

# THE DIFFERENCE IS IN MESSAGING

## *Specifications, Properties and Gratifications Affecting the Japanese Wireless Service Evolution*

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**Abstract:** This paper extends common contentions of why the mobile Internet has been widely embraced in Japan but obtained lukewarm reaction in most GSM countries. In particular, we analyze commonalities and differences pertaining to the wireless killer application in both the West and the East – messaging. A framework consisting of service specifications, properties and gratifications is used to analyze short messaging, multimedia messaging and e-mail in Scandinavia and Japan. An architecture which better supports interlinking, integrating and transitioning of interpersonal and data-based communications over the service platform was successfully established in Japan while the disjointed nature of messaging, multimedia messaging and data services has inhibited Scandinavian users to fully embrace the mobile Internet. In Japan mobile e-mail integrated instrumental and aesthetic service properties on top of the powerful expressive service properties. Accordingly, content and process gratifications have augmented powerful social gratifications which initially have been driving m-service use in both places. Idiosyncrasies identified across service integration provide insights to critical enabling and constraining factors that shape development of mobile services.

**Keywords:** wireless services, mobile services, specifications, properties, gratifications, Scandinavia, Japan, messaging, SMS, MMS, e-mail, evolution

## 1. INTRODUCTION

Despite significant interest we have yet to answer what constitutes the main characteristics of a “killer application” in wireless services. Explanations with varying grounding abound why wireless service use blossom in Japan: the unique nature of the Japanese environment and the

architecture of NTT Docomo's i-mode service (Mitzukoshi et al. 2001; Sigurdson 2001; Baldi and Thaug 2002; MacDonald 2002; Ratliff 2002; Nielsen and Mahnke 2003; Elliott and Tang 2004; Sharma and Nakamura 2004). However, little attention is given to how messaging services – e.g. SMS (GSM) and mobile e-mail (Japan) - influence the growth of portal based data services. We lack knowledge of how service adoption success is related to particular specification features, service properties and gratifications. Past studies tend to categorize wireless services based on the content provided, i.e. news and entertainment (Baldi and Thaug 2002; Aarnio et al. 2002). While useful for statistical analyses such categorizing is problematic when wireless services are hybrids integrating services crossing multiple content categories (e.g. infotainment). The engorging variety of m-services and their interconnections are now increasingly blurring categorical service identification. Thus, we encounter trouble in identifying *the* killer application as it is part of a more holistic offering: “the *package* of content [emphasis added] that we put together was our killer application that helped i-mode take off” (former i-mode manager Toshiharu Nishioka cited in Sharma and Nakamura 2004:47).

In this paper we propose that neither content variety nor service categorizing reveals the critical characteristics of a mobile ‘killer application’. Rather, we move beyond categories to look deeper at specific services – those initially scaling and catalyzing mobile data use and their critical role in the service ecology. We focus on connections between messaging services and other types of data services and explain how the gestation of killer applications in Japan and Scandinavia differed. To this end we present a framework to analyze wireless services based upon service specifications, service properties and service gratifications.

## **2. GLOBAL KILLER APPLICATIONS: GROWTH OF SMS AND MOBILE E-MAIL.**

The idea of a ‘killer application’ is widely disputed and a definition is needed (Lyman and Lowry 1996; Middleton 2003; Stroborn et al. 2004; Dey 2005). We refer to a killer application as *a distinct data service which has scaled, or is scaling towards dominance over other applications or services within a growing population of users and where its properties and name has achieved pervasive awareness*. As such, voice telephony falls outside our definition since it is not considered a data service. Connectivity is too vague to achieve pervasive awareness regarding the service name and properties. In contrast, news services or video and photo services fit with the definition. Though some of these services have reached pervasive awareness within

certain segments, their degree of meeting our criteria of pervasive awareness across a broader population is still nebulous. Only messaging services seem to fully comply with this definition.

