Gratifications, Innovation Attributes, and the Adoption of Camera Phone in Hong Kong

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A Graduation Project in Partial Fulfillment of the
Requirement for the Degree of
Master of Science in New Media

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May 2005

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Abstract

This exploratory study was conducted with 343 respondents using snowball convenience sampling. It attempts to find out the effects of the following variables, namely, gratifications, innovation attributes, technology clusters, Internet usage pattern, habit in photography, and demographics on the use of camera phones, in order to better understand how people use this converged new technology hybrid.

Results showed that among the gratification variables tested, mobility and affection were the strongest motive in predicting the overall camera phone use. Photo-taking with camera phones appeared to be for mobility, while receiving and transmitting images was predicted by mobility and showing affection; making video calls was for mobility. Furthermore, significant innovation attribute predictors were found to be perceived “fit my lifestyle and quick” and “easy to use and inexpensive” for general photo-taking with camera phones. However, no significant relationship was found between perceived innovation attributes of camera phones and making video calls. Being male and with lower monthly household income were only approaching significant demographic predictors for photo-taking with camera phones. Finally, perceived “helps my job”, “easy to use and inexpensive”, and being young were significant predictors for the likelihood to adopt the camera phone.

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Introduction

While entering the twenty-first century, a converged new technology hybrid emerged - Camera phone – dissolving boundaries between telecommunications and imaging industry. The world-first camera phone was the J-SH04, introduced by Sharp and J-Phone in Japan in November 2000. Four years later (2004), the camera phone market soared with worldwide annual shipments up more than 200%, according to In-Stat/MDR.[1] In the United States, camera phone penetration was at about 14% and growing. In Hong Kong, there was 117.8% cellular subscriber penetration per population in January 2005, and the total number of cellular subscribers was 8,122,707, according to OFTA.[2] Among these cellular subscribers, about 35% used camera phones. As handset prices continue to drop and image quality improves, the camera phone will continue its growth in 2005. Jeff Hayes [3] (2005) commented that the society is moving into an era of ubiquitous imaging that offers the ability to capture, store, send, print, and view an image anywhere.

Camera phone is a cellular phone with a built-in digital camera. Like digital camera, camera phone, with its ability to display the captured image almost immediately, brings a sense of instant gratification to all kinds of photographer. Moreover, camera phone can bring a sense of immediacy. Thanks to its wireless photo transfer, you can immediately transmit images to other applications, such as cellular phone, personal digital assistant (PDA), personal

[1] It is a division of the largest business-to-business publisher in the United States. Available at: <www.in-stat.com>.

[2] Office of the Telecommunications Authority.

[3] He is a director at InfoTrends/CAP Ventures.

computer (PC), or Moblog,[4] either via e-mail, infrared (IR) port, Bluetooth,[5] or through multimedia messaging service (MMS).[6] You can even talk face-to-face with 3G technology.[7] Unlike digital camera or film camera, camera phone does not feature a viewfinder. Instead, you frame your subject on the main phone display. The value of a photograph taken with a camera phone does not lie in its photographic quality but in the sense of immediacy and the knowledge that you are able to capture and share.

As the tiny device can easily slip into a shirt or pants pocket, it offers flexibility and convenience. Derrick Story [8] (2004) recommended that the best camera is the one in your hand when something happens. For the time being, camera phone is the one that gets the unexpected moment. It seems that everyone can be a reporter and the camera phone will become everyday camera.

Camera phone has become one of the most interesting technological developments with a potential social impact, but as many technologies do, it may have its downside. As mentioned before, camera phone resembles cellular phone much more than camera, it is difficult to tell when someone is stealthily snapping a picture of you in a private moment, or whether he or she is simply checking the list of missed calls. Also, privacy, security, and copyright concerns are raised surrounding camera phone. Accordingly, this study raises some questions: How do people use the camera phone? Do they use it differently from the digital camera or film camera? If so, how does it affect their photographic behavior? Which variable

[4] A combination of mobile and blog which allows people to take pictures anywhere, anytime, and have them appeared on a website within minutes.

[5] It is an industry standard, a method of direct wireless transfers, which connects to a variety of wireless devices, such as cellular phone, PDA.

[6] It refers to phone-to-phone messaging of files that allows images, sounds, texts, and video messages to be sent between MMS-capable phones.

[7] It refers to third generation of wireless communication technology. It aims at raising transmission speeds from 9.5K to 2M bit/sec.

[8] He is the author of *Digital Photography Hacks*.

possesses the most predictive power of the adoption behavior? Why do some people adopt camera phones, whereas others do not?

This exploratory study is aimed at examining the effects of innovation attributes, people's motivations on the camera phone adoption, or the gratifications they obtain that can be identified as unique in Hong Kong.

Theoretical frameworks

Uses and Gratifications

Uses and gratifications theory examines people's underlying motives for using the media to gratify their social and psychological needs or wants, and to identify the positive and negative consequences (Katz, Blumler, & Gurevitch, 1974). The theory "has historically been applied to mass media, but it has always held promise for the study of other media as well, including the so-called 'new' technologies" (Williams et al., 1985, 1994; Rafaeli, 1986). Various studies have examined the interactive and informational dimensions of new technologies, and explored how these 'new' media might differ from traditional face-to-face communication, and how they might provide additional communication channels. Williams and Rice (1983), for example, pointed out that computer-mediated communication (CMC) provided users with a massive information resource and a vehicle for social interaction. Rogers (1986) found that home computers were adaptable to a variety of uses that can satisfy particular communication needs. Two attributes of computers, namely, interactivity and demassification, enabled people to easily seek information, to work or play.

