as voice calls and SMS, are used. In contrast, the various contexts for mobile infotainment services are relatively new to consumers and require more facilitation for smooth use. For example, computer games, especially multiplayer games over networks, are usually played at home in a stationary environment, where it is relatively easy to achieve immediate network connection, and stable and smooth data transfer. However, it is difficult for consumers to adapt to playing games in a mobile context, such as in a moving vehicle, due to either unresolved technical issues affecting smooth data transfer or mobility constraints [59]. Overall, compared to mobile communications services to which consumers have already adapted, infotainment services are new and mobile contexts amplify the importance of FC to consumers. Thus, we hypothesize as follows.

> H4: The effect of facilitating conditions on behavioral intention will be stronger for infotainment services than for communication services.

IV. METHOD

A. Participants and Data Collection Procedure

Our study was conducted in Hong Kong that has a mobile penetration rate of over 100%[8] and an Internet penetration rate of over 90%. These high-penetration rates suggest that every resident in Hong Kong is a potential consumer of MDS. In order

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[8]The 100% penetration rate is for mobile voice service only, not MDS. There is still a significant portion—nearly a third—of the Hong Kong population, who do not use MDS [37].

to reach out to as many residents as possible, we conducted an online survey through a popular portal. This government portal provides residents with a wide array of e-government services, such as filing tax returns, booking public facilities, checking traffic information, appointment booking for various government services, and renewal of driving licenses. The portal is open to all residents of Hong Kong.

E-mails advertising the online survey were sent to registered members of the government portal. In addition, a banner advertisement for the survey was placed on the portal for four weeks to attract nonmembers. As an incentive, those who completed the survey were entered into a lucky draw to win various prizes. To decrease the possibility that a respondent participates in the study more than once, each respondent had to provide his or her mobile phone number and identity card number. Later, responses with duplicate phone numbers or identity card numbers (less than 50 duplicate entries) were dropped from the sample. The use of online surveys has gained popularity. Although such surveys tend to target the more technologically savvy, often younger consumers, in Hong Kong, where the technology sophistication and Internet penetration is over 90%, an online survey can still reach much of the population, and thus, provide a representative sample.

To help categorize the participants into potential and current consumers, the first question asked if the respondent was using MDS at the time of the survey. Based on the answer, the participants were presented with either the potential consumer's or the current consumer's questionnaire. The participants were then asked to indicate the primary category of MDS (i.e., communication versus infotainment) they were interested in adopting (i.e., for potential consumers) or in continuing to use (i.e., for current consumers). We thus distinguished consumers of communication and infotainment services. Our final sample consisted of 4777 participants of which 2269 were women (47.5%). Among the 1212 potential consumers, 391 were interested in communication services and 821 were interested in infotainment services. In the case of the 3565 current consumers, 2314 were primarily using communication services and 1251 were primarily using infotainment services.

B. Measurement

All the scales were adapted from prior research [13] and rephrased to suit the MDS acceptance context. For potential consumers, the items were phrased in the form of future expectations, and for current consumers, the items were phrased in the form of expectations after having prior experience. All items were measured using a seven-point Likert scale with the anchors being "strongly disagree" and "strongly agree." Age was measured in years. Experience was measured in months since the first acceptance of MDS. Gender was coded using a dummy variable, where 1 represented men and 0 represented women.

We created two questionnaires, i.e., one for potential consumers and one for current consumers, which were reviewed for content validity by a group of university staff and a group of IS academics. As the questionnaires were administered in Chi-

nese, the language used predominantly by the local residents in Hong Kong, we had the English questionnaire professionally translated to Chinese and then back to English to ensure translation equivalence [60]. There were minor wording differences that were discussed and resolved. The questionnaires were pilot tested among about 200 mobile phone users. We found preliminary evidence that the scales were reliable and valid.

