LEAD Project
“Preliminary research on existing and planned mobile data service solutions and value systems in leading markets”

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Contents of presentation

I- Service classification

II- Ideas in each service

III- Final conclusions
I- Service classification

The first distinction that is possible to do is divide services according players involved:

a) Services involving new players of other industries.

b) Services involving old and new players within the industry.
a) services involving new industries

<table>
<thead>
<tr>
<th>Service</th>
<th>New industry involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2M</td>
<td>Electro domestic, cars.</td>
</tr>
<tr>
<td>Browsing</td>
<td>Content providers</td>
</tr>
<tr>
<td>IP Data Cast</td>
<td>TV and radio channels</td>
</tr>
<tr>
<td>Mobile payment</td>
<td>Banks, credit cards</td>
</tr>
</tbody>
</table>
b) services representing new opportunity within the industry.

<table>
<thead>
<tr>
<th>Service</th>
<th>Winners (who get revenues)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PoC</td>
<td>Operator</td>
</tr>
<tr>
<td>Service Discovery</td>
<td>Operator, Content provider</td>
</tr>
<tr>
<td>P2P</td>
<td>Content provider, operator?</td>
</tr>
<tr>
<td>Mobile Email</td>
<td>Operator</td>
</tr>
<tr>
<td>Mobile VoIP</td>
<td>New operator</td>
</tr>
<tr>
<td>Prepaid data</td>
<td>Operator, Content Provider</td>
</tr>
<tr>
<td>DRM</td>
<td>Content provider, operator (MMS)</td>
</tr>
</tbody>
</table>
II- Services’ description

A- Within the industry

1- Service Discovery

• Many models/solutions with its challenges, strengths and weaknesses. No clear tendency.
• Jini and UPnP are popular within players. SLP and Salutation have implementations.
• Anyway, need of interoperability between solution.
• Bridges between: Jini-SLP, Salutation-SLP, Salutation-Lite-Jini, Salutation/SLP- Bluetooth discovery.
- Example of table comparison.
- Developers and interested parties

<table>
<thead>
<tr>
<th>Feature</th>
<th>SLP</th>
<th>Jini</th>
<th>Salutation</th>
<th>UPnP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer</td>
<td>IETF</td>
<td>Sun Microsystems</td>
<td>Salutation Consortium</td>
<td>Microsoft</td>
</tr>
<tr>
<td>License</td>
<td>open source</td>
<td>open license, but fee for commercial use</td>
<td>open source</td>
<td>open (only for members)</td>
</tr>
<tr>
<td>Version</td>
<td>2</td>
<td>1.0</td>
<td>2.1</td>
<td>0.91</td>
</tr>
<tr>
<td>Network transport</td>
<td>TCP/IP</td>
<td>independent</td>
<td>independent</td>
<td>TCP/IP</td>
</tr>
<tr>
<td>Programming language</td>
<td>independent</td>
<td>Java</td>
<td>independent</td>
<td>independent</td>
</tr>
<tr>
<td>OS and platform</td>
<td>dependent</td>
<td>independent</td>
<td>dependent</td>
<td>dependent</td>
</tr>
<tr>
<td>Code mobility</td>
<td>no</td>
<td>yes (Java RMI)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Srv attributes searchable</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Central cache repository</td>
<td>yes (optional)</td>
<td>optional using SLP</td>
<td>yes (optional)</td>
<td>no</td>
</tr>
<tr>
<td>Operation w/o directory</td>
<td>yes</td>
<td>Lookup Table required</td>
<td>yes</td>
<td>–</td>
</tr>
<tr>
<td>Leasing concept</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Security</td>
<td>IP dependent</td>
<td>Java based</td>
<td>authentication</td>
<td>IP dependent</td>
</tr>
</tbody>
</table>
Nowadays. **Who?**

**Japan**: operator. I-mode’s model; official and unofficial CPs.

**Korea**: operators’ portals. Each customer use own operator’s portal (not interoperability). Ex. In games, 85% to CP, 5% to game platform, and 10% to operator (SP).