Past studies have investigated the motives for using the cellular phone. Leung and Wei (2000) revealed that mobility and immediate access were unique dimensions of cellular phone use motivations. The gratifications dimensions of mobility, immediacy, and instrumentality were the strong predictors of the use of the cellular phones. The differences in gratifications

sought in different dimensions were due to respondents' differences in age, gender, and occupations. As the camera phone is a hybrid of digital camera and cellular phone, past research on the cellular phone serves as a departure point for grounding the present study. Based on the uses and gratifications theory, the following research question is raised:

RQ1: What are the gratifications people associate with camera phone use?

As gratification is an important variable in mass communication research, this study expects perceived gratifications sought from camera phone to increase with camera phone use. Thus, the following hypothesis is formulated:

H1: The more gratifications people seek from camera phone use, the more they will use camera phones.

Diffusion of Innovations

The diffusion of innovations is essentially a social process in which subjectively perceived information about a new idea is communicated from person to person. The meaning of an innovation is thus gradually worked out through a process of social construction.

Everett M. Rogers (2003)

Rogers (1995, 2003) described that there are five attributes of an innovation affect its rate of adoption,[9] as perceived by members of a social system. These five attributes are relative advantage, compatibility, complexity, trialability, and observability.

Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The nature of the innovation determines what specific type of relative advantage is important to adopters. These advantages can be measured as economic profitability, social prestige, convenience and satisfaction obtained. Past investigations of the

[9] The relative speed with which an innovation is adopted by members of a social system.

perceived attributes of innovations almost universally report a positive relationship between relative advantage and rate of adoption. Based on this attribute, the following hypothesis is proposed:

H2a: The more advantages people perceive in using camera phones, the more they will use camera phones.

Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. It is regarded as more familiar. Rogers (2003) recommended a receiver-oriented, empirical approach to naming an innovation in order to make it more compatible. Thus, we expect that:

H2b: The more people perceive camera phones compatible with their existing values and past experiences, the more they will use camera phones.

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. For some new innovations, complexity is a very important barrier to adoption. As a result, we expect that:

H2c: The less complex people perceive in using camera phones, the more they will use camera phones.

Trialability is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on the installment plan are generally adopted more rapidly than innovations that are not divisible. This means that an innovation can be tried more easily will have a more rapid rate of adoption. Relatively earlier adopters of an innovation perceive trialability as more important than do later adopters (Gross, 1942; Ryan, 1948). Therefore, our hypothesis is that:

H2d: The more opportunities people try various camera phones, the more they will use camera phones.

Observability is the degree to which the results of an innovation are visible to others. As in this study, the use of camera phones is highly observable, both visually and in an auditory sense. Thus, we expect that:

H2e: The more benefits people can observe from using camera phones, the more they will use camera phones.

Technology Cluster

A technology cluster consists of one or more distinguishable elements of technology that are perceived as being interrelated. Past diffusion research affirmed that the adoption of new communication technologies was best predicted by the adoption of functionally similar technologies and user perceptions toward them. Leung (2001) reaffirmed that ownership of functionally similar interpersonal communication technologies such as cellular phones encourage the level of ICQ use. Therefore, the following hypothesis is formulated:

H3: Frequency of people using camera phones will be positively related to ownership of functionally similar technologies such as digital camera, cellular phone, personal digital assistant (PDA), and the Web.

Past research has indicated that media use, socioeconomic background, and demographics differed between adopters and non-adopters of various new media technologies (Reagan, 1987; Leung, 1998; Leung and Wei, 1998). The purpose of this study, then, is also to examine if innovation attributes, technology clusters, Internet usage pattern, habit in photography, and demographics would be associated with their camera phone adoption. Therefore, the following research questions are raised:

RQ2: How do camera phone adopters differ from cellular phone adopters in terms of the innovation attributes, technology clusters, Internet usage pattern, habit in photography,

and demographics?

RQ3: How do the following variables, namely, gratifications, innovation attributes, technology clusters, Internet usage pattern, habit in photography, and demographics influence the use of camera phones in terms of photo-taking, receiving and transmitting images, and making video calls?

RQ4: To what extent can innovation attributes, technology clusters, Internet usage pattern, habit in photography, and demographics predict the likelihood to adopt the camera phone?

Methodology

Sampling

Data collection was conducted from March to April 2005 in Hong Kong through online and offline channels, based on snowball convenience sampling. A web-based survey questionnaire was created on http://www.my3q.com e-mailing to the participants. The URL of the questionnaire was also posted on an online forum and two newsgroups which are popular in Hong Kong, run by ringhk.com (http://board.phonehk.com) and news.hkpcug.org (hkpcug.mobile-phone), (hkpcug.mobile-phone.3G) respectively. The paper questionnaire was simultaneously distributed offline to some institutions. A total of 343 valid responses were collected.

