

# Mobile Commerce in Hong Kong: A Research Paper by John Ure<sup>1</sup>

## 1. Introduction

It is obligatory to start a research paper on m-commerce with some definition of what is meant by m-commerce. The tightest definition would confine m-commerce to transactions done by use of a mobile phone, that may or may not include actual payment. A slightly looser definition will include non-voice services received by mobile phone, such as downloads of games or information services, that may be included in the monthly subscription charge on a flat rate basis. In this paper the definition is wider still. It includes transactions undertaken when the customer is mobile using a means of transaction which itself is portable. The reason for adopting this wider view is to argue the point that this puts m-commerce into a different perspective. It sees m-commerce as building upon existing rather than newly formed consumer preferences.

## 2. M-Commerce in Hong Kong

Like most people in Hong Kong, I use mobile commerce (m-commerce) just about every day. The most popular form of m-commerce in Hong Kong is the long-established credit card, 'always on, anytime, anywhere.' For micro-payments the bank's credit card handling costs render them unprofitable, but again like most people in Hong Kong I use m-commerce for micro-payments most days, spending perhaps up to US\$20 a week. I use it mostly on the metro, trains, ferries, buses and mini-buses, and occasionally I use it to buy a cup of coffee at Starbucks or to purchase a carton of milk or a newspaper at a '7-11' store. The principal advantage is the convenience of not having to carry exact amounts of small money in coins and banknotes or indeed any small coins at all. This m-commerce is done in Hong Kong using the Octopus card.

The Octopus card costs HK\$50 (US\$7) refundable deposit, and can store value up to around US\$130. It is easily reloaded at customer service counters and Add-Value Machines located in metro and train stations and any manned retail outlets that accept Octopus for payment and provides a means of payment 'anywhere, anytime' and is 'always on'. Soon it will become usable in Hong Kong taxis, and is gradually spreading to a wider range of shops. The card contains a smart 'chip' that is read by an Octopus card reader by means of low-powered radio frequency with license exemption. Communication between the card and the reader is secured by mutual authentication, but there is no security for cards that are lost or stolen.

The back-end of these operations is networked to provide clearinghouse functions, while the customer or front-end is mostly not networked. Each card is discrete. A partial exception is where customers with designated bank or credit card accounts can now arrange with their bank to have issued a 'Personalized Octopus card'. When their card runs out of stored value the card reader on the bus or mini-bus or in the shop can automatically reload the card with value, and the credit thus obtained is itemized on the

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customer's next credit card or bank statement of account issued by their bank. Reloading in this way is limited to just over US\$30, once a day maximum. Solely for Personalised Octopus cardholders, they can report lost cards through hotline, email or fax, stopping the cards from unauthorized use and minimizing any possible loss.

The Octopus card was not the first attempt to introduce m-commerce for micro-payments by means of a payment card. In Hong Kong, as elsewhere in the world, bankcards have been promoted for this purpose. By combining bankcards and credit cards on the same piece of plastic shoppers have a choice of large item payments by credit and small item payments by point-of-sales (POS) direct debits from their bank accounts. However when the bank POS card is unhitched from the credit card and issued separately as a debit card the results seem to have universally failed. Among the many possible reasons it would seem that a crucial one is the lack of a *compelling* reason to use them. This may have something to do with the feeling of lower-income customers wanting control over their expenditure, or with the frequency of buying certain small value items, or with the availability of a cashier in a shop who can offer change for large banknotes.

The research question for mobile phone network operators and service providers is how far are the lessons to be learned from the experience of bank debit cards designed for micro-payments have relevance to the possible adoption of m-commerce by mobile phone.

In the case of the Octopus card there is a compelling reason to use them, because everyday millions of people use some means of transport. Even private motorists can use the Octopus card to pay parking meter charges. On each occasion there is a requirement for exact amounts of money, and either no cashier to give change or the risk of a long wait in a queue. In a fast-paced, indeed hyperactive, society like Hong Kong time-consuming delay is regarded as a major inconvenience, especially during rush hours, so a premium is placed upon the immediacy of micro-payment where the item in question is routinely consumed with very high frequency.

Hong Kong is very familiar with public and private electronic networking; for example ATM machines were ubiquitous by the late 1980s. In 2000 the Government initiated an online service known as ESDLife (Electronic Services Delivery) using a portal built and operated by a joint venture between Hutchison and Compaq. The portal provides online access to a range of public and private services. In July 2002 ESDLife and Nokia announced two new initiatives. The first was to install Octopus card readers at ESDLife public booths that are located in metro stations, train stations, shopping malls, housing areas and the like. Now a transaction online, such as booking cinema or concert tickets, can be conducted using the Octopus card. The second initiative is the incorporation of the Octopus smart chip into the plastic casing of a Nokia brand of mobile phone handset.