**UK**: bilateral agreement (e.g. Vodafone/Sony) through operator (via portal or fixed Internet).

Problem of interest: who owns the customer?

**USA**: powerful CPs. Through operator’s portal and CP’s portals. Also through Content Retailer (new entrance Ex. nReach).

Also Sonera’s “Mobile Fun”; software solution.

**XHTML**: interoperability between i-mode and WAP(?).
2- Mobile P2P

- Japan/Korea: not popular. USA: fixed P2P country.
- Survey about the existing fixed P2P system shows that users are ready to pay for the convenience or easiness to find content (music, for example) and the easiness and availability increase the usage of a services (music download).
- This conclusion can be applied to mobile P2P case.
- Mobility is a value in itself. People ready to pay two times more for mobile than for fixed content. Anyway there is a limit.
- Barriers: double charging (charging for traffic and content separately)
- Double charging in the i-mode’s case works (not P2P). But DoCoMo put limit to maximum charge per content. Double charging limits size of content.
“it is possible to develop protocols, which can compete also in wireless systems to lower data tariffs to a similar level per transmitted bit as the current voice tariffs” (Kantola). But if double charging stays, mobile P2P will never be as fixed P2P.

- Locally: possible to exchange larger files (but reduced to known people, not as in the fixed internet).
- Reference solution for big files: not P2P technique.
- Correct usage of resources: Gnutella protocol (dynamic protocol working well with certain topologies).
- Factors: network download, cost of transmission and download time.
- Type of content: Fixed: music. Mobile P2P: group based content (more personalized).

- 2 possibilities:
  - mobile P2P stays with limitations (locally/small content)
  - change of pricing: difficult to deploy. At least cheaper traffic charging.

<table>
<thead>
<tr>
<th>Service</th>
<th>Content Fee</th>
<th>Transmission Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMS</td>
<td>0.39 EUR/message</td>
<td>Free</td>
</tr>
<tr>
<td>Mono ringtones</td>
<td>0.95 EUR/tone</td>
<td>Free</td>
</tr>
<tr>
<td>Polyphonic ringtones</td>
<td>1.21 EUR/tone</td>
<td>Free</td>
</tr>
<tr>
<td>News</td>
<td>Free</td>
<td>Packet fees</td>
</tr>
<tr>
<td>Locator</td>
<td>0.66 EUR/search</td>
<td>Packet fees</td>
</tr>
<tr>
<td>Colour games</td>
<td>4.00 – 4.95 EUR/game</td>
<td>Packet fees</td>
</tr>
<tr>
<td>Symbian applications</td>
<td>0-20 EUR</td>
<td>Packet fees</td>
</tr>
</tbody>
</table>

Sonera’s double tariff
3- Mobile Email

- Not a big deal in Europe
  (ARPU in Europe per messages, € per month per sub)

<table>
<thead>
<tr>
<th>Type of message</th>
<th>2002</th>
<th>2004 E</th>
<th>2006 E</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS</td>
<td>4.04</td>
<td>4.35</td>
<td>3.83</td>
</tr>
<tr>
<td>Short MMS</td>
<td>0.0</td>
<td>0.04</td>
<td>0.36</td>
</tr>
<tr>
<td>Picture messaging</td>
<td>0.01</td>
<td>0.56</td>
<td>0.83</td>
</tr>
<tr>
<td>Instant messaging</td>
<td>0.0</td>
<td>0.09</td>
<td>0.2</td>
</tr>
<tr>
<td>Consumer email</td>
<td>0.0</td>
<td>0.04</td>
<td>0.28</td>
</tr>
<tr>
<td>Corporate email</td>
<td>0.0</td>
<td>0.16</td>
<td>0.44</td>
</tr>
<tr>
<td>Video messaging</td>
<td>0.0</td>
<td>0.02</td>
<td>0.08</td>
</tr>
<tr>
<td>Total</td>
<td>4.46</td>
<td>5.26</td>
<td>6.02</td>
</tr>
</tbody>
</table>

- MMS is separated (short/picture mess.) because of its potentiality of cannibalize SMS).
• **Japan**: mobile Email driver service in i-mode due to a need of cheap messaging (missing of SMS or other messaging type).
• Japan’s Mobile Email; as much ARPU as European SMS.
• Anyway in Mobile email there is more potentiality in business sector.
• ARPU order: -small/medium business
  -small business
  -mobile professional
  -consumers
• In **Europe** MMS-picture messaging is estimated to have more usage and ARPU than corporate mobile Email. Still in near future SMS is the killer application in penetration and ARPU.
• Blackberry for enterprises: anyway a good and profitable business (1.34 million users)
• pricing: usage and flat rate
• Operators offering services where it is not needed to pay for received spams. Spams in i-mode even higher than in fixed Internet.

