

# NTT DoCoMo i-mode™

## Value innovation at DoCoMo

Every ten years, Japanese companies come up with a new mobile device that shakes the world. Sony's Walkman was launched in 1979 and Nintendo launched Gameboy in 1989. And in 1999, we invented i-mode.<sup>1</sup>

Mari Matsunaga

Kouji Ohboshi is a worried man. It's early 1999, and NTT DoCoMo's Chair is anxiously waiting to hear how the press conference for i-mode – his company's new mobile Internet system – has fared. He has every reason to be nervous. Although DoCoMo is a leader in the Japanese mobile industry, the market is showing signs of saturation and Ohboshi has gambled a large stake of his company's future on the development of the new system. The report arrives and his worst fears are realized: the press conference was a debacle.

The launch of i-mode couldn't have gone worse. With only seven reporters attending, i-mode's extravagant debut had fallen on deaf ears. Those journalists present were among Japan's least charitable. With the Internet boom waning, reporters were more sceptical than ever. Mobile Internet services had failed elsewhere so why should they work in Japan? Why not wait, like everyone else, for the third generation (3G) global wireless Internet protocol? Ohboshi knew that unfavourable or – worse – weak press coverage in Japan's trend-driven mobile phone market could spell disaster.

Had he made the wrong decision to shift the company's strategic focus? Were his sceptical colleagues at DoCoMo right? What Ohboshi didn't know at the

time was that in the weeks to come, i-mode would become an explosive success. Like the Walkman and Gameboy that preceded it, i-mode was to be more than simply a commercial success – it became a phenomenon. What explains this amazing success in Japan? How did DoCoMo turn a highly competitive industry with declining growth potential into an attractive business opportunity?

### NTT DoCoMo's troubled birth

NTT DoCoMo was formed in 1992 as part of a partial government break-up of the powerful Nippon Telephone and Telegraph (NTT) telecom monopoly. Formerly NTT's mobile phone unit, it was cast from the nest to take over wireless communications sales and operations as an independent enterprise. Kouji Ohboshi, an energetic 60-year-old, was the first CEO of a company whose name DoCoMo is both a play on the Japanese word for 'anywhere' and an abbreviation of 'Do Communications over the Mobile network'.

From the start, Ohboshi realized that DoCoMo had a tough road ahead. The mobile phone market was over-regulated, transmission quality was poor, subscription fees were costly and mobiles were heavy.<sup>2</sup>

1 Interview: Ms Mari Matsunaga, formerly Manager, Gateway Business Dept., NTT DoCoMo, 20 August 2001.

2 Matsunaga (2000), *i-mode jiken* [i-mode: The Birth of i-mode], Kadokawa Shoten.

This is a modified version of the original case 'NTT DoCoMo i-mode™: creating a solution for the masses' (number 05/2002-5036) written by Yasushi Shiina, INSEAD MBA 2000. Jason Hunter prepared this freely adapted version, under the supervision of Professors W. Chan Kim, Renee Mauborgne and Ben M. Bensaou. It is intended to be used as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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**Table 1** Number of regular mobile phone/PHS subscribers in Japan (millions)

	March 90	March 91	March 92	March 93	March 94	March 95	March 96	March 97	March 98	January 99
Mobile phones	0.49	0.87	1.38	1.17	2.13	4.33	10.20	20.88	31.53	39.79
PHS	–	–	–	–	–	–	1.51	6.03	6.73	5.86
Total	0.49	0.87	1.38	1.71	2.13	4.33	11.71	26.91	38.25	45.64
(Reference)										
Pagers	4.25	5.08	5.91	6.69	8.06	9.35	10.61	10.07	7.12	4.27
Fixed-line	–	54.48	56.21	57.60	58.78	59.88	61.04	61.46	60.38	N/A
Population	123.61	–	–	–	–	125.57	125.59	125.87	126.22	126.45

Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (MPHPT), Telecommunication Carriers Association (TCA), Statistics Bureau and Statistics Centre.

Moreover, there was a palpable sense that the market had reached a plateau (Table 1).<sup>3</sup> Japan's economic bubble had burst and businesses had cut back mobile phone purchases. To add insult to injury, tough new government rules forbade the fledgling DoCoMo to ask NTT for financial assistance. By the end of its first year DoCoMo was saddled with a '10 billion yen loss ... and bankruptcy was a serious threat.'<sup>4</sup>

Faced with a looming crisis, Ohboshi went for broke, setting out to expand the market by bringing cellular phones to the masses. And he did so with a vengeance. During the next two years, Ohboshi invested ¥50 billion – a large sum for a company making a loss – to bring DoCoMo's mobile network services to everyday users.<sup>5</sup> His first move was to improve DoCoMo's network. In 1993 the company launched its new revolutionary PDC (Personal Digital Cellular) standard, bringing crystal clear calls, fewer interruptions and less background noise. Moreover, PDC helped DoCoMo use its limited allo-

cation of radio spectrum more efficiently. Within a few months DoCoMo's PDC standard was adopted

<sup>3</sup> The first Japanese cellular phone service was launched in December 1979. It was a disaster. The high service fees made the telephones unaffordable to all but the wealthiest of businessmen (*salarimen*). After putting down ¥200,000 deposit and a ¥72,000 subscription fee, users would hand over another ¥26,000 in monthly fees and a call charge of ¥280 for every three minutes. Moreover, the service area was limited, the sound quality was inferior to pay phones, and you had to be physically fit: first generation cellular phones weighed 3kg and were carried over the shoulder. With the stimulation of government deregulation and subsequent technological innovations it took a full 10 years before cell phones became increasingly attractive to mass consumers. Carriers and telecom equipment manufacturers worked closely to improve both the usability of the phones and the quality of transmission. Rightly, they believed that reducing the size of handsets and extending their battery life were crucial improvements. By the end of 1998, the weight and the battery life of a standard phone reached 68g and 330 hours respectively (Table 2 and Exhibit 1).

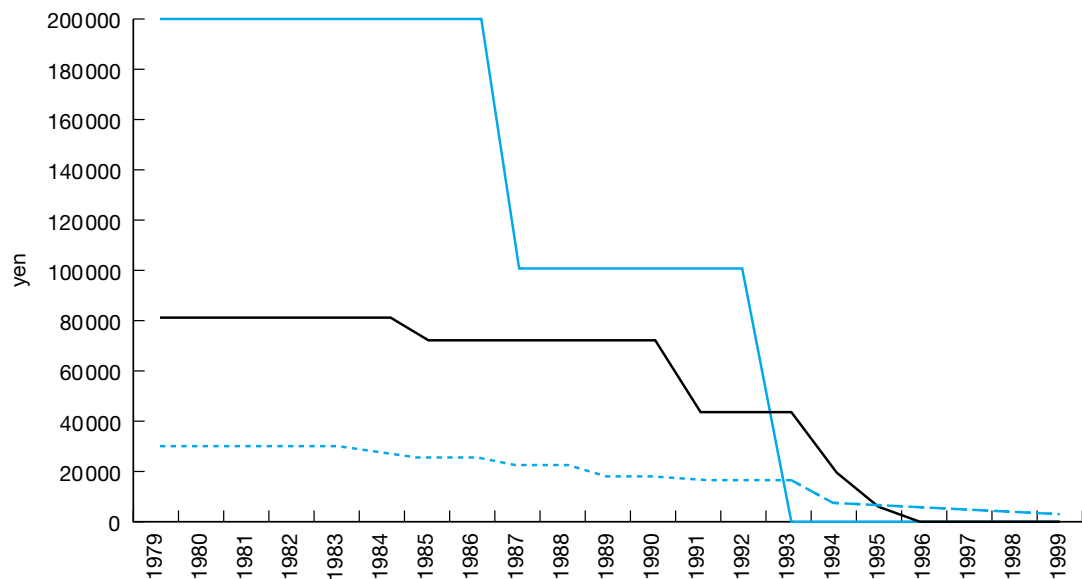
<sup>4</sup> Interview: Mr Kouji Ohboshi, Chair, NTT DoCoMo.

