Review Paper

INDIVIDUAL ACCEPTANCE OF SMS-BASED SERVICES

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Abstract

Even Short Message Service (SMS) is a simple technology, but many businesses and governments utilize SMS for delivering various services and reaching more customers. This study reviewed existing studies on the profile of SMS adopters and collected motives for using three kinds of SMS-based services: individuals’ motivations for receiving SMS Notifications (push SMS services), requesting pull SMS services, and doing transactions through SMS. These understandings are important for businesses and governments that deliver services via SMS in formulating strategies to improve the acceptance of SMS-based service and contribute to next studies on SMS and mobile services’ adoption.

Key Terms: Short Messaging Service, Acceptance, Adoption, Mobile Services.

1. Introduction

Short message service (SMS) was created as part of the European Global System for Mobile communication (GSM) phase 1 standard and has become a basic feature on all mobile phones. It uses the network-signaling channel for transmitting and receiving data, so it does not consume voice-communication channels and resources. A single SMS message is no longer than 160 alphanumeric characters and contains no images or graphics.

Technically, SMS can be delivered via pull or push services. In pull services, a user must send a request message to a service number to get an automated reply from the SMS server. In push services, a server or an operator initiates sending the messages, users are not required to send a request SMS. Messages from a push service can be sent by an event-based application (push-event SMS), by a time scheduled-based application (push-scheduled SMS), by an application that uses a profile and preferences of the user (push-personal profile SMS), when the user approaches a certain location (push-location SMS), or broadcasted to all people in a particular area (using Cell-Broadcast Service) or to certain people registered in the database (using point-to-point SMS service).
Judged by the huge number of the users, it is argued that SMS is still the king of data applications (Marlatt, 2010). In 2009, there were 3.6 billion active SMS users around the globe, which is more than the number of worldwide Internet users at 1.9 billion people, a number that includes those who access from Internet cafes and from their mobile phones (Marlatt, 2010, Stats, 2010). SMS has been used broadly as a medium for numerous purposes including marketing, social, business, education, government and public communication. Thus, it needs to understand why many individuals are willing to use this seemingly simple communication medium.

This paper reviews the profile of SMS adopters, motives and psychological forces for using SMS, why individuals are willing to register for receiving SMS Notifications (push SMS services), to request pull SMS services, and to do transactions through SMS. These understandings are important for businesses and governments that deliver services via SMS in formulating strategies to improve the acceptance of SMS-based services. This study will also contribute to next studies on SMS and mobile services' adoption.

2. A profile of the majority adopters of SMS

A survey involving over 2000 SMS users in North America showed that the majority of adopters are teen/youth aged 11-17 years (27%) and young-adults aged 18-25 years (43%) (Barrabee, 2003). In terms of gender, females are more likely to prefer SMS as a communication channel (Peters et al., 2003, Rafi, 2008).

3. Motives and psychological forces for using SMS

A domestication research based study investigating how text messages fit into the everyday lives of users suggested that SMS had become an integral aspect and were used to manage their social lives (Barkhuus, 2005). SMS users send SMS to overcome their shyness or anxieties in communication, to carefully manage their interactions turn by turn, to perform appropriate behaviours such as keeping in touch or saying hello without calling, and to send information in a concise message. SMS has allowed senders to communicate with anyone without meeting or talking directly and gives flexibility to recipients to reply to the messages without the commitment of an immediate reply required in a telephone call. Both senders and recipients have flexibility in their communications. Users, particularly those who are on the move (such as in the streets, bus, or mall), used SMS because they could contact and interact with their peers whenever they want and wherever they are. From uses and gratifications studies, this is defined as motivation for seeking convenience in communication (Leung, 2007, Peters et al., 2003).

Supporting the Barkhuus' (2005) study, Peters et al. (2003) also suggest that SMS use is more often for intrinsic or social use like entertainment and social interaction than for instrumental or task-oriented use such as time efficiency. It was found that although male and female users do not differ with respect to the number of messages sent, female users are apparently more enthusiastic about using SMS as a means of communication than male users. This may be because females are more commonly shy in communication compared with males and SMS could accommodate this condition.

