

Comment

Operators at crossroads: Market protection or innovation?

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Abstract

Many today believe that the mobile Internet was invented by Apple in the USA with their iPhone, enabling a data-driven Internet ecosystem to disrupt the staid voice and SMS business models of the telecom carriers. History, however, shows that the mobile Internet was first successfully commercialised in Japan, in 1999. Some authors such as Richard Feasey in *Telecommunications Policy* (Issue 6, 2015) argue that operators had been confused and unprepared when the Internet emerged and introduced “walled gardens”, without Internet access. This comment article reviews in detail how the operators reacted when the fixed, and later the mobile Internet spread; some introduced walled gardens, some opened it for the “unofficial” content on the Internet. The article concludes that most large European telecom and information technology companies and their investors have a tradition of risk avoidance and pursued high-price strategies that led them to regularly fail against better and cheaper foreign products and services, not only when the wireless Internet was introduced, but also when PCs and the fixed Internet were introduced. Consequences, such as the need to enable future disruptions and boost the skills needed to master them, are presented.

1. Introduction: uncovering the success factors

In recent years, since the advent of the iPhone and the similar Android smartphones, there has been a widespread perception that modern mobile data services, with their downloadable apps, Internet access, content billing models, etc., were invented in the USA. This perception exists in popular media as well as in scientific debates.

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However, those who have studied the often opaque Japanese mobile market know that key mobile data services were invented and marketed successfully before, starting as early as 1998 in Japan. This is only known, however, to two fairly small groups of people. First, there are those who participated in the early debates about NTT DoCoMo's i-mode and similar services from the competing domestic operators, J-Phone and KDDI. Naturally, many Japanese observers knew about the new services and how and why they were pushed to market, as well as Western experts, analysts and media then sitting in their "watchtowers" in Tokyo, working diligently to uncover what was happening despite almost all crucial information being available only in Japanese.

A second group of people comprised scientists worldwide who were analysing Japan's emerging mobile Internet ecosystems, but often only at a remove, being forced to rely on the English reports generated by those on site. Some of these read reports on mobile data services, reading documents ranging from contemporary publishers such as Tsuchiyama (2000) to, much more recently, Weber et al. (2011). Most others in Europe or the US came across the new mobile data services only when Apple introduced them world-wide with big fanfare and so may not have thought to dig into history or to look across the Pacific to check whether the data-driven iPhone Internet ecosystem might have been invented before.

However, history is hugely relevant for those who wish to understand why neither the then-leading European GSM operators and manufacturers, nor the Japanese with their advanced and domestically proven services and handsets, succeeded globally.

In a recent issue of *Telecommunications Policy* (Issue 6, 2015), Richard Feasey, the former Public Policy Director of the Vodafone Group, argued that the (European) telecommunications industry reacted with "confusion, denial and anger" to the challenge posed by the advent of the Internet, that it had been "unprepared" to respond and that it had been "denying the disruptive power of the Internet" (Feasey 2015). In reaction, it introduced "walled garden" services, which failed. Because of these missteps, he argued, the industry would now have to search for ways to increase their prices to maintain reasonable profits vis-à-vis the US Internet companies.

In this comment article, the authors will highlight that the European companies have a long tradition of failure, resulting from factors such as risk aversion and the anxious pursuit of selling data services as expensively as possible. They avoided competition at the level of technology, in contrast to the situation in Japan, and established the mobile "walled gardens" of the early 2000s.

These did not mimic the Japanese mobile Internet and (semi-walled) gardens, but instead were deliberately crippled in order to avoid cannibalisation of SMS revenues. It is no surprise that the successful companies today are not European ones since the Europeans did not develop any successful consumer data services beyond SMS. The Japanese providers, however, did not market their successful domestic services abroad in a sufficiently bold way. Later, Apple was able to copy the Japanese service model, create their own garden (apps, iTunes,

etc.), open their system to the Internet, and boldly market the resulting package on a global scale.

The article will end with conclusions for investors, companies, the public and policy makers regarding the approach needed to perform better risk management and to embrace competition.