<sup>5</sup> Ohboshi (2000): DoCoMo kyuseicho no keiei (DoCoMo: Management of rapid growth), Diamond Sha.

**Table 2** Development of regular mobile phones in Japan

Year	Height (mm)	Width (mm)	Thickness (mm)	Weight (g)	Battery Life (hours)
1979	140	50	210	2,400	N/A
1985	190	55	220	3,000	8
1987	120	42	180	900	6
1989	175	42	77	640	9
1991	140	47	26	220	13
1994	143	49	29	185	20
1995	140	42	26	155	150
1996	130	41	23	94	170
1997	127	40	18	79	220
1998	123	39	17	68	330

Source: NTT DoCoMo, Panasonic.

**Exhibit 1** Mobile phone rates

Key:

— Deposit    — Subscription fee    - - - Monthly basic charge (analogue)    - - - Monthly basic charge (digital)

**Table 3** Wireless telecommunication carriers in Japan, January 1999

	<i>NTT DoCoMo</i>	<i>DDI Cellular</i>	<i>IDO</i>	<i>J-Phone group</i>	<i>TuKa</i>
Year of founding	1979	1990	1988	1994	1994
Subscribers (m)	22.89	5.09	3.24	5.75	2.82
Market share (%)	57.53	12.79	8.14	14.41	7.08
System	PDC	TACS (analogue) PDC CdmaOne	NTT (analogue) TACS (analogue) PDC CdmaOne	PDC	PDC
Frequency	800 MHz	800 MHz	800 MHz	1.5 GHz	1.5 GHz
Operational region	Nationwide	Nationwide – excluding Kanto <sup>a</sup> and Tokai <sup>a</sup>	Kanto <sup>a</sup> Tokai <sup>a</sup>	Nationwide	Kanto <sup>a</sup> Kansai <sup>a</sup> Tokai <sup>a</sup>
PHS operations	NTT Personal	DDI Pocket	No	No	No
Major shareholders	NTT <sup>b</sup>	DDI <sup>b</sup> Kyocera <sup>b</sup>	Toyota Electric utility companies	Japan Telecom <sup>b</sup> Japan Railways <sup>b</sup> Vodafone Airtouch <sup>b</sup> British Telecom <sup>b</sup>	Nissan DDI <sup>b</sup> Hitachi <sup>b</sup> Motorola <sup>b</sup> Sony <sup>b</sup>

<sup>a</sup> Kanto: Tokyo area; Tokai: Nagoya area; Kansai: Osaka area.<sup>b</sup> Fixed-line telecom carriers or telecom equipment suppliers.

Source: Company annual reports; Telecommunication Carriers Association (TCA); Goldman Sachs.

by competitor carriers across Japan. By December 1998, it would account for 98.7% of the Japanese market (Table 3).<sup>6</sup>

Next DoCoMo slashed prices. Its high deposit was abolished in October 1993 and subscription fees were cut in 1996. By March 1999 monthly basic charges had dropped 73%, the average charge for a three-minute call on DoCoMo falling 57.6% in the same period. Once again, the rest of the industry quickly followed suit by cutting fees (Exhibit 1). The lust for market share in the mid-90s drove carriers to continue slashing prices to rock bottom levels, even as monthly average revenue per user (ARPU) continued to sink (while monthly average minutes use remained relatively stable) (Table 4).

**Table 4** Average monthly revenue and average monthly minute of use per user

	FY1995	FY1996	FY1997	FY1998
Average monthly revenue per user (Yen)	19,720	15,930	12,570	10,800
Average monthly minute use per user (minutes)	172	170	158	155
Churn rate	1.18%	1.20%	1.66%	1.97%

Source: NTT DoCoMo.

Ohboshi also attracted new customers by reducing the size of the phones. NTT had one of the largest R&D teams in the telecom industry and DoCoMo maintained close relationships with telecom equipment manufacturers.<sup>7</sup> Ohboshi leaned heavily on

DoCoMo's engineers and its suppliers to reduce the size of phones and extend their battery life.

Although DoCoMo was feeling the effects of deregulation, it made the best of the gains offered by the new competitive environment. Within a year of Ohboshi's drastic measures, DoCoMo was still Japan's largest mobile telephone carrier, and its revenues and net income had soared.<sup>8</sup> By March 1999, DoCoMo's sales revenue ballooned to ¥3,118 billion with a net income of ¥205 billion, and market capitalization topping out at ¥11.2 trillion – about 60% of the size of its parent company, NTT (Table 5).

### The wild, wireless East

NTT DoCoMo's emergence, together with deregulation, technological innovation, price reduction and the launch of new services all contributed to the rapid expansion of the mobile phone market to mass users in Japan. In a 10-month period during 1998,

6 Tadashi Aoyagi (2000): Daisansedai keitai business: nichibeio no nerai [The third generation cellular phone business: Aims of Japan, US and Europe], Ric Telecom.

7 DoCoMo inherited from NTT close relationships with four large Japanese suppliers (NEC, Fujitsu, Matsushita Communications Panasonic and Mitsubishi Electronics), who worked closely with NTT DoCoMo to break through technological barriers. This network soon became known as the 'DoCoMo Family', since its products were sold under the NTT DoCoMo brand, and the only way to identify the manufacturer of a cellular phone was to look at the first letter of the product number (e.g. 'N' for NEC). These relationships gave NTT DoCoMo considerable advantage especially once its PDC standard was accepted as the only one in Japan.

8 It remained the nation's leading carrier; however, at times DoCoMo's market share dropped below 50% due to fierce competition.

**Table 5** NTT DoCoMo's financial performance (million yen)

	March 95	March 96	March 97	March 98	March 99
Sales revenues	806,982	1,237,176	1,962,850	2,626,120	3,118,398
Net income	16,448	21,379	28,690	120,628	204,815
Operating margin	8.4%	9.9%	10.1%	15.7%	16.3%
Net income margin	2.0%	1.7%	1.5%	4.6%	6.6%
Market capitalization	N/A	N/A	N/A	N/A	11,203,920
Number of subscribers (thousands)	2,206	4,936	10,960	17,984	23,897
Market share	50.9%	48.4%	52.5%	57.0%	57.5%

NTT DoCoMo listed its shares on the Tokyo Stock Exchange in October 1998.

The number of subscribers is for cellular phone services.