V. RESULTS

We used partial least squares (PLS) to analyze the two datasets: current and potential consumers. In each of the cases, the data were analyzed separately by service type and also pooled across service types. The measurement model results were consistent across all datasets. Given the space constraints, we report the measurement model results related to the data pooled across service types. The measurement model provided the results related to reliability and validity of the scales. The internal consistency reliabilities (ICRs) for all the scales were greater than 0.80, suggesting that all scales were reliable (see Table I). The loadings and cross loadings revealed that one item of PE cross-loaded significantly on other constructs and was dropped. We reran the analysis and found the remaining items loaded highly (greater than 0.75) on their prescribed constructs with low cross loadings (see Table I), thus supporting internal consistency and discriminant validity. Table II shows that the average variance extracted (AVE) for all the scales were above the recommended 0.50 level [61], thus providing further support of internal consistency. All the squared correlations between constructs were lower than the AVEs of the respective constructs, providing further evidence of discriminant validity [62]. The descriptive statistics and correlations are presented in Table II and the latter were all in the expected directions. To check for the significance of common method variance, we first used Harman's single-factor test [63]. The scree plot test and eigenvalues clearly revealed the presence of five factors among the measures. In addition, no general factor was apparent in the unrotated factor structure. Further, we followed Liang *et al.*'s [64] approach. Using PLS, we specified a method factor together with the original latent variables in the measurement model and calculated the squared-factor loadings for both the method factor and the substantive factors (i.e., original latent variables). The average variance explained (i.e., average squared loadings) by the substantive factors is around 0.70, while that by the method factor is about 0.01, thus suggesting that common method variance is not of great concern in this study.

The hypotheses were tested by examining the structural model results. We first examined the correlation tables for evidence of multicollinearity among the exogenous constructs (see Table II). The highest correlation between the exogenous constructs was 0.65, which was well below the 0.90 threshold [61]. To reduce multicollinearity among the interaction terms, the variables used to create interaction terms were centered before creating the interaction terms [65]. This method is consistent with that used in the original UTAUT paper [13]. Separate structural model tests were conducted to test the models for the two different MDS. For each combination of type of consumers (i.e., potential

TABLE I
ICRs AND FACTOR ANALYSIS RESULTS

Current Consumers (n=3565)

Construct		1	2	3	4	5
Performance Expectancy (ICR=0.85)	PE1	**0.83**	0.19	0.19	0.14	0.13
	PE3	**0.80**	0.20	0.22	0.12	0.10
	PE4	**0.81**	0.14	0.25	0.17	0.08
Effort Expectancy (ICR=0.91)	EE1	0.10	**0.78**	0.14	0.28	0.05
	EE2	0.17	**0.82**	0.09	0.24	0.19
	EE3	0.18	**0.81**	0.13	0.29	0.23
	EE4	0.14	**0.80**	0.15	0.30	0.32
Social Influence (ICR=0.91)	SI1	0.23	0.20	**0.78**	0.26	0.22
	SI2	0.25	0.14	**0.84**	0.17	0.14
	SI3	0.28	0.15	**0.86**	0.15	0.13
Facilitating Conditions (ICR=0.91)	FC1	0.16	0.32	0.15	**0.82**	0.21
	FC2	0.16	0.28	0.18	**0.81**	0.22
	FC3	0.11	0.27	0.16	**0.85**	0.10
	FC4	0.13	0.27	0.14	**0.83**	0.08
Behavioral Intention (ICR=0.91)	BI1	0.21	0.08	0.13	0.22	**0.85**
	BI2	0.22	0.05	0.15	0.19	**0.82**
	BI3	0.20	0.25	0.14	0.14	**0.83**
Final Eigenvalue		2.48	3.15	2.42	3.33	2.50
% of Variance		14.4	18.3	14.0	19.3	14.5

Potential Consumers (n=1212)