2. Crippled vs. noncrippled wireless data services

This section provides a review of Feasey's analysis of mobile data services. He wrote: "...the era of the 'walled gardens', when operators, particularly mobile operators, sought to drive users towards their own Internet portals on which they hosted content and other services. The leader of this effort was NTT DoCoMo of Japan with I-mode, which was exported to Europe and inspired similar attempts, including Vodafone Live!, which launched in 2001. This strategy, however, quickly collapsed. Google's search engine was too good at navigating the web and what users found there was too interesting for them to be corralled behind the walled gardens of the telecommunication operators. Operators claimed that their services were safer and more secure and that users could easily get lost or defrauded on the Internet."

As will be shown, this summary is not a full description of what happened, but an abbreviated one. In order to demonstrate this, one must analyse single statements. To do this, it might be easiest to go through the facts in historical order and on a service-by-service basis.

For framing the analysis, past business publications and scientific research on the emergence of the mobile Internet and the walled gardens should be reviewed briefly. They can be grouped as follows.

There was an initial review of i-mode and competing, fairly similar, offerings in Japan, with services such as mobile e-mail and browsing, mobile applications, mobile music, integration of camera modules, etc. In these first reviews, the profitable innovations were appreciated, the impression given that these show the future of mobile data services, and their introduction elsewhere was recommended. Examples of this type of review were Ratliff (2000), Baker/Megler (2001), Funk (2001), and, from the business side, there were books by the insiders Matsunaga (2002) and Natsuno (2003) as well as articles in Business Week (2000) and by Hess (2004). There have been others who argued that the European approach is superior, e.g. Büllingen et al. (2004) stating that the Japanese market is not suitable for comparison because a different path is pursued, and Eberspächer (2007) stating that instead "we are leading in SMS".

In parallel and later on there has been a strand of discussion which addressed the causes which led to the invention of these Japanese data services. Examples are Tsuchiyama (2000),

Haas/Waldenberger (2003), Bohlin et al. (2004), Weber/Wingert (2006), Weber (2007), and Weber et al. (2011).

Furthermore there are US-centred views, which use the iPhone as their starting point and do not perceive its services as copies of Japanese services, such as West/Mace (2010) and Maz-zucato (2013).

The reader may conclude that different authors wrote different histories. The discussion below is aimed at reviewing Feasey and other authors using facts as close to historical developments as possible, referring to observations and analyses from the above authors.

Before continuing, it must be conceded that, for anyone outside of Japan during the launch and ascendancy of the i-mode model, roughly 1998-2005, obtaining accurate information that was adequately framed for analysis in the context of Western business culture was a major challenge. Almost all crucial information was available only in Japanese, framed according to the complex business practices of a dynamic and hypercompetitive mobile market driven by churn. Product, service and device information was often framed so as to maximise sales, with only a passing nod to clarity and completeness.

Despite the carriers publishing, for example, retail monthly sales magazines in English, certain critical elements of the i-mode model were not loudly touted. Foremost of these was the widely known fact that any of the new Japanese data handsets could access any URL in the open Internet, i.e. that i-mode and the other carrier platforms were in fact semi-walled gardens (this is amplified below). For obvious reasons, carriers were at pains to downplay this, while at the same time enabling profitable ecosystem services (such as supporting billing for content not otherwise allowed on the official platform), to flourish.

i-mode in Japan

NTT DoCoMo i-mode was first, but their strategy did not collapse at all. While it contained a “garden” offering operator-approved content, it was not so much walled, as it also offered open access to the Internet for browsing and the use of e-mail.

Popular unofficial sites included Manga comics, adult content and *deai* dating services. Therefore, Baker and Megler (2001) called it a “semi-walled garden”. E-mail was essential for two reasons. DoCoMo priced it cheaply, so that it cost about 1 Yen to send an e-mail (approximately 1 €-cent). This made it possible for it to advertise its low price compared to competing, SMS-like services. Second, e-mail had the advantage that users were able to send links to interesting official or unofficial services to each other. “Sandra Baron, who led content acquisition with operators KPN and Vodafone, said: ‘If there is a killer application in Japan, it is one click to content via email’” (Weber et al. 2011). For Japan, in 1999, this service was very convincing and a success in terms of revenues and profits (Ratliff 2000, Weber et al. 2011, Business Week 2000). Japanese operators around 2003 had world record ARPUs (av-

erage revenue per user) of about €60/month. Thus the strategy neither collapsed, nor was the service restricted to safe content.