Source: NTT DoCoMo.

the market grew by an estimated 8 million users, bringing the total number of subscribers to 39.8 million in January 1999 – fulfilling 87.2% of Japan's total wireless market (Table 1)<sup>9</sup>

Competition for market share in the late 1990s was cut-throat. Deregulation continued apace and by 1998 a flood of large foreign carriers and equipment manufacturers had entered the fast-growing market as the government lifted the last remaining limitations on foreign investment (Table 3).<sup>10</sup> Competition was equally fierce in the drive to offer new services. J-Phone shrewdly targeted younger users, launching the first SMS (short message service) and information services via the J-Sky Web package. Using a similar approach, DoCoMo introduced the wildly successful 'Pocket Board,' a well-designed yet inexpensive mobile with email and game functions.<sup>11</sup>

By January 1999, the wireless market in Japan had experienced seven years of rapid expansion (Table 1), with every third person owning a mobile phone. Although the size of the market was still small compared to that of fixed lines, its annual average growth rate of 68% was astounding compared to the anemic growth (1.5%) of the fixed line market. Yet despite general optimism in the market, Ohboshi was once again getting nervous.

### After victory, tighten your helmet strap

Ohboshi's marketing background had taught him that, 'fast growth means fast maturity, and faster speed for the market to move from maturity to saturation and then to decline'.<sup>12</sup> The market was once again moving to saturation both in the number of potential new users and in capacity as available radio bandwidth increasingly limited market expansion.

It was time for action. To survive, Ohboshi believed that DoCoMo needed 'to create a new

market, not by adapting to changes but by creating the changes through positively transforming their corporate strategy'.<sup>13</sup> Ohboshi told his employees that DoCoMo had to shift from simply increasing the size of the voice-based wireless market, to creating new value for customers. Shortly afterwards, in July 1996, the company formerly announced its new strategic focus: 'from volume to value.'

### Volume to value

At the heart of Ohboshi's 'Volume to Value' focus was non-voice-based wireless data transmission. With the explosion of Internet use during the late 1990s (Table 6), DoCoMo realized that the use of e-mail and the web was quickly becoming a cornerstone of everyday life. From new market and social psychology research, Ohboshi was convinced that, 'the daily needs and wants of the people in a mature society like Japan would shift from physical goods to communication, information, knowledge and entertainment'.<sup>14</sup>

Not only did the Internet offer new opportunities for filling customer demand, it also solved one of

9 The growth in subscribers was attributed to the increase in personal users. However, churn rates (subscriber termination rates) were also increasing, showing that customer loyalty was vulnerable in the new environment.

10 Airtouch acquired a 10–15% stake in the J-Phone Group of companies and offered its technical expertise; Motorola, a US electronic products manufacturer invested in the Tuka Group of companies.

11 For their part, DDI Cellular and IDO improved the quality of transmission substantially by adopting the US-based cdmaOne digital protocol. Although these services attracted new customers, these numbers were not significant enough to boost growth or change the structure of the market.

12 Ohboshi (2000).

13 Ibid.

14 Interview: Mr Kouji Ohboshi, Chair, NTT DoCoMo.

**Table 6** Internet users and the number of commercial (B2C) Websites in Japan

	December 96	December 97	December 98	December 99	December 00
Internet users	N/A	11.55	16.94	27.06	47.08
Penetration rate in Japan	3.3%	6.4%	11.0%	19.1%	34.0%
Penetration rate in US	N/A	N/A	32.4%	42.5%	58.9%
Commercial websites	2,966	8,245	13,926	21,634	N/A
B2C eCommerce market (billion yen)	N/A	N/A	N/A	336	770

Source: MPHPT, NUA, Nomura Research Institute, Accenture.

**Table 7** Capital expenditure by carrier in Japan (billion yen)

	FY96	FY97	FY98
Fixed line NTT	1,991.2	1,886.9	1,727.9
DDI	59.7	93.4	66.5
Japan Telecom	54.2	84.6	65.6
KDD	67.9	95.2	118.2
<b>Fixed Line subtotal</b>	<b>2,173.0</b>	<b>2,160.1</b>	<b>1,978.2</b>
Mobile NTT DoCoMo	733.6	728.7	845.9
DDI Cellular	197.5	43.5	
IDO	119.5	15.4	137.6
J-Phone	181.7	182.7	166.1
Tu-Ka	84.1	57.6	42.8
DDI Pocket (PHS)	76.8	99.6	61.1
<b>Mobile subtotal</b>	<b>1,393.2</b>	<b>1,327.5</b>	<b>1,253.5</b>
<b>Total</b>	<b>3,566.1</b>	<b>3,487.6</b>	<b>3,231.7</b>

Financial year (FY) denotes the year from April to March of next year.

Source: Morgan Stanley Dean Witter (MSDW).

Ohboshi's greatest concerns: an increasingly congested radio spectrum. In contrast to traditional voice conversations that are sent via dedicated spectrum airwaves, Internet traffic is dispersed in small packets across the network to be reassembled at their destination (e.g. a user's telephone). If DoCoMo created an alternative mobile Internet network based on packet-switching technologies, it would completely circumvent the burdened voice network.

Within a year, DoCoMo was building one of Japan's first nationwide packet-switching networks.<sup>15</sup> The mobile computing team was strengthened and soon new products and services were introduced – albeit not very successfully – culminating in 1997 with the '¥10 e-mail service' (customers could send and receive 2 kilobytes of data for a mere ¥10).<sup>16</sup>

Although these early Internet initiatives were not big profit-makers for NTT DoCoMo, they created a new market by attracting customers who had never used cellular phones or e-mail before. As one of the team members involved in developing mobile computing services pointed out, 'Our intention was not to develop and introduce *new products* into the market, but to create and introduce *new ways* of using our traditional wireless services.'<sup>17</sup>

### The new wireless world

In January 1997, Ohboshi asked Keiichi Enoki, a former electrical engineer and DoCoMo's new

Director of Corporate Sales, to plan and launch a new mobile data communication service for the mass market embodying his 'volume to value' strategy.<sup>18</sup> He later reflected:

About a year after we started launching new mobile data communication services, revenues from such new services increased to constitute 5%–6% of our total revenues. With detailed marketing research and advice from external consultants, I felt a need to further boost these new services and asked Enoki, whom I trusted, to head a project specifically targeting the mass market. I assured him that he would have full discretion in choosing his staff and in using funds worth 5 billion yen, which is a lot of money.<sup>19</sup>

Enoki would have his work cut out for him. DoCoMo had a new strategic focus, but after two long years Ohboshi's team had yet to match vision with performance. Enoki had to create a winner. He was tasked to develop a mobile phone service that would advance the Internet in the

15 This system would not only ease the use of congested radio spectrum capacity, but also serve as the basis for 3G services. Despite the optimistic market expectation and technological developments, the prospects for the 3G technologies were not necessarily bright. Although similar new data communication services attracted customers (e.g. WAP services in Europe), they had not proved to be adequate enough to boost the market, and it was feared that the same might be true of 3G cellular services. The introduction of new 3G technologies would also create huge additional costs for carriers, which had already incurred more than 1 trillion yen capital expenditure over the past few years (Table 7). Furthermore, competition would increase as other international carriers competed in a single global market.

