ADOPTION AND USAGE OF M-COMMERCE: A CROSS-CULTURAL COMPARISON OF HONG KONG AND THE UNITED KINGDOM

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ABSTRACT

Researchers and industry commentators alike have been both fascinated and perplexed by variations in take-up and usage of m-commerce services in different countries around the world. Our research compares m-commerce usage in the United Kingdom and in Hong Kong, areas with apparently similar mobile telecommunications infrastructures but with markedly different cultural profiles. We find significant differences between the UK and Hong Kong in usage of and attitudes to m-commerce services. We attribute these differences to the levels of collectivism and power distance in the cultures and to structural differences between the two markets. Attitudes to m-commerce services are formed by cultural and structural factors, consequently the search for a single, global killer application may be misguided. An understanding of the cultural dimensions of a market can aid marketers immensely in developing appropriate m-commerce services, marketing these appropriately and in setting realistic adoption targets.

Keywords: Adoption; Cross-cultural study; Hong Kong; Mobile Internet; United Kingdom

1. Introduction

The explosive growth of penetration and usage of mobile devices is frequently noted in research studies [Barnes and Scornavacca 2004; Dholakia *et* al 2004; Massoud and Gupta 2003]. By 2009 the number of mobile telephone subscribers is estimated to outstrip that of fixed-line subscribers [ITU 2000, cited in Dholakia *et al.* 2004]. The widespread availability of mobile phones that can handle digital data and that are connected to digital communications infrastructure means that the scene is set for the widespread adoption of m-commerce (defined as the use of mobile, wireless (handheld) devices to communicate and conduct transactions through public and private networks [Balasubramanian *et al.* 2002]). However, the development of m-commerce has been comparatively slow [Mylonakis 2004] and research suggests that it is seen as expensive, with poor service and usability [Jarvpenaa *et al.* 2003]. There are, nonetheless, indications of growth in consumer interest in m-commerce services. Research conducted in western Europe finds that consumer interest in m-commerce services and mobile payments increased from 23% in 2001 to 39% in 2003 [Strategy Analytics 2004]. In the UK added value mobile services grew by 29% to £1.4 billion, which is equivalent to 4.3% of total mobile revenues [Ofcom 2004]. Research by ATKearney [2004] finds that worldwide use of the mobile phone to pay for services grew from 3% of respondents in 2003 to 10% in 2004. Possibly the largest single use of m-commerce to date occurred on January 17 2005 when mobile phone users in the UK donated over £1 million via SMS to the relief fund following the Asian tsunami of 26 December 2004 [Telecom Paper 2005]. Adoption and usage of m-commerce services have been highly variable between countries; according to Dholakia *et al* [2004 p7], "the adoption of mobile technology does not follow any single universal logic or pattern". Differences in adoption and usage between countries may be attributable to differences in the mobile telecommunications infrastructure, to the range of m-commerce services on offer, to the marketing strategies utilised by service providers and to the underlying culture of the consumers of m-commerce services. We seek to investigate

the role that culture plays in explaining differences in adoption, usage and attitudes to m-commerce by comparing countries which have broadly similar m-commerce infrastructures [same operators, same technology platform) and service portfolios, but markedly different cultural profiles. Our objective is to inform decision making in the m-commerce industry.

2. M-Commerce Infrastructure In Hong Kong And The United Kingdom

Hong Kong and the United Kingdom have among the highest mobile telephony penetration rates in the world at 91% and 82.5% respectively [OFTA 2003]. The telecommunication industry in Hong Kong has been shaped by intensive competition, with 6 operators licensed to serve a population of 6.8 million compared to the UK where five companies compete to serve around 59.7 million people [Population Reference Bureau 2005]. This lead to dramatic prices falls which stimulated rapid growth; some analysts regard Hong Kong as the fiercest mobile market in the world [e.g. Xu 2001]. Despite the 91% penetration rate noted above, Hong Kong's market consists of only 5.87 million subscribers [ITU 2003] and thus may lack the critical mass required for data services. However, Hong Kong is perfectly placed to provide access to local Chinese and other Asian markets, and as a mature, competitive market is ideally positioned for the development and trial of m-commerce services.

Although mobile penetration is higher than in the UK, SMS penetration is much lower at 43% compared to 78%. This is partly due to the relatively high cost of SMS messages in Hong Kong, and to the fact that interoperability of SMS between operators was only effective in 2001, but it is likely that culture is also relevant.

The UK has a much larger population than Hong Kong, but there are only five licensed operators in the market. These operators paid very large fees for 3G licenses when these were auctioned by the government leaving them with huge costs to recoup [ITU 2002]. Since then, UK operators have taken a cautious approach to 3G and have focused on new multimedia-type applications over 2.5G [GPRS] platforms. With 86% penetration and 54.7 million subscribers [Ofcom 2004] the UK market is nearly ten times that of Hong Kong. Unlike Hong Kong, but like most other European countries, SMS has been extremely successful and continues to grow rapidly. Usage is not only social; SMS advertising has also proved very effective [Rettie, Grandcolas and Deakins 2004].

In Hong Kong both callers and called pay for calls, consequently the typical Hong Kong plan of 2000 free minutes is equivalent to 1000 free UK minutes. However, in the UK a typical plan is only 200 free minutes. This demonstrates that in Hong Kong demand is much higher, and that competition tends to be more in terms of inclusive minutes, whereas in the UK operators compete with low prices on new phones. The cost of calls beyond the free allowance are about 7.5 times cheaper in Hong Kong than in the UK, but text messages are about the same price as in the UK. This may partly explain the relatively low usage of SMS in Hong Kong, although culture may also influence SMS usage. The low usage of SMS is likely to affect the adoption of text-based m-commerce services.

