

Mobile Service Innovation: A European Failure

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Abstract

The continuing absence of innovation in Europe's mobile services industry is identified and characterised here, with such examples as mobile Internet and mobile music. Innovation failure is a critical factor leading to a lack of high-income jobs, network effects, and price reductions for data services. Most mobile service innovations have been made in Japan in 'clubs of operators' with their suppliers. Apple USA followed the same model of control with its iPhone. Conversely, a lack of this critical type of competition characterises European operators. Revenues per citizen are in some countries similar to those in Japan, but with handsets with less functions. Europe and all other regions face the challenge of competing with Japanese and US innovators. The lessons to be learned are (1) becoming aware of the situation, (2) allocating spectrum that covers a sufficient population size to allow technological competition, and (3) developing a strong customer orientation.

Keywords

Mobile telecommunications; standardisation; competition; innovation; service quality; spectrum regulation; network effects; convergence; Internet; Japan; Europe.

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1. Locus of innovation shifting away from Europe

Since GSM emerged as the world's dominant cellular network standard, many industry observers perceive Europe's mobile industry as driving innovation. However, the findings presented in this paper show that the locus of mobile innovation has shifted away from Europe and toward Japan and the US since the late 1990s.

Major service innovations such as introduction of mobile Internet, mobile email and mobile music, cellular phones with embedded digital cameras or digital TV receivers as well as handsets with Near Field Communication chipsets were first provided for the mass market in Japan. Some, but not all of these innovations spread abroad. Alongside technical innovations, Japanese mobile operators also introduced innovative business models such as flat-rate data tariffs which erased financial usage barriers and fostered uptake of the new technologies (see Table 1).

Table 1

Launch of mobile services

Mobile service	World 1st to market	2007 iPhone
Email	1998, Japan	X
WWW	1999, Japan	X
Portal	1999, Japan	X
Colour display	1999, Japan	X
Camera	2000, Japan	X
Flat rate for data	2000, Japan	X
Downloadable applications	2001, Japan	X
GPS integrated with portal services	2001, Japan	
Full-motion video	2001, Japan	X
Music	2002, Japan	X
QR code	2003, Japan	
eWallet	2004, Japan	
Zoom view	2004, Japan	X
Digital TV	2006, Japan	
Zoom/flip by fingertip	2007, USA	X

A key disruptor was the mobile Internet, which originated with Japan's NTT DoCoMo, which launched i-mode in 1999. I-mode was innovative in several respects; the most important was mobile email that could contain clickable links to websites. With European SMS, such access is inconvenient, if not impossible. Thus, i-mode allowed and fostered integration between PC and mobile Internet. The importance of Web-access from messages to content must not be underestimated for those developing content for mobile websites. At a European Parliament hearing in 2008, co-organised by one of the

authors, Sandra Baron, who led content acquisition with operators KPN and Vodafone at the time, said¹:

“If there is a killer application in Japan, it is one click to content via email.”

In North America, dominance in new radio interfaces can be seen, such as Qualcomm’s leading position in patents relevant to third and fourth generation networks (cdmaOne/2000, UMTS and LTE) as well as Intel’s introduction of alternative wireless technologies such Wi-Fi and WiMAX. Today, more data are transmitted wirelessly via Wi-Fi than with other wireless technologies (Legutko, 2010).

Finally, Canada and the US are the countries of origin of the RIM Blackberry and the Apple iPhone which are device and service combinations similar to the earlier Japanese initiatives that sparked the mobile email and Internet boom in the US and in Europe. This shows that key elements of i-mode became successful elsewhere as well.

In Europe, in contrast, an over-dependency on GSM-related technologies such as SMS and MMS can be seen, which can be perceived as an attempt to hold Internet technologies at bay rather than integrating them into the mobile technology sphere. In addition to this reliance on GSM-based technologies European operators have tended to maintain comparatively high prices for data services, in particular for messaging, at least until well into the second half of the first decade of the new century. Only with the advent of the iPhone and the gradual expansion of Blackberry services into residential customer segments has the widespread introduction of flat-fee data tariffs been observed. However, in a multi-border region such as Europe, high data-roaming fees have not yet fallen closer to cost level and are still a serious hindrance to wider mobile data usage.

From the standpoint of financial performance, the revenue streams of Japanese operators appear to be more diversified, and hence more resistant to shrinking voice revenues, than those of their European counterparts, since they have already developed non-messaging data revenues as the majority share of all data revenues. Back in 2004, Japanese operators already obtained about 80 percent of their data revenues from non-messaging services,² while in Europe non-messaging data revenues still remained at a low 20 percent of overall data revenue in 2007³.

In summary, it becomes apparent that a large number of data service innovations have been made in Japan, while a number of network and software innovations have been made in the US. Before proposing how markets outside Japan, for instance Europe, can catch up and close this 'innovation gap', it is useful to analyse why some of these innovations were made in the first place.

2. Methods

This paper is based on comparative case studies of wireless data services in Europe and Japan conducted within the framework of several research projects at the Karlsruhe Institute of Technology, Karlsruhe, Germany and the Ludwig Maximilian University, Munich, Germany. In these projects, more

¹ See Böhle, Rader, Weber, and Weber (2008).

² Today the ratio is difficult to estimate with the predominant role of flat rates.

