TECHNOLOGY READINESS AND PROPENSITY OF CELL PHONE USERS TO SUBSCRIBE TO COMMERCIAL MESSAGING SERVICES

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The use of messaging service as a marketing channel has not been sufficiently explored in the marketing literature. The purpose of this study is to: (1) examine the effect of technology readiness on cellular (mobile) telephone users in association with the propensity to subscribe to commercial short messaging services, (2) identify the types of short messaging services in demand, and (3) identify the preferred receiving time and frequency. The study uses the technology readiness index (TRI) as a part of a comprehensive questionnaire to conduct the study among cellular telephone users in Thailand. Multivariate statistical techniques were used in analyzing the data. The findings suggest that an individual's technology readiness plays a minor role in explaining a cell telephone user's attitude towards subscribing to commercial short messaging services. Nonetheless, a number of short messaging services are demanded by cell telephone users. The preferred receiving time varied during the day while the preferred receiving frequency is one to three times per day.

INTRODUCTION

Communication technology has been clearly developed during the past two decades. The invention of the cellular[1] telephone encouraged people to communicate more conveniently and in a timelier manner than traditional communication devices. In the early stage of their commercial era, cellular telephones were big, heavy and the cost of ownership was relatively high. Initially, usage was limited to business professionals or affluent consumers. Individuals who used cellular telephones at the beginning find it difficult to believe how quickly the technology is developed. Cellular telephones are now smaller, lighter to carry, and perform multifunctional tasks. Prices are plummeting while their functional capacity is increasing.

It is apparent that cellular telephones today are not used only to make or receive calls but also used in several ways depending on the particular model. The functions of current cellular telephones include short messaging services (SMS), multimedia messaging services (MMS), facsimile messages, electronic mail messages, connecting to the Internet, taking photographs, recording video clips, watching television programs, listening to music, playing games, making conference calls, and serving as small notebook computers among other more complex functions. In effect, it appears that the cellular telephone has become an important communication device in human daily life. A study conducted by Portio Research (2006) shows that the number of cellular telephone subscribers worldwide reached two billion by the end of 2005, and ownership is predicted to grow to over four billion by the year 2011. This figure tells us that more than half of the world population will use cellular telephones within the next five years.

SMS in cellular telephone is an application that allows the user to send short text messages to other cellular telephones. Messages are typically limited to one-hundred-and-sixty (160) letters or characters. The messages can be sent from either a cellular telephone or the Internet. SMS is commonly used for personal communication purposes. However, this

function can be used as a marketing channel that companies can utilize for marketing to both potential and existing customers. The vast number of cellular telephone users makes it possible for companies to offer services directly to specific groups of customers. A retailing company, for instance, may send a birthday greeting SMS to membership customers offering a special discount for this special occasion. Such use could impress customers and sustain their loyalty. Commercial SMS also can be used for public relations and customer relationship management (CRM) purposes.

A research result published by Portio Research (2006) point out that cellular messaging represents a vast global industry that generated over fifty-five billion US dollars in 2005. The largest portion of this revenue comes from simple SMS worth about thirty-five billion US dollars. This research also shows that the number of SMS messages worldwide reached one trillion in 2005. Nonetheless, commercial SMS should be used with caution since sending too many commercial SMS alerts may be considered as spamming which can negatively affect a company's image. In spite of these numbers, few studies have focused on the use of commercial SMS. Thus, it is unclear whether commercial SMS messaging works efficiently and whether it is even demanded.

The purpose of this research is to (1) examine the effect of technology readiness on cellular telephone users in association with the propensity to subscribe to commercial SMS services, (2) identify what kind of SMS services are in demand, and (3) identify the preferred receiving time and frequency of both of these services. This study utilizes the Technology Readiness Index – TRI (Parasuraman 2000) which can be used to evaluate the level of an individual's propensity to adopt new self-service technology such as subscribing to commercial SMS alerts. In addition, a business model is proposed suggesting how SMS can be used for marketing purposes.

THEORETICAL FRAMEWORK

The trend to self-service technology has increased dramatically in several industries since it helps companies reduce the costs of business operations. Several researches have investigated the utilization of self-service technology from both the customers and the organizational perspectives. Recent studies in the field include online banking (Lassar et al. 2005; Pikkarainen et al. 2006), telephone banking and ATM using (Adhav et al. 2005; Barczak et al. 1997; Sundarraj and Wu 2005), scanner check-out (Dabholkar et al. 2003), self-check in at the airport (Liljander et al. 2006), Internet shopping (Cheung and Lee 2006; Lester et al. 2005), different self-service technologies (Meuter et al. 2005; Meuter et al. 2003), cellular telephone services (Lee et al. 2001; Shim et al. 2006), etc. Nevertheless, the studies concerning commercial SMS are scarce. Consequently, more empirical analysis is needed to consolidate this knowledge.

Technology Readiness

Technology readiness is defined as "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (Parasuraman 2000, p. 308). It can be categorized into four distinct components: optimism, innovativeness, discomfort, and insecurity. Two components are related to positive feelings and the other two are related to negative feelings. Parasuraman (2000) argues that either positive or negative feelings toward technology will dominate in each individual. Each component is described as follows.

