

# The internet and its wireless extensions in Japan: the portentous interface between chaos and order

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## Abstract

**Purpose** – *The purpose of this paper is to chart the evolving internet-mobile internet relationship in Japan.*

**Design/methodology/approach** – *The approach takes the form of a case study.*

**Findings** – *The original i-Mode-based model for mobile internet in Japan was largely an ordered system except for relatively marginal unofficial web sites, which unlike official web sites were not listed on the browser, where an element of chaos reigned. The introduction of Google search engine changed the ecosystem by giving the unofficial web sites new visibility.*

**Practical implications** – *The interface between the internet and its wireless extensions is a potential source of powerful influences both ways and needs to be watched.*

**Originality/value** – *The paper looks at the little studied interface between the chaotic internet and its mobile extensions, largely ordered systems, to see whether the chaos of the internet will spill over to its mobile extensions or whether the order of the latter will march on to the former.*

**Keywords** *Internet, Wireless, Mobile communication systems, Japan*

**Paper type** *Case study*

## Introduction

Over the last few years many writers have expressed concern about developments that may change the open character of the internet. Besser (1994) warns “bringing commercialization to the internet can be seen as a colonization of one culture by another” (online). Giese (1996) wonders whether the internet’s open character will survive the rationalizing forces set into motion by the commercialization of the internet. Others regret what is lost with commercialization (Press, 1994; Callister and Burbules, 1998; Fabos, 2004). Changes in the architecture of the internet have also concerned many writers. Many believe that it is critical to maintain the end-to-end principle in order to preserve the open character of the internet. They argue against expedient “improvements” that would violate this principle (David, 2001; Blumenthal and Clark, 2001; Lessig and Lemley, 2001; Lessig, 2000). Lately, many writers have called for preservation of the network neutrality principle. They fear that differentials in transmission speeds would create a tiered internet and thereby undermine its democratic character (Wu, 2003; McCullagh, 2006; Van Schewick, 2007). The locus of such concerns has been by and large external – threats from the introduction of corrupting influences from sources beyond the internet world. This paper looks at the little studied interface between the internet and its wireless extensions.

Sawhney (2007) observes that the wireless extensions of the internet, with the exception of grassroots Wi-Fi networks, are mainly organized and closed systems. He characterizes this interface an uneasy one because “chaos” and “order” have tended to be oppositional configurations. As he points out, the Roman roads were emblematic of the imperial order. But at the outer edges of the Roman roads, the frontiers of the imperium, the barbarians lurked.

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For most of the Roman history, the advancing empire kept the barbarians on the run. But, when the empire started losing energy, the barbarians overran Rome. Similarly, the Chinese emperors built the Great Wall of China to keep the nettlesome barbarians out. Eventually, the barbarians overran the imperial order. In the realm of communications, for a period of time there was uneasy co-existence of radio amateurs, who developed broadcasting, and the radio corporations. Eventually, the corporate order prevailed and the amateurs were marginalized. Time and again we have seen that, on the one hand, “chaos” seeks to break down “order” and, on the other hand, “order” seeks to stamp out “chaos”. Both seek the elimination of the other. Thus, according to Sawhney (2007), the interface between the chaotic internet and its mobile extensions, largely ordered systems, begs attention. He wonders whether the chaos of the internet will spill over to its mobile extensions or will the order of the latter march onto the former.

This paper carries this project further to a site ripe for such exploration – the development of mobile internet in Japan. In the 1990s, while companies all over the world were having little success in making internet accessible via mobile phones, Japan’s DoCoMo, a wholly owned subsidiary of Nippon Telephone and Telegraph (NTT), had stunning success with i-Mode. The i-Mode, as explained later, was largely an ordered system, except for relatively marginal unofficial websites where an element of chaos reigned. Later, the introduction of the Google search engine from the internet world, a transfer of the type Sawhney (2007) wonders about, gave new visibility and thereby vitality to the unofficial websites, the chaotic part of the i-Mode universe.

We start this exploration by explaining why i-Mode attained great success when other mobile internet projects faltered. We then discuss how DoCoMo’s competitors copied the i-Mode model and developed their own variations. We focus on the overall mobile internet ecosystem that has developed in Japan. Finally, we discuss how the introduction of the Google search engine changed the overall texture of this ecosystem.

## **Japanese mobile internet industry**

The Japanese mobile internet industry was born with the launch of i-Mode in 1999, by DoCoMo. Technologically, i-Mode services, mainly low speed data applications, were an overlay over DoCoMo’s 2G data networks. The limited bandwidth capabilities of the network limited the possibility of graphic intense applications. This constraint not only eliminated the complexities that come with graphic applications but also pushed the content developers to focus on development of innovative content rather than high tech wizardry (DoCoMo, 2007a; Kunii and Baker, 2000). However, what really distinguished i-Mode services from mobile internet services in Europe and elsewhere was its billing and payment system and the network technologies that DoCoMo employed, which are explained below.