Sample Profiles

Among the 343 respondents, 208 (60.64%) were camera phone adopters, while 135 (39.36%) were non-camera phone adopters. With regard to the demographic characteristics, 177 (51.6%) were male, while 166 (48.3%) were female. The largest age group, 162 (47.2%)

in this sample was between 25-34, followed by 82 (23.9%) from the 18-24 age group, 49 (14.2%) from 35-44, 35 (10.2%) from 17 or below, 10 (2.91%) and 5 (1.45%) were in 45-54 and 55 or above age group respectively. In terms of marital status, 251 (73.1%) of the respondents were single, 85 (24.7%), 4 (1.16%), and 3 (0.87%) were married, separated or divorced, and widowed respectively. A total of 173 (50.29%) attained tertiary education or above, 92 (26.8%), 48 (13.9%), 18 (5.24%), and 12 (3.49%) attained Forms 4-5, Forms 6-7, Forms 1-3, and primary or below education respectively. Finally, 196 (57.14%) of camera phone adopters were Internet users, while 12 (3.50%) were non-Internet users. 104 (30.32%) and 31 (9.04%) of non-camera phone adopters were Internet users and non-Internet users respectively.

Measurements

A Chinese questionnaire (see Appendix) was designed based on the following aspects: 1) Camera Phone Adopters' Behaviors; 2) Uses and Gratifications of Camera Phone Use; 3) Five Innovation Attributes, namely, Relative Advantage, Compatibility, Complexity, Trialability, and Observability of the Camera Phone Adoption; 4) Technology Clusters; 5) Internet Usage Pattern; 6) Habit in Photography; and 7) Demographics.

Camera Phone Adopters' Behaviors: As for the dependent variables of the camera phone adopters, respondents were asked to report their camera phone uses which include photo-taking, receiving and transmitting images, and making video calls. It was measured on a 5-point scale with "1" meaning "never"; "2" "seldom"; "3" "neutral"; "4" "sometimes"; and "5" "very often".

Uses and Gratifications of Camera Phone Use: Respondents were asked to report their reasons for using camera phones. A 5-point scale was used in rating the 20 gratifications items, namely "1" means "strongly disagree"; "2" "disagree"; "3" "neutral"; "4" "agree"; and "5"

"strongly agree".

Five Innovation Attributes of the Camera Phone Adoption: All respondents (camera phone adopters and non-camera phone adopters) were asked to rate their attitudes toward camera phones which include relative advantage, compatibility, complexity, trialability, and observability, following Rogers' terms (1995, 2003). These items were measured on a 5-point scale, with "1" meaning "strongly disagree"; "2" "disagree"; "3" "neutral"; "4" "agree"; "5" "strongly agree".

Technology Clusters: Respondents were asked whether they adopted functionally similar technologies, such as computer, digital camera, PDA, cellular phone, PDA phone, DVD, MP3 player, iPod, 3G network, ICQ, e-mail, Internet, Bluetooth, and MMS. These fourteen technologies were coded as dummy with "1" meaning "yes" and "0" meaning "no".

Internet Usage Pattern: According to InfoTrends-CAP Ventures (Jan. 2005), 20% of Internet users in the United States adopted camera phones at the end of 2004. In comparison, only 3% of Internet users had camera phones at the end of 2003. It reflected that camera phones are becoming popular with Internet users. Accordingly, this survey also asked respondents whether they were Internet users and to report the average number of minutes they spent on the Internet, excluding work or homework, in a typical day.

Habit in Photography: Respondent were also asked 'how often they took photos every week on average?' in a 6-point scale with "1" meaning "never"; "2" "once or below"; "3" "two to three days"; "4" "four to six days"; "5" "everyday"; and "6" "not regularly".

Demographics: Gender, age, educational level, size of family, marital status, monthly household income, and occupation were also collected.

Analytical Procedures

Two principal components factor analyses with varimax rotation were run to

determine the potential groupings of 20 gratifications items and of 12 innovation attributes items people associate with camera phone use. Furthermore, correlation and simple regression analyses were used to examine the predictors of the camera phone use (e.g.: photo-taking, receiving and transmitting images, and making video calls) and of the likelihood to adopt the camera phone. Finally, 2-tailed T-test was conducted to compare the mean difference between the adopters and the non-adopters in different perceived attributes, technology clusters, Internet usage pattern, habit in photography, and demographics.

Findings

Gratifications Sought in Camera Phone Use

To answer the first research question, principal component factor analysis with Varimax rotation was run to categorize the potential groupings of the 20 gratifications items of camera phone use. Six factors emerged with eigenvalues greater than 1.0, explaining 68.36% of the total variance (see Table 1).