## 2.1 Evolution of Mobile Data Services in Scandinavia and Japan

**Scandinavia.** Scandinavians are among the world's most eager users of SMS. Norwegians averaged almost 36 short messages per month during 2000 and have remained the most edacious 'texters' in Scandinavia until 2002. During 2002-2004 the Danes, probably due to intense price competition and introduction of flat rate pricing schemes, drastically leapfrogged their neighbors reaching an average of 102 short messages per subscriber per month during the first half of 2004. The telecommunications authorities of Sweden (PTS) reported that considerable higher prices on SMS have constrained SMS use to mirror that of its neighbors.

*Table 1.* SMS per subscriber per month in Norway, Denmark and Sweden

	2000	2001	2002	2003	1 <sup>st</sup> half 2004
Norway	35.9	49.9	56.6	66.1	66.6
Denmark	21.5	30.7	39.9	71.6	102.1
Sweden	7.1	12.9	14.9	18.4	17.9

Research from Denmark (Constantiou et al. 2004) and Norway (Ling 2004) reveals that young users consume most data services. Ling (ibid.) reports of teens and adolescents sending between 6-9 messages per week, while people of ages 25-44 send between 1-3 messages per week. Yet, the text epidemic has not transmuted into much other data service use. Multimedia messaging (MMS) is starting to gain some momentum, but is still of miniscule significance.

*Table 2.* MMS per subscriber per month in Norway, Denmark and Sweden

	2002	2003	1 <sup>st</sup> half 2004
Norway	0.03	0.39	1.00
Denmark	0.01	0.04	0.15
Sweden	0.02	0.06	0.19

WAP use remains absent and the growth of GPRS traffic is slow. Official GPRS traffic for 2004 show that the average Swedish and Danish GPRS subscriber generated respectively 0.64 and 0.45 MB in mobile data traffic over the first six months of 2004; equal to sending and receiving a few multimedia messages per subscriber.

Norwegian and Danish MNOs have recently experienced growth in premium SMS (PSMS) services offering voting and messaging in relation to

TV and radio shows, as well as purchasing of ringtones, logos, backgrounds and screensavers etc. No official statistics document the growth of content sales. However, a telecommunications analyst (2004:13) argues that the “PSMS market in Norway exploded” when a unified content provider access (CPA) platform was presented together with attractive revenue sharing schemes. In 2003 revenues from premium content was estimated in the range of 460-570 million NOK<sup>1</sup>. In Denmark, premium content service revenues were estimated to double from 180 million DKK in 2003 to 300-350 million in 2004<sup>2</sup>. PTS<sup>3</sup> claims that the basic service model for premium content services is also solid in Sweden, but that growth has yet to occur.

For all, however, the much expected growth in portal based m-services is still pending. Hence, new revenue sources have emerged incrementally around the SMS medium as extensions to social interaction based SMS use.

**Japan.** NTT DoCoMo and J-Phone were among the leaders in the amount of revenues derived from data traffic over cellular networks in 2002<sup>4</sup>. A considerable share of NTT DoCoMo’s data revenues is attributable to content services. Although games, screen savers and ringing tones comprised more than 50% of i-mode user activity observers emphasize that “e-mail is the killer app” which “initially attracted users to i-mode” and which “remains critical to i-mode’s appeal” (Mitzukoshi et al. 2001:93). For KDDI, the only operator in Japan utilizing WAP in its cdmaONE network, the data revenues of 2002 were tangent with the MNO average – approximately par with levels of Telenor of Norway.

Mobile e-mail is persistently identified as the most important data service (Hoffmann 2001) in Japan while SMS has small presence. Sigurdson (2001) reported that SMS - branded Cmail by KDDI – dominated the use of EZweb, KDDI’s WAP based mobile Internet gateway, but has almost disappeared in Japan<sup>5</sup> with the dominance of e-mail.

Ishii (2004:48) suggests that “half of all mobile Internet users used email (excluding non-Internet short messages)” and that “the main usage of the mobile Internet is email” and Sharma and Nakamura (2004:49) argue that “Japan’s growing band of e-mail junkies have driven the phenomenal growth in i-mode”. On average, 87 e-mails were sent from a mobile phone on a monthly basis in Japan in 2002; 19 more than that what was sent over regular PCs (Ishii 2004). Although we were unable to find official statistics,

<sup>1</sup> Økonomisk Rapport: [http://www.orapp.no/oversikt/Argang\\_2003/8614/teknologi/8653](http://www.orapp.no/oversikt/Argang_2003/8614/teknologi/8653)