³ Authors’ computation after the European Commission (2009).

than 80 personal interviews were conducted with key industry leaders, analysts and researchers. The lists can be seen in Haas (2006), and Weber and Wingert (2006), and included here. Methods also comprised comparative usability studies of messaging, WWW access and portal services with NTT DoCoMo, KDDI/au, J-Phone and E-Plus (i-mode), Vodafone (live) and T-Mobile (t-zones). Interim findings have been discussed at a number of venues, including International Telecommunications Society conferences and the International Round Table on Radio Diversity (Haas, Schmid, & Wiedemann, 2006; Weber, 2006; Weber & Wingert, 2006; Weber, 2007; Weber & Haas, 2008; Weber & Scuka, 2010). One of the authors also co-edited a mobile media website in Tokyo starting in 2001, which led to personal interviews with several dozen business and technology developers most closely connected with i-mode, and co-founded the Tokyo Chapter of the Mobile Monday networking organisation.

3. Causes and obstacles to service innovation

In this section, causes and obstacles to service innovation are identified by comparing the cases of Japan and Europe. First, technology competition in Japan is analysed. Later its absence in Europe will be analysed and the implications of the differences discussed.

3.1 Technological competition in Japan

From Section 1, it has become clear that most mobile data-related service innovations during the past 12 years came from Japan. Observers often report that these were created and are used there due to cultural differences (Barnes & Huff, 2003; Gómez-Barroso et al., 2010). One German consultancy, WIK, has even ruled out *any* comparison between Germany and Japan whatsoever (Büllingen, Stamm, & Naoe, 2004, p. 29f):

“Japan is less suitable as a market for comparative purposes, as a different path has been pursued there with regard to the development and the introduction of new services.”

This “culturalist view” is criticized by the authors and others (Lindmark & Bohlin, 2003; Funk, 2007; Tee & Gawer, 2009; Cosh-Ishii, 2009) who argue that national culture does not significantly hinder mobile data use. The 'killer' applications – messaging and entertainment, such as music – turned out to be the same in Japan as in Europe. With the Blackberry and in particular the iPhone, it has become obvious that mobile Internet access is becoming popular in Europe and the US among the more affluent to whom it is marketed. Furthermore, sometimes it has been said that all these services emerged in Japan because there was little private Internet use when i-mode was started. However, at the end of the 1990s, Germany for instance had a similarly low diffusion of PC Internet (Srivastava, 2001), but i-mode was not invented there. All this does not deny that differences might exist with regard to the use of certain culturally specific types of content, such as the popularity in Japan (but almost nowhere else) of *Tamagochi* digital characters, but this is the exception. One can thus conclude that the technologies and business models are not culturally dependent.

Those who have investigated the uptake of Japanese mobile data services at the start of the i-mode era early in 1999 have quickly noticed the low minimum pricing for Japanese data services (both messaging and non-messaging). Most surprising is the low cost of mobile email, which starts as low as Yen 0.9 (approximately equivalent to 1 Euro cent or 1 US dollar cent).

It must be stressed that the setting of prices as low as Yen 0.9 meant the earlier prices for pager messages were undercut by a factor of 10. In addition, for the lower price, customers got a higher-value service as the newly introduced mobile email services allowed users to send up to 500 characters (later increased to 2000) instead of 64 or 128 characters, respectively (the size limit at the time for a short message using full-width, i.e. Japanese, characters, or half-width, i.e. Roman alphabetical, characters). Also remarkable was the low monthly base fee for subscribing to mobile data services, which was similar across all operators in the Japanese market, of Yen 300 – the equivalent of about Euro 2.50 at the time. In the light of customers being offered a functionally superior product at a fraction of the price of alternative products, it is not surprising that there was massive growth in mobile email and Internet usage in Japan from 1999 to the arrival of flat rates in 2004.

Table 2

Launch of mobile infrastructure

Year	Japan	Germany
1979	NTT system	
1985		C-Netz
1988	Hi-cap	
1989	TACS	
1992		GSM
1993	PDC	
1995	PHS	
1997	cdmaOne	
2001	W-CDMA	
2004		W-CDMA
<i>No. of infrastructure types</i>	7	3

Note: The table shows that during the analogue era, Japanese mobile users already benefited from infrastructure competition through the introduction of Motorola’s TACS system.

European operators, by contrast, have continued to keep messaging prices high throughout the 2G and 3G eras. For instance, in Germany, in 2010, unless one buys discount or SMS flat rates, with many types of contracts, SMS still cost exactly 19 Euro cents with each of the four operators – unchanged from 10 years ago. One reason for keeping messaging prices high can be seen in a certain

degree of reluctance to cannibalise existing revenues by introducing packet-based pricing.⁴ Of course, erosion of prices is not in the interest of any industry, so the massive undercutting of prices in Japan raises two questions:

1. Why did Japanese operators lower messaging prices?
2. Why did no such process emerge in Europe?

i-mode

The essential reason for the two regions taking a different path of development lies in the competitive situation within the Japanese market at the time that i-mode was launched. NTT DoCoMo's decision to reduce messaging prices took place in the context of three major competitive trends:

- The potential of differentiating its messaging services, with incremental improvements in features, such as enabling new *emoji* (emotive characters used in emails), or small price reductions appeared limited. J-Phone, in particular, had demonstrated before 1999 that it was capable and willing to respond with similar incremental improvements or further price reductions: This strategy had enabled J-Phone to capture a superior position in the growing youth segment, already causing a decrease in DoCoMo's market share. Similarly, a predecessor of KDDI, IDO, started offering a messaging service for Yen 5, in 1997 (KDDI, 1997). Compared to earlier pager messaging prices, this move already reduced prices by half. Hence, DoCoMo would only be able to achieve a truly sustainable competitive advantage by launching a "breakthrough" innovation.
- DoCoMo did not have the option of differentiating itself by offering higher-quality voice services as its domestically developed PDC 2G voice network had reached capacity, making it necessary to switch to half-rate mode while competitors DDI and IDO had just adopted Qualcomm's network technology with crystal-clear quality (Tsuchiyama, 2000).
- Aggressive pricing moves of competing operators were rather common. A rapid decrease in voice service prices (and handsets) occurred in Japan as early as the mid-1990s as NTT (NTT DoCoMo's parent company) and the regulator pushed for the introduction of low-mobility voice services based on PHS technology as a cheap option to high-priced 2G cellular (see Table 2). The market entry of PHS providers increased the number of mobile service providers operating in the Japanese market from five to seven. This caused a rapid decrease in voice prices such that services could be marketed toward youth and other time-rich, cash-poor segments. Although the operators of cellular networks were able to marginalise PHS providers after a certain period of time due to better functionality of their high mobility services, price levels remained low, meaning that all cellular operators were pressurised to look for new revenue sources in order to complement falling voice revenues (Haas, 2006).

With prices for traditional voice services eroding and a limited potential for differentiating existing non-voice services, it is not surprising that DoCoMo turned towards creating new sources of revenues outside the traditional business.

As recollections from participants of the i-mode development project vividly portray, decision makers at DoCoMo were not reluctant to acquire the necessary expertise that the company lacked internally by hiring experts from outside the mobile industry – particularly experts from the print and new me-

⁴ See also Funk (2007).

dia industries, for instance Mari Matsunaga and Takeshi Natsuno (Matsunaga, 2002). One key recommendation adopted was that “the variety of information is essential”, as Masafumi Hashimoto, owner of the Suncolor printing company, advised DoCoMo (personal communication, April 18, 2004).⁵ As the variety of content is essential for overcoming the uncertainty in demand for media products, mechanisms which foster a broad variety of content services were sought.

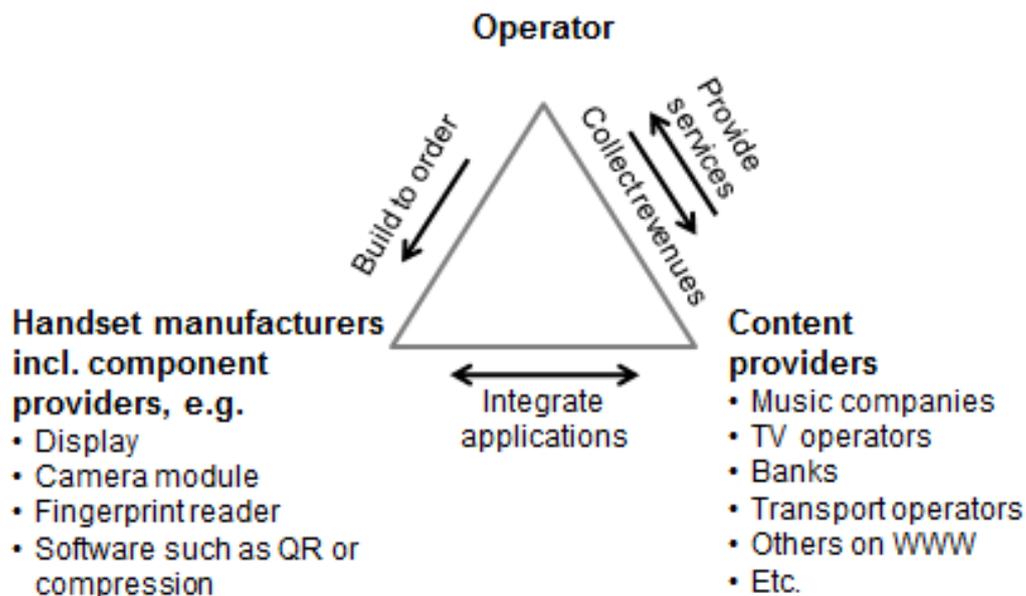


Fig. 1: Structure of a Japanese open mobile ecosystem. *Legend:* Each operator is an element of an ecosystem. Each system is open to new ideas from content companies, as well as from module providers. All ecosystems are also open to the Internet (modified after Natsuno, 2003, and Cosh-Ishii, 2009).

On the basis of this reasoning, it is straightforward to conclude that the system should be open, like IP and HTML-based PC Internet. According to the accounts given by project participants, there were quite lively discussions of DoCoMo’s position in the new content value chain. The final outcome of the internal decision-making process was the conclusion that even a large operator like DoCoMo was neither in the position to own nor to create content, and therefore a co-operative business model of sharing content fees with third-party developers in order to build up a compelling platform of providers was designed. This i-mode ecosystem was actually separated into two parts (see Fig. 1): On the one hand there was a small 'garden' of formal, operator-approved content and services in partnership with third parties. On the other hand, the system was open to the Internet so that even non-approved content could be accessed, though not as conveniently and with no subscription revenue for the operator (Wallace, Hoffmann, Scuka, Blut, & Barrow, 2002).