### ***Billing and payments***

Initially, when mobile internet services were first introduced, DoCoMo pioneered a micro-payment system, which the other carriers soon adopted. Here the carriers charged their consumers micro-payments of few cents per transaction (depending on the amount of data accessed by the subscriber) or monthly subscriptions of less than \$5 paid through the cellular phone bills. This arrangement made it easier for content providers to collect small amounts of monies and the consumers got a consolidated bill. The telecom service providers kept 9 percent of every charge, which is a very reasonable amount in the Japanese context where merchants pay 7-9 percent commission on credit card transactions (Lemon, 2001). In addition to content related usage charges, the micro billing payment systems also allowed consumers to pay for e-commerce transactions through their telephone bills.

### ***Packet switching networks***

The use of packet network technology made the “always on” feature possible because unlike the traditional circuit switched networks, packet switched network technology did not require the establishment of a circuit every time a user wanted to connect to the internet.

Since the launch of i-Mode, the Japanese mobile internet market has seen the entry of two other companies, KDDI and Softbank Mobile. As of September 2007, i-Mode continues to be the market leader with more than 53 percent of market share (52.9 million subscribers), followed by au-KDDI 29.5 percent (22 million subscribers) and Softbank 17.2 percent (17.1 million subscribers) (DoCoMo, 2007b).

### **An ecosystem approach to providing mobile internet services**

The mobile internet service providers in Japan exercise considerable control over the entire mobile value chain through a model Natsuno (2003) characterizes as a “value generating ecosystem”. This model was pioneered by DoCoMo and then later copied by other service providers (Billich *et al.*, 2007). The mobile internet ecosystem primarily consists of the service providers, handset manufacturers, content providers, software developers and equipment manufacturers. In addition, given the increase in e-commerce activity through the mobile internet system, the ecosystem now also consists of many traditional brick and mortar companies with e-commerce operations, credit card companies and other financial institutions, and entities that facilitate such e-commerce transactions.

In this ecosystem the telecom companies exercise total control over the entire technology platform on which their mobile internet systems work – delivery systems, handsets, application software, and the content that the users access. They prescribe strict technology specifications to handset manufacturers, server vendors and content developers in order to ensure that content and other access technologies work with the service provider’s network technologies. Only those applications and access technologies that meet the service provider’s standards are incorporated into the ecosystem (Natsuno, 2003; Digital Vector, 2004).

On parallel lines the telecom service providers also add value by taking an active part in testing new systems and applications in coordination with handset manufacturers, application developers and other equipment manufacturers. For example, DoCoMo has developed its own proprietary technology standards that it prescribes to its equipment manufacturers, technology vendors and content providers. Content developers are required to develop content on the C-HTML platform based on standard HTML. Also, DoCoMo prescribes its own proprietary network protocols that technology suppliers and content providers have to adhere to in order to ensure that their systems work with the i-Mode platform. DoCoMo on its part ensures that only those technology vendors and content suppliers who adhere to these technology standards and quality are allowed to be part of i-Mode ecosystem (DoCoMo, 2007a).

### ***Managing and monitoring content***

The mobile internet service providers do not generate content for their networks. However, they monitor the quality of the bulk of content that their subscribers access over their networks. The mobile internet content providers in Japan can be categorized into two categories, official content providers and unofficial content providers. The former are content providers that are officially approved by the telecom service providers. Their websites are listed on browsers of the carrier’s proprietary handsets and can be accessed by the consumer directly by pressing a single button on the handset that launches the browser. In order to obtain official recognition and to be listed on the service provider’s browser, the content providers are required to undergo an approval process. After they are approved, they benefit from the “officially recognized status”, menu listings, and billing services offered by the service provider. The official content providers and the internet service provider jointly share the revenues generated by content services.

When it comes to official websites, service providers have control over subscribers as they can deny them service if they do not pay up. This architecture has its advantages as it provides a secure environment for e-commerce transactions where buyers can be more or less assured of delivery and the sellers of payment (Carter *et al.* 2003, Fransman, 2002). In addition, it offers copyright protections to record companies, publishers, and others that are

not easy to secure on the internet (Natsuno, 2003). Correspondingly, subscribers can access the internet only through the service provider's gateways (Carter *et al.*, 2003).

The unofficial content providers, on the other hand, are not "officially" approved by the service provider, and therefore are not listed on the service provider's browser. For most part many of these unofficial website sites reach out directly to the consumer through advertizing. They either use credit card payment system or some other form of payment and are not part of the telecom service provider's billing system and correspondingly are not monitored by the service provider. In many instances these content providers earn their revenues through advertizing.

In sum, an ecosystem approach allowed the telecom service providers to manage an effective "walled garden" content delivery system where they place themselves between users and content producers by creating tightly controlled networks (Carter *et al.*, 2003) and acting as conduits between an array of actors and consumers in the ecosystem (Natsuno, 2003). The result is a secure and stable technological environment in which different actors in the ecosystem can engage in myriad transactions.

The telecom companies made their services even more attractive by charging "by-the-bit" (amount of information downloaded) and not time of usage. The "always on" and "pay-by-the-bit" features more than compensated for the limitations of a 2 G data network, such as low graphics capabilities, and the mobile internet became very popular.

