Aspects of Standardization and Development of RFID technologies (Example of Projects on implementation of this technology in the Republic of Korea)
Content

I. Strategy for USN & RFID Industry

II. Survey for USN & RFID

III. Near Field Communication (NFC)
What is the common characteristics of Successful Technology?
How to Wi-Fi(or wLAN) success?

**Infrastructure**
- Internet, Infrastructure for Wi-Fi, is widely spread in the world

**Technology**
- Wi-Fi provides convenience for accessing to Internet

- Infrastructure gives technology powerful market & consumer
- Technology can not survive only with technical advantage in the market (ex: Wibro)
- In contrast, powerful infrastructure can solve technical problems reported at the beginning stage (ex: NFC)
However, USN & RFID technology

Infrastructure

- Limited existence market
- Limited cooperation with previous technology (ex: Internet)

Technology

- Poor & limited performance compared to other technology

- Needs powerful infrastructure to make its own market
- Infrastructure can be divided into 2 aspects
  - Infrastructure of its own network or facilities
  - Infrastructure which makes USN & RFID technology merged with other business (ex: Smartphone based Services)
Strategy to motivate USN & RFID Industry

- **1st stage**: Widespread of USN & RFID Infrastructure of its own network of facilities
- **2nd stage**: Implementation of basic environment for merging USN & RFID with other business
- **3rd stage**: Qualify its conformance, performance for USN & RFID
Strategy to motivate USN-RFID Industry

- 1st stage: Widespread of USN & RFID Infrastructure of its own network of facilities
  - Korean Government implemented various projects in order to promote USN & RFID business
    - Pilot testbed for smart grid in jeju island
    - Public bike for entire nation
    - Ubiquitous City management system for 10 cities
    - Harbor Distribution System
    - RTLS for searching of missing child
Strategy to motivate USN & RFID Industry

- 2nd stage: Implementation of basic environment for merging USN & RFID with other business
  - USN & RFID system operate as a stand alone system, generally
  - Standardization for interworking between USN & RFID and other network will extend market
Strategy to motivate USN & RFID Industry

- 3rd stage: Qualify its conformance, performance for USN & RFID
  - Verification & Certification for USN & RFID will increase quality of products
  - Customer’s demands will be increased as well as growth of reliability, stability, performance, etc
Content

I. Strategy for USN & RFID Industry
II. Survey for USN & RFID
III. Near Field Communication(NFC)
**Trend of USN & RFID**

**Total Budget 8.6 million Dollar (’08)**

**Budget of World**

**RFID**
- ’09: 52.9
- ’13: 305
- ’18: 665

**USN**
- ’08: 34
- ’13: 276
- ’18: 610

**RFID Applications**

- USA: 1,254
- EURO: 895
- China: 239
- Japan: 187
- Kor: 68

*IDTechEX(2009.3)*

**Status of IRP**

**RFID**
- USA: 60.6%
- EURO: 1.6%
- Japan: 1.4%
- Kor: 24.1%

**USN**
- USA: 35.2%
- EURO: 1.4%
- Japan: 31.7%
- Kor: 31.7%

*RFID/USN Korea Agency(2010)*

**USN-RFID Industry growth will be increased rapidly**
Goal of USN & RFID

RFID/USN World No.3

1st Step ('08~'12)
- World Market: 14%
- 33 million dollar
- employment (32,000)

Market Creation
- Spread of demand
- Demand for B2C
- Compatible with other Projects
- Support for small size company
- Increase of infra

2nd Step ('13~'18)
- World Market 20%
- 211 million dollar
- employment (114,000)

Standardization
- High Quality of Service
- Standardization of RFID/USN for Infra

3rd Step ('18~)
- World Market 25%
- 318 million dollar
- employment (214,000)

Test
- Development of Test method
- Support Real Field Test bed for verification

World Market:
1. Step: 14%
   - 33 million dollar
   - employment (32,000)
2. Step: 20%
   - 211 million dollar
   - employment (114,000)
3. Step: 25%
   - 318 million dollar
   - employment (214,000)

World Market Share:
1. Step: 14%
2. Step: 20%
3. Step: 25%

Support for small size company

Increase of infra

Spread of demand

Demand for B2C

Compatible with other Projects

High Quality of Service

Standardization of RFID/USN for Infra

Development of Test method

Support Real Field Test bed for verification
## USN-RFID Projects

### 2011

<table>
<thead>
<tr>
<th>Division</th>
<th>Title</th>
<th>Institution</th>
</tr>
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<tbody>
<tr>
<td>All Agency</td>
<td>Liquor Distribution Management System</td>
<td>Nation Tax Service</td>
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<tr>
<td>Harbor Distribution Agency</td>
<td>Medicine Distribution Management System for Pharmaceutical System</td>
<td>Hanmi</td>
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<td></td>
<td>u-SCM and registered trademark</td>
<td>Schoolooks</td>
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<td></td>
<td>Global out-sourcing for RFID</td>
<td>The Basic House</td>
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<td>Part Distribution Agency</td>
<td>RFID Collaborative Production -SCM Implementation</td>
<td>HiTek</td>
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<tr>
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<td>U-SCM for semiconductor</td>
<td>Emco</td>
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# USN-RFID Projects