⁵ See also Weber and Wingert (2006).

Another key proposal brought into the i-mode project from the outside was to set prices low (M. Matsunaga, personal communication, April 20, 2004). She reckoned that high prices would forever limit the mobile data market to a few million business users. From her experience with selling print publications she knew that sales drop significantly if prices are set higher than that of a typical household consumer or women's monthly magazine. She provided the inspiration behind setting the i-mode monthly fee at Yen 300⁶:

"[At that monthly fee level] I thought it might be possible to have 10 million users. When I left [NTT DoCoMo] in March 2000, board members told me that they were grateful for having decided to price the service at 300 Yen."

With the low monthly basic rate, and messaging prices starting at Yen 0.9, financial entry barriers against using the new services were significantly diminished and usage uptake grew exponentially.

Within a year of i-mode's February 1999 launch, all Japanese cellular competitors, regardless of network technology, adopted similar business models.

DoCoMo retained a decisive lead in Japan's mobile Internet market until 2004, when competitor KDDI – enjoying superior bandwidth efficiencies due to use of the Qualcomm EV-DO network technology – introduced a carefully designed flat-rate data tariff, which DoCoMo soon had to offer as well, and this cut into the record profits enjoyed until then. With leading flat-rate data pricing, KDDI subsequently became known as the 'operator of choice' for heavy users, the youth market and early adopters, and multiple innovations (GPS-based services, mobile video, etc.⁷) were executed more successfully by KDDI and J-Phone, leaving DoCoMo – the original innovator – behind.

To summarise the analysis, intensive technological competition between mobile operators led to a business model for i-mode which offered user-friendly prices and a vast variety of content. Later, emerging competition in data pricing between DoCoMo and KDDI due to radio technology competition led further to an erosion in DoCoMo's previously dominant position and better, cheaper and faster mobile data services for everyone. This type of competition continues today, making Japan one of the most dynamic and consumer-friendly mobile data markets.

Cameras

Another example of technological competition is the inclusion of digital cameras in handsets by J-Phone, who – in co-operation with Sharp – were interested in selling displays, in particular colour ones. Again, many young people found it attractive to take pictures, although mailing them to friends did not become a significant business. But the inclusion of digital cameras became an attractive service, with only low marginal costs to the operator – around Euro 10 per handset (in Japan, handsets are sold only via operator sanction) – as expensive components such as the processor, display and battery can be shared with the phone itself. Once again, technological competition at the device level led to innovation, and all competitors had to follow suit, providing benefits for all customers.

⁶ M. Matsunaga, personal communication, April 20, 2004.

⁷ See Scuka, 2004.

Music

Another example of technological competition is the emergence of mobile music sales. Here, in 2003, KDDI had an advantage with its previously mentioned Qualcomm network. This permitted fast downloads of music at a time when DoCoMo was still struggling to get W-CDMA technology running well. Therefore, KDDI could sell high-quality music clips in close cooperation with Sony and other partners (such as Label Mobile). In 2004, DoCoMo was finally able to market fully functional W-CDMA handsets. The immediate reaction of KDDI was to introduce flat rates on 3G. This is another example of operators competing against each other on the basis of technology.

Underlying reasons

Technological competition is the major underlying factor driving the Japanese mobile industry. As described in the examples above, technological competition in Japan is characterised by the introduction of services that are well-orchestrated by mobile operators who also control the end-to-end quality of the services. As the examples further show, it is not only NTT DoCoMo that disposes of large in-house research and development resources. The smaller players like KDDI and formerly J-Phone are also capable of bringing technologically differentiated services to the market. From an analysis point of view, the approach of Japanese operators is very close to the way Apple later introduced the iPhone, in 2007. The end-consumer device itself has a superior usability, comes equipped with applications fine-tuned to the device, an “AppStore” which offers a broad variety of services and is accompanied with tariffs that allow actual use of the new services without fear of a “bill shock”.

As in the case of Apple, Japanese operators tend to launch new services on the basis of proprietary technologies and control of both the technical specifications and suppliers. Incompatibility issues between the different technologies deployed by different operators are a consequence, but are in most cases significantly diminished as variations of open Internet standards are used.

This kind of technology competition is actually not just a phenomenon of the mobile Internet era. In Table 2, as early as 1989, competition between operators using Motorola's TACS technology drove the market, which was originally dominated by Hi-cap technology, developed by NTT, the original government-owned incumbent (Tsuchiyama, 2000). This shows that Japanese operators have been familiar with technology competition since 1989.

Japanese operators' ability to launch new services based on proprietary technologies is rooted in a tight dominance over handset suppliers that cannot be observed in other markets. The innovation model is based on operators co-ordinating technology development processes and dominating decisions between technological choices. In this way, Japanese operators are able to launch all components of an innovative service including applications, handsets and network infrastructure in a well-orchestrated way.