The first factor was “trendy and relaxation” (eigenvalue = 6.45, variance = 32.25%, Cronbach’s alpha = .85). It included five items representing the use of camera phones as trendy, stylish, and image status. Also, it reflected the pleasure of using camera phones to take photos and help pass the time. “Affection” was the second factor (eigenvalue = 1.91, variance = 9.54%, Cronbach’s alpha = .75). It consisted of five items representing the motivations of using camera phones as a means to show affection. These items included “feeling closer to people”, “enhancing the enjoyment with partner”, “relieving embarrassment in the way of apology”, “sharing immediate joy or feeling to their friends”, and “making themselves always accessible or show up to their partner” through the use of camera phones. The third factor was “mobility” (eigenvalue = 1.48, variance = 7.37%, Cronbach’s alpha = .78). It included three items representing the convenience to keep in one hand and to carry other than heavy

photographic device because of camera phone use. The mean scores for these items were high, reflecting the mobility as a strong gratification sought in camera phone use. “Immediacy” was the fourth factor (eigenvalue = 1.40, variance = 6.98%, Cronbach’s alpha = .70). It consisted of three items representing the sense of immediacy in using camera phones to take and transmit images anytime and anywhere, especially during shopping for immediate decision-making with their friend. The fifth factor was “budget concern” (eigenvalue = 1.27, variance = 6.34%, Cronbach’s alpha = .60). It included two items representing buying a camera phone is more economical than buying both cellular phone and digital camera altogether. “Privacy invasion” was the sixth factor (eigenvalue = 1.18, variance = 5.88%, Cronbach’s alpha = .80). It consisted of two items representing that the camera phone could be used as a device for “peeping”. The mean scores of the items were the lowest, maybe reflecting that the adoption of camera phones in Hong Kong was at its early stage compared to that of the United States, privacy invasion was not a strong motive of camera phone use.

Perceived Attributes in Camera Phone Use

Principal component factor analysis with Varimax rotation was run again to categorize the potential groupings of the 12 innovation attributes items of camera phone use. Four factors emerged with eigenvalues greater than 1.0, explaining 65.61% of the total variance (see Table 2).

The first factor was “immediate results and trials” (eigenvalue = 3.44, variance = 28.69%, Cronbach’s alpha = .65). It contained four items indicating the use of camera phones because “this is so popular that people use camera phones to take photos in public area”, “I’ve had a great deal of opportunity to try various camera phones”, “I was permitted to use a camera phone on a trial basis provided by the company”, and “people around me are mostly using camera phones”. “Fit my lifestyle and Quick” was the second factor (eigenvalue = 2.31,

variance = 19.24%, Cronbach's alpha = .67). It had three items representing the use of camera phones "fits into my lifestyle" and "it is very quick to take photos in a short time". The third factor was "helps my job" (eigenvalue = 1.17, variance = 9.74%, Cronbach's alpha = .79). It contained two items indicating using a camera phone can "shorten the time to complete the job" and "improve my job performance". "Easy to use and Inexpensive" was the fourth factor (eigenvalue = .95, variance = 7.94%, Cronbach's alpha = .62). It had three items representing that "a camera phone is easy to use", "using a camera phone allows me to capture images faster", and "overall, using a camera phone can save money and time than using a digital camera". The mean scores of the items were high, but its Cronbach's alpha was relatively low.

Hypotheses Testing

To test the six hypotheses, correlational analyses were run (see Table 3). Results showed that mobility ($r = .220$, $p <= .01$), affection ($r = .209$, $p <= .01$), trendy and relaxation ($r = .161$, $p <= .05$) were significantly linked to photo-taking with camera phones. Furthermore, affection ($r = .219$, $p <= .01$), mobility ($r = .182$, $p <= .05$), trendy and relaxation ($r = .177$, $p <= .05$) were also significantly related to receiving and transmitting images with camera phones. Mobility ($r = .172$, $p <= .05$) was the only significant predictor for making video calls with camera phones. Only three out of six appeared as significant gratification factors for the overall camera phone use. Therefore, hypothesis H1 was partially supported.

This study also found that "fit my lifestyle and quick" ($r = .294$, $p <= .01$) was significantly related to photo-taking with camera phones, while "fit my lifestyle and quick" ($r = .160$, $p <= .05$) and "easy to use and inexpensive" ($r = .153$, $p <= .05$) were positively related to receiving and transmitting images with camera phones. However, no significant relationship was found between perceived attributes of camera phones and making video calls.

Of the four perceived attributes, only “fit my lifestyle and quick” and “easy to use and inexpensive” were significantly linked to the overall camera phone use. As a result, hypothesis H2b was supported and H2c was only partially supported whereas hypotheses H2a, H2d, and H2e were rejected.

Technology cluster concept was significantly related to photo-taking ($r = .257$, $p <= .01$) as well as receiving and transmitting images ($r = .204$, $p <= .01$) with camera phones. Hence, hypothesis H3 was supported. Furthermore, Internet usage pattern ($r = .251$, $p <= .01$) was significantly related to receiving and transmitting images with camera phones. Finally, being male ($r = .179$, $p <= .05$) and ($r = .153$, $p <= .05$) was positively related to photo-taking as well as receiving and transmitting images with camera phones respectively.

Differences between Camera Phone Adopters and Non-camera phone adopters

To answer the second research question, independent samples T-test was run to examine the differences between camera phone adopters and non-camera phone adopters in attitudes of camera phone, technology clusters, Internet usage pattern, habit in photography, and demographics (see Table 4). Results showed that only perceived “immediate results and trials” ($t = 14.40$, $p = .000$) and “fit my lifestyle and quick” ($t = 5.75$, $p = .000$) were significantly correlated to camera phone adoption. Technology clusters ($t = 13.60$, $p = .000$), habit in photography ($t = 3.37$, $p = .001$), age (negative, $t = -2.20$, $p = .029$), and educational level ($t = 2.88$, $p = .004$) were found significantly different.