Optimism refers to "a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives." It measures the feeling of individuals who view technology as a good thing. Innovativeness is defined as "a tendency to be a technology pioneer and thought leader." It measures the level of an individual's belief that he or she is at the forefront of trying new technology-based products/services and is

FIGURE 1
Relationship of Technology Readiness Index (TRI) (Parasuraman 2000)
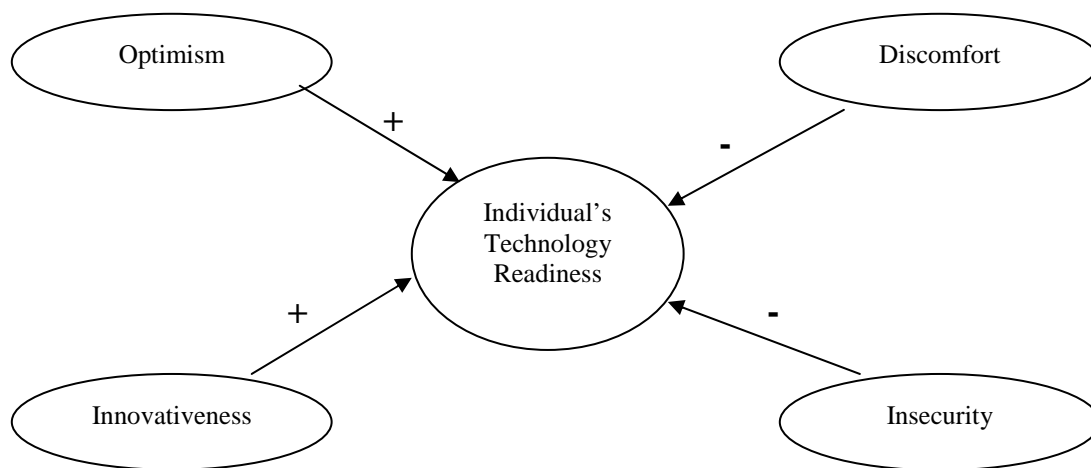
considered by others as an opinion leader on such technology-based products/services. These two dimensions reflect the positive feelings of an individual toward technology.

Discomfort is defined as "a perceived lack of control over technology and a feeling of being overwhelmed by it." It represents individuals' technology anxiety, e.g., believing that technology-based products/services are not designed for them. Insecurity is defined as "distrust of technology and skepticism about its ability to work properly." It focuses specifically on how an individual feels about the operation of technology-based products/services. These two dimensions reflect the negative feelings of an individual toward technology.

Parasuraman (2000) suggests that companies can use the Technology Readiness Index (TRI) to gain an in-depth understanding of the readiness of their existing and prospective customers to embrace and interact with technology. A number of studies using the TRI have been published. For example, Taylor et al. (2002) examined the TRI in the e-insurance industry and confirmed that the positive dimensions of optimism and innovativeness are most influential in facilitating technology readiness. Tsikriktsis (2004) tested the TRI using an English sample and found it supports

four of the five original clusters in his study. Elliott and Hall (2005) examined the gender differences relating to consumers' propensity to embrace self-service technology in the retailing industry and found that males have a higher desire to experiment with new technologies than females.

Direct Customer Communication

Companies must pay close attention to their customers since customers are a valuable asset that requires a close communication process. Sound customer communication can build a good relationship between customers and company. Customer relationship management (CRM) or relationship marketing is a vital issue in determining a firm's success or failure. Thomas and Sullivan (2005) claim that CRM has been critically proven over the past decade. It helps firms make more money by enabling them to identify the best customers, and satisfy their needs so that they remain loyal to the firm. Presently, there are several communication technologies available to directly contact customers—either real-time communication (two-way communication) or one-way communication. The communication technologies commonly seen today include e-mail, online chat, instant messaging, call centre, cellular telephone, and SMS. Each technology

has its own advantages and disadvantages which sometimes can be substituted and complemented with each other. It is beyond the scope of this paper to cover all communication technologies. This study focuses only on how SMS can be used for marketing purposes.

Greenyer (2004) examined consumer attention times commanded by six different communication channels: bill/statement, customer service correspondence, direct e-mail, direct mail, SMS, and TV advertisement. The study revealed that SMS was ranked the lowest of all media, with an average viewing time of thirteen seconds. It can be said that SMS is in the early stages of its evolution as a marketing channel since its effectiveness appears unclear. Furthermore, unsolicited SMS, similar to unsolicited electronic mail, is known as 'spam' that annoys receivers. Such messages can spoil the image of the sender's campaign if receivers find marketing messages via their cellular telephone intrusive. In order to prevent this problem, customers must give prior permission to companies before being sent commercial

SMS. Companies should also provide an opt-out mechanism to customers. According to the study by Greenyer (2004), most present SMS marketing is geared towards advertising. However, it could be argued that SMS also works for relationship management purposes and this use might be better than advertising use. This paper proposes the following business model to explain how a company might implement a commercial SMS into its business.

