









A Study on Construction & Standardization of the Mobile Banking Service based on Financial Chip for the Ubiquitous Banking

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I. Introduction

Objectives and aims

- ✓ Appearance of killer application by digital convergence in finances and carriers
- ✓ Issues regarding various standardization on mobile banking services, based on financial chip
- ✓ Aroused problems about compatibility of ATMs between each bank

✓ Acknowledging main issues by studying cases the overall process of the construction of mobile banking system

✓ The problems and the solutions regarding the standardization

✓ Contributing to the dilutions of infrastructures and services under the digital convergence circumstances

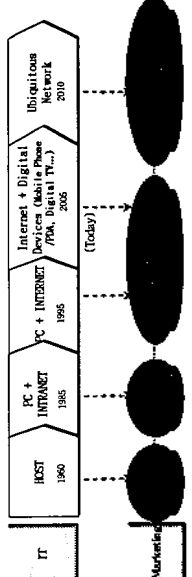
II. Related Research

Development of IT progress by Finance and Carriers

→ As the development of IT progresses, the methods of financial services become diverse and expanded and the conversion from the branches channel to the Internet channel.

→ The channels of "self services" through which the customers realize financial transactions for themselves, are increasing and the branches are focusing more on business marketing.

"Banking is necessary, but banks are not." - Warren K. Gent, II



II. Related Research

Digital Convergence in Finance and Carriers

→ The existing financial business mainly played an important part in sales of financial goods and offline payment services, on the other hand the main business field of the carriers was "voice-based" services.
 → Financial institutions and carriers cooperated in only simple business.

The elements of the past

Convergence area

III. Development of the Mobile Banking based on Financial Chip

1. Key Points of Develop

- 1 Services
- 2 IC Spec.
- 3 IC issuing Infrastructure
- 4 Mobile application and Mobile Server
- 5 ATM's Infrared devices

III. Development the Mobile Banking based on Financial Chip

2. Roadmap

→ First step : Launching basic mobile banking services on March 2004 with SK Telecom
 → Second step : Launching value-added mobile banking services on July 2004 with KTF and LG Telecom
 → Current status : Preparatory steps for non-financial services

1st Step

Basic Mobile Banking Services

- Account balance inquiry
- Account funds transfer
- Credit Card Services
- Withdrawal from ATM

→ Transportation

2nd Step

Value-added Services

- ESep
- Foreign exchange
- Money transfer to overseas
- Dealing in stock

3rd Step

Non-Financial Services

→ Ticketing (Movies etc)

III. Development of the Mobile Banking based on Financial Chip

3. Services

→ Using a hot key on the cellular phone for the Mobile Banking

III. Development of the Mobile Banking based on Financial Chip

→ contents of the new system :

(1) IC issue and validation Infra

(2) mobile VM and mobile banking server (3)ATM's dongle infra

System Configuration

→ The early design is critical because the chips are high-priced items
 → On the stage of the initial designing, the principle must be based on service extension, compatibility with every mobile telecommunications companies, and compatibility with applications that may be added in the future.

	JCOP 18K Combi	JCOP 33K Contact Only
EEPROM SIZE	16K	32K
ROM Masking	VSDC, I-CASH, SEED	NON
OTHER	Support RF	limited the functions of transportation for its contact only type

(Combi type and Contact Only type)

	ROM	EEPROM
VSDC	Mobile Banking 5.8K	
K-CASH	SKT main 5K	
	VSDC 1.2K	
	I-CASH 1.8K	

(Chip Memory)

III. Development of the Mobile Banking based on Financial Chip

→ First step : equipment of issuing card, POC000

→ Second step : terminal equipment, Dummy(In branches)

The First Step

The Second Step

III. Development of the Mobile Banking based on Financial Chip

→ contents of the new system :

(1) IC issue and validation Infra

(2) mobile VM and mobile banking server (3)ATM's dongle infra

System Configuration

III. Development of the Mobile Banking based on Financial Chip

→ contents of the new system :

(1) IC issue and validation Infra

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System Configuration

Section	System	Role
Carrier	Terminal	Providing SIM socket and RFM for implementing mobile banking services
	Mobile Banking Application (M)	UI for terminal equipment and transactions, equipped in the terminal equipment and continuous upgrading.
	OM(Chip Manager) API	providing chip library for convenience reasons, on the stage of developing VM.
	IC Card	Open type GP Card / SIM Type
Bank	IC Applet	Mobile Banking Applet
	OTA/TM Dongle	Built-in mobile ATM for offline transactions -SIM equipped to decrypt bank's account number
	Mobile Banking server	Recognizing full text of the terminal equipment for internet banking server Transaction messages for internet banking server
	validation server	Server for validating the encoding of the secondly issued chip cards and receiving records
HOST		developing the process of mobile banking transactions and managing the DB / managing IC DB

III. Development of the Mobile Banking based on Financial Chip

WIBANK

"NATE" Click

"M" Click

WIBANK

Easy to use

Economy

Safety

Click	Amount of Use (funds transfer)	Call Charges	Security
M Bank	Just 1 click	19 ~ 28 won	Pin / Security Card
WAP Bank	3 click	80 ~ 340 won	Security Card

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III. Development of the Mobile Banking based on Financial Chip

WIBANK (Example of funds transfer)

"M" Click

Info

Main menu

Withdrawal Acct.