## 2011

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<tr>
<td>Extended project</td>
<td>u-SCM for Steal management</td>
<td>POSCO</td>
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<td>Medicine Distribution Management System for Pharmaceutical System</td>
<td>ILDONG</td>
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<td></td>
<td>Medicine Distribution Management System for Pharmaceutical System</td>
<td>UNI</td>
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<tr>
<td></td>
<td>u-SCM for clothing</td>
<td>D&amp;D</td>
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<tr>
<td>Verified project</td>
<td>Dynamic RTLS system for Harbor Container localization</td>
<td>CJ-GLS</td>
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<tr>
<td></td>
<td>Smart Green Home for Advanced Metering</td>
<td>Ministry of National Territory</td>
</tr>
</tbody>
</table>
Content

I. Strategy for USN & RFID Industry

II. USN & RFID projects in Korea

III. Near Field Communication (NFC)
NFC

◆ Overview

- Communication between electronic devices
- Published by Philips & Sony
- Easy to control & including Security & short range of communication
- Using 13.56 MHz frequency
- Very cheap price for implementation
- Mobile

◆ NFC vs other technology

<table>
<thead>
<tr>
<th></th>
<th>NFC</th>
<th>RFID</th>
<th>IrDa</th>
<th>Bluetooth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-up time</td>
<td>&lt;0.1ms</td>
<td>&lt;0.1ms</td>
<td>~0.5s</td>
<td>~6 sec</td>
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<tr>
<td>Range</td>
<td>Up to 10cm</td>
<td>Up to 3m</td>
<td>Up to 5m</td>
<td>Up to 30m</td>
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<tr>
<td>Usability</td>
<td>Human centric Easy, intuitive, fast</td>
<td>Item centric Easy</td>
<td>Data centric Easy</td>
<td>Data centric Medium</td>
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<tr>
<td>Selectivity</td>
<td>High, given, security</td>
<td>Partly given</td>
<td>Line of sight</td>
<td>Who are you?</td>
</tr>
<tr>
<td>Use cases</td>
<td>Pay, get access, share, initiate service, easy set up</td>
<td>Item tracking</td>
<td>Control &amp; exchange data</td>
<td>Network for data exchange, headset</td>
</tr>
<tr>
<td>Consumer experience</td>
<td>Touch, wave, simply connect</td>
<td>Get information</td>
<td>Easy</td>
<td>Configuration needed</td>
</tr>
</tbody>
</table>
NFC

◆ Characteristics

- Short range communication
  - Association & communication only occur when they are almost attached
- Non-battery mode
  - Usually operates with battery power
  - If device become target, then it can be supplied by host’s magnetic power
- Data rate
  - 106kbps ~ 424kbps
- Previous Infra business
  - Transit card and Electronic payment system
- Security

◆ Differences with HF RFID

- Active mode
- Peer-to-Peer
**NFC**

- **Active mode**
  - Initial Command: Initiator starts communication at selected transfer speed.
  - Host → NFC Initiator
  - Host → NFC Target

- **Passive mode**
  - 1. Initiator starts communication at selected transfer speed.
  - Host → NFC Initiator
  - NFC Target
  - 2. Target answers using load modulated data at the same transfer speed.
NFC

• **Standard**
  – Standardized from ISO/IEC, ECMA, ETSI, ITU, NFC Forum

  – NFC Standard Diagram
NFC

Sony's original standard
Felica™

Chip function
Reader/writer function
Mifare® ISO14443 Type A

Chip function
Reader/writer function
ISO14443 Type B

Chip function
Reader/writer function
ISO15693

Authentication
Bluetooth
Wi-Fi
Wireless USB
P2P

RFID related standard

Data communication

NFC (Near Field Communication) standard

Mobile phone with built in smart card

IC CARD

Mobile phone with built in IC

Reader/writer

Authentication between electronic devices

Wi Fi
WEP / WAP authentication alternative

Bluetooth
"Touch and Pair" (*Hold near (touch)* and pairing)
NFC

• Mobile payment
NFC

• Outdoor Media
NFC

• Peer-to-Peer Communication
NFC

• Set up of communication for other

Bluetooth
NFC

- NFC Market Trend

※ UWB and NearFieldCommunicationsPerfectTogether, Practel, Inc, Jan-09
• NFC Market Trend

- Visiongain(England) says amount of electronic payment with NFC mobile device reach to 145 billion dollar and NFC mobile device will occupy 47% of mobile phone market

- IE Market Research(IEMR) says mobile payment market will increase at 2014 and NFC will occupy 47% of this market
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