There are two possible channels for sending commercial SMS to customers. In the first channel, a company can send SMS directly to customers using its own customer database. This channel might be limited to existing customers and can be mainly used for relationship management purposes. A special campaign or offer can be sent to customers to stimulate sales and sustain the loyalty of customers. For example, an automobile company may send a text "Happy birthday, free maintenance checking and cash voucher for this special occasion. Valid until xx/xx/xx[2]" to current customers. To be able to do this, a

FIGURE 2
Business Model for Implementing Commercial SMS Services
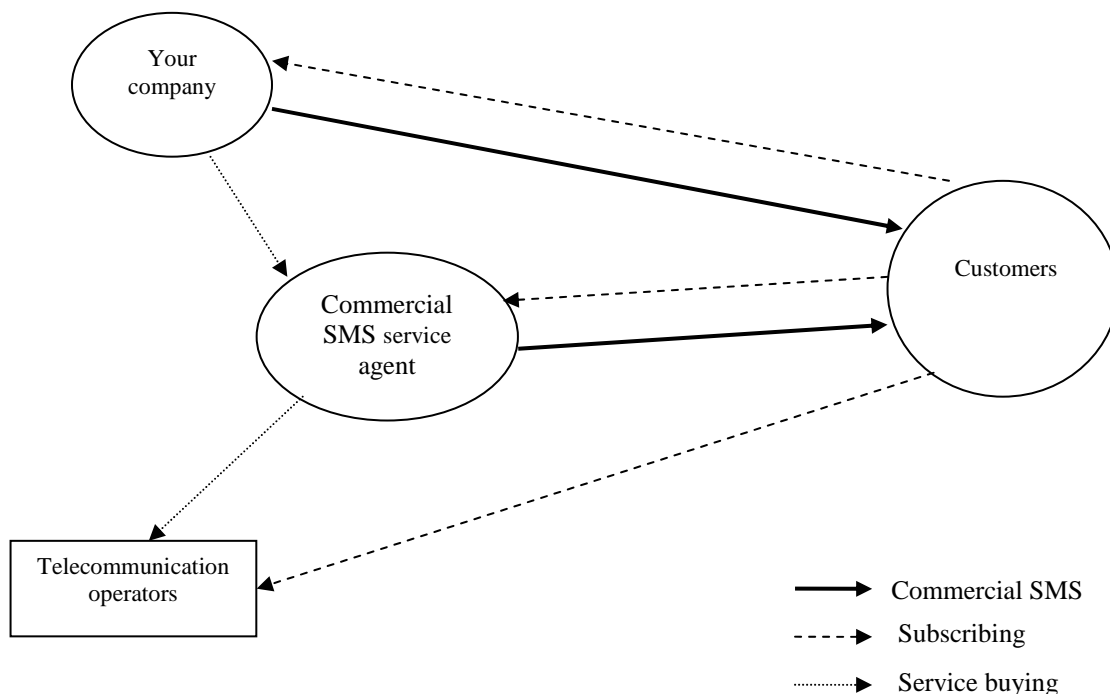
company, of course, needs to have a valid customer database and customer permission must be given before distributing the message.

The second channel is one in which a company buys services from a commercial SMS service agent. This agent would be a company that buys customer databases from various telecommunication operators which provide basic demographic information on cellular telephone subscribers. Then the agent categorizes customers into several segments based on age, gender, salary range, occupation, education, resident location, etc. This agent would then offer a service to a company wishing to send a commercial SMS to a specific group of customers. In addition, the agent also might offer a SMS alert service to customers. Examples of SMS alerts include a personalized news summary, weather forecasts, horoscope, new arrival movies/books/albums, discount promotions or special offers from personalized products/services, personalized event reminders, currency exchange, personalized stock market movements, and so forth. The second channel could be used mainly for advertising and promotion purposes to attract new customers. For instance, a video rental shop might send a text "second anniversary, free membership and get a gift set for first rent. Present this SMS to the shop nearest to you. Valid until xx/xx/xx" to attract new customers.

It should be noted that commercial SMS must be distributed only to people who somewhere subscribe to receive such messages. Otherwise, the campaign being promoted might have a negative outcome. Furthermore, the privacy of customers is protected by laws in each particular country. For example, companies who want to send commercial SMS to customers in the USA and Canada must obtain a common short code (CSC) from an authorized agency before sending commercial SMS. CSC is a special five to six digit number which is used for any 'machine' to person and person to 'machine' text messaging in the USA and Canada. The use of these numbers is mandated by the Federal Communications Commission (FCC) in the USA and the Canadian Wireless

Telecom Association (CWTA) as a way to enable fair use of mobile messaging to the benefit of consumers and companies offering products and services to wireless subscribers through mobile messages. Local laws and regulations must be considered before implementing a commercial SMS campaign.

In spite of apparent possibilities, the behavior of cellular telephone users and their propensity to subscribe to commercial SMS has not been well investigated. Even though the number of SMS messages is predicted to grow exponentially, most current messages are thought to belong to personal use. Based on the business model proposed above, however, there is a chance for businesses to use SMS as a marketing channel to capture new customers' attention and sustain current customers' relationships.