16 In addition to these measures, Ohboshi and his successor Keiji Tachikawa, (then Vice-President), set up a small project team within the Corporate Strategy Planning Department, and very soon the first proposal for NTT DoCoMo's 'Vision 2010' was drafted. The year 2010 was deliberately chosen as 'it will be the time when wireless telecom technologies will make innovations from 3G to 4G and also the period of 10 years is the longest possible for reasonable predictions to be made in a fast-changing environment.'

'Vision 2010' forecast huge opportunities for mobile telecom services in enriching personal lives and in supporting global corporate activities. In particular, it saw a greater role for mobile data services in fulfilling the needs of women, senior citizens and medical systems, important to a society characterized by a lower birth rate and an aging population. In addition to these market projections, it also emphasized the need for DoCoMo to cooperate with other companies to expand the wireless telecom market, and summarized DoCoMo's operations towards the year 2010 in five key concepts or 'MAGIC' for short (Exhibit 2).

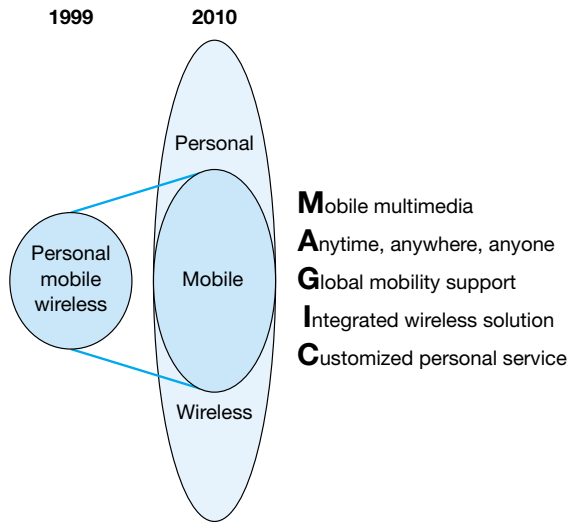
17 Interview: Mr Irukayama, Mobile Multimedia Business Department, NTT DoCoMo.

18 Ohboshi (2000).

19 Interview: Mr Kouji Ohboshi, Chair, NTT DoCoMo.



## Exhibit 2 NTT DoCoMo vision 2010 'MAGIC'



There are three words that characterize the business of DoCoMo – mobile, wireless and personal. Our aim is to make the most of the mobile communications market. DoCoMo's Vision 2010 is based on five key concepts that can be represented by MAGIC. However, MAGIC cannot be achieved by DoCoMo alone. We would like to create businesses and market opportunities through collaboration with other companies and organizations.

same way the Sony Walkman had advanced the stereo. But how?

'I got the first hints from my family,' recalls Enoki:

At that time, the pager was at the peak of its popularity. My daughter used the number pad as a form of data communication. My son could play a new computer game without reading the instructions. Their ability to adapt to new information technology and its ease of use convinced me that young people would accept a new data service that would give them the same kind of enjoyment.<sup>20</sup>

Now a believer, Enoki set out to tackle the new initiative by doing the unthinkable: recruiting new blood from the outside to lead the project. He first called Mari Matsunaga, a senior executive at Recruit Co., a job placement firm. Matsunaga was known for her marketing prowess and dramatic turnaround of *Recruit's* job placement magazine for women into one of Japan's hottest titles. She would head the content development team for DoCoMo's new service. Enoki then sought out a manager to devise a business model for the new mobile data communication

service. He chose Takeshi Natsuno, a Wharton MBA and former head of Hypernet, one of Japan's first (and most hyped) net startups.<sup>21</sup>

## Developing the Electronic Concierge service

Mastunaga set out to understand how the Internet works. What were the killer applications that provided web users with superior value? In studying the winners – such as AOL (America Online) – she found a positive correlation between the number of Internet users and the volume of content. As content increased, so did the number of users and vice versa.<sup>22</sup> Hence her conclusion: 'Content would have to be king on the new DoCoMo system.'

She also recognized that simply putting 'information' on the network would not differentiate the new service from the existing PC-based Internet, nor would it add value to users who were often lost in the sea of information on the web. Matsunaga thus envisioned a service that would function like a 'hotel concierge', where users would be 'serviced' by content providers.

If DoCoMo could make it possible for users to access pre-selected websites on the screen of their handset, then they would capture Mastunaga's concept of an Electronic Concierge. The team set out to create such a user-friendly portal to serve both as an accreditation of quality for those pre-selected 'official' sites, as well as an easy way to navigate the whole wireless web – similar to the service AOL provides its customers (Exhibit 3). Users could access other 'non-official' sites simply by typing in the URL address.

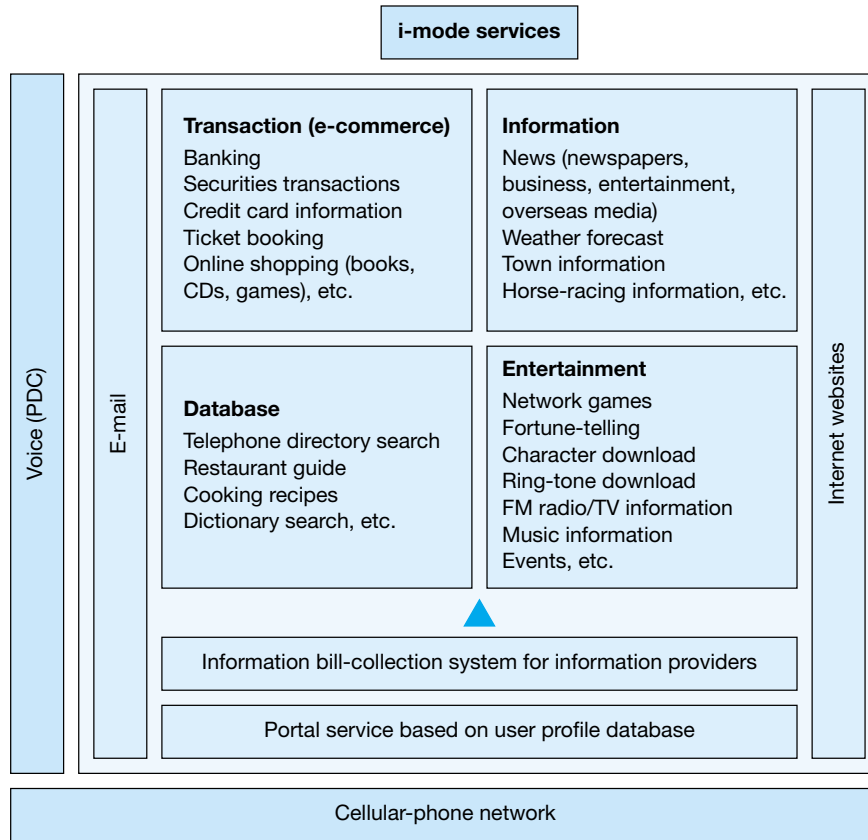
Meanwhile, Natsuno devised a business model for the new mobile data communication service based on what he saw as the 'Internet worldview' rather than the 'telecom worldview'.<sup>23</sup> The telecom worldview, according to Natsuno, is a zero-sum approach: carriers determine the standards and the services that can ride on their network, and are not interested in adapting to others' technology or in sharing profits with other

<sup>20</sup> 'A discussion with Keiichi Enoki, Senior Vice President, General Manager of Gateway Business Department, Mobile Multimedia Division' in NTT DoCoMo Annual Report 2000.