### **An M-Purse?**

The second announcement raises some questions. According to various reports, mobile phones are the items most commonly left behind in taxis. The same is not true of Octopus cards, so why anyone should be willing to take the risk of losing both at the same time is

not clear. Nor is it clear why anyone should prefer to use a relatively bulky mobile phone handset when walking through a turnstile when a simple plastic card will do. But besides what sounds like the gimmicky side of this announcement, it raises an interesting question. If the stored-value function of the card can be incorporated into the chipset of the handset itself, does this represent the equivalent of the M-purse? What would be the advantage of this development? The handset could be networked directly to the customer's bank account and direct debits or credits would then be possible. By networking the front-end as well as the back-end the m-commerce function would become totally 'always on, anywhere, anytime' by allowing uploading stored-value or facilitating debit payments at any location and at anytime time of the day or night. This still leaves the security issue unanswered, and that could be the biggest stumbling block to consumer acceptance, especially when the low-risk alternative of the current use of Octopus cards works perfectly well.

From the service providers viewpoint the major obstacles to such a development are most likely twofold. First, coordination along the value chain of chipset manufacturers, handset vendors, network operators and service providers, the banks, and the merchants, with the greatest coordination problems most likely from the middle of the chain forwards. The second obstacle specific to Hong Kong would be the scale of the market. Hong Kong has a population of around 7 million, which is small. On the other hand Hong Kong, as indicated above, is a pioneer and early adopter of online services and mobile phones. There are nearly 6 million post-paid mobile phone accounts, an 85 per cent penetration rate. About 40 per cent of households now have fixed line, fixed wireless or cable broadband connections, and according to the latest survey by the Telecommunications Research Project (TRP) in December 2002 nearly 80 per cent of households had a computer, and of these nearly 90 per cent were connected to the Internet. (See appendix).

### **Scale of Market**

Scale of market in Hong Kong is a changing issue. During 1G and 2G when the essential business of mobile phone network operators was voice the issue of scale was less important, although not unimportant. Hong Kong has six operators running eleven networks in a technology-neutral regulatory environment, and competition is intense. Hong Kong also has mobile number portability, so the transaction costs of changing networks are low, and monthly churn rates are around 5 per cent. For the past several years the average revenue per user (arpu) was falling below the critical monthly HK\$300 (US\$40) profit level for all but one of the operators, but 2002 has seen an end to cut-throat discounting and a severe cutting of costs that has brought several of them back into profitability. The market is a classic case 'monopolistic competition' wherein every operator sets out to differentiate their product through the way they package their services, their tariffing schemes, their handset promotions and so forth. For this reason the Hong Kong mobile phone sector has always been in the forefront of innovation at the service level, and the networks have been under pressure to maintain a high quality of network of coverage. For these reasons also Hong Kong has long been regarded as a testbed for new handset models and networking equipment.

But the advent of 2.5G (packet-switched) and the beckoning of 3G (higher speeds) are changing the name of the game. While voice remains the main revenue earner the focus is

shifting towards content and applications and related forms of m-commerce. Web-based content and applications accessed by mobile broadband Internet are by their very nature global, whether or not they are marketed on a global, regional or purely local basis. Furthermore, unlike voice services where the costs are minimal, applications and especially content has to be upgraded or refreshed on a regular basis, so greater economies of scale are required. Making micro-payments is most likely a very local activity, and many of the applications, such as the payment of travel fares or the purchase of a cup of coffee, can only be local. The business answer has to be to go regional at the very least, and that is exactly what is now being contemplated. In the case of the Octopus card, plans for regional expansion are under way. In the case of content developers in Hong Kong, the same is true.

To summarize thus far: m-commerce should not be viewed as an entirely new phenomena, as something that has to be invented, but rather as an extension of existing consumer preferences to a new medium, the use of a high-speed packet-switched mobile telecommunications network. This perspective is partially good news for service providers because it implies that the marketing of new services can build upon an existing foundation. That foundation consists of a widespread acceptance of the basic medium and a widespread interest in convenient ways to transact while being mobile, with payment for transport services being a paradigm case. For example, in the Japanese market commuters spend many hours on trains each day and have readily accepted the use of the mobile phone as a means of receiving information services, such as news clips and sports results, and as a means of passing the time with games, horoscopes and other diversions.<sup>2</sup> Another case in point is perhaps the US market where long distance journeys by automobile have made the use of the mobile phone in motor cars widespread, and where there seem to be many opportunities to sell applications such as location services and geo-positioning systems and traffic alerts systems.

### **Consumer Preferences for Peer-to-Peer**

But the sting in the tail of this summary is the phrase ‘consumer preferences’ because these may not coincide with ‘vendor preferences’. It is widely recognized that the most successful applications of the new information and communications technologies (ICTs) are (i) peer-to-peer (P2P) and (ii) person-to-machine (P2M) as in the case of interactive voice recognition systems and the simply answering machine or voice mailbox. Voice is the killer application of the telecommunications network, email of the Internet, including file sharing, and chatting. Short message services (SMS) have proved a close P2P substitute for voice when price differentials make it cost-effective, for example in the Philippines and in Mainland China.<sup>3</sup> The incremental buildup approach for network

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<sup>2</sup> It would seem that talking on a mobile phone in public places such as trains is culturally not widely accepted in Japan. Hong Kong, by contrast, falls into the opposite camp. People use mobile phones everywhere, including in cinemas and in the middle of concerts. In Hong Kong it is not unusual to witness a young couple together in a restaurant each talking on their mobile phone.