Figure 1 captures the complex collaborative relationships that exist among various actors in the mobile internet ecosystem and the value these relationships generate for each actor.

### Changes in the mobile internet ecosystem

In recent years the Japanese mobile internet market has witnessed majors change. While these changes are intertwined, for the sake of organizing our discussion in this section we categorize them into three categories: rapid technological change, development of advanced content applications, and integration of search engine capabilities.

#### *Technology changes*

Beginning in late 2001, one of the most important developments in the mobile arena in Japan has been the rapid deployment of 3G technologies by the three major carriers (Shankland, 2003; KDDI, 2003; Softbank, 2006). 3G technologies offer several advantages over 2G technologies in terms of greater bandwidth and rapid download and upload speeds. The advent of 3G was paralleled by the availability of compatible handsets with high-resolution screens and the development of a number of java and flash applications that run on these cell phones (Shankland, 2003; KDDI, 2003; Softbank, 2006). These developments in turn opened up opportunities for the telecom companies to offer a plethora of multimedia services on the mobile phone platform. They in turn resulted in increased demand for multimedia products and services and an explosive growth in the Japanese mobile phone content industry. It is estimated that as of today the Japanese mobile phone content market is worth around 3.4 billion dollars (Hall, 2007) and fast reaching saturation point.

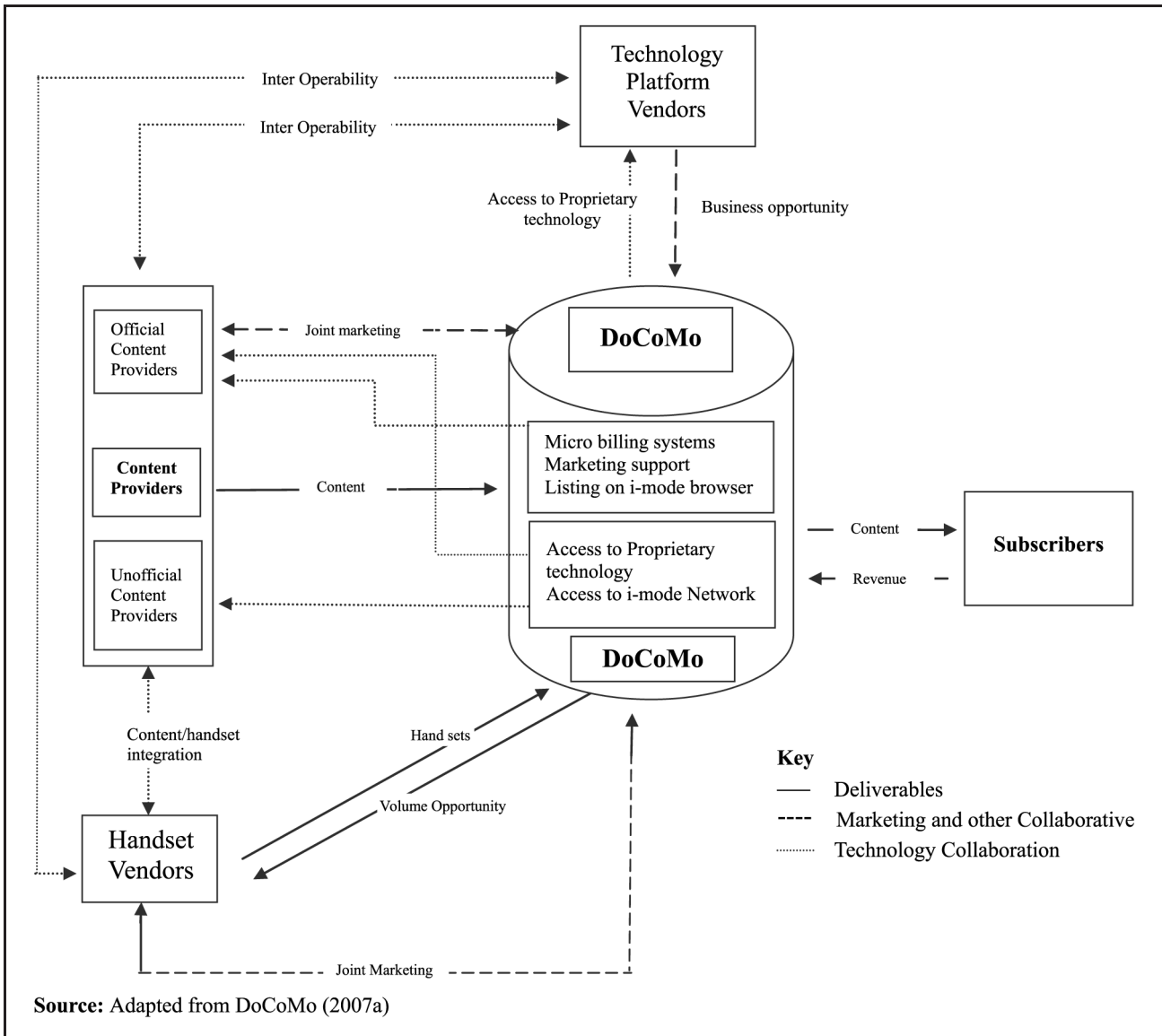
### Emerging trends in content development

Broadly there are six different categories of content that account for the bulk of revenues for mobile content industry. These include music, publications and information, Decomail (enhanced customized options for email), mobile e-commerce and mobile auction services, mobile social networking services and video services (Billich *et al.*, 2007).