<sup>2</sup> BT: <http://www.bt.dk/mobil/artikel:aid=251258:fid=100300070/>

<sup>3</sup> PTS – Post og Telestyrelsen – report on Mobile Content: [http://www.pts.se/Archive/Documents/SE/Slutrapport\\_mobilainnehallstjanster\\_2005\\_8\\_feb05.pdf](http://www.pts.se/Archive/Documents/SE/Slutrapport_mobilainnehallstjanster_2005_8_feb05.pdf)

<sup>4</sup> Nokia. 2003. A history of third generation networks: Nokia Networks. Available at: [http://www.3newsroom.com/html/whitepapers/year\\_2003.shtml](http://www.3newsroom.com/html/whitepapers/year_2003.shtml)

<sup>5</sup> NTT DoCoMo press release. NTT DoCoMo to Expand 3G International Short Messaging Service. Feb. 1st, 2005.

Mitzukoshi et al. (2001) reports of more than 100 messages sent and received per user per month in 2000. Given a 50/50 send-receive ratio, we find it plausible to expect similarities in the growth rates for mobile e-mail in Japan as witnessed with SMS in Norway and Denmark.

Younger users dominate data use (Funk 2001) with 50% of the users in their 20s or younger. Here 59% are males (59%) but 6% more females were present in the age group 19-24 (Ishii 2004).

Substantial growth in mobile Internet content, applications and multimedia communications is also evident in Japan (Funk 2001). In 2001, i-mode (NTT DoCoMo) had 30 million subscribers and J-sky (J-phone/Vodafone) and *au* (KDDI) each had 9 million. Currently, 86% of the near 85 million<sup>6</sup> Japanese mobile phone users subscribe to mobile Internet services. Next to e-mail the most accessed service types were: 1) search engines, 2) weather, 3) transportation information and maps, 4) music/concerts information, 5) news, 6) fortune telling, 7) sports, 8) computer games, 9) competitions prize/gift and 10) TV program/guide (Ishii 2004). Together data reported by Ishii (ibid.) Srivastava (2004) and NTT DoCoMo point to e-mail, video-games, ring-tones, information services and music as the most popular data services.

Mobile data revenues also boosted with the introduction of picture e-mail and mobile Java-applications. Picture mail was introduced by J-Phone in November 2000. In 2002, 60% of J-Phone subscribers owned a camera phone and subscribed to the sha-mail service which enabled sending and receiving of pictures and accessing of a 20MB personal photo gallery. These users generated on average 44% more revenue per user than a non-user (Nielsen and Mahnke 2003). A similar service was launched by KDDI in April 2002 and had 2.5 million subscribers by December 2002. NTT DoCoMo followed with the i-shot service in June 2002. By the end of the year 10% of its subscribers (4 mill.) had signed up for the service (ibid.). The different e-mail solutions have later been expanded to handle video-clips as well as other attachments (i.e. Microsoft Word and Adobe PDF).

In 2001, NTT DoCoMo introduced the i-appli service which enabled download and use of stand alone mobile Java applications (i.e. games, animations, karaoke, and tailored software applets). During 2001 the service gained 15 million subscribers. Witnessing that the average i-appli user generated double the data revenue of regular i-mode users (ibid.), KDDI and J-Phone introduced Java on their mobile Internet platforms in June 2001.

<sup>6</sup> Official statistics from the Telecommunications Authority of Japan:  
<http://www.tca.or.jp/eng/database/daisu/index.html>. Accessed March 2005.

## 2.2 Comparison of data service evolution in Scandinavia and Japan

While messaging is pivotal in Japan and Scandinavia, the access and use of data services differ. We recognize two paths in the use and innovation of mobile data services. First, after the WAP disappointment the Scandinavian approach concentrated on enhancing data services by innovating around SMS and MMS. Second, the Japanese operators have sought to innovate within and through the ecology of services which *integrate* e-mail as well as Internet based content delivery. Here, i-mode is most successful with offering access to 4,500 official and 84,000 unofficial m-service sites.