<sup>3</sup> An estimated 24 billion SMS text messages were sent worldwide during the first quarter of 2002. See ‘Mobile and Internet Drive New Telecom Demand’, *I-Ways*, Third Quarter 2002, p.11. China Mobile, China’s dominant network service provider, saw an increase from 126.7 million SMS in the first half of 2000 to 4.7 billion in the second half of 2001. (*South China Morning Post*, Technology Section, 2 November 2002, p. 6)

service providers includes Enhanced SMS where customers pay to be sent text messages of news items, special calls, stock price information, etc., or can download ring tones, bitmaps for location information, and so on. Network service providers are now investing in the next generation P2P opportunity, multi-media message services (MMS) which enables customers to send or receive short video clips, attach photos or send graphics.

The cautionary tale from the days of the dot.com bubble is that consumer preferences seem to fall into quite well known hierarchies of needs and preferred means of fulfilling them. While some of these can be hyped and fashioned and manipulated by well-orchestrated sales and marketing campaigns, these tend to be bursty commercial fads not sufficient to sustain a profitable business long term. There seems to be a major disjuncture between the overwhelming embrace of P2P applications across communication networks by customers and the high tech 'vision' of the futurologists and corporate planners. For example, vendors' hype will often stress the importance of the 'speed' of the network, the 'power' of the processor, and the immediacy of consumer and enterprise services, such as services based upon the customer's profile and location, when in reality consumers and business managers will have their own preferences about when and how they receive information, what is really worth paying for and what is just 'white noise'. It is interesting to note that according to the Mobile E-Commerce Working Group of the Electronic Commerce Promotion Council (ECOM) in Japan an estimated 800 million out of 950 million emails sent over mobile phone in 2001 were considered junk mail.<sup>4</sup> Revenue models based on advertising proved fatal for many dot.com companies, and similar models promoting the idea of push advertising to turn 'customers into consumers' based upon the customer's profile and location run the risk of substantial customer resistance.

### 3. M-Commerce by Mobile Phone in Hong Kong

Hong Kong has been very much part of the Asian growth phenomenon, despite recent difficulties. The 'tiger' or 'dragon' Asian economies have been highly export-focused, have exhibited a rapid rise of a middle class enjoying high per capita incomes with not too much in the way of public goods to consume. So most of the newly rich have funneled their incomes into personal wealth acquisition, such as property and financial assets, into family business or education for their children, and into items of personal consumption, including household goods, automobiles and, inevitably, mobile phones. For their children buying a mobile phone has become something of a 'life-style' thing, and is often treated as a fashion accessory. But the other side of the coin is that income distribution is highly skewed in these societies and most owners of mobile phones do not have large disposable incomes for substantial online purchasing. These were the observations provided about young people in Hong Kong at a recent forum organized by the TRP in November 2002 – see <http://www.trp.hku.hk/tif/papers.html>.

So from a research agenda perspective, the nature of the market and its segmentation is clearly in need of better understanding for the services of the next generation networks.

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<sup>4</sup> Cited in 'Mobile EC in Japan and User Awareness', *I-Ways*, First Quarter 2002, p.28.

This is a market research issue. From a policy perspective, Government has an interest because the advent of 2.5G, 3G and beyond raises questions about content and applications development which is regarded as a future source of economic and industrial growth and employment. This is where the issue of scale arises again. Hong Kong's market of 7 million people is not a highly attractive market on its own for m-commerce based upon either the mass market or the enterprise market, but Hong Kong's strategic position within the region, especially so-called Greater China, does offer opportunities.

The Hong Kong's spoken dialect is Cantonese, not Putonghua or the 'common language' of Mainland China. The Cantonese region embraces the entire Pearl River Delta including the city of Guangzhou (Canton) and the 'Special Economic Zone' cities of Shenzhen and Zhuhai.<sup>5</sup> There are over thirty dialects spoken across China and throughout the Chinese worldwide Diaspora. In Taiwan, Mandarin is the national language, the equivalent of Putonghua, although with a more southern pronunciation. Although the text versions of Cantonese and Chinese do differ, this is little obstacle to the development of text messaging across the region, but it is something Hong Kong developers have to take into account. One of the findings that came out of the TRP's forum on 20 November 2002 (see above) is that some of the successful early content developers have from Day One adopted a regional perspective of the market opportunities. In one case, for example, rather than looking from Hong Kong to the Mainland China market they entered the markets in Singapore and Malaysia, markets with similar characteristics to Hong Kong in many respects. Their strategy is to grow a regional competence before tackling the potentially enormous Mainland market.<sup>6</sup>

Understanding better the dynamics of overseas markets, not just in terms of end users but also in terms of the business processes of the local the service providers could be a fruitful research programme.