A conceptual model is presented below illustrating factors that might influence the propensity of cell phone users to subscribe to commercial SMS. Four types of factors are identified including TRI (optimism, innovativeness, discomfort, insecurity), cell phone ownership and SMS experiences, preferences towards commercial SMS services (type of services, preferred receiving time and frequency), and demographic variables (gender, age, education). The conceptual model is shown in Figure 3.

METHOD

This study is exploratory research attempting to find out whether identified factors in the conceptual model have any relationship to the propensity of cell phone users to subscribe to commercial SMS. A web-based questionnaire was designed and data were collected from a Thai sample. A sophisticated multivariate statistical technique was used to analyze the data.

Questionnaire

Online questionnaires provide several advantages to researchers such as being fast and

FIGURE 3
Schematic Model for the Development of Discriminant Analysis of Cell Phone Users

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┌─────────────────────┐
│ Technology Readiness│
│     Index (TRI)     │
└─────────────────────┘                              ┌──────────────────┐
                                                     │  Would subscribe │
┌─────────────────────┐                              └──────────────────┘
│ Cell phone ownership│
│  and SMS experiences│          ┌──────────┐
└─────────────────────┘          │Cell phone│
                                 │  users   │
┌─────────────────────┐          └──────────┘
│ Preferences toward  │                              ┌──────────────────┐
│ commercial SMS      │                              │Would not subscribe│
│ services            │                              └──────────────────┘
└─────────────────────┘

┌─────────────────────┐
│    Demographic      │
│   characteristics   │
└─────────────────────┘
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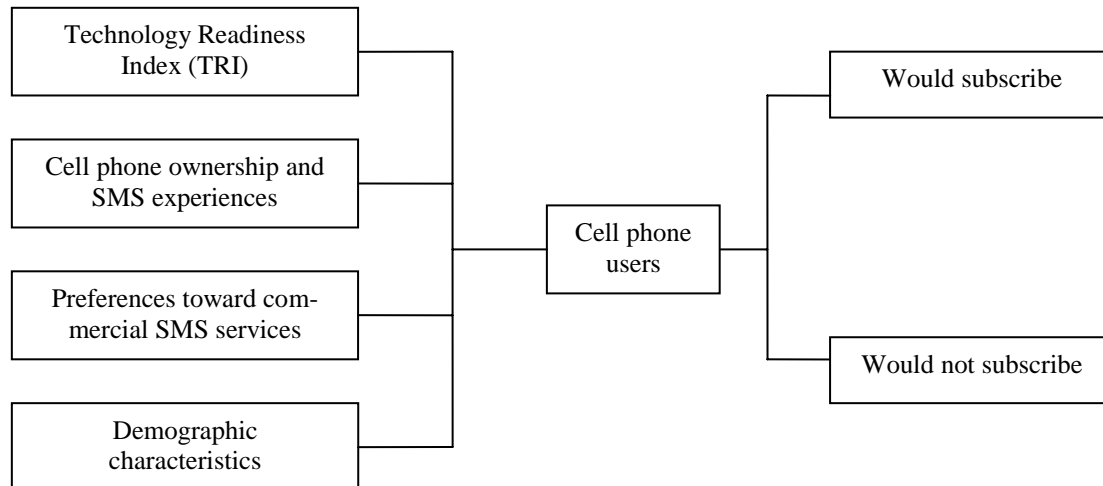
providing high response rates, cost effectiveness, making a large or national sample possible, reducing error of filling out questionnaire, allowing more flexible questionnaires than paper-based ones, and gathering data that can be put directly in a database ready for analysis.

The online questionnaire in this study was divided into four sections. The first section employed the thirty-six (36) item technology readiness index (TRI) scale developed by Parasuraman (2000). The TRI is a five-point Likert-scale with responses ranging from (1) "strongly disagree" to (5) "strongly agree." The TRI was developed to measure an individual's tendency to embrace innovative technology by assessing how the individual thinks about and responds to technology. The thirty-six item TRI is divided into four dimensions: ten items for optimism, seven items for innovativeness, ten items for discomfort, and nine items for insecurity. All thirty-six items were presented randomly in the questionnaire. According to Parasuraman (2000), the TRI scale has demonstrated high internal reliability. The coefficient score of Cronbach's alpha ranges from 0.74 to 0.81 across four dimension scales.

Furthermore, the TRI scale has shown high construct validity by being able to discriminate between users and non-users of high technology products/services.

The second section of the questionnaire concerned the ownership of cellular telephones and general sending/receiving SMS experiences. A 'yes/no' type of question was used in this section. The third section consisted of several questions relating to what kind of SMS services the customers were willing to receive, in what time period they preferred to receive SMS, how often they preferred to receive SMS, and whether they were willing to subscribe for those SMS services. A combination of multichotomous and scaling questions was used in this section. The last section asked respondents to provide some demographic information including gender, age, and education.

Data Collection

Convenient sample and snowball sample techniques were employed. The study targeted cellular telephone users in Thailand as a convenience to the authors. The link to the

online questionnaire was electronically mailed to the researchers' friends, colleagues, and relatives asking them to complete the questionnaire and forward the link to other people in their groups. In addition, the link was posted on several well-known public web boards on the Internet.