Camera phone adopters owned about 3.44 items of new media technologies more than non-camera phone adopters. Camera phone adopters took about 0.74 photos per week more than non-camera phone adopters. Non-camera phone adopters were 0.24 year older than camera phone adopters. Camera phone adopters were more educated than non-camera phone adopters. As a result, there were mean differences in technology clusters, habit in photography,

age, and educational level between camera phone adopters and non-camera phone adopters. The differences were significant.

Predictors of Camera Phone Use

To answer the third research question, regression were run to determine how the following independent variables, namely, gratifications, innovation attributes, technology clusters, Internet usage pattern, habit in photography, and demographics influenced the use of camera phones in terms of photo-taking, receiving and transmitting images, and making video calls (see Table 3).

Significant innovation attribute predictors were found to be perceived “fit my lifestyle and quick” (beta = .322, p <= .001) and perceived “easy to use and inexpensive” (negative, beta = -.271, p <= .01) for general photo-taking with camera phones. However, no significant relationship was found between perceived innovation attributes of camera phones and making video calls.

Among the gratification variables tested, mobility (beta = .180, p <= .05) was significant in predicting general photo-taking with camera phones. Affection (beta = .221, p <= .01) and mobility (beta = .172, p <= .05) had significant predictive power over the use of camera phones for receiving and transmitting images. This suggested that people tended to use camera phones to show affection while receiving and transmitting images. Mobility (beta = .205, p <= .05) was also significantly predicted the use of camera phones for making video calls.

Predicting the Likelihood to Adopt Camera Phone

To answer the last research question, regression was run again to find out the extent to which the independent variables, namely, innovation attributes, technology clusters, Internet

usage pattern, habit in photography, and demographics could predict the likelihood to adopt the camera phone (see Table 5). Significant predictors were found to be perceived “helps my job” (beta = .305, p <= .001) and “easy to use and inexpensive” (beta = .212, p <= .05). Also, young (negative, beta = -.221, p <= .05) people were found more likely to adopt the camera phone in the future. Technology cluster concept was only an approaching significant predictor of the likelihood to adopt the camera phone (negative, beta = -.225, p <= .1). This means that people who owned few technologies were more likely to adopt the camera phone. The regression equation was account for 17% of the total variance.

Conclusions and Discussion

The results of this exploratory study showed that the gratifications dimension of mobility was the strongest predictor of the overall camera phone use, followed by affection. The tiny device facilitated their convenience and mobility in photo-taking, receiving and transmitting images as well as making video calls, it also allowed people to show affection while receiving and transmitting images.

Furthermore, the perceived attributes dimensions of “fit my lifestyle and quick” and “easy to use and inexpensive” were significant predictors of photo-taking with camera phones. This revealed that people perceived camera phones compatible with their lifestyle and easy to use. “Helps my job” was approaching significant in its relationship to receiving and transmitting images, they perceived it as convenience to their job. However, “immediate results and trials” were not considered as significant variables of the overall camera phone use. The absence of a significant relationship between perceived innovation attributes of camera phones and making video calls was probably due to the fact that the adoption of third generation (3G) technology with camera phones in Hong Kong is still at its early stage. People were rather “new” to making video calls.

Moreover, this study found that 196 (57.14%) of camera phone adopters were Internet users, while 104 (30.32%) of non-camera phone adopters were Internet users. The result supported InfoTrends-CAP's research in 2005, they found that 20% of Internet users in the United States owned a camera phone at the end of 2004, and camera phones are becoming popular with web surfers.

As anticipated, technology cluster concept was a significant predictor for the adoption of an innovation (Rogers, 1995, 2003). Findings of this study indicated that camera phone adopters owned new media technologies more than non-camera phone adopters. The more technologies people own, the higher the level they would use the camera phone. This indicated that younger people who were more likely to adopt the camera phone were those who attained better education, owned more new media technologies, and who took more photos per week, perceived camera phones more compatible and observable.

However, as regard to independent variables predicting the likelihood to adopt the camera phone, this study found that perceived "helps my job" and "easy to use and inexpensive" were positively related to the likelihood to adopt the camera phone. Further, younger people who owned few technologies were more likely to adopt the camera phone in the future. It seems that those were the late adopters of new media technologies. In order to attract them to adopt the camera phone, advertising campaigns should focus on these two factors, "helps my job" and "easy to use and inexpensive", by constituting an image of camera phone as a device for improving their job performance and providing convenience to their job. Specifically, it is easy to use.

Limitations and Suggestions for Future Research

As the data collection process of this study was conducted during the early stage of the development of the third generation (3G) camera phone in Hong Kong, such limitations were

existed. For example, small sample size with a non-probability random sample. The data were collected from researcher's friends, colleagues and relatives. These results may not be generalized to current population in Hong Kong. Moreover, it is possible that those respondents were early adopters of the camera phone. The use of camera phone may change depending on its context. Therefore, future research should follow up to investigate in which gratifications sought and perceived attributes in camera phone use would support over time. Simultaneously, the qualitative method should be applied in the future study on assessing the issue of privacy invasion with camera phones in Hong Kong.