The dominance of Japanese operators over Japanese handset vendors is a result of both historical events and strategic choices of the industry players: similar to the case of Motorola's TACS, in order to sell its CDMA technology, Qualcomm demanded access to the Japanese market in the late 1990s. This move led to the key trigger to the emergence of three large competing operator groups, each

enjoying exclusive ties to specific handset manufacturers. This key event was KDDI's (formerly DDI and IDO) decision to replace its PDC network with Qualcomm's 2G cdmaOne technology. One reason for this was that DoCoMo dominated the development of updates of the PDC standard, to the disadvantage of the other PDC-using operators. As Hideo Okinaka of KDDI put it (personal communication, April 12, 2004):

“We found DoCoMo used their technological advantage as the virtual inventor of the PDC standard in differentiating themselves from competitors, therefore we decided to use cdmaOne.”

The Japanese regulator did not challenge the decision to deviate from the national PDC standard, and permitted the roll-out of CDMA in Japan. This permission, in turn, stabilised the already existing ties between Japanese operators and specific handset manufacturers. NEC, Panasonic, Fujitsu and Mitsubishi, who mainly supplied DoCoMo but also had a business relationship with IDO and DDI, were not willing to invest in the development of CDMA-compatible handsets and stopped supplying IDO and DDI.

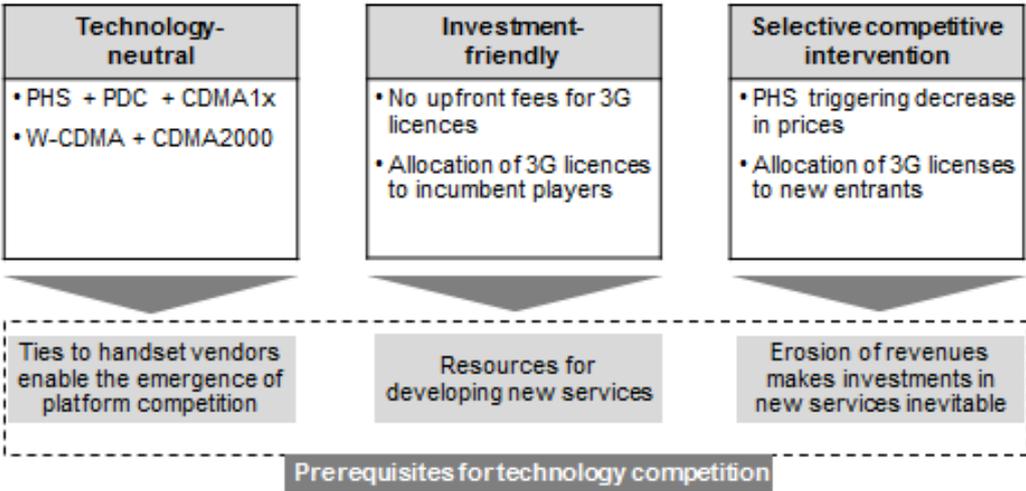


Fig. 2: Japanese regulatory actions as an enabler of technology competition.

Conversely, Casio, one main supplier of DDI, but also a supplier to J-Phone, stopped developing PDC handsets, and shifted towards exclusively supplying CDMA handsets to IDO and DDI. Sharp, who were a supplier of PDC handsets to J-Phone and DDI/IDO at the time, decided against developing CDMA handsets and became a main supplier to J-Phone (which also used domestic-standard PDC network technology), together with second-tier handset makers such as Toshiba. A merger between IDO, DDI and KDD to form KDDI (which provides mobile services under the 'au' brand) completed this trend, leading to three groups of exclusive handset suppliers led by one network operator each, who competed fiercely against each other.

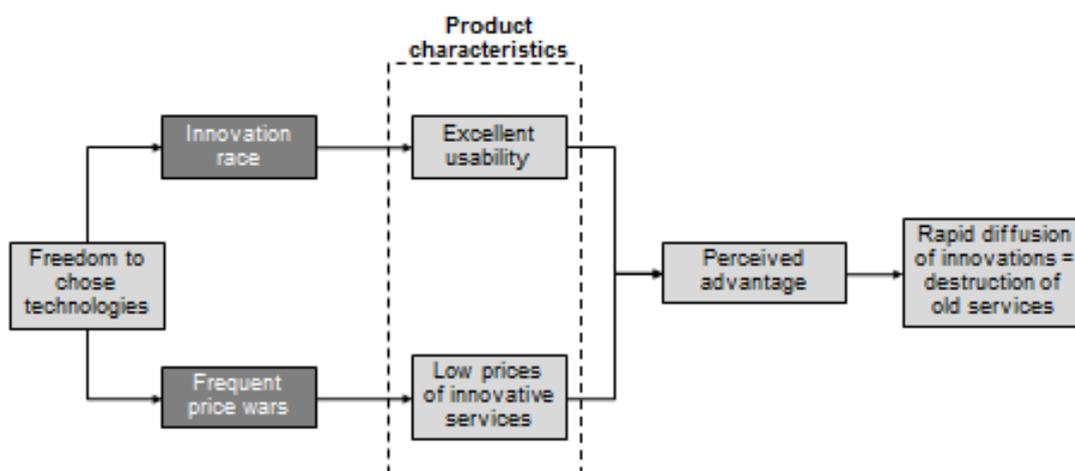


Fig. 3: Factors driving the rapid diffusion of innovations.