The questionnaire was placed online for a two-week period during summer 2006. Four-hundred-and-nine (409) questionnaires were received. Of this number, four-hundred-and-four (404) were completed with no missing data. Table 1 highlights the demographic statistics characterizing the sample.

TABLE 1
Demographic Information

Variable	n	%
Gender		
Male	138	34.2%
Female	266	65.8%
Age		
<25	126	31.2%
25 – 34	234	57.9%
34 – 44	34	8.4%
45 – 54	10	2.5%
Education level		
Senior high school or equivalent	6	1.5%
Certificate or equivalent	10	2.5%
Bachelor degree	230	56.9%
Master degree	146	36.1%
Doctoral degree	12	3.0%

Data Analysis

A four-step data analysis procedure was used for this study. First, descriptive statistics were used to present respondents' cell phone ownership and SMS experiences. Second, the mean scores for each of the four dimensions (optimism, innovativeness, insecurity, and discomfort) of the TRI scale were calculated. Also, the overall technology readiness score was computed. Then, a t-test analysis was conducted comparing mean scores of 'would subscribe to commercial SMS' versus 'would not subscribe to commercial SMS' respondents. Third, discriminant analysis was used to determine whether or not differences existed between 'would subscribe' and 'would not subscribe' groups regarding the types of commercial SMS services. Finally, a

descriptive statistics were employed to examine the 'would subscribe' respondents' preferred receiving time periods and frequency.

RESULTS

The data analysis reveals several interesting results. The results in this section are presented based on a four-step data analysis stated earlier.

Cell Phone Ownership and SMS Experiences

Table 2 summarizes descriptive data of respondents relating to cellular telephone owning and using SMS experiences. It appears that 98.5 percent of respondents have owned a cellular telephone. Within this number, 92.1 percent have sent personal SMS and 46.0 percent have sent SMS to TV or radio programs. Furthermore, 84.7 percent indicate that they have received some kind of commercial SMS.

TABLE 2
Cellular Telephone Owning
and SMS Experiences

Variable	n	%
Cellular telephone owning?		
Yes	398	98.5%
No	6	1.5%
Sending personal SMS?		
Yes	372	92.1%
No	32	7.9%
Sending SMS to TV/Radio programs?		
Yes	186	46.0%
No	218	54.0%
Receiving commercial SMS?		
Yes	342	84.7%
No	62	15.3%

Technology Readiness

Technology readiness scores are presented in Table 3. The means of the four dimensions were computed. Since the discomfort and insecurity dimensions reflect a negative attitude towards technology readiness, reversed scores for these two dimensions were computed for the overall TRI score. The t-tests were calculated to compare the means between 'would subscribe' and 'would not subscribe' respondents. The results indicate that only the

TABLE 3
Technology Readiness Scores

	Overall (N = 404)		Would subscribe to commercial SMS (n = 236)		Would not subscribe to commercial SMS (n = 168)			
	M	SD	M	SD	M	SD	t	p[c]
Optimism[a]	3.72	0.45	3.77	0.46	3.65	0.43	2.76	.006*
Innovativeness[a]	3.22	0.53	3.24	0.53	3.22	0.53	0.42	.675
Discomfort[a]	3.37	0.42	3.38	0.41	3.35	0.45	0.69	.492
Insecurity[a]	3.81	0.50	3.87	0.48	3.82	0.52	-0.430	.667
TRI overall[b]	11.77	1.18	11.83	1.11	11.69	1.26	1.181	.238

Note: a. Scale ranges from 1 = strongly disagree to 5 strongly agree
    b. TRI overall = optimism + innovativeness + [6 – discomfort] + [6 - insecurity]
    c. t-test with statistical confidence level of 95% (p<0.05)

optimism dimension is statistically significant between the two groups (p<0.05). The other three dimensions are not significant and this indicates the insignificance of the overall TRI score between two groups. Nonetheless, it should be noted that the means of 'would subscribe' respondents are higher than 'would not subscribe' respondents in all dimensions and the overall score.

Commercial SMS Services

A discriminant analysis technique was applied to see whether 'would subscribe' and 'would not subscribe' respondents have different desires in proposed commercial SMS services. The dependent variable was a dichotomous variable measured by 'would subscribe' and 'would not subscribe' to commercial SMS service. The independent variables are eleven proposed commercial SMS services measured

by five-point scale which ranged from (1) "very undesirable" to (5) "very desirable." All of the independent variables were entered together in the discriminant function.

The results in Table 4 indicate the reliability of the discriminant function. Wilks' Lambda value is used to test the significant of the discriminant function as a whole. The Wilks' Lambda in this study indicates highly statistical significance (0.000) and shows that there is a statistical difference between the two groups. Further analysis looked at the predictive capability (hit ratio) of the function. The overall predictability ability of the discriminant function is 68.3 percent. Hair et al., (2003, p.384) recommend that the classification accuracy should be at least 25.0 percent larger than by chance. For two groups, the chance predictive accuracy is 50.0 percent and the recommended accuracy should be at least 62.5 percent so, the hit ratio

TABLE 4
Wilks' Lambda and Hit Ratio

Wilks' Lambda					
Test of Function(s)	Wilks' Lambda	Sig.			
1	.825	.000			

Classification Result					
			Predicted Group Membership		
		Propensity to subscribe to commercial SMS	Would subscribe	Would no subscribe	Total
Original Group	**Count**	Would subscribe	170	66	236
		Would not subscribe	62	106	168
	%	Would subscribe	72.0	28.0	100
		Would not subscribe	36.9	63.1	100

68.3% of original grouped cases correctly classified.

here is acceptable. According to Table 4, it can be said that the discriminant function is slightly more accurate in predicting 'would subscribe' respondents (72.0 percent) than in predicting 'would not subscribe' respondents (63.1 percent).