<sup>21</sup> By the time he joined DoCoMo, Natsuno had already left Hypernet before the free ISP fell from glory in a multi-billion yen crash in 1997.

<sup>22</sup> Interview: Mr Kazuhiro Takagi, Director, Gateway Business Department, NTT DoCoMo.

<sup>23</sup> Takeshi Natsuno (2000), i-mode™ strategy, Nikkei BP.

**Exhibit 3** Contents portfolio of the new service (i-mode)

Source: NTT DoCoMo.

players in the value chain. Users must accept the infrastructure and services carriers offer them.

Conversely, the 'Internet worldview' is a positive-sum approach. As the Internet is an open network that can be accessed with various devices (e.g. computers, PDAs) whose specifications are not necessarily determined by either content providers or carriers – all parties are obliged to accept one another's technologies and services. In the Internet world, consumers choose the infrastructure they prefer. Specifications are thereby *de facto* standards determined not by their technological superiority but by the fact that they are so frequently used. In the Internet worldview, Natsuno believed, carriers have to work closely with other players, including information providers, to increase the number of users.

This 'win-win' relationship among players within the network became the foundation of Natsuno's

business model. Accordingly, DoCoMo would not purchase content from providers or equipment from manufacturers but would rather accredit 'official' websites and mobile phones to be used with the new service. Interested partners would share both the risks and the rewards. Although this model restricted DoCoMo's role to simply that of a 'gateway' to the Internet, as the service attracted more users, the idea went, the network would attract more content. More content would beget more users; more users would beget more content, and so on,<sup>24</sup> thereby creating a virtuous circle where all parties benefit.

<sup>24</sup> Similarly, content providers were inspired to continuously update their sites in order to keep their official status. And as content providers improved their websites, users were able to receive more 'useful' information from accessing the network and thus, all three players on the network benefited.



**Table 8** i-mode and regular handsets

Phone	Date	Price (yen)	Weight (g)	Size (cm <sup>3</sup> )	Battery life (hours)
<i>Regular voice-based mobile phones</i>					
Digital MOVA N207S HYPER	February 1999	32,700	96	85	300
Digital MOVA D206 HYPER	January 1998	30,100	93	99	320
<i>i-mode mobile phones</i>					
Digital MOVA N501i HYPER	March 1999	42,800	115	99	270
Digital MOVA N503i HYPER (i-application)	March 2001	Open	98	NA	460
Digital MOVA N501iS HYPER (i-application)	September 2001	Open	105	NA	450

Natsuno's 'win-win' business model would also be applied to the new service's billing system. A number of the 'official' sites would be subscription-only sites requiring customers to pay fees ranging from ¥100 to

¥300 per month. Under Natsuno's plan, DoCoMo would collect all these fees as part of its monthly phone bill, take a 9% commission, and then pass on the rest to the content providers. This service would

**Table 9** Retail price per unit and market size for various goods/services (FY 1999)

Items	Average retail price (thousands)	(Yen) Market size
Weekly magazine	300	138,480
Monthly magazine	550–540	214,630
Newspapers (monthly)	3,925–4,384	72,218
TV set	97,130	434,171
Radio tape recorder	19,680	24,233
Mobile computer game (Gameboy)	8,900	23,970
Computer game software (Gameboy)	3,000–4,900	NA
Home PC	207,000–227,000	14,311
Telephone (fixed-line)	21,270	58,470
i-mode handset	35,900–42,800	–
Mobile phone (voice only)	28,200–42,800	–
PHS handset	16,700–30,100	–
Pager	6,300–13,900	3,766
TV licence fee (monthly)	1,345	–
Internet connection charge (monthly: fixed)	8,050	–
	2.7 Yen per minute	–
Telephone bill (fixed line: monthly)	8,198	–
	10 Yen per 3 minutes	–
Telephone bill (mobile: monthly)	9,270	–
	45–120 yen per 3 minutes	–
Telephone bill (PHS: monthly)	5,550	–
	30–130 Yen per 3 minutes	–
Pager bill (monthly)	2,697	–

Telephone bills are estimated from ARPU or operating revenues.

Market size of TV, radio tape recorder and home PC are estimated from their penetration rates.

Market size of Gameboy is estimated from its outstanding units sold.

Source: MPHPT, NTT DoCoMo, NTT, TCA, Dentsu Institute for Human Studies.

**Table 10** i-mode packet transmission charges

	Charge (¥)	
My menu	2–3	
Menu List	3–4	
Mobile banking (balance information)	20–21	
Mobile banking (funds transfer)	59–60	
News	17–18	
Airline seat availability	24–25	
Restaurant guide	37–38	
TOWNPAGE(NTT telephone directory)	35–36	
Share prices(searching by issue code)	26–27	
Image download (downloading one still image the size of the display)	7–8	
i-melody (downloading one 3-chord melody approximately 15 seconds in length)	2–3	
i-anime (downloading one moving image the size of the display)	10–11	
<i>i-mode mail transmission charges</i>	<i>Sending (¥)</i>	<i>Receiving (¥)</i>
20 full-size characters	0.9	0.9
50 full-size characters	1.5	0.9
100 full-size characters	2.1	1.2
150 full-size characters	3.0	1.5
250 full-size characters	4.2	2.1

Source: NTT DoCoMo.

be attractive not only to content providers who could reduce their internal cost structure, but also to users who would appreciate not having to pay several separate bills. And by giving content providers a means to charge users, i-mode would ensure that there was plenty of high quality content available.

Lastly, Natsuno recommended that the new service adopt existing widely-used technologies. For example, although there were better text languages such as WML (Wireless Markup Language), DoCoMo adopted c-HTML for its new service. With this compact version of HTML, the language widely used to create websites for the PC environment, content providers could quickly, easily and at low cost modify their PC-based websites into a new version to be displayed on the new DoCoMo service. New handsets were also developed that closely resembled existing cellular phones used exclusively for voice communication. Manufacturers were asked to reduce the size and weight of the new handsets while increasing screen size, data capacity and battery power.

## The launch of i-mode

Almost a year had passed since Ohboshi had taken the decision to develop the new mobile data communication service, and pressure was mounting on him to perform. Although NTT DoCoMo had managed to maintain its position as the largest mobile telecom carrier in Japan, the cost of developing the new data service was taking its toll on Ohboshi's credibility and threatening the financial stability of the company. Colleagues peering in from outside Enoki's group were confounded by the project. 'Why were we wasting our time and resources on unproven Internet phones, instead of concentrating on the still-growing, regular voice-based communication services?' they wondered. By late 1998, opposition to 'Volume to Value' was growing and Ohboshi was once again under fire.