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TABLE 1
Factor Analysis (Principal Components, Varimax Rotation) of 20 Gratifications Items
(N = 208)

I use a camera phone because …	Mean	SD	Factors					
			1	2	3	4	5	6
Trendy and Relaxation								
it allows me to upgrade my image status	2.72	1.04	.752					
it helps pass the time	3.56	1.10	.708					
it is trendy	3.51	.99	.692					
it allows me to look stylish	3.32	.99	.687					
it allows me to enjoy the pleasure of photography	3.44	1.00	.645					
Affection								
it allows people to feel closer	3.35	.96		.745				
it enhances the enjoyment with partner	3.66	1.16		.744				
it helps relieve embarrassment in the way of apology	3.12	1.32		.683			.425	
it allows me to share immediate joy or feeling to my friends	3.73	.97		.525	.464			
it is helpful for me to be always accessible or show up my location to my partner	2.82	1.72		.500				
Mobility								
it allows me to keep in one hand as it is very tiny								
it is so convenient to carry other than heavy photographic device	4.21	.82			.859			
it avoids the need of turning on the viewfinder of the camera	3.56	1.16			.776			
	3.48	1.08			.641			
Immediacy								
it allows me to photo-taking during shopping for immediate	3.46	1.46				.790		
decision-making with my friend								
it allows me to transmit images at anytime anywhere	3.74	.88				.708		
it allows me to capture any precious moment at anytime anywhere	3.57	1.03				.657		
Budget Concern								
there is almost no price difference between cellular phone and camera phone	3.52	1.16					.762	
it is more economical than buying both cellular phone and digital camera altogether	3.11	1.20					.662	
Privacy Invasion								
it allows me to stealthily snap a picture of others in a private moment which makes me excited	2.08	1.07						.898
nobody notices me when I snap the picture stealthily	2.45	1.16						.894
Eigenvalue			6.45	1.91	1.48	1.40	1.27	1.18
Variance explained (%)			32.25	9.54	7.37	6.98	6.34	5.88
Cronbach's alpha			.85	.75	.78	.70	.60	.80

Note: The scale used: 1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly agree

TABLE 2
Factor Analysis (Principal Components, Varimax Rotation) of 12 Camera Phone Attributes Items (N = 208)

	Mean	SD	Factors 1	2	3	4
Immediate Results and Trials						
This is so popular that people use camera phones to take photos in public area	3.32	1.08	.761			
I've had a great deal of opportunity to try various camera phones	2.70	1.12	.727			
I was permitted to use a camera phone on a trial basis provided by the company	2.26	1.15	.722			
People around me are mostly using camera phones	3.67	1.02	.693			
Fit my lifestyle and Quick						
Using a camera phone changes my general habit in photography	2.87	1.16		.834		
Using a camera phone fits into my lifestyle	2.93	1.03	.496	.646		
It is very quick to take photos with a camera phone in a short time	3.81	.93		.642		
Helps my Job						
Using a camera phone can shorten the time to complete the job	2.80	.96			.901	
Using a camera phone improves my job performance	3.83	2.89			.860	
Easy to use and Inexpensive						
A camera phone is easy to use	3.97	.84				.708
Using a camera phone allows me to capture images faster	3.11	1.14				.707
Overall, using a camera phone can save money and time than using a digital camera	2.72	1.06				.699
Eigenvalue			3.44	2.31	1.17	.95
Variance explained (%)			28.69	19.24	9.74	7.94
Cronbach's alpha			.65	.67	.79	.62

Note: The scale used: 1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly agree

TABLE 3
Regression Analysis of Gratifications, Innovation Attributes, Technology Clusters, Internet Usage Pattern, Habit in Photography, and Demographics on Camera Phone Use (Photo-taking, Receiving & Transmitting images, Making video calls) (N = 208)

Predictor Variables	Camera Phone Use					
	Photo-taking		Receiving & Transmitting images		Making video calls	
	r	Beta	r	Beta	r	Beta
Gratifications						
Trendy and Relaxation	.161*	.138#	.177*	n.s.	n.s.	n.s.
Affection	.209**	.130#	.219**	.221**	n.s.	.157#
Mobility	.220**	.180*	.182*	.172*	.172*	.205*
Immediacy	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Budget Concern	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Privacy Invasion	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Innovation Attributes						
Immediate Results and Trials	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Fit my lifestyle and Quick	.294**	.322***	.160*	n.s.	n.s.	n.s.
Helps my job	n.s.	n.s.	n.s.	-.175#	n.s.	n.s.
Easy to use and Inexpensive	n.s.	-.271**	.153*	n.s.	n.s.	n.s.
Technology Clusters	.257**	n.s.	.204**	n.s.	n.s.	n.s.
Internet Usage Pattern	n.s.	n.s.	.251**	.169#	n.s.	n.s.
Habit in Photography	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Demographics						
Gender (male = 1)	.179*	.136#	.153*	n.s.	n.s.	n.s.
Age	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Educational level	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Monthly household income	n.s.	.127#	n.s.	n.s.	n.s.	n.s.
R^2		.256		.112		.003