Although mobile e-mail is available in Scandinavia, it has been mainly offered as a client supplied by handset manufacturers and not as a operator-integrated solution. Statistics from Denmark<sup>7</sup> show that the SMS traffic at the only MNO offering integrated e-mail services, '3', is at par with the largest GSM operator. Hence, SMS' relative stronger technical and social pervasiveness (Knutsen & Overby, 2004) seem not only to hinder e-mail from substituting SMS but, as we now will analyze, may also hinder a similar development path as witnessed in Japan.

## 3. A FRAMEWORK FOR MOBILE SERVICE ANALYSIS

A tripartite approach is suggested to analyze the integrated nature of mobile services. First, service specifications as inscribed by the technical architects and corporate designers of those services/applications need to be identified. Second, we need to understand the expected and ascribed use properties of those services. Finally, we need to assess how the former two enable certain gratifications to be perceived by users.

**Specifications** refer to the specific texts characterizing the service as given by its architects – the objective inscriptions of technical details and capacities of a specific service. Examples of specifications<sup>8</sup> include payload, bit type characters (for alphabet), interface support, transfer and access support, format support etc. Their representations are manifests of the understandings and actions constituting the institutional environment putting them forth (Hargadon and Douglas 2001).

<sup>7</sup> Official Statistics from the Danish Ministry of Technology and Innovation.

<sup>8</sup> See for instance OMA specifications for MMS: [http://www.wapforum.com/release\\_program/docs/mms/v1\\_2-20050301-a/oma-creld-mms-v1\\_2-20050301-a.pdf](http://www.wapforum.com/release_program/docs/mms/v1_2-20050301-a/oma-creld-mms-v1_2-20050301-a.pdf)

**Properties** convey the expected effects of service specifications upon humans or other artifacts. Three general categories which encompass the embodied symbol and virtual<sup>9</sup> service properties (Orlikowski 2000) that are subjectively constructed and re-constructed by actors interacting with the service or perceiving instantiations of it can be distinguished.

*Instrumental properties* encompass service capacity to support efficient interactions between humans and technologies. Examples include faster transmissions speed, augmented mass distribution capabilities, simpler text entry, reduced download/upload time, and reduced coordination time.

*Aesthetic properties* define the capability of a service to provide an aesthetically appealing human experience and/or enhance the appearance of other artifacts; e.g. evocation of visual, audible and physical sensing and decoration of artifacts that can convey the identity of the service or the identity of the service consumer.

*Expressive properties* signify the potential of a service to impress instantiations upon users and other artifacts; e.g. relative capacity of mobile service to pervasively establish connectivity and deliver content in a network of humans and artifacts.

**Gratifications** refer to pleasures, delights, and fulfillments users can perceive from using a mobile service based on their ‘needs’ and motivations (Blumler and Katz 1974; Cutler and Danowski 1980). Three main forms of gratifications can be outlined to understand how these effects can translate (or not translate) into perceived user value (Stafford et al. 2004).

*Content gratifications* encompass pleasures, delights and fulfillments experienced from the ‘consumption’ of messages offered through services; e.g. ‘consumption’ of content crafted by other users or service providers.

*Process gratifications* constitute a form of hedonic gratifications arising from the actual experience of using service (ibid.); i.e. playing, experimenting, and learning by exploring how services operate may itself be gratifying.

*Social gratifications* are gratifications perceived from service-enabled social interaction with physically or virtually co-present others; e.g. grooming of social relations, social coordination and organizing, social contact and identity expressing.

Specifications, properties and gratifications can be conceived to form the following relationships: 1) specifications have bearing upon properties and gratifications, whereas 2) properties influence the space of potential gratifications. Specifications are primarily constructed within the sphere of development, while properties and gratifications are culturally bound and

<sup>9</sup> For material artifacts, this would also include material properties (i.e. Orlikowski, 2000). Although dependent upon material artifacts, services are analytically distinguishable as virtual artifacts.

socially constructed valuations of technology primarily associated with the enactment of specifications. Hence, specifications mediate the creation of users' life-world experience with technology (Hill 1988). They become instantiated in the enactment enabled and constrained by modalities drawn upon to create meaning and legitimacy of technology use based on the monitoring of own and others direct and communicative actions pertaining to a particular technology (Blechar et al. 2005). Interpretations and enactments of properties and resulting gratifications enable isolated analysis of each tripartite element as well as assessment of their relationships to uncover what technical specifications and corresponding institutional arrangements enable and constrain interpretations of properties and the construction of gratifications. We can also analyze similarities and discrepancies in the 'text' of specifications and the degree to which the associated 'text' of properties and gratifications match and promote evolution of mobile service use.