DoCoMo's competitors in Japan quickly responded by adding then-new features such as cameras (J-Phone 2000) or music (KDDI 2002, cf. Table 1). Since 2001, when downloadable Java applications became available, one can safely call the handsets “smartphones”.

Table 1 Introduction of mobile innovations in Japan and in Germany

	Japan	Germany	Delay
Packet switching	1997	2000	3 years
E-mail	1998	2002	4 years
Browsing	1999	2002	3 years
Cameras	2000	2002	2 years
Music	2002	2004	2 years

Source: Weber 2007

i-mode in Germany

DoCoMo sought to repeat the success of i-mode in Europe and bought a minority share in the Dutch operator KPN. However, the i-mode in Europe was not identical to the Japanese form, as shown in Weber et al. (2011). For instance, KPN partner E-Plus introduced an only somewhat similar service in the largest European market, Germany. It was open to the Internet and had a “garden”, which also comprised adult services such as access to the magazine *Playboy*. But two essential characteristics were different: e-mail was priced higher than SMS, according to flyers distributed in 2002 when the service was introduced. Also, the use of e-mail was not encouraged, but buried several steps deep in the menu in order to protect SMS revenue. Eelco Boers, responsible for i-mode content and strategy at KPN, E-Plus and Base, recalls (Boers 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.” So e-mail was hidden somewhere deep in the menus, as another witness, Sandra Baron said: “At the time I was working for KPN Mobile and, together with NTT DoCoMo, brought i-mode to Europe. Obviously, the status of e-mail was very different on i-mode phones. The discussion turned to the question of how e-mail would cannibalize our SMS text messaging model, the use of which was widespread in Europe, including in Germany. I can recall that it was discussed intensely. We also discussed the pricing of e-mails. Ultimately the conclusion was reached to hide it in the phone’s user interface and not to make it as simple and user friendly to use as text messaging” (Baron 2010).

So KPN was very aware of “the disruptive power of the Internet”, as Feasey put it, which could have been introduced with pricing per packet in Europe, just like in Japan. The quotations show that there was no confusion or denial, but a clear attempt to maximise profitability by selling messages as expensively as possible.

To some degree, a reduction of SMS revenues could have been offset by the standard monthly base fee of € 3. However, SMS revenues per user were higher at the time and still growing, and there was hope that MMS or other new data services would lead to even higher data revenues. Also, revenues from browsing could have been earned, but the early flyers reveal the interest in the walled garden, and browsing the web was not clearly mentioned.

Another obstacle for i-mode in Germany was that it was marketed by the smallest operator. And yet another obstacle was the large number of handsets sold by E-Plus which did not support i-mode, such as many Nokia handsets, which were in demand by users. These obstacles, in combination with the seemingly high price of e-mails, meant that little network effect was created. In some desperation, e-mail prices were later lowered, but to no significant effect. Therefore, compared to the Japanese i-mode, there was less aggressive pricing in Germany, much less PR, less handset integration and consequently less positive word-of-mouth information and in the end no network effect.

Vodafone live! in Germany

Vodafone live! differed from the Japanese i-mode in yet another way. First, e-mail was not pushed onto handsets. One rather had to contact the Vodafone server each time when one wanted to view an e-mail. This was quite inconvenient for reading and responding. In advertisements, the pricing of e-mails was unclear, maybe because it depended on the number of downloads. In any case, it was not used to market it. Second, links in e-mails could not be clicked on, trapping users in the walled garden, as has been mentioned previously in the literature (Weber 2007). This was not done to protect users from getting “defrauded”, as Feasey describes the operator’s position, but to protect SMS revenues. Furthermore, adult services were available with *Vodafone live!*, too; images of it are still available at the website of the journal *Chip* (2015). This means that operators wanted to sell not so “safe” services themselves.

The specification of *Vodafone live!* showed a clear attempt to cherry-pick and to avoid cannibalisation, and thus an awareness of the effect that pricing-per-Internet-packet could have. The platform as such worked well, as the authors can confirm, which was explained with help from Japan: “A considerable degree of the J-Sky platform is said to have entered into Vodafone Live! after Vodafone had acquired J-Phone” (Haas/Waldenberger 2003; cf. Connect 18.3.2004).

However, some services were worse than those available on the open Internet. For instance, when searching for our institute “ITAS” in Karlsruhe (Germany), the Vodafone search engine

found “*veritas*”, a local wine bar. This was not a service able to compete with Google. Furthermore, Vodafone introduced *Vodafone live!* only on a small share of their handsets (3 of 34 in 2002). So, positive word-of-mouth transmission was limited and *Vodafone live!* collapsed.