Leung (2007) suggests another two gratifications of SMS use: entertainment and fashion. His study found that people used SMS for seeking fun or happiness, such as sending
messages to participate on a TV show or to bet online via SMS. Other people, particularly those who were in public places, used SMS as a way of making a status statement of being stylish, fashionable, busy, or always connected with their peer networks.

Within the adoption research perspective, studies pertaining to an individual’s intentions to use SMS have been conducted on the basis of the TAM which suggested a significant influence of perceived usefulness and perceived ease of use (Aripin and Omar, 2007, Ramayah et al., 2006, Turel et al., 2007).

However, Baron et al.’s (2006) study argued that the TAM-based models are less useful for understanding technology use behaviour where there is a strong community component, such as SMS. The model should include social influence as another determinant since SMS allows the users to augment their face-to-face social encounters and to maintain their social bonds. Also, emotional aspects and cost considerations should be included.

Regarding the important roles of perceived cost and emotional aspects, Turel et al.’s (2007) study suggested that an aggregation of perceived quality of the SMS service, perceived value-for-money, and perceived emotional value could adequately predict and explain the phenomenon of SMS usage. In the pay-per-use technology such as SMS, factors that relate to the cost of system usage become essential (Grinter and Eldridge, 2001, Turel et al., 2007). “Many SMS users are price sensitive” (Turel et al., 2007). People may also use SMS for purely intrinsic reasons without feeling that there is effectiveness or efficiency outcomes. Other studies defined these emotional factors as perceived fun and perceived expressiveness (Aripin and Omar, 2007, Gong and Yan, 2004, Nysveen et al., 2005).

In the context of collaboration technologies, Dennis et al.’s (2003) study involving 349 SMS users in Finland also confirmed that perceived usefulness, perceived ease of use and attitude towards use are direct determinants of SMS adoption. The study also suggests that the three direct determinants of SMS adoption are also influenced by characteristics of the service including media richness, social presence, immediacy, and concurrency. These characteristics refer to the extent to which complex information could be delivered by a service, such as the ability to transmit multiple cues or language variety (media richness), to what extent a service could develop a feeling of real person-to-person communication (social presence), the extent to which a service enables the user to quickly communicate with others (immediacy), and to what extent a service enables the user to perform other tasks concurrently while using the technology (concurrency).

Another study conducted by Nysveen et al. (2005), integrating findings in adoption research, uses and gratification, and domestication studies, explains an individual’s intention to use general mobile services (including SMS, contact services, SMS games, SMS-based payments). The study suggested that usage intention is determined by a consumer’s attitude towards use, normative pressure, behavioral control, and four motivational variables: perceived expressiveness, perceived enjoyment, perceived usefulness, and perceived ease of use. Perceived usefulness, perceived ease of use, and perceived enjoyment also influence intention indirectly through attitude towards using the services. The effects of the factors on usage intention are moderated by characteristics of the service. These findings imply that developing a positive attitude in consumers toward using an SMS-based service will increase the intention to use the service. Since consumers’ perceptions about the usefulness of an SMS-based service is a strong predictor of the attitude and intention to use
the service, the functions of an SMS-based service should answer consumers' needs and interests. The developers of an SMS-based service should also pay close attention to aspects of enjoyment such as excitement and the fun of using the service. The important role of perceived expressiveness suggests that an SMS-based service may become an important vehicle for expressing personal style, fashion, and social identity, so the service should be timely, up-to-date, and personalized according to individual user identities. Moreover, the developer should ensure, through usability pretesting, that the SMS-based service is considered sufficiently easy to use for consumers. When promoting an SMS-based service, service marketers should particularly highlight aspects relating to ease of use, usefulness, enjoyment, and availability to express users' identity. In addition to motivational and attitudinal influences, marketers should consider the fact that normative pressures exist for the intentions of individuals to use SMS-based services, so they should consider the social context in which the service is used. Finally, an individual's perception of opportunity and ability to use the SMS-based service may increase his/her intention to use the service. A possible marketing strategy for increasing consumers' perceived control could be to offer free use of the service for a period as it would enable potential users to learn the service (Nysveen et al., 2005).