Furthermore, market development was supported by radio-spectrum regulation policy (see Fig. 2). Under a 'Command & Control' regime, Japanese operators had free resources to invest in the development of innovative services, as the regulator opted for a small revenue-based licence fee scheme and did not require up-front payment for licences. Of course, conducting beauty contests and having profitable operators are not a sufficient condition for innovation.⁸ Still, avoiding auctioning was a conscious decision by government economists to support the industry (Oniki, 2006, p. 114; similarly, for South Korea, Choi, Kim, & Kim, 2001, p. 45). Market development was also supported by the introduction of cheap non-cellular PHS services, as well as by providing additional 3G licences, in 2005, which led to the emergence of a new competitor, Emobile. The effect of these radio policy decisions was to put pressure on prices, while at the same time forcing market players to move faster. There are indications that government decision makers were motivated by the desire to bring prices down in favour of consumers, however, this has not been investigated in detail.⁹

An additional factor that supported market development is the comparatively high quality and usability of new services introduced in Japan. According to interviews with experts who know both Japanese and European markets, Japanese operators provide a very high level of service. With every launch of a new mobile service, the data service, the handsets and the network work with each other seamlessly, and the consumer never needs to configure anything after taking the handset out of the box (see Fig. 3). The service co-ordination can be seen in, for example, the launch of Java-based 'i-Appli' content services on i-mode in 2001. Beforehand, NTT DoCoMo worked intensively and exclusively with a handful of third-party Java application developers to ensure that an attractive library of

⁸ France and other countries have used beauty contests instead of auctions, but this did not lead to more innovations (with thanks to a reviewer who pointed to this).

⁹ The Ministry of Internal Affairs and Communications made a rule, in force since 2008, according to which operators must inform the customer of the actual handset price separately from the contract price. Operators must offer a monthly contract fee without any charges for a handset. Apparently, as a consequence, the handset market has shrunk. Between 2000 and 2007, annual shipments were about 50 million handsets, which dropped to about 2/3 since (JEITA, 2010).

useful i-Appis would be fully compatible, tested and available for download on the day that the i-Appi handsets went on sale (Scuka, 2001). Other examples are that Sharp and Mitsubishi had to improve their handsets to have them accepted by the operators, ahead of their launches (Haas, 2006).

It remains difficult to answer the question whether this quality consciousness is rooted in “culture” or if it is a consequence of competitive pressure. Japanese companies generally enjoy the reputation of having a high focus on quality – particularly the Japanese car industry in which many quality management tools originated (Kaizen, etc.) – an observation one could use as evidence of the quality consciousness having cultural roots. In this vein, some of the experts interviewed linked quality consciousness to an attitude of creating “peace of mind” for the customer, called “Anshinkan” (Tsuchiyama, 1999; Shimada, personal communication, April 16, 2005). Other interview partners pointed out, however, that because competition is as tough as in other globally competitive industries, Japanese consumers learned that they could demand better quality.

In summary, one can conclude that creative destruction takes place when operators work in an environment of ubiquitous uncertainty,¹⁰ in which they never know what innovation their competitors might bring up next. Every Japanese operator faced the experience of competitors continuously trying to outsmart them in terms of service or handset features, or to undercut prices.¹¹ This intense competition has led to Japan becoming the world’s leading mobile data market.

3.2 Underdeveloped technological competition in Europe

In contrast, in Europe, technological competition between operators can only be observed to a very low degree. Of course, European operators introduce new services, sometimes 'cherry picking' the most rewarding portal services discovered in Japan, for instance music and picture messaging, but these new services are primarily based on common standards (MMS) (Scuka, 2003). Both WAP, Europe’s initially planned mobile equivalent to the Internet, and Multi Media Messaging were based on a common industry standard. The latest example of this rather community-based innovation model is the announcement of 24 operators to establish a Wholesale Applications Community whose aim is to encourage open standardised technologies for the development and deployment of mobile applications (WAC, 2010).

Among Western operators, Vodafone can possibly be perceived as the one that actually attempts to establish service ecosystems comparable to the approaches of Japanese operators. Following *Voda-*

¹⁰ The process is truly one of creative destruction, as Willcom, the only remaining PHS operator (though supported by venture capital investor Carlyle), faces bankruptcy, as of 2010. PHS seems unable to compete with the ultra-low prices for superior mobile data services and content that the cellular competitors could provide by the end of the first decade of the 21st century.

¹¹ When Vodafone Group bought J-Phone in 2001, it aimed at learning first-hand lessons from new services, how to specify new services, and, at the same time, intended to introduce these Japanese products as a cheap global standard. Perversely, this led to the effect that their Japanese services became less innovative, as they in fact forced their customers to accept less innovative global-standard devices and services. Admitting failure, Vodafone abandoned its attempt to keep pace with Japanese innovation and sold the fading rump of J-Phone to Softbank in 2006.

fone live the company introduced a new semi-proprietary service in the autumn of 2009, an ecosystem revolving around social communities and mobile applications called *Vodafone 360*. However, as Vodafone has also joined the Wholesale Applications Community it will probably integrate further development of *Vodafone 360* into the activities of the community.