A further difference in the structure of the two markets is in the subscriber base. The UK market is predominantly pay-as-you-go customers (who pre-pay for their calls); these accounts for approximately 60% of subscribers, compared to less than 40% in Hong Kong. This is partly the result of the availability of cheap phones for pay-as-you-go users in the UK, and also because UK users are not charged for calls received, so that some users in the UK keep their phones predominantly for receiving calls and making emergency calls. Despite the predominance of pay-as-you-go phones in the UK, they account for less than a quarter of call minutes, suggesting that the difference between the two countries is nominal.

During the period of the research 3G entered both markets within limited geographic service areas. Consequently video messaging and data services were new at the time of the research. In terms of transactions, Hong Kong was more developed with mobile betting on all GSM networks. In addition the operator CSL pioneered the world's first SMS based credit card transaction verification service in 2003 [People daily online 2003]. This enabled CSL customers for pay for tickets and their mobile bills using their mobile phone and credit card. The ring tone and screen saver markets have been very successful in both markets. In both countries all operators provide basic news services, but UK operators also provide more advanced location based services which allow users to check their location with map, to find the nearest restaurant, ATMs and taxi services. However, in the UK transaction services are less developed.

Although the above highlights fundamental differences between the pricing structures of the mobile telephony markets in Hong Kong and the United Kingdom, overall penetration rates are similar and the nature of the mobile telephony infrastructure is fundamentally similar. While the total populations of Hong Kong and the UK are markedly different in size, their population growth rates are identical (0.1% per annum) and their gross national incomes (measured on a US$ purchasing parity power basis) are very similar at $26,580 for the UK and $27,490 for Hong Kong [Population Reference Bureau, 2005].

3. Literature Review

There is a long and rich tradition of cross-cultural research in international business. Douglas and Craig [1997] identify four streams of cross-cultural research: studies focussed on examining the universality of consumer models; comparative research on similarities and differences in consumer behaviour between cultures; research on the assimilation of ethnic groups and the impact of ethnic identity on consumer behaviour; examinations of cultural context and the structure of symbols, artefacts and communication within a culture.

Despite this breadth of research, Dawar *et al* [1996] believe that the question of how culture might moderate consumer behaviour remains largely unanswered. Manrai and Manrai [1996] describe the "confounding that exists between the meaning of culture and its consequences" and note a lack of theory of cross-cultural behaviour. Much of the extant research adopts the etic approach, although Douglas and Craig [1997] level the charge of pseudo-eticism at research from the 1960's and 1970's which sought to compare, implicitly or explicitly, consumption behaviour in the US with that in other countries, using US-derived concepts and measurement instruments with minimal adaptation. In a review of consumer behaviour research published in the US between 1970 and 1990, Sojka and Tansuhaj [1995] distinguish between cross-national studies (where there was no attempt to explain results on the basis of cultural differences) and cross-cultural studies (where attempts were made to explain results on the basis of cultural meaning rather than national boundaries). They found France to be the most frequently studied country, followed by England and Japan.

Mobile devices function as part of networks, and therefore cannot be used in isolation. Patterns of usage become, therefore, collective rather than individual phenomena and are therefore influenced more strongly by culture than they would be if they were truly individual-level phenomena. A cross-cultural approach to research on usage of and attitudes to mobile communications is, therefore, both justified and necessary.

Cross-cultural studies of m-commerce usage are, however, relatively rare; perhaps not surprising given the relative youth of this market. There have, however, been a number of cross-cultural studies into adoption of IT applications. Kim *et al* [2004] provide a concise summary of the extant literature, and find evidence for significant variations between countries in adoption rates and usage patterns of IT applications. In a comparison of critical success factors governing mobile communications diffusion in Germany and India, Fraunholz and Unnithan [2004] find significant differences between the two countries, though these are examined in terms of economic and infrastructural, not cultural, factors. Carlson *et al.* [1999] examine mobile phone adoption in France and the United States, and attribute the significant differences found to cultural differences.

A number of studies compare m-commerce infrastructure across countries. Henten *et al.* [2003] compare the developments of mobile services in Europe, Japan and South Korea and suggest technology, economy, market development and structure, marketing, socio-cultural elements, and policy intervention and regulation as the factors of explanation. Bohlin *et al*. [2003], on the other hand, present new policy implications for future European mobile commence through analysing the success factors in Japanese mobile Internet. Attempts to explain the success of I-Mode in Japan have been a dominant theme of research in m-commerce. Socio-cultural factors alone are unable to explain this success, which to date has not been replicated elsewhere; I-Mode's rapid and widespread adoption is due to a combination of factors: the high market penetration of NTT Do-Co-Mo, the receptivity of Japanese consumers to new technology, the low penetration of fixed-line internet connections in Japan at the end of the 20th century and, most importantly perhaps, the prohibition of calls on public services such as trains and buses, which encourages the use of I-Mode SMS and e-mail services.

A growing research stream within the social sciences, examining the diffusion of mobile communications through the population from, amongst others, a sociological perspective, is noted by Green *et al.* [2001]. Vrechopoulos *et al.* [2003] use this sociological research stream as evidence of the importance of consumer behaviour research in understanding patterns of m-commerce diffusion. Their own research in Finland, Germany and Greece finds Finland to be the most mature market of the three in terms of m-commerce adoption and Greece to be the least mature. They also identify critical success factors for the diffusion of m-commerce, but note that these vary between the countries and recommend that marketers should avoid implementing the same m-commerce marketing strategies in all countries. Although Vrechopoulos *et al*'s research is multi-country, it does not explicitly incorporate culture as a variable. Lee *et al* [2002] present what appears to be the first consumer oriented, cross-cultural study of m-commerce usage. Using a value structure as their theoretical base, they examine m-commerce usage in South Korea and Japan, and find significant differences between these two countries in terms of (i) the value structures of the mobile internet and (ii) the effects of the value structures on satisfaction derived from the mobile internet. South Korean consumers were more likely to perceive emotional value in the mobile internet, while Japanese consumers were more likely to perceive functional value. Lee *et al.* also examine the relationship between

age and mobile internet usage and find significant differences between young (under 30) and old (over 30) mobile internet users.