From the discriminant function analysis, researchers can see which independent variables have the most predictive power. Table 5 shows the group means, standard deviations, and the test for equality of the group means. It can be seen from the univariate F value that all items are highly statistically significant (p<.05) and likely to be good predictors. In addition, the means from the 'would subscribe' group were larger than the means from the 'would not subscribe' group in all items. This result indicates that the 'would subscribe' group has a stronger level of desire to receive commercial SMS services than the 'would not subscribe' group. In addition, one open-ended question was put on the questionnaire asking respondents if they prefer another kind of SMS services. A few SMS services were recommended including lottery results, health tips, short humorous stories, traffic reports, and sport reports

Further analysis looked at which commercial SMS service is important in predicting group membership. Table 6 shows the rank of importance of all proposed commercial SMS services from the highest importance to lowest importance. By using a cut-off level of 0.3 as recommended by Hair et al., (2003), all items except the 'selected stock market movement' item show significant values. Then, the insignificant variable was removed from the list. Table 7 shows classification function coefficients in each group. The coefficients tell us what types of commercial SMS services are important to the 'would subscribe' and the 'would not subscribe' groups if they were willing to subscribe to commercial SMS services. It appears that the first two ranks are the same between the 'would subscribe' and the 'would not subscribe' groups but the afterward rankings differ between the two groups.

Preferred Receiving Time Period and Frequency

All respondents were asked at what time period during the day they preferred to receive commercial SMS services. The respondents were allowed to choose more than one time period. Only the results from 'would subscribe' respondents are presented here. The graph in Figure 4 shows that the receiving time periods are similar across the time during the day. It can be seen that the time 18.01 to 21.00 is slightly higher than other time periods and is the highest preferred time. Nonetheless, there is no huge

TABLE 5
Group Means Statistics Using Discriminant Analysis

Commercial SMS services[a]	Would subscribe		Would not subscribe		Test of equality of group means		
	M	SD	M	SD	Wilks' lambda	F value	Sig[b]
New update	3.73	1.081	3.01	1.163	0.908	40.503	.000*
Weather forecast	3.04	1.071	2.57	1.151	0.958	17.831	.000*
Horoscope	2.36	1.234	1.98	1.116	0.976	10.051	.002*
New arrival movies	2.92	1.119	2.23	1.130	0.916	36.895	.000*
New arrival books	3.02	1.122	2.45	1.280	0.948	22.078	.000*
New arrival singer albums	2.42	1.078	1.85	0.935	0.929	30.573	.000*
Discount promotion from interested prod-ucts/services	3.26	1.247	2.54	1.213	0.922	34.099	.000*
Special offer from interested products/services	3.39	1.210	2.52	1.262	0.892	48.503	.000*
Special event reminder	4.26	0.819	3.69	1.331	0.934	28.479	.000*
Currency exchange	2.53	1.081	2.13	1.081	0.969	13.063	.000*
Selected stock market movement	2.27	1.127	2.00	1.148	0.986	5.594	.018*

Note: a. Scale ranges from 1 = very undesirable to 5 very desirable
     b. F-test with statistical confidence level of 95% (p<0.05)

TABLE 6
Structure Matrix

Commercial SMS services	Function
Special offer from interested products/services	.753
News update	.688
New arrival movies	.657
Discount promotion from interested products/services	.631
New arrival singer albums	.598
Special event reminder	.577
New arrival books	.508
Weather forecast	.457
Currency exchange	.391
Horoscope	.343
Selected stock market movement	.256

TABLE 7
Classification Function Coefficients in Each Group

Would subscribe		Would not subscribe	
Commercial SMS services	Coefficients	Commercial SMS services	Coefficients
1. Special event reminder	2.525	1. Special event reminder	2.384
2. Weather forecast	1.017	2. Weather forecast	.939
3. Special offer from interested products/services	.896	3. Horoscope	.624
4. News update	.677	4. Special offer from interested products/services	.350
5. New arrival movies	.572	5. News update	.331
6. Horoscope	.499	6. New arrival movies	.327
7. New arrival singer albums	.122	7. Discount promotion from interested products/services	.083
8. Currency exchange	.066	8. New arrival books	.037
9. New arrival books	.035	9. Currency exchange	.025
10. Discount promotion from interested products/services	-.147	10. New arrival singer albums	-.021

difference across all time periods. For the preferred receiving frequency, as shown in Figure 5, the most preferred receiving frequency is one to three times per day (74 percent). The second is four to six times per day (19 percent) which is relatively less from the first preferred frequency.