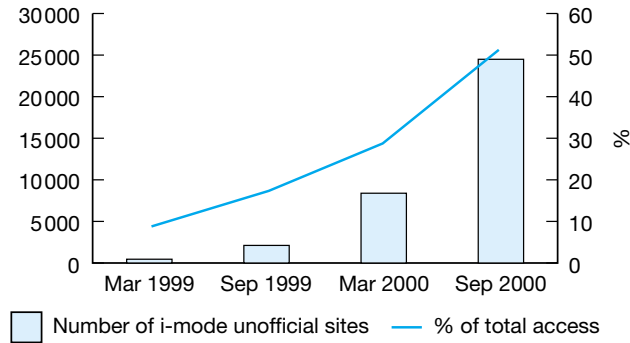
Enoki and his team finally launched the new service as 'i-mode' on 22 February 1999 – the 'i' representing 'interactive', 'Internet' and the pronoun 'I'.<sup>25</sup> Looking at the phones, a user would notice little difference from the latest models, except for a slightly larger liquid crystal display and the central feature: the i-mode button (Table 8). This connected users to the Internet, where they could send and receive e-mail, access sport scores and weather, read the news, and download pages from the web.

The new i-mode handsets were priced from ¥35,900 to ¥42,800, about 25% more than regular phones (see Table 9 for comparison with other goods/services). Users were charged ¥300 per month to access the i-mode network, and another ¥100 to ¥300 to access any of the subscription-only sites. Unlike regular mobile services, users were charged by the volume of data transmitted to their mobile phones rather than the length of time on the network. For instance, it would cost ¥0.3 per packet transmitted, and ¥4.2 to send (¥2.1 to receive) an e-mail of up to 250 characters (Table 10).

Data transmission over mobile phones would become increasingly important for DoCoMo's bottom line: as revenue from voice calls continued to fall – from an average of \$100/subscriber per month in 1997 to \$65 in 2001 – data revenue amounting to an average of \$17 per subscriber/month would increasingly fill the gap.<sup>26</sup>

<sup>25</sup> Natsuno (2000).

<sup>26</sup> 'Peering around the corner', the *Economist*, 11 October 2001.

**Exhibit 4** Number of i-mode-compatible sites.

Number of sites in march 199 is the number on 5 April 1999

Source: Natsuno (2000), p.187.

Initially 67 content providers participated in the new service, with sites ranging from banking to *Karaoke*.<sup>27</sup> In the days that followed, dozens of 'unofficial' sites sprang up, even though they were excluded from DoCoMo's official portal. A venture company developed a search engine for unofficial sites just 11 days after the launch of the new service as their number reached 190 (twice as many as i-mode official sites) within two months (Exhibit 4).<sup>28</sup>

i-mode was aggressively promoted through DoCoMo's nationwide network of shops. A how-to book on i-mode was also published, followed by over 100 books and magazines within a year.<sup>29</sup> The number of subscribers exploded reaching Natsuno's 'critical mass' of 1 million users by August 1999 (Exhibit 5).<sup>30</sup> By March 2001, i-mode subscribers

reached 21.7 million (Exhibit 6), and revenues from packet transmission services increased from ¥295 million to ¥38.5 billion within a year after launch (Table 11).<sup>31</sup> i-mode also contributed to an increase in revenue from regular voice services, even as price

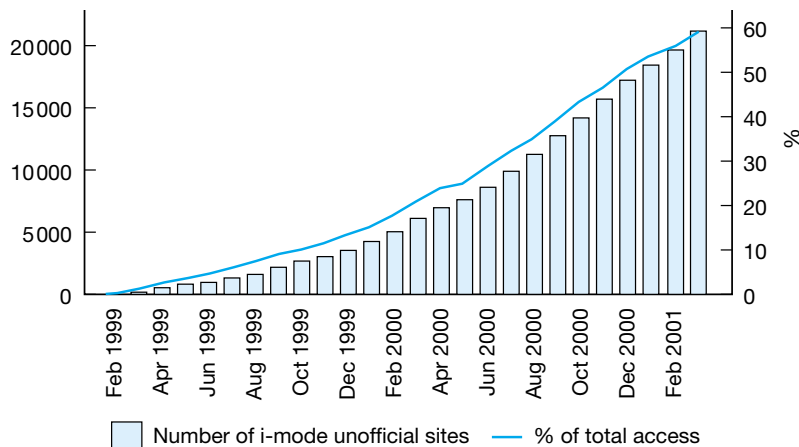
27 'Mobile internet saizensen' [Frontiers of mobile internet] in *Shukan Diamond*, 18 March 2000.

28 Natsuno (2000).

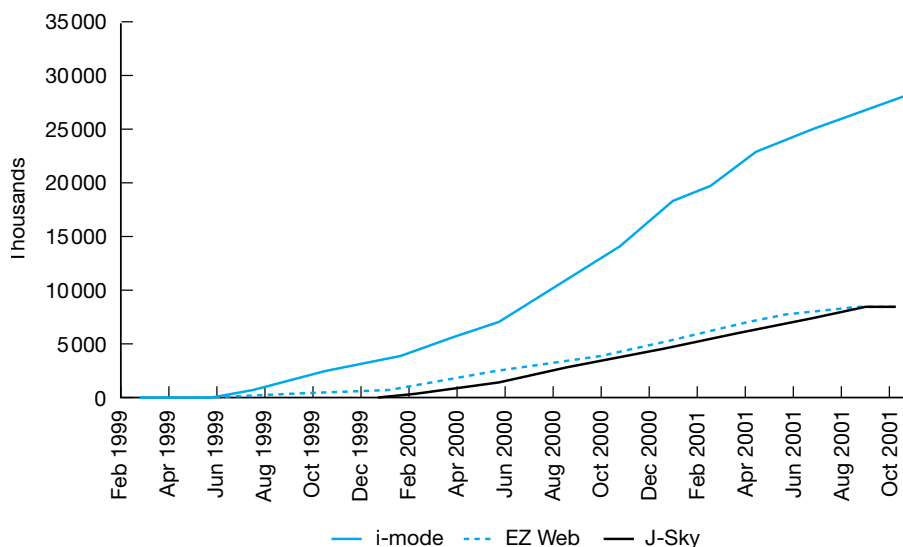
29 Ibid.

30 Ibid.

31 According to one senior official at NTT DoCoMo, 'i-mode surprisingly attracted not only young customers who were generally fond of new technologies, but also old customers who used it as a tool to communicate more often with their grandchildren. In March 2001, 27% of the total i-mode users were above the age of 40, compared to 20.3% for PC-based Internet (Table 12).

**Exhibit 5** i-mode monthly subscriber trend

Source: NTT DoCoMo.

**Exhibit 6** Number of subscribers for mobile data services on cellular phones

Source: TCA

**Table 11** NTT DoCoMo's financial performance since the launch of i-mode (million yen)

	March 99	March 00	March 01	March 02E
Sales revenues	3,118,398	3,718,694	4,686,004	5,297,000
Revenues from packet data communication	295	38,500	N/A	N/A
Net income	204,815	252,140	365,505	390,000
Operating margin	16.3%	14.7%	16.6%	17.4%
Net income margin	6.6%	6.8%	7.8%	7.4%
Market capitalization	11,203,920	40,314,960	20,977,333	N/A
Capital expenditures	845,900	876,058	1,012,795	1,070,000
R&D expenses	41,100	89,100	95,400	N/A
Average monthly churn rate	1.75%	1.61%	1.39%	1.32%
Average monthly revenue per user (ARPU: yen)	9,270	8,740	8,650	8,580
ARPU from cellular phone service (yen)	N/A	8,620	7,770	7,160
ARPU from i-mode (yen)	N/A	120	880	1,420
Average monthly minutes of use per subscriber	164	177	189	195
Number of subscribers (thousands)	23,897	29,356	36,026	40,300
Number of i-mode subscribers (thousands)	140	5,603	21,695	29,800
Market share	57.5%	57.4%	59.1%	N/A

Source: NTT DoCoMo.

competition drove down average monthly revenue per subscriber to ¥7,770 in March 2001.<sup>32</sup> In addition, the important customer churn rate began to drop from 1.97 in FY1998 to 1.39 in FY2001, while

<sup>32</sup> This increase in revenue was due to the fact that 'subscribers were using i-mode and voice-based communication services together, as they made phone calls after they searched restaurants and hotels on i-mode' ('Interview: Keiji Tachikawa' in *Shukan Diamond*, 18 March 2000).