Kim *et al.* [2004] focus on m-commerce adoption in Hong Kong, Japan and South Korea and distinguish between hedonic and utilitarian m-commerce services. Hedonic versus utilitarian is a classification widely used in consumer behaviour research to distinguish, for example, between shopping experiences [Babin *et al.* 1994], consumers' product judgement criteria [Yeung and Wyer 2004], brand commitment determinants [Chaudhuri and Holbrook 2002] and values associated with online and offline shopping [Dall'Olmo Riley *et al.* 20003]. Hedonic criteria are related to feelings and emotions such as fun, relaxation or pleasure while utilitarian criteria are concerned with quality of workmanship or delivery, fitness for purpose or the ability to perform a specific function. Kim *et al.* classify m-commerce services as hedonic or utilitarian, and find similarities in patterns of m-commerce usage between Hong Kong and South Korea, with Japanese m-commerce users exhibiting very different patterns. Hong Kong and South Korean customers are found to exhibit more hedonic m-commerce usage patterns than their counterparts in Japan, who tended towards utilitarian usage patterns, and to use SMS in preference to mobile e-mail.

4. Research Agenda

In keeping with the cross-cultural studies of m-commerce conducted by Kim *et al* 2004 and Urbaczewski *et al* 2002, we draw upon the work of Hofstede [1980] and use his measures of cultural dimensions to examine the link between cultural context and m-commerce adoption and usage. Hofstede's framework for defining and measuring cultural differences has enjoyed considerable depth and breadth of usage in social science research [Smotherman and Kooros 2001]. Large scale quantitative research conducted among employees of IBM during the 1970's yielded four dimensions of culture: individualism, power distance, uncertainty avoidance and masculinity [Hofstede 1980]. Cultures are both measured in absolute terms and compared in relative terms on these dimensions. Individualism reflects the strength of ties between individuals in a culture. Power distance reflects the distance between those at the top and those at the bottom of a social hierarchy, and also the extent to which the less powerful members of a culture accept the inequality. Uncertainty avoidance represents the extent to which people in a culture feel threatened by uncertainty or by unknown situations. Masculinity is a measure of the extent to which members of a culture are driven by supposedly masculine attributes such as assertiveness or a focus on material success. Despite, or perhaps as a result of, its widespread use in social science research, Hofstede's work has come in for considerable criticism over the years. McSweeney [2002] levies a number of charges against Hofstede, directing most criticism at his functionalist methodology and finding it fundamentally problematic. Gooderham and Nordhaug [2003], cited in Enger [2004], criticise the number of cultural dimensions identified by Hofstede and find them an over-simplification. Enger [2004] provides a useful summary of the main criticism of Hofstede's work, but concludes that the benefits outweigh the deficiencies of the research. A robust defence of Hofstede's work is provided by Williamson [2002] who concludes "To reject totally Hofstede's or similar functionalist models of national culture, before more satisfactory models have been developed, would be to throw away valuable insights". In the absence of a more satisfactory model, and building on the work of Kim et al [2004] and Urbaczewski et al [2002] we utilise Hofstede's cultural framework in this study.

According to Jeong [2003] countries should be selected for cross-cultural research on a sound conceptual basis. Douglas and Craig [1997] argue that there are conceptual and methodological dangers inherent in restricting cross-cultural research to country units, and propose the alternative of the "culti-unit" [Naroll 1970]. A culti-unit is defined as a group of people who are domestic speakers of a common language and are in regular contact with one another. The two dominant dimensions of a culti-unit, therefore, are language and the degree of social interaction and communication. We believe that this unit of analysis is ideally suited to research on m-commerce, as this is grounded in communication. Communication may be seen as a latent construct in our research; it can be argued that all commerce is grounded in communication and that m-commerce is no exception to this. The confounding of the components of and consequences of culture noted by Manrai and Manrai [1996] has already been discussed; is communication a component of culture or a behaviour that is shaped and influenced by culture? Such disentangling is beyond the scope of our research, and we argue that regardless of whether communication is an input to or output from culture, we would expect significant differences in patterns of communication and hence of m-commerce between cultures. Mobile phone users in a country can be seen as constituting a virtual culti-unit. In designing our research, we sought to identify culti-units which had similar mobile telecommunications infrastructures and penetration rates but different cultural profiles. We wished our research to be rooted in culti-units offering consumers similar opportunities to use m-commerce so that observed differences might be attributed to culture and not to differences in infrastructure. We also wished to extend previous cross-cultural research on m-commerce which has been rooted firmly in the Asian sphere of culture [Kim *et al* 2004; Lee *et al.* 2002].

Table 1 shows selected countries with high mobile phone penetration [Ofta 2003]. Hofstede's [1980] cultural dimensions have also been displayed. These variables form the basis of our sample frame.