#### **4. ANALYZING MESSAGING TECHNOLOGIES USING THE TRIPARTITE MODEL**

**Specifications.** As illustrated in table 3, SMS, MMS and mobile e-mail<sup>10</sup> differ widely their specifications off payload, text character limits, the formats supported, transmission protocols and addressing standards. SMS is by far the simplest service. It has a fraction of payload and character limit to that of MMS, only text format is supported and it depends on conversion for transfers to/from e-mail over Internet standards (e.g. HTTP). MMS has far richer specifications than SMS but is not as advanced as the mobile e-mail service. In particular, the payload of MMS (i.e. the 100kb limit for TDC customers in Denmark) is significantly less than that of mobile e-mail. In terms of formats supported, MMS and mobile e-mail are quite similar. Both support several multimedia formats and HTML. However, the attachment function of mobile e-mail opens for transmission of other file formats. With respect to addressing SMS and MMS support the E-164 phone number standards. MMS also supports the RFC 2822 standard e-mail addressing. Mobile e-mail, on the other hand, primarily supports the latter and includes, if not changed by the user, the phone number as part of the default e-mail address. Finally, the transmission protocols for the respective services differ considerably. While MMS utilizes either WAP WSP or HTTP/TCP/IP, mobile e-mail utilizes the latter and SMS utilizes X.25 which demands a

<sup>10</sup> We draw upon the mobile e-mail services offered by NTT DoCoMo over 2G and 3G networks as these have the strongest manifest in Japan.

message router appliance in order to convert and transfer data over the other transfer protocols. Importantly, MMS uses a different access point name (APN) than WAP and this disables the simultaneous use of WAP and MMS.

Table 3. Comparison of selected specifications of SMS, MMS and Mobile e-mail

	SMS	MMS	Mobile e-mail
Maximum payload	140 bytes	100 kb	500 kb
Text character limit	160 (7-bit), 140 (8-bit), 70 (double-byte)	Limited to maximum payload enabled by operator, MMSC and handset.	i-mode – i-mode: 4,000/2,000 Foma – Foma: 10,000/5,000
Formats supported	Text	Text, MPEG4 HTML Gif / Animated GIF JPEG, WBMP, PNG, MP3	Text, MPEG4, HTML, GIF, JPEG, WBMP, PNG, MSWord, Excel, PowerPoint, Adobe PDF
Transmission protocols	X.25	WAP WSP stack or HTTP/TCP/IP WAP push	HTTP/TCP/IP
Addressing standards	164 phone numbers	E.164 phone numbers and RFC 2822 e-mail addresses	RFC 2822 e-mail addresses

**Properties.** The specifications yield variations in types and degrees of instrumental, aesthetic and expressive service properties (table 3).

*Instrumental properties.* The capacity of the messaging services to promote efficient interactions between human beings and other artifacts are similar but also idiosyncratic. First, one-to-one and one-to-many properties to quickly exchange messages with other networked people are shared. But a central difference is that MMS and mobile e-mail better facilitate ease in horizontal network bridging between mobile phone users and computer based e-mail users. With respect to efficiently facilitate interactions we therefore see augmented properties for MMS and mobile e-mail to assist social micro-coordination (Ling 2004).

Second, mobile e-mail and MMS have capacity to supply content to other users through the support of HTML and multimedia. Initially limited to text and images (incl. animated), MMS now also supports video-clips, and the MP3 audio format (e.g. for sharing of recordings and podcasting). However, unable to support other third party file formats leaves an advantage to e-mail in the ability to instrumentally support a wider range of everyday activities.

Third, all three support instrumental interactions between artifacts: configuration (e.g. installation/set-up scripts) as well as service specific scripts (e.g. for payment, ticketing, and content purchases). However, the

richer format support of MMS and mobile e-mail offer wider opportunities to support exchanges between commerce services and other applications.