Notes: #p <= .1; *p <= .05; **p <= .01; ***p <= .001

TABLE 4
Comparison between Camera Phone Adopters and Non-camera phone adopters

	Adopters (M)	Non-adopters (M)	t
Innovation Attributes			
Observable Immediate Results and Trials	13.69	8.79	14.40***
Fit my lifestyle and Quick	10.18	8.62	5.75***
Helps my job	5.75	6.29	-1.64
Easy to use and Inexpensive	10.05	9.50	1.91#
Technology Clusters	9.17	5.73	13.60***
Internet Usage Pattern	137.25	102.14	1.25
Habit in Photography	4.60	3.86	3.37***
Demographics			
Age	2.71	2.95	-2.20*
Monthly household income	5.26	5.27	-.05
Educational level	4.30	3.90	2.88**

Notes: #p <= .1; *p <= .05; **p <= .01; ***p <= .001

TABLE 5
Regression Analysis of Innovation Attributes, Technology Clusters, Internet Usage Pattern, Habit in Photography, and Demographics on the Likelihood to Adopt the Camera Phone
(N = 135)

Predictors	Likelihood to Adopt the Camera Phone (Non-Camera Phone Adopters)	
	r	Beta
Innovation Attributes		
Immediate Results and Trials	n.s.	n.s.
Fit my lifestyle and Quick	n.s.	n.s.
Helps my job	.156*	.305***
Easy to use and Inexpensive	.137*	.212*
Technology Clusters	n.s.	-.225#
Internet Usage Pattern	n.s.	n.s.
Habit in Photography	n.s.	n.s.
Demographics		
Gender (male = 1)	n.s.	n.s.
Age	-.251**	-.221*
Educational level	n.s.	n.s.
Monthly household income	n.s.	n.s.
R^2		.17

Notes: #p <= .1; *p <= .05; **p <= .01; ***p <= .001

Appendix

問卷編號：_____

使用相機電話 (Camera Phone) 問卷調查
2005 年 3 月

你好！我是香港中文大學新聞與傳播學院的學生，現正進行一項有關港人使用相機電話的研究。請閣下抽出約 10 分鐘完成以下的問卷。所有資料只會作是次研究之用，絕對保密。多謝支持！

1. 你有沒有使用相機電話 (Camera Phone) 呢？
   1) 有 → (請跳至甲部繼續)
   2) 沒有

2. 你有沒有使用手提電話 (Mobile Phone) 呢？
   1) 有 → (請跳至乙部繼續)
   2) 沒有 → (請跳至乙部繼續)

甲部：相機電話使用者

1. 使用習慣

請用 1 至 5 表示：『1』代表「從不」,『5』代表「經常」。

	從不	甚少	一般	有時	經常	不適用
1) 你經常使用相機電話嗎？	1	2	3	4	5	9
2) 你經常使用相機電話來影相/ 錄影嗎？	1	2	3	4	5	9
3) 你經常在公眾場所內即興地使用相機電話來影相/ 錄影嗎？例如：餐廳、乘坐交通工具時。	1	2	3	4	5	9
4) 你經常使用相機電話來接收和傳送影像/ 短片嗎？	1	2	3	4	5	9
5) 你經常使用相機電話作「視像通訊」嗎？	1	2	3	4	5	9
6) 你經常將相機電話拍攝得來的影像沖印成相片嗎？	1	2	3	4	5	9

2. 使用模式

a) 你經常使用相機電話透過以下途徑傳送影像/ 短片嗎？

1) MMS	1	2	3	4	5	9
2) e-mail	1	2	3	4	5	9
3) 藍芽技術 (Bluetooth)	1	2	3	4	5	9
4) 紅外線 (IR)	1	2	3	4	5	9

b) 你經常將相機電話拍攝得來的影像/ 短片傳送到以下的科技/ 產品內嗎？

	從不	甚少	一般	有時	經常	不適用
1) 個人電腦 (PC)	1	2	3	4	5	9
2) 個人的 PDA 電子手帳	1	2	3	4	5	9
3) 互聯網	1	2	3	4	5	9

3. 使用原因

請用 1 至 5 表示：『1』代表「非常不同意」,『5』代表「非常同意」。

	非常不同意	不同意	一般	同意	非常同意	不適用
我使用相機電話的原因是・・・						
1) 表示我緊貼新科技的發展	1	2	3	4	5	9
2) 表示我追上潮流	1	2	3	4	5	9
3) 突顯我的身份和地位	1	2	3	4	5	9
4) 隨時將人生百態拍下	1	2	3	4	5	9
5) 方便我即時將商品拍攝，與朋友商量購買價值	1	2	3	4	5	9
6) 工作需要	1	2	3	4	5	9
7) 可消磨時間	1	2	3	4	5	9
8) 令我享受到拍攝樂趣	1	2	3	4	5	9
9) 隨時隨地可將影像傳送	1	2	3	4	5	9
10) 不用帶著笨重的攝影器材	1	2	3	4	5	9
11) 可隨手拿著，十分輕便	1	2	3	4	5	9
12) 可節省開鏡頭的時間，方便快捷	1	2	3	4	5	9
13) 手提電話與相機電話價錢分別不大	1	2	3	4	5	9
14) 沒辦法，因爲大部份手提電話都附加了相機功能	1	2	3	4	5	9
15) 人與人之間關係更密切	1	2	3	4	5	9
16) 令本來難以啓齒的事變得容易	1	2	3	4	5	9
17) 讓朋人分享到我即時的喜悅或感覺	1	2	3	4	5	9
18) 增加談情樂趣	1	2	3	4	5	9