Table 1 Cultural dimensions and mobile phone penetration in selected countries

	Hong Kong	**Sweden**	**UK**	**Singapore**	**Australia**	**South Korea**	**Japan**	**USA**
Mobile phone penetration[2]	91.0	89.5	82.5	76.7	67.8	67.3	61.9	47.3
Power distance[1]	68	31	35	74	36	60	54	40
Uncertainty avoidance[1]	29	29	35	8	51	85	92	46
Individualism[1]	25	71	89	20	90	18	46	91
Masculinity[1]	57	5	66	48	61	39	95	62

[1] Cited from Usunier [1996]
[2] OFTA [2003]

It can be seen that the United Kingdom and Sweden have penetration rates comparable to that of Hong Kong. A research design that met our overall criteria could have been achieved though a comparison of Sweden and Hong Kong or a comparison of the United Kingdom and Hong Kong. Our research avoids the pitfalls of a pseudo-etic approach [Craig and Douglas 2000] by selecting the United Kingdom and Hong Kong, as the cultural profile and background of the research team is firmly based in these culti-units. In this way, the research design can be grounded in both cultures.

Hong Kong and the UK exhibit similar moderate Masculinity and low Uncertainty Avoidance indices but differ markedly in their Individualism and Power Distance indices. Hong Kong is a strongly Collectivist culture with high Power Distance while the UK is strongly Individualist and exhibits low Power Distance. Schutte and Ciarlante [1998], cited in Kim *et al.* [2004], suggest that the higher the collectivism index in a culture, the more price sensitive people in that culture are likely to be. According to Usunier [2005] "it may be hypothesised that word-of-mouth communication will be stronger in collectivist and ingroup-oriented societies, where outside information provided by an impersonal marketer will be seen as les reliable than opinions from relatives and acquaintances". This may translate into collectivist cultures having enhanced reliance on personal recommendation as an influencer of consumer behaviour. The strong bonds between people in collectivist cultures and the high degree of dependence between them may imply that collectivism is also associated with a desire for interpersonal, synchronous rather than impersonal or asynchronous, communication, and with enhanced reliance on personal recommendation as an influencer of consumer behaviour. High power distance in a culture is associated with acceptance of one's position in society and acceptance of the status quo [Hofstede 1980]; this acceptance of one's lot in life may translate into individuals in high power distance cultures being more relaxed and fun-loving than their low power distance counterparts. This in turn may imply a greater demand for hedonic services in high power distance societies. The differences in attitudes to and usage of m-commerce services between Hong Kong, South Korea and Japan found by Kim *et al* [2004] support this proposition; although the difference is Power Distance scores between Japan and South Korea is not substantial, both Hong Kong and South Korea are lower Power Distance cultures than Japan.

Building on the work of Panis and Morphis [2002] and of Kim *et al* [2004], we classify m-commerce services in order to distinguish more clearly between synchronous and asynchronous services, hedonic and utilitarian services and in order to isolate specific m-commerce functions. The set of twenty m-commerce services used in our research was developed after extensive reviews of providers' functionality and with reference to the extant m-commerce literature. As shown in Table 2, each m-commerce service is classed as communication, transaction, information or entertainment, and is further classed as synchronous or asynchronous and as hedonic or utilitarian. Communication services may be classed as either utilitarian or hedonic, depending on the purpose to which they are put and the motivation for their use.

The extant literature provides the basis for the following research propositions:

P1: Synchronous mobile communication services will be more popular in Hong Kong's collectivist culture than in the UK's individualist culture.

P2: Hedonic m-commerce services will be more popular in Hong Kong's higher power distance culture than in the UK's lower power distance culture .

P3: Sensitivity to price of m-commerce services will be higher in Hong Kong's collectivist culture than in the UK's individualist culture.

P4: Word of mouth recommendation as an influencer to use m-commerce services will be used more widely in Hong Kong's collectivist culture than in the UK's individualist culture.

Table 2 Classification of m-commerce services

M-commerce service	**Characteristics**		
Voice	Communication	Synchronous	Utilitarian/hedonic
SMS	Communication	Asynchronous	Utilitarian/hedonic
MMS	Communication	Asynchronous	Utilitarian/hedonic
Video call	Communication	Synchronous	Utilitarian/hedonic
Email	Communication	Asynchronous	Utilitarian/hedonic
Buy Ticket	Transaction	Asynchronous	Utilitarian
Mobile Payment	Transaction	Asynchronous	Utilitarian
Banking Services	Transaction	Asynchronous	Utilitarian
Lotto/betting/gambling	Transaction	Asynchronous	Hedonic
Entertainment News	Information	Asynchronous	Hedonic
Sport News	Information	Asynchronous	Hedonic
Headline News	Information	Asynchronous	Utilitarian
Traffic News	Information	Asynchronous	Utilitarian
Weather Forecast	Information	Asynchronous	Utilitarian
Local Map	Information	Asynchronous	Utilitarian
Local Information	Information	Asynchronous	Utilitarian
Game	Entertainment	Asynchronous	Hedonic
Ring tone	Entertainment	Asynchronous	Hedonic
Wallpaper / Screensaver	Entertainment	Asynchronous	Hedonic
Browsing Internet	Entertainment	Synchronous	Hedonic

5. Research Methodology

5.1 Primary research using a quantitative survey was chosen as the data collection method given the need to take measurements of a range of m-commerce variables. Data collection took place between June and October 2004.

5.2 Questionnaire design

Questionnaires were developed for Hong Kong and the UK and were divided into three parts covering behavioural, attitudinal and demographic/socio-economic questions respectively. The questionnaires were designed with applicability to both cultures in mind, and were as far as possible identical; minor modifications were required to take account of the differences in mobile phone network provision between Hong Kong and the UK, differences in currency, income structure and education, and to take account of the fact that m-commerce enabled gambling operates differently in the two culti-units. The questionnaires were written in English for both Hong Kong and the UK; English is spoken widely in Hong Kong.

Five point Likert scales were used in Part Two of each questionnaire to enable respondents to rate their frequency of use, the perceived usefulness and expensiveness and their perceived satisfaction with each m-commerce application.