#### *Information and publications*

This category traditionally included weather and traffic information. More recently, with the widespread deployment of high bandwidth 3G networks, new services include digital e-books and Manga (Japanese comic books) that can be downloaded and viewed on mobile phones (Billich *et al.*, 2007).

**Figure 1** Collaborative relationships among various stakeholders in the mobile internet ecosystem



### Decomail

Decomail is mobile email service that allows users to decorate their emails with colored background pictures, animation and other graphic elements and can be typified as multimedia mail service or highly customizable e-greeting service. In 2006 the sales in this content category saw an astronomical growth rate of 393 percent and it is expected to be one of the fastest growing content categories in the mobile content market in Japan (Billich *et al.*, 2007).

### Mobile e-commerce

The Japanese mobile e-commerce market including mobile e-auction has witnessed rapid growth, with mobile e-commerce revenues outgrowing those revenues from content in 2004. It is estimated that in 2002 mobile commerce accounted for only 44.4 percent of mobile business revenues and by 2006 this share had grown to 60.5 percent (Mobile content forum, 2007 cited in Billich *et al.*, 2007).

### *Mobile television and video services*

Although in its nascent stages, digital mobile television services are expected to witness a rapid growth in the near future (Billich *et al.*, 2007).

### *Social networking services*

Another important content segment that is witnessing rapid growth is mobile social networking services (DeNa Co. Ltd, 2007 cited in Billich *et al.*, 2007).

While many unofficial websites offered broader content choices, the consumers' ability to access specific content from unofficial websites was primarily driven by their own awareness of these unofficial content sources. Furthermore, they had to type the URL of the unofficial website they wanted to access. Though telecom operators offered content search facilities on their proprietary browsers, the results were restricted to the particular operator's official websites. The telecom operators basically sought to retain the user within the "walled garden" as much as possible while reducing the probability of the consumers' accessing non-official content websites.

What we see here is a technological landscape dominated by "order" with "chaos" at the margins. On the one hand, there has been a rapid growth of the content industry with an estimated 90,000 unofficial sites and over 6,500 official sites (DoCoMo, 2006). On the other hand, the telecom service providers believing that their interests lie in keeping the user within the "walled gardens" of the official content sites, have tried to do so by making it much easier to access official sites than unofficial ones.

However, recently two important changes have occurred that are set to break down the walls of the "walled gardens" and change the contours of the mobile internet industry in Japan: an increase in search capabilities of the mobile phones, and the emergence of micro browsers that enable subscribers to browse PC based websites on their mobile phones. These two changes, among others, are expected to trigger other major changes in the traditional revenue models implemented by mobile internet service providers.

### *Integration of search engine capabilities*

Since the advent of mobile internet, users in Japan have been limited in their ability to conduct content searches beyond the official websites listed in the browser (Nikkei, 2006). However, what went largely unnoticed until now is that technologies that enabled broader search capabilities for mobile phones were available as early as 2001 when Google first developed a search engine for i-Mode users. This technology enabled users to access the entire World Wide Web from any i-Mode phone as it automatically translated the requested HTML document into a format optimized for i-Mode phones (Google, 2001). What was lacking was the direct integration of search engine capability into the proprietary browsers. Until recently subscribers who wanted to conduct a Google search on their mobile phones had to go through a two-step process of first accessing the Google search engine by typing its URL in the proprietary browser on their handset and then conducting their search from the Google page optimized for i-Mode. While this increased the potential for conducting web searches on i-Mode phone, lack of direct support from the telecom service provider hampered its widespread usage.

However, in 2006 KDDI the second largest mobile phone service provider in Japan took a major step by announcing a strategic partnership with Google and began placing the Google search window on top of its EZ Web mobile portal (KDDI, 2006). The result was that the search queries on EZ Web portal tripled in the month following the integration of Google search facility into the EZ portal menu. What is particularly significant is the resulting traffic pattern: only 22 percent of the queries lead to visits on EZ web official sites, and 47 percent and 31 percent searches lead to unofficial and PC sites (internet websites that are viewed on PCs, discussed in the next section) respectively (Billich *et al.*, 2007).

Closely following on the heels of KDDI, DoCoMo announced the integration of search capabilities into its existing i-Mode browsers. However, what differentiated DoCoMo's search strategy from others was that DoCoMo's keyword search service incorporates around 13

search engines, including Google, Microsoft and Yahoo. This approach is different from offerings from other service providers who have limited search capabilities to single search engines such as Yahoo Japan on Softbank and Google on au-KDDI.