Gong and Yan's (2004) study also confirmed that perceived usefulness, perceived ease of use, social pressure, perceived enjoyment, and self-efficacy could be predictors of SMS use. Self efficacy represents an individual's self-confidence in his/her capability to use an SMS-based service.

4. User acceptance of Push and Pull SMS-based services

Push SMS is a one-way SMS-based service that sends information from a service provider to users, such as an SMS advertisement in marketing or an SMS disaster warning for a community service. Users must initially register their mobile numbers with the service or the service providers should ask permission from the users before regularly sending messages. The registration could be done by filling out a form, email, web page, phone, or simply by sending an SMS.

Pull SMS is another SMS-based service that enables users to 'pull' information anytime. Users do not need to register for the service, but must send a request SMS anytime they want to get messages from the service.

Broadcasting information through SMS, like in Push SMS-based services, is efficient and effective. It is efficient because SMS is cheap or even free for some operators since SMS uses the network-signaling channel for data transmission and does not consume voice-communication channels. It is effective because SMS is reliable in the sending of messages (using a store and forward mechanism an SMS message will be stored in an SMS Centre until the recipient's device is on or ready to receive the message), the message could be sent to particular person (using point-to-point service) or broadcasted to all mobiles in a particular area, and SMS is personal since messages are sent directly to devices which are typically on hand to users 24/7 (people commonly have their mobile phone nearby all the time).

However, since SMS is typically private, people often found it annoying to receive unsolicited SMS (Bamba and Barnes, 2006). They felt their privacy was violated, abused
and harassed by providers that send irrelevant texts to them; their everyday activities may be disturbed and interfered by unimportant communication. Therefore, many countries have very strict legislation regarding SMS spam. Hence, user's permission is needed for any Push SMS-based services (Barwise and Strong, 2002, Godin, 1999).

**User's permission** is defined as an agreeing to receive a particular SMS (Bamba & Barnes, 2006). The provider should ask consumers' consent to receive particular messages while giving the opportunity to stop receiving them at any time. The contract forms (registration, choosing the type of information, and to stop the services) should be available as a hard copy, an online form, via telephone call, or simply by sending an SMS.

User's permission is critical for any Push SMS-based services as the absence of permission can generate a feeling of intrusion and irritation, and the more the person perceives intrusions into his/her private life the more he/she develops negative perceptions and attitude towards the SMS-based service (Trabelsi and Rached, 2010, Wei et al., 2009). The more positive perceptions and attitude toward the SMS-based service the more likely an individual is willing to expend cognitive effort in processing the message (Kokkinaki and Lunt, 1999). Accordingly, the main challenges in delivering Push SMS-based services are how to encourage as many people as possible to register for the services (it means they are willing to receive the messages) and to keep them using the services (not to sign-out).

Current studies on SMS marketing have revealed that people gave the highest willingness to accept Push SMS when they perceive the messages are relevant to their needs or interests, they have high control over opt-in conditions, and the brand (service provider) is familiar to them (Bamba and Barnes, 2006, Scharl et al., 2005, Wei et al., 2009).

The relevance of the messages may develop a consumer's perception of usefulness of the SMS-based service (Bauer et al., 2005). Consumers are likely to expend cognitive effort in processing the message if it is relevant to his/her needs or interests. Successful SMS marketing depends upon a strong relationship between satisfying informational needs and the advertisement (Dickinger, Scharl, & Murphy, 2005; Kokkinaki & Lunt, 1999; Scharl et al., 2005). Thus, to be perceived as useful, the message should be tailored to the consumer's interests and preferences (Krishnamurthy, 2001).

In addition to the relevance of the messages in relation to a consumer's information needs, Scharl et al. (2005) suggests that the messages should be short (concise), to the point, utilize the available 160 characters effectively and employ language understood by users. The messages may be funny, entertaining and eye catching (attractive idea).

The time and frequency of sending messages should also be personalized based on the consumer's time, location, and preferences. For example, messages for students should not be sent before noon since they are still in class, for professionals the best time to send may be between 9am and 7:30pm on weekdays, and when addressing young people, messages should be entertaining and show familiarity with the abbreviations and spitfire conversational style typical of SMS messaging (Scharl et al., 2005). The volume of messages cannot be too great and too frequent since it could impact the consumer's cognitive load in reading the messages and interrupt the consumer's daily activities (Krishnamurthy, 2001).
There is a negative relationship between the volume of the Push SMS and the attitude toward the services (Phelps et al., 2000).