Construct		1	2	3	4	5
Performance Expectancy (ICR=0.86)	PE1	**0.79**	0.12	0.23	0.10	0.12
	PE3	**0.81**	0.21	0.14	0.20	0.14
	PE4	**0.81**	0.15	0.20	0.16	0.09
Effort Expectancy (ICR=0.92)	EE1	0.25	**0.76**	0.14	0.21	0.08
	EE2	0.17	**0.83**	0.12	0.23	0.12
	EE3	0.13	**0.82**	0.15	0.28	0.20
	EE4	0.12	**0.80**	0.18	0.31	0.28
Social Influence (ICR=0.95)	SI1	0.26	0.24	**0.76**	0.24	0.25
	SI2	0.21	0.15	**0.87**	0.17	0.18
	SI3	0.25	0.13	**0.87**	0.13	0.20
Facilitating Conditions (ICR=0.93)	FC1	0.16	0.28	0.13	**0.83**	0.08
	FC2	0.13	0.31	0.15	**0.82**	0.14
	FC3	0.11	0.25	0.15	**0.80**	0.12
	FC4	0.15	0.26	0.12	**0.85**	0.01
Behavioral Intention (ICR=0.91)	BI1	0.20	0.09	0.12	0.22	**0.84**
	BI2	0.21	0.04	0.14	0.20	**0.81**
	BI3	0.18	0.24	0.18	0.15	**0.80**
Final Eigenvalue		2.48	2.43	3.13	2.44	3.29
% of Variance		14.9	14.6	18.9	14.7	19.8

Notes: 1. ICR= Internal Consistency Reliability.
2. PE2 (see Venkatesh et al. 2003) was dropped due to a low loading and high cross-loadings.

TABLE II
DESCRIPTIVE STATISTICS AND CORRELATIONS

Current Consumers (n=3565)

	Mean	S.D.	PE	EE	SI	FC	BI	Gdr	Age	Exp
PE	4.33	1.21	.78							
EE	5.07	1.18	.39	.76						
SI	4.05	1.33	.53	.43	.70					
FC	5.11	1.19	.41	.63	.40	.68				
BI	4.74	1.22	.34	.46	.39	.47	.73			
Gdr	0.52	0.50	.05#	.06#	.02#	.00#	.01#	NA		
Age	28.60	7.30	.08	-.02#	-.01#	-.01#	-.02#	.26	NA	
Exp	23.29	16.90	.06#	.09	.05	.07	.11	.00#	.00#	NA

Potential Consumers (n=1212)

	Mean	S.D.	PE	EE	SI	FC	BI	Gdr	Age	
PE	4.32	1.14	.83							
EE	5.02	1.21	.43	.71						
SI	4.12	1.28	.56	.46	.65					
FC	5.03	1.19	.48	.65	.46	.62				
BI	4.19	1.24	.51	.52	.54	.51	.69			
Gdr	0.55	0.50	.03#	.09	.02#	.01#	.07	NA		
Age	31.65	9.46	.04#	-.01#	.02#	.01#	.04#	.19	NA	

Notes: 1. Gdr = Gender; Age = Age; Exp = Experience (in months).
2. # Non-significant correlations. All others are significant at the 0.001 level.
3. Diagonal elements are AVEs and off-diagonal elements are correlations.

TABLE III
RESULTS OF MODEL TESTING FOR POTENTIAL CONSUMERS

Dependent Variable: Behavioral Intention

	Pooled (n=1212)		Communication (n=391)		Infotainment (n=821)	
	D only	D + I	D only	D + I	D only	D + I
R^2	.55	.66	.55	.65	.55	.65
Performance expectancy (PE)	.29***	.17***	.24***	.25***	.33***	.16***
Effort expectancy (EE)	.22***	.19***	.17***	.08	.23***	.20***
Social influence (SI)	.32***	.29***	.42***	.45***	.29***	.28***
Facilitating conditions (FC)	.12**	.10**	.13**	.10	.12**	.12***
Age (AGE)		.03		.07		.00
Gender (GDR)		.03		-.01		.03
AGE x GDR		.01		.07		.05
PE x GDR		-.05		.02		-.02
EE x GDR		.02		.12		.02
SI x GDR		-.04		-.02		-.07
PE x AGE		.07**		-.05		-.10
EE x AGE		.04		-.07		.09
SI x AGE		.11**		.16**		.06
PE x GDR x AGE		.12*		.07		.23***
EE x GDR x AGE		.11*		.22***		-.03
SI x GDR x AGE		-.17*		-.26***		-.08

Notes: 1. D only: Direct effects only; D + I: Direct effects and interaction terms.
2. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

or current consumers) and service type (i.e., communication, infotainment, or pooled), both the direct effects model and the full model including interaction terms were analyzed. Tables III and IV present the results for potential and current consumers, respectively.