This means that a pattern regarding the behaviour of the European operators has now become visible. Their strategy was to cherry-pick successful services and sell them expensively. Except for SMS, all such services had previously been identified in Japan.

t-zones in Germany

Deutsche Telekom also developed a sort of i-mode clone. Japanese partners helped with the implementation of i-mode in Europe and with *Vodafone live!*. T-zones, however, was much more difficult to use (Weber 2007). Users first had to install it on their handsets. Some browsers did not wrap lines. Packet-based payment sometimes happened accidentally because buttons for starting it were placed on the outside of phones. Even T-Mobile’s then CEO René Obermann concluded in 2004 that it was hard to use: “The quality of the services is not good enough” (Weber et al. 2011), but apparently he felt unable to address the deficits prior to its roll-out. Further, T-Mobile managed to sell camera phones that did not permit a user to move pictures off the handset except via MMS, which cost about 40 €-cents. So t-zones avoided packet-based pricing of photos, and its creators certainly understood the Internet. Rather, T-Mobile preferred to sell selected services expensively, and in the end this did not contribute to positive word-of-mouth communication or network effects either.

Causes and interpretation

Now one can compare some key mobile data services available in 2002 (Table 2). The comparison shows the significant difference between three implementations. Only DoCoMo in Japan had an easy-to-understand, and easy-to-use, cheap service and marketed its benefits properly, which is why it did not “quickly collapse”, as Feasey put it.

Already back in 2004, researchers who compared Japan to Europe noticed that the Japanese approach appeared to be very beneficial for customers. In a report of 2004, written on behalf of the European Commission, Bohlin et al. already warned: “Operators in Europe have limited experience of advanced mobile data communications ... in contrast to Japan... There is a need to favour a more user-focused perspective”. In hindsight one can ask oneself whether the Japanese model of making millions of youngsters have their parents pay large bills of then up to 100 Euros per month and more was a beneficial step. However, selling data “like water in the desert” (Sutherland 2005) did not appear to be the better alternative.

Table 2 Key characteristics and prices of i-mode and *Vodafone live!* in Japan and in Germany upon launch.

	NTT DoCoMo i-mode	E-Plus i-mode	Vodafone live!
Push e-mail	Yes	Yes	No
E-mail price	Yen 0.9-4	€ 0.22 ¹⁾	Not applicable ²⁾
Clickable links	Yes	Yes	No

1 As advertised.

2 The price of an e-mail with *Vodafone live!* was not advertised in the German flyers of Oct. 2002. However, the flyers mention measurement of the GPRS volume used, which would indicate pricing accordingly. Thus re-reading an e-mail would have led to additional costs.

Sources: Weber, Wingert 2006; Weber et al. 2011; E-Plus 2002; Vodafone 2002.

But why did DoCoMo behave differently than the European operators?

In *Telecommunications Policy* (Weber et al. 2011), it has been argued that there was “ubiquitous uncertainty” in the Japanese market, with various 2G and 3G services (PHS, PDC, W-CDMA, cdma 2000, etc.) competing against each other, each being regularly updated in terms of speed and data services. In other words, there was technology competition on every level, leading to competition among platforms, a search for creative ideas, and finally the ecosystems (Natsuno 2003). NTT DoCoMo noticed that they were under heavy pressure to develop attractive services, and the erosion of prices from competition, including on the then-emerging messaging, showed them that IP-based traffic charging would be the way to go, i.e. they felt a need to sell many sticky services, not just a messaging service or a few other “cherries”.

As a result, DoCoMo did not deny the disruptive power of Internet, after having analysed the alternatives, but rather felt that this was their only chance to gain market share and increase revenue (personal communication with Mari Matsunaga, quoted in Weber, Wingert 2006). They knew that a variety of content was essential (long tail, as it is called now), though they tried to earn as much from their “garden” services, so opening the platform for any content provider was an essential fact, already known prior to the start of the service. Vodafone Japan was very aware of DoCoMo’s strategy, as the General Manager of Vodafone Japan, Mica Imamura, put it in 2004: “DoCoMo tries to race ahead, setting the pace” (Weber, Wingert 2006).