In sum, the incorporation of search capabilities on mobile phone now allow subscribers to search official and unofficial sites and also the entire World Wide Web (DoCoMo, 2006; Google, 2001).

#### *PC site viewers*

With the integration of the standard search engines on telecom operator's portals, the traditional operator portal-centric walled garden approach to providing internet services is fast changing. On parallel lines another important development away from the walled garden approach is the evolution of PC Site Viewers (mobile phone version of standard browser) applications that now let users access regular internet or HTML pages on their mobile cell phones. Au-KDDI first introduced this capability in late 2004 by coming out with handsets equipped with micro browsers that rendered standard PC websites accessible on mobile phone sets. It is estimated that by 2007 subscription to these services exceeded ten million in 2007 (KDDI, 2007a). Following KDDI, Softbank and DoCoMo also began offering handsets with browsers that allow users to browse regular HTML pages. The operators of the authorized sites pay a licensing fee to KDDI, which lets Google earn, like on the internet, advertising fees based on search results.

#### **Changing business models**

The rapid growth of 3G technologies, a boom in content industry, and the integration of search engine and PC site viewing capabilities into mobile handsets led the three major carriers to adopt new revenue models, which are discussed below.

#### *Information search and advertising-based revenue streams*

With the integration of advanced search capabilities on their proprietary browsers, all the three carriers expect some content traffic to move away from their websites to unofficial websites resulting in revenue drop from official content business. On the other hand, providers are banking on revenues obtained from focused search and click-through of ad links displayed with search results – a revenue model pioneered by Google. The carriers expect that this revenue stream will offset drop in revenues from official websites (Nikkei, 2006; Billich *et al.*, 2007).

#### *PC and mobile convergence-based revenue streams*

There have been notable advancements in the integration of mobile internet and PC based internet service through a number of applications, products and services that are portable across both the platforms. Among these the LSIMO (Listen Mobile) service is particularly noteworthy. In addition to the regular music, LISMO offers facilities such as the ability to purchase and download music and videos and convert them into ringtones, import CD tracks and then port them onto the mobile phone and transfer music and video from PC to mobile phones.

In addition service providers like KDDI have also developed PC versions of their stable of branded products and service offerings that can then be seamlessly ported onto their subscriber's mobile phones. These include KDDI's social networking site (EZ Gree), au Mypage (customizable personal portals), mobile commerce sites (au Auction and au Shopping) and games (EZ Games) among others. These services are offered to its customers through its PC based website and its mobile phone equivalent (KDDI, 2007b; Billich *et al.*, 2007).

#### *Embedding and integrating services*

Mobile companies are also embedding and integrating different services. Two examples are particularly noteworthy. The first example that capitalizes upon impulsive purchase habits of viewers is being planned by mobile television and video service providers. Here consumers

will be directly able to order clothes that actors are wearing in a particular show while the show is still on, order a CD, a ring tone or a particular track that is playing on a live video or TV program and so on (Billich *et al.*, 2007, p. 115).

The second example is the *Otetsudai*; or what has been termed as “an auction system for local labor”. The system matches up employers who are looking for temporary workers with workers who are looking for temporary jobs within a specific geographical area using a mobile phone’s GPS functionality (Billich *et al.*, 2007).

#### ***Introduction of flat rate-based access plans***

Another major change in the revenue models adopted by the mobile companies is a shift from the traditional data consumption based pricing to a more flat-fee based access. In terms of this major shift KDDI was the first to move to a flat fee based access plan which was soon followed by Softbank and DoCoMo, the other two mobile internet service providers in Japan (Einhorn, 2004a).

When DoCoMo first pioneered the pricing model based on data consumption, which was copied by other carriers, it was cost effective for the customers because most of the services were low-end data applications such as email. However, the advent of 3G technologies has brought in high data rate applications such as video and real time games, and social networking applications that get consumers to spend a lot of time online. Also, the consumers now can access content on the internet. With these changes, the traditional pay-per use pricing model proved to be a barrier to increased data usage. The carriers therefore introduced flat fee based access plans, which have led to a significant jump in internet usage (Einhorn, 2004a; Einhorn, 2004b).

#### **Export of the Japanese mobile internet service model**

Attempts to replicate the Japanese model in other countries have met with limited success. For example, DoCoMo entered the global market in a bid to replicate i-Mode’s success through a series of joint ventures with global telecom companies from around the world. Table I lists the telecom companies with which DoCoMo has partnered with around the world.