*Aesthetic properties.* Much of the success of content personalization, i.e. PSMS content in Norway and ringtone purchases over i-mode in Japan, are due to augmented aesthetic properties. Personalization content supplied over SMS can potentially enhance the aesthetic effect of messages. Generation txt's invention of novel use of alphanumeric characters (e.g., smileys :-)) to display emotions (Rheingold 2002; Ling 2004) is one example of aesthetic enrichment of SMS. However, the specifications of SMS severely constrain the continuation of such aesthetically oriented innovations – e.g. towards animated GIF emoticons. Thus, extended multimedia capabilities and HTML add dimensions to the virtual aesthetics beyond that of SMS by enhancing content tailoring. For instance, NTT DoCoMo increased mobile e-mail attachment payloads at the same time it enhanced the Deco-mail message tailoring specifications ; an example of how enriched aesthetic service properties can enhance aestheticism of communicative interaction content.

*Expressive properties.* The expressive properties are high for all three as they powerfully, pervasively and rapidly can diffuse messages in enormous user networks. The expressive latitude to construct messages may however be lesser for SMS due to the limited number of character support. Although Ling (2004) found that character limitations of SMS are seldom reached in practice, the vast use of abbreviated language (Rheingold 2002) may also suggest that there are situations in which the increased payload capacity of MMS and e-mail can offer more advantageous expressive properties.

The messaging technologies exhibit network effects (Katz and Shapiro 1985; Katz and Shapiro 1986) since each becomes more valuable as the number of users increases. While content supply tend to scale according to Sarnoff's law, messaging services have properties to scale exponentially according to Metcalfe's law for two-way communications services and Reed's law for group forming networks (Reed 2001). Here, SMS and e-mail has the advantage over MMS due to the enormity of current users. With approximately two thirds of the world's wireless users being GSM customers and the fact that SMS is also available over other networks<sup>11</sup> – even the Japanese – it may even hold stronger expressive properties than that of mobile e-mail in terms of pervasive message delivery. Yet, if we consider the enormous network of computer based e-mail users around the world<sup>12</sup>, another powerful network externality enabled by mobile e-mail with other TCP/IP based networks emerges giving an upper hand to mobile e-mail.

<sup>11</sup> The GSM Association, [www.gsmworld.com](http://www.gsmworld.com)

<sup>12</sup> ITU – [www.itu.org](http://www.itu.org) - reported of close to 700 million Internet users (in terms of subscribers) in 2003. It is likely that the number of e-mail users is far larger than this.

In content delivery, the second element of expressive properties, mobile e-mail is stronger. This results from enhanced multimedia capabilities and the capacity of HTML to link to other types of content. NTT DoCoMo incorporated 'send to' and 'web to' capabilities with e-mail enabling users to hyperlink to content sites in message exchanges. This enable a helix effect, a form of positive feedback effect (Funk 2001; Lee and O'Connor 2003), which augments the expressive properties of mobile e-mail. Technically MMS has similar capabilities. But relatively limited MMS use and lack of mobile content sites constrains the coiling of such effects.

## 4.1 Gratifications

**Content gratifications.** The variety of content subject for messaging offers a tremendously versatile set of possible pleasures, delights and fulfillments through consumption. Content used to support individualized interaction and social relations has been found to be the widely used and are probably the most gratifying. Of the 882 SMS messages investigated in Norway, Ling (2004) found that about two thirds contained simple statements most often associated with micro/social-coordination (33%) followed by grooming messages (17%) – nurturing of friendships, relations and romances – answers (14%), questions (11%), information (6%), and personal news (5%). Analogous, a majority of e-mails sent from mobile phones in Japan were also directed to a limited number of people in immediate vicinity and with whom face-to-face interactions are frequent (Ishii 2004)<sup>13</sup>. A former i-mode manager, Toshiharu Nishioka, has also stated: "Sending short messages, such as saying goodnight to a friend, is one of the most popular uses of i-mode" (Sharma and Nakamura 2004)<sup>14</sup>. This suggests the personal specificity and adaptability of messaging content is superior to what any third-party information, entertainment or location sensitive service provider can offer. However, as witnessed with sha-mail (Ishii 2004), third party content providers can enhance such gratifications further by offering graphical content that increase use of endearing, emotional and experiential content; e.g., emoticons, pictures and sound. If MMS prices approximate those of SMS we may thus see a similar path in Scandinavia. As of now, however, SMS does not appear to be severely disadvantaged with respect to the prevailing type of gratifying contents.