As predicted by H1, the effect of PE on BI was moderated by age, gender, and service type. For potential consumers (see Table III), the effect was strongest among younger men in the context of infotainment services ($0.23^{***} > 0.07$). Similar results can be observed in Table IV ($0.32^{***} > 0.19^{***}$). In the case of EE, as theorized by H2a, its effect on BI of current consumers was moderated by gender, age, experience, and service type, such that the effect was strongest for older women at early stages of experience and particularly for infotainment services (see Table IV: $0.19^{***} > 0.11^{*}$). For potential consumers, the effect of EE on BI was moderated by gender, age, and service type, such that the effect was strongest for older women and particularly for communication services, thus supporting H2b (see Table III: $0.22^{***} > -0.03$). In the case of SI, its effect on BI of potential consumers was moderated by gender, age, and service type, such that the effect was strongest for older women and particularly for communication services, thus supporting H3a (see Table III: -0.26^{***} versus -0.08). For current consumers, the effect of SI on BI was moderated by gender, age, experience, and service type, such that the effect was strongest for older women in early stages of experience and particularly for communication services, thus supporting H3b (see Table IV: -0.35^{***} versus 0.02). FC had a significant positive effect on BI. This relationship was true for both potential and current consumers, and for both communication and infotainment services. This finding supported our inclusion of FC as a determinant of BI for the MDS context. Contrary to H4 (see Table III: 0.13^{**} versus 0.12^{**} and Table IV: 0.23^{***} versus 0.23^{***}), however, the effect of FC on BI was not significantly different across the two types of MDS. The patterns of results reported here were confirmed using split-sample analyses combined with Chow's tests[9] and interaction plots. In examining the support for the

[9] http://disc-nt.cba.uh.edu/chin/plsfaq/plsfaq.htm

TABLE IV
RESULTS OF MODEL TESTING FOR CURRENT CONSUMERS

Dependent Variable: Behavioral Intention						
	Pooled (n=3565)		Communication (n=2314)		Infotainment (n=1251)	
	D only	D + I	D only	D + I	D only	D + I
R^2	.39	.50	.40	.53	.40	.50
Performance expectancy (PE)	.30***	.10***	.28***	.08*	.31***	.17***
Effort expectancy (EE)	.14**	.26***	.15**	.26***	.14**	.22***
Social influence (SI)	.14**	.15***	.16**	.18***	.13**	.10*
Facilitating conditions (FC)	.21***	.20***	.23***	.23***	.23***	.15***
Age (AGE)		-.02		-.04		.04
Gender (GDR)		-.01		.03		-.08*
Experience (EXP)		.04		.03		.05
GDR × AGE		-.02		.01		-.05
AGE × EXP		-.02		-.03		.02
GDR × EXP		.04		.04		.02
GDR × AGE × EXP		.01		.01		-.02
PE × GDR		.01		.04		-.06
EE × GDR		-.01		-.04		.09
SI × GDR		-.04		-.02		-.03
PE × AGE		.02		.01		.05
EE × AGE		.05		.04		.01
SI × AGE		-.04		-.01		-.08
EE × EXP		.00		.04		.04
SI × EXP		.01		.02		-.02
PE × GDR × AGE		.26***		.19***		.32***
EE × GDR × AGE		-.01		-.06		.04
SI × GDR × AGE		.05		.02		.07
EE × GDR × EXP		.07		-.05		.04
SI × GDR × EXP		.02		.01		.04
EE × AGE × EXP		-.02		-.02		-.11*
SI × AGE × EXP		.06*		.07*		-.02
EE×GDR×AGE×EXP		.15**		.11*		.19***
SI×GDR×AGE×EXP		-.26***		-.35***		.02

Notes: 1. D only: Direct effects only; D + I: Direct effects and interaction terms.
2. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