The control over opt-in perception may relate to the risk perception (Wei et al., 2009). Consumers’ perception about risks of Push SMS-based services may include risks related to their privacy, intrusion, financial, uncertainty of information misuse, or even security risk (Krishnamurthy, 2001). Consumers’ control over opt-in conditions may reduce risk perceptions since consumers can sign out from the service any time they want. Thus, messages should also disclose how to stop receiving further messages (Lee, 2002; Scharl et al., 2005). Also, consumers’ familiarity with the brand/service or existing knowledge about brand/service may also reduce perceptions of risk. Individuals are more likely to prefer a popular, credible, and familiar SMS-based service (Bauer et al., 2005).

Additionally, since many SMS-based services are provided and used in social and everyday life contexts (Barkhuus, 2005), social pressure on acceptance of the services is likely present (Bauer et al., 2005).

Both Push and Pull SMS-based services could be either free or charge a fee to the users. Commonly, Push SMS is totally free but Pull SMS charges the recipients with a premium cost for each message sent. Pull SMS-based services, therefore, may require more effort and cost of the users since they must send an SMS in the correct format every time they request the service and they get charged when receiving the reply (often a premium SMS cost). However, in Pull SMS, privacy concerns are likely to be less salient because consumers initiate the request to receive the relevant service so they have greater control over receiving the messages. In contrast, in the Push SMS, even though the consumer has given prior consent to receive messages, it would be more intrusive and tend to interrupt the consumers and amplify privacy concerns.

Unni and Harmon’s (2007) study comparing user acceptance of Push SMS and Pull SMS in the context of Location-Based Advertising services revealed that privacy concerns were significantly greater for Push SMS-based services than Pull SMS. Push SMS was perceived to be significantly more intrusive than Pull SMS, perceived benefits and value were significantly greater for Pull than Push SMS, and intention to sign up for Pull SMS-based service was also greater than that for Push SMS-based service.

5. User acceptance of SMS-based Transaction services

SMS-based transaction service is a kind of SMS-based service that enables users to conduct data or financial transactions. The data transactions include sending data, updating, deleting or obtaining data via SMS; whereas financial transactions relate to payment or money transfer activities via SMS.

When coming to transaction purposes (data or money), the acceptance of SMS-based services are getting more complicated. In the context of general mobile commerce and mobile payment, Wu and Wang (2005) and Mallat (2007) suggest seven determinants of the user acceptance: relative advantage, compatibility, ease of use, facilitating conditions, cost (such as hardware and service fees), perceived risk and trust (such as privacy and security issues), and situational factors.
First, individuals are likely to use an available mobile-based transaction when they perceive relative advantages of the service compared to traditional payment instruments. The advances could be the possibility to make payments ubiquitously, independence of time and place, and the possibility of avoiding queues (Mallat, 2007).

Second, the SMS-based payment should be consistent (compatible) with the user’s existing values, previous experiences and needs. Mallat (2007) found that mobile payments are most compatible with small value payments for which cash would typically be used. Compatibility of mobile payments with larger value purchases was perceived as poor since mobile payments were perceived as lacking suitable charging models, security, need, payment documentation, and provides no additional value at point-of-sale (POS).

Further, Mallat (2007) identified four categories as particularly suitable for mobile payments: electronic ticketing (such as public transportation, car parking, and movies); mobile content and services (such as games, music, pictures, news, and public transport route information); purchases on vending machines and various other forms of self-service machines (such as lockers, photo booths, hair dryers in locker rooms, and self-service petrol stations); and small value payments at a POS such (as a chocolate bar or a newspaper at a kiosk or a bottle of milk in a corner shop on the way home).

Third, the complexity of mobile payment services frequently emerged as a barrier to adoption (Mallat, 2007). In the case of SMS-based payments, the message formats are often complicated and slow to key in, various payment codes, service numbers and instructions for making payments are difficult find and to remember. The mobile payment procedures should be simpler and faster, using just a few keystrokes. Additionally, complex registration procedures and separate billing arrangements also cause complexity in the use of mobile payments.