So this technology competition on every level led to the invention of what later became the iPhone services, as already argued at the ITS Berlin in 2004, then referring to the music, video and iTunes services of Japanese providers and Apple (Weber, Wingert 2006), and later in Weber et al. (2011), where it was proven that all the essential Apple services were Japanese born (Table 3).

Table 3 Japanese and Apple ecosystems: beneficial, fun-to-use, sticky services marketed first in Japan were later copied by Apple

Mobile service	World 1st to market	2007 iPhone
E-mail	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

Source: Weber et al. 2011, p. 470. Note: Prior wireless e-mail services were running on larger mobile devices, not geared at mass consumers, such as the EO and the Nokia Communicator.

In the Japanese setting, Qualcomm played a special role, as it insisted on being able to sell their technology in Japan through the local operator KDDI. Of course, as was the case in Europe with GSM, there were also Japanese who were thinking of agreeing on a single standard and exporting it. Qualcomm was not the only reason that this did not work out. Internally there were also conflicting views. One group supported PDC radio technology, originally designed by NTT and NEC and then finalised by Ericsson, while another fraction supported PHS, built by Kyocera with assistance from ArrayComm (Saffari 2015). Some representatives of NTT also expressed that they would have preferred a single standard for exporting purposes, much like the Europeans had. So there were telco executives thinking about how profitable it might be to have one standard enabling very large economies of scale. Without exploring the underlying reasons for this competition between PHS, PDC and cdma in this paper, our 2011 analysis showed that the anxiety caused by competing standards was very good for discovering new products and services.

Not agreeing on a standard meant that the market worked as a discovery process, in the sense of Hayek. Recall Kei-ichi Enoki, the Executive Vice President of NTT DoCoMo responsible for i-mode: “The business is slowing down if one agrees on standards first” (personal communication, already quoted in Weber et al. 2011). This competition between technologies and thus ecosystems led to Japan overtaking the rest of the world in terms of services (think of Felica contactless payments, QR code, mobile TV), which is sometimes called the

“Galapagos” effect. NTT DoCoMo had tried to export their successful semi-walled garden, but they underestimated the desire of their European partners to stick to their high-price services, and were not able to overcome this, due to having a limited influence based on their minority shares. This obstacle was later overcome by Apple’s well-defined flat-rate bundle.

Still, even today, the Japanese manufacturers are “inside” many smartphones, having led in the production of smartphone components since 1999, such as displays, memory chips and camera modules.

Situation in the US

Apparently, m-mode, the flavour of i-mode developed for the US with DoCoMo partner AT&T, was not marketed much more successfully in that country than the European flavours of i-mode. For instance, the handsets available at the launch in 2002 did not even have a browser, but offered WAP-based “information services” (The Register 2002). Prior to 2007, in the US, the full set of Japanese mobile services was entirely unknown. “If I bring my phone, a 504 [the NEC 504 was a folding phone with e-mail, browser and camera, launched 2002], one year-and-a-half old, Americans look at this as if I’ve come to the Congo. They are very fascinated. I have to describe it because they have no idea” (Tsuchiyama 2004).

It is thus no surprise that the average US citizen or scientist has come to believe that the initial iPhone-services were invented by Apple. For somebody who observed the emergence of the Japanese ecosystems (with DoCoMo, KDDI and J-Phone), it is obvious that Apple simply copied them and sold them, granted with a much-improved user interface. The attractive components included e-mail, browsing, apps, cameras, and music, as shown in Table 3.

This implies that the description by Mariana Mazzucato was not correct, when she wrote: “As a pioneer of the ‘smartphone’ revolution, Apple led the way in successfully integrating cellular communication, mobile computing and digital entertainment technologies within a single device” (2013, p. 102). This had already been done years earlier in Japan. Arguing that some technologies in the value chains of these services had been, at some point in time, subsidised by government, such as the Internet protocol (Mazzucato, p. 88), does not reflect the dynamics of the Japanese market as described above and is thus practically meaningless. Similarly, Christensen et al. wrote that the growth of the iPhone “was achieved not merely through product improvements but also through the introduction of a new business model.” (Christensen et al., 2015). This negates that most product improvements had been developed in Japan before, and that the business model had already been implemented in 1999.