Questionnaire pre-testing was conducted with five respondents in each of the UK and Hong Kong to ensure that the questionnaire was clear, understandable and unambiguous.

5.3 Sampling

The target sample was 100 young adult (18-30) mobile phone users in each of the UK and Hong Kong. Young adults were selected to create a cohesive m-commerce culti-unit in each country, and because consumers under 30 have been found to be faster adopters of mobile services in general [Lee *et al.* 2002]. 200 questionnaires were distributed in Hong Kong and the United Kingdom using the convenience sampling method. 137 and 114 questionnaires were collected in Hong Kong and the UK respectively, of which 7 and 10 respectively were regarded as invalid due to incompletion or the respondent being out of age range.

Sample profile– demographic and socio-economic criteria

Table 3 provides a detailed comparison of the two samples and demonstrate their similarity. The main areas of difference are a slightly older age profile in Hong Kong and a higher proportion of students in the UK, resulting in a lower income profile in the UK.

5.4 Sample profile – behavioural criteria

Table 4 shows that multiple phone and subscriber use is more prevalent in the UK. This demonstrates the structural difference of mobile markets in Hong Kong and UK. Since UK tariff plans can be complex and calls are free of charge for receivers, this may be reflected in a significant minority of UK subscribers having two mobile phones to form a combination such as one phone for off-peak hour and one for peak hour, or one phone for dialling

and one phone for receiving calls. This is further reflected in the UK sample's greater use of both monthly and pre-pay plans (14% compared with 2% in Hong Kong). Monthly plans are dominant in both samples (solus use by 87% in Hong Kong and 60% in the UK). The proportion of solus pre-pay users in our UK sample is, at 26%, well below the figure reported by Ofcom [2004] for the UK market as a whole; this is likely to be a result of the lack of under 18 year olds and over 30 year olds (heavy users of pre-pay) in our sample. Since pre-pay users account for a low proportion of mobile phone use and revenue, we do not consider that an under-representation of this group in our sample is detrimental to the quality of the research. The profiles of the samples by service provider broadly matched the overall shares of the service providers obtained from secondary sources [Ofcom 2004; OFTA 2003].

Table 3 Demographic and socio-economic profile of sample

	Hong Kong		**United Kingdom**	
	Respondents	**Percentage**	**Respondents**	**Percentage**
Male	72	55.4	62	59.6
Female	58	44.6	42	40.4
Age 19-23	78	60.0	76	73.0
Age 24-28	52	40.0	28	27.0
Mean age	23.2		22.0	
Student	60	46.2	71	68.3
Employed	65	50.0	33	31.7
Unemployed	5	3.8	0	0.0
Hong Kong CEE/GCSE*	4	3.1	8	7.7
A Level	1	0.8	26	25.0
Undergraduate/ diploma	85	65.4	56	53.8
Postgraduate	40	30.8	14	13.5
Earn < 5K**	53	40.8	60	57.7
Earn 5K-9.99K	35	26.9	16	15.4
Earn 10K-14.99K	28	21.5	19	18.3
Earn 15k-19.99K	11	8.5	7	6.7
Earn > 20K	3	2.3	2	1.9
Total	130	100.0	104	100.0

*Hong KongCEE is the same as GCSE, ** Hong Kong – dollars, monthly, United Kingdom – pounds annually

Table 4 Behavioural profile of sample

	Hong Kong		**United Kingdom**	
	Respondents	**Percentage**	**Respondents**	**Percentage**
Number of mobile phones held currently				
1	103	79.2	62	59.6
2	24	18.5	25	24.0
3	3	2.3	10	9.6
4 or more	0	0	7	6.7
Number of service providers used currently				
1	103	79.2	62	59.6
2	24	18.5	25	24.0
3	3	2.3	10	9.6
4 or more	0	0	7	6.7
Length of usage of current mobile phone				
Less than 1 year	52	40.0	64	61.5
1 -2 years	35	26.9	18	17.3
2- 3years	13	10.0	9	8.7
More than 3 years	30	23.1	13	12.5
Changed service provider in the past 12 months				
Yes	33	25.4	34	32.7
No	97	74.6	70	67.3
Total	130	100.0	104	100.0

Phone and service provider switching are more prevalent in the UK. This is likely to be a function of lower levels of phone subsidy in Hong Kong (Hong Kong service providers only subsidise around 10% to 20% of the handset cost to contract users while in the UK mobile phones are often free of charge or very cheap for contract users) and longer contract length in Hong Kong. Comparisons of monthly spend and call usage rates are clouded by the fact that in Hong Kong both caller and receiver are charged for a call, while in the UK only the caller is charged. We find, however, that Hong Kong users have considerably lower mobile phone bills than users in the UK even though they make may more calls; 95% of Hong Kong mobile phone users have monthly bills of HK$249 or less (equivalent to £18) and make up to 1500 minutes of calls while 95% of UK users have monthly bills of up to £100 but make no more than 400 minutes of calls. This reinforces the view that the Hong Kong mobile phone market competes on call price and volume of free calls while UK operators do not appear to have to compete heavily on either of these. Usage of SMS varies considerably between our two samples; in Hong Kong 87% send fewer than 50 texts per month, while in the UK 66% send more than 50 and 12% send more than 400 per month. This may be attributed to the fact that text messages are significantly cheaper than calls in the UK, but not in Hong Kong.