### **Network Competition**

Another finding that came from the forum was the current focus of Hong Kong network operators on their bottom line, with little to risk on marketing budgets for content and applications. This was turning them towards larger more established overseas developers for content. It was also shutting them off from local developers in terms of business process. Local developers had to go knocking on doors knowing little about the market strategies of the network operators, and with little initial information about the technical specifications required by each operator. Because of the highly competitive nature of the services market in Hong Kong, each operator is still looking for content to differentiate their network and this fragments the market for local developers as well as for consumers. At this stage of development of the industry we can perhaps identify three versions of this exclusive approach: (i) the 'walled garden' approach where each operator attempts to lock customers into their network, (ii) the 'walled estate' approach whereby operators with networks in many countries, such as Vodafone, try to lock their customers into their brand wherever they roam, and (iii) the 'walled country' approach where some

<sup>5</sup> The SEZ status has now lapsed but was earlier part of China's experimental opening the door to the world economy. China's membership of the WTO is the conclusion of that 'experiment'.

<sup>6</sup> There are upwards of 200 million mobile phone users in Mainland China.

countries are tempted to ring fence their territory, allowing through only certain categories of traffic. In Mainland China the market scale is so vast that the ‘walled country’ approach may not in the short term do too much to dent the revenue prospects of the mobile operators, but in the long term it will carry considerable opportunity costs unless filtering techniques become really very sophisticated and discriminating.

### **Economics of Broadband Mobile**

Market fragmentation is clearly an obstacle to creating a mass market for content. A thought experiment comes up with three possibilities. First, a world in which everyone ‘owns’ their own local access cell and transmits and receives accordingly. The local area network in this model could be provided by a municipal public body or owned by a local cooperative or outsourced. Second, many competing access networks operated by mobile network operators and mobile virtual network operators (MVNOs), more or less the Hong Kong situation. Third, where there is only a monopoly operator. In the first case, revenues from access are, in effect, non-existent and service providers are providers of content and applications. The techniques of transmission and switching are those of a telecommunications network, but the content business has little in common with the core competencies of the telecommunications sector. In the third case revenue comes from both ends, from access and usage, that is to say downloads of content and applications. Here the revenue model is not too difficult, merely a question of knowing the elasticity of demand. The complexity arises in the second case. As the auctions in Europe showed the operators are in great confusion as to what exactly the 3G business actually is, because no telecommunications licence of any kind is required to sell content and applications over the Internet, however it may be accessed. Consequently, the auction fees that were bid should have excluded revenues from content and included only those from access. As a consequence, the bids in the UK and Germany were probably wrong by a factor of ten.<sup>7</sup>

In Hong Kong my own proposal for an auction on royalty payments on 3G turnover was eventually accepted,<sup>8</sup> the point being to synchronize the need to pay with the ability to pay and thus to avoid massive upfront debts. 3G turnover was deemed to be total revenue from access, but not from content and applications. In the event four licences were awarded in September 2001 at the auction reservation price to four applicants. My further proposal was not adopted, namely to increase the number of licences issued, and to announce a policy of issuing as many in the future as could be sustained by the spectrum available. Apart from driving down the value of a licence to rock bottom, such a policy would have emphasized the changing nature of the economics of the industry.

Unlike 1G and 2G, 3G and beyond is less about selling services that are built into the networks themselves and more about selling Web-based services. This has to be qualified in two respects. First, voice will remain important and that is what networks were built to do. Second, certain applications will be run from network servers and intelligence in the

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<sup>7</sup> See John Ure ‘Licensing Third Generation Mobile’ at: [http://www.trp.hku.hk/pdf/Info\\_3G.PDF](http://www.trp.hku.hk/pdf/Info_3G.PDF) and at: [http://www.itu.int/osg/spu/ni/3G/resources/licensing\\_policy/Info\\_3G\\_Auctions\\_John%20Ure.doc](http://www.itu.int/osg/spu/ni/3G/resources/licensing_policy/Info_3G_Auctions_John%20Ure.doc).

<sup>8</sup> For the initial critique in the debate, see John Ure ‘Third Generation Mobile: to Auction or Not to Auction’ May 2000 at: [http://www.trp.hku.hk/papers/2000/3g\\_response.pdf](http://www.trp.hku.hk/papers/2000/3g_response.pdf)

network will provide the value-added to these applications, such as location services, but in principle most of this does not have to be done in the networks themselves. For example, the servers can be off net.

So another research issue is to examine exactly what network architectures make sense in the post-3G world and what are the associated commercial implications.