Players:
• operators (through browsing; i-mode, WAP)
• manufacturers (implementing mobile email solutions)
• software companies also present (Microsoft, Lotus solutions)
• new entrances (RIM Blackberry). Blackberry’s value system doesn’t involve other players.
4- Mobile VoIP

- Special case (both fixed and mobile); decrease ARPU to old mobile operators.
- fixed VoIP has been an opportunity for new entrances in the USA. Not so popular in Europe. Also new entrances in Korea.
- Still technical problems (delay, jitter, packet loss), specially in the mobile VoIP. Problems if there are more than 5 users per hot spot. Regulation: the spectrum problem.
- not always hot spot available.
- mobile VoIP:
  - Japan: IP talk and DoCoMo (3G/Wi-Fi)
  - USA: Pulver innovation with BroadVoice Communication (fixed VoIP operator)
    - Skype’s software
• In Japan DoCoMo doesn’t want to give mobile market to only Wi-Fi phones (new entrances) offering 3G/Wi-Fi phones.
• Nokia also offering Wi-Fi/GSM, but just as another feature. (?)
• with fixed VoIP Korea Telecom reacted emphasizing ADSL rather than competing in fixed telephony.

Value system’s players
• New entrances (‘old’ fixed VoIP players….they don’t loose anything).
• Unclear role of old mobile operators (active/passive).
• Mobile operators don’t like VoIP; it decreases mobile voice revenues.
• DoCoMo; incumbent interested in mobile VoIP.
• Opportunity to emphasize Wi-Fi technology (as Korea’s style)?
Example of Korea’s fixed VoIP case (also the general case)

- FSP. old incumbent. Ex. Korea telecom
- IPTSP: new entrance Ex. Serone IPTSP pays retail charge with volume discount (10-30%) for the aggregation of calls.
- IPTSPs pay and receive settlement charges for originating and terminating calls.
5- PoC

- enabled **Nextel** to differentiate from other operators and reach higher ARPU: value added service (VAS).
- easy technology
- possibility of integrating with other services.
- **MCM** (mobile contact management) service: to manage contacts in terms of presence/availability or location. This enables “friend finder” or interactive mobile games.
- challenge interoperability, interconnection between operators:
- **OMA** standard: main players working
- Clear and settlement system between operators
- If not represent an opportunity to biggest (monopoly factor)
• Europe: willingness to adopt this service is a question mark
• USA: proven willingness
• Asia: in between?
• Pricing: usage (and also flat). Should be lower than normal voice tariff.
• Example of Nextel international (USA, Canada, Argentina, Peru, Brazil and Mexico):
  – USD 0.2/min, USD 20/month
  – combination of USD 5/month and USD 0.1/min

Value system (players):
• **OMA**: Nokia, Ericsson, Motorola and Siemens, as feature (Nokia) or software application (others)
• Operators (offer services).
6-Prepaid data

• Prepaid: is it the weakness of Finnish market?
• Lower in Finland than in other European markets. Korea and Japan also low (5% or less).
• prepaid has proved to be useful in introducing services (voice/data) to unreachable segments:
  - youth customer: with parent’s control or self control
  - occasional user: older, searching for safety
  - credit challenged user: searching for self control
• prepaid: predefined credit limits
  - customer can remain anonymous
  - service viewed as a commodity (present)
  - flexibility: no commitment with SP
• less ARPU
• but less acquisition cost
Reasons:
• youth market: driver of new services (specially data services)
• prepaid cards: possible to focus on new services (In Sweden ‘3’ offers service ‘3Reload’ focused on content services).
• prepaid customer can turn into postpaid (more ARPU)
• avoid revenues leakage (people, who don’t pay their bills)
• reduce cost of transaction (C&B). Critical if transactions increase.
• Solution for m-payment (e-wallet). Also possible to use both e-wallet and phone billing systems integrated.
• Prepaid identified as “driver” for m-payment (according ACR group, 2nd most used way of m-payment).