<b>Table I</b>	List of DoCoMo’s global partnerships for providing i-Mode services around the world	
<i>Region</i>	<i>Country</i>	<i>DoCoMo regional partner(s)</i>
Asia	Japan	NTT DoCoMo
	Taiwan	Far EasTone
	Singapore	StarHub
	Hong Kong	Hong Kong
Europe	Germany	E-Plus
	The Netherlands	KPN Mobile
	Belgium	BASE
	France	Bouygues Telecom
	Spain	Telefonica Moviles
	Italy	Wind
	Greece	COSMOTE
	Russia	Mobile TeleSystems
	UK	O2
	Ireland	O2
Bulgaria	GLOBUL	
Middle East	Israel	Cellcom Israel
Oceania region	Australia	Telstra

Source: DoCoMo, 2007

While i-Mode has nearly 50 million customers in Japan, it has been only able to attract about eight million customers combined in all of its 17 joint ventures around the world. In Europe, which is one of the largest i-Mode markets outside Japan, the success of i-Mode has been so limited that some of the major telecom companies in fact have decided to discontinue the service. For example, O2, which has been able to attract only 250,000 i-Mode subscribers in Britain, plans to fade out the service by the year 2009. In addition, O2 abandoned its ambitious plans to launch i-Mode services in 2004 in Germany, which is one of Europe's largest cell phone markets (O'Brien, 2007). Similarly, Telestra, which began offering i-Mode services in 2004 in various Australian markets, has also announced its plans to discontinue i-Mode services by the end of 2007 due to lack of customers (Jenkins, 2007).

Nicholas, Head of Communications for O2 in England comments:

i-Mode's major drawback was that it was a closed system, requiring users to obtain i-Mode software and forcing mobile content providers to adhere to rigid i-Mode rules for designing Internet data and games for i-Mode devices. . .

. . . i-Mode is a good technology but it appears to be turning out to be a transitional technology. The world is moving away from the "walled garden" approach to the Internet to the totally open Internet experience, much like on your PC (quoted in O'Brien, 2007, online).

In many markets outside Japan, WAP based internet services running on open technologies as opposed to the walled garden approach of i-Mode, seem to have taken the lead over the Japanese model (O'Brien, 2007). The Japanese market itself is witnessing a dramatic change. The integration of broad based search capabilities and ability to access and browse the World Wide Web has resulted in the gradual demise of the walled garden approach. These changes along with the opportunities provided by the new technologies have resulted in the emergence of a number of innovative services that have opened new revenue streams for the service providers. It remains to be seen how the mobile internet industry plays out in Japan in the near future.

### **Analysis and discussion**

The integration of advanced search capabilities by all the three leading service providers coupled with the availability of handsets capable of browsing the WWW transposed two important attributes from the internet to its mobile extensions. With the ability to access, search, retrieve and browse content from mobile content sources outside the realm of the official content providers and from the WWW, the fundamental character of the mobile internet services started changing. The entire industry moved from a closed model towards a more open one. What is unique about this model is that it incorporates the attributes of both the classic internet as we know it – more open and flat in terms of hierarchy – at the same time retaining some of the unique features of original i-Mode – closed and hierarchical. In the changing scenario the institutional arrangements are also fast changing, with all the three major service providers quickly adapting to these changes by evolving a hybrid model of internet service.

Furthermore, as revenues from official content business are slowing down, service providers are increasingly adapting revenue models that have migrated from the internet to its mobile extensions. They include search results based advertising model pioneered by Google, revenue streams from services evolving out of fixed line and mobile internet integration, diverse service integration, and e-commerce services. In addition, given that increased content consumption and extended usage is an important aspect of these business models, service providers are increasingly shifting usage based fees to flat fee based subscription models in order to increase mobile internet usage.

On the other hand, DoCoMo's inability to replicate i-Mode's success in Europe must again be analyzed within the context of the institutional and technological environments prevalent there at the time of DoCoMo's entry. DoCoMo entered the European markets through collaborative ventures with a number of established European carriers. However, what differentiated European markets from Japanese markets is that in many European countries WAP based mobile internet services were already under way. Before i-Mode portals could be established in European markets, content providers had already established content

portals and consumers were being charged through premium SMS. At the time of i-Mode's entry, large content providers were already entrenched and they competed vigorously, including through aggressive advertising. On the other hand, the lengthy process required for setting up i-Mode portals created barriers to rapid availability of content which in turn hindered i-Mode's growth.

In addition, for i-Mode to succeed it was critical for DoCoMo and its European partners to exercise significant control over the mobile value chain. However, this was not possible in Europe where typically handset manufacturers and content providers operate independently of each other and European operators do not exercise much control over them. Given these conditions, problems such as limited lineup of i-Mode capable handsets, inability to establish retail channels and inability of Japanese i-Mode handset manufacturers to penetrate many European markets all limited the DoCoMo and its European partners' ability to attain the critical mass necessary to sustain themselves (Van Blokand, 2007). In effect, DoCoMo's approach of controlling the entire value chain of the mobile industry in a market that had institutional arrangements that favored a flatter open model of internet services for most part has failed.

Schneider (2000) suggests that one strategy for organizations developing large scale technical systems is to support such "systems in their initial stages through hierarchical coordination, but later, when they have gained a certain size and critical mass, to support decentralization and to turn them into flexible markets" (p. 327). The Japanese mobile internet service providers seem to have followed this very pattern. The three major service providers started off by adopting a hierarchical portal-centric model. However, with time they have been able to adapt to the changing technological environment and slowly move towards a flatter non-hierarchical open internet model that gave them the flexibility to adapt to changing market conditions.