### **Policy Issues**

This brings us back to the policy issue raised earlier. What are the sensible and flexible policies to be pursued by regulators to encourage the growth of the market, not necessarily the growth of the existing networks. The market in question is the market for the consumption of content and applications. On the supply side this may involve, besides licensing policy, the freeing up of spectrum, a more liberal use and reuse of spectrum, and of spectrum trading as well as spectrum pricing. On the demand side, it may involve Government support for private sector initiatives to promote small and medium-sized content and applications developers. At the TRP forum there was considerable interest in the M-Net project in Adelaide in South Australia where vendors and service providers have set up a testbed area for content and applications developers. Canada has a similar experimental development and there is now some discussion going on in Hong Kong as a way to help local SME developers. Vendors and operators in many parts of the world are pursuing similar schemes.<sup>9</sup>

This seems to open up a fruitful field for research in coming to a better understanding of the business processes through which network operators and developers can work together to serve both consumer and enterprise markets. This would involve several different focuses. On the one hand, the initiatives that have been taken by the private sector to enable small developers better understand the technologies available, the platform requirements (api's) and the markets. On the other hand, public-private sector joint initiatives that exist to promote the ability of small and medium-sized developers to make the jump from creative ideas to the development of marketable products.

### **Forecasting Issues**

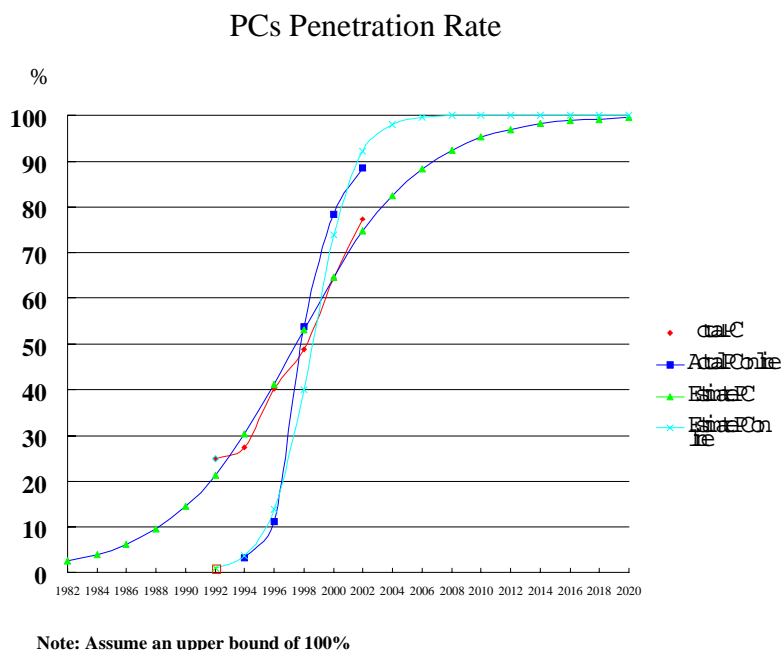
In terms of the commercial realities facing the industry, the whole sector is still feeling its way. Forecasts of market take-up and market growth are notoriously subject to self-interested hype or to simplistic methods of extrapolation. Rather than relying upon them, from an academic viewpoint it is far better to model market development as far as this is possible. The most used model is some form of diffusion analysis, based upon logistic curve fitting or probit curve fitting.<sup>10</sup> The constraint is lack of time series data, but this

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<sup>9</sup> Singapore's second largest operator, MobileOne (M1) reports that within six months of starting an 'Application Developers' Community' in October 2001 they attracted over sixty developers to test out their services, which included games, entertainment and information services and location-based services. See [http://www.m1.com.sg/M1/CDA/About\\_Us/Corporate\\_Information/Press\\_Releases/Press\\_Release\\_Details/1,1028,6098,00.html](http://www.m1.com.sg/M1/CDA/About_Us/Corporate_Information/Press_Releases/Press_Release_Details/1,1028,6098,00.html)

<sup>10</sup> See John Ure (2002) 'Modelling Critical Mass for E-commerce: the case of Hong Kong' *Electronic Commerce Research*, v.2, Nos.1-2 (2002) Jan/April – also to be found at:

does not preclude the development of models that can be reviewed and revised, as new data becomes available. For example, the following graph illustrates the diffusion of PCs among households in Hong Kong and the diffusion of Internet access among those same PC-owning households.