Problems:
(social)
• anonymous: regulator interested in customers’ data.
• possibility of operators’ abuse (economical)
• transactions: not a big revenues for banks (not interested in it deployment)
• prepaid system need a certain size to be cost effective (~500,000 users)

**Value system** (more details in m-payment)

Ways of prepaid:
• buy to CP through mobile service provider (i-mode)
• direct to CP in a bilateral transaction
• person–to-person. Direct from shop, when buying something bigger (money transfer system needed, agreement between bank, etc).
7- DRM

- Many solutions. OMA’s DRM for super-distribution seems to be prevailing (Nokia, IBM). Standard focused on MMS.
- Example of OMA DRM: BeepScience solution.
- Interesting solution: CR Content Reference. Instead of sending content send a reference of the content.
- First step to super distribution: MMS (client centered)
- network centered super-distribution. Same problems as P2P. Locally can have success.
- important: people acceptance. People don’t want to pay for content freely available in Internet. They will use if it is easy to use; more important usability than 100% security.
Players

- OMA players: Nokia, Panasonic, Real Networks, Samsung and Warner Bros Studios. Also Ericsson, Motorola and Siemens
- New players: BeepScience. Value system example.
Value system:

- **Japan**: operator’s high involvement. DoCoMo and DDI Pocket using already IBM’s EMMS solution.
- **Europe**: manufacturers interested. Also operators control portals.
- **USA**: the “Big 5”. Universal, EMI, BMG, Warner and Sony.
B- Services involving other industries

• 1- IP Data Cast
  • Cost effective technique. It is needed only one stream. (In traditional VoD service it is used one stream per user).
  • Accepted idea: Sweden 70%, Finland 53%, UK 49%.
  • Also DVB-H is even more effective than DVB-T.
  • Digi-TV techniques: Japan (Asia) ISDB-T, Europe DVB, USA ATSC

Source: ITU.
Problems:
- some operators see this service as cannibalization of data
- spectrum allocation (regulations)
- unproven demand (anyway TV is the most seen media).
- other regulations (licenses, etc)

DVB-H v/s DVB-T
- more channels (80-30 instead of 3-5)
- battery limited: ”time slicing” technology to save power.

Using IP Datacast technology to make TV mobile.

MPEG-2 over DVB-T
24 Mbps

IP Datacast over DVB-H
11 Mbps

4-5 Mbps
3-5 TV programs for large screen

128 - 384 kbps
30-80 video streams for small screen
Korea
• DVB: digital video broadcasting, planned via satellite for VoD.
• example of pricing USD 15/month. Traditional streaming method would charge USD 217 for the same amount of video.
• MBSAT satellite with Japan (SK Telecom and Toshiba’s MBCO Mobile Broadcasting Corporation)
• satellite working since 2004, service will be launched in 2007 (estimation)

Japan
• MBSAT satellite.
• unclear legal framework. Operators must get broadcast license.
• Japan Broadcasting (NHK) and five privates planning to launch terrestrial broadcasting in 2005.

UK
• DAB project with Radio channels (British telecom and Digital One)
• Nokia talking with companies to launch a pilot service in autumn (DVB-H)
- UK and Finland: TV licence compulsory (€165/year) when having a TV set. Anyway flat rating. Is mobile phone a TV-set?
- Finland: pilot in Autumn 2004 (TeliaSonera, Radiolinja, MTV, Nelonen, YLE and Digita)
Value systems.
- Who will provide IP Datacasting to end user (operators, channels)?
- There are two approaches: single and double pricing (only to Mobile service provider or both Datacast and Cellular service providers).
- Korea /UK: trend of single pricing.
- Flat pricing. Also usage is possible.
2- Mobile Browsing

• Involvement of new Content providers

I- mode in Japan

• DoCoMo has 60% market share

• success’ factors (apart from cheap messaging possibility):
  -more a service than a protocol
  -cHTML
  -packet billing (not time)
  -portal revenue-sharing model. Low flat prices, revenue mostly from traffic.
  -low internet penetration when launching of service
i-mode’s value system

Unofficial Content Providers
(>53,000)¹
Dating, Chat, Ring-tones, On-line shopping...