**Table 12** Comparison between i-mode and the Internet

	<i>i-mode Internet</i>	<i>Sex of users</i>
(male:female)	57:43	58:42
Age of users (years)	Under 19: 7% 20–24: 24% 25–29: 20% 30–34: 12% 35–39: 8% Above 40: 27% Unknown: 2%	Under 19: 2.6% 20–29: 38.1% 30–39: 38.1% 40–49: 15.6% Above 50: 4.7% Unknown: 0.9%
Price	Monthly basic charge of 300 yen + 0.3 yen per 1 packet	Monthly basic charge of 1,480 yen + 8 yen per 3 minutes
Number of users (March 2001)	21.70 million	17.25 million

Prices exclude monthly basic charges for cellular phone and fixed line telecom services. Price for the Internet is based on KDDI's IP service rates.

Number of users for the Internet is the number of contracts with Internet providers excluding mobile telecom carriers.

Source: MPT, NTT DoCoMo, KDDI.

DoCoMo's market share in the cellular market climbed to 59.1% in March 2001 (Tables 4 and 11)

## Playing catch-up

Two months after i-mode's extraordinary launch, two competitors, DDI Cellular and IDO, announced their own mobile data communication services, called 'EZ Web' and 'EZ Access' respectively. Similar to i-mode, customers could subscribe to their services to access the Internet via their mobile phones.<sup>33</sup> However, with an eye towards future markets abroad, DDI and IDO asked their content providers to code their pages in HDML (Handheld Device Markup Language) used for the Wireless Access Protocol (WAP).<sup>34</sup>

Unsurprisingly, due to the costs and difficulties in transforming existing HTML-based Internet websites to EZ Web sites based on HDML, only a handful of content providers were willing to participate in the new service, driving DDI Cellular and IDO to purchase content until the number of subscribers was high enough for content providers to bear such costs voluntarily. In 2000, the two carriers merged to create 'AU (access to you)'. Although the number of DDI and IDO subscribers was much smaller than DoCoMo's i-

mode subscribers, they still remained competitive with 6.7 million subscribers in 2001 (Exhibit 6).

DoCoMo's other main rival, J-Phone responded to i-mode's success by concentrating on improving transmission quality and adding content to its existing service (J-Sky Web), and upgrading its J-Sky service so that users could send and receive large e-mail messages (3,000 characters each) and view Internet content.<sup>35</sup> As with i-mode and EZ Web, all official J-Phone sites were accessible via the J-Phone portal and classified into nine categories.<sup>36</sup> By 2001, the new J-Sky service continued to attract many new – particularly adolescent – customers, totaling 6.2 million subscribers in March 2001 (Exhibit 6).

## Without a net

As its competitors played catch-up, DoCoMo continued to power ahead in its quest for i-mode dominance in Japan. In March 1999, a month after the launch of i-mode, it formed a strategic alliance with Sun Microsystems. Through the partnership,

<sup>33</sup> In addition to Internet access, the new EZ Web service offered subscribers e-mail services. They could now send e-mails of up to 250 characters and receive e-mails of up to 2,000 characters on their cellular phones. Furthermore, DDI Cellular and IDO offered PIM (Personal Information Management) services that were not offered by their competitors. By paying a ¥100 premium for address, schedule and task list functions, EZ Web subscribers were able to use their cellular phones more like PDAs (Personal Digital Assistants). DDI Cellular and IDO initially offered these new EZ Web services by using circuit line switching technology that was also used for their voice-based telecom services. None of them had yet a packet-switching network. Thus, unlike i-mode, they charged EZ Web subscribers for the connecting time rather than for the volume of data transmitted to cellular phones (Table 13).

<sup>34</sup> DDI and IDO also asked a number of their content providers to connect directly to DDI Cellular and IDO's EZ Web servers, in order to secure confidentiality and stable transmissions.

<sup>35</sup> The amount of viewable content was also increased by allowing access not only to its own 'official sites,' but also to HTML-based Internet sites and even to c-HTML-based i-mode sites by introducing MML (Mobile Markup Language) as the language for content. MML was another simplified version of HTML developed for simple mobile computing devices by J-Phone and Keio University in Tokyo. Although it was not accepted internationally like c-HTML or HDML, it was very similar to HTML and made it easy for content providers to adapt their existing Internet websites, or even their i-mode sites, into MML-based J-Sky websites.

<sup>36</sup> In a strategy to attract younger customers, J-Phone's content focuses on entertainment. 'Keitai Denwa, PHS Kanzen Test (Cellular phones, PHS: Perfect test)', *Nikkei Trendy*, September 2000.

**Table 13** Mobile data communication services on mobile phones (September 2000)

	<b>NTT DoCoMo</b>	<b>DDI Cellular(au)</b>	<b>IDO(au)</b>	<b>Tu-Ka</b>	<b>J-Phone</b>
<i>Service</i>	i-mode	EZ Web	EZ Access	EZ Web	J-Sky
<i>Functions</i>	Internet access Internet mail transmission	Internet access Internet mail transmission PIM services	Internet access Internet mail transmission PIM services	Internet access Internet mail transmission PIM services	Internet access Internet mail transmission (J-Sky Walker)
<i>Network Platforms</i>	PDC (800 MHz)	cdmaOne (800 MHz)	cdmaOne (800 MHz)	PDC (1.5 GHz)	PDC (1.5 GHz)
<i>Communication method (speed)</i>	Packet switching technology (9600 bps)	Circuit switching technology (14.4 kbps) Packet switching technology (14.4 kbps)	Circuit switching technology (14.4 kbps) Packet switching technology (14.4 kbps)	Circuit switching technology (9600 bps)	Circuit switching technology (9600 bps)
<i>Content</i>	c-HTML	HDML (WAP based)	HDML (WAP based)	HDML (WAP based)	MML
<i>Content providers</i>	Official: 1,000 Unofficial: 24,032		Official: 368 Unofficial: 1,600		Official: 258 Unofficial: 2,700
<i>E-mail size</i>	Send/receive: 250 full characters		Send: 250 full characters Receive: 2,000 full characters		Send/receive: 3,000 characters
<i>Fee collection services</i>	February 1999	March 2000	July 2000	June 2000	April 2000
<i>Monthly basic charge (yen)</i>	300	Standard: 300 Premium: 400	Standard: 200 Premium: 400	Standard: 200 Premium: 300	J-Sky Web: No charge J-Sky Walker: 250
<i>Access fees</i>	0.3 yen per 1 packet (= 128 bytes)	First 15 seconds free and 10 yen per 30 seconds thereafter Packet comm.: 0.27 yen per 1 packet (= 128 bytes)	10 yen per minute Packet comm.: 0.27 yen per 1 packet (= 128 bytes)	First minute 3 yen and 10 yen per minute thereafter	J-Sky Web: 2 yen per single request/reply J-Sky Walker: 8 yen per message transmission
<i>Handset (nominal/real retail prices: yen)</i>	NEC N502i (39,000/18,800) Mitsubishi D209i (34,600/16,800)	Panasonic C308P (44,300/1,800) Sony C305S (45,800/1,800)		Sharp J-SH03 (42,000/9,800) Toshiba J-T04 (42,000/7,800)	Panasonic TP01 (open/4,800) Toshiba TT02 (open/4,800)
<i>Subscribers (% of market)</i>	12.6 million (64.2%)	3.9 million (16.5%)		0.7 million (3.3%)	3.1 million (16.0%)
<i>Service start</i>	February 1999	April 1999		November 1999	December 1999