Reviewing the European “success” story

This means that mobile operators everywhere reacted differently to the possibilities offered by the advent of the Internet protocol. Those facing cut-throat competition on every level quickly abolished mobile-specific – and expensive – data transmission technologies, such as the local Japanese versions of messages. Those that ran their businesses more as part of an oligopoly, with standards and no nasty outsiders, like KDDI, pushing forward, were able to preserve SMS prices. Cherry-picking, however, turned out to be successful for a while in Europe, but only for SMS. MMS and the walled gardens never really gained traction.

Nokia was a major driving force behind this strategy. For them, it was highly attractive to keep selling equipment specific to the mobile world. As Eelco Boers put it: “Innovations like SMS, like WAP, were driven by Nokia, driven with the commercial interest of Nokia! If you only have a transparent Internet you don’t have to buy, as an operator, MMSCs [Multimedia Messaging Service Centre], and who is selling MMSCs? Who is selling WAP-Gateways?” (Boers, personal communication, 2005)

It is not that Europeans in general would not have been interested in more competition on the radio interface. For instance, the city of Düsseldorf was interested in having a cheap mobile service, i.e. PHS, just like in Japan. PHS can be compared to a DECT handset working everywhere and can be provided with very cheap base stations. Reportedly, Siemens exercised pressure so that PHS would not be deployed in Germany (Weber 2014a).

In terms of economies of scale, the European approach was very profitable for many years, as the case of Nokia showed: it included handsets that were cheap to manufacture, but that commanded a handsome sale price, and proprietary software and network hardware sold to operators who used the systems to, in turn, sell expensive services. This was appreciated by investors. They did not want any cheaper, IP-based services to be pushed. So the bottom line is that the European operators were not “confused and unprepared” after the success of the mobile Internet in Japan; instead, they tried to keep their high data prices, running at 1000 € per MB for SMS, and tried to expand on that with their proprietary camera, music and erotic services.

Recently, the New York Times (2015), discussing the success of Apple, Google etc., asked: “Why hasn’t Europe fostered the kind of innovation that has spawned hugely successful technology companies?” Actually, the Japanese operators invented most of the successful technologies, at least in the mobile realm. European innovators and investors were aware of these and could have mirrored them, but they preferred to play an apparently safer game, excluding cheap competitors and betting that no operator would push for IP services. Jeffrey Funk recommended that European operators encourage e-mail and browsing, and concluded that they had a start-up problem (Funk 2007, 2009), but our evidence shows that they did not want to.

Later, the reputation of the early European data services that were introduced deteriorated. As analyst Jan Mühlig put it in 2007: “Nearly all users in Germany had negative experiences with mobile services concerning costs... Users want to access ‘all services’, not just a selection.” In 2004, a representative from DoCoMo asked whether the situation in Europe was “SNAFU or FUBAR”. The telecom walled gardens had turned out to be failures.

It is fair enough for every investor to try to play a safe game. However, there is always a chance that, someday, a better or cheaper approach will win. A key event, in Europe, was the deal between Apple and T-Mobile, which led to the introduction of the iPhone, and ultimately of Android clones.

Coming back to the issue of whether to risk SMS revenues or not, as Steve Jobs reportedly put it: “If you don't cannibalise yourself, someone else will.” And that is what happened: the high price strategy failed for non-Internet technologies and with it its largest manufacturer, Nokia.

Apple found partners, such as T-Mobile in 2007. The iPhone was packaged exactly as the Japanese data phones were with the same services, and everything worked fine from the moment one first took it out of the box. Combined with a mandatory flat rate, no negative surprises emerged, just like with i-mode in 1999.

Thus, Apple was able to create positive word-of-mouth and plenty of network effects. Of course, their user interface played an important role, too. But imagine if, in 2007, all the European mobile operators had successfully marketed Internet access, applications, music and camera services. Apple would then have played the role of a “me-too” seller, much like it did in Japan (Fasol 2007).

With the success of the iPhone, Nokia was no longer able to compete against Apple. This was, first, because they had built their business on *not* integrating all services into every handset, in order to help the selling of “cherries” by carriers to specific customers. They sold camera phones, music phones, or e-mail-enabled business phones. This left them with a multitude of models which were difficult to adapt to any full ecosystem.

Second, they were arrogant towards their corporate customers (Bouwman 2014).