6. Research Findings

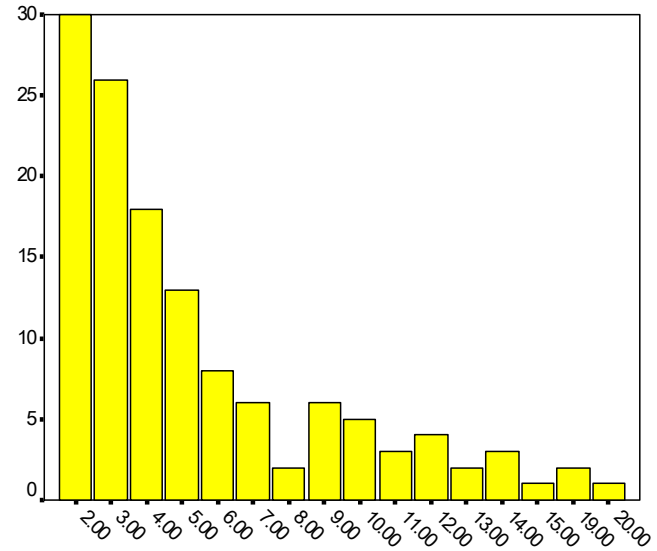
6.1 Adoption of m-commerce services

Table 5 summarises the adoption rates of the various m-commerce services, grouped into the four categories of communication, transaction, information and entertainment. The adoption rates of communication services are the highest of the four categories in both Hong Kong and the UK. Adoption rates are generally higher in the UK, with only lotto/betting/gambling, ticket purchase and ringtone downloads having higher adoption rates in Hong Kong. Hong Kong consumers in general show a higher propensity to adopt the hedonic entertainment services rather than the utilitarian transaction and information services. Compared to their adoption of the other types of m-commerce service, UK consumers show a relatively low propensity to adopt transaction services though the adoption rate is similar to that in Hong Kong, suggesting that transaction services are at a similar stage of development in both markets.

Table 5 Adoption rates (%) of m-commerce services

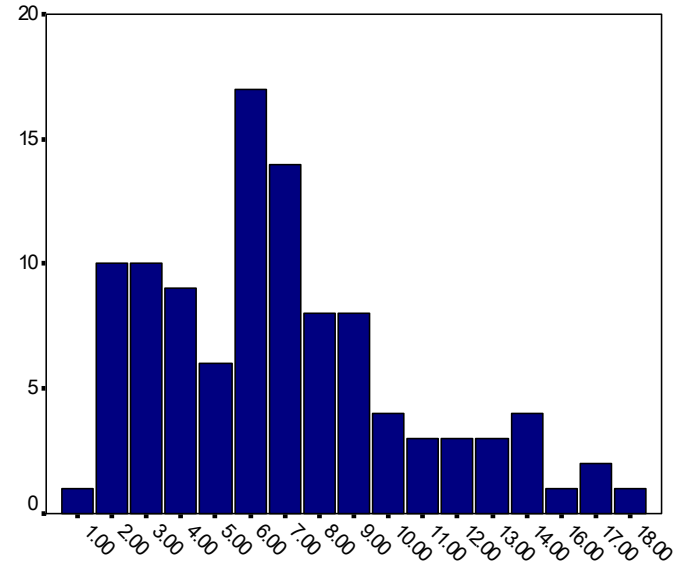
	% Adoption among sample	
	Hong Kong	**UK**
Communication Services		
Voice	100	100
SMS	94	97
MMS	35	59
Video	18	28
E-mail	16	41
Transaction Services		
Ticket purchase	15	12
Small payment	9	18
Banking services	12	12
Lotto/betting/gambling	5	1
Information Services		
Entertainment news	28	36
Sports news	13	27
Headline news	15	29
Traffic news	10	10
Weather forecast	16	17
Local map	5	14
Local area information	7	23
Entertainment Services		
Download game	34	38
Download ringtone	94	49
Download wallpaper/screensaver	35	31
Browse internet	18	52
Mean number of services adopted	5.4	7.0

The differences in adoption of m-commerce services between Hong Kong and the UK are further underlined by the overall distribution of adoption rates, as illustrated in Figures 1 and 2. The distributions are markedly different, demonstrating that UK mobile phone users have a wider experience of m-commerce services. 23% of Hong Kong users only have experience of the two core services (voice and SMS) around half have experience of the two core plus two additional services. In contrast, half the UK users have experience of six m-commerce services (two core plus four additional).



Mean	5.44
Median	4.00
Mode	2.00
Std. Deviation	3.97
Total	130

Figure 1: Distribution and Central Tendency of M-commerce Application Adoption in Hong Kong



Mean	6.97
Median	6.00
Mode	6.00
Std. Deviation	3.78
Total	104

Figure 2: Distribution and Central Tendency of M-commerce Services Adoption in the UK

Respondents were asked to rate the importance of a range of factors influencing their decision to adopt a new m-commerce service using a five-point scale where 1 equalled "very unimportant" and 5 equalled "very important".

Table 6 shows that two of the three factors related to price sensitivity were rated as being more important in Hong Kong than in the UK, however only "free trial" was significantly different. "Friend/family recommendation" was rated as being more important in Hong Kong than in the UK, though this difference was not significant. "Demonstration" and "enhance lifestyle" were both found to be significantly more important in Hong Kong than in the UK.