The data for this graph has been collected by the TRP bi-annually since 1994, with some data from other sources going back to 1991. It shows that from 1998 onwards a critical mass of PC-enabled homes existed in Hong Kong for e-commerce take-off. The additional data that is now being assembled relates to those with Internet connections who 'frequently' shop online, say 10 times or more a year. The 2002 TRP survey found that 11 per cent of online households (5.6 per cent of all households) had purchased online, compared with 6.9 per cent (3.5 per cent of all households) in 2000 and 1.5 per cent (0.4 per cent of all households) in 1998.<sup>11</sup>

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[http://www.trp.hku.hk/publications/ecr\\_ure\\_2002.pdf](http://www.trp.hku.hk/publications/ecr_ure_2002.pdf) and <http://ecommerce.mit.edu/cgi-bin/viewpaper?id=195>

<sup>11</sup> The TRP's survey results consistently exceed those of the Census & Statistics Department of the HK SAR Government. The differences may be due to sampling methodologies. The TRP data is collected by telephone survey, whereas Census & Statistics data is collected by personal interview. For the most recent government data, see 'Information Technology Usage and Penetration' *Thematic Household Survey*, Report No. 10 Dec. 2002. See <http://www.info.gov.hk/censtatd/eng/press/ops/1202/itsurveysummary2002.pdf>

The same diffusion modelling can be applied to m-commerce, although the data points are even scarcer as 2.5 phones only entered the Hong Kong market in 2002 and 3G phones are due in 2003.

A summary of the TRP's 2002 survey results is provided in the Appendix, and the question about Internet access by mobile phone was added for the first time. By December 2002 some 5.1 per cent of household respondents said they had accessed the Internet by mobile phone, what could be considered already a surprisingly high percentage.

If a critical mass of broadband mobile phone Internet users builds quickly, as it clearly did in Japan and Korea, and as it seems to be doing in Mainland China, then the next set of questions concern the necessary and sufficient conditions for m-commerce to take-off. These are usually catalogued as 'enabling factors', such as the availability of colour screen handsets, and shift towards the harmonization of handset standards, including keyboard navigational procedures and screen sizes, and inter-operability of applications and content across networks and handset brands. From a business perspective one of the most important revenue sources of the future could be international roaming inter-operability where content and applications are equally available and accessible. A good recent example of this has been the development of gaming (i.e., playing games, not gambling) across frontiers, so for example a person in Hong Kong can play a virtual horse-racing game with contestants in Taiwan or on Mainland China, each contestant sending racing instructions to their virtual jockey or horse by means of SMS. The local service providers collect the SME revenues, and each link up to a central server which houses the game.

We may add a second category of complimentary developments, what could be termed 'enhancers'. These would include devices like digital cameras and music players that can be attached or built into the handsets. In some cases, the sale of these devices may prove more profitable than the sales of services.

I am unaware of research that explicitly attempts to model the impact of either 'enablers' or 'enhancers' to examine how they effect the character and speed of the diffusion process. This would be an interesting area to investigate.

### **Revenue Issues**

Finally we come to the critical (critical to the industry, that is) concept of a revenue model. At first sight it would seem there are logically two possible approaches, one based upon the economics of the supply-side of the industry, and one based upon the trial and error of the marketplace. The former approach will, for example correlate joining fees, subscription fees and usage fees with fixed costs, with variable costs, and with marginal costs and revenues. In reality an industry facing cut throat competition will swing a long way from such rational pricing in the short term until consolidation brings the industry the back to its basics. An industry in its infancy therefore faces two opposing pressures. The first is to extend traditional tried and tested pricing approaches to new products and services, and the second is to try and test new pricing policies. In this case the

traditionalist approach may not work for the industry-as-a-whole if the key issue is to promote widespread adoption of 2.5G, 3G and beyond because what ‘adoption’ means is in fact a two-stage process. Stage one is to buy into broadband access. Stage two is to buy into m-commerce. The traditional approach is to treat new products and services as premium services that attract premium prices, and this worked for a narrowband telecommunications industry. While the relative failure of ISDN could be seen as a case of the traditional approach failing, managers of leased circuit business units within the fixed line telecom operators probably regarded this as a sensible avoidance of cannibalism. However in a broadband world it makes better sense to sell access as a commodity service from Day One as a means of promoting the usage of content and applications. As one telecoms executive manager in Hong Kong recently put it, ‘if we don’t cannibalize ourselves someone else will do it for us.’ Of course, this assumes a competitive market.

If an experimental pricing approach has to be adopted for broadband mobile Internet services, the deep pockets of incumbent operators should give them an advantage. If this is the case, first-to-market may not be the priority that many market gurus claim it to be as incumbents can always adopt the winning strategy of others. From the strategic viewpoint of the individual operator, does this or does it not favour the ‘walled garden’ approach? If incumbents can dominate the market by simply outlasting their smaller competitors, then adopting an open systems approach could be advantageous to them, providing the economies of scale for longer-term commercial success.

Research into ‘walled garden’ and ‘open systems’ strategies, possibly with the help of game theory, as they affect new entrants, smaller operators and incumbent operators, would be interesting.

What is clear at the present time is that pricing for similar services differs considerably between operators, but in Hong Kong at least the pricing structure is consistent. The following table summarizes the situation in Hong Kong in early January 2003. While SMS and MMS charges differ quite a lot, the structure of pricing is almost identical. In the case of downloading games the charges are also quite similar.