Another difference between Japanese and European operators can be observed in their approach towards pricing: When European operators introduced the mobile Internet in 2002, messaging prices were not lowered as in Japan. KPN/E-Plus even intended to *raise* them, as visible from advertisements, though the uptake of i-mode was so low that they did not do so and maintained the lower, introductory prices. Operators were extremely careful *not* to destroy the existing (and very profitable) SMS market. Similarly, Vodafone with their *Vodafone live* service did not push mobile email, in both senses of the word: email messages were neither pushed onto handsets, nor was their usage pushed through attractive pricing. *Vodafone live* was even designed *not* to let users click on web links in emails, in order to force users to use portal services.

Key industry decision makers were sceptical as to whether the journey to Internet standards would lead to higher revenues. Eelco Boers, responsible for i-mode with KPN/E-Plus, remembers (E. Boers, personal communication, May 19, 2005):

“In practice people have different beliefs. And if you don’t believe in data services, then it’s logical to argue that you should not cannibalise your SMS revenues. In that situation, where people do not fully believe in the capabilities of i-mode, you have quite some discussion within the company about: How is the right way to go forward? And what comes out is a sort of compromise, and this is not always very understandable by customers.”

In the early days of the mobile Internet in Europe, these differences in the approaches had severe consequences: The reliance on an open standard in which many parties could influence the decision over technological choices led to content being introduced before compatible handsets were brought to the market and to handsets which regularly failed to display content. This in combination with high prices for email messages makes it unsurprising that the mobile Internet did not take off in Europe.

In the European environment, operators appear to accept or maybe have to accept lower quality standards than their Japanese counterparts: Messages did not arrive, handsets needed to be configured, links could not be clicked on, etc. As one Japanese expert put it, he would feel “ashamed” if the user interface was not consistent, a hint at the Japanese quality orientation. T-Mobile’s CEO of the time, René Obermann was aware of such issues as he put it at a public event (Petersberg, September 14, 2004):

“The quality of the services is not good enough, there is a need to configure services.”

Underlying reasons

Funk argued, in this journal (Funk, 2007), that the European operators have a different “mental model” from the Japanese. He assumed that the European operators were more geared toward business

users, while the Japanese targeted youth more. However, this remains superficial. One reason is that the orientation towards youth is much an effect of competition, as shown in Section 3.1. More importantly, it can be noted that market leader, DoCoMo, had the same mental model as European counterparts in the 1990s when packet-switched services were introduced. It was also believed in Japan that mostly business users would buy the new service. McKinsey, DoCoMo's outside consultant for the design of i-mode, recommended focusing on business customers (Matsunaga, 2002). When DoCoMo introduced a PDA-like device with its *DoPa* data service in the 1990s, only some 10,000 units were ever sold (M. Matsunaga, personal communication, April 20, 2004). It was because these services did not sell and because of J-Phone's success and pressure, i.e. the different market set-up that, as suggested by Matsunaga, DoCoMo changed its mental model, addressed the general public and reduced prices.

Table 3

Monthly data revenue per capita in key countries, USD.

Source: Authors' computation based on data from Bank of America and Merrill Lynch (2009).

Country	Data ARPU per capita		
	2007	2008	2009
Japan	13.13	17.42	20.43
USA	7.48	10.04	12.85
United Kingdom	13.36	14.88	13.02
Italy	8.56	10.84	9.79
France	6.02	8.16	9.29
Germany	6.05	7.77	7.34

The figures are for the 2nd quarter and include revenues from the use of mobile phones, laptop computers, etc. The figures are not entirely comparable, as the figures for Japan do not include revenues from PHS, which is used for accessing the Internet from PCs.

Two factors can explain why European operators stick to their established "mental models": a) pursuing service innovations in the Japanese way is extremely costly and b) the "traditional" way of doing business is still highly profitable.

One reason for European operators not pursuing service innovations based on proprietary technologies and taking care of a good end-to-end usability of new services is their lack of control over handset suppliers. In the 1990s, the GSM system was a system with many operators and few manufacturers, which meant that operators had a weak bargaining position towards the manufacturers.¹² The handset manufacturers themselves are interested in selling large volumes of standardized handsets to many operators in order to exploit economies of scale. If operators wished to procure non-

¹² See Haas (2006, p. 136ff) for details.

standardized handsets, this would have required compensating manufacturers for the extra cost of specifically developing or at least customising the devices.

Table 4

Data use by mobile subscribers, in percent, 2006.

Sources: m:metrics (2007); for Japan: A.T. Kearney and University of Cambridge, 2004.

	UK	Italy	Spain	Germany	France	US	Japan
Sent Text Message	86	85	84	80	71	38	3
Used email	7	9	9	6	6	8	82

Figures for Japan cover 2004.