Table 6 Factors influencing adoption of m-commerce services

	Hong Kong		**United Kingdom**	
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**
Discount	3.97	1.245	3.69	1.247
Free Trial	3.38	1.242	2.78**	1.336
Low Cost	4.07	1.289	4.32	1.108
Incentive	3.15	1.182	3.33	1.178
Interest	3.39	1.138	3.40	1.153
Friend/Family Recommendation	3.48	1.115	3.17	1.280
Demonstration	2.95	0.967	2.52**	1.269
Enhance lifestyle	3.23	1.138	2.90*	1.318

(** and * indicate significance at p<0.01 and p<0.05, respectively)

6.2 Attitudes to m-commerce services

Attitudes to m-commerce services vary considerably between Hong Kong and the UK, as shown by tables 7-10. Respondents used a five-pint scale to rate their frequency of use of each m-commerce service, its usefulness, expensiveness and their degree of satisfaction. A score of 1 on the scale equalled "not at all useful/expensive/satisfactory" and a score of 5 equalled "very useful/expensive/satisfactory". T-tests were performed on the ratings of communication services and one entertainment service where sample sizes made this feasible. Levene's test was applied before the use of t-tests; if the significance for the Levene's test was 0.05 or below, the "Equal Variances Not Assumed" test was used, otherwise the "Equal Variances Assumed" test was used. Clear patterns emerge and we find that Hong Kong users are generally less satisfied than UK users, find m-commerce services less useful, more expensive and rate their usage frequency less.

Table 7 Attitudes to Communication Services

	Voice Conversation				**SMS**			
	Hong Kong		**United Kingdom**		**Hong Kong**		**United Kingdom**	
	Mean	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Frequency	3.94	1.091	3.71	1.196	2.84	1.160	4.25**	0.957
Useful	4.13	0.884	4.19	1.006	3.65	1.113	4.52**	0.810
Satisfied	3.85	0.827	3.88	1.094	3.52	0.972	4.32**	0.839
Expensive	2.39	0.858	2.90**	1.326	2.55	1.114	3.01**	1.307

(** and * indicate significance at p<0.01 and p<0.05, respectively)

	MMS				**Video Call**			
	Hong Kong		**United Kingdom**		**Hong Kong**		**United Kingdom**	
	Mean	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Frequency	1.57	0.779	2.02**	0.806	1.75	0.989	2.10	1.205
Useful	2.43	1.186	2.74	1.153	2.92	1.060	2.86	1.329
Satisfied	2.48	1.110	2.92**	1.144	2.75	1.032	2.62	1.265
Expensive	3.67	1.136	4.15**	1.078	3.54	1.503	4.21	1.236

(** and * indicate significance at p<0.01 and p<0.05, respectively)

	Email			
	Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev
Frequency	1.48	0.873	2.52**	1.383
Useful	2.33	0.796	3.64**	1.265
Satisfied	2.19	0.814	3.33**	1.356
Expensive	3.48	1.250	2.60**	1.061

(** and * indicate significance at $p<0.01$ and $p<0.05$, respectively)

Attitudes to voice and SMS are more positive than to other services, but, predictably perhaps, UK users consider both these services to be expensive. E-mail is viewed in a significantly more positive light in the UK than in Hong Kong where it is seen as the least useful communication service, and in the UK is viewed as being less expensive than in Hong Kong. The least useful communication service in the UK is viewed as MMS. Differentiating between synchronous and asynchronous services (refer to Table 2) we find that UK respondents have consistently more positive attitudes to asynchronous services than their counterparts in Hong Kong do. Hong Kong respondents rate their usage frequency of voice higher than UK respondents. Hong Kong respondents' rating of video calls is lower than that in the UK, although video calls are rated by Hong Kong respondents as more useful and more satisfactory than they are in the UK. The low use frequency of video calls in Hong Kong could be attributed to the relatively recent availability of this service.

Table 8 Attitudes to Transaction Services

	Buying Tickets				Small Direct Payment			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	1.47	0.772	2.23	1.481	1.83	1.030	3.32	1.376
Useful	2.58	1.071	4.00	1.225	2.08	0.996	4.16	1.167
Satisfied	2.21	0.976	3.38	1.193	2.08	0.996	3.53	1.264
Expensive	2.53	1.307	2.46	1.050	1.75	0.866	3.00	1.491

	Banking Services				Betting/Lotto			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.06	1.181	2.69	1.377	1.83	0.983	.	.
Useful	2.56	1.094	4.15	1.144	2.50	1.049	.	.
Satisfied	2.88	0.957	3.69	1.251	2.33	1.211	.	.
Expensive	1.88	1.147	2.92	1.498	3.33	1.033	.	.

Data on betting/lotto/gambling are not presented for the UK, as only one respondent had experience of these services. The level of usage of these services is also found to be low in Hong Kong, surprising perhaps in view of the dominance of gambling in the Hong Kong culture [Chung *et al.* 2002] and in view of the wide availability of mobile gambling services in Hong Kong. Transaction services are not used frequently by either group, though they are clearly viewed in a more positive light in the UK. UK respondents see small direct payment services as being particularly useful.

Table 9 Attitudes to Information Services

	Entertainment News				Sport News			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.14	0.899	2.66	1.321	1.88	1.054	2.71	1.536
Useful	2.17	0.910	3.16	1.242	2.29	1.263	3.39	1.166
Satisfied	2.31	0.980	3.16	1.220	2.41	1.064	3.21	1.371
Expensive	2.28	1.162	2.82	1.373	2.41	1.121	2.89	1.286

	Headline News				Traffic News			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.22	1.263	2.90	1.517	1.69	1.032	2.50	1.509
Useful	2.67	1.237	3.70	1.264	2.54	1.050	3.50	1.080
Satisfied	2.50	1.098	3.37	1.377	2.62	1.044	3.40	1.350
Expensive	2.50	1.249	2.67	1.269	2.38	1.325	3.50	1.080

	Weather Forecast				Local Map			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.19	1.030	2.44	1.381	1.50	1.225	2.21	0.975
Useful	3.05	1.117	3.22	1.478	3.33	0.816	3.86	1.512
Satisfied	2.95	1.071	3.06	1.392	2.67	1.366	3.36	1.393
Expensive	2.33	1.155	3.11	1.132	3.00	1.414	3.21	1.188

	Finding Local Information			
	Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.33	1.323	2.42	1.100
Useful	3.33	0.707	4.00	1.063
Satisfied	3.22	0.833	3.46	1.318
Expensive	2.56	0.882	3.00	1.319

Respondents use local information and maps less and view these as less satisfactory in Hong Kong. This probably reflects the underdevelopment of services offering local information content in Hong Kong. However, view local information and maps are rated as the most useful information services by respondents in both Hong Kong and the UK, demonstrating strong potential to develop these services further in Hong Kong. Entertainment news is viewed as the least useful information service in both.