TABLE V
SUMMARY OF HYPOTHESES TESTING

Hypothesis	Supported?
H1: The effect of performance expectancy on behavioral intention will be moderated by gender, age and service type, such that the effect will be strongest for younger men and particularly for infotainment services.	Yes
H2a: For current consumers, the effect of effort expectancy on behavioral intention will be moderated by gender, age, experience and service type, such that the effect will be strongest for older women in early stages of experience and particularly for infotainment services.	Yes
H2b: For potential consumers, the effect of effort expectancy on behavioral intention will be moderated by gender, age and service type, such that the effect will be strongest for older women and particularly for communication services.	Yes
H3a: For potential consumers, the effect of social influence on behavioral intention will be moderated by gender, age and service type, such that the effect will be strongest for older women and particularly for communication services.	Yes
H3b: For current consumers, the effect of social influence on behavioral intention will be moderated by gender, age, experience and service type, such that the effect will be strongest for older women in early stages of experience and particularly for communication services.	Yes
H4: The effect of facilitating conditions on behavioral intention will be stronger for infotainment services than for communication services.	No

different models, UTAUT explains 50%–66% of the variance in BI and performs much better in the case of potential consumers than it does in the case of current consumers. We summarize the results of the hypotheses testing in Table V.

VI. DISCUSSION

We proposed an extended version of UTAUT for the context of consumer acceptance of ICT services. This model received strong support in a field study of 4777 consumers. As expected, PE, EE, and SI had significant effects on consumers' BI and these effects were moderated by age, gender, and experience. The role of service type as a moderator received strong support. By theorizing about mass market ICT service acceptance, our paper contributes to the theory and practice of digital service management in particular and the research on technology acceptance in general.

A. Theoretical Contributions and Implications

In contrast to organizational settings, where external support is provided by an ICT department and that too at no cost to employees, consumers of personal ICT services generally do not have convenient and free access to such resources. Thus, FC become important in determining consumers' BI to use ICT services. We found that both potential and current consumers of ICT services needed support, with the effect being stronger for current consumers, indicating that the need for support becomes particularly pronounced when consumers use MDS. These results provide empirical support for our theorized direct effect of FC on BI in UTAUT, specifically in the context of digital service management.

Technology acceptance models, especially TAM and UTAUT, are regarded by some as only applicable to the acceptance decision, i.e., the context of nonusers becoming users of a particularly ICT. When ICT continuance is the focal issue, the expectation-confirmation theory (ECT) [66] is considered to be more appropriate. However, we contend that UTAUT is also applicable to continued use behavior given that experience is characterized in the model as an important moderator. Given that both BI and use were measured at different points in time, UTAUT essentially characterizes the stabilization of use behavior, and thus, models ICT continuance. UTAUT also provides a viable alternative to ECT as it expands the singular perceived usefulness belief in ECT to include other beliefs that are important in different contexts of technology acceptance and continued use. For example, in the context of MDS, other beliefs, i.e., EE, SI, and FC, play important roles in determining continued use of ICT. An interesting future research direction arising from this paper is to integrate UTAUT and ECT in a theoretically meaningful way so as to incorporate ideas related to disconfirmation into the UTAUT framework.

We have proposed differential influences of the proposed factors across ICT service categories. As suggested by Orlikowski and Iacono [33], there is *multiplicity* in the nature of most ICTs—here, in the case of MDS, the variety of services provide different types of value to consumers and require different levels of human-device interactions—and should not be considered as a single black box. We dealt with this issue by hypothesizing the moderating role of ICT service type based on the underlying characteristics of different types of services. Particularly, we pointed out that communication services are more homogeneous in that they mainly serve a single purpose—facilitate

interpersonal communications. In contrast, infotainment services are more heterogeneous as they satisfy different consumer needs, i.e., both information and entertainment in various use contexts, such as reading the news or playing a game, while waiting for the bus. Moreover, different service types may be subject to different usability constraints [27]. These key differences lead to ICT service type playing a key moderating role in UTAUT. For instance, for potential consumers, the main effects of PE and EE were stronger for infotainment services, while the main effect of SI was stronger for communication services. Also, for current consumers, the interaction effect of PE, gender and age was stronger for infotainment services. Significant differences between service types were also found with the interaction terms for EE and SI among current consumers. Overall, the specification of ICT service type as a moderator produced meaningful and interesting insights into consumers' ICT service acceptance and use decisions.