Fourth, a lack of large merchant acceptance inhibits adoption of mobile payments (Mallat, 2007). Mobile payments should not be exclusive to the customers of certain financial and telecommunication service providers but be widely available for all customers of different banks and mobile operators as people were reluctant to change their mobile phone model or bank just to gain the payment functionality.

Fifth, cost, particularly premium pricing, was revealed as a very critical factor that discouraged individuals from using mobile payments (Mallat, 2007). The SMS-based payment should cost no more than paying cash.

Sixth, perceived risk and trust in mobile payment are the other determinants of adoption. The perceived risks covered six categories: 1) possibility of unauthorized use of mobile payments by someone else when the mobile phone was lost, stolen or hacked; 2) lack of transaction record and documentation that may lead to spending more money than intended, or difficulty to make claims for a refund; 3) errors in payment transactions whether caused by the payment system or by the user; 4) vagueness of the transaction and perceived lack of control (for example, users were unsure whether the payment had taken place or not, and whether or not the payment had been charged); 5) device and mobile network reliability (for example, the phone’s battery could run out or the network connection could fail in the middle of a payment transaction); 6) compromising privacy (for example, the payments would be tracked, their personal information misused, or receiving
a lot of advertisements). As a consequence of these perceived risks, people are more willing to conduct payments with trustworthy transaction parties, including banks, credit card companies, and telecom operators.

Additionally, the advantage of mobile payments is also dependent on situational factors. Mobile payments were perceived as most advantageous in situations such as presence of queues, lack of alternative payment methods, hurry, and unanticipated need. It is the relative advantage that reflects the ubiquitous features of mobile payment services that enable reactions to unexpected situational conditions (Mallat, 2007).

In addition to perceived usefulness, perceived ease of use and perceived credibility (trust), Wang et al.’s (2006) study suggests self-efficacy and perceived financial resource as another two psychological factors that could influence individuals to conduct mobile transactions. An individual’s intention to use a mobile service will be affected by his/her perceptions of the availability of the knowledge and the financial resources needed to use the system.

Overall, Table 1 summarizes user acceptance determinants of SMS-based services suggested by the present studies.