Ringtone download is viewed as the most useful entertainment service in Hong Kong, while the mobile internet is viewed as the least useful service in this category. UK respondents, in contrast, rate mobile internet as the most useful service in this category, but view downloads of wallpaper and screensavers as the least useful service. Hong Kong respondents are consistently more negative than those from the UK in their attitudes to usefulness and in their satisfaction ratings, though UK respondents consistently view entertainment services as being more expensive than their counterparts in Hong Kong.

Table 10 Attitudes to Entertainment Services

	Download Game				Download Ring Tone			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.00	0.866	2.38	1.161	2.40	0.986	2.57	1.204
Useful	2.63	0.915	2.92	1.010	2.81	0.988	2.96	1.166
Satisfied	2.66	0.883	3.00	1.076	3.04	0.806	3.20	1.149
Expensive	3.80	1.100	3.90	1.353	3.72	1.139	3.80	1.484

	Download Wallpaper/Screensaver				Browsing Mobile Internet			
	Hong Kong		United Kingdom		Hong Kong		United Kingdom	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Frequency	2.02	0.917	2.53	1.344	1.89	0.950	2.85**	1.352
Useful	2.60	0.986	2.81	1.281	2.50	1.134	3.56**	1.110
Satisfied	2.78	0.876	2.88	1.289	2.33	0.956	3.07**	1.195
Expensive	3.44	1.099	3.72	1.373	3.53	1.276	3.63	1.186

(** and * indicate significance at $p<0.01$ and $p<0.05$, respectively)

7. Limitations

The samples were not identical in terms of age profile, with the mean age of the UK sample being slightly younger than that of the Hong Kong sample. In both Hong Kong and the UK students constituted a significant part of the sample; while students are likely to be enthusiastic adopters of m-commerce, their relatively low income may influence the nature of the services which they adopt. The numbers of respondents adopting some m-commerce services was extremely small and this precluded much statistical analysis. Larger samples in both culti-units would have been helpful in overcoming this problem. The consistently lower usage and attitude scores obtained in Hong Kong may be a function of the manner in which Hong Kong respondents utilised the Likert scales rather than a true measure of attitude; calibration of scale use would have been a helpful addition to the research. The nature of our data has not enabled us to engage in formal hypothesis testing; this represents a major opportunity for further research. Some of our findings are not statistically significant, and we wish to address this in future research studies.

8. Discussion

We find significant differences between the UK and Hong Kong in usage of and attitudes to m-commerce services. Overall, adoption rates are lower in Hong Kong and respondents there have experience of fewer m-commerce services there than in the UK. Hong Kong respondents are consistently less satisfied with m-commerce services and consistently find them less useful, but consider them to be less expensive than the UK respondents do.

We find some evidence to support *P1*. Voice services are used more frequently in Hong Kong than in the UK and video calls are viewed as more useful and more satisfactory in Hong Kong than in the UK. However, attitudes to browsing the mobile internet are significantly more negative in Hong Kong than in the UK. The higher use of voice in Hong Kong may be attributed to the higher level of collectivism in the culture, as hypothesised, but it may also be a function of the lower cost of calls in Hong Kong. Further research is required to disentangle the effect of these factors.

Our data also provide some support for *P2*. While a comparison of Hong Kong and the UK on adoption rates and rated usage frequencies shows that m-commerce services are generally used much more extensively in the UK, analysis of the Hong Kong data in isolation shows that Hong Kong respondents consistently display more positive attitudes to hedonic services (apart from browsing the mobile internet) than they do to utilitarian services. We also find support for *P2* in the fact that lifestyle enhancement is seen as a significantly more important influencer on adoption in Hong Kong than in the UK.

Price sensitivity is hypothesised to be positively associated with collectivism, and we find support for *P3*. While UK respondents consistently rate m-commerce services as being more expensive than their counterparts in Hong Kong, this does not appear to deter UK mobile phone users from adopting a wide range of these services. On the other hand, adoption rates are generally lower in Hong Kong and this may be a function of the higher cost of the value-added services compared with voice. We also find that discounts and free trial are much more likely to influence adoption in Hong Kong than in the UK.

We find support for *P4* as word of mouth recommendation is viewed as a more important influence on adoption in Hong Kong than it is in the UK, though this difference is not statistically significant.

In conclusion, our findings provide some support for the view that culture plays a major role in shaping usage of and attitudes to m-commerce services. We intend to investigate these relationships further, and we encourage other researchers to join us in this work. In particular, further research is required to investigate the relationship between pricing strategy, m-commerce usage, and culture as our data do not allow us to isolate these. Although the m-commerce infrastructures in Hong Kong and the UK are similar in may respects, pricing structures are markedly different and our research has not enabled us to examine the impact of this. Our findings are of importance to marketers of m-commerce services in that it is unrealistic to expect consistent levels of adoption of m-commerce across the world and the search for a single, global killer application is perhaps misguided. An understanding of the cultural dimensions of a market can aid marketers immensely in developing appropriate m-commerce services, marketing these appropriately and in setting realistic adoption targets.

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