It is also interesting to compare the results from the potential consumers sample with those from the current consumer sample. As we discussed earlier, going from "no experience" to "some experience" with ICT services is a fundamental change for consumers because ICT services are used under dynamic contexts and consumers do not have the luxury of formal training or technical support as enjoyed by employees of organizations. Particularly, the main effects model explained greater variance in the potential consumers sample than it did in the current consumers sample ($R^2 = 0.55$ versus 0.39). This result suggests that for potential consumers, who have no experience with dynamic use contexts, the four main factors can already predict BI to a large extent. However, for current consumers, the interactions among demographic profiles, use experiences and service type must be taken into account to explain BI to a large extent. Also, potential consumers relied more on SI or word of mouth to make decisions than did current consumers ($\beta = 0.32$ versus 0.14). In contrast, current consumers tend to place greater emphasis on FC than do potential consumers ($\beta = 0.21$ versus 0.12). All these differences point to the importance of use experience. Thus, consumers without experience with the ICT service tend to rely more on other people's opinions, whereas after gaining ICT service experience, they realize the importance of FC in the diversified and dynamic context. Overall, our results support the notion that potential consumers' decision making is essentially different from current consumers.

To examine the differences between ICT services and technology acceptance, we compare our results to those from the original UTAUT study of Venkatesh *et al.* [13]. However, this is only a general comparison as there are a number of differences in the specifications of both models and comparing models across studies has limitations. Regarding the variance explained, our empirical test generated lower R^2 than that in the original UTAUT study. This is not surprising because, unlike the relatively stable environment inside organizations, consumers are using ICT services in much more diversified and dynamic contexts. Also, consumers are relatively more heterogeneous than employees in organizations in terms of backgrounds, preferences, etc. Moving UTAUT from the organizational context in which and for which it was developed to the ICT services for

consumers context was bound to reveal some boundary conditions associated with the relationships specified in the original model.

There are several implications for these results. First, it suggests that there may be other contextual variables that can explain consumer acceptance of ICT services, and future research should incorporate these variables into the extended UTAUT for ICT services. Second, it may be fruitful to further delineate the ICT service type construct. While we used a dichotomous measurement of ICT service type and test its moderating effects, future research can conceptualize ICT service type as a multidimensional, multilayered construct, and develop a refined measurement for it.[10] Some ways to do so include developing a comprehensive taxonomy of ICT service type, or conceptualizing the dimensions of context, task, and social setting related to the ICT service type. Third, there may be a need to develop an improved model for ICT service acceptance by using a more general motivation model (e.g., TPB) as the starting reference point[11], and then, extending it with ICT-related service variables, possibly using the concept of SaaS[12] to distinguish service and technology. Finally, there are differences between our study and the original UTAUT study in terms of the main effects of each individual factor.[13] As discussed in Section II, we expected that SI, EE, and FC will be of greater importance in the case of ICT services among consumers than they were among employees. This is mainly because ICT services are subject to diversified and ever-changing use contexts. Our empirical results basically support these propositions, i.e., all the three factors had significant effects on BI in the main effects model, while in the original UTAUT study, not all factors were significant in the main effects model, especially with increasing experience. Our results were robust for both potential and current consumers of ICT services. Thus, when ICT services are continually used by consumers on a long-term basis, all the four UTAUT factors remain important across time, even though as experiences increases, the relative importance of some factors may be reduced. This analysis again supports our contention that ICT services for consumers are different from technology acceptance within organizations.

B. Managerial Implications

Our findings have managerial implications, particularly in terms of service management for ICT service providers. First, FC are important in consumer decision making about ICT service acceptance because there is no systematic and readily available third-party support for consumers' use of ICT services. Thus, service providers need to find ways to provide relevant and timely support to ensure acceptance of their services, e.g., online user communities and online demo of services and/or device use may be helpful in this situation. For instance, when

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[10]We thank a reviewer for this suggestion.

[11]We thank a reviewer for this suggestion.

[12]http://en.wikipedia.org/wiki/Software_as_a_Service

[13]As the original UTAUT model consists of higher order interaction terms with voluntariness included, we can only compare the results for the main effects.