One reason for not making investments in customised handsets is that Western European operators are still highly profitable without doing so. If one calculates Average Data Revenue Per User (Data ARPU), it becomes apparent that European operators are notably behind Japan. However, this calculation approach can be misleading. The Japanese typically do not own more than one phone, and also do not use prepaid phones very much. In contrast, Europeans may own several handsets, which inflates the number of subscribers. However, owning more than one handset does not necessarily mean that their owner spends twice as much on using them. For countries with mobile penetration above 100%, calculating data ARPU per capita can provide a more accurate picture of mobile phone users' willingness to pay. This reveals that maintaining the model of selling both SMS, premium SMS and MMS, as well as Internet services, can be quite rewarding, as Table 3 shows (see Table 4 for the use of SMS and email). Some European countries get relatively close to Japan in terms of data revenues per capita, while Germany and France have a particular low uptake of data services. Therefore, the European operators do not need the advice to earn money from mobile email and entertainment, as Funk recommended in this journal (Funk, 2009).

The above evidence shows that the European operators did not have a "startup problem" with triggering the mobile Internet (Funk, 2007). On the contrary, it may rather have been an economically sound decision to stick with the SMS paradigm. To answer this question perfectly would require comparative data on the investments necessary for either model in both areas, and these are not available to the authors.

3.3 Implications

Up to now, the European mobile industry's innovation model that revolves around open standards seems to have its advantages. But what about its disadvantages? The case of the mobile Internet suggests that advantages and disadvantages of open standards have to be seen in dynamic perspective. In an environment where interfaces between the modules of a system product, i.e. browser,

content, and mobile phone are not fixed and still in a state of fluctuation the open standard approach can lead to lengthy negotiation processes between participants of the joint innovation attempt – to quote Kei-ichi Enoki, then Executive Vice President of DoCoMo (K. Enoki, personal communication, April 23, 2004):

“The business is slowing down if one agrees on standards first.”

In the case of WAP the negotiation process was even prematurely ended as interfaces were not fully specified, for example, leading to WAP handsets being launched but failing to display WAP content. This in turn can have negative implications for European operators themselves: The failure to agree on high quality interfaces opened the opportunity for industry outsiders to gain the lead over the innovation process and push operators increasingly out of the driver’s seat. Blackberry, for example, would probably not be as successful at offering mobile push email services if Western operators had been able to offer the same services as their Japanese counterparts. Furthermore, being slow in creating a mobile Internet ecosystem consisting of user-friendly devices and broad content variety opened a window for Apple to introduce the iPhone, to create a mobile Apps industry, and to exclude mobile operators from gaining a share in the revenues generated by this new industry.

Ironically, Apple’s success is based on its traditional focus on closed and proprietary technologies – an innovation approach which is very common to those of the Japanese operators:

- Control over technical specifications to make services, networks and handsets work with each other smoothly and seamlessly.
- A provision of a semi-'walled garden' with quality tested applications. Many of these are simply data applications as on the PC web, but adapted to the small touch screen.
- Nurturing an application-developer community based on promoting applications through the pre-installed Apps Store and revenue-sharing business model.
- Openness to the Internet.

In short, like Japanese operators, Apple created an ecosystem and controls the user experience, as Yusuke Kanda at the Radio Diversity Round Table put it (Weber & Scuka, 2010). Christoph Legutko of Intel added: “Apple is like an operator without a network” (see Weber & Scuka, 2010). Apple even interfered in the tariff definition of mobile operators by specifying that iPhones should be launched together with appropriate flat-rate data tariffs.

Putting the question of disadvantages into a wider perspective, it is clear that the locus of innovation is shifting away from Europe to other regions in the world, and along with these innovations also the high-value adding and high-income jobs¹³. While Japanese companies excel at identifying new services and developing new components, such as displays and cameras, and US Internet companies excel in software and silicon development and with radio interfaces, European companies are gradually losing their influence on technological trends in communications.

In Europe, the “highly centralized approach foregoes the benefits of competition in research and development” (Gandal, Salent, & Waverman, 2003; Farrell, Schapiro, Nelson, & Noll, 1992). Gerald Brock, formerly with the FCC, pointed to some difficulties of getting clear results when researching

¹³ See an analysis of the iPod by Linden, Kraemer, and Dedrick (2007).

such a question (G. Brock, personal communication, August 24, 2004): “The essential question is whether the coordination and economies of scale benefits of utilizing a single standard outweigh the *innovation-retarding effect* of requiring all carriers to conform to the standard.”

How can the benefits of invention be weighed? For industrialised countries, taking the path of low innovation and high prices does not seem attractive, as the initial problem analysis has demonstrated. If one wants, however, the kind of innovativeness seen with the US Internet firms and the Japanese electronics giants, what can be done in Europe?

4. Proposals

Europe, or in fact any other region or country which would like to participate in the global race for mobile innovations, should become aware of the ‘gap’ in terms of mobile Internet use and innovation with regard to services and technologies. In order to catch up with Japan and the US, it would be necessary to:

- Be aware of deficits, investigate the causes of innovation and the lack thereof, and generate conclusions based on an analysis.
- Introduce greater technological competition, be it radio technologies for licensed use, terminal technologies, or technologies for new forms of spectrum management, e.g., a commons approach that uses innovative anti-congestion methods (Weber & Scuka, 2010; Bohlin, Blackman, Forge, & Renda, 2007).
- Create a large enough market space to attract innovative service providers, such as a new competitor, or one reconsidering specification processes. For Europe, there should be licences covering at least the EU countries, for achieving economies of scale in the production of equipment.
- Service-providers must develop a better customer orientation. This might be developed for instance by awareness, public discussions, or shareholder action. In fact, its increase might be supported by more technological competition.

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