*Process gratifications.* There are two contrasting issues pertaining to process gratifications. On one hand, efficiency and simplicity can be the most gratifying process aspect. However, such instrumentally oriented fulfillments can sometimes be foreshadowed by gratifications derived from

<sup>13</sup> Although there is an indication concerning this, this issue warrants further studies.

<sup>14</sup> Notice that messaging is here considered an inherent and inseparable function of i-mode.

carefully crafting an aesthetically appealing message. Ling's (2004) research provides empirical support: younger users, men in particular, tend to write short messages. The average was 5.54 words for men and 6.32 for women. Women also appear to take more care in crafting messages with appropriate punctuation and capitalization and emoticons were more commonly used by women of ages 13-25. Not only does this signify that women's relatively stronger social interaction skills can be instantiated in messaging (ibid.), but also that women in general receive higher gratifications from advanced messaging. Interestingly, the messaging technologies (MMS and e-mail more than SMS) can support both ends of the simple-complex spectrum. Nevertheless, since the enhanced multimedia capabilities of MMS and mobile e-mail do not compromise process efficiency, their enriched multimedia capabilities can also offer complementary process gratifications for both genders. Importantly, process gratifications gained from crafting own content appear to be larger than process gratifications gained from 'surfing', 'browsing', or 'clicking' the mobile Internet.

*Social gratifications.* Messaging weaves new socio-communicative textures of contextual interaction. Although taking place culturally distinct ways, several commonalities in social gratifications can be identified. In both Japan and Norway messaging is involved in establishing and maintaining relationships. Ling (2004) reports of grooming as well as terminations of relationships via SMS in Norway and Ishii's (2004) research in Japan document that mobile e-mail provides a double fulfillment in both supporting communication of personal feelings while also securing that face-to-face interaction can be minimized. Messaging also fulfills an important role in breaking down barriers between people in the beginning of relationships, help in the transitioning to synchronous communication as well as erect barriers if one party chooses to disengage (Ling, 2004). Although most social gratifications arise from everyday person-to-person communications, i.e. (boy/girl-) friends, spouse, other family members, and peers, the versatility of mobile messaging also introduces hybrid forms of inter-personal communications. This is significant for social gratifications related to the nurturing of group relations as well as for understanding how group forming networks operate. Not only can they scale exponentially (Reed 2001), but they can have a potent effect on the velocity at which messages traverse and how messages bind or unbind people's social ties. Research shows that crafting as well as consuming of messages can take place as a social activity among co-present people, i.e. local social interaction in sharing and reading aloud, passing digital devices around etc. (Ling 2004). Hence, gratifications associated with group membership, feelings of belonging, participation and identity across wider time and space spans are enabled by mobile messaging. Research in Denmark supports this

in finding that independence of time and space (21%), contact with friends and peers (21%) and contact with family members (17%) are top three contributions of mobile service activities (Constantiou et al. 2004). While cultural idiosyncrasies exist, e.g. limited private space as a conduit for messaging success in Japan (Sharma and Nakamura 2004), the freedom of being able to connect socially while simultaneously disconnect from constraints of physical space seem fundamental to social gratifications sought in both geographical areas.

SMS, MMS and mobile e-mail all strongly enable social gratifications. Few details exist if MMS brings social gratifications beyond that of SMS, but the rapid adoption and use of animation, photo and video documented with mobile e-mail in Japan (Nielsen and Mahnke 2003; Ishii 2004) suggest that sending and receiving of aesthetically enhanced content augments social gratifications by offering new content for communication; e.g. interchange of personal recordings and pictures, and moblogging where users post pictures, messages and recordings from mobile phones onto personal Internet pages (Brown 2004). Also, the ability to use 'mail to' and 'web to' type functions and link to content enable new integrations can expand interpersonal communication and the magnitude of social gratifications.