DISCUSSION

This study attempts to assess if an individual's technology readiness would affect the propensity to subscribe to commercial SMS services. The results show that there is no statistical difference in technology readiness scores between people who would subscribe and those who would not subscribe to commercial SMS services in this sample. Consequently, it can be said that technology readiness plays a minor role in explaining cellular telephone users' propensity towards subscribing to commercial SMS services. This finding is very interesting when considering the

connection to the cellular telephone owning rate and SMS experiences. Most people have owned a cellular telephone (98.5 percent) and thus know how to send and receive SMS. It can be said that the cellular telephone has become such a common communication device that everyone can get one easily. Cellular telephone models range from simple to sophisticated models. People tend to buy the model that fits their needs and most recent models have all the basic functions including SMS. Consequently, it could be argued that the cellular telephone and its common function are no longer considered new technology. This observation may be the most important result of this study.

Nevertheless, when comparing the desire for various types of commercial SMS services between the 'would subscribe' and the 'would not subscribe' groups, this study found that there is a certain number of SMS services demanded. Two types of SMS services, 'special event reminder' and 'weather forecast', are

FIGURE 4
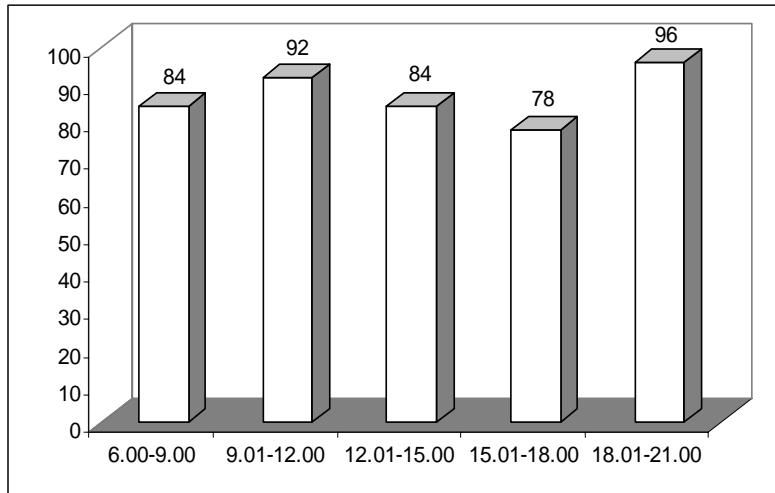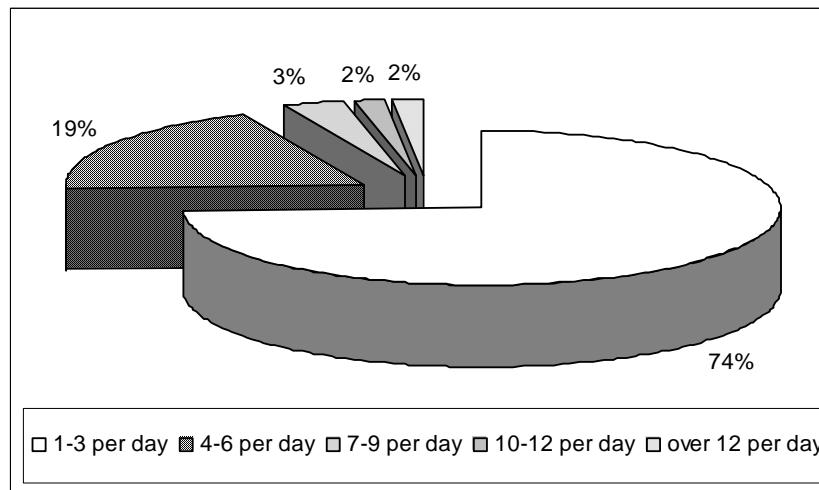**Preferred Receiving Time Period**

FIGURE 5
Preferred Receiving Frequency

demanded by both groups. Additionally, another interesting result is that a 'special offer from interested products/services' message seems to be the most important discriminating factor since it was ranked number one of all proposed SMS services in the discriminant function analysis. When we look specifically at the coefficients in each group, this type of SMS services is also ranked within the top five most important factors. This type of SMS message can be used directly for advertising and CRM purposes for almost all types of consumer-oriented businesses. Further, indirect marketing messages can be supplemented with other types of SMS services. More services can be added

since there are a number of people who willing to subscribe to the services that deliver what they want. Thus, if a company is able to offers those SMS services, the chance of success in gaining sales is relatively high, and thus has clear implications for consumer businesses.

Commercial SMS service is in its early stage and has not been given serious attention yet. However, the number of cellular telephone users is predicted to reach almost four billion people worldwide by the end of year 2011 (Portio Research 2006). This figure indicates that SMS messaging will also increase exponentially in the near future. Thus, this

growing segment provides a lot of potential business opportunities. Proper SMS services could increase a company's profitability and revenue.