Table 1: User acceptance determinants of SMS-based services

<table>
<thead>
<tr>
<th>Factor (s)</th>
<th>Definition</th>
<th>Example studies</th>
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<tbody>
<tr>
<td>Attitude toward use</td>
<td>The degree to which a person has a favourable or unfavourable evaluation of using an SMS-based service (adopted from TRA and TPB).</td>
<td>Dennis et al. (2003), Nysveen et al. (2005), Bauer et al. (2005), Aripin &amp; Omar (2007)</td>
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<tr>
<td>Relative advantage, perceived usefulness/utility, personal relationship benefits</td>
<td>The degree to which a user believes that using an SMS-based service will fulfil his/her needs (adopted from TAM).</td>
<td>Mallat (2007), Wu &amp; Wang (2005), Dennis et al. (2003), Nysveen et al. (2005), Bauer et al.’s (2005), Krishnamurthy (2001), Peter et al. (2003), Ramayah et al. (2006), Aripin &amp; Omar (2007), Wang et al. (2006), Gong &amp; Yan (2004), Wei, et al. (2009), Kim et al. (2008)</td>
</tr>
</tbody>
</table>
| Perceived risks, trust, familiarity and credibility of the brand | The extent to which an individual trusts the brand and the service provider and the SMS technology | Mallat (2007), Wu & Wang (2005), Bamba & Barness (2006), Bauer et al. (2005), Krishnamurthy (2001),...
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<tr>
<th>or service providers, Privacy</th>
<th>and believes that using the service will not cause problems for him/her.</th>
<th>Dickinger et al. (2005), Kaasinen (2005), Wang et al. (2006), Wei et al. (2009)</th>
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<tbody>
<tr>
<td><strong>Perceived cost, perceived monetary value</strong></td>
<td>The degree to which an individual perceives that an SMS-based service is costly.</td>
<td>Mallat (2007), Wu &amp; Wang (2005), Leung (2007), Grinter &amp; Eldridge (2001), Kim et al. (2008)</td>
</tr>
<tr>
<td><strong>Perceived compatibility</strong></td>
<td>The degree to which an individual perceives that an SMS-based service fits with his/her existing values, previous experience and current needs (adopted from DOI).</td>
<td>Mallat (2007), Wu &amp; Wang (2005)</td>
</tr>
<tr>
<td><strong>Perceived expressiveness, fashion</strong></td>
<td>The degree to which an individual perceives that an SMS-based service enables him/her to show his/her personality, style, or way of life to others.</td>
<td>Nysveen et al. (2005), Leung (2007), Aripin &amp; Omar (2007)</td>
</tr>
<tr>
<td><strong>Perceived convenience, flexibility in communication</strong></td>
<td>The degree to which an individual perceives that an SMS-based service enables more flexible, relaxed, confident, less anxious, and convenient communication with others.</td>
<td>Barkhuus (2005), Peters et al. (2003), Grinter &amp; Eldridge (2001), Leung (2007), Grant &amp; Donohoe (2007)</td>
</tr>
<tr>
<td><strong>Perceived relevance of the message, message personalization</strong></td>
<td>The degree to which an individual perceives that messages sent by an SMS-based service are relevant with his/her needs or interest.</td>
<td>Bamba and Barness (2006), Krishnamurthy (2001), Dickinger et al. (2005), Grant &amp; Donohoe (2007)</td>
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<tr>
<td><strong>Message volume</strong></td>
<td>Frequency of the messages sent to consumers</td>
<td>Krishnamurthy (2001)</td>
</tr>
<tr>
<td><strong>Perceived enjoyment, fun, entertainment use, pleasant</strong></td>
<td>The degree to which an individual perceives that an SMS-based service enables him/her to get an intrinsic reward (such as fun or entertainment).</td>
<td>Nysveen et al. (2005), Peters et al. (2003), Aripin &amp; Omar (2007), Gong &amp; Yan (2004), Grant &amp; Donohoe (2007), Kim et al. (2008)</td>
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<tr>
<td><strong>Situational factors</strong></td>
<td>Users' situations, such as travelling, in a mall, or in an emergency situation.</td>
<td>Mallat (2007)</td>
</tr>
<tr>
<td><strong>Perceived behavioural control, control over opt-in conditions, permission</strong></td>
<td>A person's perceptions of his/her ability to use an SMS-based service (adopted from TPB).</td>
<td>Nysveen et al. (2005), Bamba &amp; Barness (2006), Dickinger et al. (2005), Kim et al. (2008)</td>
</tr>
<tr>
<td><strong>Facilitating conditions (including financial resources, network,)</strong></td>
<td>The degree to which an individual perceives that technical infrastructure exists to support</td>
<td>Mallat (2007), Wang et al. (2006), Kim et al. (2008)</td>
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<td>and mobile phone)</td>
<td>the use of an SMS-based service (adopted from DTPB).</td>
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<tr>
<td><strong>Self efficacy</strong></td>
<td>Individual’s self-confidence in his/her capability to use an SMS-based service (adopted from DTPB).</td>
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<tr>
<td><strong>Normative pressure, social use, personal relationship use</strong></td>
<td>The perceived social pressures to perform or not to perform the behaviour of using an SMS-based service (adopted from TRA and TPB).</td>
<td></td>
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<tr>
<td></td>
<td>Nysveen et al. (2005), Bauer et al (2005), Gong &amp; Yan (2004), Grant &amp; Donohoe (2007)</td>
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### 6. Conclusion

In order to understand how SMS-based services can be accepted by target users this study has reviewed the profile of SMS adopters and motives for using push SMS services, pull SMS services, and doing transactions through SMS. Existing studies clearly establish the importance of an individual’s attitude towards use and perceptions about the service, the service providers, the SMS technology, and social norms on adoption of SMS-based services. Situational factors and demographic factors may also moderate the influences. SMS is also perceived as compatible for social media, so people have been using SMS for satisfying a gratification of personal relationship, such as contacting family, peers or friends, or sharing, participating, interacting, conversing and exchanging information among members of a community. Businesses and governments that deliver services via SMS should consider and accommodate these factors in formulating strategies, designing, developing and running an SMS-based service.

### Reference