## 5. E-MAIL: AN ARBITER OF DATA SERVICE USE

The differences in specifications in messaging yield different scope in properties and gratifications enabled. Despite striking similarities in properties and gratifications associated with text based messaging, Japan is experiencing greater use of data services and thus greater cultural and social embodiment of additional gratifications. So why does multimedia messaging and mobile Internet use still differ? Our analysis points to e-mail as a killer application enabling evolution in a larger socio-technical configuration.

First, NTT DoCoMo created a integrated solution which did not erect barriers between messaging and content browsing by using de-facto Internet standards (Funk 2001). This promoted seamless service migration and unleashed the power of content and hyperlink-interchange in messaging. A natural connection between data services and mobile e-mail was established as an imperative gene promoting service-synthesis. Mobile e-mail became the killer application gluing together a service-smorgasbord that embodied a broad set of instrumental, aesthetic and expressive properties. Hence, e-mail yielded gratifications *as a whole* beyond any other free-standing data service (e.g news, entertainment etc.) due to its superior aesthetic and expressive service properties and strong baseline ability to provide social gratifications.

Second, the use of e-mail together with packet based technology from the inception of i-mode offered advantages in perpetual connectivity and scalability. A more flexible pricing scheme calculated based upon the size of messages made users not choose either between SMS or MMS price, but based upon the relative gratification perceived during composition and the imagined gratifications of the receiving person(s). In contrast, MMS is offered as a separate service and is charged per message. This forces new acronyms, learning and choices regarding how a service relates to the scripts and meanings currently known instead of evoking “interpretations among potential adopters that are based on adopters’ past understandings and experiences” (Hargadon and Douglas 2001:478).

Third, while consumer oriented cultural explanations (e.g. Baldi and Thaug 2002) are “partly true – but mostly false” (2004:46) institutional and cultural differences in business organization related to wireless services are important. One of the master-minds behind i-mode, Takeshi Natsuno, proclaimed that: “The true mechanism of the great success is that the operator has made a function of coordination of the total value chain” (Sharma and Nakamura 2004). Such organizing sharply contrasts with the more “silver bullet” based vertical orientation adopted by major players in the West. Our analysis suggests that the former approach appears to facilitate horizontal and vertical bridging of specifications and properties as well as an extended line of achievable gratifications.

## 6. CONCLUSION

The rift erected between SMS and MMS breaks down a natural path to extended service use, while the original Japanese architecture promotes an incremental evolution which promote advanced service use through a robust architectural design which is flexible and rigid as well as extensible and simple (Hargadon and Douglas 2001). Smoreda and Thomas (2001) suggested that the Internet and SMS should be brought together in order to “further stimulate the use of SMS”. In applying the framework above we find that e-mail forms the most promising technology to facilitate this bridging. Other messaging services have weaker properties to function as the socio-technical glue binding data services together. The GSM Association recently initiated the “Integrated Messaging Initiative”<sup>15</sup> aiming to create an integrated user experience for SMS, MMS and e-mail. If our analyses hold water, this initiative should be focused on migration towards e-mail.

<sup>15</sup> GSM Association. February 15<sup>th</sup>, 2005. Press release: Integrated Messaging Initiative Will Drive Growth of Richer Messaging Services. [www.gsmworld.com](http://www.gsmworld.com)

However, in being recalcitrant to rock the profits of the SMS juggernaut by following the empirically documented desire for e-mail (Anckar and D'Incau 2002; Constantiou et al. 2004) operators are now inviting new players to the scene. Three million Blackberries with primary functions being e-mail and calendar have been sold in the US in 2004 – a traditionally slow messaging market – and Blackberries are increasingly gaining patronization in Europe (Gibbs 2005). Revenue hungry operators have the opportunity unleash the power of mobile e-mail to grow data service use. But this requires operators, handset providers and content providers to commit to interorganizational revenue sharing and innovation (Kodama 1999; Funk 2001; Mitzukoshi et al. 2001; Baldi and Thaug 2002; Ratliff 2002) so that value creation both at the supply and demand sides become sufficiently lucid and geared towards economies and gratifications of scale.

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