Official Content Providers
(Over 2,990 and growing...)¹

9% of content fee

DoCoMo Net

End-user

1) March 2002 figures. Source: www.mobileMMS.com
Europe

WAP 1.0 Where are the phones?
Problems:
• Protocol without a service
• delay
• ineffective billing model: time pricing
• lack of content in WML format
• monochrome interface

WAP 2.0
• Services as Vodafone live!
• improved mistakes: good phones, correct pricing.
• XHTML: integration with i-mode
• similar business model than i-mode
• Value system: operator and portal provider could be the same
i-mode in Europe

- problems at the beginning: slow entrance (launched in 2002)
  - lack of camera
  - lack of MMS
  - unclear pricing model.
  - no known handsets’ brand (now Nokia/Samsung/Siemens)
- users after 1 year: France: 400,000
  Spain: 500,000
- Vodafone live!’s better launching, but now i-mode has 3 million users.
- Now WAP- i-mode integration with XHTML can stimulate generally WAP 2.x class- browsing.
- Def. PDA browsing: Nokia’s Communicator or RIM Blackberry
• Browsing ARPU (€/month/subs) in Europe
• i-mode/WAP 2.0 are the winners
• less ARPU than messaging

<table>
<thead>
<tr>
<th>Browsing type</th>
<th>2002</th>
<th>2004 E</th>
<th>2006 E</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAP 1.x</td>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td>WAP 2.x (and i-mode)</td>
<td>0</td>
<td>0.03</td>
<td>0.11</td>
</tr>
<tr>
<td>PDA</td>
<td>0</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Total</td>
<td>0.12</td>
<td>0.13</td>
<td>0.22</td>
</tr>
</tbody>
</table>
3- M-payment

3 main applications:
• micro-payments
• e-wallet
• PoS transaction

• Main barrier: security.

Europe:
• not expected to generate a lot of revenues in near future.
• More revenues with PoS adoption. ARPU estimations.
• requirement: WAP. Nowadays quite extended in Europe.

<table>
<thead>
<tr>
<th></th>
<th>Korea</th>
<th>Japan</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>e-wallet</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PoS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Micropayment (WAP)</td>
<td>0.02</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>e-wallet (WAP 2.0)</td>
<td>0</td>
<td>0.01</td>
<td>0.13</td>
</tr>
<tr>
<td>PoS (Java)</td>
<td>0</td>
<td>0</td>
<td>0.15</td>
</tr>
<tr>
<td>Total</td>
<td>0.02</td>
<td>0.06</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Players

- Who is Payment Service provider?
  - Banks: SEB
  - Credit card firms: VISA
  - Mobile Operator: Orange
  - Payment start-up: (new entrance) Paybox.
Who provides?

**Europe**

- **New entrances: payment in different shops/stores/parking.**
  - Agreements
    - Paybox (Germany, also UK)
    - Mint (Sweden)
  - Mobile Payment Service Association (operators):
    - Orange/Telefónica/T-Mobile/Vodafone
  - Sonera: some micro payments services
  - Spain: Telefónica “Mobipay”, initiative from authorities (100% of mobile phones and 80% of bank customers).
  - Vodafone/T-Mobile: “m-pay” platform
Korea: cooperation between credit card companies and operators.
- SKT: “Moneta” 1 million users
- KTF: “K-merce” 500,000 users
- LG Telecom “Zoop” growing
- ”SKT’s Network Money” (NeMo) service for making payments and money transfer (PoS)

Japan:
- PIA Corporation: mobile ticketing system.
  DoCoMo:
  - “Felica cards”: for public transportation and tickets (concert)
  - recent e-wallet application (i-mode Felica service)
4- M2M

- SK Telecom’s vision: M2M as 4G. Big potentiality / big risk?
- According Harbor Research Group M2M market is going to exceed 100 million connections (wider concept than users) and USD 700 billions in revenues by 2010.
- Many new players
• In this kind of M2M services it is needed a wide integration between many players.