Source: NTT DoCoMo, KDDI, MSDW, CSFB, TCA, 'Nikkei Trendy'.



Sun and DoCoMo developed i-appli, a new i-mode application platform that allowed users to run a wider variety of programs, from video games to online financial services on their mobile phones.<sup>37</sup> A similar strategic partnership with Symbian, a UK-based wireless operating system company, led to the development of a new operating system adaptable to both PCs and mobile phones.

On the content side, in the two years after launching i-mode, DoCoMo struck a number of partnerships with new content providers, ranging from Japan Net Bank (the first Internet bank in Japan) and Playstation.com, to AOL and Walt Disney. Furthermore, i-mode pioneered so-called machine-to-machine or M2M communications that allow i-mode users to purchase soft drinks and other sundries from Japan's huge network of vending machines. A joint venture with Dentsu, the largest advertising agency in Japan, led to the introduction of advertisements on i-mode, thereby providing a new source of revenue and attracting new content providers to the network. Through these and other partnerships the i-mode network swelled to 42,720 sites (1,620 official

and 41,100 unofficial) by March 2001.

Looking into the near future, DoCoMo had great hopes for entering the European and American markets and establishing i-mode as a global standard. In recent years, the Japanese mobile giant had been building its equity stakes in various foreign carriers (Tables 14 and 15), as well as applying for 3G licences in markets inside and outside of Japan. In January 2001, while NTT DoCoMo was announcing plans to introduce i-mode in Europe<sup>38</sup> a number of crucial questions needed answers. Were i-mode and its success easily transferable outside of Japan? Could DoCoMo make it work outside of Japan and should it use the same strategy?

Despite i-mode's runaway success, DoCoMo faced a number of key domestic challenges. Its capital expenditures continued to soar as it built its new 3G services. Network congestion and interoperability between newer mobiles and the i-mode system continued to plague the company. In March 2001, under intense political pressure, DoCoMo was forced to reduce interconnection fees to other mobile phone operators. And with Vodafone's acquisition of a con-

**Table 14** NTT DoCoMo's major overseas operations since 1999

2 March 1999	Joint test of 3G mobile communications system with Telephone Organization of Thailand and NEC
17 March 1999	Establishment of local corporation in Brazil
30 September 1999	Establishment of US subsidiaries
8 October 1999	Establishment of Joint Initiative toward Mobile Multimedia (JIMM) with 8 foreign carriers
2 December 1999	Capital investment in Hutchison Whampoa (Hong Kong)
27 January 2000	W-CDMA field trials in South Korea with SK Telecom
9 May 2000	Equity participation in KPN Mobile (the Netherlands)
27 June 2000	Establishment of representative office in Beijing, China
12 July 2000	Announcement of 3G mobile multimedia strategic cooperation with Hutchison Whampoa and KPN Mobile
2 August 2000	Launch of Japan-South Korea roaming service with SK Telecom
29 September 2000	Establishment of UK subsidiary and research lab in Germany
30 November 2000	Capital investment in KG Telecom (Taiwan)
30 November 2000	Capital investment in AT&T Wireless (US)
7 December 2000	Establishment of advisory board in US
18 January 2001	Announcement of Pan-European mobile Internet alliance with KPN Mobile and TIM (Italy)
22 January 2001	Launch of international roaming service in Europe, Asia, Africa and Oceania
7 November 2001	Agreement with KPN Mobile to transfer and license technologies for i-mode-like services in Europe
18 February 2002	Agreement with E-Plus (Germany) to transfer and license technologies for i-mode-like services in Europe (service launched on 16 March 2002)
1 March 2002	Listing of stocks on London and New York Stock Exchanges

The dates shown above are the dates of press releases from NTT DoCoMo, as of March 2002.

Source: NTT DoCoMo.

**Table 15** Other major partnerships to promote mobile multimedia services

15 March 1999	Increased level of relationships, Symbian (UK)
16 March 1999	Technological partnership, Sun Microsystems (US)
17 March 1999	Fusion of technologies, increased level of cooperation, Microsoft (US)
14 June 2000	Increased level of relationships, 3Com (US)
27 September 2000	Joint development of new Internet services, American Online (US)

The dates shown above are the dates of press releases from NTT DoCoMo, as of September 2000.

Source: NTT DoCoMo.

trolling stake in J-Phone, DoCoMo's guaranteed pre-eminence in the Japanese market came under an increasingly dark cloud. How sustainable was NTT DoCoMo's advantage and what should its future moves be?

Keiji Tachikawa, Ohboshi's successor, believed that NTT DoCoMo's future was bright. In the three years since the launch of i-mode, DoCoMo had become the only company to make money out of the mobile Internet. Its net income continued to rise to an all-time high of ¥365.5 billion in March 2001, and its market capitalization far exceeded its parent company, NTT. In the fall of 2001, DoCoMo launched FOMA ('freedom of multimedia access'), the world's first 3G mobile network capable of video-telephony

and the use of data and voice services simultaneously) while other promised 3G initiatives around the world languished. As Tachikawa said, 'Anything *mobile* in society is a business opportunity for NTT DoCoMo'.<sup>39</sup> Maybe Mr Ohboshi can finally get a good night's sleep.

37 *i-appli* is based on Sun's popular, highly compatible Java programming language. Java allows application sharing across operating systems (e.g. between Microsoft Windows and Macintosh).

38 These initiatives are in partnership with KPN Mobile and Telecom Italia Mobile (TIM).

39 'Interview: Keiji Tachikawa' in Shukan Diamond, 21 April 2001.

## DISCUSSION QUESTIONS

- 1 How would you assess the attractiveness of the telecom industry in Japan at the time of the launch of i-mode services? What would you conclude from a Five Forces industry analysis (see Exhibit 3.1, p.xxx)?
- 2 How did NTT DoCoMo create distinctive value at low cost? How did DoCoMo combine the strengths of the mobile phone and the PC-Internet? How did the value curve of DoCoMo's i-mode differ from those of the mobile phone and the PC-Internet?
- 3 Where and how did i-mode create new buyer utilities? What is i-mode's business model?
- 4 How did NTT DoCoMo make profits out of its i-mode services?