Third, they did not undertake a critical self-examination; they even claimed they had invented all these new mobile data services. Erkki Ormala, Vice President of Business Environment at Nokia, did so at a conference in 2011, when he displayed a slide mentioning a “Journey from mobile telephony over SMS and camera, navigation, music, Internet activities to a fully-fledged application and services eco-system” (Ormala 2011). All these new data services were invented in Japan, though, and furthermore were first successfully commercialised in a full package in that country.

Fourth, Nokia's Ovi platform was flawed, and Nokia did not master touch screens (similarly, Cord 2014). So in the end, Nokia's mobile device business was sold to Microsoft in 2013.

Coming back to the topic of telco survival, what can one conclude?

The European telcos tried to erect a moat around themselves and expensively sell selected data services (re-using a notion reportedly used by Warren Buffett, cf. Burton 2012). Unfortunately, the authors have no comparative analyses of the profit rates available; data ARPUs, though, indicate that the overall effect of cherry-picking was limited (Weber et al. 2011). While the moat may have worked for some years (“we are leading in SMS”), in the long run, outside competitors crossed the moat and razed the fortress, i.e. Apple, Google and Samsung. Would it have been better if investors had opened the market as in Japan? The question will be taken up again at the end of this paper.

3. Fixed Internet vs. Videotex

Feasey also mentions the fixed Internet and says that telecommunications operators originally denied its disruptive power. However, when open networks such as the Internet were emerging, in the 1980s, at least the European PTTs tried to control this. For instance, in Germany, a centrally structured system was introduced, the Bildschirmtext system, which was similar to the British Prestel or the French Minitel systems (Pospischil 1998).

With Bildschirmtext, users had to buy expensive equipment and charges were made per downloaded screen (Spiegel 1985). Open networks had, however, been in demand by computer enthusiasts since 1981 (Berliner Zeitung 2006). The US had Hayes modems since 1978 to access arbitrary servers. In Germany, modems that could be used to connect to other computers were very expensive, e.g. sold for DM 1950, in order to discourage users from connecting to services such as CompuServe or to the emerging Internet service providers (Schneider 1989). Users then tried to get hold of clones of Hayes modems to connect illegally (imagine there was no way to search the WWW to find where to buy them or find out how to solder them to the PTT wires then buried in the wall). The pattern is similar to what happened to the mobile Internet: operators tried to keep users inside walled gardens and charge them as much as possible in an oligopolistic or even monopolistic way. Again, the European telecommunications companies were very well aware of what was going on. Under pressure from US companies such as IBM, this changed. The European Commission also reached the conclusion that “cartels” had been formed to create national “protected markets”, supported by “national champions” (Kommission 1991, p.11, 17). When Asian clones of Hayes modems became available, the European strategy fell apart. In summary, at least the European fixed operators saw the threat of open networks, were not confused, but tried to build their walled gardens.

4. PC with graphical user interface

An aside about outside telecoms will be helpful. Playing a safe game is a tactic that was also visible earlier. A Swiss investor, Heinz Waldburger, marketed the world's first personal computer with a graphical user interface (GUI), the Lilith, back in 1980, using inventions from Xerox PARC and ETH Zürich (Furger 1993, Wikipedia 2015). Waldburger sold 120 machines. However, the Swiss banks thereafter did not want to invest in large-scale manufacturing. As a banker put it to Waldburger, "We cannot engage in an enterprise of the size you propose" (p. 58). Apple only started marketing a GUI in 1983, with the Lisa machine, followed by the Macintosh in 1984. Apple, apparently, had more skilful investors at hand, such as Laurance Rockefeller. Imagine the consequences if European banks and investors had not been so risk averse and all high-end computers were now designed in Switzerland....

5. Interpretation

Comparing the situation in communications to a successful European industry such as the car industry, it becomes obvious that in the latter case there is no such moat. Tesla, Tata, whoever wishes can relatively easily enter and sell on the European market. There is no equivalent of spectrum licenses or wires in the ground keeping new or smaller car companies out. The global car market shows that it is a place of discovery and of creative destruction, much like the Japanese mobile market.

The *Economist* found that "much of the world's digital territory has in effect been ceded to America without a fight" (Economist 2015). With regard to telecommunications, this is not the whole story. The European industry and its investors, ranging from PTTs to Nokia, to Siemens and to the mobile operators, have preferred their local or high-price strategies. These appeared to be less risky than participating in the global race for the best services at the lowest cost.