		非常不同意	不同意	一般	同意	非常同意	不適用
19)	隨時監察對方/ 匯報自己的行蹤	1	2	3	4	5	9
20)	相比分別購買手提電話及數碼相機爲化算	1	2	3	4	5	9
21)	人家以爲我在使用電話，不知道我在偷拍	1	2	3	4	5	9
22)	在無人知曉的情況下拍攝，令我興奮莫名	1	2	3	4	5	9

<u>乙部：所有受訪者</u>

以下的問題是有關你對相機電話的看法，答案無對錯之分。請用 1 至 5 表示：『1』 代表「非常不同意」,『5』代表「非常同意」。

		非常不同意	不同意	一般	同意	非常同意	不適用
1)	整體上，使用相機電話影相會比數碼相機節省時間、金錢	1	2	3	4	5	9
2)	使用相機電話能加快我攝影的速度	1	2	3	4	5	9
3)	使用相機電話令我多些機會去鍛鍊攝影的技術	1	2	3	4	5	9
4)	使用相機電話可令工作更快地完成	1	2	3	4	5	9
5)	使用相機電話能有助我工作的表現	1	2	3	4	5	9
6)	使用相機電話來影相是十分快捷的	1	2	3	4	5	9
7)	相機電話的影像質素是決定我購買相機電話的主要原因	1	2	3	4	5	9
8)	使用相機電話適合我的生活方式	1	2	3	4	5	9
9)	使用相機電話改變我以往的攝影習慣	1	2	3	4	5	9
10)	相機電話容易操作	1	2	3	4	5	9
11)	很多我認識的人都使用相機電話	1	2	3	4	5	9
12)	我常見到有人在公眾場所內使用相機電話來影相	1	2	3	4	5	9

	非常不同意	不同意	一般	同意	非常同意	不適用
13) 我常有機會嘗試使用不同的相機電話	1	2	3	4	5	9
14) 我曾使用相機電話網絡供應商提供的試用服務優惠	1	2	3	4	5	9
15) 我從未試用過相機電話	1	2	3	4	5	9
(此題只需非相機電話使用者作答)						
16) 若我的手提電話壞了，下一部我會購買相機電話	1	2	3	4	5	9

丙部：

1. 你家裡有以下哪些科技/ 產品呢？『1』代表「有」,『0』代表「沒有」。

	有	沒有
1) 電腦	1	0
2) 數碼相機	1	0
3) PDA 電子手帳	1	0
4) 手提電話	1	0
5) PDA 電話	1	0
6) DVD 播放機	1	0
7) MP3 Player	1	0
8) iPod	1	0
9) 3G 網絡	1	0
10) ICQ	1	0
11) e-mail	1	0
12) 互聯網	1	0
13) 藍芽技術 (Bluetooth)	1	0
14) MMS	1	0

2. 上網及攝影習慣

a) 除了工作或功課需要外，你每日平均用幾多時間上網？

_____分鐘

b) 你的攝影習慣是：

1) 從不　2) 每周 1 日或以下　3) 每周 2 - 3 日　4) 每周 4 - 6 日
5) 每日　6) 沒固定

丁部：個人資料

1. 性別： 1) 男 2) 女

2. 年齡： 1) 17 或以下 2) 18 - 24 3) 25 - 34
4) 35 - 44 5) 45 - 54 6) 55 或以上

3. 教育程度：
   1) 小學或以下 2) 中一至中三
   3) 中四至中五 4) 中六至中七
   5) 大專/ 大學 6) 研究院或以上
   7) 其他，請註明：_____

4. 與你同住的家庭成員(包括你)一共：_____人

5. 婚姻狀況：
   1) 未婚 (請跳至第 7 題繼續) 2) 已婚
   3) 離婚/ 分居 4) 喪偶

6. 有 10 歲或以下子女？
   1) 是 2) 否

7. 你家庭平均月入：
   1) $5,000 或以下 2) $5,001 - $10,000
   3) $10,001 - $15,000 4) $15,001 - $20,000
   5) $20,001 - $25,000 6) $25,001 - $30,000
   7) $30,001 - $35,000 8) $35,001 - $40,000
   9) $40,001 或以上 99) 不知道/ 不作答

8. 職業類別：
   1) 政府及公營機構 2) 運輸及通訊業
   3) 建造業 4) 飲食及酒店業
   5) 零售、批發及貿易業 6) 漁農及礦產業
   7) 金融、保險、地產及商業服務業 8) 教育、醫療、社會及個人服務業
   9) 製造業 10) 家庭主婦
   11) 學生 12) 失業/ 退休
   13) 其他，請註明：_____

- 問卷完。謝謝你寶貴的意見。 -