• Example of house equipment.

• Also end users can pay separately to SP and equipment’s manufacturer (Ex. when equipment is bigger as car, house, etc)

• Key word: integration (of many players)
- General case. Here we can see examples of players, especially in USA/European markets.

<table>
<thead>
<tr>
<th>TECHNOLOGISTS</th>
<th>OEMS</th>
<th>SERVICE PROVIDER</th>
<th>USERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targeted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Korea:

- involvement of Government:
- Government will target the industry of intelligent home networks with USD 213 million of investment from 2004 until 2007. The Korean government hopes to have 10 million homes with intelligent networks by 2007 (61% of households of the country).

- Examples:
- Home networks:
  - control of air-conditioner, refrigerator, washer/dryer and electric gas stove.
  - Samsung’s “Tower Palace”: Samsung is acting as mobile manufacturer, home equipment’s manufacturer and building constructor.
- SK Telecom’s service: leaving video message when door bell rings and subscriber is not at home. Also it is possible to open the door (to NATE subscribers).
- smart card based key in phones to open home’s door. (H2M)
- Navigation service in car. It uses GPS (global positioning system) in cars for LBS (location based service) in cars via CDMA network.
Japan

- Some H2M solutions
- Authentication to mobile phone via fingerprint (DoCoMo’s model F505i).
- Sonic Speaker with Bone conduction technology
- LBS in cars (navigation):
  - Pioneer Corporation’s “Air Navi” provided by KDDI
  - Toyota’s G-Book in model “Will Cypha”. There are plans to expand to other (all?) models.

USA

Just ideas:

- Sensors to measure temperature humidity, etc and actuator operating to activate heating, air conditioning, etc.
- LBS in cars
- Sensor to track products in shops/stores and reduce products’ stealing.
Technically:

- **push strategy**: intelligent device pushes data to remote device. Not expensive.
- **pull strategy**: server pulls data from intelligent device. It enables to “monitor the monitor”. It is more expensive (always on connection).
- **pull/push combination**.

General Problems:

- **customers’ adoption**. Human reluctance in adopting some M2M services; if service makes life more difficult rather than easier.
- **costs**
- **security issues**
III- Final ideas

- missing some services in Finland: e-wallet, M2M, WAP based services.
- M2M: cooperation with other industries critical. Other bigger countries’ advantage.
- Some European rules: SMS, and messaging instead of mobile Email. PoC?

Q: Which is killer application?
A: All are important.

<table>
<thead>
<tr>
<th>Service</th>
<th>In Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepaid</td>
<td>Missing in Finland. Future m-commerce?</td>
</tr>
<tr>
<td>PoC</td>
<td>Nokia’s role. Not sure how the usage will be.</td>
</tr>
<tr>
<td>Mobile Email</td>
<td>In business. For normal customer MMS will be more important.</td>
</tr>
<tr>
<td>Mobile VoIP</td>
<td>No clear plans.</td>
</tr>
<tr>
<td>IP Data Cast</td>
<td>Finland is leading in this service.</td>
</tr>
<tr>
<td>Browsing</td>
<td>WAP 2.0. Needed services as “Vodafone live!”</td>
</tr>
<tr>
<td>M-payment</td>
<td>e-wallet, next step.</td>
</tr>
<tr>
<td>M2M</td>
<td>Some ideas. Anyway not leading market.</td>
</tr>
<tr>
<td>Service Discovery</td>
<td>Possible operators’ role. Nokia developing Jini. Interoperability.</td>
</tr>
<tr>
<td>DRM</td>
<td>Already in some Nokia phones. (OMA solution)</td>
</tr>
<tr>
<td>Mobile P2P</td>
<td>Double pricing to bigger contents.</td>
</tr>
</tbody>
</table>