Apple's iPhone was first introduced in the market, it provided an online demo to facilitate its use (e.g., how to interact with the touch screen). In fact, when iPhone 3G was introduced, a similar "guided tour" was launched on Apple's Website.[14] Consumers should be able to access support anytime anywhere. Particularly, geographic coverage of service networks is crucial to maintain the anytime-anywhere nature of MDS. Providing ongoing support after acceptance is also important because only during use of ICT services do consumers realize the importance of support. This is confirmed by our finding that current, more than potential, consumers of MDS placed greater weight on FC.

Second, the moderating role of ICT service type suggested that service providers are facing the challenge of managing the diversity and heterogeneity of ICT services. Our findings suggested that service type has significant impacts across both the main effects and the interaction effects among most factors that influence ICT service acceptance. Particularly, given that the original moderators in UTAUT that were relevant to the services context were individual characteristics, the addition of service type implies that fitting user type to service type may be an effective strategy to influence consumers' BI and behavior. For instance, the stronger interaction effect of PE, age, and gender in the infotainment samples suggest that consumers of different demographic profile assign different weights to the effectiveness gains from using mobile infotainment services. In contrast, potential consumers, regardless of age and gender, assign the same weight to the PE of communication services. Thus, service providers need to segment consumers of infotainment services with greater precision—i.e., by age and gender—when trying to understand the role of PE. In contrast, segmentation by age and gender is not necessary for potential consumers of communication services. Similarly, strategies that utilize SI should be targeted at the right consumer segment for communication services. In sum, the unique characteristics of each service category need to be addressed to achieve a better fit with different types of consumers.

Third, differences in the results between potential and current consumers suggest that ICT service providers need to employ different marketing strategies when designing their customer acquisition and retention plans. Basically, when trying to acquire new consumers, service providers can utilize the power of SI in their marketing communications to persuade people to subscribe to their services. For example, when introducing 3G services in Hong Kong, Hutchison rolled out a promotional plan for video phone calls at a significant discount subject to the condition that the subscriber brings in another person (e.g., a friend) as a new subscriber. In contrast, when dealing with existing consumers, there is a need for consumer segmentation based on which services can be personalized or customized to fit different consumer profiles. For instance, Yahoo! Mobile recently introduced a mobile service that allowed users to customize their mobile devices with information they regularly check on the Web, organize it by topic, drawing on Yahoo's collection of news services, and organize their social networks and contacts. Also, as noted earlier, FC, such as online help and call-center

services, are very much needed to assist current consumers in their service use.

Finally, the nonsignificant difference in the impact of FC on BI across service types may reflect the development stage of the infotainment industry. Despite the huge potential of the infotainment services sector, due to the relatively limited killer applications and functional constraints of mobile handsets,[15] many of the infotainment services have depended on preinstalled games or simple information downloads, which cannot be strictly labeled infotainment yet [36]. MDS consumers with such limited infotainment experience may not place a great premium on FC, such as network coverage and smoothness of connection. However, as wireless technology and mobile devices advance, consumers' infotainment experience will become more sophisticated with video streaming and location-based services. The success of these services will require favorable perceptions of FC. For example, consumers may want to watch video clips of the goals in soccer games in a timely and continuous fashion, or they may demand a location-based navigation guide anywhere on the streets. Thus, we expect the importance of FC to grow with technology evolution in mobile infotainment services.

VII. Conclusion

We proposed a model of consumer acceptance of ICT services by extending UTAUT. Grounded in the distinct characteristics of ICT services, we examined the moderating role of ICT service type. Further, to examine the generalizability of UTAUT to the consumer context and to both the acceptance stage and postacceptance stage, we empirically tested our model among potential and current consumers of the target ICT service, namely, MDS. Our model received strong empirical support with service type moderating key relationships and the moderated model explaining a large proportion of the variance (50%–66%) in BI to use ICT services. Our paper contributes to service science research by pointing out the important roles of service type (communication versus infotainment), consumer type (potential versus current), and FC when studying individual decision making about ICT services. Our extension of UTAUT, a synthesis of technology acceptance research, to the ICT service context can serve as a foundation for future research into ICT service management.

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