Select

Input Password of Acct. & Select Destination Acct.

Security Code

Completion

Alert SMS (Optional)

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III. Development of the Mobile Banking based on Financial Chip

1. Customers

Mobile Banking (sex)

Women 36%

Men 62%

Mobile Banking (age)

Over 60 4%

Under 20 2%

age 30 34%

age 20 21%

age 40 26%

Age 30 ~ 40: 60.5%

Age 20 ~ 40: 84.4%

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III. Development of the Mobile Banking based on Financial Chip

2. Impact on use of the services

- The attribution of mobile banking call phones by financial institutions have reached 1.5 million units, including 0.34 million by W bank (the end of December, 2004).
- The number of transactions processed through mobile banking have increased to 2 million per month and its amount of money transfer to 228.4 billion.

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IV. standardization issues

- Issues about standardization of financial chips and compatibility of CD/ATM
- Issues about standardization of mobile IRFM and Dongle
- Mobile platform standardization

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IV. standardization issues

Two type of forms in regard of financial chips exist in domestic banks (the forms are stated as type A and B)

When using the ATM, the spec of sending card information and encryption method are not compatible.

Type A	Type B
FCI	PN
Customer Info	GET, A, P, Z, D
Cash Card	Main Acc
ATM KEY	Acc
Mobile Acct	Customer Info
To Acct	To Acct
IB Info	Transfer Info
	Log

Type A	Type B
Cash Card	Track III (107 B/yr)
Security	SEED
Adoption Bank	14 Banks
	4 Banks

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IV. standardization issues

ATM compatibility among domestic banks

differences in location for decryption

differences in method for encryption

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IV. standardization issues

3. Proposal

The following proposal is based on the study on easy-to-develop, cost, security and services

proposal : (1) standardization based on type A
 (2) alternative plan against the existing type B

in the case of adopting the type A, duplicated development is not necessary as the financial IC coincides with the system

in case of the type A, the key is located in Host therefore linking connection for any leakage of validation keys is not difficult. On the other hand, in the case of type B any modification of keys is difficult as it is located ATM.

The type B is more convenient to use than the type A, more possible to use the side key.

For the type A, SAM is located in HOST, but the type B need to install SAM module for 3-DES at each ATM.

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IV. standardization issues

5. standardizing credit card spec.

→ credit card standard : SKI - VSDC / KIT & LOT - Harex type (Korea Domestic Company)
 → The standardization of credit card is also necessary to effectively use the limited chip memory.

W BANK		N BANK	
VSDC (Credit Card)	K-CASH	VSDC (Credit Card)	SKI_Mem.
	ROM		ROM
Mobile Banking	SKT_Mem.	Mobile Banking	Harex (Credit Card)
	EEP ROM		DATA
	DATA		

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V. Results and Recommendations for Future Research

Results

- ✓ Mobile banking service which is based on financial chip meets its growths :
 - quantitative growth : popularizing the mobile-banking phones
 - qualitative growth : increasing the number and the amount of transaction
- ✓ The main issues about building up mobile banking service is identified by case research, and the important issue is derived.
 - ✓ The research contributes to standardization of domestic mobile financial industry and to diffusion of customers access.
- ✓ Convergence in finances and broadcastings is ongoing after that in finances and carriers.
 - ✓ To establish early standardization system about T-Commerce, the convergence in finances and broadcastings
 - ✓ To propose research, embodiment and standardization of U-banking model on basis of IC chip, on united condition of finances, carriers and broadcastings.

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VI. Overview of ongoing Research

Ongoing Research

- ✓ By the boost of mobile banking services, the infra of mobile commerce is expanding but there is few way to evaluate the customers' subjective satisfaction and usability.
 - ✓ There are various traditional methodologies but it is not suitable on the condition of mobile commerce. Therefore new methods for the evaluation are required.
- ✓ The method to measure the subjective satisfaction and usability is a new field of study under the circumstance of mobile commerce.
 - ✓ To analyze and research about the existing methodology for evaluation and to develop a method about the evaluation of mobile commerce by adequate category addition.

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VI. Overview of ongoing Research

Ongoing Research

- ✓ To achieve the next two goals by applying new methodology on basis of mobile banking service base on chip.
 1. To prove the methodology to be reliability and validity by the statistical verification.
 2. To analyze the situation and to draw the improvement by measuring the satisfaction of users at each category of mobile banking service.
- ✓ Literature review about fifteen kinds of methodology (QUIS, SUMI, PQUEU, SUS, WAMMI, CUSO, etc.)
 - ✓ Research about the definition of usability (ISO9241, ISO3146, Shackel, Nielsen, etc.)
 - ✓ Development of methodology and pilot test (groups of experts e.g. financial institutions, telecommunication companies, SW engineering companies, etc.)
 - ✓ Implementing a survey for users of mobile banking.
 - ✓ Statistical verification

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