In regard to the business model proposed earlier, commercial SMS messages can be used for advertising and CRM purposes. The findings of this study reveal that it is possible for a company to send commercial SMS directly or via service agents. Both channels also can be used simultaneously to sustain the loyalty of current customers and capture the attention of new customers. In general, the SMS messages sent by a service agent will reach a larger number of customers than messages sent by a company itself. Consequently, the management of a company needs to decide what is the purpose of the campaign being promoted? Who are the targets, new customers or existing customers? How many customers does the campaign wants to reach? Should the company buy the service or 'do-in-yourself'? By answering these questions, a company selects an appropriate channel that can send the messages most efficiently and effectively. It would be suggested that an advertising message is appropriate for a service agent channel and a CRM message is appropriate for a company's own channel.

As mentioned earlier, too many SMS alerts may cause a negative image for the campaign being promoted. Thus, commercial SMS subscribers should be allowed to personalize the time period and frequency of receiving SMS alerts. The findings of this study indicate clearly that the preferred receiving time period varies during the day. Subscribers should be allowed to choose what time period they prefer the most and a company needs to develop a system that allows such choice. Most people prefer to receive SMS alerts one to three times per day (74 percent). A minority prefer to receive SMS alerts more than three times per day (26 percent). These findings are useful for companies developing SMS systems and may serve as a means for segmenting users. Commercial SMS alerts must be distributed at the requested time and frequency.

Further technology development in cellular telephones will lead to more features and functions than what is currently offered in the market. For example, a multimedia message service (MMS) function is available in some models now but it probably will be a basic function in the future. This function is more attractive than SMS since animated graphics are allowed. If that develops, then, it will be possible to distribute sophisticated advertising messages via MMS. Additional functions and applications are being developed. Consequently, the capacity of cellular telephones will be absolutely enhanced. There will be additional potential business opportunities waiting for companies to capture and increase their revenue.

Management should not underestimate the effectiveness of utilizing SMS as a marketing communication channel. The number of cellular telephone subscribers is growing rapidly and there are a certain number of SMS services demanded by those cellular telephone subscribers. A cellular telephone is carried by its owner almost all the time. People can send and read SMS messages at any time no matter where they are. Generally speaking, customers tend to come back and stay longer with the company that satisfies them the most. If what a company offers is what the customers are looking for, a long term relationship between the company and its customers can be built through this effective communication channel. For instance, a credit card company may offer SMS alert service to its members whenever a credit card transaction is made. This would allow card members to know immediately whether any unauthorized transaction had been made. Such a SMS alert service could also be applied to the financial and bank industries.

The retailing industry could use SMS to increase the returning rate of customers which would lead to increased revenue. A local supermarket might set a 'best special offer' of the day/week and inform its customers via SMS every day/week. The products being promoted would need to be randomly selected and not anticipated by the customers. Customers who

visit the supermarket once per week or two-weeks might come back more frequently if they found the products they wanted were being promoted. Generally, once customers are in the supermarket, they not only buy promoted products but other products as well. A supermarket could eventually increase its sales and the number of returning customers. Moreover, SMS is also applicable to other types of consumer businesses. It is an effective communication tool and can be used effectively for marketing purposes.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Although the findings reveal interesting insights about cellular telephone users, certain limitations of this study must be acknowledged. First, the study is exploratory research in which the sample was collected by using convenient and snowball sampling techniques. Thus, the sample in this study cannot be considered representative of all cellular telephone users. However, the number of respondents in the sample is sufficient to contribute valuable knowledge to the field of customer communication marketing. Further research using probability sample techniques is needed to validate this exploratory research.

Second, the data collection was done through electronic mail and the Internet using a web-based questionnaire, which meant that all respondents had access to the Internet. This selectivity further restricts the ability to generalize the results, since not all cellular telephone users have access to the Internet. Cellular telephone users who do not have access to the Internet may exhibit very different forms of behavior. Further research using paper-based questionnaires is needed to compare the results found in this study. Finally, belief, behavior and attitude are known to normally vary from culture to culture. All results in this study can be representative only for Thai people. Technology readiness scores in other countries might be different because technology development also differs from country to country. Consequently, further

comparative research is needed to validate whether different cultures affect the technology readiness scores. The results of this study should be interpreted in light of these limitations.

CONCLUSION

This study examined the relationship between an individual's technology readiness and the propensity of cellular telephone users to subscribe to commercial SMS services. The findings suggest that there is no statistical difference in technology readiness scores between people who 'would subscribe' and those who 'would not subscribe' to commercial SMS services. Nevertheless, these two groups have different desires regarding various types of proposed commercial SMS services. The implications are clear. A certain number of SMS services are demanded including direct marketing messages, e.g., new arrival movies, special offer and discount promotion from interested products/services and non-direct marketing messages, e.g., news updates, special event reminders, weather forecasts. In addition, the study proposes a business model in which a company can send commercial SMS either through service agents or its own system with permission given by customers. The subscribers should be allowed to personalize their preferred receiving time and frequency. The preferred receiving time varies across the day while receiving frequency is suggested to one to three times per day. A company that is willing to use commercial SMS for advertising or CRM purposes could take the results of this study into consideration. It has been noted that they should also consult the appropriate laws and regulations in the particular countries that are targeted.

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Footnote:

[1] The term "cellular" telephone is typically used in North America. For the rest of the world, a cellular telephone is known as a "mobile" telephone.

[2] This refers to a dating system.