#### Tariffing Schemes of Hong Kong Operators for Some Data Services

<b>Operator</b>	<b>SMS</b>	<b>MMS</b>	<b>Games download</b>
SmarTone	\$50 for 200 messages, thereafter \$1 per message	Free until 3/31/03 2 cents per KB thereafter	\$15-18 per game
CSL	\$38 for 120 messages, thereafter \$0.5 per message	\$3-\$15	\$15 per game

Orange	\$28 for 100 messages, thereafter \$0.5 per message	\$3-10 per MMS download, \$9 monthly subscription fees	\$15-20 per game
SUNDAY	\$0.3-0.8 per message (package charge)	\$3	\$ 15 –20 (game content only) + \$ 5 download charge
Peoples	\$20 for 70 messages	\$3-\$15	\$15 per game, additional charges of \$0.09 per Kb for Java games
New World Mobility	\$30 for 100 messages, thereafter \$0.5 per message	\$5-20	\$10 monthly fees and \$0.1/KB data charge

Source: TRP research.

As a percentage of revenue, data services in Hong Kong remain minimal and growth uncertain. The following figures come from the Annual Reports of Telstra,<sup>12</sup> SmarTone and Sunday.<sup>13</sup>

#### Data Revenues as Percentage of Total Service Revenues of Three Listed Hong Kong Operators

<b>SmarTone (Dec. 2001)</b>	<b>Sunday (Dec. 2001)</b>	<b>CSL (Dec. 2001)</b>	<b>CSL (June 2002)</b>
4.3 %	2.3%	2.75%	2%

Source: Oracle Market Research, Telstra Annual Report.

These estimates can be compared with those from the Gartner Group for the Asia-Pacific region. According to this table, data revenues were 1.6 per cent of total service revenues in Hong Kong in 2000, and Gartner's forecast of 3.9 per cent by 2001 was not realized.

<sup>12</sup> Telstra bought full ownership of CSL from PCCW HongKong Telecom in 2002. See [http://www.telstra.com.au/investor/cfo\\_presentation\\_02.pdf](http://www.telstra.com.au/investor/cfo_presentation_02.pdf)

<sup>13</sup> Data revenues for Peoples Telephone were 5 per cent by October 2002 compared with 4 per cent over five months to May 2002. Reported South China Morning Post, Technology Post, 21 January 2003, p.1

**Cellular Data Service Revenues in US\$M and as Percentage of  
Total (Voice + Data) Service Revenues for the Years 2000 and 2001 (E)**

Economy	2000		2001 (estimated)	
	Revenue	% Service Revenue	Revenue	% Service Revenue
Asia-Pacific	\$4.1m	4.7	\$10.2m	9.5
China	\$104m	0.6	\$630m	3.1
Hong Kong	\$28.8m	1.6	\$75.6m	3.9
India	\$10.3m	1.7	\$39.2m	3.7
Indonesia	\$7m	1.1	\$16m	1.6
Japan	\$3,424m	7.7	\$8113m	15.0
Malaysia	\$25m	1.9	\$47.9m	2.6
Philippines	\$124m	14.9	\$278m	19.6
Singapore	\$44m	5.5	\$67m	7.3
South Korea	\$140m	1.5	\$369m	3.4
Taiwan	\$87m	1.8	\$169m	2.8
Thailand	\$4m	0.5	\$18m	1.5
Rest of Asia	\$20m	1.6	\$52m	3.3

Source: Gartner Group, August 2001.

Outstanding in this table are Japan, the Philippines and Singapore. In Japan the phenomenal success of *iMode* is well documented, except that the success is to be judged more in terms of revenues than profits.<sup>14</sup> The Philippines is explained exclusively by SMS which has grown exponentially as access to mobiles phones became widespread and as mobile operators were early to interconnect so that messages, which are much cheaper than voice calls, could be sent and received between networks. In the case of Singapore, SingTel Mobile, the largest of three mobile operators, reports for the six months to September 2002 data revenues rising to 11 per cent of total service revenues.<sup>15</sup>

An interesting research question is why should these economies stand out, and do they have sufficient in common to hold lessons for the others? On the face of it they display remarkable dissimilarities in many respects.

The interest of this research question lies not only in what factors help determine the growth of each domestic market around the region, but given the essentially regional and global nature of any mobile broadband Web-based content and applications sector, developers may come to understand better the market characteristics and critical success

<sup>14</sup> An additional point of interest in Japan is the demographic factor. In an aging population a survey in October 2001 by ECOM found that the most sought after online mobile phone service was 'hospital congestion information and appointments'. See 'Mobile EC in Japan and User Awareness', *I-Ways*, First Quarter 2002, p.27.

<sup>15</sup> See [http://home.singtel.com/investor\\_relations/financial\\_report/default.asp](http://home.singtel.com/investor_relations/financial_report/default.asp). SMS network interoperability was introduced very early in Singapore when there were only two networks.

factors for entering these markets. This information can help them establish a regional presence and achieve the scale economies necessary to survive.

The concomitant issue is that the most lucrative business for operators in the near term could well be the growth of international messaging and content traffic. It is therefore in the interests of operators to conclude international roaming agreements as soon as possible and to encourage the type of content and applications development that stimulates roaming traffic.