We started by wondering what happens when "chaos" and "order" are juxtaposed together? Will the "chaos" of the internet spillover and open up the wireless arena? Or, will that "order" of the wireless arena march onto the internet? The answer that seems to emerge from the case of Japanese mobile internet is that as of now the chaotic order of the internet seems to be seeping into the "order" of the wireless arena. Currently, the portal-centric model of mobile internet is existing in an uneasy coexistence with the more open model of the internet. Simultaneously, the mobile industry has also been adopting a number of internet based revenue models. But the "order" of the wireless arena is far from crumbling. What seems to emerge is that for now the mobile internet in Japan has evolved into a hybrid model that encompasses aspects from both the closed model of mobile internet and the open one of the internet itself. As to what direction will the equilibrium tilt remains to be seen.

## References

- Besser, H. (1994), "A clash of cultures of the Internet", available at: <http://www.gseis.ucla.edu/~howard/Papers/sf-chron.html>
- Billich, C., Scuka, D. and Cosh-Ishii, L. (2007), *Japan Mobile Internet Report – Carriers, Handsets, Content and Services*, Mobikyo K.K. and Wireless Watch Japan.
- Blumenthal, M.S. and Clark, D.D. (2001), "Rethinking the design of the Internet: the end-to-end arguments v. the brave new world", *ACM Transactions on Internet Technology (TOIT)*, Vol. 1 No. 1, pp. 70-109.
- Callister, T.A. and Burbules, N.C. (1998), "Paying the piper: the educational cost of the commercialization of the Internet", *Electronic Journal of Sociology*, Vol. 3 No. 3, available online.
- Carter, K.R., Katz, R., Pitt, W. and Van Rossen, J. (2003), "NTT DoCoMo, USA: can it bring the wireless Internet to America?", *Chazen Web Journal of International Business*, Spring, pp. 1-19, available at: [www0.gsb.columbia.edu/chazen/journal](http://www0.gsb.columbia.edu/chazen/journal)
- David, P.A. (2001), "The evolving accidental information super-highway", *Oxford Review of Economic Policy*, Vol. 17 No. 2, pp. 159-87.