European innovators have thus regularly been hampered by local companies and their investors. Imagine if investors from Europe had dared to sell garden services with open access to the Internet to the whole world. The world might have turned out to be very different, with perhaps KPN proving to be a leader in apps and Vodafone with the best mobile search machine, instead of Apple and Google. Global Internet companies might then have emerged in Japan, the US, Europe and China (such as Baidu).

6. Conclusions

Economically speaking, the situation of the European operators is not at all hopeless. If users want to download more and more data, they will pay for it. Somebody will also have to

transmit this data and serve as a profitable pipe in order to attract the funds to invest, much like Feasey anticipates, which is a procedure normal in a market economy.

But is this enough? Given the US lead in IT, with some special roles for Japan and China, would it be possible, now, for the operators and European investors to take bolder steps in order to obtain more of the future revenue than simply by keeping the castle profitable by the usual means?

First conclusion: It appears unimaginable that bolder steps will be taken in Europe without prior self-criticism of the European IT companies, operators and investors. These need to analyse how the situation in communications technology, IT and wireless services deteriorated during the last 30 years.

Second conclusion: Better risk management is needed, as are more managerial skills. European mobile operators and manufacturers were not able to specify and manage the implementation of a well-working ecosystem. It also seems that US managers have better skills in managing risky options. Not that these skills would not exist, such as in the European car, mechanical engineering or pharmaceuticals industries. But with regard to IT, our analysis showed that there is a lack of such skill. Both DoCoMo and KPN actually hired outsiders to lead the development of IP-based data markets, but the European operators were encumbered.

The US has a long tradition in spotting risky but promising new IT markets and leaving companies in the west coast culture free to exploit these (which Feasey mentioned). And if one looks at Sandra Baron's reasoning (Baron 2010) and the success of European mechanical engineering, the situation is not hopeless at all. But it seems that the traditional "telco thinking" needs to be overcome. Combined with more venture capital, which is much more available in the US, in total and per startup (Saffari 2014, Business Insider UK 2015), there is plenty of potential in Europe. Opening the space for innovation first requires, however, that a critical review be conducted in which those investors who were too hesitant should perhaps participate.

Using the market as a discovery procedure in the sense of Hayek and as a means of creative destruction in the sense of Schumpeter would conform to the textbook path for discovering innovation. Regulators and policy makers could support, however, the emergence of profitable disruptions, as will be demonstrated in the final conclusions.

Third conclusion: EU-wide licenses could be provided, so that economies of scale with any new approach accrue, e.g. to competing approaches of 5G-technologies, in order to bring dynamics to the WAPECS process of technology and service neutrality (Wireless Access Policy for Electronic Communications Services). As Gérard Pogorel put it (2014), a continent-wide industry would be needed, providing seamless services across Europe. Such operators would be strong enough to impress mobile phone vendors with their demands. This would require higher skills of managers and technical specialists in Europe to find new uses of the

radio spectrum, a skill which was not obviously available when the i-mode semi-clones were designed.

Fourth conclusion: An operator could support long-range commons, as suggested by us in a previous article in *Telecommunications Policy* (Elsner, Weber 2014), and thus provide cheaper services and attract users. Feasey mentioned that in the future one might see “internet companies building networks themselves using unlicensed spectrum technologies”. But actually, licensed operators could use long-range commons for cheap offloading and “race ahead”, to quote the manager of Vodafone Japan again. Racing ahead is quite the opposite of discussing collusion (which Feasey reveals).

The above conclusions follow fairly logically from the above analysis. There is, however, one more option:

Fifth conclusion: Yet another possibility would be to regulate that computers must not contain weaknesses that permit law enforcement and economic espionage (Weber 2014b). The emergence of several manufacturers in more than one world region, using various technical approaches (some keywords: proven components, clean slate, open hardware, compartmentalisation) could promote resilience and competition. This poses, of course, a big challenge, yet work such as Gernot Heiser’s with DARPA on unhackable drones (ZDnet 2013) or that of Mitra, Wong and Wong (2015) on ironing out Trojan horses in hardware, is quite encouraging. An IT world characterized by zero-day exploits and backdoors is not a solid basis for a critical infrastructure, business secrets or anybody’s passwords and little secrets.

In sum, there is plenty of space for European and other investors to discover new markets.

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