## Conclusion

This paper has argued three points. First, that an understanding of m-commerce as not something entirely new but as an incremental development of existing consumer preferences could be a helpful perspective. Second, the paper has attempted to identify a number of research questions, and at least one research method, in looking at the prospects of m-commerce growth. Third, the paper suggests that going regional and global will be inevitable for developers in relatively small economies such as Hong Kong, and this also makes good sense for network operators in these economies. They need to conclude international roaming and interoperable arrangements as quickly as possible.

## Appendix: TRP Survey December 2002 – Summary Results

### Home Computers and Networking in Hong Kong

*TRP Surveys 2002*

Sample size – 532, 526 (exclude don't know and no response for PC question)

#### **Computer Penetration**

Homes with computers - Table 1					
<i>PCs per Household</i>	<i>1 PC</i>	<i>2 PCs</i>	<i>3 PCs</i>	<i>4 PCs</i>	<i>At least 1 PC</i>
1991 <sup>1</sup>	na	na	na	na	21.8%
1993 <sup>1</sup>	na	na	na	na	27.9%
1994 <sup>2</sup>	25.6%	1.6%	0.2%	0.1%	27.5 %
1996 <sup>2</sup>	36.9%	3.1%	0.2%	0%	40.2%
1998 <sup>2</sup>	42.4%	5.7%	0.4%	0.2%	48.8%
2000 <sup>2</sup>	49.8%	12.5%	1.6%	0.4%	64.2%
2002 <sup>2</sup>	57.9%	14.1%	4.1%	1.1%	77.3%

Notes: 1. Institute of Asia-Pacific Studies; 2. Telecommunications Research Project

Number of people in the PC household who share the use of the PC(s) (n=411)

	Frequency	Percentage
1	90	21.9%
2	167	40.6%
3	99	24.1%
4 or more	52	12.7%
Don't know	3	0.7%
Total	411	100%

Number of households that have PCs with Internet connection: 364

Percentage of households that have PCs with Internet connection: 88.6% (n=411)

Number of households that have PCs with broadband Internet connection: 294

Percentage of households that have PCs with broadband Internet connection: 71.5% (n=411)

#### **Online transaction (n=364) over past 12 months**

	Frequency	Percentage of cases
Online ordering/purchase	40	11%
Online stock trading	5	1.4%
Online banking	20	5.5%

PPS online	14	3.8%
Others (Auction)	1	0.3%
No online transaction	302	83.0%
No response	3	0.8%

#### **Online ordering or purchase (n=40) over past 12 months**

No. of times order online	Frequency	Percentage
Once	4	10%
Twice	9	22.5%
Three times	3	7.5%
Four times	4	10%
Five times	4	10%
6 – 10 times	6	15%
Over 10 times	11	27.5%
No response	3	7.5%

#### **Types of goods ordered online (n=40)**

	Frequency	Percentage of cases
Books	14	35%
Magazine	1	2.5%
CDs	3	7.5%
Food/beverages/Groceries	3	7.5%
Computers or computer products	6	15%
Toys	3	7.5%
Flowers	2	5%
Clothing/Apparel/Footwear	3	7.5%
Air ticket	5	12.5%
Hotel booking	6	15%
Videos	3	7.5%
Household items/Furniture	1	2.5%
Home appliance	2	5%
Health and cosmetic products	1	2.5%
Event tickets (movie/show/concert tickets)	9	22.5%
Stock	2	5%
Others	5	12.5%
DK	1	2.5%

**Online stock trading (n=5)**

No. of times doing online stock trading	Frequency	Percentage
Once	1	20.0%
6 times	1	20.0%
10 times or above	3	60.0%

**Expenditure for goods and services ordered online (n=40)**

	Frequency	Percentage
\$1000 or below	12	30%
\$1,001 to \$5,000	16	40%
\$5,001 to \$10,000	4	10%
Above \$10,000	4	10%
DK	1	2.5%
No response	3	7.5%

**What proportion of the expenditure was paid online (n=40)**

	Frequency	Percentage
0 %	4	10%
1-25%	1	2.5%
26-50%	2	5%
51-75%	1	2.5%
Over 75%	28	70%
DK	2	5%
No response	2	5%

**Wireless Internet access in public places like airport, Internet café, shopping mall (n=526)**

	Frequency	Percentage
Yes	39	7.4%
No	477	90.7%
No response	10	1.9%
Total	526	100%

Internet access through mobile phone (n=526)

	Frequency	Percentage
Yes	27	5.1%
No	483	91.8%
Can't access the Internet through my mobile phone	12	2.3%
Don't know	4	0.8%
Total	526	100%

Have you ever used the ESD online public services provided by the Government (n=526)

	Frequency	Percentage
Yes	66	12.5%
No	307	58.4%
Don't know what is ESD online public services	153	29.1%
Total	526	100%