- Digital Vector (2004), *Value in the Mobile Content Value Chain: Strategies, Trends and Opportunities*, publication ID number DG1070460, Digital Vector, Bangalore.
- DoCoMo (2006), "Keyword search service expands mobile convenience", *Mobility*, December, available at: [www.nttdocomo.com/binary/about/mobility\\_doc\\_09.pdf](http://www.nttdocomo.com/binary/about/mobility_doc_09.pdf)
- DoCoMo (2007a), DoCoMo business model, available at: [www.nttdocomo.com/services/imode/business/index.html](http://www.nttdocomo.com/services/imode/business/index.html)
- DoCoMo (2007b), *NTT DoCoMo Factbook*, available at: [www.nttdocomo.com/binary/about/facts\\_factbook.pdf](http://www.nttdocomo.com/binary/about/facts_factbook.pdf)
- Einhorn, B. (2004a), "DoCoMo's 'new business model'", *Business Week Online*, April 19, available at: [www.businessweek.com/technology/content/apr2004/tc20040419\\_6212\\_tc058.htm](http://www.businessweek.com/technology/content/apr2004/tc20040419_6212_tc058.htm)
- Einhorn, B. (2004b), "DoCoMo v. A mouse that's roaring", *Business Week Online*, April 19, available at: [www.businessweek.com/magazine/content/04\\_16/b3879077.htm](http://www.businessweek.com/magazine/content/04_16/b3879077.htm)
- Fabos, B. (2004), *Wrong Turn on the Information Superhighway: Education and the Commercialization of the Internet*, Columbia University Teachers College Press, New York, NY.
- Fransman, M. (2002), "Explaining the success of NTT DoCoMo's I-Mode Wireless Internet Service", available at: [www.telecomvisions.com/articles/pdf/fransman\\_imode.pdf](http://www.telecomvisions.com/articles/pdf/fransman_imode.pdf)
- Giese, M. (1996), "From ARPANet to the internet: a cultural clash and its implications in framing the debate on the information superhighway", in Strate, L., Jacobson, R. and Gibson, S. (Eds), *Communication and Cyberspace*, Hampton Press, New York, NY, pp. 123-41.
- Google (2001), "Google brings award-winning search engine to Japanese I-mode users", press release, available at: [www.google.com/press/pressrel/pressrelease50.html](http://www.google.com/press/pressrel/pressrelease50.html)
- Hall, K. (2007), "Mobile phone manga storms Japan", *Business Week Online*, April 9, available at: [www.businessweek.com/globalbiz/content/apr2007/gb20070409\\_610225.htm](http://www.businessweek.com/globalbiz/content/apr2007/gb20070409_610225.htm)
- Jenkins, C. (2007), "Telstra kills off mobile i-mode", *Australian IT Online*, July 18, available at: [www.australianit.news.com.au/story/0,24897,22094111-15306,00.html](http://www.australianit.news.com.au/story/0,24897,22094111-15306,00.html)
- KDDI (2003), "Number of 3G mobile phone (CDMA2000 1x) users tops ten million", press release, September 17, available at: [www.kddi.com/english/corporate/news\\_release/2003/0917/index.html](http://www.kddi.com/english/corporate/news_release/2003/0917/index.html)
- KDDI (2006), "KDDI and Google partner to incorporate Google search into au EZ Web", press release, May 18, available at: [http://www.kddi.com/english/corporate/news\\_release/2006/0518/index.html](http://www.kddi.com/english/corporate/news_release/2006/0518/index.html)
- KDDI (2007a), "KDDI announces PC Site viewer enabled handset subscriptions exceed ten million", press release, March 22, available at: [www.kddi.com/english/corporate/news\\_release/2007/0322/index.html](http://www.kddi.com/english/corporate/news_release/2007/0322/index.html)
- KDDI (2007b), "KDDI introduces 'au one' unified portal site for au mobile phones and PCs", press release, July 30, available at: [www.kddi.com/english/corporate/news\\_release/2007/0730a/index.html](http://www.kddi.com/english/corporate/news_release/2007/0730a/index.html)
- Kunii, I.M. and Baker, S. (2000), "Japan's mobile marvel", *Business Week*, January 17, pp. 88-92.
- Lemon, E. (2001), "NTT DoCoMo's i-Mode", available at: [www.digital4sight.com/DCAS/published/iMode.pdf](http://www.digital4sight.com/DCAS/published/iMode.pdf) (accessed March 14, 2003).
- Lessig, L. (2000), "Innovation, regulation, and the Internet", *The American Prospect*, Vol. 11 No. 10, pp. 26-9.
- Lessig, L. and Lemley, M.A. (2001), "The end of end-to-end: preserving the architecture of the Internet in the broadband era", *UCLA Law Review*, Vol. 48, pp. 925-72.
- McCullagh, D. (2006), "New Net neutrality plan may ruffle feathers", June 8, *CNET News.com*, available at: [www.news.com/2100-1028\\_36081887.html](http://www.news.com/2100-1028_36081887.html)
- Natsuno, T. (2003), *The i-Mode Wireless Ecosystem*, John Wiley and Sons, Hoboken, NJ.
- Nikkei (2006), "KDDI tie up in cell service", *Nikkei Weekly*, 22 May, available from Factiva Database.
- O'Brien, K. (2007), "Forerunner of mobile Internet, i-mode is fading in Europe", *International Herald Tribune Online*, July 17, available at: [www.iht.com/articles/2007/07/17/business/imode.php](http://www.iht.com/articles/2007/07/17/business/imode.php)
- Press, L. (1994), "Commercialization of the internet", *Communications of the ACM*, Vol. 37 No. 4, pp. 17-21.

Sawhney, H. (2007), "Innovations at the edges: the impact of mobile technologies on the character of the internet", paper presented at the Mobile Media 2007 Conference, Sydney, July.

Schneider, V. (2000), "Evolution in cyberspace: the adaptation of national videotext systems to the internet", *The Information Society*, Vol. 16 No. 4, pp. 319-28.

Shankland, S. (2003), "NTT DoCoMo: 3G catching on", *CNET News.com*, June 20, available at: [www.news.com/NTT-DoCoMo-3G-catching-on/2100-1095\\_3-1019617.html](http://www.news.com/NTT-DoCoMo-3G-catching-on/2100-1095_3-1019617.html)

Softbank (2006), "Vodafone K.K. 3G subscribers top 3 million", press release, April 7, available at: [www.umtforum.org/index2.php?option=com\\_content&do\\_pdf=1&id=1060](http://www.umtforum.org/index2.php?option=com_content&do_pdf=1&id=1060)

Van Blokand, A. (2007), "Why did i-mode fail outside Japan? Was it really the walled garden approach?", *Wireless Watch*, No. 165, August 15, available at: [www.japaninc.com/ww165](http://www.japaninc.com/ww165)

Van Schewick, B. (2007), "Towards an economic framework for network neutrality regulation", *Journal on Telecommunications and High Technology Law*, Vol. 5, pp. 329-91.

Wu, T. (2003), "Network neutrality, broadband discrimination", *Journal of Telecommunications and High Technology Law*, Vol. 2, pp. 141-79.

### Further reading

Softbank (2004), "Vodafone K.K. releases V601T with Chaku-uta® and high-speed 3Dgames", press release, July 15, available at: [www.umtsforum.org/index2.php?option=com\\_content&do\\_pdf=1&id=624](http://www.umtsforum.org/index2.php?option=com_content&do_pdf=1&id=624)

Tanikawa, M. (2000), "Phone surfing for a few Yen", *New York Times Online*, August 19, available at: <http://query.nytimes.com/gst/fullpage.html?res=9B01E3D7123EF93AA2575BC0A9668B6&sec=&spon=&pagewanted=1>

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